

2017

Stratford's Community Energy Plan to Reduce Greenhouse Gas Emissions



Stratford's Third Milestone of the Partners for Climate Protection Program

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Under the guidance of Town Council, Stratford's Sustainability Committee along with the CAO's Office supervised the development of the plan with the active involvement of the Advisory Committee, Steering Committee, various stakeholders and town staff.

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PEI Energy Corporation	\$5,000 with additional In-kind support
PEI Office of Energy Efficiency	\$5,000 with additional In-kind support
Stratford Area Watershed Improvement Group	\$3,000 of In-kind support
Town of Stratford	\$10,000 with an additional \$5,000 of In-kind support

Public & Stakeholder Engagement

Over 500 local citizens contributed ideas and feedback to this Plan. The Town of Stratford would like to thank every resident for contributing and invites everyone to continue providing feedback as this plan is implemented. More information about the Stratford Community Energy Plan can be found on the Town of Stratford website: www.townofstratford.ca

Executive Summary

Overview:

A Community Energy Plan (CEP) often encompasses energy use, transportation planning, land use, sewage and water management as well as waste management. Community Energy Plans are meant to be used as “living documents” with extensive community stakeholder meetings and collaboration with local business leaders, academic professionals and government officials. This document will help start a local conversation on integrated community energy systems, which will make the Town of Stratford more resilient. Community Energy Plans create short and long-term goals that make positive sustainable change for all residents. This plan will include specific tasks to be completed by municipal departments, and an implementation plan. The Town of Stratford is a progressive community that has a high potential for creating and sustaining the Community Energy Plan. Sustainability is already integrated in many town planning procedures but there is always room to improve procedures and protocols. There are many groups within the town that can support this project as it progresses through its five phases of development including the Stratford Area Watershed Improvement Group and the Stratford Sustainability Committee.

Our Vision:

“Stratford’s Community Energy Plan envisions a sustainable community that reduces greenhouse gas emissions and energy consumption through active transportation, education, energy conservation and efficiency, and renewable energy.”

Our goals to meet the above Vision, we will:

1. Increase capacity to lower greenhouse gas emissions across the entire community.
2. Promote energy efficiency among Stratford residents and reduce electricity consumption.
3. Promote energy efficiency and energy conservation among Stratford businesses.
4. Promote energy efficiency and conservation among all development and construction companies working within Stratford.
5. Promote renewable energy and among Stratford residents and businesses.
6. Reduce greenhouse gas emissions being produced by all municipal operations and buildings.

The Process:

The Community Energy Plan process outlined by the Partners for Climate Protection Program includes:

- ☐ Milestone 1: Create Greenhouse Gas (GHG) Emission Baseline Inventory;
 - This milestone was completed and submitted to the Federation of Canadian Municipalities in January, 2017.
- ☐ Milestone 2: Create and formally adopt GHG Emission Reduction Targets;
 - This milestone was unanimously adopted by the Stratford Town council on April 12, 2017.
- ☐ Milestone 3: Create and formally adopt local action plan (Community Energy Plan);
 - This milestone will be adopted by Town Council on September 13, 2017.
- ☐ Milestone 4: Create, adopt and carry out implementation plan for Community Energy Plan;

- This milestone will recognize the progress made by the Town of Stratford in implementing the Community Energy Plan's Recommended Actions.
- Milestone 5: Monitor progress of local action plan by updating the emission inventory every 3-5 years and monitoring success of the actions taken thus far;
 - The next planned emission inventory will be in 2021 for the Town of Stratford.

Stratford's Municipal GHG Emission Inventory revealed that in 2015 there was 946 Tonnes of CO₂E produced by all municipal infrastructure and operations. The two largest categories of emissions were Water & Sewage and Buildings. The energy source that produced the most GHG emissions was electricity. Stratford's Community GHG Emission Inventory revealed that in 2015 there were 83,192 Tonnes of CO₂E produced by all sectors of the community. The three largest categories of emissions were Residential, Commercial/Institutional and Transportation. The energy source that produced the most GHG emissions was electricity. Background data were collected from multiple forms of resources. Electricity data were provided by Maritime Electric Incorporated. Home heating data and transportation data were provided by Statistics Canada. Demographic data were gathered from Statistics Canada as well as the Town of Stratford's Planning, Development, and Heritage Department.

Research was conducted by the Community Energy Plan Coordinator to find the most cost-effective ways to reduce GHG emissions for the municipal government and the community of Stratford. Four possible reduction targets were created, almost every target aligning with pre-existing provincial, regional and national strategies. A reduction target calculator tool was used to decide on the most practical reduction target for the municipal government and the community of Stratford ([Image A7.](#)). After four months of discussions, and research with various committees and residents, the Town of Stratford chose a reduction target that is generally recommended by the Federation of Canadian Municipalities (FCM).

Stratford Town Council voted to adopt the Target of 20% for the Municipality and 6% for the Community below 2015 levels by 2026, with the condition that a review of the targets will occur in 2022 or earlier to increase or decrease the targets accordingly. In 2022, a GHG Inventory will need to be created for the year of 2021 to assess whether the reduction targets for the Municipality and Community have been reached.

In other municipalities across Canada that have developed CEP's, the period of time in which a CEP is developed is often two or more years; this CEP was developed and is scheduled to be adopted in less than 1.5 years. The reason for this fast and efficient CEP drafting and implementation was due to the excellent leadership provided by the CEP Steering Committee's Chair, Mayor David Dunphy and the Chief Administrative Officer (CAO) of Stratford, Robert Hughes.

Implementation:

The implementation of this Community Energy Plan has been spread out over a ten year period with various departments and community groups being appointed different tasks. There are six goals, 16 objectives and 48 actions that should be implemented in order for Stratford to reach its reduction targets ([Figure C1.](#)). Most of the recommended actions should not be implemented exactly as written but rather each action should adapt as time passes on to changing circumstances ([Figure D1](#)).

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Abbreviations and Definitions

List of Abbreviations

CEP: Community Energy Plan.

FCM: Federation of Canadian Municipalities.

GHG: Greenhouse Gas Emissions.

GWP: Global Warming Potential.

IPCC: Intergovernmental Panel on Climate Change

kWh: Kilo Watt Hours.

NRCAN: Natural Resources Canada.

PCP: Partners for Climate Protection.

VKT: Vehicle Kilometres Travelled.

List of Definitions

Carbon dioxide (CO₂): A gas that is naturally produced by chemical reactions. Large amounts of Carbon dioxide are released by combustion processes such as the burning of garbage/waste. Carbon dioxide has a Global Warming Potential of 1. Trees take up CO₂ and release oxygen.

Climate Change Mitigation: Is a process of reducing or preventing the emission of greenhouse gases often using new technologies or renewable energy systems to replace older equipment that is not as energy efficient.

CO₂E: Carbon dioxide, methane, nitrous oxide combined into one measurement. The “E” stands for Equivalent meaning that the mass of methane and nitrous oxide has already been converted to the amount of CO₂ particles they are equal to.

Community Capacity: the existence within a community of particular capabilities that may have an impact on ways to help promote or sustain the well-being of the community and its components (individuals, informal groups, organizations, social interactions, the physical environment).

Global Warming Potential: A relative measure of how much heat a greenhouse gas traps in the atmosphere. It compares the amount of heat trapped by a certain mass of any gas to the amount of heat trapped by an equal amount of carbon dioxide.

Green Globe: Green Globe is the global certification for sustainable businesses. Membership is reserved for companies and organizations that are committed to making positive contributions to people and the planet.

LEED: Leadership in Energy and Environmental Design (LEED) is one of the most popular green building certification programs used worldwide.

Mass: Is a property of a physical body and is often measured using kilograms. The mass of an object takes into account the effect of gravity on a physical body and is not the same as a measurement of weight.

Methane (CH₄): A gas that is naturally produced by chemical reactions. Small amounts of Methane can be produced by burning certain resources such as gasoline. For this CEP, Methane had a Global Warming Potential of 21.

Nitrous oxide (N₂O): A gas that is naturally stored in the soil. Small amounts of nitrous oxide are released by farming practices that rotate soil. Nitrous oxide has a Global Warming Potential of 310. This means it is 310 times more effective at keeping heat trapped within the atmosphere compared to CO₂.

Passive Haus (Translation-Passive House): Is a rigorous, voluntary standard for energy efficiency in a building to reduce its ecological footprint. It results in ultra-low energy buildings that require little energy for space heating or cooling.

Photovoltaic Solar Panel: A panel that converts sunlight to energy using semi-conducting materials that exhibit the transference of light into voltage (electrical force).

Solar Thermal: A technology that converts sunlight into energy in the form of heat that can be used to heat liquids for use in heating or cooling systems.

Tier 1 measurements: The broadest, least accurate and highly precise form of data that can be used in greenhouse gas inventories. This kind of data is often sourced from the IPCC online resources and provides country specific data based on international reporting.

Tier 2 measurements: This method is more accurate than Tier 1 data but less accurate than Tier 3 data and often uses less precise information. Tier 2 data is based on country specific emission factors and can include engineering estimates, calculating a quantity of fuel based on prices and paid amounts, and fuel use estimated from VKT multiplied by average fuel efficiencies.

Tier 3 measurements: This is the most accurate and precise data that can be used in GHG emission inventories and is the most recommended method by the PCP protocol. This method takes into account the type of fuel that can be combusted, combustion technology, age of equipment used to burn fuel, quality of maintenance, control technology, operating conditions, metered energy use and metered methane recovery

Tonne: Also referred to as the “metric tonne”, it is a unit of mass equal to 1,000 kilograms.

PART I. Introduction

What is a Community Energy Plan?

A Greenhouse Gas Reduction Plan according to the Green Municipal Fund is a plan that creates a baseline Green House Gas (GHG) emission inventory, sets emission reduction targets and outlines actions to reduce emissions for municipal and community activities. A Community Energy Plan includes Greenhouse Gas Reduction Plans but they also include perspectives on how energy is used, conserved, generated, distributed and potentially stored. Community Energy Plans focus on how people can work together to improve the current system and use less energy so that the community can be more resilient in the future.

A Community Energy Plan is a living document that provides guidance for a municipality and its residents to reduce their energy consumption and/or use their energy in a more efficient way. This document takes a holistic approach to community planning with a focus on reducing the community's impact on Climate Change. Think of a Community Energy Plan as a road map towards a cheaper, brighter future where people can have a direct impact on what happens in their town. A Community Energy Plan focuses on five key categories of planning: Land Use, Energy Use, Transportation Planning, Water and Sewage Management and Waste Management. A plan such as this, accounts for three main gases that can be produced in the five planning categories: methane, carbon dioxide and nitrous oxide.

Background

There are 170 communities across Canada that have Community Energy Plans. Stratford is the first community in Prince Edward Island (PEI) to create a Community Energy Plan and join a small group of communities in Atlantic Canada that have done so. The Town of Stratford has been a member of the Federation of Canadian Municipalities (FCM) Partners for Climate Protection (PCP) program since 2008. Since 2008 Stratford has implemented many sustainability initiatives through its *Sustainable Stratford Results Matter Plan*. Stratford's Community Energy Plan focuses specifically on energy consumption and mitigation within the town boundaries with a purpose to increase the climate change mitigation measures practiced by municipal operations, commercial operations and residents.

Community Energy Plan Development and Oversight

Stratford's Community Energy Plan (CEP) was developed by a paid, one year contract, for a Community Energy Plan Coordinator position funded by the Federation of Canadian Municipalities, The Town of Stratford, Maritime Electric, the PEI Office of Energy Efficiency, and the PEI Energy Corporation. In-kind funding for the development of the CEP was provided by the PEI Office of Energy Efficiency, the Town of Stratford, and the Stratford Area Watershed Improvement Group (SAWIG).

A project timeline with five phases along with a public engagement plan was created to guide the project development process ([Table A1](#)). A staff engagement plan was also created so that municipal staff could provide their own feedback on the CEP and include them in the development process.

Within the first month of the planning process of CEP development a steering committee was created to advise the CEP Coordinator and monitor progress. The steering committee met on a monthly basis and is composed of representatives from the funding partner organizations Maritime Electric and the PEI Office of Energy Efficiency as well as other representatives from the community, municipality and SAWIG.

Members of this committee were invited by the CEP Coordinator and the CAO of Stratford and were chosen based on their relationships with various stakeholder groups and residents. After six months of CEP development two additional committee members were chosen by the committee through Stratford's Community Energy Champion Program ([Image A1.](#)). This program celebrated one adult Stratford resident and one youth Stratford resident who had made an impact in the community through their established volunteer/sustainability record confirmed by their peers.

In other municipalities across Canada who have developed Community Energy Plan's, the period of time in which a Community Energy Plan is developed is often two or more years; this plan was developed and is scheduled to be adopted in less than 1.5 years. Fast and efficient CEP drafting and implementation is due to the excellent leadership provided by the CEP Steering Committee's Chair, Mayor David Dunphy and the Chief Administrative Officer (CAO) of Stratford, Robert Hughes. The Vice-Chair of the Committee, Councilor Diane Griffin was replaced by Councilor Keith Maclean due to Councilor Griffin's appointment to the Senate of Canada in November, 2016. The representatives of the CEP Steering Committee are listed below:

1. Robert Hughes: CAO of the Town of Stratford.
2. David Dunphy: Mayor of the Town of Stratford.
3. Diane Griffin: Town Councilor (replaced by Councilor Keith Maclean).
4. Kelley Farrar Arnold: Watershed Coordinator for the Stratford Area Watershed Improvement Group (SAWIG).
5. Ben Grieder: Stratford Community Energy Plan Coordinator.
6. Mike Proud: Manager of the PEI Office of Energy Efficiency.
7. Aaron MacDougall: Resident of Stratford.
8. Jill Burrige: Resident and business owner in Stratford.
9. Dave Barrett: Representative of Maritime Electric.
10. Len Currie: Stratford Energy Champion.
11. Lilly Hickox: Stratford Green Energizer.

An advisory committee provided feedback and technical advice to the CEP Coordinator with quarterly meetings. The advisory committee includes representatives from the PEI Office of Energy Efficiency, the Charlottetown and Area Chamber of Commerce, the University of Prince Edward Island (UPEI) Climate Lab, Renewable Lifestyles Inc. and Holland College's Energy Systems Engineering Technology program. The representatives of the advisory committee are listed below:

1. Daryl Hardy: Learning Manager of the Energy Systems Engineering Technology program at Holland College.
2. Dr. Adam Fenech: Director of the Climate Lab and an Associate Professor of Environmental Studies at the University of Prince Edward Island.
3. Andy Collier: Energy Programs Officer at the PEI Office of Energy Efficiency.
4. Steve Howard: Owner and Operator of Renewable Lifestyles Limited.
5. Keith Hanson: Stratford Representative of the Greater Charlottetown Area Chamber of Commerce.

Approach to Plan Development

The Community Energy Plan process outlined by the Partners for Climate Protection Program includes:

- Milestone 1: Create a GHG Emission Baseline Inventory;
 - This milestone was completed and submitted to the Federation of Canadian Municipalities in January, 2017.
- Milestone 2: Create and formally adopt GHG Emission reduction targets;
 - This milestone was unanimously adopted by the Town of Stratford Town council on April 12, 2017.
- Milestone 3: Create and formally adopt local action plan (CEP);
 - This milestone will be adopted by Town Council on September 13, 2017.
- Milestone 4: Create, adopt and carry out an implementation plan for Community Energy Plan;
 - This milestone will recognize the progress made by the Town of Stratford in implementing the recommended actions.
- Milestone 5: Monitor progress of a local action plan by updating the emission inventory every 3-5 years and monitoring success of the actions taken thus far;
 - The next planned emission inventory year will be 2021 for the Town of Stratford.

The following municipal plans and reports were referenced during the development of the CEP:

- 2015 Annual Resident Survey;
- 2012 Master Storm Water Management Plan Parts A & B;
- 2011 Greater Charlottetown Area Transit Strategic Plan;
- 2010 Stratford Area Watershed Management Plan;
- 2011 Natural Heritage Study;
- 2010 Stratford Active Transportation Plan;
- 2010 Climate Change Adaptation Plan;
- 2009 Sustainable Strategic Plan;
- 2009 Stratford in Action Report;
- 2007 Transit Feasibility Study.

An inventory of community capacity was completed, which indicated that the following Stratford committees can help implement the recommended actions in this plan:

- Sustainability Committee;
- Diversity and Inclusion Sub-Committee;
- Finance and Technology Committee;
- Recreation Culture and Events Committee;
 - Events Sub-Committee;
- Planning, Development and Heritage Committee;
 - Heritage Sub-Committee;
- Infrastructure Committee;
 - Active Transportation Sub-Committee;
- Accountability and Engagement Committee;
- Safety Services Committee.

From July, 2016 to April, 2017 ten community engagement events were created. The format of these events took on various forms of engagement including:

- Pop-up information booth's throughout the community;
- Energy action workshops;
- Exhibits at community expos/festivals;
- School presentations.

The Community Energy Plan Coordinator also met with various community groups throughout this period.

Our Vision

“Stratford’s Community Energy Plan envisions a sustainable community that reduces greenhouse gas emissions and energy consumption through active transportation, education, energy conservation and efficiency, and renewable energy.”

To meet the above Vision, our goals will be to:

1. Increase capacity to lower greenhouse gas emissions across the entire community.
2. Promote energy efficiency among Stratford residents and reduce electricity consumption.
3. Promote energy efficiency and energy conservation among Stratford businesses.
4. Promote energy efficiency and conservation among all development and construction companies working within Stratford.
5. Promote renewable energy and energy efficiency among Stratford residents and businesses.
6. Reduce greenhouse gas emissions being produced by all municipal operations and buildings.

The overarching vision guides the focus of each goal, and the goals provide the reasoning for each objective (Diagram 1.). Every objective in this plan has measurable targets that need to be completed and the actions listed below each objective are the ways in which the measurable targets will be achieved

Diagram 1. This diagram portrays the way each goal, objective and action is depicted in Part II.



Where we are now.

Overview

Stratford is located on the banks of the Hillsborough River and is bordered on two sides by the Charlottetown harbour area. Stratford was formed in 1995 after the amalgamation of five rural communities including Southport, Bunbury, Keppoch-Kinlock, Crossroads and the unincorporated area of Battery Point. The Trans-Canada Highway links the City of Charlottetown to the Wood Islands ferry terminal, and intersects the Municipality of Stratford with the Hillsborough Bridge forming the major transportation corridor between Stratford and Charlottetown.

Stratford is a progressive PEI community with a fast growing population of 9,706 according to the 2016 census. There are many young families that care about sustainability, with a vision of protecting the community for future generations. The average age of Stratford's population is 39.8 which is lower than the national average age of 41.6. 3000 people in Stratford are between the ages of 15-64 with over a third of Stratford's population being under the age of 40¹.

Stratford is home to the Crossroads Fire Department, which serves the town and other smaller communities in the area. The municipality provides police protection, street lighting, sidewalks, animal control, urban planning, and building inspection services. A growing portion of Stratford is serviced by a municipal sewer system and water system; the town currently operates a waste water treatment plant that is located on the Hillsborough River.

Stratford has four community parks and 25 neighborhood parks with a number of other municipal controlled greenspaces. The Town of Stratford provides space for a provincially operated public library and it also provides space for local artistic groups. Stratford runs many different recreational programs including soccer, baseball, softball, volleyball, hockey, ball hockey, basketball, tennis, badminton, fitness classes, and walking. The town also hosts special events such as Canada Day celebrations, the Family Fun Festival, Stratford Days, a New Year's Day Levee, Bike Week and other events. The Stratford Town Centre includes a stage, gymnasium, walking track, meeting rooms, town offices and leased office space for the headquarters of the PEI Public Schools Branch.

Stratford's most recent initiative, the *Sustainable Stratford Results Matter Plan*, was created to help initiate sustainability actions within the community. Some of the actions listed in this Community Energy Plan originated from Stratford's sustainability approach. The *Results Matter Strategic Performance Management Plan* lists five sustainability principles that have helped guide Stratford's decision making process: Social Principle, Environmental Principle, Economic Principle, Cultural Principle and Governance Principle. Community engagement is a key component of Stratford's Sustainability approach, which has been implemented successfully since it was adopted. Each year the Town of Stratford does a resident survey, which seeks to engage residents on new and ongoing issues. Through this annual survey, municipal staff and council members can prioritize certain projects and find ways to solve existing problems facing the community².

History

The Mi'kmaq name for the area within present day Stratford is known as Adoosak³. The Stratford area is known to be traditionally inhabited by the Mi'kmaq with written historical accounts noting Mi'kmaq families inhabiting the shoreline of the Hillsborough River during the summer months of the early 1700's. Acadians first settled in the area that is now the Town of Stratford in the 1700's and established small farms along the shore of the Hillsborough River. After the Acadian deportation of 1758, the land on

¹Census Profile, 2016 Census—Statistics Canada: <http://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?Lang=E&Geo1=PR&Code1=01&Geo2=CSD&Code2=1102080&Data=Count&SearchText=Stratford&SearchType=Begin&SearchPR=01&B1=All>

²2014 Town of Stratford Official Plan—Town of Stratford; P.6: <http://www.townofstratford.ca/wp-content/uploads/2014-Official-Plan-Merged-Doc1.pdf>

³Sustainability Plan and Decision Making Framework—Town of Stratford;P.9: <http://www.townofstratford.ca/wp-content/uploads/2013/01/Imagine-Stratford-Sustainability-Plan.pdf>

Prince Edward Island was surveyed by the Surveyor General of Quebec, Samuel Holland, who allocated 20,000 acres of land as Lot 48 which comprises most of present day Town of Stratford⁴.

Many small communities began to emerge within the land of Lot 48 including the communities of Keppoch, Kinlock and Crossroads. As builders and other skilled craftsman moved to the Stratford area due to the emerging ship building industry in PEI, a ferry service began to transport people from Charlottetown to the areas of Kelley's Cove and Southport in 1835. Many communities within the Stratford area were predominantly agricultural communities and with the completion of the Hillsborough Bridge in 1905, benefited greatly from the establishment of a railway running through these communities. In 1961, the present day Hillsborough Bridge was completed, which abandoned the rail line completely and provided a corridor for automobile traffic⁵.

Since the 1960's, and the establishment of the Hillsborough Highway Bridge, Stratford has experienced continued growth of year-round dwellings. The amalgamation in 1995 sparked even more growth in Stratford with a new Town Hall/Community Centre complex being completed in 2003 and considerable commercial growth along the TransCanada Highway⁶.

Land Use

The Town of Stratford is the third largest community in PEI with the City of Summerside having a population of 14, 829 in 2016 and the City of Charlottetown having a population of 36,090 in 2016. Stratford is the fastest growing community in Prince Edward Island with a population of 9,706 according to the 2016 Canadian census. Between 2011 and 2016 Stratford grew by 13.2%, a growth rate that is 8.8% higher than Charlottetown, the next fastest growing community in PEI⁷.

Stratford contains over 100 commercial enterprises with a small amount of light industrial companies⁸. The bulk of Stratford's growth is in its residential sector with increasing amounts of subdivisions being built on traditional farmland. The total amount of municipal green space in Stratford in 2015 was 355.1 acres with many public parks including the Robert L. Cotton Park, Tea Hill Park, Fullerton's Marsh Park and Pondside Park. In 2015 there were 3,780 dwelling units in Stratford with 2,180 residential developed acres. The residential density in 2015 was 1.73 dwelling units per acre⁹.

As part of the town's effort to increase employment and the commercial tax base, a business park was constructed within sight of the Trans-Canada Highway. The first phase of the business park was completed in 2000 and most lots are in various stages of development. A limited number of industrial companies are housed adjacent to the Stratford Business Park.

⁴Bunbury Notes on a Community—Community of Bunbury; P.1-2:

<http://www.islandlives.ca/fedora/repository/ilives%3A215258/PDF/ilives%3A215258/Full%20Text.pdf>

⁵ Bunbury Notes on a Community—Community of Bunbury ; P.3-4:

<http://www.islandlives.ca/fedora/repository/ilives%3A215258/PDF/ilives%3A215258/Full%20Text.pdf>

⁶ About Stratford—Town of Stratford: <http://www.townofstratford.ca/about-stratford/>

⁷ Census Profile, 2016 Census—Statistics Canada: <http://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?Lang=E&Geo1=PR&Code1=01&Geo2=CSD&Code2=1102080&Data=Count&SearchText=Stratford&SearchType=Begin&SearchPR=01&B1=All>

⁸Business Directory—Town of Stratford: <http://www.townofstratford.ca/business-directory/>

⁹ Final Report 2016 Annual Resident Survey—Town of Stratford: <http://www.townofstratford.ca/wp-content/uploads/Stratford-Resident-Survey-2016-Report-Final-2016-05-12.pdf>

Subdivision development in Stratford is growing substantially and spurring new forms of development. The Stratford Sustainable Subdivision Bylaw is an example of one way that Stratford is moving towards sustainability while also encouraging growth. This Sustainable Subdivision framework encourages building with energy efficiency and renewable energy in mind and uses less land thus protecting existing trees, flora and fauna. Stratford developers can benefit from this bylaw because it allows them to build buildings closer together, provide smaller roadways and use fewer resources with lower development expenses. The municipality benefits greatly from the Sustainable Subdivision Bylaw through the protection of forested land to be maintained as park space.

Community Transportation

Stratford has been actively expanding its active transportation network since 2009 by working with the provincial government, the owners of all public roadways within the Municipality. There were 66km in an Active Transportation Network in 2015 with over 17 km of trails and 32 km of roadside bike lanes ([Table A1.](#)). According to the Greater Charlottetown Area Regional Active Transportation Plan completed in 2012, less than 5% of Stratford's population used walking or biking as a form of transportation. Over 80% of Stratford's population uses cars, vans, or trucks as their main form of transportation, which reflects the high amount of vehicles that can be seen during rush hour between Stratford and Charlottetown. Less than 5% of Stratford's population uses public transit as their main form of transportation and the Town of Stratford has been actively working with T3 Transit to increase ridership. Over 10% of Stratford's population was a passenger in another person's vehicle indicating that there is an active, uncoordinated carpooling community in Stratford¹⁰.

There are two public transit routes, #7 Bunbury Road and #8 Kinlock Road that operate within the Municipality ([Image A2.](#)) Both routes are approximately 10km in length and offer services from 6:00AM-8:30PM, 12PM-1PM and 4:00PM-6:30PM, Monday through Friday. There are no weekend service routes available and no service available on most statutory holidays. Stratford has been actively trying to increase bus ridership numbers on a yearly basis with the average amount of passengers per day in 2015 being 88.9 ([Table A2.](#)).

Every year the Town of Stratford continues to expand its Active Transportation network using Stratford's 2009 Active Transportation Plan as a guiding framework ([Image A3.](#)) The goal will be to have every trail in Stratford connected to existing sidewalks or trail systems so that residents can walk throughout the town in a safe and healthy way.

Energy Sources

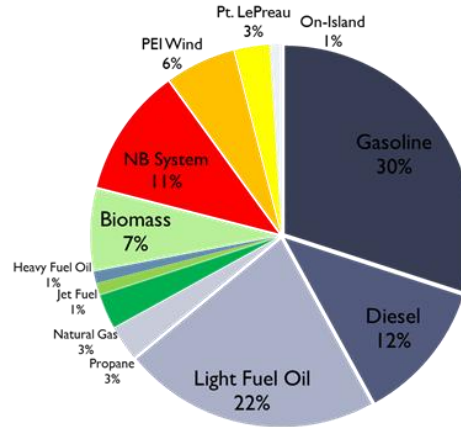
Prince Edward Island (PEI) lacks the raw resources of coal, uranium, and oil to provide electricity on a province-wide scale. In the early 1900's there were many small electric utilities across the island that provided power for individual communities. As Maritime Electric slowly expanded its services, these smaller utilities, which relied on coal burning plants or individual hydro power facilities, disappeared or

¹⁰ Greater Charlottetown Area Regional Active Transportation—City of Charlottetown; P.4-10: http://www.city.charlottetown.pe.ca/pdfs/TTR_RATMP-main-report-FINAL-2012-02-28.pdf

were sold to Maritime Electric. The only municipal electric utility that still exists in PEI today is the Summerside Electric Utility¹¹.

Prince Edward Island uses per capita the largest amount of wind power to provide electricity to its residents of any province in Canada. The province currently has 99 wind turbines producing approximately 204MW of electricity (Table A3.). It is also working to expand the amount of energy produced by biomass incineration, which in 2015 made up 7% of PEI's total energy consumption (Figure 1.). It is important to note that the largest energy consumption source in PEI is gasoline, which relates to the number of vehicles that are owned and operated within PEI and the amount of driving that occurs within the province.

Figure 1. PEI's Total Energy Consumption in 2015 provided by the Office of Efficiency PEI.



Stratford has also developed a Wind Energy Policy that identifies a portion of Stratford as an acceptable location for large wind production mandated by the provincial government. The Wind Energy Policy confirms Stratford's commitment to renewable energy and revision of municipal by-laws is needed to allow small-scale wind turbines on residential properties. Stratford's current bylaw relating to small-scale wind turbines stipulates that there can only be one wind turbine per residential property and the turbine tower must be 2.1 times the height away from all property boundaries. There are other regulations within Bylaw Number 29-B Part III that regulate construction of a wind turbine in Stratford¹².

All residents, commercial enterprises, institutional infrastructure and municipal infrastructure in PEI consumed a total of 129,588,121 KWh of electricity in 2015¹³. On-Island Wind Generation in PEI amounted to 24% of that electricity consumption (Figure 2.) and 26% of the NB Power System Energy Purchases was produced by coal power plants in New Brunswick (Figure 3.).

¹¹ Charting our Electricity Future—PEI Energy Commission; P.4-5:

<https://www.princeedwardisland.ca/sites/default/files/publications/finalreport-webversion.pdf>

¹² 2014 Town of Stratford Official Plan—Town of Stratford: <http://www.townofstratford.ca/town-hall/government/official-plan/>

¹³ Calculated by using data provided by Maritime Electric.

Figure 2. On-island energy production in 2015 provided by Maritime Electric.

Where did your Electricity come from in 2015?

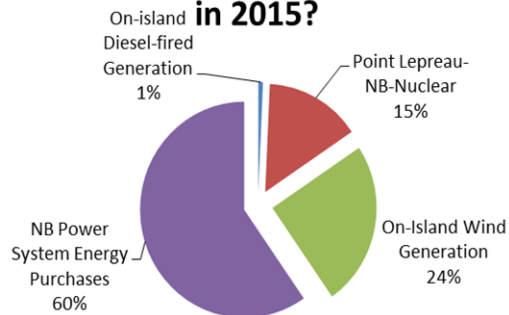
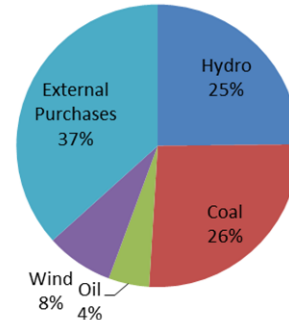


Figure 3. The types of power production that are used for electricity purchased by Maritime Electric and provided to Stratford residents with data provided by NB Power.

NB Power Sources in 2015



Water and Waste Water Management

The Town of Stratford manages its own water and sewer infrastructure through the Stratford Infrastructure Department. This department maintains all water and waste water infrastructure and also works with the provincial government to implement storm water management practices from Stratford's Master Stormwater Management Plan. Many of the projects that Stratford implements complement Stratford's Sustainability goals and often differ from other municipal and provincial practices. For example, Stratford uses drainage ditches in-between streets and sidewalks rather than the more common practice of rain gutters and storm drains (Image 1.).

Image 1. Photograph of storm water management practice on Shakespeare Avenue, Stratford.



Stratford currently draws from three wellfield areas using three stations: the Fullerton's Water Station (Main), Cable Heights Water Station (Secondary) and the Pondsides Water Station (Secondary/back-up). All of these stations are located near public parks. Stratford residents consumed 589,189,711 liters of drinking water in 2015 with the average per person per day consumption being 240 liters ([Table A4](#)).

Municipal staff conducted 91 drinking water sample tests in 2015 and 100% of drinking water samples were safe for human consumption.

Stratford's Waste Water Treatment Plant is located along the waterfront area of Stratford's future downtown, south of the Hillsborough Bridge (Image 2.). It was built in the early 1980's. In 2013, it was upgraded with Blue Frog technology to accommodate growing amounts of effluent originating from Stratford's fast growing population¹⁴. The Town of Stratford is now in the process of implementing a new plan that will involve sending Stratford's raw sewage to Charlottetown's Pollution Control Plant for treatment.

Image 2. Stratford's Waste Water Treatment Plan Sewage Lagoons with the Hillsborough Bridge in the background.



Waste Management

Conventional waste has been collected by the Island Waste Management Corporation (IWMC) since May, 1999. Stratford is part of the Capital region, one of four waste management regions in the province. The IWMC institutes provincially regulated recycling and composting programs in PEI. There is one landfill still in use in PEI that is managed by the IWMC and a large composting facility is located in Brookfield, PEI that that is under contract to IWMC ([Image A4.](#)). A number of contracted recycling companies sort the bulk of recyclables collected.

All regular residential curbside garbage collected in Stratford that is not recyclable or compostable, is taken to the Veresen Inc. District Energy System plant located on the Charlottetown waterfront north of the Hillsborough Bridge ([Image A5.](#)). This plant burns a combination of wood chips and garbage to create heat in the form of steam, which is transported to the Veresen Inc. main customers: the Queen Elizabeth Hospital and the University of Prince Edward Island.

¹⁴ Water Treatment Plant Media Release—Town of Stratford: <http://www.townofstratford.ca/stratford-wastewater-treatment-plant-update/>

Commercial waste transportation employs private companies to transport waste to IWMC waste disposal facilities or to Veresen Inc. incineration facility. Town of Stratford municipal waste goes to the Veresen incineration facility or to the landfill site in Wellington, PEI ([Image A6.](#)). PEI's total waste diversion for the year ending March 31, 2016 was 55,344 Tonnes¹⁵ the best per capita diversion rate in Canada.

¹⁵ 2016 Annual Report—IWMC: <https://www.iwmc.pe.ca/pdfs/2016AnnualReport.pdf>

Emissions Profile

Establishing Operational Boundaries

Both a Corporate and Community inventory were created so that the maximum amount of GHG emissions could be accounted for. Stratford's growth rate for 2015 was 1.2% demonstrating only a small change in population growth. Based on information from the Stratford 2016 Budget document, Stratford's estimated population for 2015 was 9,860 people. There were certain review documents completed in 2015 on streetlight fixtures, and heating oil consumption that also made it imperative to establish a baseline inventory in 2015. As well, considerable information was collected in 2015 and made accessible to Town of Stratford staff.

According to the *PCP Protocol: Canadian Supplement International Emission Analysis Protocol*, the Town of Stratford boundaries in 2015 were used to establish physical and geographical boundaries for both the Corporate and Community GHG emission inventories. These boundaries led to certain GHG accounting methods being used over others. For example, instead of accounting for all GHG emissions originating from the T3 Transit system services (T3), only GHG emissions from T3 services that operated within the Town of Stratford boundaries were accounted for. It is important to note that due to the physical restrictions of the town boundaries, only local vehicle traffic originating from Stratford residential areas were included in the community inventory. All traffic that occurs on Highway 1, would fall under provincial jurisdiction and is not therefore included in Stratford's GHG emission inventories.

Quality Control and Quality Assurance

A set of technical activities to measure quality control of the data used for this inventory was established based on the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories example procedures chart¹⁶. These activities helped establish routine and consistent checks on data and insured that all data collected did not omit information or have errors.

Quality Control Measures:

- Check a sample of input data for transcription errors;
- Identify spread sheet modifications that could provide additional controls or checks on quality;
- Ensure that adequate version control procedures for electronic files have been implemented;
- Confirm that bibliographical data references are included in spreadsheets for all primary data;
- Check that copies of cited references have been archived;
- Check that assumptions and criteria for selection of boundaries, base years, methods, activity data, emission factors and other parameters are documented;
- Check whether emission units, parameters and conversion factors are appropriately labeled;
- Check if units are properly labeled and correctly carried through from beginning to end of calculations;
- Check that conversion factors are correct;
- Check the data processing steps (e.g., equations) in the spreadsheets;
- Check that spreadsheet input data and calculated data are clearly differentiated;

¹⁶ Global Protocol for Community-Scale Greenhouse Gas Emission Inventories; p. 147:
<http://www.iclei.org/activities/agendas/low-carbon-city/gpc.html>

- Check all calculations using the PCP Milestone Tool inventory calculator;
- Check consistency of time series inputs and calculations.

Corporate Inventory

This inventory includes services and utilities that the municipality has a significant financial control over and/or has 100% operational control. Services that were included in this inventory due to financial control include Fire Services, and Library Services. Solid Waste collection for the community was not included in the Corporate Inventory since the Island Waste Management Corporation provides these services through financial support from the Provincial Government. The Town of Stratford does not maintain its own roads and has an agreement with the Provincial department of Transportation, Infrastructure and Energy. Due to this agreement all emissions relating to road maintenance and traffic operations were excluded from the Corporate Inventory.

Contracted services were included if:

1. The service provided by the contractor is a service that is traditionally provided by local government;
2. Emissions from the contracted service were reported in an earlier local government GHG inventory; and/or
3. Emissions generated by the contractor are a source over which the local government exerts significant influence¹⁷.

Traditional Local government Services:

- Administration and Governance;
- Drinking, Storm and Waste Water;
- Solid Waste Collection, Transportation and Diversion;
- Roads and Traffic Operations;
- Arts, Recreation and Cultural Services;
- Fire Protection.

The traditional serviced model was broken down even further in “The Workbook: Helping Local Governments Understand How to be Carbon Neutral in their Corporate Operations.” This workbook was used to determine the traditional services that are offered by Stratford’s local government services:

- Administration and Governance;
- Drinking, and some Storm and Waste Water conduits;
- Arts, Recreation and Cultural Services;
- Local Public Transportation;
- Fire Protection.

Community Inventory

The community inventory was limited in some respects as to the kind of data available and focused on key areas of measurement:

¹⁷ PCP Protocol: Canadian Supplement International Emissions Analysis Protocol; p.7:
https://www.fcm.ca/Documents/reports/PCP/PCP_Protocol_Canadian_Supplement_EN.pdf

- Energy consumption in buildings;
- Heating fuel consumption based on Statistics Canada information;
- Institutional energy consumption and heating fuel consumption;
- On-road Transportation;
- Solid Waste Generation.

Due to the established boundaries of both inventories, many municipal services that are offered by other municipalities in Canada were not included in the Community Inventory. Examples of excluded services include waste pick-up, waste storage/processing, and road construction and repair. It is also important to note that Stratford has only been incorporated as a municipality for 21 years and has had less time to grow as a community compared to other municipalities in Prince Edward Island (PEI).

Quantification of Corporate GHG Emission Inventory

Five activity sectors were investigated for the Corporate Inventory (Figures 4, 5.):

- Buildings and Facilities;
- Fleet Vehicles;
- Streetlights (but not traffic lights);
- Water and Wastewater;
- Solid waste.

Figure 4. Overview of Corporate GHG Emissions.

2015 Corporate GHG Emissions by Sector Total: 946 Metric Tonnes

■ Buildings ■ Fleet ■ Streetlights ■ Water & Sewage ■ Solid Waste

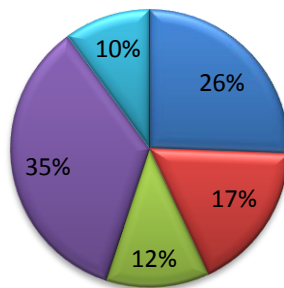
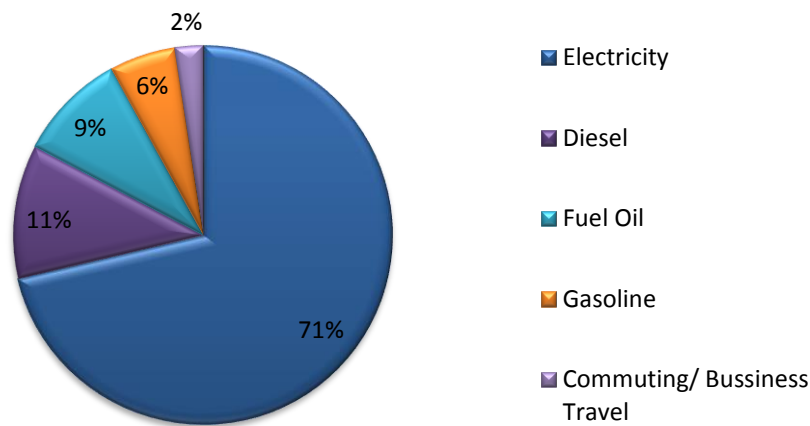


Figure 5. Overview of Corporate GHG Emissions.

2015 Corporate GHG Emissions by Source



Buildings and Facilities

The total GHG emissions for the municipal buildings in 2015 were 242.07 Tonnes. The buildings and facilities that were included in this inventory were largely administrative and recreational in nature. Tier 3 data collection methods were used and most buildings were heated by heat pumps. Some municipal buildings still use oil heat and those heating oil consumption records were included in this inventory.

- Bunbury Rink;
- Youth/Senior Complex;
- Art Community Centre;
- Cross Roads Community Centre;
- Tea Hill Park Facility;
- Pondsides Park Shelter;
- Stratford Library;
- Soccer Field House;
- Town Hall Offices/Gym.

Municipal Fleet Inventory

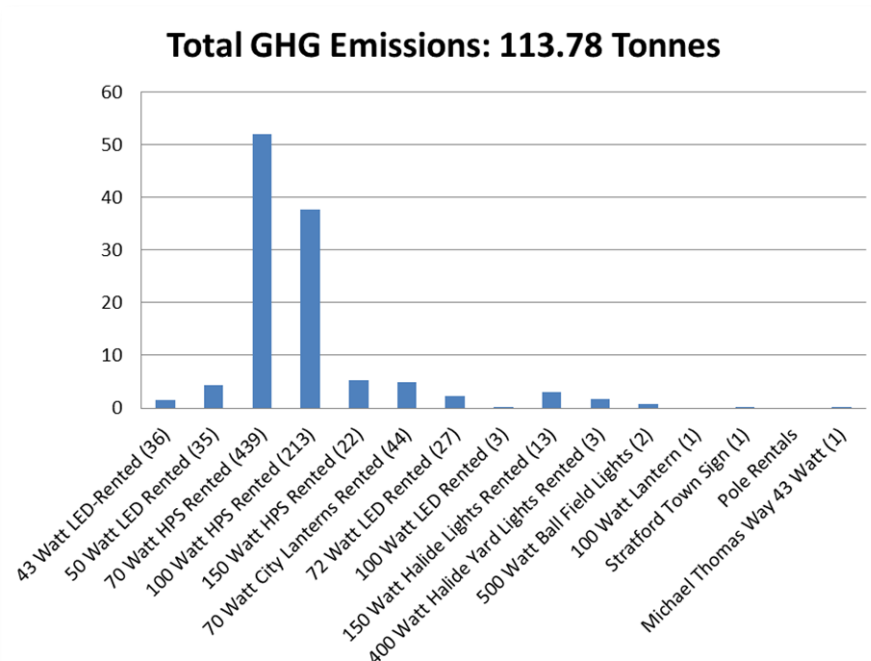
The total GHG emissions for this category was 165.18 metric Tonnes and included municipal fleet vehicles, staff commuting, fire fleet services, T3 Stratford Bus Transport and recorded travel kilometres for staff conferences. Using Tier 3 data collection methods, each vehicle in the municipal fleet was accounted for according to the monthly fuel records for the year 2015. The electricity requirements for the vehicles could not be separated from the building electricity use and are therefore represented in the buildings and facilities category. According to the PCP Protocol, fire services are normally provided by a municipality and should be considered as part of the corporate inventory. Calculations were made on the GHG emission contributions of the fire hall fleet based on operational/financial control by Stratford, which was calculated to be 78.45%. Two optional data categories were also recorded for municipal fleet vehicles including staff commuting based on calculated vehicle kilometres travelled (VKT) using Google Earth and the World Resources Institute transportation tool. Business travel fuel amounts were also

included in this Fleet Vehicles category. GHG emissions from local bus transportation provided by the municipal government and contracted to T3 Transit were more difficult to quantify and Tier 1 methods were used instead of Tier 3 methods.

Street Lights

In total, the streetlight category had a recorded sum of 113.78 Tonnes of GHG emissions (Figure 6.). The Town of Stratford does not own any streetlights within the town boundaries; Stratford does rent streetlights from the private utility Maritime Electric and through a contract agreement Stratford has operational control over the majority of the lighting systems that it rents. For example, Stratford can request certain lights to be changed from HPS to LED if it is willing to pay for Maritime Electric to upgrade the streetlight. Tier 3 data collection methods were used to collect the electricity consumption for these streetlights.

Figure 6. Overview of Municipal Streetlights in 2015 and their GHG emissions.



Water and Sewage

Total GHG Emissions from Stratford's Water and Sewage operations in 2015 were 330.24 Tonnes. Stratford has an extensive drinking water and sewage system that is constantly being expanded to accommodate new subdivisions every year. The provincial government maintains most of the storm water systems in Stratford and the municipal government has operational control over only a few systems, which means that storm water systems were excluded from the inventory. Electricity consumption and heating fuel are the two Tier 3 sources that were used to calculate the GHG emissions for this category.

Waste

There is a standard sorting protocol for all municipalities and commercial enterprises in PEI with the Island Waste Management Corporation (IWMC) providing leadership, enforcement and education

resources. The total GHG Emissions from municipal waste in 2015 was 94.75 Tonnes. There has never been a waste audit done for municipal buildings in Stratford and therefore an alternate Tier 1 method of waste emission calculations was undertaken. After consulting with infrastructure staff and conducting some observational studies, certain calculations relating to waste bins were completed. Once bin capacities and average waste amounts were calculated, the total waste amounts for municipal buildings were determined. Waste GHG emissions were low for 2015 and should be lower once a formal waste audit is performed in the future.

Quantification of Community GHG Emission Inventory

There are 5 areas that the PCP protocol requires a GHG inventory to provide records of (Figures 7, 8.):

- Residential
- Commercial & Institutional
- Industrial
- Transportation
- Solid Waste

This Community Inventory was completed to the fullest extent possible given that all the information was provided voluntarily. There are a number of data sets that could not be accessed due to a lack of accurate information at the municipal level and concerns of privacy in the commercial and industrial sectors. Electricity information provided by Maritime Electric formed the largest set of information accessed at the community level and is the only information represented by GHG emissions in the Industrial category. Online surveys were attempted through Facebook to gain additional information relating to the Residential, Commercial and Transportation Categories. Four surveys were sent out over the course of four weeks with a combined total of 79 responses. The response rate for these surveys was too low to be used in this inventory but will be used as supplemental information for Community Energy Planning in the future.

Figure 7. Overview of Community GHG Emission Inventory by Sector.

2015 Community GHG Emissions by Sector Total: 83,192 Metric Tonnes

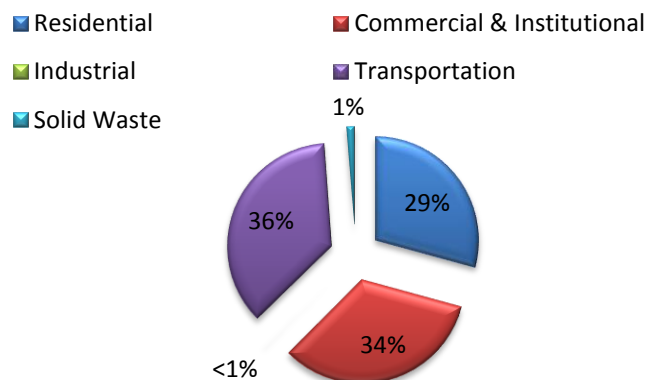
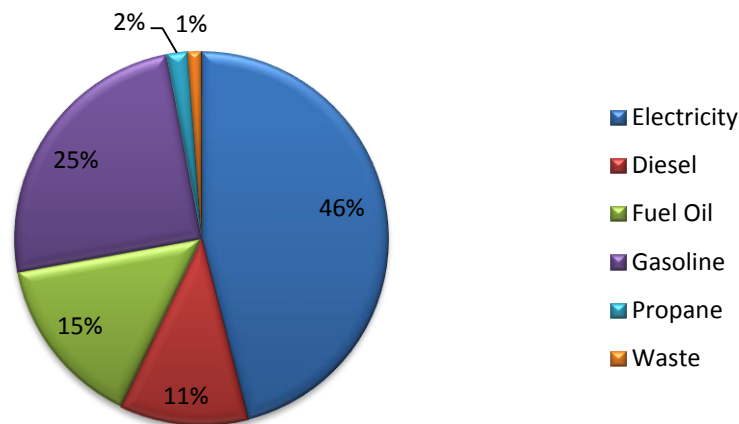


Figure 8. Overview of Community GHG Emission Inventory by Source.

2015 GHG Emissions by Source



Residential

The total GHG emissions for the residential category in 2015 was 24,311.34 Tonnes. Two different submissions of electricity consumption information for the Stratford area from Maritime Electric were used to identify the Residential Electricity consumption for the 2015 year. These Tier 3 consumption results were given in Kilowatt hour (KWh) units and converted to GHG emission totals using the PCP protocol conversion tools approved by the IPCC. Both the PCP Protocol calculator tool and the calculations made using the PCP Protocol guidelines were used to produce the GHG emission results for the residential category of the community inventory.

A Tier 2 approach was taken to provide an estimation of energy consumption relating to Residential Heating in Single Family Dwellings based on Statistics Canada data and Municipal housing data. Data relating to average energy consumption per household was used from Statistics Canada while data relating to the number of households in Stratford was provided by the Town of Stratford. This tier 2 information was based on provincial statistics and was the most accurate information available when this inventory was being created.

Commercial & Institutional

The total Commercial & Institutional GHG emissions for 2015 was 27,720.37 Tonnes. Commercial Electricity data was provided by Maritime Electric as a General Service Category and was broken down even further by subtracting municipal building electricity consumption, municipal utility electricity consumption, fire hall service electricity consumption and provincial school board building electricity consumption. This tier three method used the total calculated commercial electricity data and was calculated into gigajoules of electricity using the PCP Protocol Milestone calculator.

Commercial Heating: Unable to Quantify

Due to a lack of quantifiable information, commercial heating was not calculated. The PCP Protocol recommends that direct heating fuel consumption be used to calculate the amount of greenhouse gas

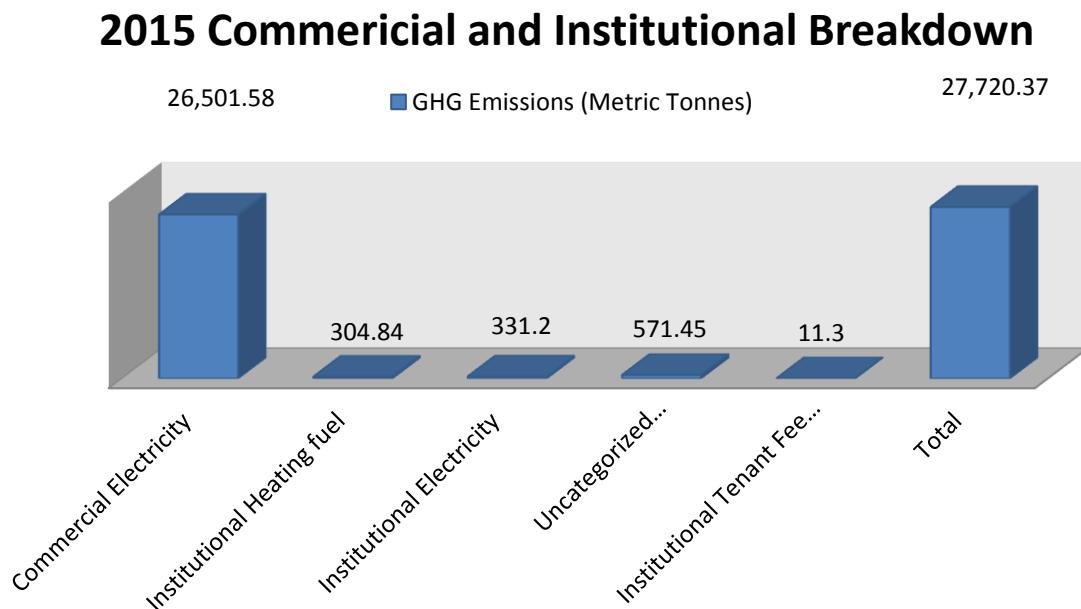
emissions produced by commercial heating. After contacting certain businesses and fuel providers, it became apparent that the recommended method could not be applied because of a vocalization of privacy concerns. An alternate method was reviewed but could not be applied. It would have relied on tier 2 data collections from Statistics Canada and the provincial or municipal government. This alternate method used an average commercial heating fuel consumption being applied to the total area of commercial space being used in the Town of Stratford; neither the provincial government nor the municipal government could provide the total area of commercial space being used in the town.

There are two schools and a public school board office that fall into the intuitional category. There is also a tenant fee associated with the Common area of Town Hall which was also included in this category. The institutional electricity amounts were provided by the PEI public school board and contained Tier 3 level data.

Institutional heating takes into account the two public school buildings and the school board office. Both elementary schools use home heating oil for their heating requirements contributing to the institutional GHG emissions. Tier 3 data collection methods were used to account for this category using information provided by the public school board.

A large amount of electricity consumption that was not controlled by the municipality was represented in the streetlight system. It was included in the Commercial & Institutional category since it would be commercial development companies, Maritime Electric or the provincial government had operational control of these lights. Since there were a number of different data sets included in this Commercial & Institutional Category a further breakdown was created using a bar graph (Figure 9.).

Figure 9. Further Breakdown of 2015 Commercial & Institutional calculated GHG emissions.



Industrial

The total GHG emissions for the Industrial category in 2015 were 61.79 Tonnes. Industrial Electricity Tier 3 level data provided by Maritime Electric was used to account for the GHG emissions being produced from this industry. Heating and other energy related emissions could not be accounted for due to a lack of accessible information on the industrial operations in the Stratford area (Table B9.).

Transportation

The total GHG emission amount for the Transportation category in 2015 was 30, 142.68 Tonnes. This category includes data on average vehicles per household in PEI, which was applied to the total number of dwellings in Stratford giving the total community VKT within the Stratford Town Boundaries (Table B10.). This was an alternate method prescribed by the PCP protocol that used Tier 2 level data from Natural Resources Canada. The recommended method of data collection for this transportation category was fuel sales data but that method could not be accomplished due to a lack of cooperation with local fuel stations residing in Stratford. An alternate approach using VKT could not be accomplished due to a lack of transportation measurement programs existing within the Stratford municipality. Another alternate approach using vehicle registration information from the PEI motor vehicles office was attempted but could not be completed due to a lack of data manipulation ability within the department. It only took into account residential vehicles and national averages and is the least accurate model that could be employed in this category.

Solid Waste

The total GHG emission for the Solid waste category in 2015 was 956.21 Tonnes. The emissions total from solid waste was estimated after discussion with representatives from the Island Waste Management Corporation (IWMC) and Veresen Incorporated. The emission data collected used a live computer monitoring program that reports the day to day emissions of the biomass waste incineration plant, which produces heat for the local heating district in Charlottetown. This Tier 2 emissions data was calculated by taking the total weight of residential waste collected by IWMC across Prince Edward Island and dividing that weight by the total number of households that were registered for garbage pick-up in the 2015 year. That rate was then applied to the total number of applicable pick-up locations in Stratford creating the total mass of waste produced by residents in Stratford. This mass was then applied to the emissions monitoring system in the Veresen incineration facility. This Solid Waste data only accounts for residential waste that is collected on a regular basis and does not include two waste pick-up events that would be collected from residents in the spring and the fall (large item disposal days). Garbage pick-up from these two waste collection events is sent to the IWMC Wellington Centre. Commercial and Industrial waste brought to the Veresen Inc. company could not be quantified due to an inability to separate Stratford waste from other provincial waste that is being brought to the Veresen Inc. incineration facility.

Emission Growth and Reduction Targets

Based on permit applications processed by the Planning, Development and Heritage department, Stratford's average annual growth rate from 1995 to 2015 was 3.59%. A predicted annual growth rate of 3.31% was used to determine the annual increase in emission growth. Stratford's emission growth was projected using the 2015 GHG Emission Baseline Inventory. A predicted increase of 595 Tonnes of GHG emissions was determined for the municipal corporation by 2030 (Figure 10.). A predicted increase of 52,323 Tonnes of GHG emissions was determined for the Community by 2030 (Figure 11.).

Figure 10. Projected GHG Emission Growth from 1995 to 2030 for the Municipal Corporation.

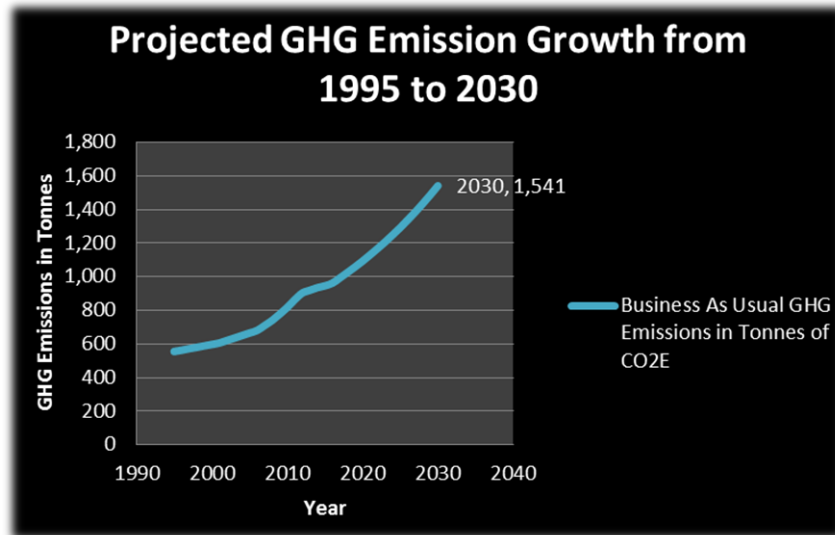
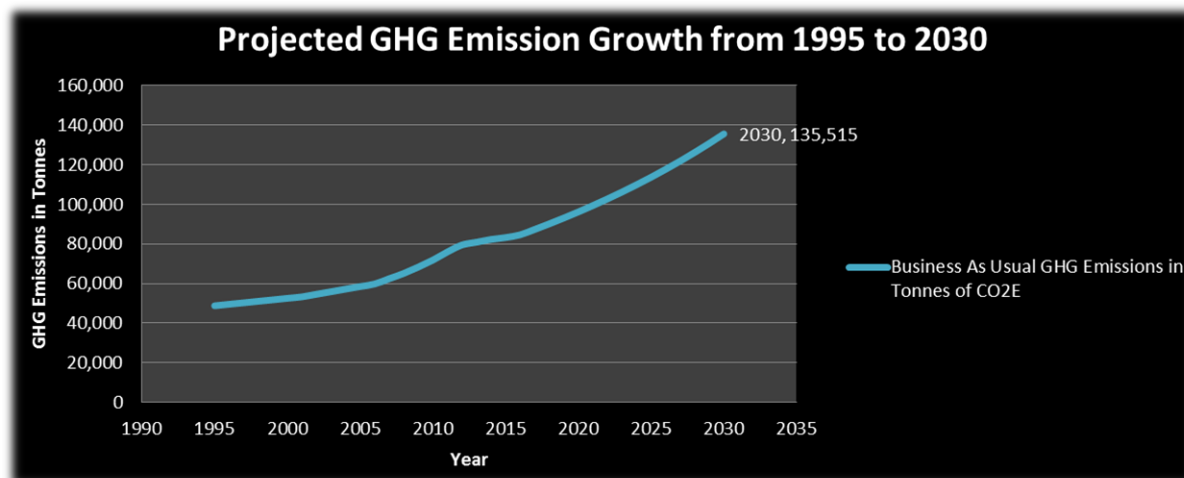


Figure 11. Projected GHG Emission Growth from 1995 to 2030 for the Community of Stratford.



Research was conducted by the Community Energy Plan Coordinator to find the most cost-effective ways to reduce GHG emissions for the municipal corporation and the community of Stratford. Four possible reduction targets were created, almost every target aligning with pre-existing provincial, regional and national strategies. A reduction target calculator tool was used to decide on the most practical reduction target for the municipal government and the community of Stratford ([Image A7.](#)). After four months of

discussions, and research with various committees and residents, the Town of Stratford chose a reduction target that is generally recommended by FCM.

Stratford Town Council voted to adopt a reduction target of 20% for the municipality (Figure 7.) and 6% for the community (Figure 8.) below 2015 levels by 2026, with the condition that a review of the targets will occur in 2022 to increase or decrease the targets accordingly. It is important to note that for the Community this reduction target represents a 34% per capita reduction in GHG emissions between the years 2017 and 2026. In 2022, a GHG Inventory is needed in 2021 to assess whether the reduction targets for the municipal corporation and community have been reached.

Figure 12. Municipal Corporation GHG Emission Projections (in Tonnes) compared to required emission reductions for Reduction Target.

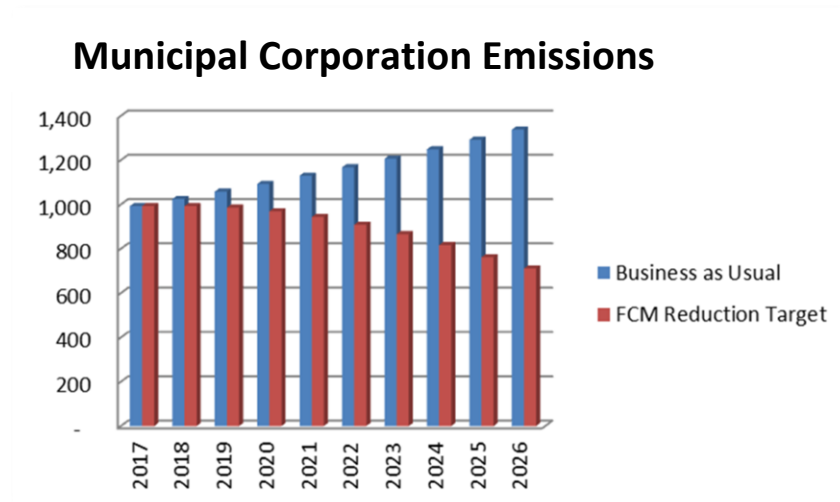
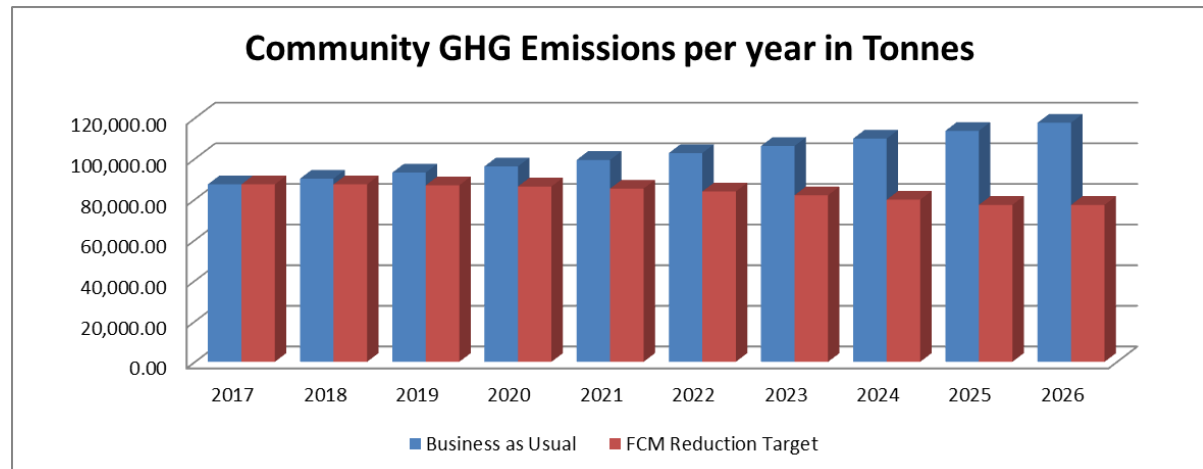


Figure 13. Community GHG Emission Projections compared to required emission reductions for Reduction Target.



Part II: Action Plan

1. Goal: Increasing Capacity.

Increasing capacity to lower greenhouse gas emissions across the entire community.

Stratford's open land spaces are slowly being converted to residential housing, which decreases the capacity for existing natural areas to absorb greenhouse gas emissions for the benefit of the community ([Image B1.](#)). Different types of soil can store nitrous oxide but if the soil is disturbed or removed that capacity to store nitrous oxide disappears. Carbon dioxide is absorbed by trees and other plant life and converted to oxygen, which creates a healthy, breathable atmosphere for residents to enjoy. As more undeveloped land/pastoral land that contains older, larger trees is developed, the capacity to store carbon dioxide decreases. As the population continues to grow, actions will need to be taken to ensure that the community can continue to thrive over the next ten years without endangering the air quality for existing residents. Residents need to understand what they can do to increase Stratford's air quality and how they will benefit.

Objective: Carbon Sequestration.

Increase carbon sequestration through reforestation and capture 70 Tonnes of GHG Emissions by 2026.

Current Situation: The Town of Stratford held a Natural Areas Workshop in January 2017, which will help establish a Natural Areas Lens to apply to future development within Stratford¹⁸. Stratford has an active watershed protection organization called the Stratford Area Watershed Improvement Group (SAWIG), which continuously encourages residents to plant trees through numerous events and programs. Stratford also has a strategic performance management plan that contains a stewardship perspective. This perspective contains objectives that correlate with this carbon sequestration objective:

- Develop a natural area conservation program;
- Identify, protect and restore natural areas.

Increase Tree Cover: Recommended Action.

Adoption of an Enhanced Carbon Sequestration and Energy Savings Program¹⁹:

- Outlines tree planting recommendations for each development that occurs within the Stratford municipal boundaries;
- Encourages existing property owners to replant trees if they choose to cut down any existing trees on private property;
- Where it is not possible to plant all trees on a given property, the remainder can be planted on another existing site within the municipality;
- Research of "Blue Carbon" Sequestration and how protection of sea grasses can help sequester carbon dioxide in Stratford should also be attempted while designing this by-law.

¹⁸ Developing a Natural Areas Lens for Stratford; Report on the Planning Workshops—Town of Stratford.

¹⁹ By-law Proposal for Enhanced Carbon Sequestration and Energy Savings (Tree Cutting and Native Tree Planting)—Stratford Area Watershed Improvement Group: <https://sawig.wordpress.com/>

Rationale: Trees have a large capacity to sequester Carbon dioxide, aid in water management and improve air quality. Trees that are 45 centimeters in diameter or larger have an exponentially high capacity to sequester carbon dioxide compared to smaller trees and must be protected²⁰. Trees that are strategically placed also aid in passive heating and cooling on residential properties, which will save residents money on their heating bills. Increased tree cover also aids in municipal winter snow removal by creating wind barriers that decrease blowing snow movement.

Responsible Department: CAO's Office.

Suggested Timeframe: This action should be reviewed, both by staff and the general public during the fall of 2017 and eventually implemented by the summer of 2018.

Greenhouse gas impact: It is difficult to measure a GHG emission impact for this action due to its range of variability. Trees that are two meters tall sequester carbon at a different rate compared to a tree that would be 10 meters tall. The type of tree and how fast it grows also must be taken into account. To achieve a 70 Tonne sequestration by 2026, 9,000 trees with diameters of 15 centimeters or less must be planted and preserved. If all 7,000 trees are not planted in 2018 than an additional 500 existing trees with diameters of 15 centimeters or more must be preserved and encouraged to grow so they can help achieve the additional sequestration required to reach the 70 Tonne target²¹.

Financial Impact: Tree saplings can be purchased through coordination with SAWIG and local provincial tree nurseries for \$2.00 a tree and tree planting should be provided by volunteers. There would be no direct financial impact to the town corporation but a small start-up fund may be required to ensure that trees can be purchased at low costs to individual residents. This would require 10 hours of coordination by municipal staff on an annual basis.

Helpful Resources:

- <https://www.greenfacts.org/glossary/abc/carbon-sequestration.htm>
- <http://sustainability.tufts.edu/carbon-sequestration/>
- <http://www.arborenonvironmentalalliance.com/carbon-tree-facts.asp>
- <http://www.treesintrust.com/environmental.shtm>
- <https://www.fs.usda.gov/ccrc/topics/forests-carbon>

²⁰ By-law Proposal for Enhanced Carbon Sequestration and Energy Savings (Tree Cutting and Native Tree Planting)—Stratford Area Watershed Improvement Group: <https://sawig.wordpress.com/>

²¹ Et. Al.

Objective: Education.

To decrease Carbon dioxide output within the Municipality through education programs, reducing GHG emissions by 300 Tonnes before the end of the year 2026.

Current Situation: The 2016/2017 PEI Energy Strategy encourages culture-changing programs that help ensure sustainable lifestyles and Stratford has made some progressive choices to further sustainability goals within the community. Stratford's Wind Energy Policy was created to encourage residents to adopt wind energy in their homes. There is one Electric Vehicle (EV) Charging station located in downtown Stratford that is owned by the Town of Stratford. There are two elementary schools in Stratford located directly adjacent to each other; these buildings are not energy efficient and contribute GHG emissions to the community. Stratford has a very strong public communication initiative with over 900 people participating in the yearly public opinion surveys that are released by the municipal government.

Anti-idling: Recommended Action.

Implement Anti-idling Education Campaign:

- Would involve encouraging people to limit their engine idling times to under three minutes;
- Information signs and posters would be required throughout the community;
- A social media campaign would need to be launched to ensure that the community is aware;
- Staff working for the municipality would need to lead by example.

School Energy Challenge: Recommended Action.

Implement School Energy Challenge:

- This would involve both Stratford Elementary and Glen Stewart Elementary schools competing against each other over a one month period with participation required by school staff and students;
- This would require representatives from the Town of Stratford to provide energy education/conservation for the children and work with the Public School Board;
- Maritime Electric could provide monitoring and review of results to identify the winner of the competition with results being compared on a per student basis;
- Both the Town of Stratford along with Maritime Electric could present the prizes to the winner of the competition.

Community Solar Farm: Recommended Action.

Encourage Community Solar Farm:

- Stratford would need to lobby the provincial government to allow a community solar farm to be created within the municipality;
- The Town of Stratford could provide free meeting space, donate staff time and help create a group of residents that would form their own Community Solar Farm;
- Stratford could help rezone certain land for solar development.

Micro-grant Program: Recommended Action.

Establish Sustainability Micro-grant Program:

- Staff would be needed by the Town of Stratford this program to coordinate this program;
- Projects that educate the public or preserve natural features in the subject areas of land use, energy use, transportation planning, water management and waste management would be encouraged;
- Grants up to \$2,000 would be provided to any group of Stratford residents who are willing to start a project within Stratford. Grants would not be renewable and the projects would have to be completed within a 1-2 year time span.

WatersCool Expansion: Recommended Action.

Expand WatersCool program to include energy and ecosystem education and create a “Sustainability School”:

- WatersCool program currently operates over one week in May and involves 10 classes;
- This program should be expanded with two additional components or classrooms with one focusing on energy and the other on carbon sequestration from ecosystems;
- The additional content would require a longer program occurring over 2 weeks.

Dog Poop Fertilizer: Recommended Action.

Creation of a Dog Fertilizer Recycling Program:

- A similar type of program is being piloted in Waterloo, Ontario where dog poop receptacles help digest pet waste into potential fertilizer, which is then taken to a processing facility to complete the digestive process;
- Stratford could use available digesting technology to enrich surrounding park soil;
- This program could involve planting native flowers around the submerged digesting receptacles to promote the growth of native plant species;
- Fullerton’s Marsh Park, Tea Hill Park and the Stratford Dog Park would be excellent places to pilot this project with other Stratford parks being included in this program on an as needed basis.

Rationale: Each of these actions will help reduce GHG emissions and encourage community unity. The anti-idling campaign will help raise awareness in the community of some simple things that people can do to reduce GHG emissions and it will also improve air quality. The School Energy Challenge will help educate children and parents of the importance of energy conservation. Current provincial legislation restricts the creation of community solar farms and meetings lobbying will need to occur in order to create a solar farm within the municipality. Encouraging a Community Solar Farm will make Stratford more self-reliant and help unify the community. The WatersCool program is very popular in Stratford and surrounding areas and more education that occurs on the topics of energy and GHG emissions will ensure that more people are aware and would be willing to take action. The Dog Fertilizer Recycling program would help encourage residents to dispose of their pet waste responsibly while also taking advantage of Methane capturing technology; this program would also make efficient use of a resource that is often wasted.

Responsible Department: All recommended actions except Dog Poop Fertilizer will fall under the department of the CAO's Office. The Dog Poop Fertilizer recommended action should be pursued by the Recreation, Culture and Events Department.

Suggested Timeframe:

Recommended Action	Implementation Date
Anti-idling	September, 2018
School Energy Challenge	September, 2018
Community Solar Farm	2020
Micro-grant Program	Fall, 2018
WatersCool Expansion	2021
Dog Poop Fertilizer	2022

Greenhouse Gas Impact: This objective will depend on community support, community partnerships and public communications to achieve any significant amount of GHG emission reduction. If both elementary schools were able to decrease their heating oil usage by half of their 2015 amounts, that would be equivalent to a 152.5 Tonne GHG emission reduction. The Dog Poop Fertilizer recommended action could have varying impacts on the amount of Methane that is released within the community and would have a small impact in lowering GHG emissions.

Financial Impact:

Recommended Action	Cost	Staff time required	Reason	Money spent/ Tonne of CO2E reduced
Anti-idling	\$10,000	35 hours on annual basis	Would include consulting fees, marketing materials, and equipment costs	\$312.50
School Energy Challenge	\$15,000	40 hours on annual basis	Partial funding for student positions	\$33.33
Community Solar Farm	-	35 hours on annual basis	-	\$25.76
Micro-grant Program	\$40,000	50 hours on annual basis	Overall fund of \$40,000 to disperse micro-grants over an extended amount of years	\$250.00
WatersCool Expansion	\$20,000	150 hours on annual basis	For additional equipment and materials	-
Dog Poop Fertilizer		10 hours of labour to install two digesters in two different parks with an additional 10 hours annually of maintenance.	Each digester would cost approximately \$700.00 with additional signage and landscaping as extra costs. Action F could cost as much as \$2000.00 to implement in two different locations.	-

Helpful Resources:

- <http://english.seoul.go.kr/citizen-participatory-energy-conservation-program-saves-energy-enhances-eco-friendliness/>
- <http://www.city.charlottetown.pe.ca/microgrant.php>
- <http://peoplepowerplanet.ca/community-energy-models/community-solar-gardens/>
- <https://www.planetnatural.com/product/green-cone-composting-system/>
- <http://wattnow.org/79/the-power-of-dog-poop>

Objective: Policy.

To review and enforce policy that will help reduce GHG emissions and encourage residents to seek alternate ways of consuming energy.

Current Situation: Stratford is a growing town with a larger amount of homes being built with energy efficiency in mind. Stratford was one of the first municipalities in PEI to adopt the 2010 National Building Code. The government of PEI does not have any of its own supplemental building codes to enforce and is in the process of adopting the 2015 national building code²². The 2015 National Energy Code is based off of the 2011 edition, which was created to promote energy efficiency consistently across all provincial and territorial building codes. This document is based on research from the National Research Council, and Natural Resources Canada with intent to increase energy efficiency in all new buildings and reduce greenhouse gas emissions.

Wind Policy: Recommended Action.**Initiate Bylaw Review of Stratford's Wind Energy Policy:**

- Stratford's Wind Energy Policy was created to encourage wind development in the community but there has been no implementation of a wind energy system in Stratford since this policy has been adopted;
- Consultation with residents and wind energy professionals will be explored while this policy is being reviewed;
- This policy needs to be reviewed by the Planning, Development and Heritage department to better align with provincial policy and current wind energy technologies.

2015 NEC/NBC: Recommended Action.**Adopt 2015 National Energy Code and National Building Code in Municipality in coordination with the provincial government and hold interactive workshops for all parties affected by these adoptions:**

- The 2015 National Energy Code contains many new standards for electric water heating and indoor pipe insulation that are not included in the 2015 National Building Code;
- Municipal staff should work with local contractors to ensure that everyone understands the new standards of this code.

²² 2016/2017 Prince Edward Island Energy Strategy—Prince Edward Island Energy Corporation; p. 22: <http://www.peiec.ca/the-strategy.html>

Solar Ready Bylaw: Recommended Action.

Create a Solar Ready Building Policy:

- This policy would require all new homes to be built so that photovoltaic solar panels or solar hot water systems could be installed with ease;
- Stratford will consult with the provincial government to create a policy that could be initiated in Stratford and then adapted in other municipalities;
- In most homes this would simply require an unobstructed south facing roof that could support the extra weight required to have a roof mounted solar energy system.

Rationale: By ensuring that new homes are built with solar energy systems there would be no extra construction costs and it would make this technology simple to adapt in the future. Stratford has already adopted the 2010 National Building Code but it will need to adopt the 2015 National Energy Code by 2019 to align with the 2016/2017 PEI Energy Strategy.

Responsible Department: Planning Development and Heritage Department.

Suggested Timeframe:

Recommended Action	Implementation Date
Wind Policy	2018
2015 NEC/NBC	2019
Solar Ready Bylaw	2019

Greenhouse Gas Impact: These actions will lower greenhouse gas emissions from residential homes in Stratford over the long term. As these actions become more publicized, people will be encouraged to do more in their homes to reduce electricity consumption.

Financial Impact: All three of these actions will require significant staff time to complete but can be attempted during periods of time when the office is less busy. These actions should require no grants or funding to complete.

Helpful Resources:

- http://www.nrc-cnrc.gc.ca/eng/publications/codes_centre/2015_national_energy_code_buildings.html
- <http://www.nrcan.gc.ca/energy/efficiency/buildings/eenb/codes/4037>
- <http://www.townofstratford.ca/wp-content/uploads/Stratford-Wind-Energy-Policy.pdf>
- <http://www.weican.ca/>
- <http://vancouver.ca/home-property-development/electric-vehicle-charging-requirements.aspx>

Objective: Transportation.

To decrease GHG emissions by having 6,500 residents reduce their gas vehicle travel by half of the average 2015 values (reduction of 15055km per person to 7527.5km) by 2026.

Current Situation: Stratford's close proximity to Charlottetown and the high amount of vehicle traffic leading into Charlottetown each morning on the Hillsborough Bridge indicates that many people live in Stratford and work in Charlottetown. All Stratford children who attend grades 7-12 in the PEI school system are driven to nearby schools such as Birchwood Intermediate School or Charlottetown Rural High School in Charlottetown. There is an average of 1.48 vehicles per household in PEI²³. In Stratford there is a necessity to have more than one vehicle due to the limited public transit services available and the lack of safe active transportation routes into surrounding communities such as Pownal and Charlottetown. Stratford has taken many steps in the last 10 years to increase public participation in public transit programs by establishing a Park & Ride program as well as increasing the number of bus stops available in Stratford. No buses run on the weekend to transport people between Stratford and Charlottetown. The Stratford Infrastructure and Public Works department has also taken many steps to increase the amount of active transportation routes available in Stratford. Stratford also has over 66.48 km of active transportation routes that include sidewalks, bike lanes and hiking/biking trails²⁴. There is one level 2 Electric Vehicle Charging station located in downtown Stratford that is owned by the Town of Stratford. The Provincial Government announced in May, 2017 that it would be building a separated active transportation corridor across the Hillsborough bridge; this corridor will help increase the amount of people who use active transportation to travel between Charlottetown and Stratford.

Electric Vehicle Stations: Recommended Action.

Implement Electric Vehicle (EV) Charging station Education Program:

- Electric Vehicles currently only have access to one EV charging station within Stratford and it is owned by the Town of Stratford. Commercial businesses need to realize the profitability of having an EV charging station installed in front of their business;
- Stratford will work to identify partners such as Holland College, Maritime Electric and Efficiency PEI to hire students and/or new graduates that will help provide financial feasibility assessments for installing EV charging stations on commercial properties;
- This program would help encourage increased electric vehicle traffic in Stratford that will reduce GHG emissions.

²³ PCP Protocol: Canadian Supplement International Emissions Analysis Protocol—FCM;; https://www.fcm.ca/Documents/reports/PCP/PCP_Protocol_Canadian_Supplement_EN.pdf

²⁴ Stratford KPI Reporting 2016 document.

Carpooling: Recommended Action.

Implement Carpooling/Ride Share Program:

- An online website can be created in correlation with the Stratford website redesign;
- Residents are encouraged to find willing partners for carpooling along their route to get to work;
- Participants could be picked up at a public bus stop or other public location because privacy is an issue;
- This program would serve people who need to regularly commute to Charlottetown and surrounding areas;
- This program could be part of a larger community sharing campaign/platform.

Park and Ride: Recommended Action.

Expand Park and Ride Program:

- Additional promotion of this program needs to take place once a community survey has determined if residents would like to see this program expanded or changed;
- The Park and Ride Program is a free service where people can apply for free parking passes to leave their car all day in a parking spot located close to a public transit station;
- There are currently six designated parking spaces at the Bunbury Mall with another four available at the Stratford Community Centre;
- Since the start of the program in September, 2016 there has been three parking passes issued.

Walking Bus: Recommended Action.

Implement Walking Bus Program:

- Coordination of a chaperoned walking program for elementary school children who live within a 2 KM radius of both the Stratford Elementary School and Glen Stewart Elementary School is recommended;
- It would require school children to walk to school instead of taking the bus or getting driven to school to alleviate heavy traffic currently occurring in front of both elementary schools;
- This program would also alleviate the overcrowding on school busses travelling to Glen Stewart and Stratford Elementary Schools;
- This program would need to be coordinated by parents and could be coordinated by the Home and School Association.
- This program would require at least 10 parental volunteers (two volunteers for each day, Monday-Friday) in order for it to be a success.
- Meeting space and communication assistance can be provided by the Town of Stratford.

Transit: Recommended Action.

Increase Bus Ridership and Availability Initiative:

- A map of the current bus stops available in Stratford needs to be posted on the Town of Stratford website;
- The municipality needs to negotiate a weekend route for bus transportation between Stratford and Charlottetown;
- The Community Engagement Coordinator should work with staff in the future to make access to public transit as easy as possible.

Active Transportation: Recommended Action.

Create Active Transportation Programs:

- Should develop partnerships with organizations such as Trails PEI, Cycling PEI, GO PEI, and local equipment stores;
- A partnership with Holland College's Applied Research and Contract Training program would allow increased temporary administrative support for this specific action;
- This program needs to include events as well as ongoing classes and active transportation groups such as community Bike Ride groups.
- A committee or group such as Stratford's Active Transportation Committee could help coordinate these Active Transportation programs.

Bike Availability: Recommended Action.

Implement Bike Mobility Program:

- Bikes should range in size to accommodate all users so that the program can be family friendly;
- A partnership between Go PEI and the Town of Stratford could be formed to apply for an Access and Activity Grant through the MEC Community Grants Program;
- This type of partnership would provide up to \$15,000 of equipment that could fund the purchase of 15 bicycles for public use;
- These bicycles could be stored in Town of Stratford facilities at the Stratford Community Centre;
- Stratford recreation staff would be required to sign the equipment out and collect a deposit to ensure that bikes are returned in good condition;
- A number of annual bike activities should be incorporated into this program.

Rationale: By promoting alternative transportation methods, people can improve their own health and also use their personal vehicles less. If less residents use their vehicles for local transportation, then less GHG emissions will be produced within Stratford. The municipal government is expanding its active transportation routes but the roadways are managed and maintained by the PEI provincial government; if more people use the active transportation routes that are available, then any feedback they have can directly impact the improvements made to active transportation routes within the municipality.

Responsible Department: All recommended actions except the Active Transportation program and the Bike Availability program would be the responsibility of the CAO's Office. The Active Transportation program and the Bike Availability program would be the responsibility of the Recreation, Culture and Events department.

Suggested Timeframe:

Recommended Action	Implementation Date
Electric Vehicle Stations	2019
Carpooling	2019
Park and Ride	2020
Walking Bus	2019
Transit	2019
Active Transportation	2020
Bike Availability	2020

Greenhouse Gas Impact: Each car that is removed from the streets of Stratford for daily driving needs is one less Tonne of GHG emissions that will be emitted within the community. Stratford has significant amounts of active transportation infrastructure already and it plans to continue expanding its active transportation network in future years. With almost 10,000 people and 1.5 cars per person, the community of Stratford has a very large potential to reduce GHG emissions. If every other person in Stratford simply biked to school or to work, that would be at least 2,500 Tonnes of GHG emissions reduced. Since cycling is preferred as a seasonal activity, residents could continue to reduce GHG emissions in the winter time by using Stratford's potential Rideshare program or even carpooling with someone who has an electric vehicle. An electric vehicle consumes electricity, which still produces Carbon dioxide and other GHG emissions in PEI it only produces 1/5 of the GHG emissions compared to the most efficient gas powered car on the market in PEI.

Financial Impact:

Recommended Action	Cost	Staff time required	Reason	Money Spent/Tonne of CO2E reduced
Electric Vehicle Stations	-	40 hours on annual basis	-	\$18.59
Carpooling	\$20,000	40-60 hours in the first year	Will require considerable amount of time to have a carpooling/rideshare online portal	\$3.21
Park and Ride	-	40 hours on annual basis	-	\$64.20
Walking Bus	-	40 hours on annual basis	-	\$32.10
Transit	\$200,000	40 hours on annual basis	This will add operating expenses to the municipal government. For each hour of service that is added to the existing bus schedule, there is \$50 per service hour, per day fee. What this means is that if current bus service was extended by 30 minutes each day (only Monday through Friday) then the additional annual cost would be \$6,300.	\$64.20
Active Transportation	\$30,000	10-30 hours on annual basis	Will require partnering with outside organizations to secure worth of funding	\$16.05
Bike Availability	\$30,000	10-30 hours on annual basis	Will require partnering with outside organizations to secure worth of funding	\$64.20

Helpful Resources:

- <http://www.tac-atc.ca/sites/tac-atc.ca/files/site/doc/resources/primer-active-trans2012.pdf>
- http://www.fcm.ca/Documents/tools/GMF/Transport_Canada/ActiveTranspoGuide_EN.pdf
- <http://www.walkingschoolbus.org/>
- <http://smartcommute.ca/>
- <http://www.translink.ca/en/Getting-Around/Driving/Carpooling.aspx>
- http://www.recreationpei.ca/index.php?page=programs_school_travel

2. Goal: Residential Energy Efficiency.

To promote energy efficiency among Stratford Residents and reduce electricity consumption.

The largest portion of GHG emissions (46%) is derived from electricity consumption and 29% of those electricity emissions would be generated by residents of Stratford. This translates to a total of 11,174 Tonnes of GHG emissions produced by local residents in 2015 that were using electricity within their homes. Energy efficient appliances and lighting can be used to reduce the growing amount of emissions being produced by Stratford residents. Energy conservation can also be communicated to the Stratford population through education campaigns. Through increased collaboration with Efficiency PEI, Stratford residents can learn how to benefit from energy efficiency and energy conservation while also reducing the average GHG emission output per person. Stratford residents can save significant amounts of money by making their homes and appliances more energy efficient and there are many programs currently in place to help them do so.

Objective: LED Lighting.

To increase residential use of LED lighting so that by 2026, 90% of homes in Stratford will be completely outfitted with LED Light Bulbs.

Current Situation: By April 2015, the Government of Canada's update of the Efficient Light Bulb standards phased out traditional incandescent light bulb sales in PEI²⁵. Incandescent Halogen lights are the cheapest light bulbs available to residents in Stratford followed closely by Compact Fluorescent light bulbs. Light-emitting diodes (LED's) are still the most expensive light bulb available to consumers in PEI however the prices are dropping considerably compared to previous years²⁶. According to the Natural Resources Canada Energy Factbook²⁷, 4% of the energy consumed by Canadian residents is related to lighting. Using this information an inference can be made that residents consumed 1,440,573.4 KWh of electric lighting in 2015. Maritime Electric did run an LED lighting campaign in December, 2016 and had great success with that program²⁸. Efficiency PEI does not have a specific program at this time that focuses on lighting replacements but it does provide free lighting upgrades with its Home Energy Low-Income Program (HELP)²⁹.

²⁵ Regulations and Standards—Natural Resources Canada: <http://www.nrcan.gc.ca/energy/regulations-codes-standards/7281>

²⁶ Publication Library—CLASP: <http://clasp.ngo/en/Resources/PublicationLibrary/2016/Study-retail-prices-of-LED-lamps-dropping-rapidly>

²⁷ Energy Fact Book 2015/2016—Natural Resources Canada; P. 91-92:
https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/energy/files/pdf/EnergyFactBook2015-Eng_Web.pdf

²⁸ Bright idea: Maritime Electric launches LED light campaign—CBC News, Shana Ross:
<http://www.cbc.ca/news/canada/prince-edward-island/pei-led-lights-maritime-electric-1.3865875>

²⁹ Home Energy Low Income Program (HELP)—Efficiency PEI:
<https://www.princeedwardisland.ca/en/information/transportation-infrastructure-and-energy/home-energy-low-income-program-help>

Light Bulb Exchange: Recommended Action.

Implement Stratford Business Group/ Rotary Club/ Light Bulb exchange

- The Stratford Business Group along with the Stratford Rotary Club have voiced their interest in partnering with the Town of Stratford to promote an LED light bulb exchange program;
- People would pay a low cost for the light bulbs while exchanging their old ones and all proceeds would go to a Rotary club campaign to help provide renewable power to a remote community in an impoverished country;
- Town of Stratford would provide the administrative support necessary to ensure that residents can easily exchange their light bulbs.

Rationale: Lighting is a category of energy use, which is very easy for people to understand and take advantage of. With the national standards now in place, lighting will contribute a large portion of GHG emission reductions for a very small price and effort if this action is done correctly.

Responsible Department: CAO's Office.

Suggested Timeframe: This should be implemented when there are external funding opportunities available between the winter of 2018 to the fall of 2019.

GHG Impact: According to the Energy Fact Book produced by Natural Resources Canada, 4% of all energy used by residents is used for lighting. If the average person in Stratford consumes 3,675 KWh of electricity then 233 Tonnes of GHG emissions would be reduced if all residents were to replace their traditional light bulbs with LED's.

Financial Impact: Only 40 hours of coordination and administrative work should be dedicated to this action, which should be initiated in concert between the Community Engagement Coordinator and other staff members. \$50,000 for the single bulk purchase of the LED Light bulbs needs to be raised using a small portion of municipal/community funds and relying on provincial or national funding programs for 50-80% of the rest of the cost. The Money Spent/Tonne of CO2E reduced for this action is \$31.71.

Helpful Resources:

- <http://www.nrcan.gc.ca/energy/regulations-codes-standards/7281>
- <http://sustainability.tufts.edu/get-involved/bulb-exchange/>

Objective: Audits and Retrofits.

To increase residential energy retrofits to eventually eliminate fuel oil consumption from the home, this will reduce 13,000 Tonnes of GHG emissions in the community.

Current Situation: 65 Stratford residents took advantage of Efficiency PEI rebate programs from April 1, 2015 to March 31, 2016. For someone to conduct an energy audit in PEI they can contact House Master or another inspection service company. Efficiency PEI covers 50% of the cost of home energy audits that are automatically deducted from House Master Bills³⁰. If someone wishes to update their home with energy related retrofits, they can ask Efficiency PEI for contact information to a contractor and also receive rebates for each retrofit they do. There is also a Home Energy Low Income Program (HELP) that offers free retrofit products to residents who have a household income of less than \$50,000. If someone wishes to install a renewable energy system in their home they must hire a contractor, have meetings, assessments and approvals before a system can be installed. The rebates must be applied through Efficiency PEI after the different contractors have finished their work.

SPEAR: Recommended Action.

Stratford's Program for Energy Audits and Renewables:

- SPEAR would provide a single point of contact for a resident to receive an energy audit, and energy/renewable retrofits without having to contact multiple service providers;
- SPEAR would require no payments to begin the process with all costs for the program being recovered by payments made after all the work is complete;
- The concept is that people will not pay more than they are paying right now for energy but they will be able to use less energy and save money once all retrofits from the program have been paid off.

Rationale: The amount of time that a resident must put in to coordinate all the contractors, assessments and regulations is a deterrent to making a resident's home more efficient. This program would help alleviate that entire time spent contacting people for extra information. A staff person would visit the residents home once, have one day of assessments and have the resident sign one contract. The resident would also not have to pay any money upfront, another popular deterrent, and they would benefit from all the retrofits that need to occur.

Responsible Department: CAO's office.

Suggested Timeframe:

- Case Study and Pilot: 2017-2018;
- Program Operation 2018-2021;
- Program Review after 2021 to assess continuance of program.

³⁰ Energy Efficiency—Efficiency PEI: <https://www.princeedwardisland.ca/en/topic/energy-efficiency>

GHG Impact: This program has the potential to reduce and possibly eliminate residential oil consumption within Stratford and reduce GHG emissions by 13,000 Tonnes.

Financial Impact: After fully launching the program, there should be no operational cost for the program since it will be designed to pay for all staff time required to operate the program. There will be some additional in-kind office costs associated with the program that would be associated with this recommended action.

Helpful Resources:

- <http://www.howtogermaany.com/pages/energycertificate.html>
- <https://www.iea.org/policiesandmeasures/pams/germany/name-23950-en.php>
- <http://www.electrical-efficiency.com/2014/01/german-kfw-funding-renovation-energy-efficiency-projects/>

Objective: Education and Awareness.

Increase the knowledge base of residents through community programs and communicate with at least 2000 different residents on energy conservation.

Current Situation: Stratford is an engaging community with various organizations working together within the Municipality to achieve specific goals. Stratford is a fast growing community with a majority of the population under the national median age³¹. Efficiency PEI is currently trying to find new ways to reach PEI residents and they are interested in providing geo-targeted programs to promote efficiency³².

Community Energy Challenge: Recommended Action.

Implement Community Wide Energy Challenge:

- It would involve people volunteering to monitor their homes in order to win a prize;
- Maritime Electric bills would be used to monitor each household;
- Final results would be comparing the average energy consumption per person per square foot of living space;
- The competition would occur over one month and could be held on an annual basis.

Rationale: This is about getting people motivated and what better way to motivate someone then to make them compete against their neighbors³³. Results from energy conservation programs in California have shown that when people are compared to their neighbors or other community members, they will respond quickly to try and “out-do” these people. One example from Seoul, Korea revealed a significant, sustained decrease in energy consumption due to an energy challenge taking place³⁴. If Stratford could replicate the energy challenge that was practiced in Seoul (but on a smaller scale) then it would decrease energy consumption, promote energy efficiency and increase the awareness of both concepts across the entire community.

Responsible Department: CAO’s Office.

Suggested Timeframe: Planning meetings should occur with project partners in 2018 with the eventual launch of the program in 2019.

³¹ Census Profile, 2016 Census—Statistics Canada: <http://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/Page.cfm?Lang=E&Geo1=CSD&Code1=1102080&Geo2=PR&Code2=13&Data=Count&SearchText=Hillsborough&SearchType=Begin&SearchPR=01&B1=All&wbdisable=true>

³² Prince Edward Island Provincial Energy Strategy 2016/2017—Prince Edward Island Energy Corporation; P. 22: https://www.princeedwardisland.ca/sites/default/files/publications/pei_energystrategymarch_2017_web.pdf

³³ Is tracking neighbours' energy bills the key to cutting consumption?—The Guardian, Mark Rowe: <https://www.theguardian.com/big-energy-debate/2014/sep/11/neighbours-bills-cut-consumption>

³⁴ A citizen-participatory energy conservation program that saves energy and enhances eco-friendliness—Seoul Metropolitan Government: <http://english.seoul.go.kr/citizen-participatory-energy-conservation-program-saves-energy-enhances-eco-friendliness/>

GHG Impact: The goal would be to engage 2,000 residents through this program over a period of time and reduce each participant's annual energy consumption by 10%, which would reduce GHG emissions by 1,688 Tonnes.

Financial Impact: There would be up to 100 hours of staff time required annually, to run this community campaign. This would require staff support from Efficiency PEI as well. The Money Spent/Tonne of CO₂E reduced would be \$29.62.

Helpful Resources:

- <http://english.seoul.go.kr/citizen-participatory-energy-conservation-program-saves-energy-enhances-eco-friendliness/>
- <https://www.theguardian.com/big-energy-debate/2014/sep/11/neighbours-bills-cut-consumption>

3. Goal: Commercial Energy Efficiency.

To promote energy efficiency and energy conservation among Stratford Businesses.

Stratford's commercial sector is growing larger every year with enterprises ranging from home based businesses to office based service companies to construction related companies. Stratford has two large grocery stores as well as fast food restaurants and restaurants that offer local fare. The average business in Stratford spends approximately \$70,000 on its annual electricity consumption. Many businesses would gladly employ more sustainable measures if it helped them save money on their operation costs. If businesses were offered efficient, and low cost solutions to increase the energy efficiency of their businesses then there would be less GHG emissions produced within the business community.

Objective: Audits and Retrofits.

Promote energy efficient retrofits in businesses by promoting efficiency PEI programs and increase Stratford commercial participation in Efficiency PEI programs by 50% compared to 2015 levels.

Current Situation: There are only 151 businesses listed on Stratford's Businesses directory³⁵ and yet these businesses produced 26,501 Tonnes of GHG emissions in 2015. This means that the average business produced 176 Tonnes of GHG emissions in 2015 29 times more than the average household in Stratford at 6 Tonnes of GHG emissions. The difference in emissions is quite large and the amount of time spent in a household compared to a business can also be quite different. If a business were as efficient as a household in using energy then it should only produce five to ten times the emissions of the household.

SPEAR: Recommended Action.

Implement Stratford's Program for Energy Audits and Renewables:

- SPEAR would provide a single point of contact for a business to receive an energy audit, and energy/renewable retrofits without having to contact multiple service providers;
- SPEAR would require no payments to begin the process with all costs for the program being recovered by payments made after all the work is complete;
- The concept is that entrepreneurs/businesses owners will not pay more than they are paying right now for energy but they will be able to use less energy and save money once all retrofits from the program have been paid off.

Rationale: The Stratford Business Group has identified that a business's top priority is to make their operation as efficient and cost-effective as possible to attain lower operation costs to increase their profits. By providing a way to enable businesses to save money on their operational costs, and also take advantage of existing Efficiency PEI programs, there will be a greater reduction in electricity and heating fuel consumption; this will lower GHG emissions within the community.

Responsible Department: CAO's Office.

³⁵ Stratford Businesses Directory—Town of Stratford: <http://www.townofstratford.ca/business-directory-listings/>

Suggested Timeframe: A case study and pilot program will be conducted from the summer of 2017 to spring of 2018 with expected full implementation of the program occurring in the Spring/Summer of 2018.

GHG Impact: Depending on the success of the pilot program and the interest generated within the first year this recommended action would have the potential to improve overall efficiency in businesses by 10% and could reduce 10% of the GHG emissions produced by commercial businesses; using 2015 amounts that would be a potential 2,650 Tonnes of GHG emissions reduced by this program.

Financial Impact: After fully launching the program, there should be no operational cost for the program since it will be designed to pay for all staff time required to operate the program.

Helpful Resources:

- <http://www.howtogermany.com/pages/energycertificate.html>
- <https://www.iea.org/policiesandmeasures/pams/germany/name-23950-en.php>
- <http://www.electrical-efficiency.com/2014/01/german-kfw-funding-renovation-energy-efficiency-projects/>

Objective: Education and Awareness.

To promote energy awareness and create support for energy conservation among Stratford businesses ensuring that at least 50 different Stratford businesses have participated in an energy conservation program.

Current Situation: Commercial and Institutional emissions are the second highest category of emissions in Stratford and, commercial emissions are the bulk of this category's emissions. There are only a 151 businesses listed on Stratford's Businesses directory and yet these businesses produced 26,501 Tonnes of GHG emissions in 2015. There is no program or strategy in place in Stratford to encourage businesses operating in Stratford to operate sustainably.

Business Energy Challenge: Recommended Action.

Implement Stratford Business Energy Challenge:

- Businesses can compete against each other in a similar format to the Community Wide Energy challenge;
- Potential partners such as the Charlottetown and Area Chamber of Commerce or the Stratford Business Group could help facilitate this program;
- Maritime Electric Bills would be used to monitor participants' progress;
- Businesses would be compared by the KWh consumed per square foot.

LED Lighting Campaign: Recommend Action.

Implement LED Lighting Campaign:

- A partnership with an organization such as Maritime Electric could occur where the potential partner provides LED light bulbs for large commercial businesses in Stratford;
- Stratford would administer the program and the partnering company would simply provide the financial backing for one large LED light purchase.

B Corporation: Recommended Action.

Promote the B Corporation Businesses Model:

- The B Corporation is a commercially driven business model program that promotes the restructuring of a commercial operation to be more sustainable;
- By providing public education for commercial businesses to become more sustainable, Stratford will be able to reduce its GHG emissions through this action.

Rationale: These recommended actions will reduce GHG emissions but also promote awareness of energy efficiency and show case businesses that are doing their part to make Stratford more sustainable.

Responsible Department: CAO's Office.

Suggested Timeframe:

Recommended Action	Implementation Date
Business Energy Challenge	2018
LED Lighting Campaign	2019
B Corporation	2020

GHG Impact: All three actions will reduce GHG emissions but will depend on the amount of participants and how engaged each business is in the action programs. If 15 businesses were to become more energy efficient through Action A that would reduce GHG emissions in the community by 32 Tonnes.

Financial Impact:

Recommended Action	Staff time required	Money Spent/Tonne of CO2E reduced
Business Energy Challenge	30 hours on annual basis	\$19.75
LED Lighting Campaign	30 hours on annual basis	\$94.34
B Corporation	10 hours on annual basis	-

Helpful Resources:

- <https://www.bcorporation.net/>
- <http://www.hydroone.com/MyBusiness/SaveEnergy/Pages/SBLighting.aspx>

4. Goal: Energy in Development.

To promote energy efficiency and conservation among all development and construction companies working within Stratford.

It is more cost effective to design energy efficiency into a building before it is built rather than after it is built. There are many building designs that are accessible to construction companies in PEI that would help improve energy efficiency and conserve energy within a home or business. These sustainable designs include Passive Haus, Energy Star, Leadership in Energy and Environmental Design (LEED), Green Globes, Living Building Challenge, Edge, etc. In places like Vermont or Nova Scotia, energy efficiency and energy conservation are topics that construction companies are aware of and implement strategies relating to these topics on a regular basis. Stratford needs to use some of the techniques practiced in Vermont and Nova Scotia to better educate and encourage energy efficient designs in all construction companies that operate within the municipality.

Objective: Education and Awareness.

To create awareness of energy efficient products, renewable energy products and smart building practices and ensure that at least five contractors working within Stratford are constantly employing smart building practices.

Current Situation: The Town of Stratford is one of three municipalities in PEI that is employing the 2010 National Building Code. The Province of PEI announced that it will begin to implement the adoption of the 2015 National building code and require all other municipalities to adopt it by 2019. Stratford has already begun planning for adoption of the new code and plans to be one of the first municipalities to do so just as it was one of the first municipalities to adopt the 2010 National Building Code. Contractors in Stratford are actively engaged with Town of Stratford planning staff to ensure that they meet all building code requirements. The Stratford department of Planning, Development and Heritage find that it is hard to enforce the 2010 National building code due to the lack of public education available to contracting companies.

Green Building Network: Recommended Action.

Implement Stratford Green Building Network Pilot Project:

- This will require partnering with an organization such as Efficiency PEI to help build a green building network in Stratford that then can be extended to surrounding areas;
- Quest Caucus's in other provinces such as Nova Scotia have built similar networks and they could be used to build one here;
- This network would help provide free education workshops and seminars for contracting/building companies that require knowledge on the new building code requirements³⁶.

³⁶ Prince Edward Island Provincial energy Strategy 2016/17—Prince Edward Island Energy Corporation, p. 24: https://www.princeedwardisland.ca/sites/default/files/publications/pei_energystrategymarch_2017_web.pdf

Rationale: The province of PEI is already hiring staff to provide new courses for building companies to adapt to the 2015 National building code. This recommended action will help provide continuing public education for all building code updates including the 2015 National building code and 2015 National Energy Code.

Responsible Department: CAO's Office as well as the Planning, Development and Heritage Department.

Suggested Timeframe: Implement in 2018 and maintain for five years after which point it should be reviewed to be expanded, maintained or discontinued.

GHG Impact: This action will reduce GHG emissions but will depend on the amount of participants and how engaged each building company is.

Financial Impact: This objective will require 10 hours annually of staff time and an in-kind donation for a meeting space. The Money Spent/Tonne of CO2E reduced for this action would be \$59.24.

Helpful Resources:

- <https://contractors.encyclopedia.com/>
- <http://www.questcanada.org/our-network/caucus/ns/ns-buildings>
- <https://www.wbdg.org/design-objectives/sustainable>
- <https://www.wbdg.org/resources/green-building-standards-and-certification-systems>

5. Goal: Renewable Energy.

To promote renewable energy and energy efficiency among Stratford Residents and businesses.

Since 2008, Stratford has encouraged the use of wind power to produce energy for residential homes through its Wind Energy Policy By-law. More recently, the municipality has done more research into the feasibility of using solar power to provide electricity for local infrastructure. Both types of renewable energy comply with Stratford's sustainability vision and can be feasible depending on the type of system installed. Stratford residents and businesses can do their part to help reduce GHG emissions by installing renewable energy in their homes. As the price of electricity continues to rise, and as the population grows, renewable energy will become even more cost-effective and will provide energy security within the municipality. When residents and businesses use less electricity, they lower the overall demand on local power distributing stations, which decreases the chances of brown-outs and black-outs across the province.

Objective: Education and Awareness.

To create awareness of renewable energy and energy efficiency options available in Stratford and increase the amount of people who are aware of renewable energy options to 2,000 people.

Current Situation: People need to be reminded of why they need to reduce their energy consumption, how they can reduce their energy consumption and where they can get more information. Stratford has multiple streams of communication with its residents that includes a quarterly printed newsletter called the Town Talk, a shorter biweekly emailed newsletter, Facebook and Twitter announcements as well as a digital communication sign at Stratford's north entrance into town. The digital sign can only be seen by traffic driving into Stratford and is under-utilized at this time. Solar energy systems are becoming more and more cost-effective each year but the industry is still in its fledgling phase in PEI. Solar energy systems and wind power systems are becoming more common in PEI but many residents and businesses are unaware of the latest benefits and cost-effectiveness of these two options. Companies that work in the renewable energy industry in PEI are hosting their own information sessions in community centers with some success. Stratford's Program for Energy Audits and Renewables (SPEAR) is another action within this plan that will have a large renewable energy component in its program structure.

Waste Not Wednesdays: Recommended Action.

Implement Waste not Wednesdays Campaign

- Public Campaign that will provide renewable energy education to Stratford Residents;
- Will reinforce energy conservation and energy efficiency practices promoted by Efficiency PEI;
- Will use social media, and the digital town sign to communicate with residents;
- Will recognize Waste Not Wednesday participants through social media;
- Can hold a quarterly speaker program that would invite renewable energy experts into the town to speak;
- Speakers could be brought in from other provinces.

Rationale: People are motivated by money. Being constantly reminded of how people will be able to save money and also be unfriendly compete with their neighbours through the Waste Not Wednesdays Campaign will help reduce energy consumption among the residents of Stratford. People will be able to find out more about the Efficiency PEI programs and be more interested in becoming more energy efficient. Bringing speakers in from other regional markets will help provide people with a better idea of what renewable energy systems can do for them and give them examples that can be adapted locally.

Responsible Department: CAO's Office.

Suggested Timeframe: The Waste Not Wednesday's program is ready to launch due to the work completed by the Community Energy Plan Coordinator and the Community Outreach Coordinator. This campaign should be implemented in the fall of 2017 and be reevaluated after one year

GHG Impact: Depending on the effectiveness of this campaign, energy consumption in residential households could limit end use energy consumption growth to 2.3% through replacement of energy efficient appliances and lighting. If this limiting of energy consumption in the residential sector is attained, that would result in a 2.4% decrease in electricity consumption per person changing the average electricity consumption of a Stratford resident from 3,675 KWh annually to 3,586.8 KWh; this would be the equivalent of a 0.026 Tonne reduction in GHG emissions per person or a total reduction of 259 Tonnes based on the 2015 estimated population of 9,800.

Financial Impact: This objective requires 30 hours of coordination annually and donated public space for speakers at the Stratford Community Centre.

Helpful Resources:

- <https://www efficiencyns.ca/service/building-optimization/>
- <http://www.theguardian.pe.ca/opinion/2016/12/10/diane-griffin--combatting-climate-change.html>
- <https://www.youtube.com/watch?v=sGRrUbtcl7M>

6. Goal: Municipal Operations.

To reduce greenhouse gas emissions being produced by all municipal operations and buildings.

Stratford residents and businesses must do their part to help reduce GHG emissions within the community but the corporate structure of the Town of Stratford allows the municipal corporation to provide leadership and demonstrate the effectiveness of renewable energy projects, energy efficiency retrofits and energy conservation techniques. As Stratford continues to grow, energy efficiency and conservation will be even more important to ensure that the community remains on the sustainable path outlined in its sustainability plan.

Objective: Energy Efficiency in Buildings.

To upgrade energy efficiency of all municipal buildings owned and operated by the municipality where feasible to reduce GHG emissions by 50 Tonnes before 2026.

Current Situation: The Town of Stratford currently operates and maintains eight buildings of various sizes, excluding water treatment and waste water treatment buildings. Of the eight buildings that are owned by the Town of Stratford two were built in the early 1900's, one was built in the 1990's, two were built in 2003, one in 2005 with an extension built onto it in 2009, two built within the last six years. All buildings were built before the 2010 National Building Code was adopted in the Town of Stratford. Prince Edward Island is the last province in Canada to adopt the National Building Code with the potential official implementation of this adoption occurring in January, 2018³⁷. Due to the lack of building standards, companies have been encouraged to follow National Building Code Standards³⁸. All municipal buildings have potential to increase their energy efficiency performances and require building retrofits.

Town Centre: Recommended Action.

Implement Energy Audit and Efficiency Upgrades of Town Hall:

- The Stratford Community Centre was built in 2003;
- The building design was modified many times due to budgetary restraints and has many inefficient lighting and heating installments that should be updated.

Fire Hall: Recommended Action.

Implement Energy Efficiency Upgrade of the Crossroads Fire Hall:

- The Stratford Fire Hall contributes to Stratford's Corporate GHG emission inventory;
- With the expected construction of a new fire Hall in the process, energy efficiency upgrades can be made.

³⁷ P.E.I. last province to fully adopt National Building Code standards—Daily Commercial News, Dong Procter: <http://dailycommercialnews.com/en-US/Government/News/2017/5/PEI-last-province-to-fully-adopt-National-Building-Code-standards-1023735W/>

³⁸ Affordability and Choice Today (A.C.T) Streamlined Approval Process Project—Construction Association of Prince Edward Island; P.1-3: https://fcm.ca/Documents/case-studies/ACT/Adoption_Of_The_National_Building_Code_In_Prince_Edward_Island_CS_EN.pdf

Maintenance Building: Recommended Action.

Conduct Energy Audit and Energy Efficiency Upgrades of the Town of Stratford Maintenance Building:

- The lighting of the maintenance building should be updated and an energy audit will reveal the type of heating that should be used in the building.

Crossroads Community Centre: Recommended Action.

Implement Energy Efficiency Upgrade of Crossroads Community Centre:

- The Cross Roads Community Centre should be fully renovated and made more efficient by the end of 2017.

Cotton Arts Centre: Recommended Action.

Implement Energy Efficiency Upgrade of the Cotton Arts Centre:

- The arts centre lighting and heating needs to be upgraded to a more efficient and cost effective form of heating. Small insulation factors should also be considered for the building.

Net-Zero Town Centre: Recommended Action.

Ensure that Town Community Centre/Town Hall is Net-Zero by 2026.

- The Stratford Community Centre can become net-zero and become a model for other communities across Canada to follow.

Rationale: The Town of Stratford currently spends approximately \$100,000 annually for the energy used in its eight owned and operated buildings. This cost could easily be reduced by \$10-\$30,000 annually by implementing the recommended actions for this objective.

Responsible Department: Department of Infrastructure and Public Works.

Suggested Timeframe:

Recommended Action	Implementation Date
Town Centre	2019
Fire Hall	2020
Maintenance Building	2022
Crossroads Community Centre	2017
Cotton Arts Centre	2020
Net-Zero Town Centre	2026

GHG Impact: By making municipal buildings more efficient, a reduction of 40-80 Tonnes could be achieved.

Financial Impact: Each of these actions will require hours of coordination among staff with an estimated annual time of 70 hours.

Estimated project costs for each action (excluding Stratford staff time) are listed below:

Recommended Action	Expense	Present Value of Savings (over 10 year period)	Net Cost	Money Spent/Tonne of CO2E reduced
Energy Audit and Efficiency Upgrades of Town Hall	\$40,000.00	\$25,600.00	\$14,400.00	\$1,400.00
Conduct Energy Audit and Energy Efficiency Upgrades of Town of Stratford Maintenance Building	\$30,000.00	\$5,000.00	\$25,000	\$12,500.00
Energy Efficiency Upgrade of Crossroads Community Centre	\$15,000.00	\$5,000.00	\$10,000.00	\$1,100.00
Energy Efficiency Upgrade of the Cotton Centre Arts Centre	\$30,000.00	\$8,500.00	\$21,500.00	\$2,400.00
Ensure that Town Community Centre/Town Hall is Net-Zero by 2026.	\$400,000.00	\$199,000.00	\$201,000.00	\$2,500.00

Helpful Resources:

- <https://living-future.org/net-zero/>
- <http://www.solarbuildings.ca/index.php/en/>
- http://www.cecobois.com/publications_documents/publications-casestudy-Hamilton_and_Oyster_River_Fire_Halls.pdf
- <https://www.princeedwardisland.ca/en/information/transportation-infrastructure-and-energy/commercial-energy-audit-program>

Objective: Renewable Energy.

To install cost-effective renewable energy array's in all municipal buildings and utility structures where feasible and reduce GHG emissions by 154 Tonnes by 2026.

Current Situation: The unit of municipal infrastructure in Stratford that consumes the most electricity is the Waste Water Treatment Plant. Since the Waste Water Treatment Plant will be removed and replaced with a system that will pump sewage to the City of Charlottetown Pollution Control Plant, there is no need to install renewable energy for that unit of infrastructure. The second largest electricity consuming unit of infrastructure in Stratford is the Stratford Community Centre. The combined electricity consumption in 2015 for the Stratford Town Hall and Community Gym was 451,534 KWh, which was an approximate \$70,000 expense for the municipalities operating budget.

Town Centre: Recommended Action.

Install Solar Energy System on Stratford Community Centre Gym Roof:

- This would involve installing up to a 100KW grid tied photovoltaic solar system onto the roof of the town centre gym;
- Depending on the size of the system and the cost of installation, the amount of savings generated would be roughly \$15,000-\$35,000 a year in operational costs;
- If installed, this would be one of the first photovoltaic systems mounted onto a community centre in Prince Edward Island and it would be one of the first town halls in Canada to be powered by solar panels.

Pondside: Recommended Action.

Install Solar Energy System for Pondside Pumping Station:

- If this solar installation were approved, Stratford would be one of the first town's in PEI equipping utility infrastructure with solar panels;
- Stratford would also be one of the few places in the Maritimes to have a solar array connected to its utility infrastructure;
- A grid tied, ground mounted photovoltaic system would be required;
- There is currently enough space to house all the necessary equipment on the surrounding property owned by the municipality.

Fullerton's Marsh: Recommended Action.

Install Solar Energy System for Fullerton's Marsh Pumping Station:

- Solar arrays are becoming more cost effective each year and there are over five different solar companies in PEI that would be able to compete for this project;
- When photovoltaic panels are installed to provide power for a water station alongside a back-up propane generator, it ensures that even during a power outage services can be maintained at low levels so that residents can have clean drinking water for longer periods of time;
- A grid tied, ground mounted photovoltaic system would be required;
- There is currently enough space to house all the necessary equipment on the surrounding property owned by the municipality.

Maintenance Building: Recommended Action.

Install Solar Energy System on Town of Stratford Maintenance Building:

- Although the maintenance building does not consume a large amount of electricity it still consumes enough for a solar panel installation to be feasible;
- A grid tied, roof mounted photovoltaic system would be the best application for this type of building.

Crossroads Community Centre: Recommended Action.

Install Solar Energy System for Crossroads Community Centre:

- This building is currently being retrofitted to be more efficient. Once that is complete, a photovoltaic system would be most feasible by powering both the baseball field lights and the Crossroads Community Centre with one single Maritime Electric metre instead of the two current metres;
- Eliminating redundant maritime electric fees (approximately \$350 annually);
- A grid tied, ground mounted photovoltaic system would be the best application for the combined community centre and baseball field meter;
- There is currently enough space to house all the necessary equipment on the surrounding property owned by the municipality.

Altitude Valve C: Recommended Action.

Install Solar Energy System for the Altitude Valve C Complex:

- This utility installation ensures that water pressure in all drinking taps have enough pressure. This is an essential component of the municipal water utility that needs to be reliable at all times. When it is being powered by solar panels it will be even more reliable;
- This installation consumes just enough electricity for this project to be feasible (11,000 KWh annually);
- There is currently enough space to house all the necessary equipment on the surrounding property owned by the municipality;
- A grid tied, ground mounted photovoltaic system would be required;

Cable Heights: Recommended Action.

Install Solar Energy System for the Cable Heights Water Station:

- This utility installation consumes around 82,000 KWh annually and would require a 61KW photovoltaic system;
- There is currently enough space to house all the necessary equipment on the surrounding property owned by the municipality;
- A grid tied, ground mounted photovoltaic system would be required.

Rationale: In the last ten years solar panel technology has advanced drastically making solar systems more affordable, efficient and durable. Most solar panels come with 25 year warranties and most major components have 10-20 year warranties. None of the proposed projects should be completed within the same year. As solar technology becomes more efficient and affordable, the amount of savings will increase making the projects that are proposed much more feasible. If the suggested timeframe is followed then the municipality will benefit immensely from solar technology.

Responsible Department: Department of Infrastructure..

Suggested Timeframe: Action A should be completed by the end of 2018. Action B should be completed by 2019 and Action C should be completed by 2020. Action G should be completed by 2021 and action E should be completed by 2022. Actions D and F should be completed by 2023.

Recommended Action	Implementation Date
Town Centre	2018
Pondside	2019
Fullerton's Marsh	2020
Maintenance Building	2023
Crossroads Community Centre	2022
Altitude Valve C	2023
Cable Heights	2021

GHG Impact: the Pondside and Fullerton's Marsh projects would contribute a 145.6 Tonne reduction in GHG emissions. All other actions will reduce GHG emissions but will depend on the size of each project; these actions could reduce municipal emissions by 86.48 Tonnes.

Financial Impact: Each of these actions will require hours of coordination among staff with an estimated annual time of 70 hours.

Estimated project costs for each action (excluding Stratford staff time) are listed below:

Action	Expense	Present Value of Savings (Over 25 year period)	Net Cost	Money Spent/Tonne of CO2E reduced
Install Solar Energy System on Stratford Community Centre Gym Roof	\$180,000.00	\$226,000.00	\$(46,000)	(\$1500.00)
Install Solar Energy System for Pondsides Pumping Station	\$390,000.00	\$369,000.00	\$21,000.00	(\$700.00)
Install Solar Energy System for Fullerton's Marsh Pumping Station	\$390,000.00	\$369,000.00	\$21,000.00	(\$700.00)
Install Solar Energy System on Town of Stratford Maintenance Building	\$70,000.00	\$23,000.00	\$47,000.00	\$3,100.00
Install Solar Energy System for Crossroads Community Centre	\$50,000.00	\$30,000	\$20,400.00	\$2,500.00
Install Solar Energy System for the Altitude Valve C Complex	\$50,000.00	\$28,000.00	\$22,000.00	\$5,300.00
Install Solar Energy System for the Cable Heights Water Station	\$122,000.00	\$123,000.00	\$1000.00	\$(40.00)

Helpful Resources:

- <http://www.nrcan.gc.ca/energy/efficiency/buildings/research/solar-photovoltaic/3907>
- <https://www.fastcodesign.com/3059298/10-buildings-that-prove-solar-can-be-beautiful>
- http://www.cansia.ca/uploads/7/2/5/1/72513707/cansia_submission_-_2016_price_review.pdf
- <https://www.fcm.ca/home/programs/green-municipal-fund/why-net-zero-energy-reduces-emissions-and-costs.htm>

Objective: Energy Efficient Utilities.

To initiate measures that will ensure energy conservation and efficiency in all utility systems that will achieve an improved 10% efficiency by 2026.

Current Situation: The Stratford Waste Water Treatment Plant is the largest consumer of electricity compared to all other infrastructure maintained by the municipality. An agreement has been established between the City of Charlottetown, the Province of PEI and the Town of Stratford which will transport Stratford Municipal sewage to the Charlottetown Sewage Treatment Plant via a piping system anchored to the Hillsborough Bridge³⁹. This agreement will be completed by 2019.

Waste Water Treatment: Recommended Action.**Conduct Energy Efficiency Review and Implement necessary changes of Waste Water Treatment Operations:**

- During the implementation of the Stratford/Charlottetown Sewage connection there should be a rigorous evaluation of how to make the operating systems as energy efficient as possible;
- Once the new Waste Water Treatment operation update is complete, all water and sewer pumping stations should be examined to ensure they are as energy efficient as possible;
- Coordination with the planning department needs to occur to ensure that gravity fed operations are used as much as possible instead of using additional pumping stations;
- New sewer infrastructure should have GHG emission monitoring equipment installed.

Rationale: Most utility operations are large electricity consumers and energy efficiency retrofits can drastically decrease operational costs.

Responsible Department: Stratford Utility/Public Works.

Suggested Timeframe: Action should be attempted immediately and be completed by 2022.

GHG Impact: Depending on the amount of work completed for this objective, this action will have varying levels of impact on GHG emission reductions.

Financial Impact: This Waste Water Treatment action will require an additional 20 hours of coordination among staff and partners.

³⁹ Canada and Prince Edward Island support improvements to Stratford and Charlottetown wastewater services—CISION: <http://www.newswire.ca/news-releases/canada-and-prince-edward-island-support-improvements-to-stratford-and-charlottetown-wastewater-services-624378483.html>

Helpful Resources:

- <https://fcm.ca/home/searchresults.htm?q=waste+water+treatment+efficiency+measures>
- <https://www.dhigroup.com/areas-of-expertise/urban-water/water-and-wastewater-treatment>
- <http://www.wef.org/globalassets/assets-wef/3---resources/topics/a-n/collection-systems/technical-resources/2010-08-02fca-1.pdf>

Objective: Procedures and Management.

To initiate measures and policies that will reduce greenhouse gas emissions in day-to-day operating procedures and management practices, this will reduce GHG emissions by 216 Tonnes by 2026.

Current Situation: Stratford's Records Management Policy currently dictates that all hard-copy financial files are generally stored for up to seven years depending on the file classification. All soft-copy financial records are stored in a file management and record keeping software called Town Suite, which has stored records pertaining to Stratford infrastructure since 2004. In order to review records pertaining to energy consumption, General Ledger Records must be accessed through the Town Suite software.

There are various kinds of commercial spaces in Stratford with many businesses operating in these commercial spaces or within their homes. There is no commercial registry in Stratford and no way to assess the total commercial space that exists within the municipal boundaries.

Stratford currently has two public transportation busses that provide services Monday through to Friday. Stratford works with the regional transit provider, T3 Transit to provide the public transit services that are currently available. Stratford staff is limited in how they can assess traffic congestion and the amount of traffic driving through the municipality. The municipality currently owns a number of fleet vehicles that are used to service recreation equipment/fields, municipal buildings and municipal utilities.

Data Gathering: Recommended Action.**Institute quality assurance measures for all future GHG monitoring, and reporting:**

- Include electricity consumption (KWh) amounts on General Ledger (GL) records. These records already take note of the monthly payments from received electricity bills and could easily contain more information relating to energy consumption;
- Include oil consumption (Litres) amounts on General Ledger (GL) records;
- Include oil account numbers and Electricity Meter account numbers in the General Ledger (GL) description columns. This will help make it more efficient to account for oil and electricity consumption in the future;
- Collect VKT information from Stratford residents, businesses, and local industry on a biennial basis through surveys for future GHG emission inventories;
- Update Staff the Travel Expense Claim form and the Council Expense Claim Form to include air travel departure and arrival information as well as specific vehicle information, which can be reviewed by future staff members who need to conduct GHG emission accounting ([Image B2](#)).

Sustainability Coordinator: Recommended Action.

Create a Sustainability Coordinator position to implement actions in this document that cannot be done by existing staff:

- One full time, two year term position should be created to help administer the actions represented within this Community Energy Plan;
- This position would provide 1560 work hours annually for sustainability issues with 560 hours annually being dedicated to the actions represented in this plan.

Electric Vehicles: Recommended Action.

Implement Electric Replacement of Half ton truck fleet vehicles:

- Current municipal fleet vehicles are used only locally and often sit for extended periods of time in various locations;
- Electric vehicles are far better suited for local travel and are more efficient when used in traditional “stop & go traffic”;
- As electric vehicles become more main stream, electric truck prices will fall;
- A single electric truck replacement would reduce GHG emissions by 5.15 Tonnes.

Staff Carpooling: Recommended Action.

Create Staff Carpooling Program:

- Many staff already carpool within Stratford but there are others who live in Charlottetown and surrounding areas who could also participate if there was enough interest;

Electric Bus: Recommended Action.

Work with T3 to establish Electric Bus replacement program for city transit:

- The 2017-2018 Federal Budget announced a significant amount of funds available for updating municipal transit systems; Stratford, Charlottetown, Cornwall and T3 can work together to take advantage of this available funding;
- By replacing one electric bus that provides service in Stratford, a reduction of 49 Tonnes of GHG emissions can be achieved.

Waste Auditing: Recommended Action.

Implement Solid Waste Audit Program for Stratford maintenance operations:

- An official Waste Audit should be conducted on a biennial basis for municipal facilities using reporting models from Dalhousie University and/or Clean River Incorporated;
- In the future this waste audit program could allow for the Town of Stratford to improve its waste reduction program;
- This program could lead to almost or no waste (everything being recycled or composted) from all municipal facilities by 2026.

Future Building Policy: Recommended Action.

Institute Policy that all future buildings that are part of municipal infrastructure be built to an internationally recognized standard such as LEED or Green Globes:

- If the Town of Stratford builds any future buildings such as a library, community centre or sports centre, it should be built to a standard that will make it energy efficient and have less of an impact on the environment.

Building Tax Incentive: Recommended Action.

Initiate Review of Sustainable Building Design Tax Incentive Policy:

- This policy was adopted in 2008 but there have been no applications for this program since it was adopted;
- The tax incentive applies to any new assessment or increase in assessment for property located in the Town of Stratford where that property is zoned for commercial, institutional, industrial and high density residential in the Stratford Zoning and Subdivision Control Bylaw;
- To qualify, owners must demonstrate that the building has been designed and constructed to meet a LEED or Green Globes standard.
- The tax incentive is based on the level of certification achieved with platinum LEED certified buildings able to receive up to a 100% discount on its annual municipal tax contributions.

Rationale: Natural Resources Canada already has national and provincial averages for energy consumption based on square feet or square metre measurements. This information could be used for various kinds of energy assessments and future GHG emission inventories. Future GHG emission inventories may require information relating to carbon sinks and the amount of trees located in public and private areas of a municipality. The Town of Stratford needs to ensure that all future buildings are built to a better standard compared to current buildings.

Responsible Department: The Data Gathering recommended action should be implemented by the accounting department. The Electric Vehicles and Waste Auditing recommended actions should be implemented by the Public Works & Infrastructure department. All other recommended actions should be implemented by the CAO's office.

Suggested Timeframe:

Recommended Action	Implementation Date
Data Gathering	2018
Sustainability Coordinator	2018
Electric Vehicles	2025
Staff Carpooling	2021
Electric Bus	2024
Waste Auditing	2020
Future Building Policy	2022
Building Tax Incentive	2021

GHG Impact: The Data Gathering and the Sustainability Coordinator recommended actions will have no direct impact on GHG emission reduction but will help in the completion of all other actions in this CEP. The Electric Vehicles recommended action could reduce GHG emissions by 6.08 Tonnes per electric vehicle replaced while the Staff Carpooling recommended action could reduce GHG emissions by 9.5 Tonnes depending on the amount of staff that are involved. The Electric Bus recommended action depends on the amount of collaboration that occurs between the different municipalities; for every T3 bus that is replaced with an electric bus, there is the potential to reduce GHG emissions by at least 40 Tonnes. The Waste Auditing recommended action has the potential to reduce GHG emissions by 68 Tonnes. The Future Building Policy and Building Tax Incentive recommended actions will have varying levels of impact.

Financial Impact:

Recommended Action	Cost	Staff time required	Reason	Money Spent/Tonne of CO2E reduced
Data Gathering	-	-little impact	-	-
Sustainability Coordinator	\$45,000 (over two years)	20 hours	-should require a two-year term annual salary of \$45,000, which with 50% funding from FCM would create an expense of \$22,500 on an annual basis for the Town of Stratford	-
Electric Vehicles	\$10,000 more than pre-budged amounts of \$45,00 per vehicle	-	- should also be combined with the existing vehicle seven year replacement policy already in place in the Town of Stratford	\$1,500 per vehicle
Staff Carpooling	-	10 hours on annual basis	-	-
Electric Bus	-	15 hours on annual basis	-	-
Waste Auditing	-	-20 hours	- would require 20 hours of labour combined with coordination by staff on a biannual basis	-
Future Buildings Policy	-	20 hours on annual basis	-	-
Building Tax Incentive	-	20 hours on annual basis	-	-

Helpful Resources:

- <https://www.cdm.org/ZeroWaste/resources/KAB-WasteAudit.pdf>
- <https://cleanriver.com/waste-audit-in-5-easy-steps/>
- <http://workhorse.com/pickup/>
- http://www.humber.ca/sustainability/sites/default/files/uploads/documents/140804_Humber College Car Pool Program STAFF 4 Updated%20no%20carpool%20zone.pdf

Part III: Implementation Plan

The implementation of this Community Energy Plan has been spread out over a ten year period with various departments and community groups being appointed different tasks. There are six goals, 16 objectives and 48 actions that should be implemented in order for Stratford to reach its reduction targets ([Figure C1](#)). Most of the recommended actions should not be implemented exactly as written but rather each action should adapt as time passes to the changing circumstances that may be present ([Figure D1](#)).

This implementation plan is portrayed in a series of tables that portray the short term and long term actions. The actions are arranged into municipal and community categories followed by tables that assign the responsibility of implementation of each action into the various departments. In Appendix E, there is an Implementation Plan project template that can help guide the completion of each action. Progress of this implementation plan will be monitored by the Sustainability Committee, which will continue to meet on a Quarterly basis. A monitoring plan will be completed before the adoption of the Stratford Community Energy Plan and is not part of this draft document.

Municipal Corporation

Short Term

Recommended Year to Start working on Action	Action	Staff hours required annually	Net Cost (excluding staff hours)	Estimated CO2E Reduction	Responsible Department	Expected Year To Complete Action	Started (S) In Progress(P) Completed (C)
2017	6.1.D. Crossroads Community Centre	-	\$12,500	9	Infrastructure and Public Works	2017	
2017	6.1.A. Town centre	15	\$15,000	9	Infrastructure and Public Works	2018	
2017	6.2.A. Town Centre	10-1 year	-\$45,000	32	Infrastructure and Public Works	2018	
2017	6.4.A. Data Gathering	-	-	-	Accounting	2018	
2017	6.4.B. Sustainability Coordinator	20-1 year	\$22,500	-	CAO's Office	2018	
2018	6.1.B. Fire Hall	-	-	21	CAO's Office	2019	
2018	6.2.B. Pondsides	10-1 year	\$21,000	30	Infrastructure and Public Works	2019	

Long Term

Recommended Year to Start working on Action	Action	Staff hours required annually	Net Cost (excluding staff hours)	Estimated CO2E Reduction	Responsible Department	Expected Year To Complete Action	Started (S) In Progress(P) Completed (C)
2019	6.1.E. Cotton Arts Centre	10	\$21,500	9	Infrastructure and Public Works	2020	
2019	6.2.C. Fullerton's Marsh	15	\$21,000	30	Infrastructure and Public Works	2020	
2018	6.4.F. Waste Auditing	20-every 2 years	-	68	CAO's Office	2020	
2020	6.2.G. Cable Heights Water Station	15	-\$1,000	25	Infrastructure and Public Works	2021	
2018	6.4.C. Electric Vehicles	-	\$10,000	6	Infrastructure and Public Works	2021	
2019	6.4.D. Staff Carpooling	10	-	10	CAO's Office	2021	
2020	6.4.H. Building Tax Incentive	10	-	-	CAO's Office	2021	
2021	6.1.C. Maintenance Building	10	\$25,000	2	Infrastructure and Public Works	2022	
2021	6.2.E. Crossroads Community Centre	10	\$20,400	8	Infrastructure and Public Works	2022	
2020	6.3.A. Waste Water Treatment	20	-	21	Infrastructure and Public Works	2022	
2022	6.2.D. Maintenance Building	10	\$47,000	15	Infrastructure and Public Works	2023	
2022	6.2.F. Altitude Valve C	10	\$22,000	4	Infrastructure and Public Works	2023	
2021	6.4.E. Electric Bus with T3	15	-	80	CAO's Office	2024	
2022	6.1.F. Net-zero Town Centre	15	\$201,000	79	CAO's Office	2026	
2022	6.4.G. Future Buildings Policy	20	-	-	CAO's Office	2026	

Community

Short Term

Recommended Year to Start working on Action	Action	Staff hours required annually	Net Cost (excluding staff hours)	Estimated CO2E Reduction	Responsible Department	Expected Year To Complete Action	Started (S) In Progress(P) Completed (C)
2017	5.1.A. Waste Not Wednesdays	30	-	-	CAO's Office	2017	
2017	1.1.A. Increase Tree Cover	10	-	70	CAO's Office	2018	
2018	1.2.A. Anti-idling	20	\$10,000	-	CAO's Office	2018	
2018	1.2.B. School Energy Challenge	40	\$15,000	152.5	CAO's Office	2018	
2017	2.2.A. & 3.1.A. SPEAR	-	\$4,430	500-13,336	CAO's Office	2018	
2018	4.1.A. Green Building Network	10	-	-	CAO's Office	2018	
2018	1.2.D. Micro-grant Program	50	\$40,000	-	CAO's Office	2019	
2018	1.3.B. 2015 NEC/NBC	-	-	-	Planning Development and Heritage Department	2019	
2019	1.3.C. Solar Ready-Bylaw	-	-	-	Planning Development and Heritage Department	2019	
2019	1.4.A. Electric Vehicle Stations	40	-	-	CAO's Office	2019	
2018	1.4.B. Carpooling	80	\$20,000	156	CAO's Office	2019	
2018	1.4.D. Walking Bus	30-for first year only	-	78	CAO's Office	2019	
2017	1.4.E. Transit	40	\$200,000	156	CAO's Office	2019	
2018	2.1.A. Light Bulb Exchange	40	\$25,000	788	CAO's Office	2019	
2018	2.3.A. Community energy Challenge	100	-	1688	CAO's Office	2019	
2018	3.2.A. Business Energy Challenge	30	-	32	CAO's Office	2019	

Long Term

Recommended Year to Start working on Action	Action	Staff hours required annually	Net Cost (excluding staff hours)	Estimated CO2E Reduction	Responsible Department	Expected Year To Complete Action	Started (S) In Progress(P) Completed (C)
2018	1.2.C. Community Solar Farm	30	-	194	CAO's Office	2020	
2019	1.3.A. Wind Policy	-	-	-	Planning Development and Heritage Department	2020	
2019	1.4.C. Park and Ride	20	-	-	CAO's Office	2020	
2018	1.4.F. Bike Availability	15	-	78	Recreation Culture and Events Department	2020	
2018	1.4.G. Active Transportation	15	-	156	Recreation Culture and Events Department	2020	
2018	3.2.B. LED Lighting Campaign	30	-	-	CAO's Office	2020	
2019	3.2.C. B Corporation	10	-	-	CAO's Office	2020	
2020	1.2.E. WatersCool Expansion	150	\$20,000	-	CAO's Office	2021	
2020	1.2.F. Dog Poop Fertilizer	10 +10 initial hours of labour	\$2,000	-	Recreation Culture and Events Department	2022	

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CAO's Office						
Recommended Year to Start working on Action	Action	Staff hours required annually	Net Cost (excluding staff hours)	Estimated CO2E Reduction	Expected Year To Complete Action	Started (S) In Progress(P) Completed (C)
Municipal						
2017	6.4.B. Sustainability Coordinator	20-1 year	\$22,500	-	2018	
2018	6.1.B. Fire Hall	-	-	21	2019	
2018	6.4.F. Waste Auditing	20-every 2 years	-	68	2020	
2019	6.4.D. Staff Carpooling	10	-	10	2021	
2020	6.4.H. Building Tax Incentive	10	-	-	2021	
2021	6.1.C. Maintenance Building	10	\$25,000	2	2022	
2021	6.4.E. Electric Bus with T3	15	-	80	2024	
2022	6.1.F. Net-zero Town Centre	15	\$201,000	79	2026	
2022	6.4.G. Future Buildings Policy	20	-	-	2026	
Community						
2017	5.1.A. Waste Not Wednesdays	30	-	-	2017	
2017	1.1.A. Increase Tree Cover	10	-	70	2018	
2017	2.2.A. & 3.1.A. SPEAR	-	\$4,430	13,336	2018	
2018	1.2.A. Anti-idling	20	\$25,000	-	2018	
2018	1.2.B. School Energy Challenge	40	\$15,000	152.5	2018	
2018	4.1.A. Green Building Network	10	-	-	2018	
2017	1.4.E. Transit	40	\$200,000	156	2019	

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2018	1.2.D. Micro-grant Program	50	\$40,000	-	2019	
2018	1.4.B. Carpooling	80	\$20,000	156	2019	
2018	1.4.D. Walking Bus	30-for first year only	-	78	2019	
2018	2.1.A. Light Bulb Exchange	40	\$25,000	788	2019	
2018	2.3.A. Community Energy Challenge	100	-	1688	2019	
2018	3.2.A. Business Energy Challenge	30	-	32	2019	
2018	1.2.C. Community Solar Farm	30	-	194	2020	
2018	3.2.B. LED Lighting Campaign	30	-	-	2020	
2019	1.4.A. Electric Vehicle Stations	40	-	-	2019	
2019	1.4.C. Park and Ride	20	-	-	2020	
2020	1.2.E. WatersCool Expansion	150	\$20,000	-	2021	

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Planning Development and Heritage						
Recommended Year to Start working on Action	Action	Staff hours required annually	Net Cost (excluding staff hours)	Estimated CO2E Reduction	Expected Year To Complete Action	Started (S) In Progress(P) Completed (C)
2018	1.3.B. 2015 NEC/NBC	-	-	-	2019	
2019	1.3.C. Solar Ready Bylaw	-	-	-	2019	
2019	1.3.A. Wind Policy	-	-	-	2020	

Recreation Culture and Events						
Recommended Year to Start working on Action	Action	Staff hours required annually	Net Cost (excluding staff hours)	Estimated CO2E Reduction	Expected Year To Complete Action	Started (S) In Progress(P) Completed (C)
2018	1.4.F. Bike Availability	15	-	78	2020	
2018	1.4.G. Active Transportation	15	-	156	2020	
2020	1.2.F. Dog Poop Fertilizer	10 + 10 initial hours of labour	\$2,000	-	2022	

Accounting						
Recommended Year to Start working on Action	Action	Staff hours required annually	Net Cost (excluding staff hours)	Estimated CO2E Reduction	Expected Year To Complete Action	Started (S) In Progress(P) Completed (C)
2017	6.4.A. Data Gathering	-	-	-	2018	

Infrastructure and Public Works						
Recommended Year to Start working on Action	Action	Staff hours required annually	Net Cost (excluding staff hours)	Estimated CO2E Reduction	Expected Year To Complete Action	Started (S) In Progress(P) Completed (C)
2017	6.1.D. Crossroads Community Centre	-	\$12,500	9	2017	
2017	6.1.A. Town Centre	15	\$15,000	9	2018	
2017	6.2.A. Town Centre	10-1 year	-\$46,000	32	2018	
2018	6.2.B. Pondside	10-1 year	\$21,000	30	2019	
2019	6.1E. Cotton Arts Centre	10	\$21,500	9	2020	
2019	6.2.C. Fullerton's Marsh	15	\$21,000	30	2020	
2020	6.2.G. Cable Heights Water Station	15	-\$1,000	25	2021	
2018	6.4.C. Electric Vehicles	-	\$10,000	6	2021	
2021	6.1.C. Maintenance Building	10	\$25,000	2	2022	
2021	6.2.E. Crossroads Community Centre	10	\$20,400	8	2022	
2020	6.3.A. Waste Water Treatment	20	-	21	2022	
2022	6.2.D. Maintenance Building	10	\$47,000	15	2023	
2022	6.2.F. Altitude Valve C	10	\$22,000	4	2023	

Appendices

Appendix A

Table A1. Original Project Timeline.

	June, 2016	July	August	September	October	November	December	January	February	March	April	May	June	July	August, 2017
Phase 1: Planning Process															
Acquire GHG IQ Certification															
Establish Advisory Committee															
Establish Steering Committee															
Establish Contact with Baseline data providers															
Creating Engagement Plan for Staff															
Creating Public Engagement Plan															
Phase 2: Create Sustainability Vision															
Engage both Advisory Committee and Steering Committee on Energy plan vision and project details															
Creating Vision for Community Energy Plan															
Phase 3: Assess Current Situation															
Launch Public Engagement Strategy															
Establish Baseline Inventory															
Analyze Inventory Results															
Phase 4: Develop Action Plan															
Identify Actions															
Engage Stakeholders															
Start draft of Final CESP															
Acquire approval for Final CESP															
Phase 5: Develop Implementation and Monitoring Strategy															
Adopt & Publicize															
Engage Stakeholders															
Implementation Plan															
Develop Monitoring Plan															
Adopt Monitoring Plan															
Months	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Image A1. Media Release of Community Energy Champion Award Winners posted December 14, 2016.



Congratulations to the New Stratford Energy Champion and Green Energizer!

THE AWARD CEREMONY WAS HELD ON DECEMBER 14TH WITH MAYOR DAVID DUNPHY PRESENTING THE AWARDS HIMSELF. BOTH OF THESE AWARD RECIPIENTS WILL MAKE A VALUABLE ADDITION TO THE STRATFORD COMMUNITY ENERGY PLAN COMMITTEE AND WILL HELP STEER THE ENERGY FUTURE OF STRATFORD. THE TOWN OF STRATFORD WOULD LIKE TO THANK ALL THE RESIDENTS WHO SUBMITTED NOMINATIONS FOR THESE AWARDS.

THE STRATFORD ENERGY CHAMPION AWARD RECIPIENT, LEN CURRIE, IS WORKING HARD TO SAVE MONEY AND ALSO REDUCE HIS PERSONAL GREENHOUSE GAS EMISSIONS. HE HAS INSTALLED SOLAR PANELS ON HIS HOUSE, INSTALLED HEAT PUMPS FOR HEATING IN HIS HOME AND IS CONSTANTLY LOOKING FOR WAYS THAT STRATFORD CAN BE MORE SUSTAINABLE.

THE GREEN ENERGIZER YOUTH AWARD RECIPIENT, LILLY HICKOX, IS A PASSIONATE INDIVIDUAL WHO HAS DISTRIBUTED PETITIONS, MET WITH DIFFERENT MUNICIPALITIES FOR ENVIRONMENTAL INITIATIVES AND IS CONSTANTLY WORKING TO IMPROVE ACTIVE TRANSPORTATION IN PEI. SHE IS A MEMBER OF HER SCHOOL'S GREEN CLUB, A MEMBER OF THE SIERRA CLUB AND ALSO A MEMBER OF SAVE OUR SEAS & SHORES.

KEEP YOUR EYES OPEN IN THE NEW YEAR FOR LILLY AND LEN AS THEY HELP SPREAD THEIR KNOWLEDGE AND WISDOM AT COMMUNITY ENERGY PLAN EVENTS!

STRATFORD COMMUNITY ENERGY PLAN

Town Hall
234 Shakespeare Dr,
Stratford, PE C1B 2V8

Email: barieder@townofstratford.ca
Town Hall Phone: 902.569.1995
Town Hall Fax: 902.569.5000

Table A1. Results Matter Active Transportation Data.

	Active Transportation Network (Km)							
	2008	2009	2010	2011	2012	2013	2014	2015
Trails	6.25	7.22	8.03	8.50	12.00	15.00	16.00	17.54
Sidewalks	10.72	12.00	12.69	13.10	15.00	16.35	16.35	16.35
Bike Lanes	23.40	26.94	28.44	28.90	30.00	32.59	32.59	32.59
Total (km)	40.37	46.16	49.16	50.50	57.00	63.94	64.94	66.48

Image A2. T3 Bus routes provided in Stratford copied from website: http://triustransit.ca/schedules/stratford_transit.

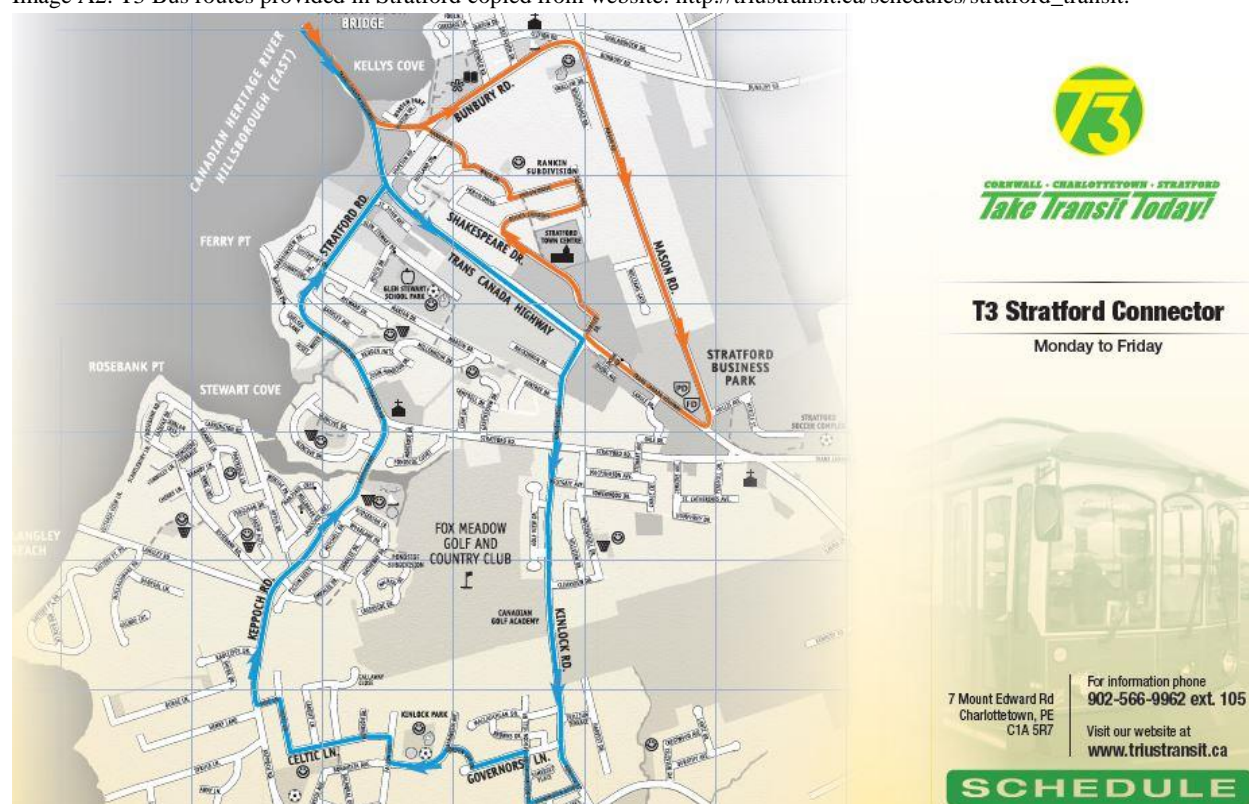


Table A2. Results Matter Public Transit Data.

	Public Transit							
	2008	2009	2010	2011	2012	2013	2014	2015
Average passengers per day	51.0	68.6	87.7	83.0	80.3	81.2	87.4	88.9
Estimated Population	7,600	7,800	8,100	8,500	9,000	9,400	9,600	9,800
Target	76.0	78.0	81.0	85.0	90.0	94.0	96.0	98.0
Stretch Goal	95.0	97.5	101.3	106.3	112.5	117.5	120.0	122.5

STRATFORD COMMUNITY ENERGY PLAN

Image A3. Exert from Stratford's 2009 Active Transportation Plan available at <http://www.townofstratford.ca/wp-content/uploads/2013/01/Stratford-Active-Transportation-Plan.pdf>.



Table A3. Overview of Wind Turbines located in PEI as of 2015,

Name	Number of Turbines	Estimated Annual Electricity Generation
East Point Wind Farm	10	90-95 Gigawatt-hours
North Cape Wind Farm	16	10.6 MW (Megawatts)
Aeolus Wind Farm	1	3 MW
Norway Wind Farm	3	9 MW
West Cape Wind Farm	55	99 MW
City of Summerside wind Utility	4	12 MW
Hermanville/Clearspring Wind Farm	10	110 Gigawatt-hours
Total	99	204 MW
Source: PEI Energy Corporation's government webpage: https://www.princeedwardisland.ca/en/information/transportation-infrastructure-and-energy/wind-energy-prince-edward-island		

Table A4. Stratford Results Matter Water Consumption Data.

	Water Consumption					
	2010	2011	2012	2013	2014	2015
Water Consumption in Litres						
Total produced	552,918,476	556,008,660	593,280,654	618,992,275	657,106,572	691,251,937
5% estimated System Leakage in litres	27,645,924	27,800,433	29,664,033	30,949,614	32,855,329	34,562,597
Commercial Usage in litres	53,159,591	55,846,593	58,768,906	59,976,000	52,036,719	67,499,629
Leakage + Commercial in litres	80,805,515	83,647,026	88,432,939	90,925,614	84,892,048	102,062,226
Residential Usage per Year in litres	472,112,961	472,361,634	504,847,715	528,066,661	572,214,525	589,189,711
Demographics						
Total Population at year end	8,100	8,500	9,000	9,400	9,600	9,800
Units in Stratford	3,550	3,688	3,858	3,927	3,995	4,041
Units Actually Connected to Town Water	2,093	2,288	2,498	2,630	2,694	2,768
% of Units connected	59.0%	62.0%	64.7%	67.0%	67.4%	68.5%
Estimated number of residents on Town Water	4,779	5,273	5,827	6,295	6,474	6,713
Consumption Breakdown						
Litres consumed per person per day	271	245	237	230	242	240
Litres consumed per dwelling unit per day	618	566	554	550	582	583

Image A4. Central Compost Facility where Stratford's compost is taken; this image and more information is available at <https://www.iwmc.pe.ca/pdfs/Central%20Compost%20Facility.pdf>.



CENTRAL COMPOST FACILITY

Brookfield, Prince Edward Island, Canada

Image A5. Veresen Inc. PEI Energy System Facility; this image and more information is available at <https://www.iwmc.pe.ca/pdfs/PEI-Energy-Systems9-25-07.pdf>.



Image A6. Wellington Landfill site operated and maintained by IWMC; this image and more information is available at <https://www.iwmc.pe.ca/pdfs/EPWMFBrochure.pdf>.



STRATFORD COMMUNITY ENERGY PLAN

Image A7. Sample of the CO2E Calculator tool used to calculate the most cost effective way to meet a specified reduction target.

	Yes (Insert "1")/ No (Insert "0")	Year	Project/Item	Estimated Cost (Total Cost over 10 year period)	Estimated Savings (over 10 year period)	Net Cost	CO2E Reduction in Tonnes
1	1	1	Solar Install-Town Hall Roof	\$ 107,607.00	\$ 195,502.00	\$ (87,895.00)	32.4
2	0	0	Efficiency Upgrade-Cotton Centre	\$ -	\$ -	\$ -	0
3	1	1	Retirement/selling of 1999 International f	\$ (1,500.00)	\$ 3,500.00	\$ (5,000.00)	0.9
4	1	1	Waste Audit and new in-house recycling p	\$ 60,000.00	\$ 12,500.00	\$ 47,500.00	27
5	1	1	Efficiency Upgrade-Town Hall	\$ 20,000.00	\$ 30,000.00	\$ (10,000.00)	9
6	1	1	Efficiency Upgrade-WWTP Pump Station	\$ 20,000.00	\$ 20,000.00	\$ -	15
7	0	0	Ponside Small Solar Array	\$ -	\$ -	\$ -	0
8	1	1	Pondside Large Solar Array	\$ 230,699.49	\$ 231,047.34	\$ (347.85)	30
9	0	0	Fullertons Small Solar Array	\$ -	\$ -	\$ -	0
10	1	1	Fullertons Large Solar Array	\$ 230,699.49	\$ 231,047.34	\$ (347.85)	30
11	1	1	Electric Replacement Half ton Truck fleet v	\$ 55,000.00	\$ 43,419.00	\$ 11,581.00	5.51
12	0	0	Electric Replacement Half ton Truck fleet v	\$ -	\$ -	\$ -	0
13	1	1	Cable Heights Water Station Solar Array	\$ 122,661.50	\$ 106,623.00	\$ 16,038.50	24.6
14	1	1	Planned Halt of Sewer Lift Station Addition	\$ -	\$ -	\$ -	42
15	1	1	Staff Carpooling Program	\$ 10,000.00	\$ -	\$ 10,000.00	9.5
16	1	1	Have all Streetlights be LED's by 2022	\$ 200,000.00	\$ 271,641.00	\$ (71,641.00)	62.8
17	1	1	Electric Replacement Half ton Truck fleet v	\$ 55,000.00	\$ 61,487.00	\$ (6,487.00)	6.08
18	1	1	Purchase Electric Bus with T3 to replace #5	\$ 200,000.00	\$ 200,000.00	\$ -	27.61
19	1	1	Solar Install-Alittude Valve C	\$ 25,000.00	\$ 15,472.00	\$ 9,528.00	3.57
20	1	1	Vehicle Replace-Hybrid to electric	\$ 38,590.00	\$ 35,960.00	\$ 2,630.00	0.22
21	1	1	Efficiency & Solar Upgrade-Maintenance B	\$ 70,000.00	\$ 40,000.00	\$ 30,000.00	17.31
22	1	1	Efficiency Upgrades-Fire Hall	\$ 50,000.00	\$ -	\$ 50,000.00	20.84
23	1	1	Purchase Electric Bus with T3 to replace #5	\$ 200,000.00	\$ 200,000.00	\$ -	35.61
24	1	1	Solar Install-Library	\$ 50,000.00	\$ 15,000.00	\$ 35,000.00	5
25	1	1	Solar Install- Cotton Centre	\$ 100,000.00	\$ 50,000.00	\$ 50,000.00	33
26	1	1	Solar Install-Cross Roads Community Cent	\$ 50,000.00	\$ 25,000.00	\$ 25,000.00	8
27	1	1	0 Waste Policy-All municipal by 2025	\$ 100,000.00	\$ 50,000.00	\$ 50,000.00	68
28	1	1	Solar Upgrade-Town Hall	\$ 95,000.00	\$ 95,000.00	\$ -	24
29	1	1	Net-Zero Electricity-Town Hall (Solar)	\$ 400,000.00	\$ 350,000.00	\$ 50,000.00	79
30	1	1	Solar Arbor Install-Sewage Pump Station	\$ 30,000.00	\$ 15,000.00	\$ 15,000.00	3
31	0	0	Solar Arbor Install-Sewage Pump Station	\$ -	\$ -	\$ -	0
32	0	0	Solar Arbor Install-Sewage Pump Station	\$ -	\$ -	\$ -	0
33	0	0	Solar Arbor Install-Sewage Pump Station	\$ -	\$ -	\$ -	0
34	0	0	Solar Arbor Install-Sewage Pump Station	\$ -	\$ -	\$ -	0
35	0	0	Solar Arbor Install-Sewage Pump Station	\$ -	\$ -	\$ -	0
Total				\$ 2,518,757.48	\$ 2,298,198.68	\$ 220,558.80	619.95

Appendix B

Image B1. Town of Stratford Zoning Map.

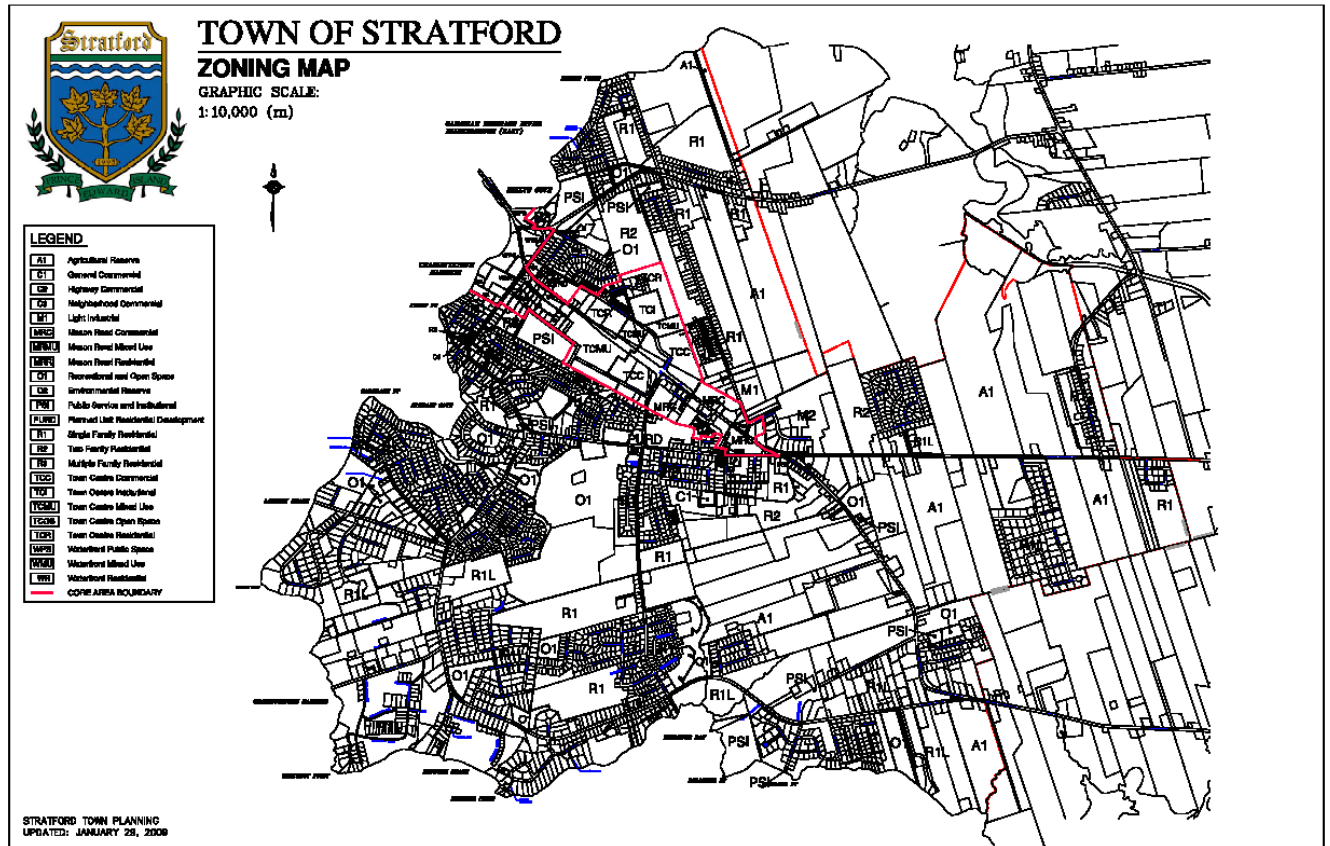


Image B2. Updated Travel Expense Claim Form and Council Expense Claim form to better account for GHG emissions.

TOWN OF STRATFORD - TRAVEL EXPENSE CLAIM FORM

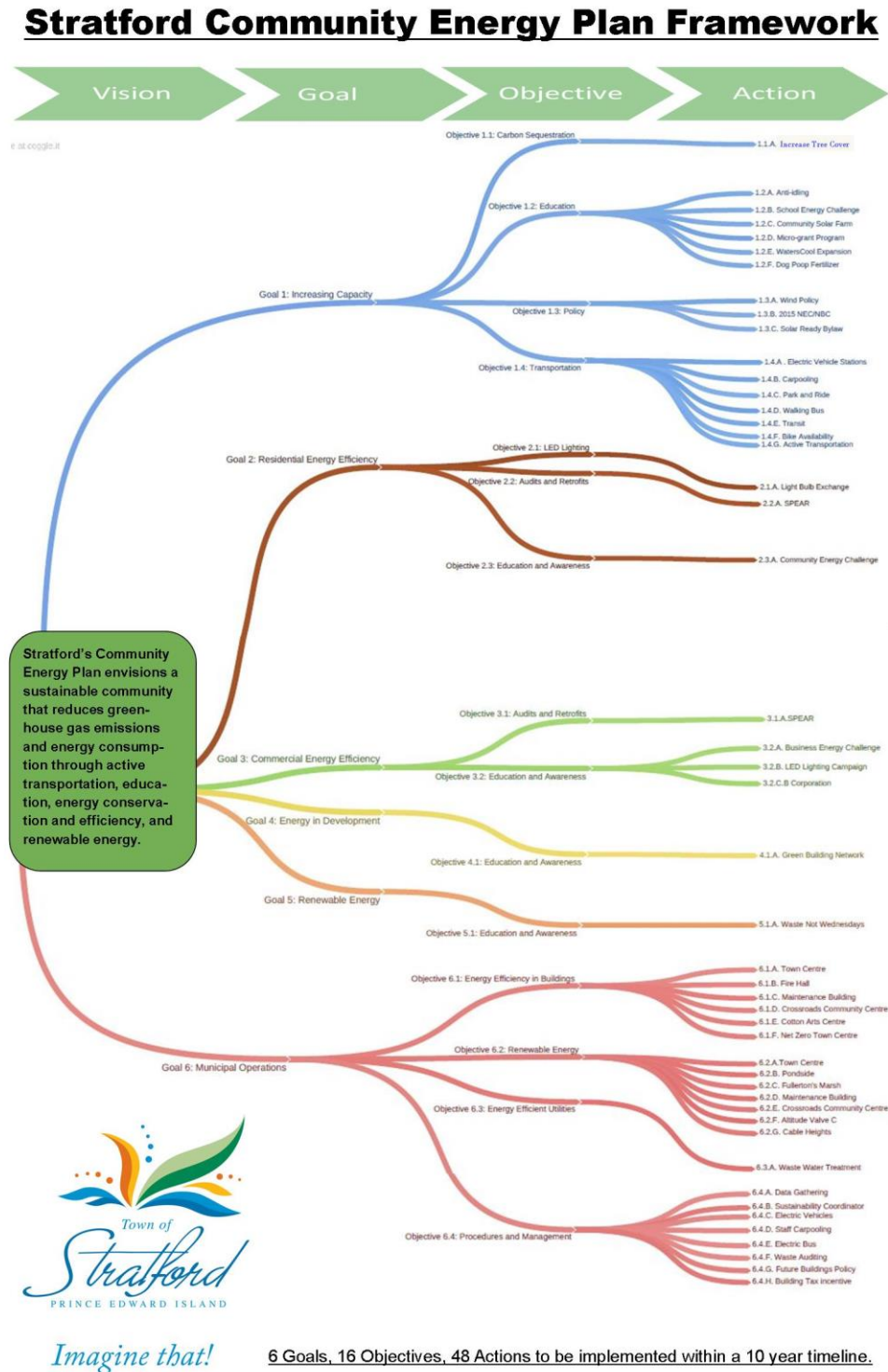
Name: _____ Month: _____
 Name of Business: _____ Location: _____
 Travel Dates from: _____ to: _____
 Meal Allowance: (\$10 for breakfast, \$15 for lunch, \$25 for supper) \$ _____
 Air Fare: (attach receipts)
 Departure Airport: _____
 Arrival Airport: _____ \$ _____
 Accommodations: (attach receipts) \$ _____
 Taxi/Transit: (attach receipts) \$ _____
 Car Rental: (attach receipts)
 Vehicle Year/Model: _____
 Amount of Km travelled: _____ \$ _____
 Personal Vehicle: Amount of _____ Km x \$0. _____ per Km \$ _____
 Vehicle Year/Model: _____ \$ _____
 Parking/Tolls: \$ _____
 Other: (specify and provide receipts)
 \$ _____
 \$ _____
 \$ _____
 \$ _____
 \$ _____
 Sub-Total: \$ _____
 Less Advance: \$ _____
 Total Travel Expense Claim: \$ _____
 Account Name: _____ Account #: _____
 Signature _____ Approval _____

TOWN OF STRATFORD - COUNCIL EXPENSE CLAIM FORM

Name: _____ From: _____ to: _____ 20 _____
Meeting Stipend
 Claim each Regular Council meeting that you attend, each Regular Committee of the Whole meeting that you attend and each Regular Committee meeting that you chair.
 total meetings claimed _____ x \$65 per meeting = \$ _____
 plus # of two-part COW meetings where you attended both parts _____ x \$35 \$ _____
Travel Expense
 Nature of Business: _____ Location: _____
 Travel Dates (to day/month): From: _____ To: _____
 Per Diem Allowance: number of days _____ (to the nearest ¼ day) x \$150 per day \$ _____
 Meal Allowance: (\$10 for breakfast, \$15 for lunch, \$25 for supper) \$ _____
 Air Fare: (attach receipts)
 Departure Airport: _____
 Arrival Airport: _____ \$ _____
 Accommodations: (attach receipts) \$ _____
 Taxi/Transit: (attach receipts) \$ _____
 Car Rental: (attach receipts)
 Vehicle Year/Model: _____
 Amount of Km travelled: _____ \$ _____
 Personal Vehicle: Amount of _____ Km x \$0. _____ per Km \$ _____
 Vehicle Year/Model: _____ \$ _____
 Parking/Tolls: \$ _____
 Other: (specify and provide receipts)
 \$ _____
 Local travel and communication expense (claim \$100 per month) \$ _____
 Less Advance \$ _____
 Total Meeting Stipend and Travel Expense Claim: \$ _____
 Signature _____ Approval _____

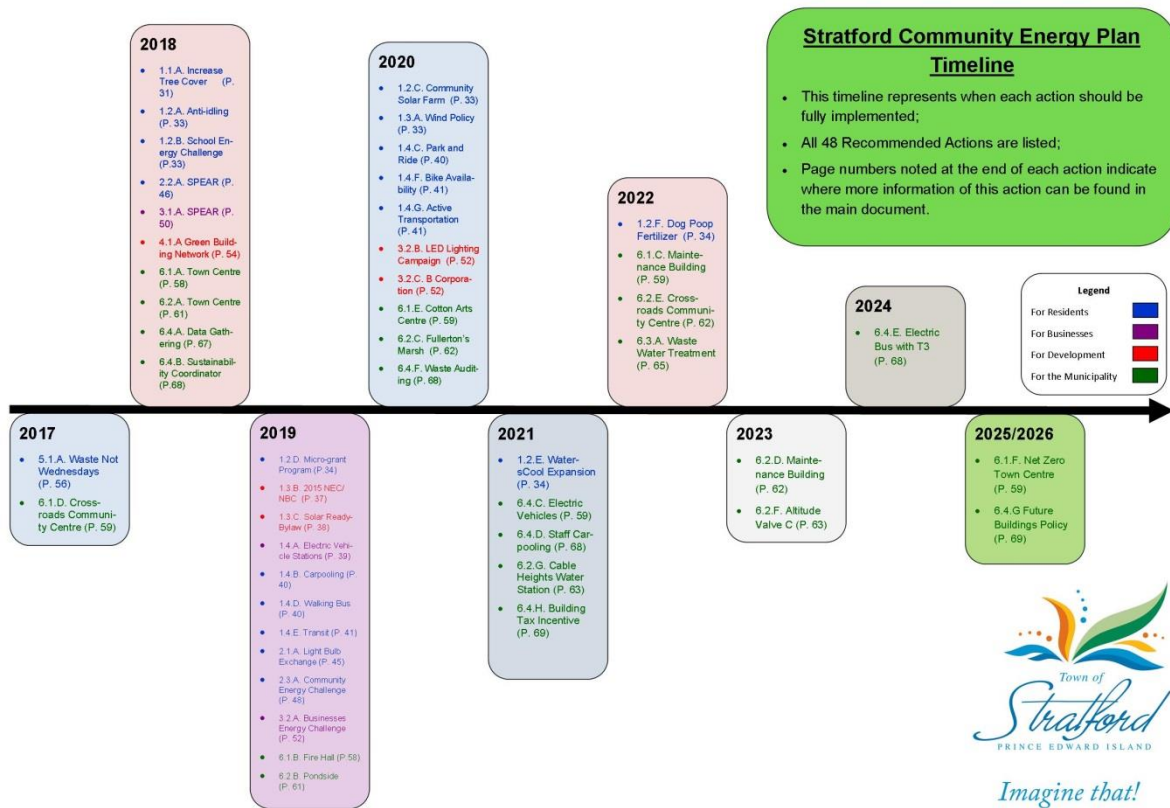
Appendix C

Figure C1. Community Energy Plan Framework



Appendix D

Figure D1. Community Energy Plan Timeline.



Appendix E

Table E1. Recommended Action Implementation Plan Template.

Stratford Community Energy Plan Project Implementation													
Recommended Action: EXAMPLE													
Task No.	Task	% Completed	Status	Day Started	Day to be Completed	Actual Completion Date	Task Assignment	Priority	Milestone	Amount of Fuel/Electricity Traditionally used	Amount of Fuel/Electricity Actually used	Total Fuel/Electricity Reduced	Total CO2E Reduced (Tonnes)
1	Project Initiation	100	Completed	1/2/2018	28/2/2018	15/2/2018	Staff 1, volunteer 1, volunteer 2	Critical	Yes	N/A	N/A		
2	Collect Project Ideas	100	Completed	1/2/2018	28/2/2018	17/2/2018	Staff 1, volunteer 1, volunteer 2	Critical	No	N/A	N/A		
3	Prioritize Project Ideas	90	On Schedule	1/2/2018	28/3/2018		staff 1	low	No	N/A	N/A		
4	Justify Project	80	On Schedule	1/3/2018	28/4/2018		staff 1	high	No	N/A	N/A		
5	Identify Project Sponsor and Project Manager	70	On Schedule	1/4/2018	28/4/2018		staff 1, staff 2	critical	No	N/A	N/A		
6	Get the team in place	60	On Schedule	1/5/2018	28/5/2018		staff 1, staff 2	high	No	N/A	N/A		
7	Conduct Project Brainstorming meeting	50	On Schedule	1/6/2018	28/6/2018		staff 1, staff 2	low	No	N/A	N/A		
8	Develop statement of Scope	40	Behind Schedule	1/7/2018	28/7/2018		Staff 1, volunteer 1, volunteer 2	low	No	N/A	N/A		
9	Outline Project Plan	30	Behind Schedule	1/8/2018	28/8/2018		Staff 1, volunteer 1, volunteer 2	low	No	N/A	N/A		
10	Implement Project Phase 1	20	Behind Schedule	1/9/2018	28/9/2018		Staff 1, volunteer 1, volunteer 2	high	Yes	N/A	N/A		
11	Implement Project Phase 2	10	Cancelled	1/10/2018	28/6/2018		Staff 1, volunteer 1, volunteer 2	high	No	N/A	N/A		
12	Implement Project Phase 3	0	Future Task	1/11/2018	28/11/2018		Staff 1, volunteer 1, volunteer 2	high	Yes	Electricity-8000	Electricity-4000	4000	1.12
13	Implement Project Phase 4	0	Future Task	1/12/2018	28/12/2018		Staff 1, volunteer 1, volunteer 2	high	No	N/A	N/A		
14	Analyze Results	0	Future Task	1/12/2018	28/12/2018		Staff 1, volunteer 1, volunteer 2	high	Yes	N/A	N/A		
15	Change Project Details as necessary	0	Future Task	1/12/2018	28/12/2018		Staff 1, volunteer 1, volunteer 2	high	No	N/A	N/A		
16	Monitor Participation/ Results	0	Future Task	1/1/2019	28/2/2019		Staff 1, volunteer 1, volunteer 2	high	Yes	N/A	N/A		
Note: The unit that should be used for fuel is Liters. To convert Liters of oil used to heat a building to Tonnes of CO2E produced simply multiply the total consumption by 0.002735.													
Note: The unit that should be used for Electricity consumption in a building is KWh. To convert KWh of electricity consumed to tonnes of CO2E produced simply multiply the total consumption by 0.000280.													
Note: For any other Fuel or type of consumption (vehicle consumption), consult the PCP Protocol Canadian Supplement International Emission Analysis Protocol Manual.													