Acting Today to Change Tomorrow

Rural Municipality of St. Clements, Manitoba

Climate Change Local Action Plan

For Greenhouse Gas Reduction
2016

Éco-Ouest
Eco-West

Foreword

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Eco-West: *Leading the Way to Sustainable Communities and a Greener World.*

During the last few decades, the world has seen an unprecedented rate of acceleration in climate change and the effects of this game-changing evolution are already being felt on a daily basis in communities everywhere in Canada and elsewhere across the globe.

Average annual mean temperatures are on the rise due to an increase in greenhouse gas (GHG) emissions by factories that emit too many pollutants into the atmosphere or because there are too many vehicles on the road that are not equipped with the latest emissions technologies. Landfill areas are becoming a major source of concern as they expand, reach capacity and become toxic to the point of no longer being usable. Bodies of water have been rendered useless either as a source of potable water and/or are no longer viable as areas of recreation due to a rapid rise in the levels of eco-damaging nutrients found there.

Since 2008, our mandate at Eco-West has been to understand the impacts of these and other causes of climate change on our world. And so for the past half dozen years, we have been working towards enhancing the growth and prosperity of Western Canada's municipalities through the planning and implementation of more progressive, eco-friendly communities and infrastructures.

At Eco-West, we actively seek to establish partnerships with various stakeholders from all three levels of government, private enterprise as well as local residents, with a view of creating a dynamic for initiatives that deal with issues having to do with energy, the economy as well as the environment in general. This is accomplished by demonstrating that alternatives do exist to the conventional solutions that are commonly applied to the production and utilization of energy.

As such, our green team of consultants is always striving to implement innovative and cost-effective projects that improve local and regional practices in the areas of waste management, wastewater treatment, waste to value-added technologies, composting, recycling and transportation.

We do this by working with stakeholders to create local action plans that have been tailored to the specific needs of each community, region or district, and zeroing in on initiatives that are achievable in the short as well as the long run. We also assist municipalities in obtaining the funding to make their various projects come to life and help them to move forward along the road that leads to successful project completion.

The framework that we use to create local action plans that focus on climate change issues is the Federation of Canadian Municipalities' Partners for Climate Protection (PCP) program. This includes the conducting of a municipal inventory of GHG emissions and establishing a target for the reduction of these emissions, which in turn leads to the development of a Climate Change Local Action Plan (CCLAP) that shows how a municipality will be able to achieve its goals in this area.

With that strategic document in hand and as members of the PCP program, communities can take matters into their own hands and put the wheels in motion that will enable them to implement change by tackling climate change issues head-on.

At Eco-West, we believe that the time to just talk about climate change has passed, and we are committed to working with municipalities and other interested parties to bring about real change in our communities, and to make them better, cleaner and safer places in which to live and play.

The time has come to take action and turn back the tide against climate change. Together we can make a difference.

Yours truly,

Dany Robidoux
Director, Eco-West

Message from the Mayor

The effects of climate change are already affecting municipalities all over Canada.

As providers of basic municipal services such as roads, snow clearing, waste management, emergency services, and other community services, our facilities, operations and budgets are directly affected by these changes and present important challenges in the improvement of municipal buildings, operations and infrastructure.

In 2012, we were approached by the CDEM's Green Projects Team (now known as Eco-West) to participate in a project to measure our greenhouse gas emissions and create a plan to help us navigate the potential impacts of climate change within our community.

Over the past four years, we worked alongside the Eco-West team through a comprehensive process, which included consulting with community stakeholders to create a practical, community-supported, action plan that is presented in this document. This plan represents real concrete actions that we can undertake to reduce emissions and save money but also provides us with a practical method for making a difference in our community.

Some projects are already underway. More will likely be undertaken in the future. This plan recognizes that local residents, businesses, institutions and municipalities all have a role to play as we "think globally and act locally" to help better position our community and protect our environment to ensure our quality of life.

On behalf of the RM of St. Clements, I would like to thank the many community members who were involved at the various stages of the development of this plan for their contributions.

Yours truly,

Debbie Fiebelkorn
Mayor of St. Clements

Table of Contents

Project Background

What is this document?

In an effort to develop a Climate Change Local Action Plan (CCLAP), The Rural Municipality (RM) of St. Clements has partnered with the Conseil de développement économique des municipalités bilingues du Manitoba (CDEM/Eco-West) to reach the three milestones of the Partners for Climate Protection (PCP) program of the Federation of Canadian Municipalities (FCM).

MILESTONE 1: Creating a GHG emissions inventory and forecast

MILESTONE 2: Setting an emissions reduction target

MILESTONE 3: Developing a local action plan (LAP)

This document is the LAP that represents the results of that four-year process. The RM of St. Clements has completed Milestone 1 and has proceeded concurrently with Milestones 2 and 3 in collaboration with the municipal government and the people of St. Clements, in a participatory process.

The municipality must now move forward by formally adopting this LAP in order to further develop, approve and implement potential programs identified in this plan. In doing so, they will demonstrate leadership and provide a positive example of a motivated, sustainable municipality that is taking action against climate change.

Terms and acronyms

CCLAP	Climate Change Local Action Plan (as an overall process)
CO2	Carbon Dioxide
FCM	Federation of Canadian Municipalities
GHG	Greenhouse Gas
ICLEI	International Council for Local Environmental Initiatives
LAP	Local Action Plan (for Greenhouse Gas Emission Reduction)
MATs	Measures, Actions and Technologies
PCP	Partners for Climate Protection Program
RM	Rural Municipality

Note: Literary and online references are identified by a superscript number that appears at the end of the source name or quotation. References and image credits are listed sequentially in the Appendix.

Prepared by:

SCATLIFF + MILLER + MURRAY
visionary urban design + landscapes

www.scatliff.ca

How to use this document

While climate change is a challenge often viewed on a global scale, solutions are also needed at national, provincial, and local levels.

Acting Today to Change Tomorrow: Climate Change Local Action Plan For Greenhouse Gas Reduction has been developed as a resource tool to assist the RM of St. Clements in reducing GHG emissions in their community.

The recommended actions represent the ideas and issues that were brought forward through this process. It is a living document that will require regular review to measure and evaluate progress to ensure that the goals and recommended action plans become a reality.

Throughout this report you will see several graphic cues or 'pull outs' that provide additional but relevant information on the subject matter. These may be presented as quotes, Fast Facts, 'Did You Knows', or Easy Wins to help you get started on reducing your GHG emissions right away!

For example . . .

Be Enviro - Aware!

Whenever possible, make environmentally-conscious purchasing decisions such as water and energy efficient fixtures and appliances, fuel-efficient or hybrid vehicles and phosphate-free products, soaps, and detergents. Look for environmentally preferable logos and labels like the EcoLogo® and the It's Lake Friendly! logo.

Take action now!

We can reduce emissions by:

- Substituting non-carbon forms of energy (renewable energy) for fossil fuels.
- Reducing energy consumption through energy conservation and efficiency.

Possible energy strategies include:

- Stimulating the retrofit of buildings and processes to conserve energy.
- Promoting energy-efficient, new construction of buildings.
- Promoting energy-efficient modes of transportation together with energy-efficient and alternative fuel vehicles.
- Promoting and installing renewable forms of energy generation.
- Designing our communities to reduce energy consumption and increasingly using community energy systems.

Possible non-energy strategies include:

- Reducing emissions from solid waste through further diversion and alternative treatment of residual waste (including energy from waste).
- Planting trees and reforming agricultural practices to sequester carbon.
- Increasing local food production and use.[1]

Project Description

Climate Change Local Action Plan (CCLAP) Goals & Mission

The CCLAP project aims to offer participants as much support as possible to assist in the completion of their GHG emission inventories and local action plans.

Step 1: ***Project resources required for the development of an inventory and a climate change local action plan***

Eco-West/CDEM will partner with specialists and experts and request the assistance of the Federation of Canadian Municipalities (FCM) in the various technical and specific projects to be carried out.

Step 2: ***Development of knowledge and expertise to address environmental and climatic issues in Manitoba***

Eco-West/CDEM would like to take these issues and transform them into opportunities for participants. The development of local action plans will allow municipalities to identify structuring projects enabling them to face environmental challenges and generate significant socioeconomic impacts. For instance, these potential impacts could result from the introduction of high-performance and innovative equipment that is better suited to local or regional needs, thereby reducing energy consumption and its related expenses, or even locally producing renewable energy to be distributed or sold locally (i.e. geothermal, solar thermal, solar photovoltaic, biomass heating systems, etc.).

Step 3: ***Projects funded by the FCM and in part by participating municipalities***

To benefit from supplementary FCM assistance for the funding of inventories, participating municipalities must be or become members of the FCM's Partners for Climate Protection (PCP) program. Membership is free and requires only the adoption of a resolution by municipal council. Members will complete the first three (3) milestones of the PCP program in the context of the CCLAP project.

The intent of the project is to duplicate the production of quality inventories and action plans at the lowest possible cost in order to enable the following actions:

- Identify innovative model projects for participating municipalities
- Establish the preliminary design of green projects that can more easily be adopted by the population and funded by different levels of government and the FCM's Green Municipal Fund (GMF)
- Improve and enrich local and regional knowledge and expertise with the help of specialised contractors and firms in order to create innovative infrastructures tailored to the needs of local and regional populations

Through the execution of the project, Eco-West/CDEM will establish partnerships and collaborate with institutional partners in Manitoba to improve and safeguard provincial knowledge and expertise.

Context and background

The Partners for Climate Protection

Climate change is a global issue, yet addressing it will require countless local actions worldwide. In Canada, the Federation of Canadian Municipalities (FCM) has developed the Partners for Climate Protection (PCP) Program to guide municipal governments towards reducing GHG emissions. The PCP program defines a process for municipal governments to quantify their GHG emissions and then to develop and implement action plans that can achieve emissions reductions.

PCP membership covers all provinces and territories and accounts for more than 80% of the Canadian population. Since the program's inception in 1994, over 250 municipalities have joined PCP, making a public commitment to reducing emissions.

PCP is the Canadian component of the ICLEI's Cities for Climate Protection network, which involves more than 1,100 communities worldwide. PCP is a partnership between the Federation of Canadian Municipalities and ICLEI — Local Governments for Sustainability. PCP membership is free for municipalities. Since cost is not an obstacle, municipalities of all sizes can empower themselves to take action against climate change.

The program empowers municipalities to take action against climate change through a five-milestones process.

This process guides members in creating GHG inventories, setting realistic and achievable GHG reduction targets, developing local action plans, and implementing plans using concrete actions to reduce emissions. Benefits of PCP membership include:

- Obtaining the means to fight against climate change
- Asserting the need for joint authority and global action on climate change
- Becoming a positive example for your community and other Canadian municipalities
- Sharing your knowledge and experience on how to reduce GHG emissions
- Benefitting from Green Municipal Fund (GMF) program services offered to municipalities such as grants and loans

The PCP program consists of five milestones:

Milestone One

Creating a Greenhouse Gas Emissions Inventory and Forecast.

Milestone Two

Setting an Emissions Reduction Target.

Milestone Three

Developing a Local Action Plan that sets out how emissions and energy use in municipal operations and the community will be reduced.

Milestone Four

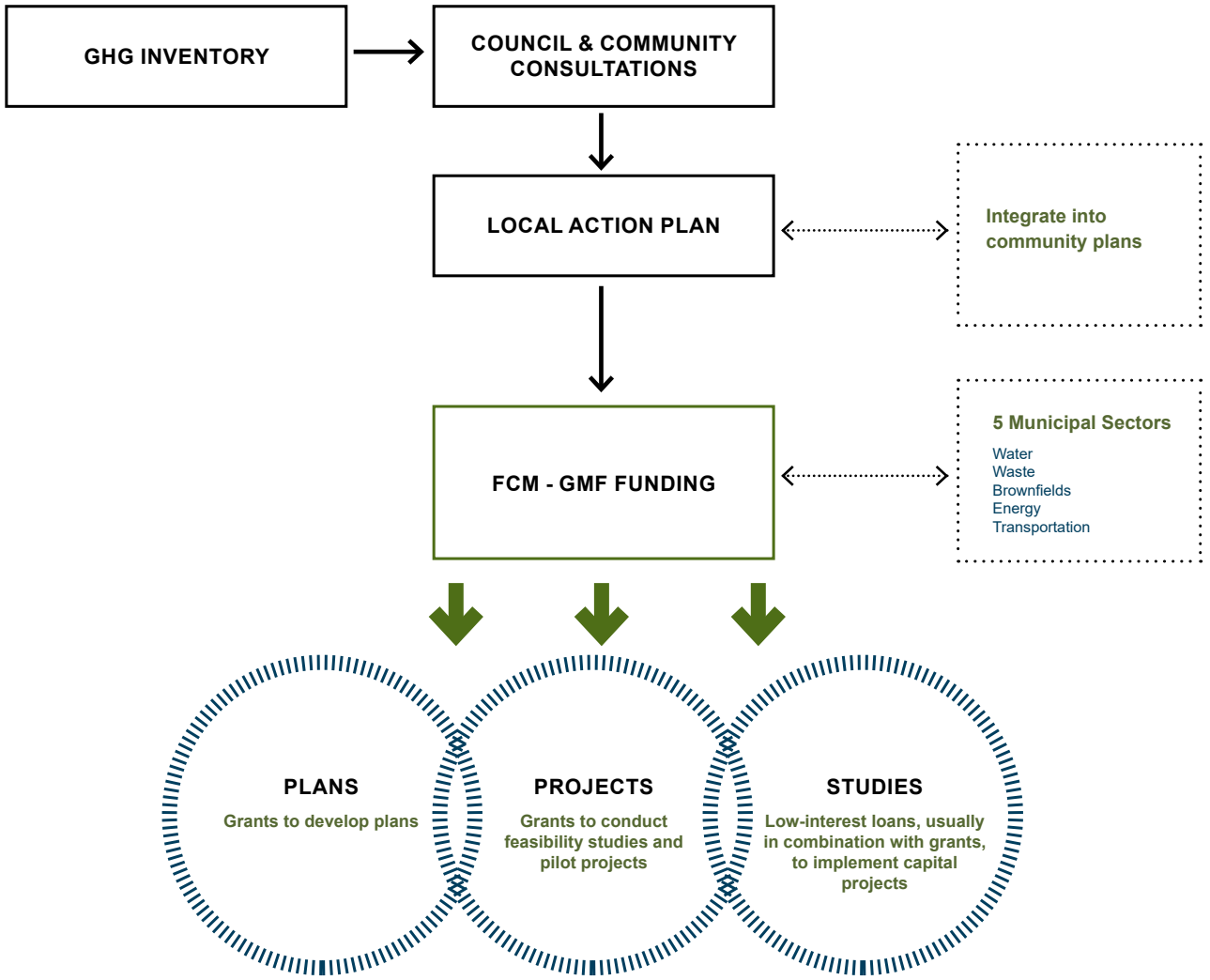
Implementing the Local Action Plan.

Milestone Five

Monitoring Progress and Reporting Results.

Eco-West - Partners for Climate Change Protection Flow

Process Chart



The Need

for community action on climate change

The climate is changing

Weather records confirm that temperatures and weather patterns around the world, and here in Manitoba, are changing.

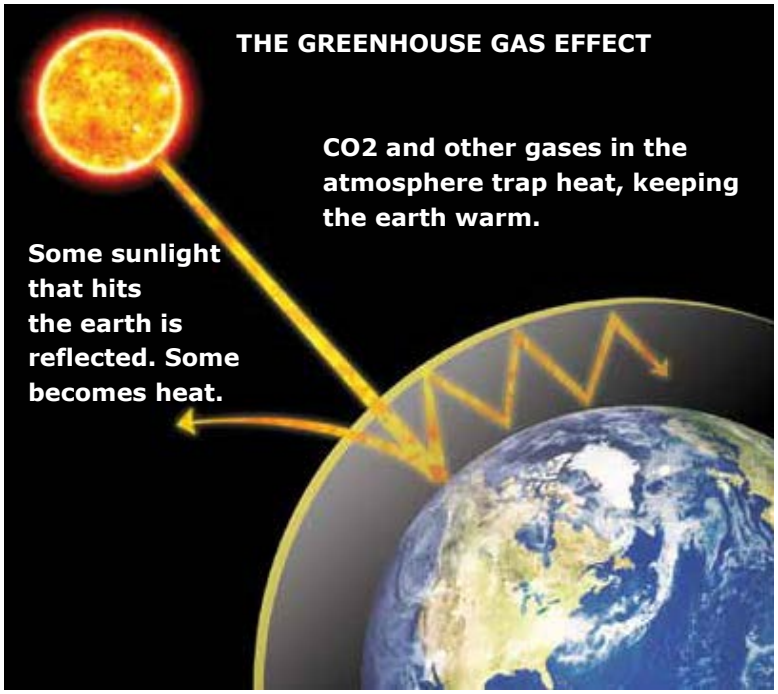
Scientific sources state that the average global temperature has risen almost 1°C over the last 50 years, and in Canada it has risen 1.5°C over the last 64 years.[2]

While that may not seem like a big change given the daily and seasonal variations in weather, it is quite a significant change in average temperature. Along with the increase in temperatures, communities from the different regions of Canada are already confronted with additional effects of climate change. Some face more severe droughts, while others face more violent storms and floods. The longer, colder winters and hotter summers increase damage to municipal infrastructure. All of these impacts cost cities and municipalities millions of dollars, and communities will expect that adaptation measures be implemented.

According to the Intergovernmental Panel on Climate Change (IPCC), warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea levels have risen, and the concentrations of greenhouse gases have increased. Continued emissions of greenhouse gases will cause further warming and changes in all components of the climate system (which could cause significant damage to our environment, economy and society). Limiting climate change will require substantial and sustained reductions of greenhouse gas emissions.[3]

What is causing climate change?

The greatest contributor to human-caused climate change is carbon dioxide created by the burning of fossil fuels: coal, oil and natural gas. Currently fossil fuels constitute about 86% of energy supply worldwide.[4] Other gases, such as methane, water vapour, ozone, nitrous oxide and chlorofluorocarbons, and other sources such as forest fires, deforestation, agricultural and industrial practices also contribute to the increase of GHGs in the atmosphere. These gases trap heat in the atmosphere through the Greenhouse Effect.[5]



What are the implications?

Canada's infrastructure deficit is significant, and the continued effects of climate change will no doubt increase this deficit by shortening asset-replacement cycles. In its report "Paying the Price": the Economic Impacts of Climate Change for Canada, published in 2011, the National Round Table on the Environment and the Economy suggested that the economic impact on Canada could reach $5 billion per year by 2020, and between $21 and $43 billion per year by 2050.

These issues present important challenges in the improvement of municipal buildings and infrastructure, as well as local communities.

What can be done? The LAP

An inventory of emissions is the first step in the creation of a local action plan (LAP). It brings together data on community and municipal energy use and solid waste generation in order to estimate GHG emissions in a given year. The LAP is a strategic document that outlines how the municipality will achieve its GHG emissions reduction objectives.

The LAP covers municipal operations and the community and provides a preliminary description of the proposed measures, actions and technologies (MATs) and, in its first phase, estimates the environmental and economic advantages expected to be derived from the application of the MATs. The proposed MATs will also take into account the potential environmental consequences of climatic damage. The LAP puts forward various tools (geomatics) considered useful in the selection and development of measures to be taken.

What is the municipal role?

Municipal governments have an important role to play in the use of a new corporate planning method that is consistent with the trend toward sustainability when faced with climate change. Through planning and the implementation of a green economy infrastructure, small municipalities can guarantee sustainable economic development, which will also lead to the growth and prosperity of their communities.

- Ensures environmental sustainability
- Ensures economic sustainability

In this way, municipalities that participate in greening their local economies by inventorying greenhouse gas emissions and creating local action plans to address climate change will create opportunities to commercialize clean technologies, attract foreign direct investments and train a qualified workforce.

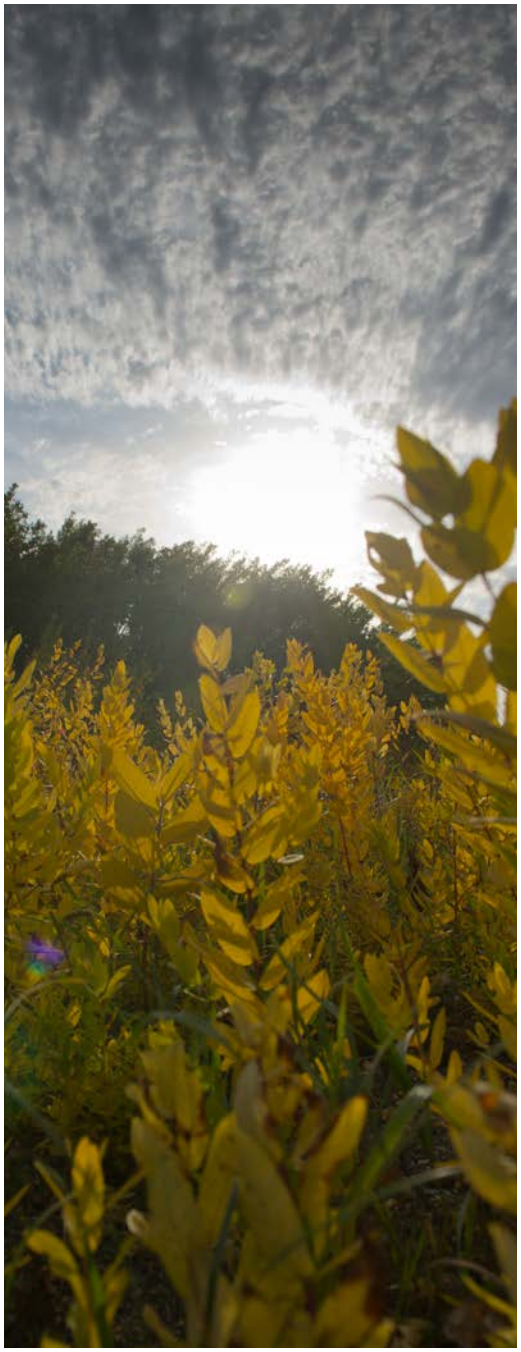
The INVENTORY can identify emissions sources based on the types of energy used, the sectors involved (transportation, building, water treatment plants, residual materials management, etc.), and the equipment being utilized. An inventory serves as a management tool to:

- Save money: The inventory helps to track the dollars spent on energy. That which can be measured can be managed. An inventory highlights opportunities to invest in energy efficient upgrades.
- Provide useful information: Inventorying significant sources of GHG emissions helps municipalities to establish adequate measures to reduce emissions and create an efficient LAP.

Helping municipalities face challenges

Faced with the challenges posed by climate change and economic development, municipal populations and governments must tackle many threats and challenges:

- Revising infrastructure and equipment needs
- Revising sustainability and adaptation strategies to take into account the environmental and economic vulnerability of lands under municipal authority
- Municipalities' limited resources and financial capabilities



Why should the communities in the RM of St. Clements act?

By positioning the RM of St. Clements as a leader in tackling climate change, they have the opportunity to influence other villages, towns and municipalities to do the same.

To combat climate change and ensure the economic viability of municipalities, or in other words, to reduce the causes of climate change and protect against its impacts, it is suggested that local governments employ the following strategies:

- Identify the source of emissions and evaluate the quantity of GHG emissions produced by municipalities (Inventory)
- Select measures and take actions to reduce GHG emissions produced by municipalities, both directly and indirectly (Local Action Plan)
- Become better established and better developed by planning for serious events linked to climate change (flooding, drought, erosion, etc.) and selecting methods to protect against these impacts

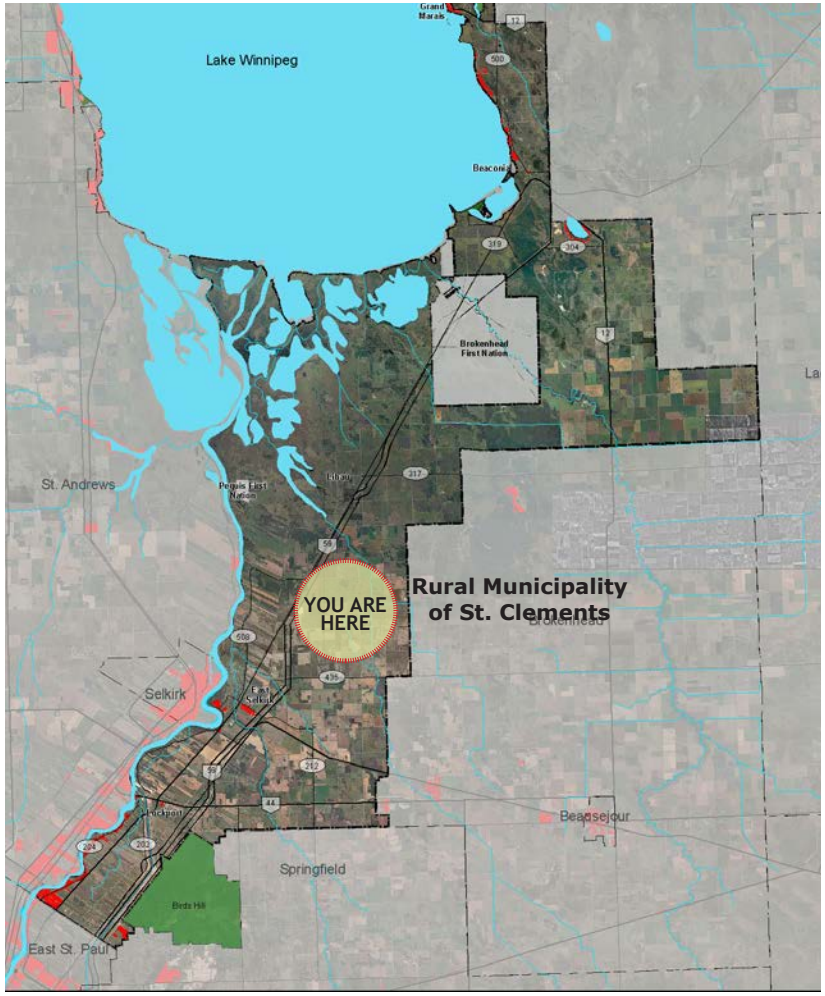
Because of their roles and responsibilities, municipalities must act as leaders to chart the way forward and make a difference so that these strategies can be integrated by all civil society stakeholders.

RM of St. Clements

community at a glance

Local Context

The Rural Municipality of St. Clements is one of the largest (728.65 sq km) and most diverse municipalities in Manitoba. It is situated within the Manitoba Capital Region and roughly bound by the Red River (west), Lake Winnipeg/Netley-Libau Marsh (north) and the RMs of East St. Paul, Springfield, Brokenhead, Lac du Bonnet and Alexander (south to east).



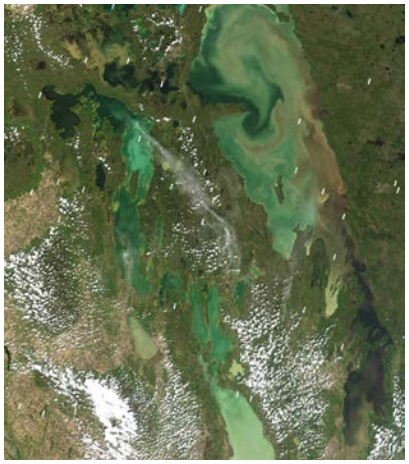
Potential Climate Change Challenges in the RM of St. Clements

Sitting at the northern edge of the municipality is Grand Beach Provincial Park on Lake Winnipeg – Manitoba's most popular tourist destination on the province's largest lake.

Lake Winnipeg is the largest aquatic life support system in Manitoba, covering some 24,500 sq km. It sustains a complex food web and the largest commercial fishery west of the Laurentian Great Lakes. Our inland sea is Manitoba's recreational playground and as the world's third largest hydro reservoir, it energizes our economy. Like many natural systems, the lake is shaped by environmental forces and disturbed by human activities. Weather, climate, and geology regulate the growth and reproduction of its plants and animals.

But excess nutrients from urbanization, agriculture and economic development in the Lake Winnipeg watershed are impairing its water quality and, in spite of its size, Lake Winnipeg is susceptible to the impacts of climate change.

The essential message about Lake Winnipeg and climate change is simple: All life on earth is inseparably linked and inter-dependent. There is a link between the microscopic plankton in Lake Winnipeg and your automobile exhaust (*Alex Salki, Research Biologist*).[6]



Aerial image of algal blooms on Lake Winnipeg

Community Profile

The municipality is known for its many parks and beach communities, making the RM of St. Clements “the place to be” for year-round relaxation and recreation.

Tourism is one of the municipality’s strongest economic activities. With some of Manitoba’s greatest beaches within its boundaries, services and products cater to the beach goers and cottager owners in the municipality. Activities abound in every season: swimming and boating in the summer; fishing, hunting and hiking in the spring and fall; snowmobiling and skiing in the winter.[7]

The RM encompasses several distinct communities and land uses across its diverse natural setting. The community of **Grand Marais** anchors the northern tip of the RM. The name “Grand Marais” is French for “Big Marsh”, named by the son of the famous explorer La Vérendrye in 1734. It is situated adjacent to Grand Beach Provincial Park and the community is a popular seasonal residential node which is rapidly evolving to a year round community. Grand Marais is the most exciting “place to be” in the summer when the entire town is buzzing with activity. The “beaches area” encompasses several seasonal residential areas stretching along Lake Winnipeg such as Sunset Beach, Lakeshore Heights, Beaconia and Gull Lake.

Towards the south, **Libau** is the smallest and quietest of the villages in the community and marks the transition from the forested beaches area to the more agricultural areas. It is situated near the Mars Hill Wildlife Management Area, where you can find a natural area of mixed bog and parkland, wildflower species and wildlife. Libau was named after the port of Liepaja, in Latvia, so named by Latvian and German immigrants who settled in the area in the late 1800’s.

East Selkirk provides important services and an administrative centre. The community is linked to the City of Selkirk on the west side of the Red River and is one of the predominant growth areas of the RM. It is a lively community and is the ideal “place to be” for young families.

In the south, the RM is dominated by the river lot (seigniorial) structure with long, narrow, river lots doted with clusters of residential uses. **Lockport** marks the outlet of the Winnipeg Floodway and provides one of the RM’s primary service centres with commercial and higher density residential land uses. It is named after the St. Andrews Lock and Dam, which allows navigation from the Red River to Lake Winnipeg, and is a very popular spot among avid fishers.

Official Plans

Development Plan

The Rural Municipality of St. Clements is part of the Red River Planning District, which uses the Selkirk and District Development Plan By-law No. 190/08 (the Development Plan) to guide planning and development related decisions. In addition, there are five supplementary Secondary Plans used within the areas of East Selkirk, Grand Marais, Libau, Lockport, and South St. Clements.

East Selkirk Secondary Plan

The Goal of this Secondary Plan is to promote the long-term, sustainable development of East Selkirk by directing growth and transitioning the area from individual wells and septic fields to piped municipal services. The Plan promotes long-term sustainability based on efficient use of water, energy, and waste management services to reduce the areas carbon foot print. The Plan intends to ultimately link the community's social, environmental and economic goals with all land use and development.

Grand Marais Secondary Plan

Similar to the East Selkirk Secondary Plan, the Goal of this Plan is to transition Grand Marais from current private wastewater management to municipally-supported site servicing. Key components of the Plan include shoreline stabilization, protection of Lake Winnipeg, and 'green infrastructure' to serve the needs of the area. Additionally, a trail system connecting Grand Beach to Grand Marias is discussed.

Libau Secondary Plan

The Goal of this Secondary Plan is to provide policy statements and proposed initiatives where more detailed directions for land use, transportation, infrastructure, environmental protection in Libau are required. There are no specific sustainability measures included within this Secondary Plan, with focus remaining on growth and by-law enforcement.

East Lockport Secondary Plan

The Goal of this Secondary Plan is to promote mixed-use residential and commercial development. The Plan intends to celebrate natural and historic resources and revitalize the area as a Capital Region visitor destination. Key considerations in the Plan include the incorporation of AT highway design, and the promotion of sustainable land use and infrastructure development.

South St. Clements Secondary Plan

The Goal of this Secondary Plan is to effectively manage growth and protect natural resources. The Plan identifies a need for new housing to accommodate projected population growth over the next 15 years. In addition, South St. Clements is endowed with rich agricultural soils and the community is poised to embrace its historical roots of small-scale agriculture, market gardening, and horticulture. The Plan also intends to bring an end to the river lot system to support more condensed development and make new site servicing more feasible.

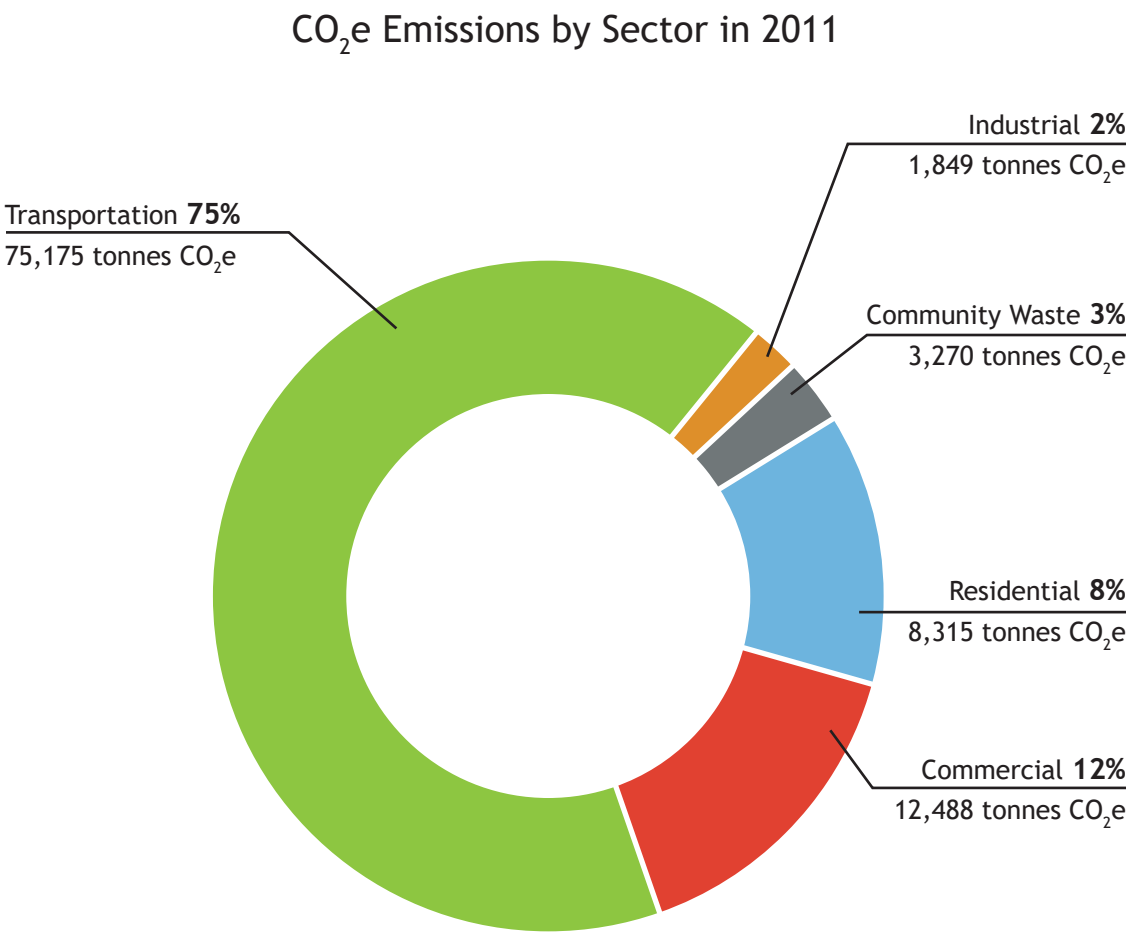
What are St. Clements' GHG emissions, and where do they come from?

Community emissions

In 2013, Eco-West completed a community wide GHG emissions inventory for the RM of St. Clements. Eco-West compiled energy usage data and traffic counts from 2011 as the base year as it coincided with the most recent Canadian Census. Additional data was obtained from 2006 to coincide with the previous census to plot the change in GHG emissions over the five years. Emissions were also projected forward to 2021 with a business-as-usual (BAU) scenario as well as with two different emission reduction targets.

Most of the GHG emissions for the RM of St. Clements result directly from the burning of fossil fuels (e.g. natural gas, gasoline and diesel) for heat or transportation. Energy consumption in the form of electricity usage has a relatively minor effect on GHG emissions in the community given the general cleanliness of Manitoba Hydro's hydroelectric power generation. A small portion of GHG emissions come from methane released by landfill sites.

A breakdown of the community GHG emissions by sector is shown adjacent.



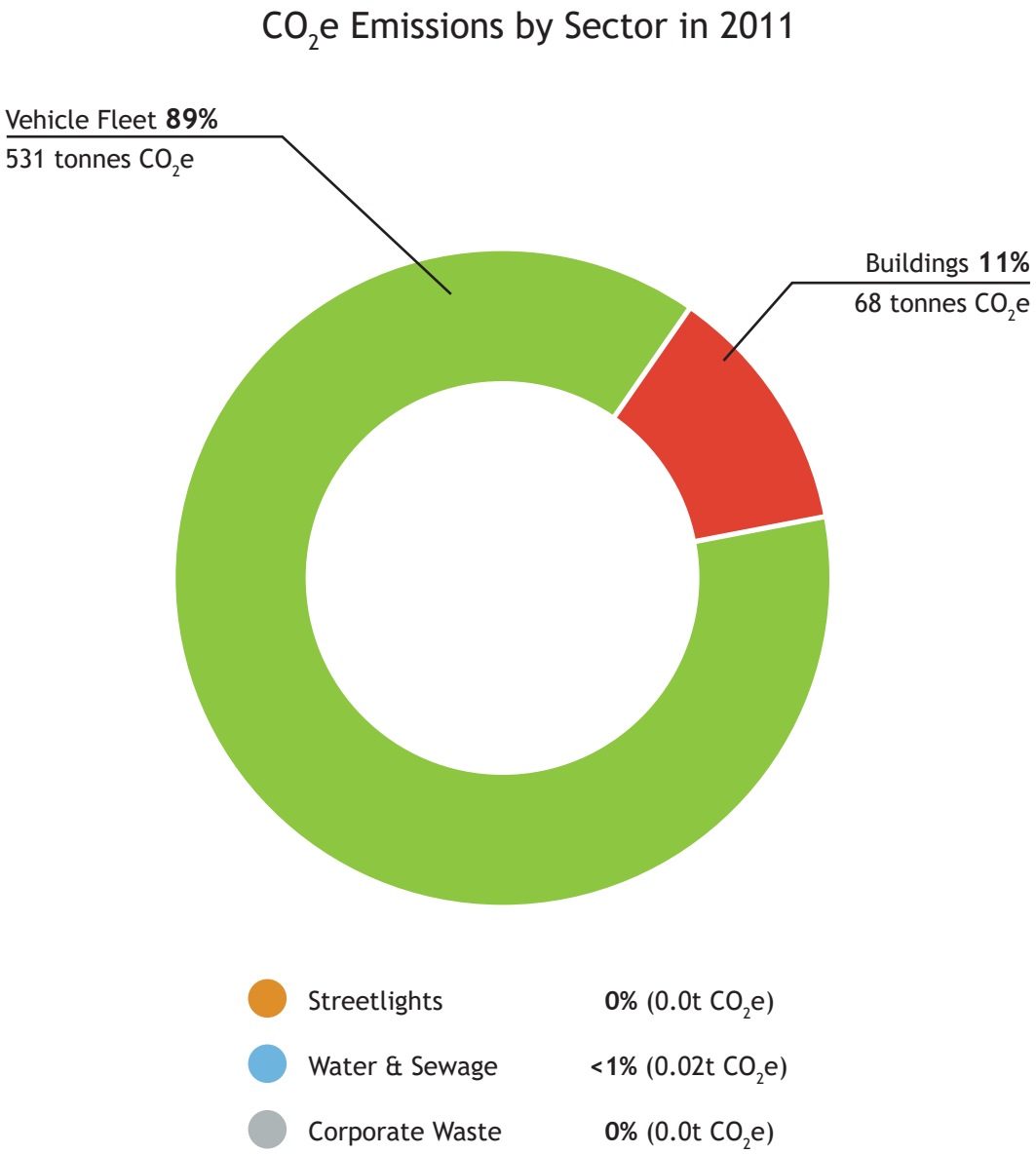
What are St. Clements' GHG emissions, and where do they come from?

Corporate emissions

In addition to the community wide GHG emissions inventory, a detailed corporate inventory was completed for the municipal operations of the RM of St. Clements. As with the community emissions, the bulk of the municipal GHG emissions resulted from burning fossil fuels for heat and transportation. This is reflected in the majority of the emissions being attributed to the Buildings and Vehicle Fleet sectors as the Water and Sewage and Streetlight sectors rely largely on electricity produced through hydroelectric power generation.

A breakdown of the corporate GHG emissions by sector is shown adjacent.

The full Emissions Inventory Report is available in the Appendix.



What has been the process to produce a LAP?

Municipal and Community Consultations

Eco-West held two separate workshop/visioning sessions to present and discuss their Greenhouse Gas Emissions Inventory for the RM of St. Clements.

A visioning exercise was then facilitated in each session. Participants were directed to 'brainstorm' actionable ideas based on the following categories:

- New Developments
- Buildings / Energy
- Water
- Vehicles and Equipment (Municipal only)
- Waste
- Transportation
- IT Infrastructure
- Natural Disaster Mitigation

The categories were used to focus participants' ideas, and are represented as thematic icons within the Action Plan Goals.

Municipal and Community Sessions

Municipal Committee for the RM of St. Clements

The event was held on March 5, 2014.

Community Committee for the RM of St. Clements

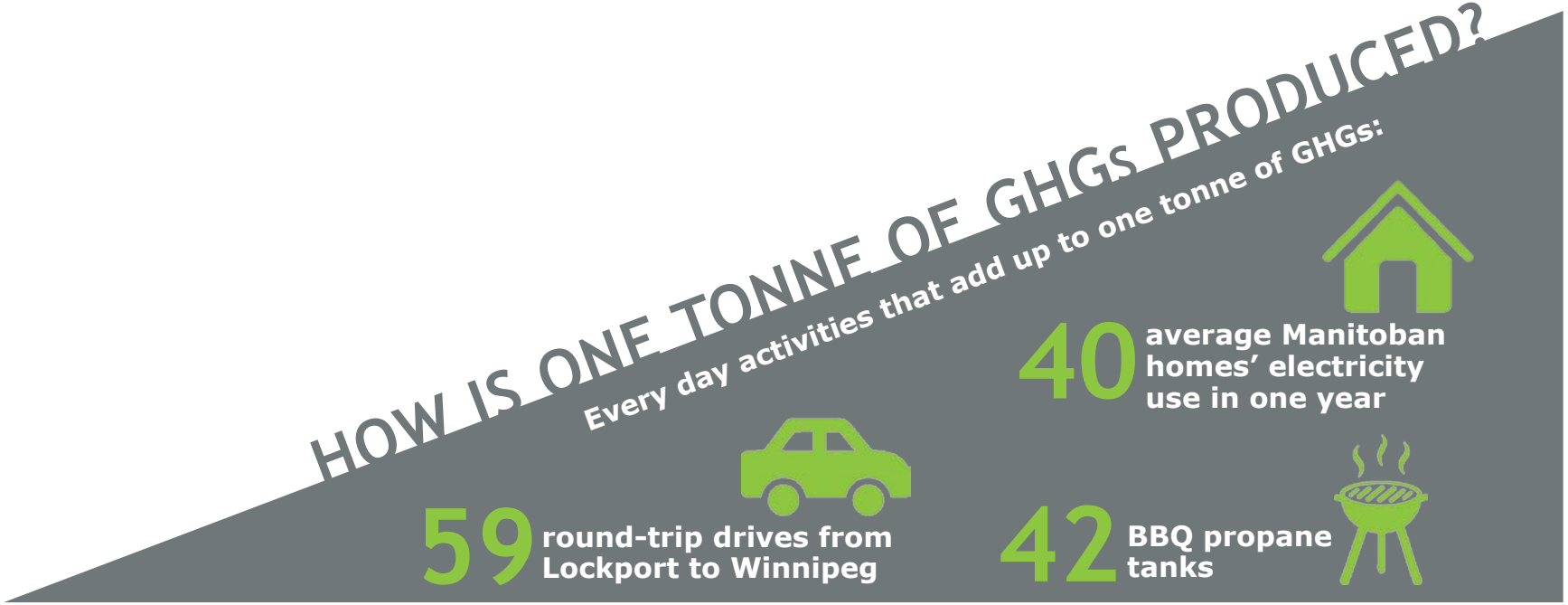
The event was held on April 1, 2015.

Vision statement

*By participating in the Climate Change Local Action Plan process, within the context of a concerted regional project initially led by CDEM's Green Projects Team (now known as Eco-West), the **Rural Municipality of St. Clements** has positioned itself as a community leader in the area of climate change action and the reduction of greenhouse gas emissions in order to help navigate the potential long-term impacts of climate change.*

Corporate and community targets

*The Rural Municipality of St. Clements commits to reducing its greenhouse gas emissions to **20%** below 2011 levels for **municipal operations** within **10** years, and to reduce its greenhouse gas emissions to **6%** below 2011 levels in the **community** within **10** years.*



Potential Programs

goal-based action plans

Greenhouse Gas Reduction Action Plans

This set of potential programs represents initiatives identified and endorsed by stakeholders and community representatives in the RM of St. Clements.

Together, these 6 Goals constitute a Climate Change Local Action Plan (LAP) that can be characterized as:

- Ambitious
- Strategic
- High-leverage
- Effective in reducing GHG emissions
- Attractive to the St. Clements communities by producing environmental, economic and social benefits

It is important to recognize that each program within the plan will require subsequent development and individual approval by Council before being implemented in the years ahead. Not all of these potential programs will necessarily be approved and launched.

What is Green Building?

Green building is the practice of increasing the efficiency with which buildings use resources — energy, water, and materials — while reducing building impacts on human health and the environment, through better siting, design, construction, operation, maintenance, and removal — the complete building life cycle.[8]

It takes a village - get started now!

Easy wins at home include:

- Have an energy audit conducted for your home and implement the recommendations (such as home energy retrofits and the installation of residential renewable energy systems)
- Compost kitchen and garden organic waste to build soil
- Use native trees, plants, ornamental grasses, and ground covers to replace lawn
- Capture run-off in a rain barrel and use it for all your outdoor watering needs (such as lawn, garden, car washing)

Easy wins at work include:

- Participate in workplace and community-based carpools
- Implement an anti-idling program to reduce emissions from municipal fleet vehicles
- Turn off lights and get rid of phantom loads by using a power bar and shutting it off when equipment (computers, monitors etc.) is not in use
- Buy sustainable and/or recyclable supplies

Easy wins in the community include:

- Walk and bike to get around - help increase demand for pedestrian and bike-friendly infrastructure!
- Support local Council in making decisions consistent with corporate policies and sustainability

Easy wins for the municipality include:

- Implement high performance buildings energy retrofits and the installation of renewable energy systems; develop guidelines for green buildings and sites
- Purchase alternative fuel for corporate fleets
- Initiate a Streetlight Replacement Program (such as replacing mercury vapour lamps)

Action Plan Legend

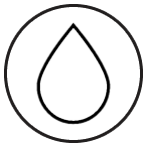
Goal	Goals are general statements of desired ends to be incorporated into the future direction strategies of the community.
Objective	Objectives are more specific statements of the general goals. Objectives require detailed action plans.
Action	Actions are quantifiable and time sensitive; they are taken to achieve the objective.
Step	The tasks undertaken to fulfill the Action.

Indicator	A measure to determine the success of the Action.
Time Frame	Indication for when the Action will be undertaken: Short-term: within one to two years (**ST**) Medium-term: within two to five years (**MT**) Long-term: beyond five years (LT) Continuous: ongoing (**C**)
Responsibility	Indicates the person, department, or group who will lead implementation of the Action.

Take action!
Assign responsibility for each Action within the LAP.

Thematic icons


New Developments


Water


Waste


IT Infrastructure


Buildings / Energy


Vehicles / Equipment


Transportation


Natural Disaster Mitigation

Goal 1: Sustainably grow the Rural Municipality of St. Clements

Continue to grow the communities of St. Clements without creating additional increases in GHG emissions

Objective:

Promote development projects that seek to reduce or mitigate new GHG emissions as a result of development

Action 1A:

Promote all new building construction to have high efficiency furnaces, low flow toilets and high R-value insulation

Steps:

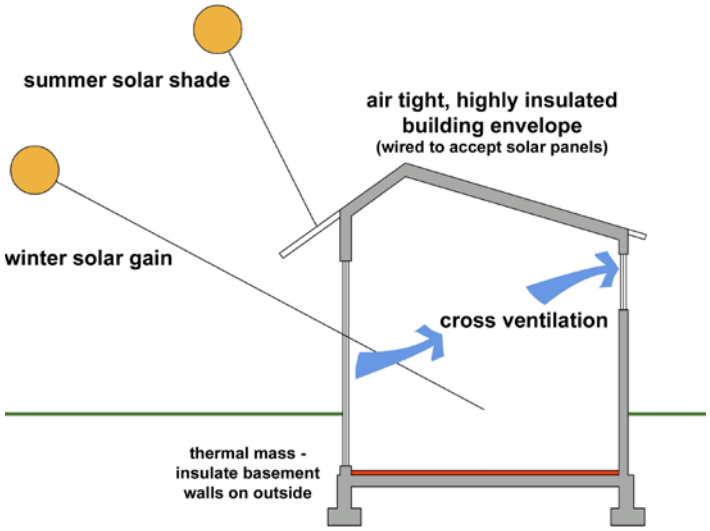
- Review the standards for new building construction
- Review standard development agreements
- Determine if changes can be made to enforce or encourage more energy efficient building design in new developments

Percentage of new building construction with higher energy efficiency ratings

MT

Use less energy

As much as possible, use passive techniques for home heating and cooling. Manually adjust your thermostat or invest in a 'smart' programmable thermostat to avoid temperature extremes in winter (heating) and summer (air conditioning).



Climate Resilient Architecture

Features like screened-in-porches, attached sunrooms and greenhouses, more glazing on east and south exposures, and vegetated roofs may help to "Future Proof" against the predicted increase in frequency and severity of weather events as a result of climate change.

Goal 1: Sustainably grow the Rural Municipality of St. Clements

Continue to grow the communities of St. Clements without creating additional increases in GHG emissions

Objective:

Promote development projects that seek to reduce or mitigate new GHG emissions as a result of development

Action 1B:

Promote plantings in new developments that are designed for carbon sequestration

Steps:

- Review current zoning requirements and standard development agreements
- Determine if changes can be made to encourage developers to include carbon sequestration projects as part of development

☑ Acres of carbon sequestration planting

☑ Tonnes of carbon being stored

MT

Fast facts

In addition to carbon sequestration, native plants offer a more sustainable solution because they:

- **attract birds, mammals, and insects**
- **filter more pollutants and require less fertilizer, pesticides, and irrigation**
- **use less potable water**
- **reduce water costs**
- **protect water sources for future generations**

One generation plants the trees, another gets the shade.

(Old Chinese Proverb)

Rain garden, École communautaire Aurèle-Lemoine, St. Laurent, Manitoba

Goal 1: Sustainably grow the Rural Municipality of St. Clements

Continue to grow the communities of St. Clements without creating additional increases in GHG emissions

Objective:

Ensure new developments are planned/ built with priorities placed on pedestrian and cyclist transportation

Action 1C:

Develop an Open Space Strategy for new developments

Steps:

- Hire consultant or allocate internal staff to develop a policy for creating enhanced open spaces in new developments

☑ Council adopted policy

MT

A Manual for Conservation Subdivision Design explains how to design rural subdivisions that protect open space, woodlands, natural areas, wildlife habitats, and wetlands.

www.gov.mb.ca/ia/land_use_dev/manualforconservationsubdivisiondesign.html

Objective:

Promote building retrofits that will have a positive effect on reducing GHG emissions

Action 1D:

Assist local businesses and residents with building retrofits / grants / emission reduction plans

Steps:

- Research programs for assisting homeowners and businesses with building retrofits
- Provide information to residents on existing grant programs for building improvements

☑ Amount of building retrofit projects that include GHG reduction measures

☑ Dollars received from grant programs for building retrofits

ST

Goal 2: Sustainably manage water

Be proactive in educating the public on ways to reduce treated water consumption and minimize water runoff

Objective:

Reduce the amount of stormwater runoff into Red River basin

Action 2A:

Conduct feasibility study for the development of naturalized wetland stormwater retention facilities

Steps:

- Hire consultant or allocate internal staff to conduct feasibility study

Study completion with recommendations for areas where naturalized wetland stormwater retention facilities could be built including estimates for amount of runoff prevented from entering Red River basin

MT

The constructed natural wetlands in Royalwood subdivision (Winnipeg, Manitoba) have replaced standard stormwater retention ponds. Not only are they an environmentally sound solution to water retention, but they also serve as a beautiful focal point and unique recreational and educational resource.

Bio-swale, Seven Oaks subdivision, Winnipeg, Manitoba. Bio-retention systems are designed to mimic processes that occur in the natural environment by filtering and storing runoff water from rainstorms and snow melt, rather than letting it be flushed through the stormwater sewer system.

Goal 2: Sustainably manage water

Be proactive in educating the public on ways to reduce treated water consumption and minimize water runoff

Objective:

Reduce the amount of stormwater runoff into Red River basin

Action 2B:

Initiate a discount rain barrel program

Steps:

- Review successful rain barrel programs from other municipalities such as Winnipeg
- Allocate budget for creation of similar program in RM

Number of rain barrels sold to public

MT

A rain barrel offers a great opportunity to help educate students, neighbours, or your community about water conservation.

FAST FACTS

Non-potable, captured water can be used for

- **watering plants**
- **flushing toilets**
- **custodial and maintenance purposes**

Many communities hold rain barrel design competitions, events and fundraisers – a great way to promote water recycling while enhancing artistic abilities!

Goal 2: Sustainably manage water

Be proactive in educating the public on ways to reduce treated water consumption and minimize water runoff

Objective:

Reduce the risk of droughts and reliance on watering landscapes

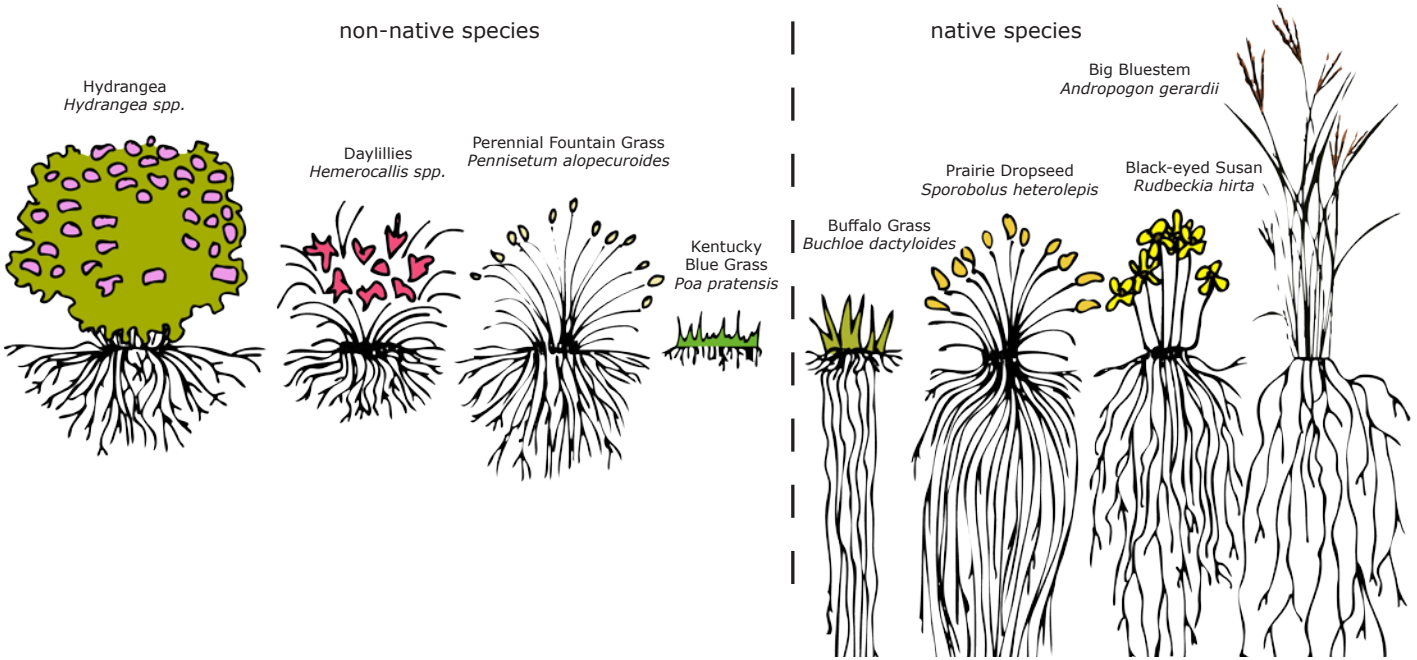
Action 2C:

Plant native species in the RM

Steps:

- RM to review approved plant species for all public reserve and right of way planting
- Create education materials (or direct to existing sources) for general public on appropriate plants to use in home landscape that require less water

- ☑ Decrease in treated water usage
- ☑ Decrease acres of land requiring re-seeding/re-sodding
- ST



Native plants have much deeper root systems than non-native species. These long roots give native species the advantage when it comes to competing for, absorbing, and retaining water and nutrients. These "super" roots also filter excessive nutrients such as nitrogen and phosphorous from stormwater runoff before it reaches rivers and lakes.

Goal 2: Sustainably manage water

Be proactive in educating the public on ways to reduce treated water consumption and minimize water runoff

Objective:

Encourage water conservation programs

Action 2D:

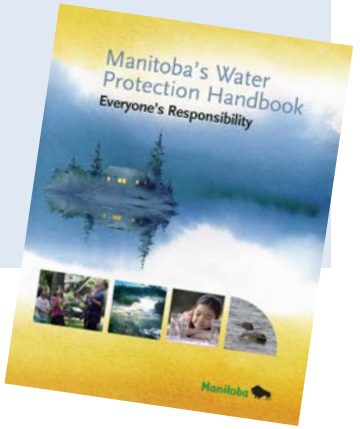
Promote community education on maintaining clean and safe drinking water

Steps:

- Promote Water Smart and Lake Friendly programs through municipal communications such as on the website and in community newsletters

Reduction in community water usage

ST



Manitoba's Water Protection Handbook is for all Manitobans living and working in urban and rural areas with an interest in keeping our waters clean.

www.gov.mb.ca/waterstewardship/reports/water_protection_handbook.pdf

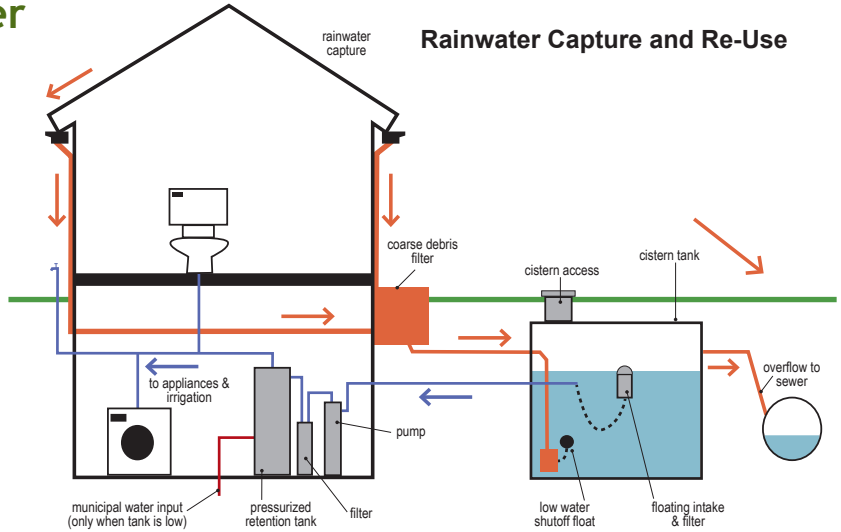
Take it one 'flush' further

Grey Water Capture and Re-Use

- water from bath and laundry is rerouted to a grey water system for filtration and disinfection and can then be used to replace potable water for flushing toilets

Rainwater Capture and Re-Use

- rain barrels and cisterns store water for irrigation, flushing toilets, and laundry



Goal 3: Sustainably operate the municipal operations of St. Clements

RM to become a leader for the community for GHG emission reduction, energy and water use reduction, and waste reduction

Objective:

Be a leader in energy conservation in all RM buildings

Action 3A:

Conduct annual energy audits of all corporate facilities

Regular reports presented to Council for information

Steps:

- Track all energy usage information for all corporate facilities
- Annual review of all energy usage including calculations of GHG emissions
- Create annual report to Council and community on energy use, GHG emissions, targets reached, and projects underway

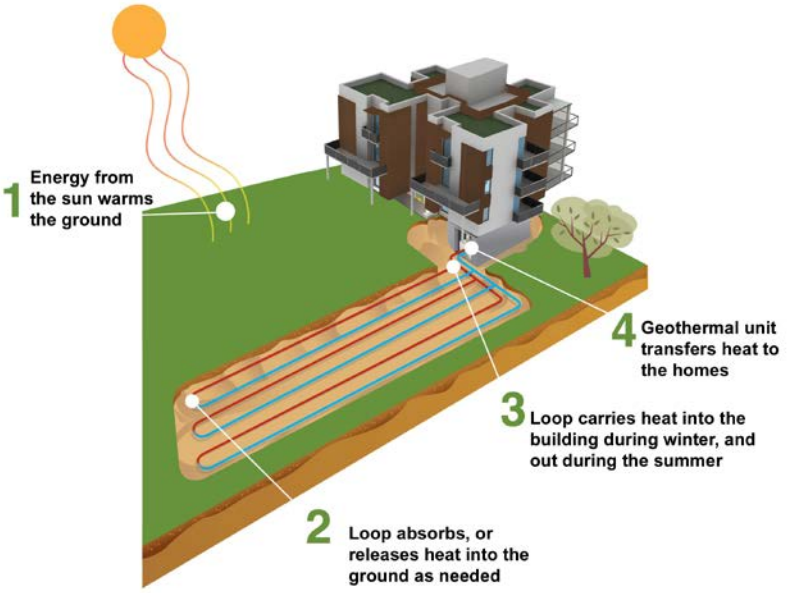
ST

Did you know?

Buildings generate about 35 per cent all of greenhouse gases, 35 per cent of landfill waste comes from construction and demolition activities, and up to 70 per cent of municipal water is consumed in and around buildings.[9]

Let the sun light the way one step further!

Geothermal systems for corporate or community buildings!



Goal 3: Sustainably operate the municipal operations of St. Clements

RM to become a leader for the community for GHG emission reduction, energy and water use reduction, and waste reduction

Objective:

Ensure municipal operations run efficiently for both cost reductions as well as environmental impacts

Action 3B:

Adopt a "green" purchasing policy for all new fleet vehicles and equipment

Steps:

- Review existing purchasing policies
- Revise policies to include reviewing new technologies that reduce GHG emissions and produce cost savings

- ☑ Decreased GHG emissions from fleet vehicles and equipment
- ☑ Decreased costs for fuel and maintenance of fleet and equipment

ST

Action 3C:

Purchase an RM van for staff and Council carpooling

Steps:

- Determine budget requirements and include in future budgeting process
- Purchase a van

- ☑ Decreased amount of fuel used for staff and Council to attend meetings and events

MT

Goal 4: Reduce community waste

Seek to reduce the average waste per household in the RM of St. Clements

Objective:

Expand the awareness, education and capacity for recycling and solid waste diversion

Action 4A:

Review community recycling strategy to determine possible additional steps such as improved/ increased recycling depots and/or community pick up

Steps:

- Review best practices in recycling programs from other municipalities
- Consult with the public on what services they would like
- Determine best steps for moving forward in the community

Reduction in the amount of waste produced per household in the RM

ST

Did you know?

In an effort to encourage waste reduction, many Canadian municipalities have set bag limits on weekly curbside waste pick-up. Pre-paid bag tags allow for any additional bags.

Goal 4: Reduce community waste

Seek to reduce the average waste per household in the RM of St. Clements

Objective:

Expand the awareness, education and capacity for recycling and solid waste diversion

Action 4B:

Review community organics strategy to determine possible additional steps such as community compost/ yard waste drop off sites, organics pick up

Steps:

- Review best practices in yard waste and organics programs from other municipalities
- Consult with the public on what services they would like
- Determine best steps for moving forward in the community

Reduction in the amount of waste produced per household in the RM

ST

Did you know?

As a consumer society it is important to practice the 6 "Rs" related to waste reduction; Rethink, Refuse, Reduce, Reuse, Repair and Recycle in that order. Recycling should be the last step in reducing the amount of waste sent to the landfills each year.

What is "Zero Waste?"

Zero waste is a philosophy related to the redesign of our resource-use system. It strives towards maximum waste reduction through the most efficient use of natural resources and materials and the maximizing of recycling. The term waste is replaced with resource. A growing number of municipalities across Canada are adopting the philosophy of Zero Waste.[10]

Goal 4: Reduce community waste

Seek to reduce the average waste per household in the RM of St. Clements

Objective:

Expand the awareness, education and capacity for recycling and solid waste diversion

Action 4C:

Encourage compost education in schools

Steps:

- Initiate dialogue with compost education programs such as those offered through the Green Action Centre and with area schools
- Determine what supports education program may need such as compost bins for schools

- ☑ Number of students educated on proper composting techniques
- ☑ Waste diversion rates from schools with compost programs

ST

Ecological literacy

The ability to understand the natural systems that make life on earth possible. An ecologically literate society would be a sustainable society that does not destroy the natural environment on which it depends.[11]

Goal 4: Reduce community waste

Seek to reduce the average waste per household in the RM of St. Clements

Objective:

Expand the awareness, education and capacity for recycling and solid waste diversion

Action 4D:

Conduct compost and gardening workshops in the RM for local residents

Steps:

- Initiate dialogue with compost education programs such as those offered through the Green Action Centre
- Invite residents to education workshops

- ✓ Number of residents educated on proper composting techniques
- ✓ Reduction in the amount of waste produced per household in the RM

ST

Objective:

Determine sources of waste

Action 4E:

Conduct landfill study

Steps:

- Hire consultant or allocate internal staff to conduct study on the landfill including effective life, sources of waste and types of waste

- ✓ Report to Council for information and next steps for moving forward with further waste reduction actions for the RM

LT

Goal 5: Improve air quality

Seek to improve air quality and reduce GHG emissions through a reduction in the number of motor vehicle kilometres travelled

Objective:

Reduce reliance on automobiles

Action 5A:

Provide parking stalls for car pools

Use of car pool parking spot(s) once installed

ST

Steps:

- Conduct community review (may include community survey or key stakeholder interviews) to determine best locations for car pool parking spots
- Install signage for electrified parking stalls
- Educate public on car pool parking stall location(s)
- Promote car pool rider matching through community news

Walk to work, even if it's four miles. Ride a bike to work. Drive a different way.

(Nolan Bushnell)

Take it one 'kilometre' further

Electric car charging station. . .

Goal 5: Improve air quality

Seek to improve air quality and reduce GHG emissions through a reduction in the number of motor vehicle kilometres travelled

Objective:

Reduce reliance on automobiles

Action 5B:

Collaborate with the Capital Region on developing the Regional Transportation Master Plan as well as a Capital Region bus service

- ☑ Regional Transportation Master Plan
- ☑ Creation of Regional bus service

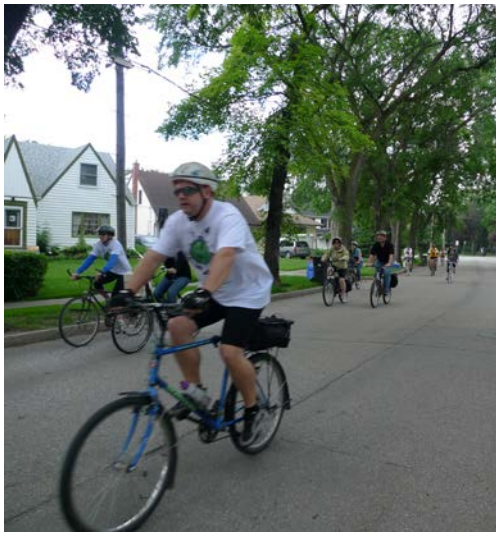
LT

Steps:

- Advocate for Regional Transportation Master Plan to include measures that would reduce motor vehicle kilometres travelled (i.e. bike routes)
- Advocate for a regional bus service in the Capital Region

Every time I see an adult on a bicycle, I no longer despair for the future of the human race.

(H.G. Wells)



Goal 5: Improve air quality

Seek to improve air quality and reduce GHG emissions through a reduction in the number of motor vehicle kilometres travelled

Objective:

Reduce reliance on automobiles

Action 5C:

Develop Active Transportation Plan for the Rural Municipality of St. Clements

Steps:

- Hire consultant or allocate internal staff for production of plan

Production of Active Transportation Plan

LT

Goal 6: Reduce energy consumption

Seek to reduce energy consumption for existing buildings

Objective:

Promote sustainable retrofit measures for existing facilities

Action 6A:

Promote Power Smart Programs

Steps:

- Include educational information on Manitoba Hydro Power Smart Programs on RM website and in RM publications

Increase of reported Power Smart Program usage

ST

Did you know?

Sealing a house to reduce air leakage is often the least expensive way of achieving significant savings on your heating bill.

(Manitoba Hydro)

Goal 6: Reduce energy consumption

Seek to reduce energy consumption for existing buildings

Objective:

Promote development of alternative sources of energy

Action 6B:

Seek alternative energy sources such as bladeless wind and solar for community energy needs

Amount of energy sourced from renewable sources

LT

Steps:

- Conduct research into installation of small scale renewable energy generators for community usage

'Bright' ideas!

Solar parking panels and solar heating for an outdoor pool!

Did you know?

The cleanest and cheapest unit of energy is the one you don't use!

Hudson Hope, BC

Goal 6: Reduce energy consumption

Seek to reduce energy consumption for existing buildings

Objective:

Promote development of alternative sources of energy

Action 6C:

Study the potential for conversion of steam plant in East Selkirk to biomass energy plant using bulrushes harvested from Netley Marsh

Study initiated

LT

Steps:

- Initiate discussions with Manitoba Hydro on producing a joint study for the potential re-use of the power plant in East Selkirk

Bulrush / Schoenoplectus Spp.
(formerly Scirpus Spp.)

Did you know?
Cattail vs bulrush

Although they are commonly confused or interchanged, the cattail and bulrush are two distinct wetland species. Cattails have tall, flat, blade-like leaves and a long brown catkin that looks like a hot dog. Bulrushes have long, round leaves and drooping clusters of small, brown spikelets. Both species are often planted in constructed wetlands because they act as the kidneys of the wetland, filtering out pollutants from the water.

Netley-Libau Marsh, MB

Local Benefits & Impacts

environmental, economic & social

Types of Benefits

Local benefits serve as motivation for action. . .

"What does this mean to me, my family, my job or business, my community?"

The topic of global climate change can be rather abstract for some people. The setting of greenhouse gas reduction targets helps to create a tangible, overarching goal that unites and aligns the diverse motivations and agendas of the residents, businesses, institutions, community organizations and municipal government. However, this is not enough to enable and motivate stakeholders to act: the overarching goal must be translated to local benefits. One of the key principles in the PCP Program is to emphasize local benefits.

Economic Benefits

- Energy and operating cost savings in all sectors
- Physical asset renewal in municipal operations and private sector
- Improved municipal service delivery
- Reduced healthcare costs
- Increased productivity and employee morale
- Greater support for local businesses - significant multiplier effects
- New local business opportunities in sustainable development sector
- Local job creation in new "green" businesses and services

Environmental Benefits

- Improved air quality
- More green space and trees in the community
- Improved health of natural ecosystems
- Reduced "urban heat island effect"
- Better indoor living and working environments (e.g. improved lighting, better indoor air quality, reduced noise, increased comfort)

Social Benefits

- Improved health of residents
- Reduced traffic congestion
- Increased community investment and services
- Opportunity for the municipal government to show leadership and influence other community stakeholders to take action
- Greater sense of community; enhanced quality of life

Estimated impacts of the Community Climate Change Local Action Plan

KEY

↓ = amount of GHG reduction

$ = cost

= amount of positive environmental impact

= amount of positive economic impact

= amount of positive social impact

ACTIONS		GHG REDUCTION	COST	BENEFITS		
				Environmental	Economic	Social
GOAL 1: Sustainably grow the Rural Municipality of St. Clements						
Action 1A	Promote all new building construction to have high efficiency furnaces, low flow toilets and high R-value insulation	↓ ↓ ↓	$ $			
Action 1B	Promote plantings in new developments that are designed for carbon sequestration	↓ ↓ ↓	$ $			
Action 1C	Develop an Open Space Strategy for new developments	↓ ↓	$ $ $			
Action 1D	Assist local businesses and residents with building retrofits / grants / emission reduction plans	↓ ↓ ↓	$ $			
GOAL 2: Sustainably manage water						
Action 2A	Conduct feasibility study for the development of naturalized wetland stormwater retention facilities	↓ ↓	$ $ $			
Action 2B	Initiate a discount rain barrel program	↓	$			
Action 2C	Plant native species in the RM	↓ ↓ ↓	$ $			
Action 2D	Promote community education on maintaining clean and safe drinking water	↓	$			
GOAL 3: Sustainably operate the municipal operations of the Rural Municipality of St. Clements						
Action 3A	Conduct annual energy audits of all corporate facilities	↓ ↓ ↓	$ $ $			
Action 3B	Adopt a "green" purchasing policy for all new fleet vehicles and equipment	↓ ↓ ↓	$ $ $			
Action 3C	Purchase an RM van for staff and Council carpooling	↓ ↓	$ $ $			

Estimated impacts of the Community Climate Change Local Action Plan

ACTIONS		GHG REDUCTION	COST	BENEFITS		
				Environmental	Economic	Social
GOAL 4: Reduce community waste						
Action 4A	Review community recycling strategy to determine possible additional steps such as improved/increased recycling depots and/or community pick up	↓ ↓ ↓	$			
Action 4B	Review community organics strategy to determine possible additional steps such as community compost/ yard waste drop off sites, organics pick up	↓ ↓ ↓	$			
Action 4C	Encourage compost education in schools	↓ ↓ ↓	$			
Action 4D	Conduct compost and gardening workshops in the RM for local residents	↓ ↓ ↓	$			
Action 4E	Conduct landfill study	↓ ↓ ↓ ↓	$ $ $			
GOAL 5: Improve air quality						
Action 5A	Provide parking stalls for car pools	↓ ↓	$ $			
Action 5B	Collaborate with the Capital Region on developing the Regional Transportation Master Plan as well as a Capital Region bus service	↓ ↓ ↓	$ $			
Action 5C	Develop Active Transportation Plan for Rural Municipality of St. Clements	↓ ↓ ↓	$ $			
GOAL 6: Reduce energy consumption						
Action 6A	Promote Power Smart Programs	↓ ↓ ↓ ↓	$ $			
Action 6B	Seek alternative energy sources such as bladeless wind and solar for community energy needs	↓ ↓ ↓	$ $ $			
Action 6C	Study the potential for conversion of steam plant in East Selkirk to biomass energy plant using bulrushes harvested from Netley Marsh	↓ ↓ ↓ ↓	$ $ $ $			

Next Steps
getting started

Conclusion

This report confirms that the RM of St. Clements has completed the 3rd milestone of the Partners for Climate Protection (PCP) program.

With this Climate Change Local Action Plan received by council on May 10, 2016, the RM of St. Clements now has a report that can be described as comprehensive, effective, and achievable.

The next step for Eco-West and the RM of St. Clements will be to engage participating stakeholders in implementing the initiatives that have been identified in this report, and to seek all available sources of funding in order to make these projects come to fruition with sustainable results.

The timelines for many of these activities will vary, as some programs may take only a matter of months to fine-tune and launch while others may require more time and resources to fully develop and reach the point of approval. Once launched, some programs could take years to fully implement.

As the community is developing and implementing these projects, best practices for additional project concepts that could be added to this plan should be identified. Moreover, technologies, policies, economic/legal drivers and climate conditions will inevitably change in the years ahead. New opportunities and obligations arising from this changing environment may require a revision of this report in the short term and create a "second generation" of initiatives in the longer term.

Appendices

references

emissions inventory

References

Literature

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2 Natural Resources Canada. *Canada in a Changing Climate: Sector Perspectives on Impacts and Adaptation.* www.nrcan.gc.ca/environment/resources/publications/impacts-adaptation/reports/assessments/2014/16309

3 IPCC. *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.* http://www.ipcc.ch/report/ar5/wg1/

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8, 10, 11 City of Thunder Bay. *EarthWise Thunder Bay Community Environmental Action Plan.* www.thunderbay.ca/Assets/Living/Environment/docs/EarthWise+Thunder+Bay+Community+Environmental+Action+Plan.pdf

Images

Unless otherwise noted, images are courtesy of SMM, and all photos from flickr are from Creative Commons.

Eco logo (pg. 3)
www.ecologo.org

Lake friendly logo (pg. 3)
www.lakefriendly.ca

Earth/Sun GHG (pg. 8)
www.durham.ca/climatechange

St. Andrews Lock & dam, by Shahnoor Habib Munmun (pg. 11)
https://upload.wikimedia.org/wikipedia/commons/4/4e/Lockport_Dam_on_Red_River_Manitoba_Canada_%288%29.JPG

Algal Blooms, modified by Greg McCullough (pg. 12)
http://home.cc.umanitoba.ca/~gmccullo/LWsat2005.htm

Beach, by 681yukien: "photo1.jpg" (pg. 13)
www.tripadvisor.ca

St. Andrews Lock & dam, by Shahnoor Habib Munmun (pg. 13)
https://upload.wikimedia.org/wikipedia/commons/4/4e/Lockport_Dam_on_Red_River_Manitoba_Canada_%288%29.JPG

Green building logo (pg. 20)
www.cagbc.org

St. Laurent rain Garden, Denise Allard, École communautaire Aurèle-Lemoine (pg. 23)

Rain Barrel (pg. 26)
www.flickr.com/photos/glamourschatz/5457067371/sizes/o/in/photostream/

Rain Barrel art (pg. 26)
www.flickr.com/photos/mobikefed/2430341456/sizes/o/in/photostream/

Idle free zone sign (pg. 30)
www.climatechangeconnection.org

Tags (pg. 31)
stalbert.ca

Bag with tag (pg. 31)
sinmcoe.ca

Compost garden (pg. 32)
www.flickr.com/photos/faircompanies/2201828072/sizes/o/in/photostream/

Composter (pg. 33)
www.earthmachine.com

Car pool car (pg. 35)
www.ucalgary.ca

Car pool sign (pg. 35)
www.edmonton.ca

Electric car (pg. 35)
www.flickr.com/photos/evgo/6545153803/sizes/l/in/photostream/

Cellulose insulation (pg. 38)
www.flickr.com/photos/30585638@N07/6950427151/sizes/m/in/photostream/

Solar panel parking lot (pg. 39)
www.flickr.com/photos/greatvalleycenter/38288929/sizes/z/in/photostream

Solar heated swimming pool (pg. 32)
www.northerndevelopment.bc.ca

Bulrush (pg. 40)
www.flickr.com/photos/soggydan/5187342291/sizes/o/in/photostream/

Netley-Libau Marsh aerial (pg. 40)
www.gov.mb.ca

Community builders (pg. 42)
www.flickr.com/photos/codnewsroom/3831296134/sizes/o/in/photostream/

Rural Municipality of St. Clements Greenhouse Gas (GHG) Emissions Inventory

Since spring, CDEM has worked with your municipality in order to provide the following GHG emissions information for your jurisdiction.

The tables below indicate the source of GHG emissions and the amount that is generated within your territory in 2003, 2008 and 2011, both at the Community and the Corporate levels.

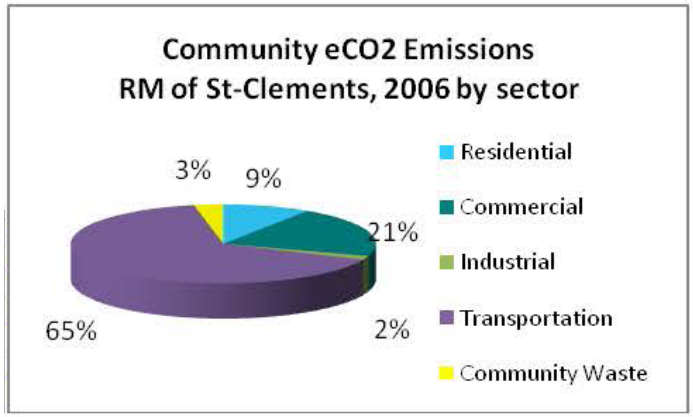
- Community Inventory: This inventory includes residential, institutional, commercial and industrial, as well as transportation and solid waste data.
- Corporate Inventory: This inventory includes data on all municipal government installations, including the buildings, the street lighting, water and sewage, the municipal fleet and solid waste within the community and / or the municipal government.

1. St. Clements Community Emissions Inventory for 2006 and 2011

eCO2 Emissions, by Sector, in 2006:[1]

Energy Usage and eCO_2 Emissions by Sector

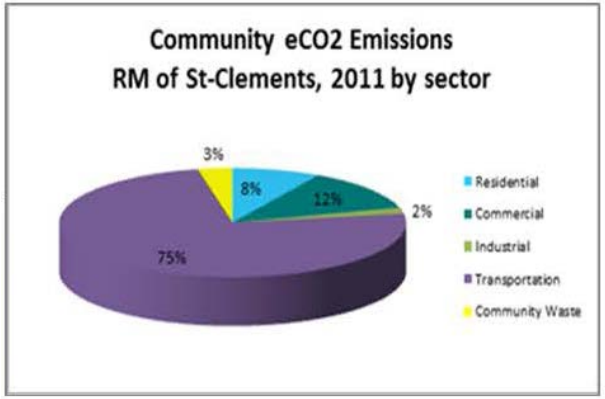
Sector	Energy (GJ)	Total eCO_2 (t)
Residential	493 822,30	9 252,19
Commercial	468 026,96	20 640,32
Industrial	49 180,59	1 561,03
Transportation	931 371,88	64 939,83
Community Waste	-	3 086
Total	**1 942 401,74**	**99 479,12**



eCO2 Emissions, by Sector, in 2011:[2]

Energy Usage and eCO_2 Emissions by Sector

Sector	Energy (GJ)	Total eCO_2 (t)
Residential	534 446,14	8 314,79
Commercial	329 719,08	12 487,73
Industrial	60 203,61	1 848,93
Transportation	1 078 171,19	75 175,40
Community Waste	-	3 270
Total	**2 002 540,02**	**101 097,11**



[1] Energy Sources for 2006, in eCO2 (t): Electricity 1,341; Natural Gas 30,113; Diesel 18,977; Gasoline 45,431; Propane 532; Waste 3,086.

[2] Energy Sources for 2011, in eCO2 (t): Electricity 260; Natural Gas 22,391; Diesel 21,969; Gasoline 52,591; Propane 616; Waste 3,270.

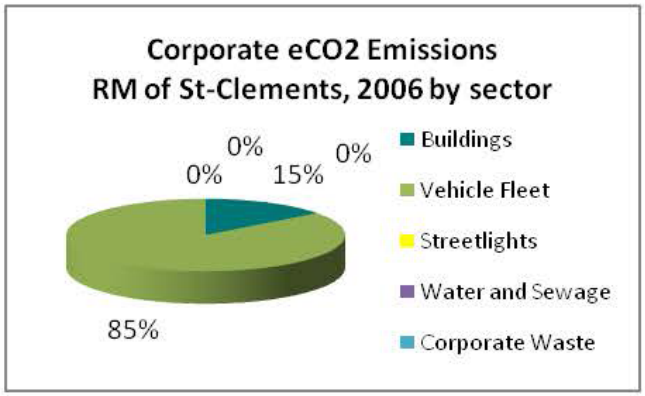
Rural Municipality of St. Clements Greenhouse Gas (GHG) Emissions Inventory

2. St. Clements Corporate Emissions Inventory for 2006 and 2011

eCO2 Emissions, by Sector, in 2006:[3]

Energy Costs and eCO_2 Emissions by Sector

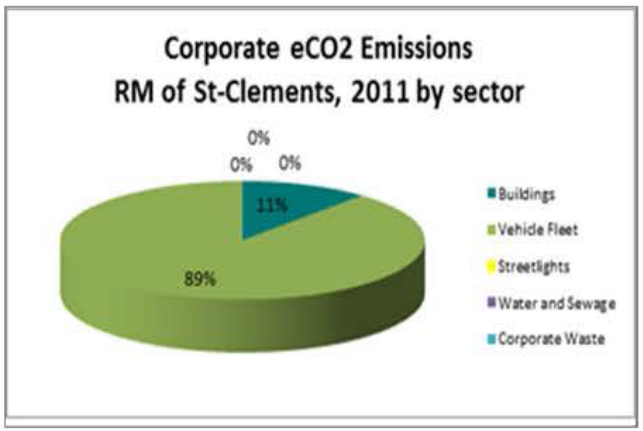
Sector	Total Cost ($)	Energy (GJ)	Total eCO_2 (t)
Buildings	0	2 582,44	72,39
Vehicle Fleet	111 606	156 452,10	419,83
Streetlights	0	0,00	0,00
Water and Sewage	0	15,19	0,05
Corporate Waste	-	-	0,00
Total	**111 606**	**159 050**	**492**



eCO2 Emissions, by Sector, in 2011:[4]

Energy Costs and eCO_2 Emissions by Sector

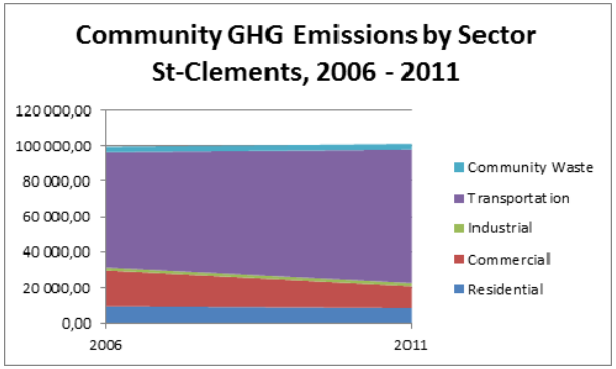
Sector	Total Cost ($)	Energy (GJ)	Total eCO_2 (t)
Buildings	0	3 286,57	68,03
Vehicle Fleet	182 074	7 574,88	530,72
Streetlights	0	0,00	0,00
Water and Sewage	0	34,88	0,02
Corporate Waste	-	-	0,00
Total	**182 074**	**10 896**	**599**

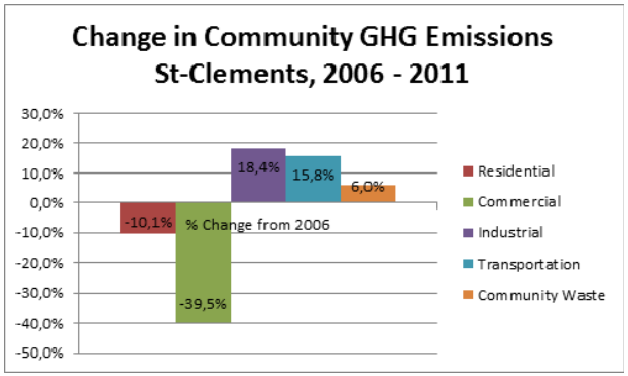


[3] Energy Sources for 2006, in eCO2 (t): Electricity 4; Natural Gas 38; Diesel 420.
[4] Energy Sources for 2011, in eCO2 (t): Electricity 1; Natural Gas 67; Diesel 531.

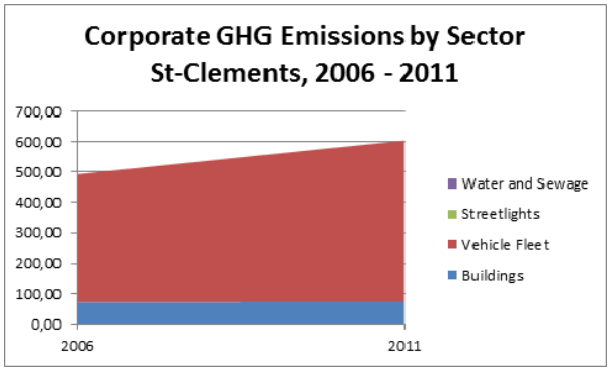
Rural Municipality of St. Clements Greenhouse Gas (GHG) Emissions Inventory

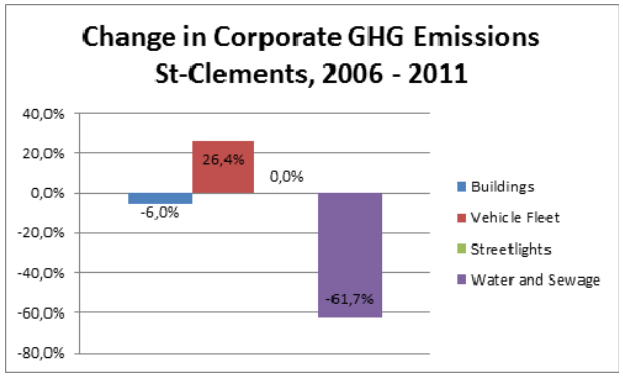
3. Preliminary Observations: 2006 and 2011





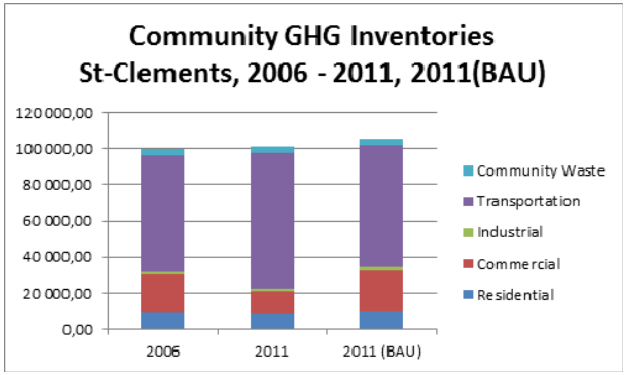
As demonstrated in the tables above, there hasn't been a significant change in actual GHG emissions as a whole within the community. The observed reduction of emissions indicates a significant decrease in the Commercial and Residential sectors and an increase of emissions in Industrial, Transportation and Community Waste sectors. The Transportation sector in particular accounts for nearly 75% of total emissions.

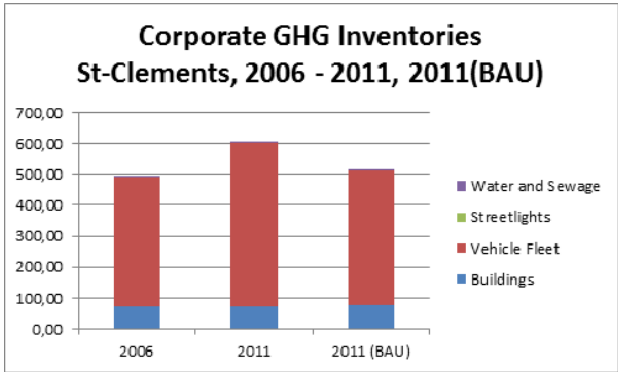




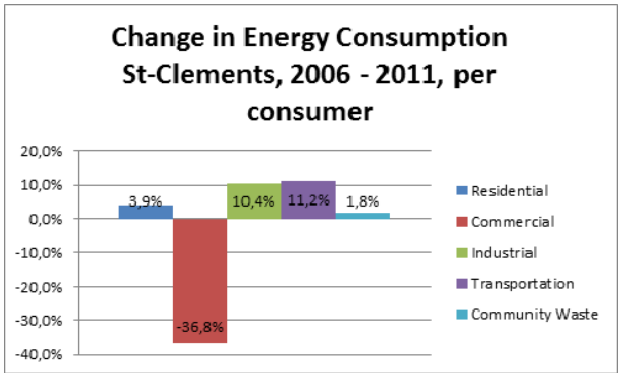
At the Corporate level, actual GHG emissions amount have increased by over 20% largely due to increases in vehicle fleet fuel consumption. While the Water and Sewage sector has decreased in GHG emissions, the overall emissions is less than 1% of total Corporate emissions.

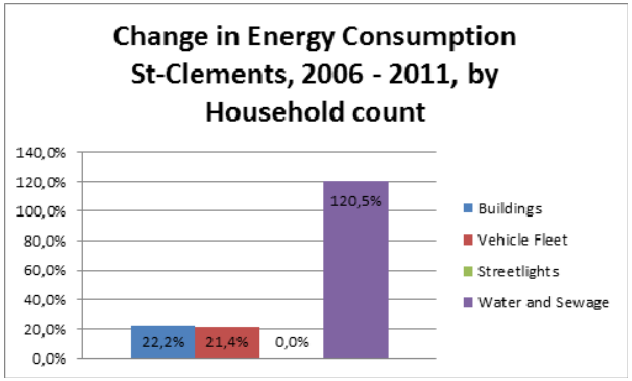
Rural Municipality of St. Clements Greenhouse Gas (GHG) Emissions Inventory





The table on the left indicates that actual Community GHG emissions levels have remained relatively stable through a time of strong population growth. With the table on the right, it is noted that actual 2011 Corporate GHG emissions are higher that the projected "Business as usual" emissions predictions.

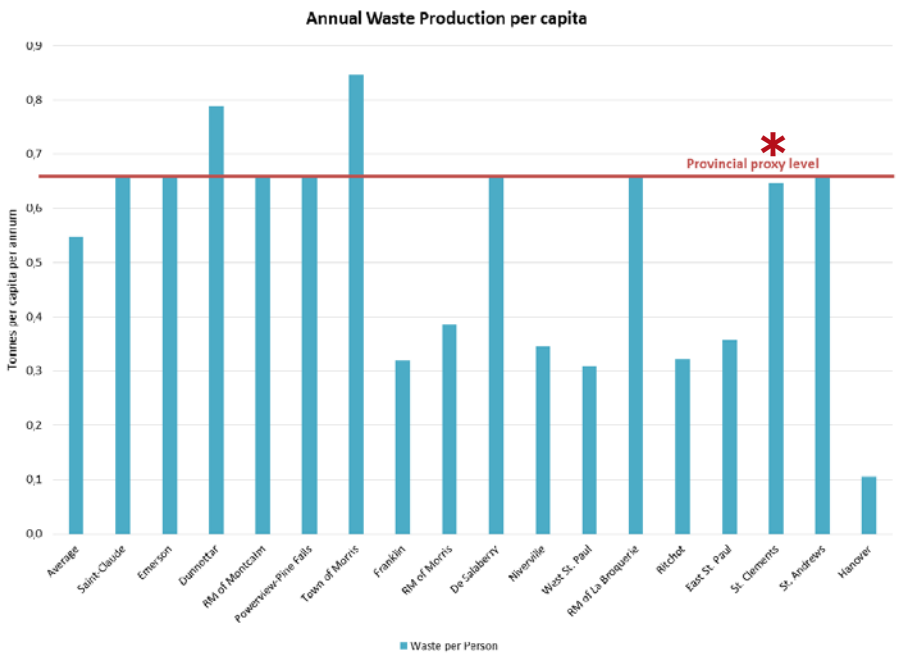


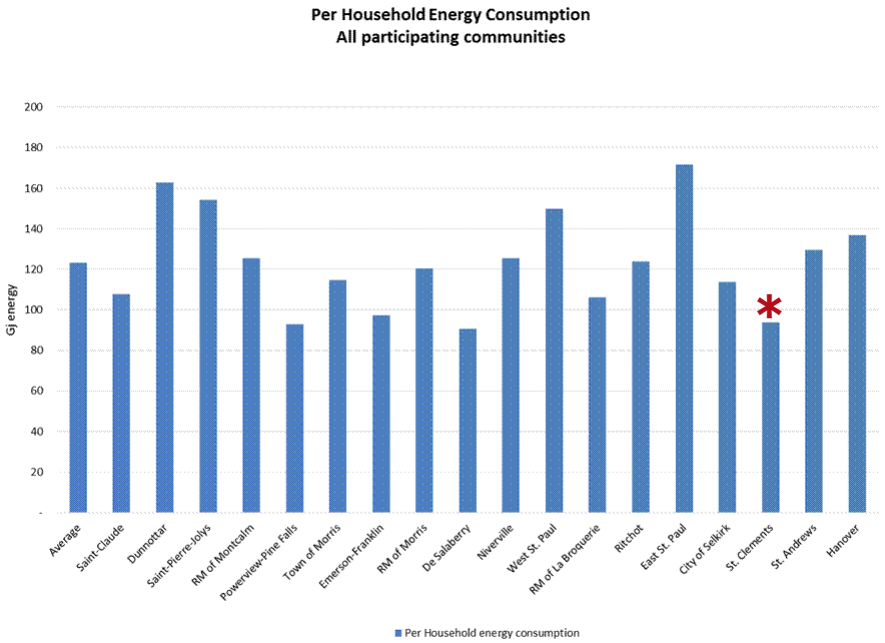


The graph on the left demonstrates that energy consumption per consumer has dropped for the Commercial sector but there has been an increase in all other sectors. The graph on the right shows that the per household energy consumption of the RM has increased across all sectors (streetlights have been omitted).

Rural Municipality of St. Clements Greenhouse Gas (GHG) Emissions Inventory

3. Preliminary Observations: 2006 and 2011





Rural Municipality of St. Clements Greenhouse Gas (GHG) Emissions Inventory