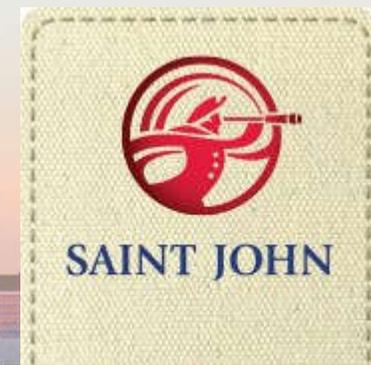


# City of Saint John Community GHG & Energy Action Plan



January 2019

Realised with the



Consulting team



Financed by



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**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 **City of Saint John** 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.

#### **Saint John 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
- ✓ City of Saint John, NB, Saint John City Market energy upgrades, 2018
- ✓ Our Saint John, Integrated Community Sustainability Plan, 2009



***In addition to the Corporate GHG Action Plan, the Community GHG & Energy Plan 11 is the UMN B CCEI second foundation stone. The Plan brings a powerful and dynamic tool to help communities for smart and sustainable development allowing to reduce its carbon print.***

***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 UMN B 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.*

## II. THE PLAN'S STRATEGY

### ***Vision***

The vision of the Plan is to achieve a community that is efficient and economically viable in how it reduce its carbon footprint, uses energy through development and retrofits, land use and transportation planning, renewable or clean energy generation, conservation and 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 industry.**
- 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, Saint John Energy programs, etc.
8. Create a competitive and economic advantage for the Community
9. Demonstrate global leadership

### **GHG Emission Reduction Target**

**9% for 2025 and 18% 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 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.

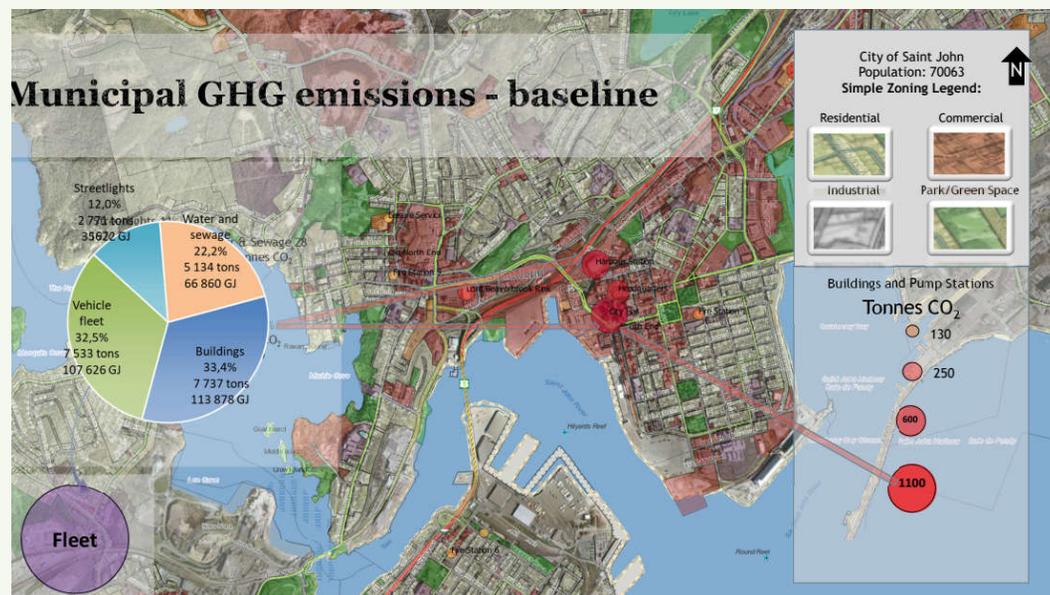
## III. THE COMMUNITY'S PROFILE

**The City of Saint John** is located in southern New Brunswick, in the County of Saint John, of which it is the chief City. Saint John is 415 kilometers west-northwest of Halifax, 915 kilometers east of Montreal and 650 kilometers northeast of Boston. Located at the mouth of the Saint John River on the edge of the Bay of Fundy, the City, with its port, occupies an important place in the economy of the Maritimes. Saint John is the oldest incorporated municipality in Canada and the second largest City in New Brunswick after Moncton.

The population of Saint John in 2016 was 67,575 inhabitants spread over an area of 315.96 km<sup>2</sup>, a density of 213.9 hab./km<sup>2</sup>. It experienced a population decrease of 3,6% from 2011 to 2016. The City had 33,801 private dwellings in 2016, of which 30,208 were occupied by full time residents. 81% of dwellings were built before 1991.

The official languages spoken by the Saint John population are 86% English, 0,15% French, and 13% both French and English.

PICTURE 1: SAINT JOHN'S MAP



## III. THE COMMUNITY'S PROFILE

**Saint John's** dedication to excellency and to be a social leader in New Brunswick and in Canada is well illustrated by the number of awards received through the years.

### **Awards for City &/or Its Amenities**

**2017 - 20 of the Most Beautiful Canadian Cities to Live In, Slice.ca**

**2012 - Top 7 Intelligent Communities Award, Intelligent Communities Forum (ICF)**

**2010 - Cultural Capital of Canada Designation, Government of Canada, Canadian Heritage and Official Languages**

### **City Organization & Services**

**2017 - Showcase Award for Engineering Excellence, Assoc. of Consulting Engineering Companies –NB (ACEC-NB) – Spruce Lake Barge Facility**

**2016 - CAMA Willis Award for Innovation, Canadian Association of Municipal Administrators (CAMA) - One Stop Development Shop**

**2016 - Laserfiche Run Smarter® Award - Best Records Management category**

**2014 - URISA Exemplary Systems in Government (ESIG) Award, Distinguished System/Single Process System – Zone SJ Map Viewer**

**2013 - Community Recognition Award, Province of New Brunswick – Saint John Municipal Energy Efficiency Program (MEEP)**

**2013 - Premier's Award for Energy Efficiency, project - Commercial New Construction, One Peel Plaza,**

**2012 - Willis Award for Innovation, Canadian Association of Municipal Administrators (CAMA) – Plan SJ**

**2012 - Showcase Award for Engineering Excellence, Assoc. of Consulting Engineering Companies –NB (ACEC-NB) - Eastern Wastewater Treatment Facility**

**2011 - Premier's Award for Energy Efficiency, project - Commercial New Construction, Saint John Transit**

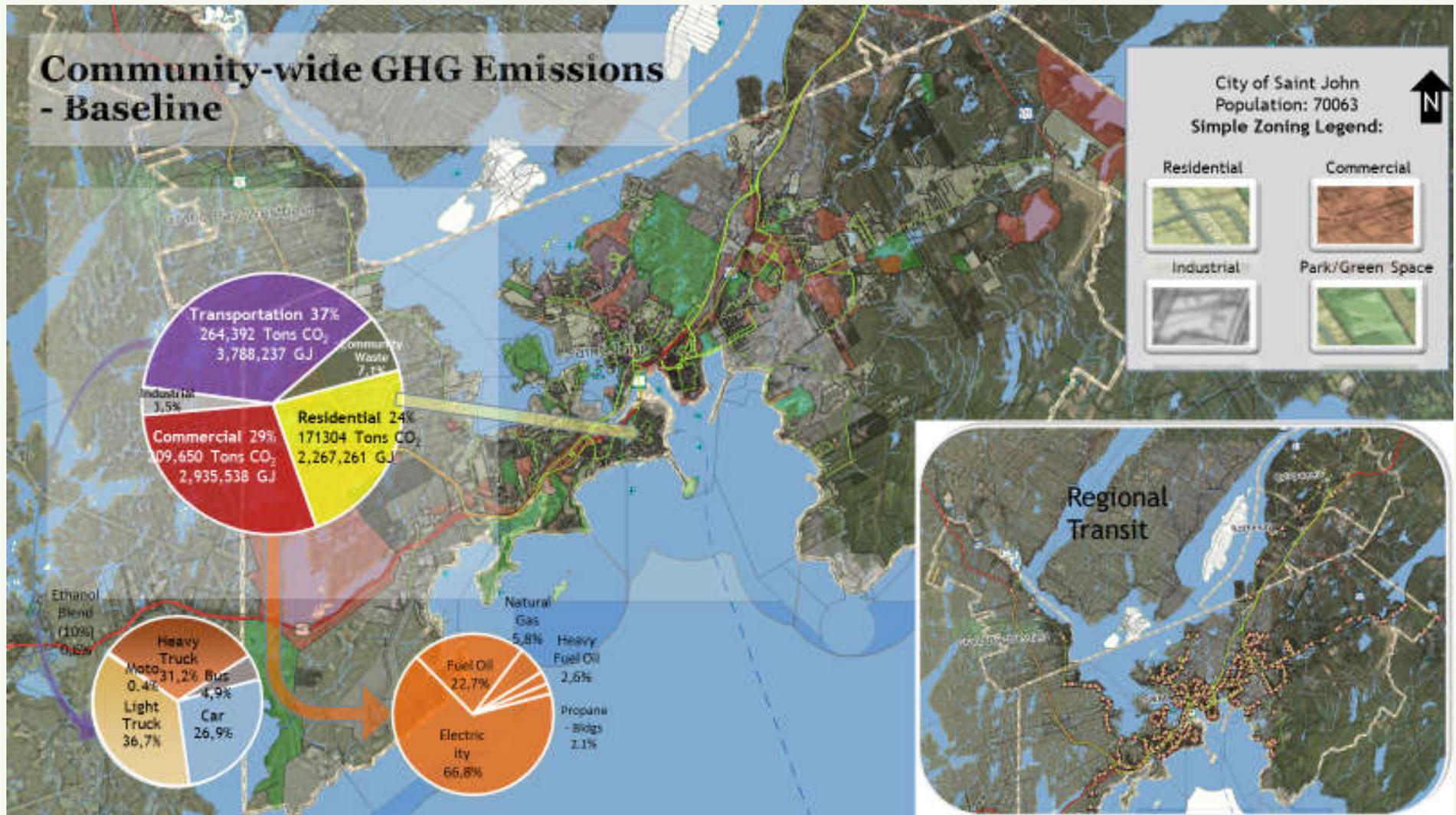
**2011 - Premier's Award for Energy Efficiency, Energy Efficiency Champion - Commercial Sector, City of Saint John**

**2010 - Milton F. Gregg Conservation Award, Conservation Council of New Brunswick – Saint John Sustainable Energy Management Team**

**2008 - Federation of Canadian Municipalities (FCM)-CH2M HILL Sustainable Community Award, Energy - Saint John Municipal Energy Efficiency Program (MEEP).**

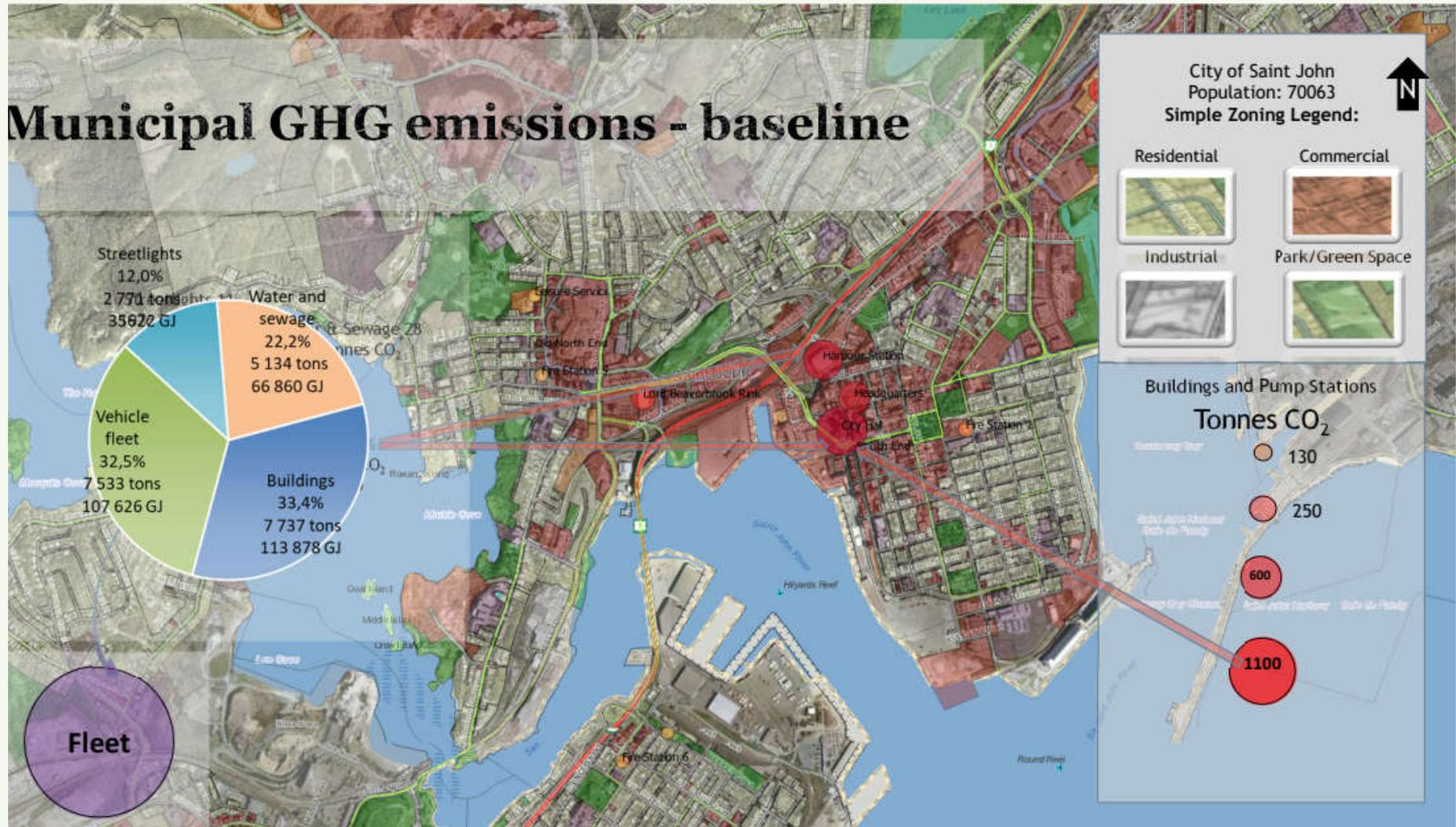
## III. THE COMMUNITY'S PROFILE

PICTURE 2: SAINT JOHN'S GHG COMMUNITY EMISSIONS MAP



## III. THE COMMUNITY'S PROFILE

PICTURE 3: SAINT JOHN'S GHG MUNICIPAL EMISSIONS MAP



## III. THE COMMUNITY'S PROFILE

PICTURE 4: SAINT JOHN TRANSIT REGIONAL SERVICES



*The Saint John Transit Commission* was established in 1979 to provide scheduled transit service to the city. It is the largest public transit system in New Brunswick in terms of both mileage and passengers. Ridership on Saint John Transit's system is about 2.1 million passengers per year.

*Saint John Transit's ridership is approximately 50 percent higher than the average for Canadian cities with a population of between 50,000 and 150,000.*

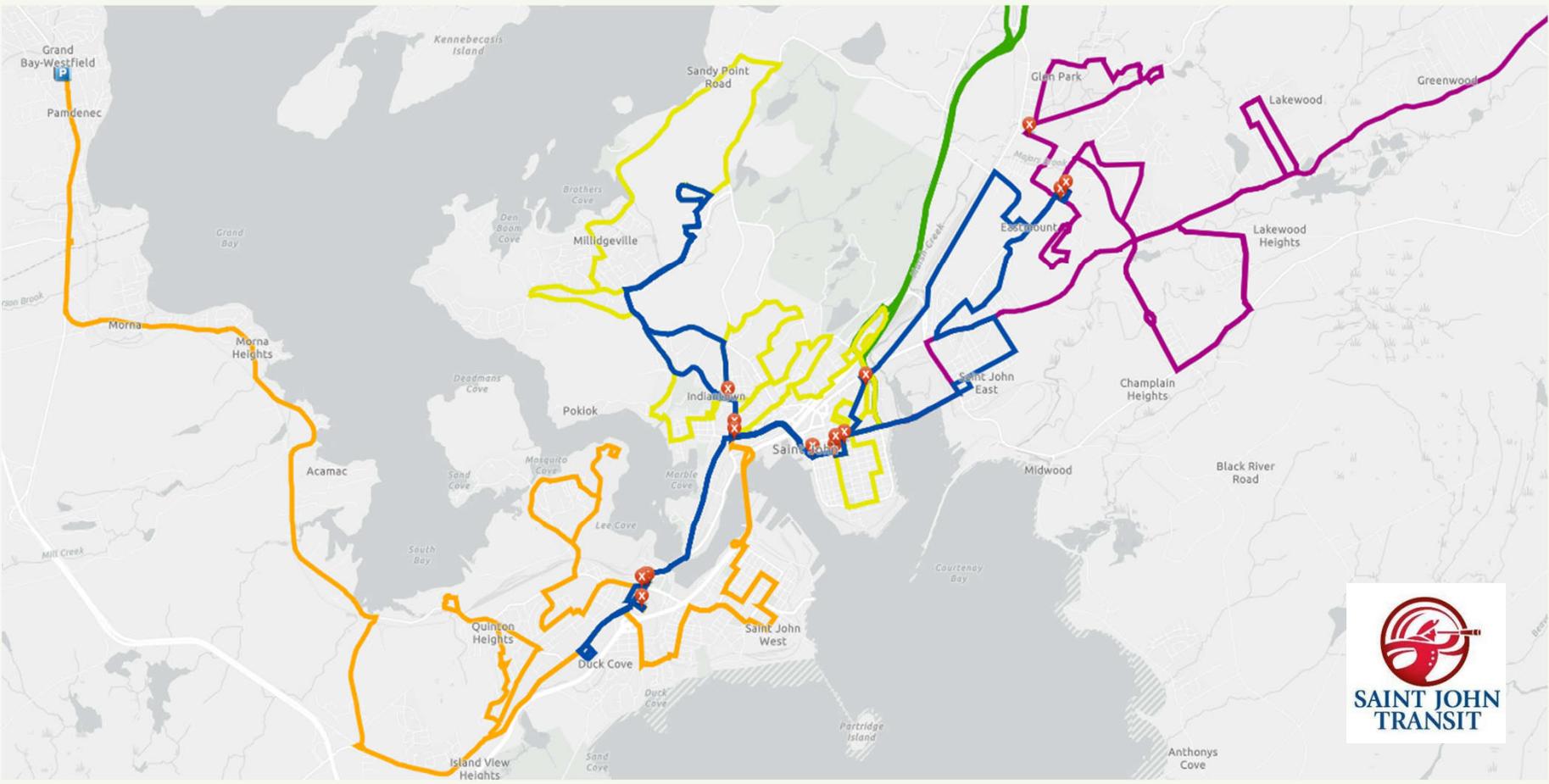
*Governed by a Commission, Saint John Transit is dedicated to high standards of customer service through innovative programs and commitment to the community.*

### **Demographics**

- ✓ *Saint John has had public transit since 1869.*
- ✓ *Seven day-per-week service—29 separate workday routes—covers every area of the city, including high-traffic areas (Uptown and East side, university and hospital service).*
- ✓ *Routes cover approximately 515 kilometers of city streets.*
- ✓ *Ridership on Saint John Transit is about 2.7 million passengers per year; the highest in the province.*
- ✓ *Saint John Transit is currently experiencing a significant increase in passenger levels.*
- ✓ *Saint John Transit receives about 50 percent of its operating costs from the fare box, which makes it one of the most self-sufficient services in Canada for cities of similar size.*

## III. THE COMMUNITY'S PROFILE

PICTURE 5: SAINT JOHN TRANSIT ROUTES



## III. THE COMMUNITY'S PROFILE



*Saint John Energy (SJE) is 100% owned by the City of Saint John, and accountable to 36,400 residential, commercial and industrial customers for reliable service at rates that are among the lowest in the region.*

*SJE owns and operates the electricity grid and serves all connected customers and also provides energy services including the installation, maintenance, and rental of electric hot water heater units and mini split heat pump units. On average, residential rates are 10% lower and commercial rates are 3% lower than other utilities in New Brunswick. This is due in part to an excellent relationship with NB Power, the supplier of wholesale electricity.*

### **Facts**

- ✓ 36,400 customers
- ✓ 94 full-time employees
- ✓ 760 km of distribution line (590 overhead & 170 underground)
- ✓ 22,000 poles
- ✓ 13 substations

## III. THE COMMUNITY'S PROFILE

**Environment, Saint John Energy** continuously works to reduce environmental footprint and help customers do the same through energy conservation. In 2017, SJE achieved all environmental objectives and targets with 100% environmental regulation compliance. SJE also updated its Environmental Management System to the ISO 14001:2015 Standard. And 2018 marks the 20th year that Saint John Energy operations have been certified as meeting this internationally recognized standard of environmental performance.

SJE has over 9,300 smart meters in-market. Saint-John Energy's award-winning Energy Star Most Efficient rated mini-split ductless heat pump rental program, established in 2016, was the first of its kind in Canada and now provides over 3,200 customers with safe, efficient and affordable home heating.

**Energy conservation** is a key priority for SJE who not only encourage customers to reduce and conserve energy, but continuously looks for ways to do so within its operations. The utility actively finds ways to reduce overall costs and to benefit its customers. One of these many initiatives was installing LED street lights, which not only last longer and require less maintenance, but are more energy efficient.

SJE is founding member of Sustainable Saint John, a grassroots program dedicated to advocacy, education and engagement on environment-related initiatives through a network of like-minded, local organizations.

In 2018, SJE developed a Smart Grid Roadmap with the aspirational view to provide state of the art enhancements to its electricity distribution grid which will maximize energy efficiency, provide environmental benefits, enhance system operations, contribute to the regional economy, and induce customer participation. Following the Smart Grid Road Map, SJE developed a framework to support the Community Energy Plan . This framework sets forth to quantify general targets and timelines, and to identify a number of specific initiatives.

### **Managing Peak Demand and Smart Grid**

- Smart Grid Roadmap and smart Grid demonstration projects
- Operational efficiencies from smart grid projects
- Peak demand reduction projects

### **Exploring Renewable Generation Projects**

- Embedded renewable energy projects – solar PV and wind energy

### **Increasing Efficient Consumer products**

- Mini-split heat pump rental program
- Water heater rental program
- New energy efficient products and energy-saving initiatives
- Electric Vehicle residential charging units

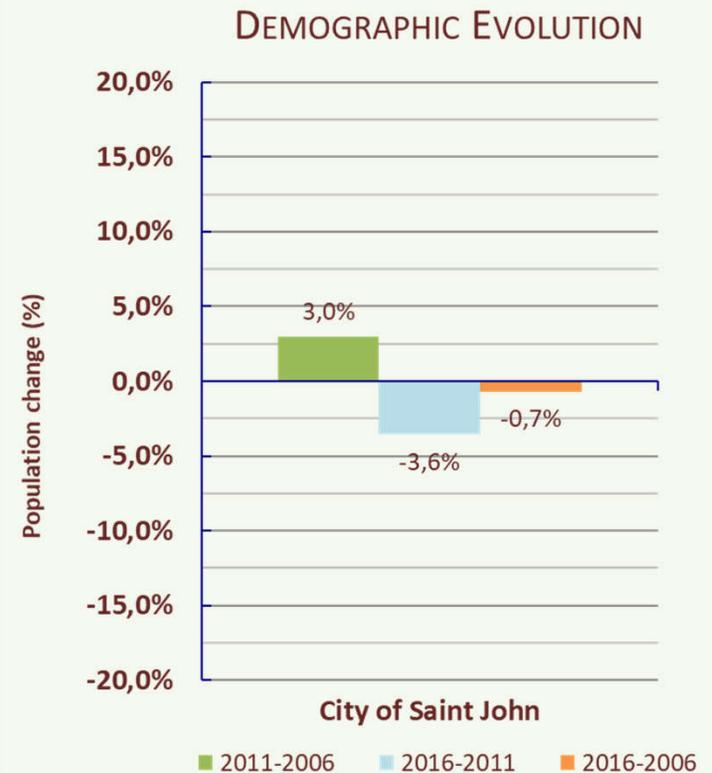
**SJE's Plan aims to integrate renewable energy generation to the system, to decrease energy demand, and to increase overall energy efficiency.**



## III. THE COMMUNITY'S PROFILE

### Challenges

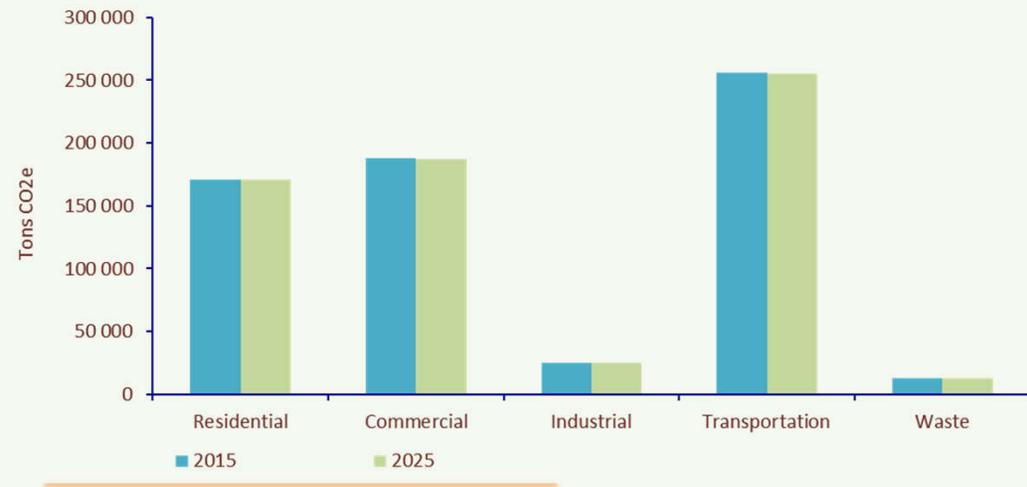
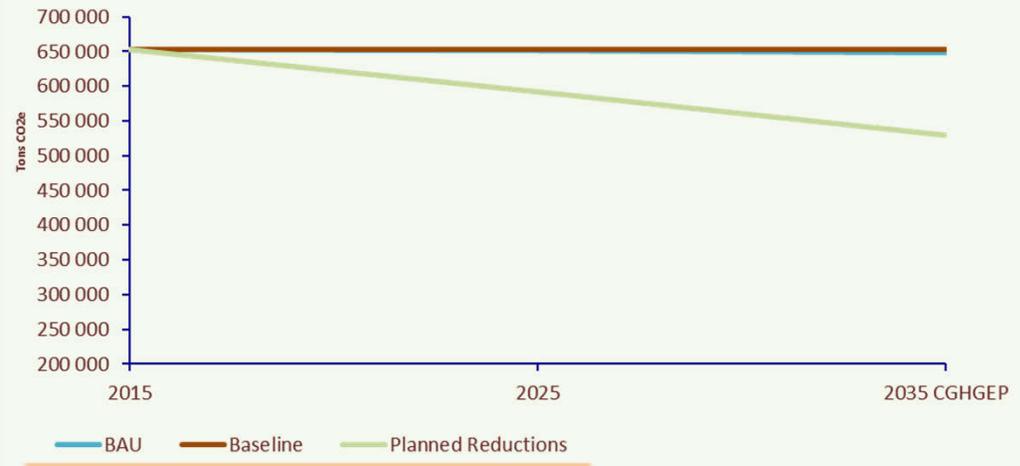
- ✓ The City of Saint John and its community are facing challenges related to population decrease: almost 4% between 2011 and 2016.
- ✓ For the City, while its responsibilities and expenses remain similar or increase, tax and other incomes are decreasing in time. However energy needs are difficult to curb down.
- ✓ In the last 3 years, but also prior to 2015 with the Municipal Energy Efficiency Program (MEEP) adopted in 2008, many actions (called the Early Actions), reflected in the Corporate GHG Action Plan, were taken to reduce energy consumption and had significant positive impacts on the GHG emission reduction.
- ✓ For the Community, to curb down energy consumption and GHG emission, investment will be needed to help citizens to adopt cleaner and more efficient equipment.
- ✓ To provide regional services to growing neighborhood municipalities impacts energy needs and community GHG evolution.
- ✓ The main challenge for Saint John, the City and its Community, is to find solutions to reduce energy consumption, to produce clean energy and imperatively generate income as well as a good return on investment.



# Community GHG & Energy Action Plan

## III. THE COMMUNITY'S PROFILE

The business as usual scenario anticipates that, apart from the present action plan reduction, the level of the community GHG emissions will decrease by 0.7%. This action plan is expected to bring them down by 9% in 2025 and by 18% in 2035.



### A. THE PLAN

**The Plan aims to help Saint John and its Community to face main challenges.**

- **Reduce dependency on fossil energies**
- **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 15% clothes line usage
  - Promote energy efficient technologies:
    - a. LED lighting to replace 60% all lights in the community
    - b. 6 000 commercial and industrial consumers to reduce their electricity use by 10% (Target set by Saint John Energy)
    - c. At least 15% of residential consumers to improve their non-electrical energy efficiency for an average of 10%
    - d. At least 20% of commercial and industrial consumers to improve their non-electrical 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

### A. THE PLAN (CONTINUED)

- **Implement low capital project & strategy to generate good return on investment overcome tax income stagnation**
- **Generate income with local renewable energy production:**
  - A. District Energy
- **Support and collaborate with Saint John Energy to achieve their 6% renewable energy production target**
  - A. Solar Farms – PV
  - B. Wind Turbine Farms
- **Diversify transportation alternatives by supporting public transit services**

### ***Saint John Energy – Supportive Community Energy Plan 2019 in support of The City of Saint John***

***Targets and Initiatives*** The general targets for the SJE's Energy Use Effectiveness Plan are:

***1. Increase SJE's annual system load factor from 71% to 75% by 2025.*** An increase in system in load factor will result in a lower energy demand during peak times, and more smooth energy usage throughout the day. The reduction of peak power demand will improve total system operations, reduce stress on electricity delivery assets, and displace high-cost emitting generation during peak times. The load factor target will be achieved through several demand response initiatives such as the development of demand prediction algorithms, managed energy storage assets, smart dispatchable assets, conservation voltage reduction, and fleets of controllable energy loads.

➤ **Target Demand Reduction of 25 MW, and t/yr of 1,170 t/yr GHG.**

***2. Offer products that allow customers to reduce energy by 10% by 2025.*** Reducing customers' energy usage will result in less generation production, less greenhouse gases overall, and lower costs to the end users. The load reduction targets will be achieved by installing more efficient energy products in bundles at customers' homes – e.g. mini split heat pumps, ultra high efficiency hot water heaters.

➤ **Target Energy Reduction of 9,400 MW/yr, and 2,632 t/yr of GHG**

***3. Provide infrastructure to allow for the integration of embedded renewable energy resources of 6% of SJE's total energy needs by 2025.*** The integrated renewable energy assets will be predominately wind energy projects and utility-scale solar PV plants. SJE plans to accommodate the first wave of renewable energy projects by 2022, and have a connection-ready process and system by 2025 for additional larger projects. The renewable energy generated will displace emitting generation in the system and reduce greenhouse gases.

➤ **Target Vehicle conversion of 20, and 60 t/yr of GHG.**

(continued)

### ***Saint John Energy – Supportive Community Energy Plan 2019 in support of The City of Saint John***

**Targets and Initiatives** *The general targets for the SJE's Energy Use Effectiveness Plan are:*

**4. Provide initial pilot installations for residential EV chargers for 20 vehicles by 2025.** *The pilot installations will be part of the overall Community Program, which will consist of the provision of several public electric vehicle ("EV") charging stations as well as the introduction of a residential home charger rental program. The use of electric vehicles will reduce combustion emissions and greenhouse gases. This target is consistent with NB Power's province-wide target for EV chargers.*

➤ **Target Vehicle conversion of 20, and 60 t/yr of GHG.**

**5. Increase SJE's system operational efficiency by 2% by 2025.** *The modernization of the grid will result in operational efficiencies utilizing more efficient transformers, and upgrading the electrical infrastructure. This will result in more streamlined power flow and lower distribution losses.*

➤ **Target losses reduction of 24 mWhr/yr and 6.75 t/yr of GHG.**

**6. Increase SJE's operational productivity by 2% by 2025.** *Implementing state of the art grid information systems will result in increased operational productivity such as lowering downtime, reducing windshield time for operational crews, decreasing maintenance timelines and costs, and providing more efficient customer service. These efficiencies will be derived by the use of several smart informational technologies, such as AMI, GIS, Self-Healing Networks, Intelligent Fault Indicators and Smart Sensors throughout the system.*

**AMI infrastructure will eliminate 2 maintenance vehicles from the SJE fleet.**

➤ **Target Vehicle elimination of 2, and 6 t/yr of GHG.**

### 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		
<b>R 1 LED lighting</b>		
1 Annual activity review report		Status, project implementation development
<b>R 2 Energy efficiency (Residential buildings)</b>		
1 Annual activity review report		Status, project implementation development
2 Monitoring activities		GHG & GJ reduction evaluation
<b>R 3 Clean Energy Conversion</b>		
1 Annual activity review report		Status, project implementation development
2 Monitoring activities		GHG & GJ reduction evaluation
<b>R 4 Energy efficiency - Residential - Clothes Line Program</b>		
1 Annual activity review report		
2 Annual activity review report		Status, project implementation development





### B. THE STRATEGY (CONTINUED)

Transportation		
<b>T1</b>	<b>Electric Vehicle Community Program</b>	
1	Annual activity review report	Status, project implementation development
2	Monitoring activities	EV purchase information
<b>T2</b>	<b>Idle-free Policy</b>	
1	Annual activity review report	Status, project implementation development
	Branding operation & policy revision Drive through	
<b>T3</b>	<b>Fuel-efficient driving</b>	
1	Annual activity review report	Status, project implementation development
<b>T4</b>	<b>More efficient &amp; compact vehicles</b>	
1	Annual activity review report	Status, project implementation development
	Branding operation	
Local Renewable Energy Production		
<b>RE 1</b>	<b>District Heating</b>	
1	Annual activity review report	Status, project implementation development
2	Monitoring activities	GHG & GJ reduction evaluation
3	According to potential volume - Carbon Credit Registration process: Year status, registered credits, etc.	
<b>RE 4</b>	<b>Hydroelectricity - Turbine</b>	
1	Annual activity review report	
2	Monitoring activities	Status, project implementation development
3	According to potential volume - Carbon Credit Registration process: Year status, registered credits, etc.	

**COMMUNITY GHG INVENTORY**

## V. THE INVENTORY

The City of Saint John 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.

Saint John'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 City of Saint John. The relevant additional elements are detailed in the appendices.

### A. SUMMARY

The community component consists of five emission sectors. For Saint John, the total emissions of the community is approximately 653 152 tons of CO<sub>2</sub> equivalent. Most of these came from transportation that is 39.3%. Commercial generated 28.8% of emissions, residential 26.2%, industrial 3.8% and finally 1.9% of emissions are attributed to the community waste.

The Community, with its 67 575 inhabitants has a per capita emission rate of 9.7 tons of CO<sub>2</sub> equivalent.

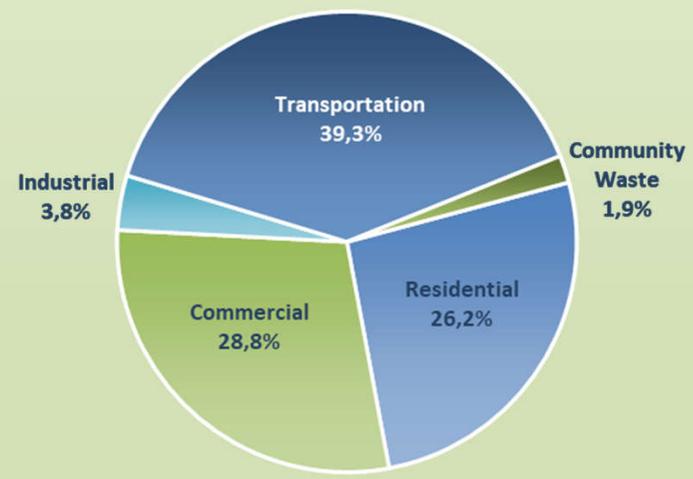
TABLE 1 :

COMMUNITY GHG EMISSIONS FOR THE BASE YEAR

GHG (tons eCO <sub>2</sub> )	2015
Residential	171 288
Commercial	187 917
Industrial	25 020
Transportation	256 393
Community Waste	12 534
<b>Total</b>	<b>653 152</b>
Population	67 575
GHG per capita (teCO <sub>2</sub> )	9,7

GRAPH 1 :

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



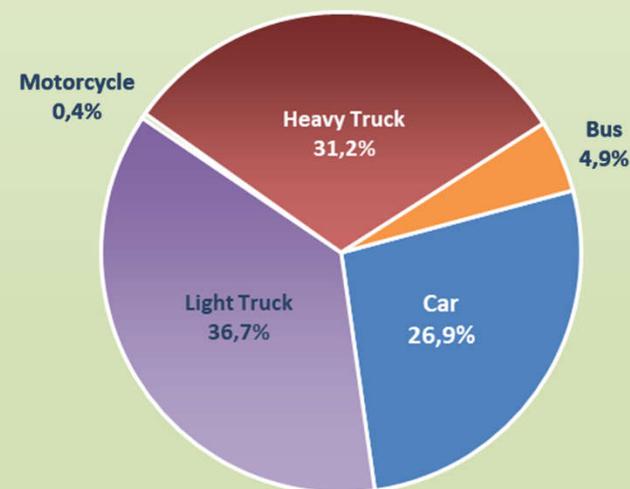
### B. TRANSPORTATION

For the year 2015, the Saint John community had 56 795 vehicles numbered on its territory. With 256 393 tons of eq. CO<sub>2</sub>, the transportation sector is responsible for a large part (39.3%) of greenhouse gas emissions of the community (see Graph 1). Emissions from the sector come from five (5) subclasses; light truck because of their large number, form the category that generates the most emissions from GHG, with 36.7% of the total sector. Heavy Truck is in second place with 31.2%, follow car 26.9%, bus 4.9%, and finally motorcycle with 0.4%.

**TABLE 2 :**  
TRANSPORTATION GHG EMISSIONS BREAKDOWN  
BY VEHICLE TYPE (teCO<sub>2</sub>)

Vehicle Type	2015			
	Number	%	(teCO <sub>2</sub> )	%
Car	27 377	48,2%	69 015,5	26,9%
Light Truck	23 982	42,2%	94 107,6	36,7%
Motorcycle	1 910	3,4%	907,1	0,4%
Heavy Truck	3 304	5,8%	79 913,6	31,2%
Bus	222	0,4%	12 449,0	4,9%
<b>Total</b>	<b>56 795</b>		<b>256 393</b>	

**GRAPH 2 :**  
TRANSPORTATION GHG EMISSIONS BREAKDOWN  
BY VEHICLE TYPE (teCO<sub>2</sub>)



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

In 2015, an estimated 384 225 tons of eq. CO<sub>2</sub>, greenhouse gas emissions from come from Saint John’s residential and industrial, commercial and institutional (ICI) sectors. Electricity gets noticed as first source of GHG emissions with 267 538 tons of eq. CO<sub>2</sub>. Fuel oil and natural gas assume 80 787 and 19 770 tons, heavy fuel oil and propane emit 9 306 and 6 825 tons eq. CO<sub>2</sub>.

TABLE 3 :

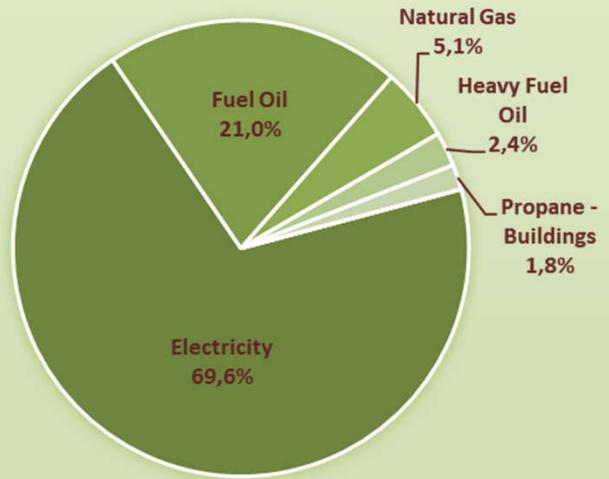
COMMUNITY GHG EMISSIONS AND ENERGY CONSUMPTION BY TYPE

Energy	2015		(teCO <sub>2</sub> )	%	(Gj)	%
	Volume	Units				
Electricity	955 491 860	kWh	267 538	69,6%	3 439 771	65,8%
Fuel Oil	29 536 412	Liters	80 787	21,0%	1 146 013	21,9%
Natural Gas	10 391 032	m <sup>3</sup>	19 770	5,1%	407 744	7,8%
Diesel - Buildings	-	Liters	-	-	-	-
Heavy Fuel Oil	2 958 875	Liters	9 306	2,4%	125 752	2,4%
Propane - Buildings	4 420 006	Liters	6 825	1,8%	111 870	2,1%
District Energy	-		-	-	-	-
<b>Total</b>			<b>384 225</b>		<b>5 231 150</b>	

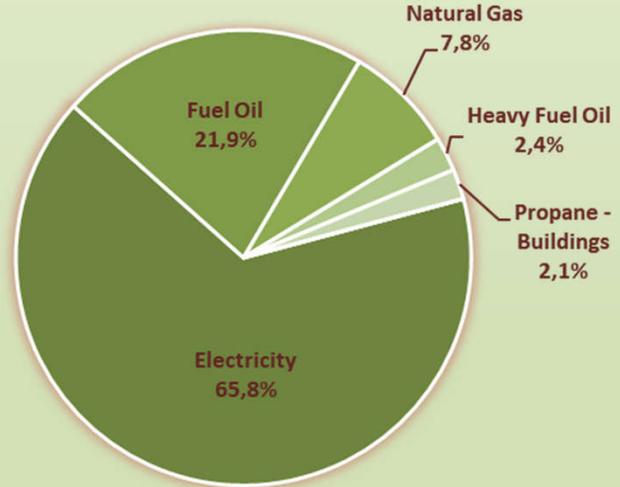
### C. Industrial, Commercial and Institutional Buildings (ICI) (continued)

Electricity produces 69.6% of the sector's emissions and meets 65.8% of the Saint John Territory's energy needs for the residential sector and ICI. Fuel oil, natural gas, heavy fuel oil and propane accounted for 21.0%, 5.1%, 2.4% and 1.8% of greenhouse gases, respectively, and together they 21.9%, 7.8%, 2.4% and 2.1% of their energy demand in their sectors for the Saint John community.

**GRAPH 3 :**  
RESIDENTIAL AND ICI GHG EMISSIONS BREAKDOWN  
BY ENERGY TYPE (TECO<sub>2</sub>)



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



## V. THE INVENTORY

### D. Community Waste

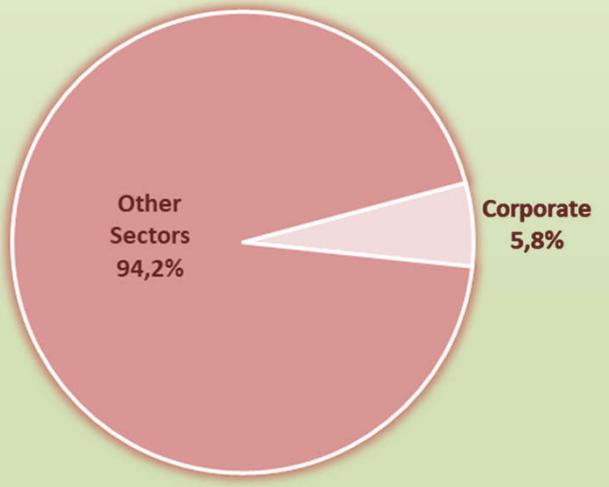
In 2015, the 36 050 tons of Saint John’s solid waste produced 12 534 tons of eq. CO<sub>2</sub> greenhouse gas. They are responsible for 1.9% of the total emissions of the Community (see Graph 1).

The estimated share of corporate emissions is 731.9 tons of eq. CO<sub>2</sub> (5.8% of the total) which would correspond to nearly 1 785 tons of waste.

**TABLE 4 :**  
**COMMUNITY LANDFILL WASTE BY CATEGORY**

Waste Category	2015			
	tons	%	(teq. CO <sub>2</sub> )	%
Corporate	1 785	5,0%	731,9	5,8%
Other Sectors	34 265	95,0%	11 802,1	94,2%
<b>Total</b>	<b>36 050</b>		<b>12 534,0</b>	

**GRAPH 5 :**  
**COMMUNITY LANDFILL WASTE GHG EMISSIONS BY CATEGORY (teCO<sub>2</sub>)**



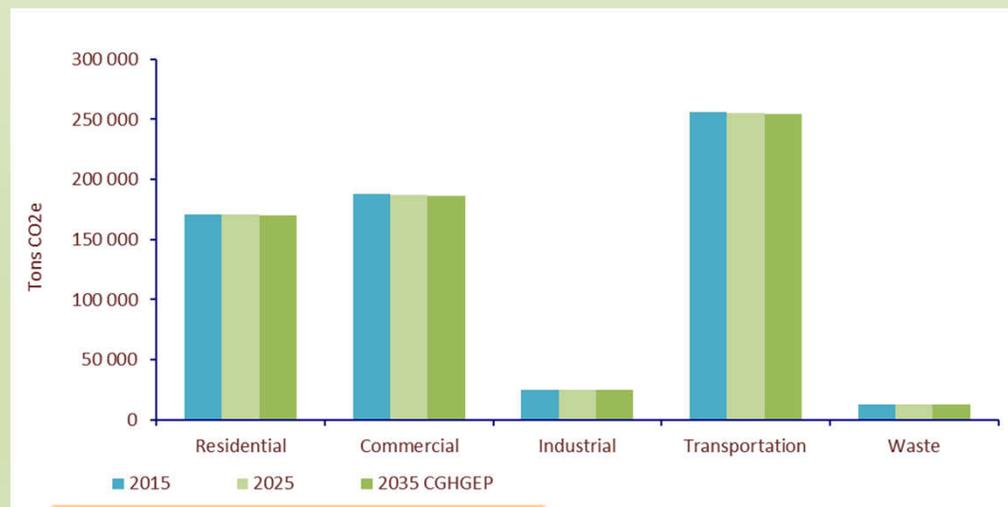
### E. Community Emissions Forecast

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 Saint John, the business as usual scenario anticipates that, apart from the current action plan reduction, the level of the community GHG emissions will decrease slightly by 0.7%.

**TABLE 5 :  
COMMUNITY EMISSIONS FORECAST BY SECTOR**

	Current emissions	% Change Expected**	Emissions in Forecast year	Emissions in CEP Forecast year
Residential	171 288	-0,7%	170 699	170 110
Commercial	187 917	-0,7%	187 270	186 624
Industrial	25 020	-0,7%	24 934	24 848
Transportation	256 393	-0,7%	255 511	254 629
Waste	12 534	-0,7%	12 491	12 448
<b>Total Emissions (t CO2e)</b>	<b>653 152</b>		<b>650 906</b>	<b>648 660</b>



### 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 Saint John, the business as usual scenario anticipates that, apart from the present action plan reduction, the level of the community GHG emissions will decrease by 0.7%. This action plan is expected to bring them down by 9% in 2025 and by 18% in 2035.

**TABLE 6 :**  
**COMMUNITY INFORMATION**

Base Year	2015	
Forecast Year*	2025	2035 CGHGEP
Reduction Target by Forecast Year* (%)	9,0%	18,0%

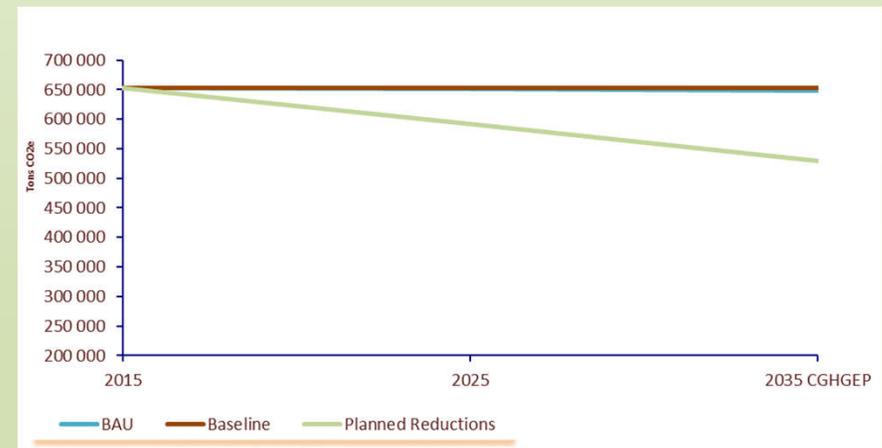
Baseline: 2015 (Base year)

BAU: Business as usual scenario forecast

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**

### 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 City, the community plan proposes the achievement of a target of 9% reductions in GHG emissions for 2025 and 18% reductions in GHG emissions for 2035 according to the reference year 2015.

TABLE 7 :  
COMMUNITY INFORMATION

#### Objectives and year set by Saint John:

##### Corporate Action plan :

- Reduction Target : 9% and 18%
- 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 City of Saint John'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

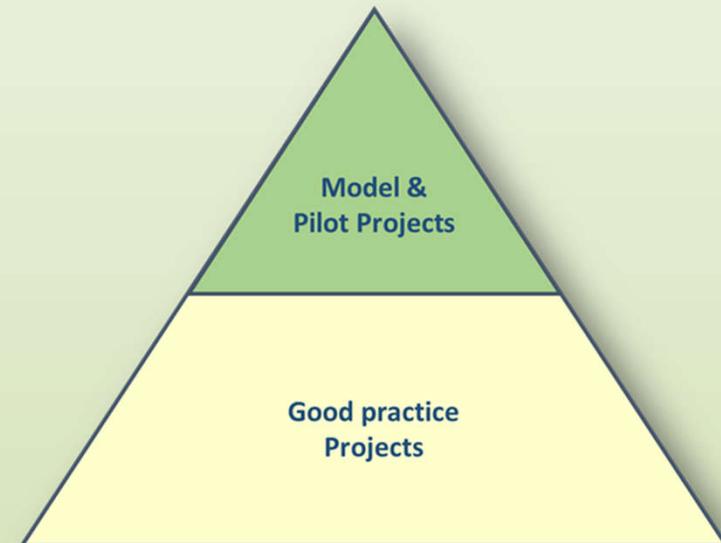
The action plan prioritises projects considered as "good practices". These projects correspond to the application of, for example, measures and technologies supported by the programs of New Brunswick Power, the Government of New Brunswick or Canada.

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

##### MODEL PROJECTS & PILOT PROJECTS

As part of Saint John's CCEI, the action plan also proposes s three types of model projects & pilot projects :

- **Transport electrification & EV integration in the community**



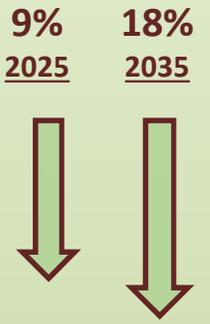
### B. REFERENCE LEVEL AND TARGET

The goal of the City of Saint John’s Community Action Plan is to reduce greenhouse gas emissions by 9% by 2025 and 18% by 2035 from their 2015 baseline.

For Saint John, 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 58 784 tons or 9% by 2025 and 117 567 tons or 18% by 2035.

**TABLE 8 :**  
**BASELINE AND TARGET**

Tons of CO2 equivalent	Year		
	Base 2015	Forecast 2025	Forecast CGHGEP 2035
1 Current Emissions	653 152		
2 Community Emissions Forecast (BAU Scenario)		<b>650 906</b>	<b>648 660</b>
3 Reduction Target		9,0%	18,0%
4 Forecast emissions (target) (line 1 - line 5)		594 368	535 585
<b>5 Total reductions to be achieved (line 1 - line 4)</b>		<b>58 784</b>	<b>117 567</b>
<b>6 Total reductions to be achieved (Including BAU Scenario)</b>		<b>56 538</b>	<b>113 075</b>



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

Achieving the objective of Saint John's Action Plan would mean that the level of community GHG emissions for the year 2025 be at 592 883 tons of eq. CO<sub>2</sub>. This is a decrease of 60 269 tons from the 2015 emissions level of 653 152 tons of eq. CO<sub>2</sub>. This represents a potential reduction of 9.2%, which is 0.2 percentage points above the target of 9% and 1 486 tons more than the targeted reduction of 58 784 tons (see Table 8).

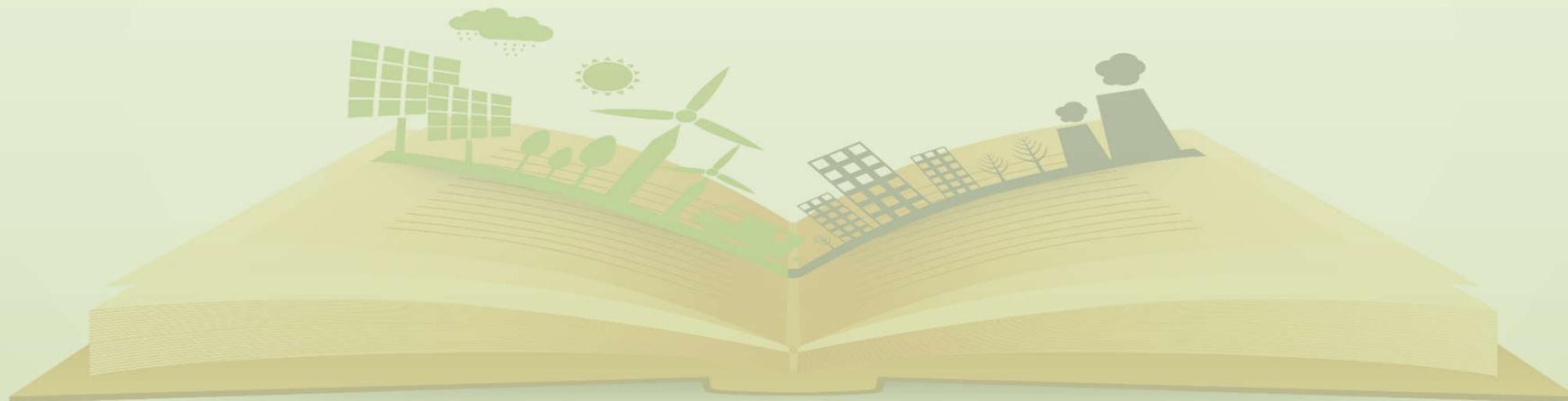
**TABLE 9 :**  
**ANALYSIS OF THE OUTCOME OF THE ACTION PLAN**

		Total reductions		Forecast CGHGEP 2025
		eCO <sub>2</sub> (t)	%	
1	Current Emissions (Base year)	653 152	100,0%	
2	Early action results	0,0	0,0%	
3	Expected reductions in the Action Plan	60 269	9,2%	
4	<b>Total Reductions (line 2 + line 3)</b>	<b>60 269</b>	<b>9,2%</b>	
5	<b>Level of anticipated emissions (forecast year) (line 1 - line 4)</b>	<b>592 883</b>	<b>90,8%</b>	
6	<b>Gap with the target ( Action Plan 2025)</b>	<b>1 486</b>	<b>0,2%</b>	
7	<b>Considering BAU Scenario (2025)</b>	<b>3 732</b>	<b>0,3%</b>	<b>9,6%</b>

### 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 Saint John, the development of the Project Portfolio was completed.

The action plan contains seventeen (17) projects whose potential reductions are estimated at 60 269 tons of CO<sub>2</sub> equivalent (see Table 10).



### D. PROJECT PORTFOLIO

#### Project Portfolio Summary

TABLE 10 : COMMUNITY PROJECT PORTFOLIO

Projects (Measurs, Actions, Technologies)	Total GHG reductions (tons)
<b>Residential</b>	5 857
1 R1 LED lighting	2 118
2 R2 Energy efficiency (Residential buildings)	369
3 R3 Clean Energy Conversion <span style="float: right;">Conversion rate : 35%</span>	2 673
4 R4 Energy efficiency - Residential - Clothes Line Program	696
<b>ICI</b>	8 312
5 ICI1 LED lighting	6 710
6 ICI2 Energy efficiency (commercial buildings)	1 602
<b>SJE's Supportive Community Energy Plan Targets for 2025</b>	19 893
7 SJE1 SJE Energy efficiency (Residential/Commercia/Industrial)	2 632
8 SJE2 Increase Annual Load Factor	1 170
9 SJE3 Facilitate Fuel Switching (EV's) <span style="float: right;">See Electric Vehicle Community Program</span>	-
10 SJE4 Increase Operational Efficiency	7
11 SJE5 Increase Operational Productivity	40
12 SJE6 SJE Renewable Energy Strategy <span style="float: right;">SJE Target 6%</span>	16 044
<b>Transportation</b>	22 753
13 T1 Electric Vehicle Community Program <span style="float: right;">EV Units: 220</span>	243
14 T2 Idle-free Policy	16 020
15 T3 Fuel-efficient driving	4 859
16 T4 More efficient & compact vehicles	1 631
<b>Local Renewable Energy Production</b>	3 454
17 RE1 District Energy System	3 454
<b>TOTAL</b>	<b>60 269</b>



### D. PROJECT PORTFOLIO

#### 1. Infrastructure (lighting) - LED lighting (Residential/Commercial/Industrial)

##### (Project #: R1 & ICI1)

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	2 267 261	629 794 834	
2 Estimated residential lighting power consumption	82 528	22 924 532	3,64%
3 Total CI sector energy consumption	2 317 362	643 711 632	
4 Estimated commercial lighting power consumption	248 421	69 005 887	10,72%
5 Total industrial energy consumption	357 221	99 228 038	
6 Estimated industrial lighting power consumption	13 003	3 611 901	3,64%
<b>Efficiency gains due to conversion</b>			
7 Efficiency gains due to conversion		55%	
8 Conversion rate for 2025		60%	
9 Annual energy conversion reduction (residential)		7 565 096	kWh
10 Annual Energy Conversion Reduction (CI)		22 771 943	kWh
11 Annual Energy Reduction in Conversion (Industries)		1 191 927	kWh
12 Reduction of GHG emissions from conversion (residential)		2 118	t. eq. CO <sub>2</sub>
13 Conversion GHG emission reduction (CI)		6 376	t. eq. CO <sub>2</sub>
14 Reduction in Conversion GHG Emissions (Industries)		334	t. eq. CO <sub>2</sub>
<b>15 Reduction of GHG emissions from conversion (all sectors)</b>		<b>8 828</b>	<b>t. eq. CO<sub>2</sub></b>

**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 & envelope) - Energy efficiency (Residential buildings)

##### (Project #: R2)

In addition to Saint John Energy Targets and Initiatives which provide efficiency solutions to power consumers, the City of Saint John intends to develop energy efficiency programs and incentives that aim other forms of energy used for heating purposes in the residential sector (natural gas, fuel and propane).

According to the community inventory, more than 26% of the community's GHG emissions come from the residential sector.

The average implementation rate of these measures is set at 15%. 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 %) *	4 532	15,0%
3	Energy saved per year (Gj)	5 487	
4	<b>Reduction of GHG emissions (tonnes and %)</b>	<b>369</b>	<b>1,5%</b>
	* Rough estimation		
5	<b>Estimation details</b>		
6	Total electricity Consumption	n/a	Gj See SJE project
7	Energy use for heating purposes	65,94%	
8	Electric Consumption - heating	n/a	Gj See SJE project
9	Fuel consumption - heating	309 363	Gj see below
10	Natural gas and Propane consumption - heating	56 426	Gj
11	Electricity consumption GHG emissions	n/a	eCO <sub>2</sub> (t) See SJE project
12	<b>Fuel consumption GHG emissions</b>	<b>21 808</b>	<b>eCO<sub>2</sub> (t)</b>
13	Natural gas and propane GHG emissions	2 801	eCO <sub>2</sub> (t)
14	GHG emissions targeted	24 609	3,8%
15	Projects' rate of implementation	15%	<b>Target to set</b>
16	Total community emissions	653 152	eCO <sub>2</sub> (t)
17	Average energy efficiency gain	10,0%	<b>Target to set</b>
18	Number of Dwellings in the community	30 210	
19	Participating households	4 532	Rough estimation
	<b>See Clean Energy Conversion project</b>		

### D. PROJECT PORTFOLIO

#### 3. Infrastructure (heating, cooling) - Clean Energy

##### (Project #: R3)

Saint John wishes to increase use of cleaner sources of energy. The municipality plans to run a survey on old heating system 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 26% of the community's GHG emissions come from the residential sector. Fuel furnaces are less efficient than electric heater.



Clean Energy Conversion		Base year : 2015	
1	Energy conversion	35,0%	
2	Participating households (number and %) *	10 574	35,0%
3	Energy saved per (Gj)	49 974	
4	<b>Reduction of GHG emissions (tonnes and %)</b>	<b>2 673</b>	<b>8,0%</b>
	* Rough estimation		
<b>Estimation details</b>			
5	Heating oil consumption	475 944	Gj
6	Heating oil GHG emissions	33 551	eCO <sub>2</sub> (t)
7	<b>Projects' rate of implementation</b>	<b>35%</b>	<b>Target</b>
8	Number of Dwellings in the community	30 210	
9	Participating households	10 574	Rough estimation
10	Electricity needs (result of conversion)	116 606	Gj
11	Electricity GHG Emissions (result of conversion)	9 069	eCO <sub>2</sub> (t)
12	Residual Heating Oil consumption	309 363	Gj
13	Residual Heating GHG Emissions	21 808	eCO <sub>2</sub> (t)
14	<b>GHG reduction</b>	<b>2 673,5</b>	eCO <sub>2</sub> (t)

### D. PROJECT PORTFOLIO

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

##### (Project #: R4)

Saint John 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 26% 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 15%.

		Base year : 2015	
<b>Infrastructure (heating, cooling)</b>			
1	Energy saving (estimated)	7,5%	
2	Participating households (number and %)	4 144	13,7%
3	Energy saved per year (kWh)	2 486 356	
4	<b>Reduction of GHG emissions (tons and %)</b>	<b>696</b>	<b>0,1%</b>
<b>Estimation details</b>			
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	30 210	
8	Ratio of households with an electric clothes dryer	91,4%	
9	Annual estimated power used by laundry dryers	33 151 414	kWh / year
10	Total estimated GHG emissions of laundry drying	9 282	eCO <sub>2</sub> (t)
11	<b>Clothes lines efficiency</b>	<b>100%</b>	
12	<b>Clothes lines use rate</b>	<b>50%</b>	<b>6 months / year</b>
13	<b>Projects' rate of penetration</b>	<b>15%</b>	
14	Participating households	4 144	
15	Energy reduction	2 486 356	kWh
16	GHG reduction	696	
17	Energy savings	263 305	\$
18	Total community emissions	653 152	eCO <sub>2</sub> (t)

### D. PROJECT PORTFOLIO

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

##### (Project #: ICI2)

In addition to Saint John Energy Targets and Initiatives which provide energy efficiency solutions to electrical power consumers, the City of Saint John intends to develop energy efficiency programs and incentives that aim other forms of energy (natural gas, fuel and propane) used for heating purposes in the commercial, institutional and industrial sector.

According to the community inventory, more than 28 % 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.

The average implementation rate of these measures is set at 20%. The average efficiency of all these measures is set at 10%.

Energy efficiency (commercial buildings)		Base year : 2015	
1	Energy saving (estimated)	10%	
2	Energy saved per year (Gj)	25 324	
3	<b>Reduction of GHG emissions (tonnes and %)</b>	<b>1 602</b>	<b>2,0%</b>
<b>Estimation details</b>			
4	Total electricity Consumption	n/a	Gj See SJE project
5	Energy use for heating purposes	48,35%	
6	Electric Consumption - heating	n/a	Gj See SJE project
7	Fuel consumption - heating	772 414	Gj
8	Natural gas and Propane consumption - heating	493 766	Gj
9	Electricity consumption GHG emissions	n/a	eCO <sub>2</sub> (t) See SJE project
10	Fuel consumption GHG emissions	54 450	eCO <sub>2</sub> (t)
11	Natural gas and propane GHG emissions	25 644	eCO <sub>2</sub> (t)
12	GHG emissions targeted	80 094	12,3%
13	<b>Projects' rate of implementation</b>	<b>20%</b>	<b>Target to set</b>
14	Total community emissions	653 152	eCO <sub>2</sub> (t)
15	<b>Average energy efficiency gain</b>	<b>10,0%</b>	<b>Target to set</b>

### D. PROJECT PORTFOLIO

#### 6. Infrastructure (heating, cooling & envelope) – SJE Energy efficiency (Residential/Commercial/Industrial)

##### (Project #: SJE1)

Saint John Energy Targets and Initiatives - Offer products that allow subscribing customers to reduce energy usage by 10% by 2025. Reducing customers' energy usage will result in less generation production, less greenhouse gases overall, and lower costs to the end users. The load reduction targets will be achieved by installing more efficient energy products in bundles at customers' homes.

According to the community inventory, 69,6 % of the community's GHG emissions come from the residential sector.

The project aims to reach 6000 customers.

SJE Energy efficiency (Residential/Commercial/Industrial)		Base year : 2015	
1	Energy saving (estimated)	10,0%	
2	Participating customers (number)	6 000	
3	Energy saved per year (Gj ; kWh)	33 839	9 399 600
4	<b>Reduction of GHG emissions (tonnes and %)</b>	<b>2 632</b>	<b>1,0%</b>

See also Summary of Supportive Community Energy Plan 2018

### D. PROJECT PORTFOLIO

#### 7. Infrastructure – SJE Energy efficiency (Energy Optimization)

(Project #: SJE2, SJE3, SJE4, SJE5)

Saint John Energy Targets and Initiatives - Offer products that allow subscribing customers to reduce energy usage by 10% by 2025. Reducing customers’ energy usage will result in less generation production, less greenhouse gases overall, and lower costs to the end users. The load reduction targets will be achieved by installing more efficient energy products in bundles at customers’ homes.

Energy optimization		
SJE Energy Plan		Base year : 2015
1	Energy saving (estimated) *	0,6%
2	Energy saved per year (Gj ; kWh) *	1 673      6 024 000
3	<b>GHG reduction</b>	<b>1 217</b> eCO2 (t)
* Rounded figures		

See also Summary of Supportive Community Energy Plan 2018

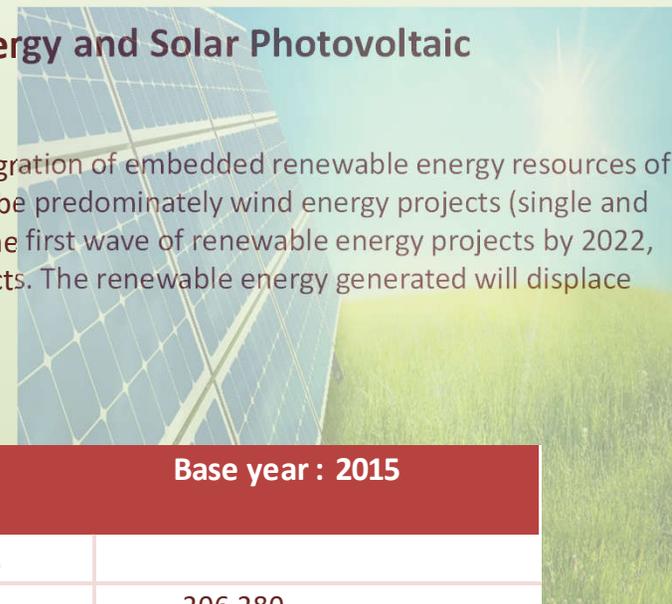


### D. PROJECT PORTFOLIO

#### 8. Saint John Energy Renewable Energy Production – Wind Energy and Solar Photovoltaic

##### (Project #: SJE6)

Saint John Energy Targets and Initiatives - Provide infrastructure to allow for the integration of embedded renewable energy resources of 6% of SJE's total energy needs by 2025. The integrated renewable energy assets will be predominately wind energy projects (single and multi-turbine projects) and utility-scale solar PV plants. SJE plans to accommodate the first wave of renewable energy projects by 2022, and have a connection-ready process and system by 2025 for additional larger projects. The renewable energy generated will displace emitting generation in the system and reduce greenhouse gases.



SJE Renewable Energy Strategy			Base year : 2015	
1	Energy conversion	Target starting year	2025	
2	Energy saved per (Gj)			206 280
3	Reduction of GHG emissions (tons and %)			16 044      6,0%
<b>Estimation details</b>				
4	Electricity consumption (all sectors)		3 439 771	Gj
5	Electricity consumption (all sectors) GHG emissions		267 538	eCO <sub>2</sub> (t)
6	Renewable Electricity Production		206 280	Gj
7	Renewable Electricity Production		57 300 000,0	kWh
8	Renewable Electricity Production ratio		6,0	%
9	GHG reduction		16 044,0	eCO <sub>2</sub> (t)
10	GHG reduction for all sector electricity use (%)		6,0	%

### D. PROJECT PORTFOLIO

#### Saint John Energy – Summary of Supportive Community Energy Plan 2019

Major Target	Current Initiatives Underway	Target Figure for 2025	GHG Factor	GHG Saved at Target t/year
<b>Energy optimization</b>				
1 Increase Annual Load Factor	SMART Grid Demonstration Project Integrated System Manger Utility Batteries Generator Disptaching Transformer Tap Changers Controllable Water Heaters, Baseboard Heaters and Heat Pumps	Demand Savings of 25 MW 6 000 MWhr shifted from Peak to OffPeak (2 hr/day x 120 days/yr)	0,463 t/MWhr Peak, 0,268 t/MWhr OffPeak	1 170,0
4 Facilitate Fuel Switching (EV's)	Residential Charging Pilot Program Future Charging Stations **	20 residential charging stations pilot	3 t/yr/vehicle	See Electric Vehicle Community Program
5 Increase Operational Efficiency	Capital Planning Amorphous Core Transformers ** Overhead Conductor Upgrades ** Underground Conductor Upgrades **	24 MWhr	0,280 t/MWh	6,7
6 Increase Operational Productivity	Regulatory Planning Capital Planning Advanced Metering Infrastructure (AMI) ** Intelligent fault sensing devices **	Elimiation of 2 full time service vehicles	3 t/yr/vehicle	40,0
<b>Energy efficiency</b>				
2 Reduce Energy Usage	Mini-split Heat Pumps Next Gen Consumer Products ** Customer Outreach	Annual Energy Savings of 9 400 MWhr 6 000 customers: 10% of 15,6 MWhr each	0,280 t/MWh	2 632,0
<b>Renewable Energy Production</b>				
3 Integrate Embedded Generation	Utility Embedded Generation Policy Distribution Infrastructure ** Embedded Wind Energy Projects ** Community Solar Projects **	Annual Energy Produced of 57 300 MWhr 6% of 955 000 MWhr	0,280 t/MWhr	16 044,0
<b>Total</b>				<b>19 892,7</b>

\*\* Requires Funding and/or Budget Approvals



### D. PROJECT PORTFOLIO

#### 9. Transportation - Electric Vehicle Community Program

##### (Project #: T1)

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 <sub>2</sub> (t)	<b>243</b>	
2	Target number of EV units for 2025	Minimum & maximum	79      220
3	<i>NB CCAP Target for EV units for 2025 (estimated)</i>	<i>Total &amp; annually</i>	<i>886      111</i>
4	GHG emissions reduction (tonnes and %)	Minimum	243      0,0%
5		Maximum	675      0,1%
6	Transport GHG emissions reduction (%)	Maximum & Minimum	0,3%      0,1%
7	Savings per year (Minimum & maximum)		80 960 \$      246 620 \$
8	Number of car & light Truck		51 359
9		Minimum & maximum	0,2%      0,4%



### D. PROJECT PORTFOLIO

#### 9. Transportation - Electric Vehicle Community Program (continued)

Charging Station : In 2018, Saint John counts 27 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	27
400 Chesley Dr, - Ocean Steel & Construction - SJEnergy - Flo		1
57 Union St, SJEnergy - Flo		1
65 Carleton St, Peel Plaza Parking Garage - SJEnergy - Flo		1
183 Rothesay Ave, Brett Chevrolet Cadillac - SJEnergy - N3 Flo		1
1265 Loch Lomond Road, Loch Lomond Mitsubishi - No network		1
906 Grandview Ave, NBCC Saint John - No network		1
4241 Loch Lomond Rd, Saint John Airport - FLO Addenergy		1
· Rockwood Park	Proposed W1	1
· Uptown SJ	Proposed W1	1
· McAllister Mall	Proposed W1	1
· Lancaster Mall	Proposed W1	1
· Reversing Falls (stone hammer)	Proposed W1	1
· Cruise Ship Terminal (Water Street)	Proposed W1	1
· University/ Hospital	Proposed W1	1
· Tucker Park (by UNB and Hospital)	Proposed W1	1
· Irving Nature Park	Proposed W1	1
· Tourism Info Building	Proposed W1	1
· Commercial Drive (East mall)	Proposed W1	1
· Lansdowne Plaza	Proposed W1	1
· Main Street North, and Main Street West, and Waterloo Area (for development)	Proposed W1	1
· Harbour Station	Proposed W1	1
· Port	Proposed W1	1
· Seniors Home	Proposed W1	1
· Refinery/ East Industrial Park	Proposed W1	1
· Dominion Park	Proposed W1	1
· Shamrock Park	Proposed W1	1
· Little River Reservoir	Proposed W1	1



### D. PROJECT PORTFOLIO

#### 10. Transportation - Idle-free Policy

##### (Project #: T2)

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	52 593	3 701
2 Fuel consumption	68 613 182 liters	32 599 587 liters
4 GHG emissions	167 384 eCO <sub>2</sub> (t)	87 479 eCO <sub>2</sub> (t)
5 Average fuel wasted idling	5 654 799 liters	829 024 liters
6 Average fuel economy	8,2%	2,5%
7 GHG emissions reduction	13 795 eCO <sub>2</sub> (t)	2 225 eCO <sub>2</sub> (t)
<b>9 Total GHG Emissions reduction</b>	<b>16 019,68 eCO<sub>2</sub> (t)</b>	

### D. PROJECT PORTFOLIO

#### 11. Transportation - Fuel-efficient driving

##### (Project #: T3)

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	256 393	eCO <sub>2</sub> (t)
2 Total community emissions	653 152	eCO <sub>2</sub> (t)
3 Number of targeted units	5 466	
<b>4 Reduction of GHG emissions (tonnes and %)</b>	<b>4 859</b>	<b>0,74%</b>

D. PROJECT PORTFOLIO

12. Transportation - Compact vehicles

(Project #: T4)

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.



More efficient & compact vehicles		Base year : 2015	
1	Community transportation emissions	256 393	eCO <sub>2</sub> (t)
2	Total community emissions	653 152	eCO <sub>2</sub> (t)
3	Number of targeted units	2568	
4	<b>Reduction of GHG emissions (tonnes and %)</b>	<b>1631</b>	<b>0,25%</b>

### D. PROJECT PORTFOLIO

#### 13. Renewable Energy Production – District Energy System

**(Project #: RE1)**

The City of Saint John aims to take leadership in terms of sustainable energy by implementing and managing sustainable energy policies and measures, with the goal of reducing green house gas emissions, reducing energy costs, and improving the efficiency of the City’s infrastructure.

The City of Saint John isn’t focused solely on operations. The policies and measures are also intended to affect the wider community. For instance, Brunswick Square, St. Joseph’s Hospital and other public buildings will be part of the district energy project, which takes thermal energy that’s a by-product of industry and turns it into an efficient way to heat buildings.

Base year: 2015		Target Year				TOTAL
		2025	2030	2035	3040	2025-2040
<b>District Energy System</b>						
1	Total Energy saved (Gj)	52 988	96 198	61 755	230 000	440 941
2	<b>Total GHG reductions (t eCO2)</b>	<b>3 454</b>	<b>4 747</b>	<b>3 250</b>	<b>11 349</b>	<b>22 800</b>
3	Total GHG reductions per floor area (t eCO2/Sq.Ft)	0,004	0,003	0,003	0,006	0,004



**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.