

# Town of Hantsport

## Municipal Climate Change Action Plan



November, 2013

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# 1 Introduction

## 1.1 What is a MCCAP

A Municipal Climate Change Action Plan (MCCAP) is a plan all municipalities of Nova Scotia are required to prepare in accordance with the Gas Tax Fund Agreement and the Municipal Funding Agreements.

The first Gas Tax Fund Agreement (2005 – 2010) provided to Nova Scotia municipalities \$145.2 million in federal funding for eligible municipal projects. The second agreement goes from 2010 until 2014 and provides an additional \$223 million in federal funding.

As a requirement to receive the funding every municipality must prepare by the end of 2013 a MCCAP as an amendment to the municipal Integrated Community Sustainable Plan (ICSP). Hantsport's ICSP was prepared and submitted to the province in early 2010.

To help municipalities prepare their MCCAP, Service Nova Scotia and Municipal Relations prepared a guidebook which was distributed in late 2011. A sister document known as the MCCAP Assistant was also prepared and distributed.

There are two key elements of the MCCAP: adaptation and mitigation.

### **Adaptation**

The Provincial Guidebook states "Simply put, adaptation is all about understanding climate impacts and effects in order to undertake substantive actions that make communities and municipal investments more resilient to the harmful effects of weather and climate. In addition, actions undertaken may also capitalize on any positive long-term opportunities that will result from these changes."

Climate change may well result in

- Increasing storm intensity
- Changes in precipitation and extreme precipitation events
- Sea level rise
- Storm surges and floods
- Accelerated coastal erosion
- Flooding and flash-floods
- Wetter winters
- Loss of sea ice
- Drier summers with droughts and more forest fires
- Water (availability) constraints

It is important to note that there is a wide divergence among municipalities on the risks of climate change. A rural municipality with miles of coastline or with a history

of flooding will need to prepare a more comprehensive plan to address the risks. Only a small portion of Hantsport is on the coast of the Avon River so adapting for climate change, while important for the Town, does not encompass the greater challenges that will be faced by a Town like Yarmouth or a Rural Municipality like West Hants or Colchester.

## **Mitigation**

Mitigation encompasses all efforts to reduce greenhouse gas emissions. Using solar and wind power, conserving energy, and promoting active transportation are examples of what everyone, not just municipalities, can do to lower their carbon footprint

### **1.2 Atlantic Climate Adaptation Solutions (ACAS)**

The preparation of this report was greatly aided by the Town's involvement in ACAS. Several years ago ACAS was established by the federal government and the four Atlantic provinces to promote collaboration in addressing the challenges facing communities adapting to climate change. The Town of Hantsport was one of the thirteen Nova Scotia municipalities which took part in the ACAS process. A number of workshops and other information sharing venues took place in 2010-2012. Each of the municipalities prepared a report which identifies climate change risks and solutions within their jurisdiction. Hantsport's report was completed in March of 2012. These reports and other climate change information can be found at <http://atlanticadaptation.ca/>.

### **1.3 Town Profile**

Hantsport is a small town of 1159 residents located on the Avon River in the eastern part of the Annapolis Valley, Nova Scotia. The Town has had a stable population for many years and is a safe close-knit community with great recreational, educational, and cultural facilities.

The Town is in Hants County about three kilometers off Highway #101, the major highway that traverses the Annapolis Valley, one of the most scenic areas of the province. The Town abuts the western boundary of Kings County, by far the largest

municipality in the region. To the south and east lies the Municipality of the District of West Hants. The Town of Windsor is some 10 kilometers away toward Halifax which is 85 kilometers away.

Hantsport has an area of 2.3 square kilometers and is bounded to the southeast by the Halfway River for a distance of one kilometer. The boundary continues in a northerly direction along the Avon River for another kilometer. The Avon River and to a lesser extent the Halfway River are subject to sea level rise.

## **2 The Adaption Committee**

Hantsport is fortunate to have a Planning Advisory Committee (PAC) in place. The PAC oversaw the preparation of the Town's Integrated Community Sustainability Plan (ICSP) in 2010. Council saw this group as having the diversity and background to act as the Adaption Committee in preparing the MCCAP, both the necessary adaption measures and any actions that may be taken by Council to mitigate the effects of climate change.

The Committee members are:  
*To be inserted.*

The mandate of the Committee is to provide direction and guidance to staff in the preparation of the MCCAP. The collective knowledge of the Committee was crucial during the process of first identifying climate change issues and hazards and then formulating strategies for adaptation and mitigation.

### 3 Climate Change Issues and Hazards

By using the Climate Change Hazard Impact Matrix contained in the Guidebook the Committee was able to come to a better understanding of the effects that climate change may have on the Town.

Hazard	Severity			Frequency			Area		
	Severe	Moderate	Minor	Often	Sometimes	Rarely	Large	Medium	Small
Sea Level Rise		X		N/A	N/A	N/a			X
Erosion		X			X				X
Flooding		X			X				X
Storm Surge		X				X			X
Hurricanes/ Wind		X				X	X		
Forest Fires	X					X	X		
Drought			X		X		X		

The following is a summary of the discussion on each of the hazards:

**Sea Level Rise** has been the subject of a number studies in recent years. The following is from the Coastal and Ocean Information Network website:

“One of the most recent reports (October 2009) published by the Government of New South Wales in Australia (Derivation of the NSW Government’s sea level rise planning benchmarks) estimates an increase in global sea level of 30 cm by 2050 and 59 cm by 2100. If the impact of potential accelerated ice melt is included the 2100 number increases by 20 cm. The report uses numbers in the upper range of predictions which can be considered wise due to the uncertainty in these predictions.

Batterson and Liverman (2010) project between 30 and 40 cm rise in sea level in Newfoundland and Labrador by 2049 and 70 cm to more than 100 cm on the Avalon Peninsula by 2100.

The Province of Nova Scotia’s State of the Coast report states “Researchers expect an additional increase [in sea level] from 70 to 140 cm over the next century.”

The Hantsport area has a moderate coastal sensitivity to sea level rise (from Natural Resources Canada). Sea level rise in the long term may affect an industrial area along the Avon River (including a wharf no longer being used).

**Erosion** has occurred behind the houses located on Avon Street. In the 1980’s the Town, through a provincial program, deposited rock in this area to mitigate erosion.

Since that time individual homeowners have done similar work. The Town has no plans to take any further action

**Coastal Flooding** Only a small portion of the Town is along the coast (assuming the Avon River is considered the coast). The northeastern part of this coastline is developed with houses fronting on Avon Street. Relatively steep cliffs prevent any flooding. Adjacent to the residential development to the south is an industrial area which has not experienced any flooding. The Town will monitor coastal flooding in this area.

**Inland Flooding** has not been a major issue within the Town of Hantsport but some areas have flooded during severe rain storms, as follows:

- The Tim Horton's/Chittick Street area
- Bottom of Holmes Hill Road
- Behind Rand Street

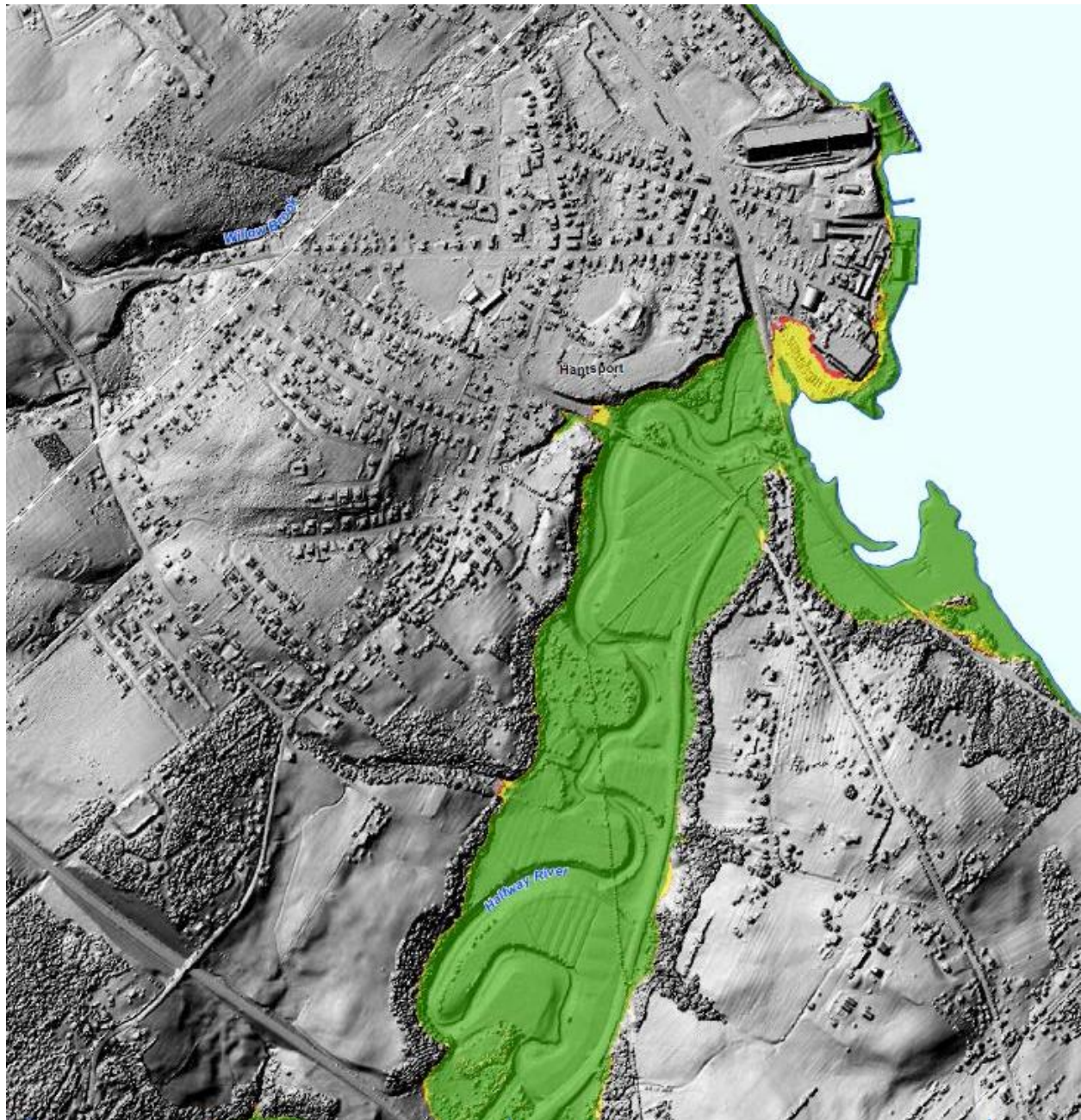
Although the floodwaters recede within hours of a storm subsiding, the likelihood of more intense storms in future may result in significantly more of the area being flooded for longer periods of time.

A major concern regarding flooding is an area not located within the Town but is where one of the main entrances to the Town is located. Exit 8 from Highway 101 crosses an area adjacent to the Halfway River immediately south of the Town. The bridge on this road has from time to time been flooded during severe storms.

In February of 2013 the Nova Scotia Transportation and Infrastructure Department (NSTIR) and EnviroSphere Consultants Limited prepared a report entitled **FINDING SOLUTIONS—TIDAL FLOW CONTROL ON THE HALFWAY RIVER AND FLOODING AT HANTSPORT** . The summary of this report states:

“ The lower reaches of Halfway River, a tidal river which enters the Avon River estuary at Hantsport, Nova Scotia, is prone to flooding due to the interaction of occasionally high natural runoff; the presence of an aboiteau structure for control of tidal flow; coincidence of high tides with high river flows; and occasional aboiteau malfunctions and blockage. The flooding can have a significant impact on Nova Scotia Transportation and Infrastructure Renewal (NSTIR) roads as well as other public and private infrastructure. Management of the situation on Halfway River is complicated by the private ownership of the aboiteau by a local shortline railway, which has limited ability to conduct major structural repairs on the aboiteau. A proposed project by the Town of Hantsport to construct a new road crossing of the river adjacent to the railbed and over the aboiteau recently offered an opportunity to fix the aboiteau; however the project may not take place. Other issues, in particular, farming and river ecology, exist, and perhaps a more comprehensive solution to management of the tidal flow should be considered.”

The following is a map taken from website of the N.S. Department of Natural Resources which shows the Coastal Flood Risk from sea level rise and storm surge for this area:



In addition to the risk to the road and bridge that traverse this area, the Windsor and Hantsport Railway may also be at risk. For years this railway hauled gypsum to Fundy Gypsum Inc. but the railway is not currently active due to the closure of Fundy Gypsum Inc. The future of the Railway is very uncertain. The door is not completely closed that

Fundy Gypsum could re-open and again receive gypsum via the Railway, but this prospect is doubtful. Other uses for the Railway have not as yet come to light.

**Storm Surges** will have an impact on the Halfway River, as indicated by the previous section on coastal flooding. The effect of storm surges in other areas of the Town are minimal.

**Hurricanes and Wind Storms** have not caused any major damage or disruption in Hantsport over the years. The last hurricane to hit Nova Scotia was Hurricane Juan in 2003. The Town was not directly in the path of the hurricane and did not experience the damage and destruction of other areas.

### **Drought**

Climate change is expected to bring dryer weather conditions. For the Kentville area the annual average temperature is predicted to go from 6.9 degrees Celsius in the 1980s to 10.6 by 2080. (Please see <http://climatechange.gov.ns.ca/adaptation/> for this and other climate information.) From a report by Galbraith in 2012 entitled "Trends and variability in Eastern Canada Sea-Surface Ocean Temperatures" summertime conditions could be extended by as much as two weeks with an overall increase in air temperature of 1 degree Celsius.

## **4. Facilities, Infrastructure, and Service Delivery**

Like all municipalities Hantsport has over the years invested in the infrastructure necessary in providing services to its residents. A risk assessment into the effects of climate change is necessary for all the facilities and infrastructure of the Town in order to protect this important investment and to maintain service delivery.

To assist municipalities in assessing the risks of climate change to infrastructure the Canada Nova Scotia Infrastructure Secretariat has developed spreadsheets which are organized by asset category. For Hantsport the categories are water system, wastewater system, storm water management systems, municipal buildings, roads and bridges. For each category, climate hazards are listed: sea level rise, extreme precipitation, extreme wind, flooding, temperature fluctuations, and erosion. A numerical score between 1 and 3 (representing the level of perceived risk to the infrastructure) has been assigned to each asset, and for each hazard.

The following is a brief description of each asset:

## **Wastewater Treatment Facilities**

The Town's wastewater is treated by a facility located in Hants Border. It is owned and operated by the Municipality of the County of Kings.

## **Water Treatment Facilities**

Hantsport receives its drinking water from the Davidson Lake watershed located in Bishopville approximately 10 kilometers to the southwest of the Town. The water treatment plant is located near Davidson Lake and has not been subject to flooding.

## **Streets**

There has been flooding on Chittick Street near Tim Hortons, the bottom of Holmes Hill Road, and an area adjacent to Rand Street.

## **Fire Station**

The fire station is located at 5 Oak Street. There has been no history of flooding in this area.

## **Town Hall**

The Town Hall is located at the corner of Main and Prince Street and was constructed in 2000. The Town Hall serves as the centre for the Regional Emergency Measures Organization. It is located in an area which is not subject to flooding and is not vulnerable to any other climate change risk.

## **School and Library**

The school, which also houses the library, is located on School Street. This area has not flooded in the past.

## **Senior Citizens Housing**

Hantsport has two main buildings of senior citizen housing. There are also two Nursing Care Homes, one on Main Street and the other on William Street. Some minor flooding has occurred near these buildings in the past. The Town will pay particular attention to these facilities as the residents will require assistance if storm conditions are severe enough to cause major flooding.

## **5. Socioeconomic and Environmental**

The Town's socioeconomic and environmental goals are contained in **Part 2 Integrated Community Sustainability Plan (ICSP)** in Section 2.2 and 2.3. The Town's ACAS report also contains socioeconomic information.

Since the writing of the above reports the Town received news in late 2012 that Minas Basin Pulp and Power have decided to close its operation in the Town, resulting in a loss of 135 jobs. The closure is a setback for the entire region. The loss of tax revenue will be challenging for the Town but Council is confident they can meet this challenge.

On the brighter side, of the 135 people who will lose their jobs more than 40 employees will be moved to other companies within Scotia Investments, an investment holding company. Those companies include CKF Inc., a paper plate manufacturer also located in Hantsport. As well, Minas Basin Pulp and Power is still involved in the development of tidal energy which could be very beneficial to the area in the years to come.

The Town is also experiencing some residential growth primarily through a partnership between the Town and Hantsport Development Limited. Through this partnership a new residential area known as McCully Pines was started in 2011.

On the environmental side the Municipal Planning Strategy and Land Use By-law have protected from development the wetlands located within the Town, as identified by the N.S. Department of Natural Resources. These wetlands are located adjacent to the Halfway River and along a stream which flows from the intersection of Rand Street and Holmes Hill Road to the Halfway River.

## **6. Priorities for Action**

For the Town of Hantsport the main area of concern from the effects of climate change is the potential for increased flooding from more intense rain storms.

### **Meeting Flooding Challenges**

#### **6.1 Preparation of a Storm Water Management Strategy**

Hantsport like many small municipalities does not have a storm water management strategy. Flooding has not been a major issue over the years. Storm water is collected in ditches and storm sewers and directed to the Town's water courses. There has only been one new street constructed in Hantsport for many years. The design of this street included a method of accommodating storm water for this new development but there is

no overall strategy which takes into account where the all of the Town's storm water goes and the impact of this water on the receiving water bodies.

With respect to the volume of storm water that must be accommodated, climate change means that design criteria can no longer be based on historical rainfall amounts. The Town of Stratford, P.E.I, recently developed new design criteria taking into account the increase in rainfall caused by climate change. Nova Scotia municipalities should build on this type of information for storm water management.

In developing a Storm Water Management Strategy a multi faceted approach will be employed. This approach is outlined in the following sections.

## **6.2 Green Technology**

Many municipalities particularly in other parts of Canada and the United States have been looking to "green" options for managing storm water runoff. As expressed in a 2006 study for HRM by Dillon Consulting this approach "stresses the importance of preserving natural storage, infiltration and pollutant filtering functions where feasible, thus reducing the lifecycle cost for storm water management and minimizing the need for costly capital improvements to the existing system".

The Dillon Study entitled "Storm water Management Guidelines" describes "Best Management Practices (BMPs), techniques and methods of managing storm water drainage for adequate control and pollutant reduction by using the most effective and practical means that are economically acceptable to the community."

The report also states that "ideally, all BMP design criteria should be based on recommendations developed as part of a comprehensive watershed or sub watershed plan prepared for the subject location's basin. These plans are produced through the study of the environmental and land use features of a watershed. The purpose of the plan is to identify those areas that should be protected and preserved as part of the land use planning process, to evaluate the impact of future land use changes and to develop criteria to mitigate potential cumulative impacts in the watershed."

A three day conference on green technology was held in Halifax in June, 2013. The papers given at the conference may be found at <http://clean.ns.ca/programs/water/ns-swims/> A number of the techniques and methods for storm water management presented at the conference may be suitable for Nova Scotia communities.

### **6.3 Put Requirements in the Town's Planning Documents**

Most of the Towns in Nova Scotia have included in their Subdivision By-law design specifications for the construction of new streets and services, including a method for managing storm water. Hantsport has not as yet prepared specifications other than to refer to **Standard Specifications for Municipal Services** prepared by the Nova Scotia Road Builders Association (NSRBA) and the Nova Scotia Consulting Engineers Association (NSCEA) Joint Committee on Contract Documents.

The timing for preparing specifications may be right as it will be an opportunity to include “green” approaches as opposed to the traditional ways of managing storm water. The major issue to including green technology in a Subdivision By-law in Nova Scotia is that no standards have been developed. This may slowly change in the coming years. Hantsport will keep abreast of new “green” standards and specifications which can then be incorporated into the subdivision by-law.

With respect to having new development use green techniques for storm water management on the site there may be opportunities by using development agreements for issuing development permits. Hantsport's current Municipal Planning Strategy does not authorize the use of development agreements but the time may be right to consider amending the MPS to include them, especially for new commercial, industrial, and institutional uses. More information about development agreements is contained in Schedule B.

### **6.4 Encourage Residents and Businesses**

For existing development the Strategy could encourage property owners to take steps to reduce or slow down storm water runoff from their site. There are ways of slowing down and “treating” storm water (such as rain gardens) on individual lots which are not costly and would help the Town in the management of storm water. If everyone pitched in the need for expensive storm water infrastructure may be significantly reduced.

Information on these types of techniques may be found at

<http://clean-water.uwex.edu/pubs/pdf/gardens.pdf>

### **6.5 Mapping**

In 2012 Hantsport partnered with the Province to produce color orthophotos covering the Town. This “GIS Ready” digital mapping includes annotation, spot heights, drainage,

Digital Terrain Model (DTM), and contours at a 2 metre interval. This mapping will be instrumental in evaluating what areas of the Town will be at risk from more intense storms and areas susceptible to erosion.

## **6.6 Formation of a Water Resources Committee**

In many areas of the province groups of interested citizens have come together with the goal of protecting the lakes and rivers in their area. Perhaps the best known group in Nova Scotia is the Clean Annapolis River Project (CARP). Storm water runoff which carries pollutants into waterbodies is a concern. These groups can be very useful in advising municipalities and property owners on ways of managing storm water that reduces any negative impacts on the province's water resources.

No such group exists in the Hantsport area. The Town intends to work with adjacent municipalities to investigate the formation of a regional committee which would take the lead in protecting the water resources in the area. Ideally the Committee would have at least one member who has some expertise in watershed management. If efforts to form a regional committee are not successful the Town will attempt to form one which will focus on Hantsport.

The primary mandate of the Committee will be to encourage the residents and the business and institutional community in the area to consider taking steps to manage storm water on their properties before it reaches the storm water system of the Town. Rain barrels, rain gardens, and in some cases the construction of ponds are some of the ways everyone can play a part in both reducing the flow of storm water and improving its quality. Along with improving water quality these steps may save the Town and thus the taxpayers the cost of installing or replacing storm water infrastructure.

The Committee could also offer suggestions to Public Works departments on future storm water infrastructure.

## **6.7 Exit 8**

One of the more immediate threats from climate change may be to the main entrance into the Town from Hwy 101. As indicated in the inland flooding section of **Part 3**, Exit 8 travels through an area adjacent to the Halfway River. In past storms the river has risen over the bridge.

This area is located in the Municipality of the District of West Hants. The road and bridge are owned and maintained by the Province. As one might expect, the exit is very important to Hantsport and the Town would like to continue to be involved with both West Hants and the Province if or when there is an increased risk to this area.

## 6.8 Regional Emergency Measures Organization (REMO)

The Town along with the Town of Windsor and the District of West Hants is an active member of the REMO organization for this region. The Town Hall in Hantsport is headquarters for many of the REMO operations.

REMO will become increasingly important in dealing with the adverse effects of climate change. Hantsport will continue to be an active member of REMO and will support all efforts to improve the organization's ability to deal with emergencies.

## 7. Mitigation

As a small town Hantsport is not a big generator of greenhouse gas (GHG) emissions. But the Town would like to do its part to reduce its energy consumption and to encourage energy conservation on the part of residents. As a first step, Policy ICSP-11 called for the Town to conduct an inventory and energy audit. This study entitled "Energy and Emissions Report-Town of Hantsport" was completed in 2011.

The report summarized the energy usage and GHG emissions related to the municipal operations of the Town for the fiscal year 2009/2010 and recommended a number of actions to be considered by the Town to be more energy efficient.

The executive summary of the report is contained in Schedule A. The major recommendations of the report are as follows:

- Utilize an Excel spreadsheet to input monthly energy data as required to ensure collection practices are accurate and to allow for an ease of access for the next inventory (a spreadsheet for recording data was created with this report and provided separately).
- Record kilometers traveled for vehicle fleet to allow for a proper comparison of fuel consumed per km traveled. This will also allow for a stronger business case when upgrading to more fuel efficient vehicles.
- Implement an Energy Management Plan (EMP). Refer to Appendix B for some more information regarding an EMP.
- Conduct an energy audit on the buildings with the highest kWh/m<sup>2</sup> as these buildings will provide the best opportunities to realize cost savings in the short term. Refer to Appendix C for a quick introduction to various energy audits and a description of each.
- Contact Efficiency Nova Scotia for funding opportunities that is directed to reducing your electricity usage and subsequent GHG emissions. Refer to Appendix A or visit <http://www.energyncs.ca>

The report also identified a number of small “quick hit” actions that could be done, as follows:

- Install motion sensors in rooms that are not used frequently, such as a janitor’s room or a bathroom that is used infrequently.
- Install programmable thermostats.
- Upgrade fluorescent bulbs from T12 to T8. Upgrade cost is eligible to be covered by 80% through ENS.
- Swap incandescent light bulbs to compact fluorescent bulbs. Free for a limited time through ENS.
- Insulate all hot water tanks with an insulated jacket. Free for a limited time through Efficiency Nova Scotia.
- Insulate all piping that is used for hot water use or steam or pressure boilers.
- If heating system is in need of a replacement, consider an air to air source heat pump.
- If hot water tank is in need of replacement, consider an instantaneous water heater located at each sink.
- Consider a variable speed drive for all pumps and motors that is associated with moving water or air. Most systems have been designed to handle a larger volume of liquid or air and significant savings can be realized in kWh usage and demand charges.

The Town has implemented a number of the above and will investigate other actions which have not as yet been carried out.

### Executive Summary- Energy and Emissions Inventory Report

The rising cost for energy is a trend that has caught the attention of many over recent years. This is not different for municipalities. The effects of greenhouse gas (GHG) emissions have also begun to affect our social wellbeing as a society as the effects have been correlated with a rising average global temperature, air and water pollution, and overall changes to our climate, such as an increase of extreme weather events. Energy use is forecasted to continue to rise globally, nationally, and regionally. GHG emissions are directly related to the amount of energy one consumes and how it is generated.

Municipalities contribute close to 50% of all GHG emissions in Canada (FCM, 2009). This is directly related to the operational, recreational, and civil services that municipalities provide. With this understanding, municipalities have an opportunity to be a true leader in the reduction of GHG emissions in Nova Scotia and Canada at large. Therefore it is important to have a baseline understanding of what a municipality is contributing in terms of its energy and GHG emissions footprint.

This report summarizes the energy usage and GHG emissions that are related to the municipal operations of the Town of Hantsport. The baseline year that was examined was the 2009 fiscal year from April 1, 2009 to March 31, 2010.

The total GHG emissions produced by Hantsport for the 2009 fiscal year equaled 646.29 tonnes. A measure known as equivalent kilowatt hours (ekWh) is used to compare the total consumption in kilowatt hours (kWh) for any given fuel. In relation, the Town consumed a total of 1,178,791.73 ekWh. The buildings accounted for 381,850.80; vehicle fleet for 66,557.53; street and area lights for 199,479.00; and water and wastewater facilities accounted for 530,904.4 ekWh.

The town buildings in Hantsport use electricity, furnace oil, and diesel. Electricity accounted for 96.58 tonnes (59.13%), furnace oil accounted for 66.53 tonnes (40.73%), and diesel accounted for 0.23 tonnes (0.14%) of GHG emissions produced by the buildings. The fire hall, public works shed, and town hall had the highest consumption of energy in terms of floor area at 489.01, 478.37, and 381.36 ekWh/m<sup>2</sup>, respectively. These three buildings are recommended to undertake an energy audit to further highlight saving opportunities. The operational hours will also need to be considered on a further analysis. A total of 6,831.26 L of gasoline was used for the vehicle fleet. Based on this data, the fleet contributed 16.11 tonnes of GHG emissions.

Street lights accounted for a total of 167.57 tonnes of GHG emissions. High pressure sodium lighting contributed 120.94 tonnes, mercury vapour lighting contributed for 44.45 tonnes, incandescent lighting accounted for 1.55 tonnes, and fluorescent crosswalk lighting accounted for 0.64 tonnes of GHG emissions.

Water and wastewater energy consumption accounted for 299.27 tonnes of GHG emissions and is the largest contributor to GHG emissions by sector, contributing 46.31% of total GHG emissions for the

Town of Hantsport. Electricity associated with the treatment of water and wastewater contributed 238.98 tonnes and diesel contributed 60.29 tonnes of GHG emissions.

## Schedule B

# Development Agreements

## A Tool for Green Approaches to Storm Water Management

More and more jurisdictions in Canada and the United States are recognizing that storm water runoff is a pollutant and are taking steps to reduce its negative effects on the environment, particularly our water resources. The conventional wisdom was that storm water should be moved as quickly as possible from urban areas. This was accomplished by collecting stormwater and piping it to the nearest water body. New “green” approaches are being developed and in many cases have proven to be cost effective. These approaches include naturalized storm water ponds, porous asphalt, rain yards and gardens, tree filters.

Recent research conducted by the University of New Hampshire Storm Water Center has concluded that dealing with storm water site by site can be very effective. In other words as development proposals are being planned they could incorporate some of these new approaches instead of channeling the storm water directly into municipal storm water systems.

In Nova Scotia the use of development agreements may be a useful tool as part of an overall storm water strategy. In addition to regulating the requirements that may be contained in a land use by-law there is additional authority for a municipality through a development agreement to contain terms with respect to “the construction, in whole or in part, of a storm water system” (clause 227(1)(f) of the *Municipal Government Act*).

Development agreements are guided by criteria contained in the Municipal Planning Strategy. These criteria could include requirements for innovative ways to address storm water. Some municipalities have taken the step that there shall be no net increase of water from a site after it is developed. A development agreement could contain the same requirement but could also be more flexible and evaluate each proposal on its approach to storm water management, both in terms of quantity and quality.

Development agreements would not be suitable for all future development. Council can decide in the MPS which developments (i.e. commercial developments of a specified size) will be required to go through the development agreement process.