



# **Energy Conservation & Demand Management Plan Version 2.0**

**Township of Greater Madawaska  
County of Renfrew**

June 28, 2019

Greenview File: 102.19.024



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## 1.0 Introduction

### 1.1 Background

The Province of Ontario has mandated that public sector agencies monitor, assess, and plan for energy conservation and demand related to their buildings and facilities. Ontario Regulation (O.Reg.) 397/11 was launched requiring municipalities, among other public sector groups (schools, hospitals, etc.), to report their energy consumption annually, and, to assess their energy needs and prepare an energy conservation and demand management plan (Plan) on a minimum, five (5) year frequency. The original reporting for greenhouse gas (GHG) emissions and an initial Plan was prepared by the Township in 2014 (Evergreen Energy Solutions Ltd.).

As part of the requirements of the *Electricity Act 1998*, O.Reg. 507/18 *Broader Public Sector: Energy Reporting and Conservation and Demand Management Plans* (Appendix A) came into effect in December 2018, updating the previous legislation for Plan review and reporting. As per the original jurisdiction, the regulation applies to all public sector agencies in Ontario, including municipalities and municipal service boards that operate buildings/facilities that are heated and/or cooled, and those responsible for the treatment or pumping of water or sewage.

The requirements for the Plan are generally consistent with those of the original (2014) requirements, plus a 5-year review element. In general, the updated Plan is to include:

- A review of the effectiveness of energy conservation and demand management measures employed by the municipality over the past five-year period.
- Energy-related information relevant to the municipality, including other energy-related plans, strategies, goals, objectives for managing its energy needs, and associated targets.
- Information about any/all renewable energy generating facilities owned by the municipality, and energy generation summaries for each facility and the municipality overall.
- Information about the municipality's consideration of utilizing ground source energy, solar energy, and/or heat pump technologies (thermal, air, water, etc.) in current and/or future measures to conserve energy associated with designated facilities.

Greenview Environmental Management Limited (Greenview) was retained by the Township of Greater Madawaska (Township) to provide an update to the municipality's *Energy Conservation and Demand Management Plan* as required by Ontario Regulation 507/18, and for consideration in municipal asset management for building and facilities.

### 1.2 Purpose & Scope

The purpose of this Plan is to document the legislated requirements related to the energy conservation and demand management of the Township's buildings/facilities, inclusive of the following scope:

- Review of the Township's past energy consumption and related GHG emissions up to the year 2017 for buildings and facilities in which the municipality conducts its operations from, that are heated or cooled or are related to the treatment or pumping of water or sewage.
- Perform current site reviews all of the Township's buildings/facilities covered under the legislation and document past and current energy conservation measures completed for the eligible facilities.
- Review and propose future measures to conserve and manage the Township's energy consumption throughout its operations, including the capital costs and potential savings estimate for the recommendation measures.

- Provide a summary document for interested parties and the municipality to review with respect to the various efforts and measures being undertaken to effectively manage energy consumption in municipal building operations.

## 2.0 Methodology

### 2.1 Documentation Review

The following documentation was reviewed with respect to the preparation of this Plan.

1. Ontario Regulation 507/18, Broader Public Sector: Energy Reporting and Conservation and Demand Management Plans (Appendix A).
2. *Energy Conservation and Demand Management Plan*, Township of Greater Madawaska, dated July 1, 2014 by Evergreen Energy Solutions Ltd.

### 2.2 Site Visitations / Reviews

On April 3, 2019, personnel from Greenview completed site reviews at the Municipality's buildings and facilities applicable to the legislation. Any additional buildings that were either newly constructed or newly renovated and would need to be reported on in future energy summaries were additionally reviewed. Site/building photographs were taken to document existing conditions.

For each visit, the following condition items were observed/noted:

- Exterior grounds, including exterior lighting.
- Building envelope review, including doors, windows, and other fenestrations around the exterior of the building.
- General review of the heating, ventilation, and air conditioning (HVAC) and domestic hot water systems, and any renewable energy systems.
- Electrical systems, including lighting systems and controls, emergency exit signs and any process pumps, equipment, or monitoring systems.
- Potential opportunities for new energy conservation measures to be considered/employed.
- Water conservation practices and the status of the existing toilets and faucets.
- Existing Energy Star rated appliances and/or office equipment.
- Past or current energy conservation measures utilized by the municipality relative to each building.

### 2.3 Annual Reporting of GHG Emissions

The Municipality is responsible to report its energy consumption for each eligible building on an annual basis. The energy consumption is converted into the resultant GHG emissions (in kilograms [kg]), and secondly in Energy Intensity (eWh/HDD/sq.ft.). The energy intensity data has been normalized relative to the geographic location of the municipality, accounting for relative climate conditions for the municipality, etc.

The normalized energy consumption data for the Township's energy consumption and GHG emissions from 2011 to 2016 is summarized in the attached Table 1 to this report. Consistent with the initiation of the program, data reporting for the calendar year two (2) years prior (2017 calendar year) is due by July 1, 2019. Annual reporting is completed directly through the Ministry's reporting portal website. As the 2017 data is in the process of being reported and has not yet been normalized with past year's data (completed by the Ministry), it has not been included in the detailed reviews in this Plan. Data from 2011 to 2016 has been normalized, and has been reviewed and included accordingly in Table 1.

## 2.4 Energy Management Measures & Results

As noted in Section 2.3, historical energy consumption values from the initiation of the program in 2011 to 2016 were sourced from the Ministry of Energy and the data compiled into Table 1. Normalized data relative to regional climate conditions via heating degree days (HDD), and was compared against Ministry benchmarks to evaluate a building's overall performance for its operation type, on a pass/fail basis.

The energy reviews consisted of a particular focus of the site's energy consumption and consequential opportunities for identifying measures for reducing energy demand.

For each building, a summary was developed based on the 2014 Plan and on-site findings, and these are included as Table 2. The tables summarize the status of the past measures from the 2014 Plan, and newly proposed measures with the associated estimated implementation costs, and projected annual cost savings per year with a simple return on investment calculation for context.

## 2.5 Plan Development

The Township is committed to managing and reducing the energy consumption across its facilities and operations. The plan includes proactive monitoring of energy usage and forward-thinking facility renovations and building service equipment upgrades. A summary of the measures, goals and objectives are to be published in this Plan. The plan offers recommendations for building specific findings but also plan more general recommendations. More general recommendations consist of; good recordkeeping on energy consumption and costs, internal and external low energy retrofit programs, future potential use of renewable energy technologies and exchanging end of service life appliances and office equipment with new Energy Star replacements.

### 3.0 Review of Past Goals & Objectives

The objective of the legislation and the development of a Plan is, in general, to provide a mechanism for annual accounting for energy consumption for its buildings and facilities, and to consider measures that can be employed to decrease energy demand in these facilities.

In the Township's 2014 version of the Plan, goals and objectives were established and noted as follows (per Schedule 2):

Goals		Objectives
1	Reduce energy consumption and GHG emissions in the Township-owned and operated facilities	Set up an energy baseline, using the average energy consumption over a three-year period, with the aim of reducing energy consumption by a minimum of 5% by 2019 (next reporting period)
2	Promote employee and community energy conservation when using the Township owned and operated facilities	Provide training and guidance to Municipal staff and facility end users to conserve energy, explaining the benefits both financially and environmentally to the community
3	Monitor, measure and manage energy consumption in the Township owned and operated facilities	You need to measure to manage. Appoint a staff member to monitor and report on a monthly basis the energy usage across the Township, compared with the baseline and previous year
4	Explore the usage of alternative and renewable energy	Carry out studies on the feasibility of installing alternative and renewable energy in the Township owned and operated facilities and rolling out pilot schemes on the outcome of the studies
5	Promote energy efficiency in Township owned and operated facilities	Township Senior Management lead by example in their approach to energy conservation and management and purchasing.
6	Secure funding to implement energy efficiency savings	Prior to budgeting and implementing an energy conservation measure, check and secure funding available for a Township on local, provincial and federal levels

Of the six (6) goals set in the 2014 Plan, the following results are reported by the Township:

1. The Township's energy consumption and GHG emissions between 2011 and 2016 for all buildings increased by approximately 11%, therefore, the Township did not meet the 2014 energy reduction goal.
2. The Township has not undertaken specific training to inform staff and/or facility users of the benefits of energy conservation and the inherent benefits of reduced energy demand.
3. The Township has not appointed a staff member to monitor and report energy consumption on a monthly basis and to compare the results on a regular basis to past records and usage.
4. The Township has considered/reviewed opportunities and/or the feasibility of implementing renewable energy technologies for municipally-owned facilities.



5. The Township's Senior Management have not led by example in their approach to energy conservation and management and purchasing with dedicated employee training and direction.
6. The Township has utilized available local/Provincial/Federal funding for the implementation of energy management measures.

## 4.0 Review of Energy Conservation Measures

### 4.1 Past Measures & Energy Demand

Included with the 2014 version of the plan was the development of various recommended measures at the Township's buildings that were anticipated to have beneficial impacts with respect to reducing energy consumption and demand.

In the 2019 Plan, the initial 2014 measures were reviewed both on site and via data assessment from 2011 to 2016. The past energy usage and the completed measures were analyzed to determine any potential trends and patterns in the building/facility's overall energy usage. The energy usage was also analyzed against the provided Ministry benchmark values for each building type.

The following was noted when reviewing the past measures and energy demand:

1. Exterior lighting updates to more energy-efficient models and controls were generally completed on some buildings.
2. As proposed in 2014, programmable thermostatic HVAC controls had been installed in some of the buildings that were reviewed.
3. In buildings where domestic hot water is used/stored, none of the storage tanks had timers installed to mitigate energy consumption during non-operational hours.
4. The majority of the buildings had interior lighting upgrades completed, or were in progress as proposed in the 2014 Plan.
5. There has been a recommendation to replace kitchen appliances and office equipment at the end of their respective service lives with Energy Star rated equipment. During the time between the previous report and the 2019 reviews, there were several appliances/equipment that reached the end of their service life and were replaced with Energy Star rated appliances/office equipment.
6. In the majority of the buildings, there were photoluminescent exit signs which were recommended in the previous report.
7. Since the time of the last report, several HVAC systems reached the end of their respective service life and have been replaced with new high-efficiency models.

### 4.2 Historical Data & Trend Analysis

Table 1 presents a summary of energy-related data from 2011 to 2016, and associated trends. The following is noted from an analysis of the data and associated trends.

1. Throughout the period from 2011 to 2016, approximately half of the buildings showed a decrease in GHG emissions, while the other half showed an increase.
2. The Griffith Fire Hall/Garage, Calabogie Medical Centre (former Library), Municipal Office, and Calabogie Community Hall (& Rink Shed) all showed an increase in GHG emissions, the measures for these buildings should be concentrated on in future projects.
3. From the year 2013, the Calabogie Fire Hall and Griffith Fire Hall/Garage have shown a consistent decrease in GHG emissions. Current practices and measures should be continued at these buildings.
4. After showing a downward trend from 2014 to 2015, the Calabogie Community Hall registered its largest GHG emission level since the reporting started. The inclusion of the new Rink Shed building with the Hall is likely the source, and moving forward, these building should be reported independently.

### 4.3 Performance Benchmarking

Respective building energy intensity values for 2016 were compared to Ministry normalized benchmarks as presented in Table 1. The following is noted from the benchmarking review.

1. The majority of the applicable buildings meet the normalized benchmarks for the respective building types. There are eight (8) buildings that are below the benchmarks and two (2) that are above.
2. The Calabogie Garage shows an energy intensity that is higher than the applicable benchmark. The building has large bay doors that appear to be in poor condition and could be a main source for heat loss in winter months. Measures have been outlined to update the doors building envelope. Operator use is also a key measure with bay doors. In winter months, the doors should remain closed as often as possible.
3. The Calabogie Medical Centre (formerly the Library) has shown energy intensity levels that are much higher than the applicable benchmark in 2015 and 2016. The library was located in the basement of the building and is currently being moved to a different space and the old library area is being renovated. Depending on the new use of the building, energy intensity levels should trend downwards.
4. In 2014, the Calabogie Fire Hall registered the highest energy intensity since reporting began. Although it was just below the applicable benchmark, it was much closer to the benchmark value. A new furnace was installed in 2015 and assisted the building in decreasing the energy intensity since the peak year. A new SCBA filling station was also put into service in recent time.
5. The Griffith Fire Hall & Garage has shown historical values that are almost double the applicable benchmark. The energy intensity levels were not reported for 2016 and 2017. These values need to be reported in order to ascertain whether the energy intensity is still trending to be much higher than the benchmark.

#### 4.4 Proposed Measures

Generally consistent with the 2014 assessments, Greenview reviewed the eligible municipal buildings for opportunities to reduce energy usage moving forward into the next five-year period. Consideration was given to the historical data review and trend analysis as noted above.

The following general measures are proposed to the Township for overall consideration. The proposed measures are specifically presented in the respective Table 2 for each building, as attached.

1. Exterior lighting should be replaced with photocell-controlled LED fixtures where applicable.
2. At the time of the 2014 review, the condition and/or performance of windows and doors were not necessarily identified as a proposed measure. Since the last review, the condition of the windows and doors in various municipal buildings has deteriorated and have become a point for energy loss.
3. Interior lighting upgrades to LED or energy efficient fluorescent tubes (T5 or T8) should be completed at all buildings, as a capital upgrade or on an end of lifecycle replacement. It is understood that the majority of buildings have been completed.
4. With more buildings now having programmable thermostatic controls since the last review, this measure should be implemented at all buildings with typical human occupancies.
5. Many of the HVAC systems throughout the Township's buildings have already been converted to newer, energy-efficient systems and the remainder of the inefficient and aging systems should be replaced at the end of their operating life. Typical lifecycle for an HVAC plant is not more than 25 years.
6. With the replacement of the HVAC systems in progress, the ventilation systems of the buildings must similarly be improved. In the water treatment and works garage facilities, demand control ventilation (DCV) equipment should be installed to provide the required ventilation to these buildings. In non-industrial buildings, heat recovery or energy ventilators (HRV or ERV) should be installed for energy-efficient ventilation. Installing the proper ventilation equipment will aid in the efficiency of the HVAC system, address current building code compliance, and improve the overall performance of the building.

#### 4.5 Anticipated Benefits

The completion of the proposed measures should lead to an overall decrease in GHG emissions and energy consumption of each building. In Table 2, the anticipated benefit for each of the measures is noted as minimal, moderate, or significant. In larger buildings with multiple opportunities for energy reductions, the implementation of a specific measure could have a significant aggregate benefit.

With the implementation of the proposed measures, the decreased energy usage would result in a variety of benefits including reduced GHG emissions and reduced energy costs.

## **5.0 Renewable Energy Considerations**

### **5.1 Existing Renewable Energy Generation**

O.Reg. 507/18 requires the municipality to consider renewable energy as an alternative to reducing energy consumption and demand for its buildings/facilities.

The Township currently does not currently utilize specific sources of renewable energy for its buildings. The Township should consider renewable and/or sustainable energy projects for all of its facilities or as stand-alone projects. The preferred energy sources for public agencies are described below.

### **5.2 Ground Source Energy**

Ground source heat pump technology harnesses energy from below the ground surface to provide heating in the winter and cooling in the summer. Ground source energy systems utilize the generally constant temperature of the ground in both the winter and summer months. Most ground source energy systems operate as hydronic systems and as the liquid is pumped through the pipes running through the ground, the constant temperature saves energy on both heating and cooling the liquid depending on the season.

The Township would consider ground source heat pump technology during the initial design stages of all planned heating and air conditioning (HVAC) system installations.

### **5.3 Solar Thermal Energy**

Solar thermal technology uses solar heat energy gathered to provide heating for air or water and can also be used for energy production. Solar thermal energy is captured by concentrating the light from the sun to create heat. A device absorbs the sun's energy and uses the thermal properties to provide heat for air or water. Solar thermal energy can be used to simply heat domestic water or in a more advanced system, can be used to heat water to create steam to run a turbine generating system.

The Township would consider solar thermal technology during the initial design stages of all planned heating, ventilation and air conditioning (HVAC) or domestic hot water system installations.

### **5.4 Opportunities for Other Sources of Renewable Energy**

The feasibility of implementing other types of renewable energy technologies (air source, etc.) with building systems should be evaluated when opportunities arise with building renewals, major renovations, etc.

## 6.0 Updated Goals & Objectives

With due consideration of the 2014 goals and objectives, and the Township's progress related to them as presented in Section 3.0, the Township has established the following goals and objectives moving forward for the next period.

Goals		Objectives
1	Reduce energy consumption and GHG emissions in the Township-owned and operated facilities	Reduce energy consumption by a minimum of 5% by over the next reporting period as an aggregate for all municipal buildings.
2	Promote energy conservation for users of Township owned and operated facilities	Provide promotion, education, and/or training to Municipal staff and facility users with respect to the benefits of energy conservation, explaining the benefits both financially and environmentally to the community
3	Monitor and review energy consumption in the Township owned and operated facilities	On an annual basis and after Ministry data normalization, review GHG and energy consumption results with Municipal senior management to review performance. Take measures to meet Ministry-established energy benchmarks for each municipal building
4	Explore the usage of alternative and renewable energy	Consider the feasibility of implementing new, alternative, and renewable energy systems in Township owned and operated facilities
5	Secure funding to implement energy efficiency savings	Prior to budgeting and implementing an energy conservation measure, research and secure available funding energy-related measures

## 7.0 Conclusions & Recommendations

### 7.1 Conclusions

With due consideration of the 2014 Plan and progress made to the current 2019 review, the following conclusions are presented.

1. The Township has made no progress in reducing its energy consumption and GHG emissions from 2011 to 2016, with an overall increase of approximately 11% during this time period. The measures outlined in the report should be employed to reduce GHG emissions and energy consumption.
2. Low-capital cost measures to reduce energy consumption should be employed to realize potential return on investment benefits. Upgrades to exterior and interior lighting, programmable devices to control energy use on HVAC and hot water storage systems, and the replacement of door seals are noted.
3. Subject to longer-range building and facility planning, the building envelope of the municipality's works garages should be upgraded to reduce the thermal losses and excessive energy consumption.
4. Where required, minimum safety-related equipment should be installed, and consideration of energy-efficient equipment should form part of the equipment specification and procurement process.
5. Staff and employee education and training are recommended to maximize the potential benefits of energy conservation and demand management.
6. New and emerging technologies in energy consumption monitoring and/or internet-based control systems should be considered for implementation in buildings with non-regular utilization.

### 7.2 Recommendations

The proposed measures noted in this report should be implemented by the Township as applicable and as opportunities are available to do so, considering building and facility asset planning, financial considerations, and other aspects of municipal asset management.

## 8.0 Closing

We trust this report provides a real benefit to the Township of Greater Madawaska in its on-going planning and implementation efforts to reduce energy consumption in the use and operation of its buildings and facilities.

This report and its findings are governed by the attached statement of service qualifications and limitations (Appendix B).

All respectfully submitted by,

**Greenview Environmental Management Limited**



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Tyler H. Peters, P.Eng.  
Project Director



## Tables



Table 1  
 Historical Reporting Summary (2011-2016)  
 Municipal Energy Conservation & Demand Management Plan (2019)  
 Township of Greater Madawaska  
 102.19.024



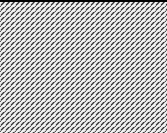


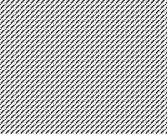


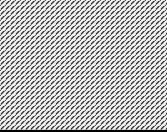


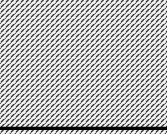


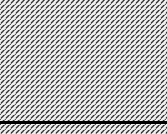


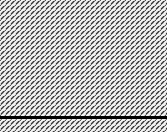


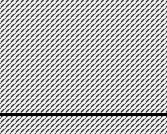
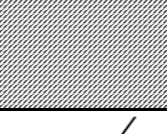
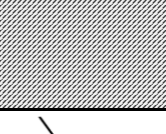
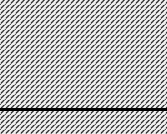
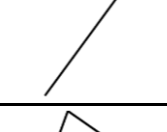
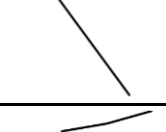
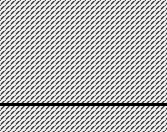


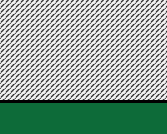



No.	Building Name	Operation Type	Address	Town/City	Construction Year	Building Age (years)	Building Area		Greenhouse Gas Emissions (GHG; kilogram [kg])						6-Year Trend	Energy Intensity (eWh/HDD/sq.ft.)						6-Year Trend	Energy Intensity (Mega Litre; ML)						6-Year Trend	2016 Benchmark Values & Status							
							square feet (ft <sup>2</sup> )	square metres (m <sup>2</sup> )	2011	2012	2013	2014	2015	2016	Sparkline	2011	2012	2013	2014	2015	2016	Sparkline	2011	2012	2013	2014	2015	2016	Sparkline								
1	Calabogie Community Hall & Rink Shed	Community centres	574 Mill Street	Calabogie	1996	23	6501	604	13,744	5,848	10,982	12,811	9,731	14,096		3.26	1.55	1.73	2.96	2.49	3.38		-	-	-	-	-	-		-	-	-	-	-	-		5.0
2	Calabogie Fire Hall	Fire stations and associated offices and facilities	12470A Lanark Road	Calabogie	1991	28	3208	298	8,396	7,823	7,180	13,992	6,701	5,531		3.95	3.50	3.00	5.26	3.05	2.94		-	-	-	-	-	-		-	-	-	-	-	-		5.4
3	Calabogie Garage	Storage facilities where equipment or vehicles are maintained, repaired or stored	12470B Lanark Road	Calabogie	1991	28	5038	468	33,007	30,149	25,725	20,695	27,214	27,732		8.32	7.47	4.14	4.97	6.60	7.06		-	-	-	-	-	-		-	-	-	-	-	-		5.8
4	Calabogie Medical Centre	Other	1101 Francis Street	Calabogie	1990	29	1345	125	-	2,015	3,482	5,098	7,207	7,592		-	2.51	3.75	4.63	8.79	9.44		-	-	-	-	-	-		-	-	-	-	-	-		6.4
5	Griffith Community Hall	Community centres	25991B Highway #41	Griffith	1997	22	4209	391	-	7,755	4,063	879	7,708	4,227		-	2.14	1.26	0.56	2.52	1.86		-	-	-	-	-	-		-	-	-	-	-	-		5.0
6	Griffith Fire Hall	Fire stations and associated offices and facilities	25991C Highway #41	Griffith	1974	45	2260	210	1,948	7,872	4,185	10,285	12,695	14,097		2.11	4.29	1.60	5.39	4.85	5.03		-	-	-	-	-	-		-	-	-	-	-	-		5.4
7	Griffith Garage	Storage facilities where equipment or vehicles are maintained, repaired or stored	25991C Highway #41	Griffith	1974	45	1292	120	10,728	6,807	9,047	10,199	-	6,009		10.01	6.61	7.61	9.07	-	-		-	-	-	-	-	-		-	-	-	-	-	-		5.8
8	Griffith Rink	Community centres	15 Ginza Street	Griffith	1975	44	1496	139	7,739	-	-	-	-	-		5.54	-	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-		5.0
9	Matawatchan Salt Shed	Storage facilities where equipment or vehicles are maintained, repaired or stored	3568 Matawatchan Road	Griffith	2009	10	990	92	-	2,918	4,658	-	-	-		-	3.60	2.84	-	-	-		-	-	-	-	-	-		-	-	-	-	-	-		5.8
10	Municipal Office	Administrative offices and related facilities, including municipal council chambers	19 Parnell St.	Calabogie	1914	105	6300	585	-	-	1,675	8,548	6,808	6,009		-	-	1.51	2.37	2.43	2.54		-	-	-	-	-	-		-	-	-	-	-	-		6.2
<b>TOTALS</b>							32639	3032	75,562	71,187	70,997	82,508	78,065	85,292		33.20	31.68	27.43	35.20	30.73	32.24		0	0	0	0	0	0		0	0	0	0	0	0		



Table 2-1  
Energy Conservation & Demand Management Measure Summary  
Municipal Energy Conservation & Demand Management Plan (2019)  
Township of Greater Madawaska  
102.19.024

Site: Calabogie Community Hall

Address: 574 Mill Street  
Calabogie, Ontario

Area of Building (Sq.ft.): 5296

Primary Use: Community Centre

Primary Heating System: Forced Air Propane Furnace

Air Conditioning: None

Percent (%) Change (2011-2016) GHG Emissions (kg): 2%

Percent (%) Change (2011-2016) Energy Intensity (eWh/HDD/sqft): 4%

Percent (%) Change (2011-2016) Energy Intensity (eKWh/ML): -

Item	Measure Summary		Past Measures (2011 - 2017)			Current & Proposed Measures (2018 - 2023)			
	Type	Description	Priority	Completed Status Y/N (Year)	Interpreted Benefit	Priority	Estimated Capital	Savings (Annual)	Simple ROI (Years)
<b>1.0 Exterior Grounds</b>									
1.01	Exterior Lighting	Update existing LED outdoor lighting to have programmable controls.	2	N	Minimal improvement	2	\$150	\$30	5
<b>2.0 Building Envelope</b>									
2.01	Windows	N/A	-	-	-	-	-	-	-
2.02	Doors	Replace the existing person doors to meet the new energy efficiency requirements.	-	Y (2019)	Moderate improvement	-	-	-	-
2.03	Overhead Doors (As Applicable)	N/A	-	-	-	-	-	-	-
2.04	Insulation	N/A	-	-	-	-	-	-	-
2.05	External Service Penetrations	N/A	-	-	-	-	-	-	-
2.06	Building Envelope Integrity	N/A	-	-	-	-	-	-	-
2.07	Exterior Cladding	N/A	-	-	-	-	-	-	-
<b>3.0 Heating, Ventilation, Air Conditioning (HVAC) &amp; Domestic Hot Water</b>									
3.01	Heating & Cooling System	Heating system has reached/exceeded its expected service-life and should be replaced with a new, high-efficiency system.	-	Y (2017)	Substantial improvement	-	-	-	-
3.02	Ventilation System	Install a heat recovery ventilation system (HRV) on the existing HVAC system.	-	-	-	3	\$1,000	\$50	20
3.03	Duct Network	Insulate and/or seal existing HVAC ductwork to mitigate heating/cooling losses.	-	-	-	4	\$500	\$100	5
3.04	HVAC Controls	Install programmable thermostats to control the indoor air temperature and setback temperatures when the building is unoccupied.	2	Y (2015)	Minimal improvement	-	-	-	-
3.05	Domestic Hot Water System	Install a programmable timer on the domestic hot water system.	2	N	Minimal improvement	2	\$50	\$150	0
<b>4.0 Electrical</b>									
4.01	Energy Efficient Lighting System	Replace the existing lighting system with an energy-efficient LED lighting system.	2	Y (2016)	Substantial improvement	-	-	-	-
4.02	Lighting Controls	Replace existing with occupancy-activated lighting controls.	3	N	Minimal improvement	2	\$1,000	\$175	6
4.03	Emergency Exit Signs	Install energy efficient, photo luminescent emergency exit signs.	3	Y (2015)	Minimal improvement	-	-	-	-
4.04	Pumps	N/A	-	-	-	-	-	-	-
4.05	Monitoring and Targeting System	N/A	-	-	-	-	-	-	-
<b>5.0 Renewable Energy</b>									
5.01	Renewable Energy - Solar PV	Consider ground-mount or roof-mounted solar PV systems as a potential source of renewable energy to the building.	-	-	-	-	-	-	-
5.02	Renewal Energy Heating & Cooling - Ground Source or Air Source Heat Pump Technology	Consider implementing ground source and/or air source heat pump heating/cooling systems with next heating/cooling system replacement.	-	-	-	-	-	-	-
5.03	Renewable Energy - Solar Thermal Air	Consider solar air systems as a potential use of renewable energy to the building.	-	-	-	-	-	-	-
5.04	Renewable Energy - Solar Thermal Water	Consider solar water systems as a potential use of renewable energy to the building.	-	-	-	-	-	-	-
<b>6.0 Water Conservation</b>									
6.01	Low-Flow Toilets	At the end of an existing toilet's service life, replace with low-flow type.	3	Y (2015)	Moderate improvement	2	\$1,500	\$150	10
6.02	Low-Flow Faucets	Install metered low-flow faucets for the hot & cold water services. Faucets are to have an adjustable timing sequence.	3	N	Minimal improvement	3	\$1,800	\$150	12
6.03	Automatic Equipment	Replace existing manual plumbing fixtures and washroom equipment with automatic fixtures/equipment.	-	-	-	5	\$5,000	\$250	20
<b>7.0 Energy Efficient Appliances / Equipment</b>									
7.01	Energy Star Rated Appliances	Replace the existing non-rated appliances with new Energy Star rated appliances at the end of service life.	-	Y (2019)	Minimal improvement	TBD	TBD	TBD	TBD
7.02	Energy Star Rated Office Equipment	Replace the existing non-rated office equipment with new Energy Star rated equipment at the end of service life.	-	-	-	TBD	TBD	TBD	TBD
<b>8.0 Training &amp; Awareness</b>									
8.01	Staff Training	Staff/Employees have been made aware of the goals, objectives, and benefits of the Municipality's energy conservation and demand management planning and associated measures	-	-	-	1	\$1,000	\$200	5





Table 2-2  
Energy Conservation & Demand Management Measure Summary  
Municipal Energy Conservation & Demand Management Plan (2019)  
Township of Greater Madawaska  
102.19.024

Site: Calabogie Fire Hall

Address: 12470A Lanark Road  
Calabogie, Ontario

Area of Building (Sq.ft.): 3208

Primary Use: Fire Station

Primary Heating System: Forced Air Propane  
Furnace

Air Conditioning: None

Percent (%) Change (2011-2016) GHG Emissions (kg): -34%

Percent (%) Change (2011-2016) Energy Intensity (eWh/HDD/sqft): -26%

Percent (%) Change (2011-2016) Energy Intensity (ekWh/ML): -

Item	Measure Summary		Past Measures (2011 - 2017)			Current & Proposed Measures (2018 - 2023)			
	Type	Description	Priority	Completed Status Y/N (Year)	Interpreted Benefit	Priority	Estimated Capital	Savings (Annual)	Simple ROI (Years)
<b>1.0 Exterior Grounds</b>									
1.01	Exterior Lighting	Replace existing outdoor lighting with energy efficient LED lighting with control sensors.	-	-	-	4	\$750	\$80	9
<b>2.0 Building Envelope</b>									
2.01	Windows	N/A	-	-	-	-	-	-	-
2.02	Doors	N/A	-	-	-	-	-	-	-
2.03	Overhead Doors (As Applicable)	N/A	-	-	-	-	-	-	-
2.04	Insulation	N/A	-	-	-	-	-	-	-
2.05	External Service Penetrations	N/A	-	-	-	-	-	-	-
2.06	Building Envelope Integrity	N/A	-	-	-	-	-	-	-
2.07	Exterior Cladding	Repair any areas of exterior cladding that are damaged and would create a potential location for energy loss.	-	-	-	5	\$1,000	\$100	10
<b>3.0 Heating, Ventilation, Air Conditioning (HVAC) &amp; Domestic Hot Water</b>									
3.01	Heating & Cooling System	The existing HVAC system should be replaced to a new energy-efficient system.	-	Y (2017)	Substantial improvement	-	-	-	-
3.02	Ventilation System	Install a heat recovery ventilation system (HRV) on the existing HVAC system.	-	-	-	2	\$1,000	\$50	20
3.03	Duct Network	Insulate and/or seal existing HVAC ductwork to mitigate heating/cooling losses.	-	-	-	4	\$500	\$100	5
3.04	HVAC Controls	Install programmable thermostats to control the indoor air temperature and setback temperatures when the building is unoccupied.	-	Y (2020)	Minimal improvement	3	\$250	\$500	1
3.05	Domestic Hot Water System	Install a programmable timer on the domestic hot water system.	-	-	-	4	\$50	\$150	0
<b>4.0 Electrical</b>									
4.01	Energy Efficient Lighting System	Replace the existing lighting system with an energy-efficient LED lighting system.	-	Y (2016)	Moderate improvement	-	-	-	-
4.02	Lighting Controls	Replace existing with occupancy-activated lighting controls.	-	-	-	3	\$1,000	\$175	6
4.03	Emergency Exit Signs	Install energy efficient, photo luminescent emergency exit signs.	-	-	-	4	\$250	\$30	8
4.04	Pumps	N/A	-	-	-	-	-	-	-
4.05	Monitoring and Targeting System	N/A	-	-	-	-	-	-	-
<b>5.0 Renewable Energy</b>									
5.01	Renewable Energy - Solar PV	Consider ground-mount or roof-mounted solar PV systems as a potential source of renewable energy to the building.	-	-	-	-	-	-	-
5.02	Renewal Energy Heating & Cooling - Ground Source or Air Source Heat Pump Technology	Consider implementing ground source and/or air source heat pump heating/cooling systems with next heating/cooling system replacement.	-	-	-	-	-	-	-
5.03	Renewable Energy - Solar Thermal Air	Consider solar air systems as a potential use of renewable energy to the building.	-	-	-	-	-	-	-
5.04	Renewable Energy - Solar Thermal Water	Consider solar water systems as a potential use of renewable energy to the building.	-	-	-	-	-	-	-
<b>6.0 Water Conservation</b>									
6.01	Low-Flow Toilets	At the end of an existing toilet's service life, replace with low-flow type.	-	-	-	4	\$500	\$50	10
6.02	Low-Flow Faucets	Install metered low-flow faucets for the hot & cold water services. Faucets are to have an adjustable timing sequence.	-	-	-	5	\$300	\$25	12
6.03	Automatic Equipment	N/A	-	-	-	-	-	-	-
<b>7.0 Energy Efficient Appliances / Equipment</b>									
7.01	Energy Star Rated Appliances	Replace the existing non-rated appliances with new Energy Star rated appliances at the end of service life.	-	-	-	4	TBD	TBD	TBD
7.02	Energy Star Rated Office Equipment	N/A	-	-	-	-	-	-	-
<b>8.0 Training &amp; Awareness</b>									
8.01	Staff Training	Staff/Employees have been made aware of the goals, objectives, and benefits of the Municipality's energy conservation and demand management planning and associated measures.	-	-	-	1	\$1,000	\$200	5





Site: Calabogie Garage

Address: 12470B Lanark Road  
Calabogie, Ontario

Area of Building (Sq.ft.): 5038

Primary Use: Municipal Garage

Primary Heating System: Propane Fired Tube Heaters

Air Conditioning: None

Percent (%) Change (2011-2016) GHG Emissions (kg): -16%

Percent (%) Change (2011-2016) Energy Intensity (eWh/HDD/sqft): -15%

Percent (%) Change (2011-2016) Energy Intensity (eKWh/ML): -

Table 2-3  
Energy Conservation & Demand Management Measure Summary  
Municipal Energy Conservation & Demand Management Plan (2019)  
Township of Greater Madawaska  
102.19.024

Item	Measure Summary		Past Measures (2011 - 2017)			Current & Proposed Measures (2018 - 2023)			
	Type	Description	Priority	Completed Status Y/N (Year)	Interpreted Benefit	Priority	Estimated Capital	Savings (Annual)	Simple ROI (Years)
<b>1.0 Exterior Grounds</b>									
1.01	Exterior Lighting	Replace existing outdoor lighting with energy efficient LED lighting with control sensors.	2	Y (2020)	Minimal improvement	-	-	-	-
<b>2.0 Building Envelope</b>									
2.01	Windows	Replace existing windows in the building to meet energy efficient fenestration requirements.	-	Y (2020)	Minimal improvement	2	\$3,000	\$600	5
2.02	Doors	Replace/repair seals on exterior person doors.	2	N	Minimal improvement	2	\$50	\$25	2
2.03	Overhead Doors (As Applicable)	Replace overhead doors and associated seals.	3	N	Moderate improvement	1	\$7,500	\$750	10
2.04	Insulation	N/A	-	-	-	-	-	-	-
2.05	External Service Penetrations	N/A	-	-	-	-	-	-	-
2.06	Building Envelope Integrity	N/A	-	-	-	-	-	-	-
2.07	Exterior Cladding	Repair any areas of exterior cladding that are damaged and would create a potential location for energy loss.	-	-	-	5	\$1,000	\$100	10
<b>3.0 Heating, Ventilation, Air Conditioning (HVAC) &amp; Domestic Hot Water</b>									
3.01	Heating & Cooling System	Heating system has reached/exceeded its expected service-life and should be replaced with a new, high-efficiency system.	-	Y (2019)	Substantial improvement	-	-	-	-
3.02	Ventilation System	N/A	-	Y (2019)	Minimal improvement	-	-	-	-
3.03	Duct Network	N/A	-	-	-	-	-	-	-
3.04	HVAC Controls	Install programmable thermostats to control the indoor air temperature and setback temperatures when the building is unoccupied.	2	Y (2019)	Minimal improvement	2	\$250	\$500	1
3.05	Domestic Hot Water System	Install a programmable timer on the domestic hot water system.	2	N	Minimal improvement	2	\$50	\$150	0
<b>4.0 Electrical</b>									
4.01	Energy Efficient Lighting System	Replace the existing lighting system with an energy-efficient LED lighting system.	-	Y (2016)	Moderate improvement	-	-	-	-
4.02	Lighting Controls	Replace existing with occupancy-activated lighting controls.	-	-	-	3	\$1,600	\$280	6
4.03	Emergency Exit Signs	Install energy efficient, photo luminescent emergency exit signs.	3	Y (2016)	Minimal improvement	-	-	-	-
4.04	Pumps	N/A	-	-	-	-	-	-	-
4.05	Monitoring and Targeting System	N/A	-	-	-	-	-	-	-
<b>5.0 Renewable Energy</b>									
5.01	Renewable Energy - Solar PV	Consider ground-mount or roof-mounted solar PV systems as a potential source of renewable energy to the building.	-	-	-	-	-	-	-
5.02	Renewal Energy Heating & Cooling - Ground Source or Air Source Heat Pump Technology	Consider implementing ground source and/or air source heat pump heating/cooling systems with next heating/cooling system replacement.	-	-	-	-	-	-	-
5.03	Renewable Energy - Solar Thermal Air	Consider solar air systems as a potential use of renewable energy to the building.	-	-	-	-	-	-	-
5.04	Renewable Energy - Solar Thermal Water	Consider solar water systems as a potential use of renewable energy to the building.	-	-	-	-	-	-	-
<b>6.0 Water Conservation</b>									
6.01	Low-Flow Toilets	At the end of an existing toilet's service life, replace with low-flow type.	4	N	Minimal improvement	3	\$500	\$50	10
6.02	Low-Flow Faucets	Install metered low-flow faucets for the hot & cold water services. Faucets are to have an adjustable timing sequence.	-	-	-	5	\$1,200	\$100	12
6.03	Automatic Equipment	Replace existing manual plumbing fixtures and washroom equipment with automatic fixtures/equipment.	-	-	-	4	\$1,000	\$50	20
<b>7.0 Energy Efficient Appliances / Equipment</b>									
7.01	Energy Star Rated Appliances	Replace the existing non-rated appliances with new Energy Star rated appliances at the end of service life.	3	N	Minimal improvement	3	TBD	TBD	TBD
7.02	Energy Star Rated Office Equipment	N/A	-	-	-	-	-	-	-
<b>8.0 Training &amp; Awareness</b>									
8.01	Staff Training	Staff/Employees have been made aware of the goals, objectives, and benefits of the Municipality's energy conservation and demand management planning and associated measures.	-	-	-	1	TBD	TBD	TBD





Site: Calabogie Medical Centre

Address: 1101 Francis Street  
Calabogie, Ontario

Area of Building (Sq.ft.): 1345

Primary Use: Medical Centre

Primary Heating System: Forced Air Propane Furnace

Air Conditioning: None

Percent (%) Change (2011-2016) GHG Emissions (kg): 73%

Percent (%) Change (2011-2016) Energy Intensity (eWh/HDD/sqft): 73%

Percent (%) Change (2011-2016) Energy Intensity (eKWh/ML): -

Table 2-4  
Energy Conservation & Demand Management Measure Summary  
Municipal Energy Conservation & Demand Management Plan (2019)  
Township of Greater Madawaska  
102.19.024

Item	Measure Summary		Past Measures (2011 - 2017)			Current & Proposed Measures (2018 - 2023)			
	Type	Description	Priority	Completed Status Y/N (Year)	Interpreted Benefit	Priority	Estimated Capital	Savings (Annual)	Simple ROI (Years)
<b>1.0 Exterior Grounds</b>									
1.01	Exterior Lighting	Replace existing outdoor lighting with energy efficient LED lighting with control sensors.	2	N	Minimal improvement	2	\$1,875	\$200	9
<b>2.0 Building Envelope</b>									
2.01	Windows	N/A	-	-	-	-	-	-	-
2.02	Doors	Replace/repair seals on exterior person doors.	3	Y (2018)	Minimal improvement	-	-	-	-
2.03	Overhead Doors (As Applicable)	N/A	-	-	-	-	-	-	-
2.04	Insulation	N/A	-	-	-	-	-	-	-
2.05	External Service Penetrations	N/A	-	-	-	-	-	-	-
2.06	Building Envelope Integrity	N/A	-	-	-	-	-	-	-
2.07	Exterior Cladding	Repair/repointing of any areas of veneer masonry that are damaged and could result in a source of excess energy consumption.	-	-	-	5	\$500	\$50	10
<b>3.0 Heating, Ventilation, Air Conditioning (HVAC) &amp; Domestic Hot Water</b>									
3.01	Heating & Cooling System	Heating system has reached/exceeded its expected service-life and should be replaced with a new, high-efficiency system.	-	Y (2016)	Substantial improvement	-	-	-	-
3.02	Ventilation System	Install a heat recovery ventilation system (HRV) on the existing HVAC system.	-	Y (2016)(1 furnace)	Substantial improvement	2	\$1,000	\$50	20
3.03	Duct Network	Insulate and/or seal existing HVAC ductwork to mitigate heating/cooling losses.	-	-	-	4	\$500	\$100	5
3.04	HVAC Controls	Install programmable thermostats to control the indoor air temperature and setback temperatures when the building is unoccupied.	2	Y (2016)	Minimal improvement	-	-	-	-
3.05	Domestic Hot Water System	Install a programmable timer on the domestic hot water system.	2	N	Minimal improvement	2	\$100	\$300	0
<b>4.0 Electrical</b>									
4.01	Energy Efficient Lighting System	Replace the existing lighting system with an energy-efficient LED lighting system.	2	Y (2018/19)	Substantial improvement	-	-	-	-
4.02	Lighting Controls	Replace existing with occupancy-activated lighting controls.	-	-	-	4	\$2,000	\$350	6
4.03	Emergency Exit Signs	Install energy efficient, photo luminescent emergency exit signs.	3	Y (2015)	Minimal improvement	-	-	-	-
4.04	Pumps	N/A	-	-	-	-	-	-	-
4.05	Monitoring and Targeting System	N/A	-	-	-	-	-	-	-
<b>5.0 Renewable Energy</b>									
5.01	Renewable Energy - Solar PV	Consider ground-mount or roof-mounted solar PV systems as a potential source of renewable energy to the building.	-	-	-	-	-	-	-
5.02	Renewal Energy Heating & Cooling - Ground Source or Air Source Heat Pump Technology	Consider implementing ground source and/or air source heat pump heating/cooling systems with next heating/cooling system replacement.	-	-	-	-	-	-	-
5.03	Renewable Energy - Solar Thermal Air	Consider solar air systems as a potential use of renewable energy to the building.	-	-	-	-	-	-	-
5.04	Renewable Energy - Solar Thermal Water	Consider solar water systems as a potential use of renewable energy to the building.	-	-	-	-	-	-	-
<b>6.0 Water Conservation</b>									
6.01	Low-Flow Toilets	At the end of an existing toilet's service life, replace with low-flow type.	4	Y (2019)	Moderate improvement	4	\$1,500	\$150	10
6.02	Low-Flow Faucets	Install metered low-flow faucets for the hot & cold water services. Faucets are to have an adjustable timing sequence.	-	-	-	4	\$1,800	\$150	12
6.03	Automatic Equipment	Replace existing manual plumbing fixtures and washroom equipment with automatic fixtures/equipment.	-	-	-	5	\$4,000	\$200	20
<b>7.0 Energy Efficient Appliances / Equipment</b>									
7.01	Energy Star Rated Appliances	Replace the existing non-rated appliances with new Energy Star rated appliances at the end of service life.	-	-	-	TBD	TBD	TBD	TBD
7.02	Energy Star Rated Office Equipment	Replace the existing non-rated office equipment with new Energy Star rated equipment at the end of service life.	-	-	-	TBD	TBD	TBD	TBD
<b>8.0 Training &amp; Awareness</b>									
8.01	Staff Training	Staff/Employees have been made aware of the goals, objectives, and benefits of the Municipality's energy conservation and demand management planning and associated measures	-	-	-	1	\$1,000	\$200	5





Site: Calabogie Rink Shed

Address: 574 Mill Street  
Calabogie, Ontario

Area of Building (Sq.ft.): 1202

Primary Use: Municipal Storage

Primary Heating System: Propane Unit Heater

Air Conditioning: None

Percent (%) Change (2011-2016) GHG Emissions (kg): N/A

Percent (%) Change (2011-2016) Energy Intensity (eWh/HDD/sqft): N/A

Percent (%) Change (2011-2016) Energy Intensity (ekWh/ML): -

**Table 2-5**  
Energy Conservation & Demand Management Measure Summary  
Municipal Energy Conservation & Demand Management Plan (2019)  
Township of Greater Madawaska  
102.19.024

Item	Measure Summary		Past Measures (2011 - 2017)			Current & Proposed Measures (2018 - 2023)			
	Type	Description	Priority	Completed Status Y/N (Year)	Interpreted Benefit	Priority	Estimated Capital	Savings (Annual)	Simple ROI (Years)
<b>1.0 Exterior Grounds</b>									
1.01	Exterior Lighting	Update existing LED outdoor lighting to have programmable controls.	-	-	-	4	\$225	\$45	5
<b>2.0 Building Envelope</b>									
2.01	Windows	N/A	-	-	-	-	-	-	-
2.02	Doors	N/A	-	-	-	-	-	-	-
2.03	Overhead Doors (As Applicable)	N/A	-	-	-	-	-	-	-
2.04	Insulation	N/A	-	-	-	-	-	-	-
2.05	External Service Penetrations	N/A	-	-	-	-	-	-	-
2.06	Building Envelope Integrity	N/A	-	-	-	-	-	-	-
2.07	Exterior Cladding	N/A	-	-	-	-	-	-	-
<b>3.0 Heating, Ventilation, Air Conditioning (HVAC) &amp; Domestic Hot Water</b>									
3.01	Heating & Cooling System	N/A	-	-	-	-	-	-	-
3.02	Ventilation System	N/A	-	-	-	-	-	-	-
3.03	Duct Network	N/A	-	-	-	-	-	-	-
3.04	HVAC Controls	N/A	-	-	-	-	-	-	-
3.05	Domestic Hot Water System	Install a programmable timer on the domestic hot water system.	-	-	-	5	\$50	\$150	0
<b>4.0 Electrical</b>									
4.01	Energy Efficient Lighting System	N/A	-	-	-	-	-	-	-
4.02	Lighting Controls	Replace existing with occupancy-activated lighting controls.	-	-	-	-	-	-	-
4.03	Emergency Exit Signs	Install energy efficient, photo luminescent emergency exit signs.	-	Y (2020)	Minimal improvement	5	\$250	\$30	8
4.04	Pumps	N/A	-	-	-	-	-	-	-
4.05	Monitoring and Targeting System	N/A	-	-	-	-	-	-	-
<b>5.0 Renewable Energy</b>									
5.01	Renewable Energy - Solar PV	Consider ground-mount or roof-mounted solar PV systems as a potential source of renewable energy to the building.	-	-	-	-	-	-	-
5.02	Renewal Energy Heating & Cooling - Ground Source or Air Source Heat Pump Technology	Consider implementing ground source and/or air source heat pump heating/cooling systems with next heating/cooling system replacement.	-	-	-	-	-	-	-
5.03	Renewable Energy - Solar Thermal Air	Consider solar air systems as a potential use of renewable energy to the building.	-	-	-	-	-	-	-
5.04	Renewable Energy - Solar Thermal Water	Consider solar water systems as a potential use of renewable energy to the building.	-	-	-	-	-	-	-
<b>6.0 Water Conservation</b>									
6.01	Low-Flow Toilets	N/A	-	-	-	-	-	-	-
6.02	Low-Flow Faucets	N/A	-	-	-	-	-	-	-
6.03	Automatic Equipment	N/A	-	-	-	-	-	-	-
<b>7.0 Energy Efficient Appliances / Equipment</b>									
7.01	Energy Star Rated Appliances	N/A	-	-	-	-	-	-	-
7.02	Energy Star Rated Office Equipment	N/A	-	-	-	-	-	-	-
<b>8.0 Training &amp; Awareness</b>									
8.01	Staff Training	Staff/Employees have been made aware of the goals, objectives, and benefits of the Municipality's energy conservation and demand management planning and associated measures.	-	-	-	1	\$1,000	\$200	5



Site: Griffith Community Hall

Address: 25991B Highway #41  
Griffith, Ontario

Area of Building (Sq.ft.): 4209

Primary Use: Community Centre

Primary Heating System: Forced Air Propane Furnace

Air Conditioning: None

Percent (%) Change (2011-2016) GHG Emissions (kg): -45%

Percent (%) Change (2011-2016) Energy Intensity (eWh/HDD/sqft): -13%

Percent (%) Change (2011-2016) Energy Intensity (ekWh/ML): -

Table 2-6  
Energy Conservation & Demand Management Measure Summary  
Municipal Energy Conservation & Demand Management Plan (2019)  
Township of Greater Madawaska  
102.19.024

Item	Measure Summary		Past Measures (2011 - 2017)			Current & Proposed Measures (2018 - 2023)			
	Type	Description	Priority	Completed Status Y/N (Year)	Interpreted Benefit	Priority	Estimated Capital	Savings (Annual)	Simple ROI (Years)
<b>1.0 Exterior Grounds</b>									
1.01	Exterior Lighting	Replace existing outdoor lighting with energy efficient LED lighting with control sensors.	2	N	Minimal improvement	2	\$1,125	\$120	9
<b>2.0 Building Envelope</b>									
2.01	Windows	Replace existing windows in the building to meet energy efficient fenestration requirements.	-	-	-	-	-	-	-
2.02	Doors	N/A	-	-	-	-	-	-	-
2.03	Overhead Doors (As Applicable)	N/A	-	-	-	-	-	-	-
2.04	Insulation	N/A	-	-	-	-	-	-	-
2.05	External Service Penetrations	N/A	-	-	-	-	-	-	-
2.06	Building Envelope Integrity	N/A	-	-	-	-	-	-	-
2.07	Exterior Cladding	Repair any areas of exterior cladding that are damaged and would create a potential location for energy loss.	-	-	-	5	\$1,000	\$100	10
<b>3.0 Heating, Ventilation, Air Conditioning (HVAC) &amp; Domestic Hot Water</b>									
3.01	Heating & Cooling System	The existing HVAC system should be replaced to a new energy-efficient system.	-	Y (2016)	Substantial improvement	-	-	-	-
3.02	Ventilation System	Install a heat recovery ventilation system (HRV) on the existing HVAC system.	-	-	-	3	\$1,000	\$50	20
3.03	Duct Network	Insulate and/or seal existing HVAC ductwork to mitigate heating/cooling losses.	3	N	Minimal improvement	2	\$250	\$50	5
3.04	HVAC Controls	N/A	-	-	-	-	-	-	-
3.05	Domestic Hot Water System	Install a programmable timer on the domestic hot water system.	2	N	Minimal improvement	2	\$50	\$150	0
<b>4.0 Electrical</b>									
4.01	Energy Efficient Lighting System	Replace the existing lighting system with an energy-efficient LED lighting system.	-	Y (2019)	Substantial improvement	-	-	-	-
4.02	Lighting Controls	Replace existing with occupancy-activated lighting controls.	3	N	Moderate improvement	3	\$1,000	\$175	6
4.03	Emergency Exit Signs	Install energy efficient, photo luminescent emergency exit signs.	2	N	Minimal improvement	2	\$500	\$60	8
4.04	Pumps	N/A	-	-	-	-	-	-	-
4.05	Monitoring and Targeting System	N/A	-	-	-	-	-	-	-
<b>5.0 Renewable Energy</b>									
5.01	Renewable Energy - Solar PV	Consider ground-mount or roof-mounted solar PV systems as a potential source of renewable energy to the building.	-	-	-	-	-	-	-
5.02	Renewal Energy Heating & Cooling - Ground Source or Air Source Heat Pump Technology	Consider implementing ground source and/or air source heat pump heating/cooling systems with next heating/cooling system replacement.	-	-	-	-	-	-	-
5.03	Renewable Energy - Solar Thermal Air	Consider solar air systems as a potential use of renewable energy to the building.	-	-	-	-	-	-	-
5.04	Renewable Energy - Solar Thermal Water	Consider solar water systems as a potential use of renewable energy to the building.	-	-	-	-	-	-	-
<b>6.0 Water Conservation</b>									
6.01	Low-Flow Toilets	At the end of an existing toilet's service life, replace with low-flow type.	3	N	Minimal improvement	3	\$1,500	\$150	10
6.02	Low-Flow Faucets	Install metered low-flow faucets for the hot & cold water services. Faucets are to have an adjustable timing sequence.	3	N	Minimal improvement	3	\$1,200	\$100	12
6.03	Automatic Equipment	Replace existing manual plumbing fixtures and washroom equipment with automatic fixtures/equipment.	-	-	-	5	\$5,000	\$250	20
<b>7.0 Energy Efficient Appliances / Equipment</b>									
7.01	Energy Star Rated Appliances	Replace the existing non-rated appliances with new Energy Star rated appliances at the end of service life.	3	N	Minimal improvement	3	TBD	TBD	TBD
7.02	Energy Star Rated Office Equipment	N/A	-	-	-	-	-	-	-
<b>8.0 Training &amp; Awareness</b>									
8.01	Staff Training	Staff/Employees have been made aware of the goals, objectives, and benefits of the Municipality's energy conservation and demand management planning and associated measures	-	-	-	1	\$1,000	\$200	5





Site: Griffith Fire Hall

Address: 25991C Highway #41  
Griffith, Ontario

Area of Building (Sq.ft.): 2260

Primary Use: Fire Hall

Primary Heating System: Forced Air Propane  
Furnace

Air Conditioning: Window Mounted Unit

Percent (%) Change (2011-2016) GHG Emissions (kg): 86%

Percent (%) Change (2011-2016) Energy Intensity (eWh/HDD/sqft): 58%

Percent (%) Change (2011-2016) Energy Intensity (eKWh/ML): -

Table 2-7  
Energy Conservation & Demand Management Measure Summary  
Municipal Energy Conservation & Demand Management Plan (2019)  
Township of Greater Madawaska  
102.19.024

Item	Measure Summary		Past Measures (2011 - 2017)			Current & Proposed Measures (2018 - 2023)			
	Type	Description	Priority	Completed Status Y/N (Year)	Interpreted Benefit	Priority	Estimated Capital	Savings (Annual)	Simple ROI (Years)
<b>1.0 Exterior Grounds</b>									
1.01	Exterior Lighting	N/A	-	-	-	-	-	-	-
<b>2.0 Building Envelope</b>									
2.01	Windows	Replace existing windows in the building to meet energy efficient fenestration requirements.	2	N	Minimal improvement	1	\$500	\$100	5
2.02	Doors	Replace/repair seals on exterior person doors.	2	N	Minimal improvement	2	\$1,500	\$200	8
2.03	Overhead Doors (As Applicable)	Repair overhead doors and associated seals.	2	N	Moderate improvement	2	\$1,000	\$100	10
2.04	Insulation	N/A	-	-	-	-	-	-	-
2.05	External Service Penetrations	N/A	-	-	-	-	-	-	-
2.06	Building Envelope Integrity	N/A	-	-	-	-	-	-	-
2.07	Exterior Cladding	N/A	-	-	-	-	-	-	-
<b>3.0 Heating, Ventilation, Air Conditioning (HVAC) &amp; Domestic Hot Water</b>									
3.01	Heating & Cooling System	The existing HVAC system should be replaced to a new energy-efficient system.	-	Y (2016)	Substantial improvement	-	-	-	-
3.02	Ventilation System	Install a heat recovery ventilation system (HRV) on the existing HVAC system.	-	-	-	2	\$1,000	\$50	20
3.03	Duct Network	Insulate and/or seal existing HVAC ductwork to mitigate heating/cooling losses.	-	-	-	3	\$250	\$50	5
3.04	HVAC Controls	N/A	-	-	-	-	-	-	-
3.05	Domestic Hot Water System	Install a programmable timer on the domestic hot water system.	2	N	Minimal improvement	2	\$50	\$150	0
<b>4.0 Electrical</b>									
4.01	Energy Efficient Lighting System	Replace the existing lighting system with an energy-efficient LED lighting system.	-	Y (2016)	Substantial improvement	-	-	-	-
4.02	Lighting Controls	Replace existing with occupancy-activated lighting controls.	-	-	-	3	\$400	\$70	6
4.03	Emergency Exit Signs	Install energy efficient, photo luminescent emergency exit signs.	2	N	Minimal improvement	2	\$500	\$60	8
4.04	Pumps	N/A	-	-	-	-	-	-	-
4.05	Monitoring and Targeting System	N/A	-	-	-	-	-	-	-
<b>5.0 Renewable Energy</b>									
5.01	Renewable Energy - Solar PV	Consider ground-mount or roof-mounted solar PV systems as a potential source of renewable energy to the building.	-	-	-	-	-	-	-
5.02	Renewal Energy Heating & Cooling - Ground Source or Air Source Heat Pump Technology	Consider implementing ground source and/or air source heat pump heating/cooling systems with next heating/cooling system replacement.	-	-	-	-	-	-	-
5.03	Renewable Energy - Solar Thermal Air	Consider solar air systems as a potential use of renewable energy to the building.	-	-	-	-	-	-	-
5.04	Renewable Energy - Solar Thermal Water	Consider solar water systems as a potential use of renewable energy to the building.	-	-	-	-	-	-	-
<b>6.0 Water Conservation</b>									
6.01	Low-Flow Toilets	At the end of an existing toilet's service life, replace with low-flow type.	3	N	Minimal improvement	2	\$500	\$50	10
6.02	Low-Flow Faucets	Install metered low-flow faucets for the hot & cold water services. Faucets are to have an adjustable timing sequence.	-	-	-	4	\$300	\$25	12
6.03	Automatic Equipment	N/A	-	-	-	-	-	-	-
<b>7.0 Energy Efficient Appliances / Equipment</b>									
7.01	Energy Star Rated Appliances	Replace the existing non-rated appliances with new Energy Star rated appliances at the end of service life.	3	N	Minimal improvement	3	TBD	TBD	TBD
7.02	Energy Star Rated Office Equipment	Replace the existing office equipment with new Energy Star rated equipment at the end of the service life.	-	-	-	3	TBD	TBD	TBD
<b>8.0 Training &amp; Awareness</b>									
8.01	Staff Training	Staff/Employees have been made aware of the goals, objectives, and benefits of the Municipality's energy conservation and demand management planning and associated measures	-	-	-	1	\$1,000	\$200	5





Site: Griffith Garage

Address: 25991C Highway #41  
Griffith, Ontario

Area of Building (Sq.ft.): 1292

Primary Use: Municipal Garage

Primary Heating System: Propane Tube Heater

Air Conditioning: None

Percent (%) Change (2011-2016) GHG Emissions (kg): -44%

Percent (%) Change (2011-2016) Energy Intensity (eWh/HDD/sqft): -9%

Percent (%) Change (2011-2016) Energy Intensity (ekWh/ML): -

**Table 2-8**  
Energy Conservation & Demand Management Measure Summary  
Municipal Energy Conservation & Demand Management Plan (2019)  
Township of Greater Madawaska  
102.19.024

Item	Measure Summary		Past Measures (2011 - 2017)			Current & Proposed Measures (2018 - 2023)			
	Type	Description	Priority	Completed Status Y/N (Year)	Interpreted Benefit	Priority	Estimated Capital	Savings (Annual)	Simple ROI (Years)
<b>1.0 Exterior Grounds</b>									
1.01	Exterior Lighting	Replace existing outdoor lighting with energy efficient LED lighting with control sensors.	2	N	Minimal improvement	2	\$750	\$80	9
<b>2.0 Building Envelope</b>									
2.01	Windows	Replace existing windows in the building to meet energy efficient fenestration requirements.	2	N	Minimal improvement	1	\$2,000	\$400	5
2.02	Doors	Replace the existing person doors to meet the new energy efficiency requirements.	1	N	Minimal improvement	1	\$1,500	\$200	8
2.03	Overhead Doors (As Applicable)	Repair overhead doors and associated seals.	3	N	Moderate improvement	3	\$500	\$50	10
2.04	Insulation	N/A	-	-	-	-	-	-	-
2.05	External Service Penetrations	N/A	-	-	-	-	-	-	-
2.06	Building Envelope Integrity	N/A	-	-	-	-	-	-	-
2.07	Exterior Cladding	N/A	-	-	-	-	-	-	-
<b>3.0 Heating, Ventilation, Air Conditioning (HVAC) &amp; Domestic Hot Water</b>									
3.01	Heating & Cooling System	N/A	-	-	-	-	-	-	-
3.02	Ventilation System	Replace/install existing circulating fans with dual-directional model.	-	-	-	3	\$250	\$100	3
3.03	Duct Network	N/A	-	-	-	-	-	-	-
3.04	HVAC Controls	Install programmable thermostats to control the indoor air temperature and setback temperatures when the building is unoccupied.	2	N	Moderate improvement	2	\$250	\$500	1
3.05	Domestic Hot Water System	N/A	-	-	-	-	-	-	-
<b>4.0 Electrical</b>									
4.01	Energy Efficient Lighting System	Replace the existing lighting system with an energy-efficient LED lighting system.	2	Y (2017)	Substantial improvement	-	-	-	-
4.02	Lighting Controls	Replace existing with occupancy-activated lighting controls.	-	-	-	3	\$200	\$35	6
4.03	Emergency Exit Signs	Install energy efficient, photo luminescent emergency exit signs.	2	N	Minimal improvement	2	\$500	\$60	8
4.04	Pumps	N/A	-	-	-	-	-	-	-
4.05	Monitoring and Targeting System	N/A	-	-	-	-	-	-	-
<b>5.0 Renewable Energy</b>									
5.01	Renewable Energy - Solar PV	Consider ground-mount or roof-mounted solar PV systems as a potential source of renewable energy to the building.	-	-	-	-	-	-	-
5.02	Renewal Energy Heating & Cooling - Ground Source or Air Source Heat Pump Technology	Consider implementing ground source and/or air source heat pump heating/cooling systems with next heating/cooling system replacement.	-	-	-	-	-	-	-
5.03	Renewable Energy - Solar Thermal Air	Consider solar air systems as a potential use of renewable energy to the building.	-	-	-	-	-	-	-
5.04	Renewable Energy - Solar Thermal Water	Consider solar water systems as a potential use of renewable energy to the building.	-	-	-	-	-	-	-
<b>6.0 Water Conservation</b>									
6.01	Low-Flow Toilets	At the end of an existing toilet's service life, replace with low-flow type.	4	N	Minimal improvement	4	\$500	\$50	10
6.02	Low-Flow Faucets	Install metered low-flow faucets for the hot & cold water services. Faucets are to have an adjustable timing sequence.	4	N	Minimal improvement	4	\$300	\$25	12
6.03	Automatic Equipment	N/A	-	-	-	-	-	-	-
<b>7.0 Energy Efficient Appliances / Equipment</b>									
7.01	Energy Star Rated Appliances	Replace the existing non-rated appliances with new Energy Star rated appliances at the end of service life.	4	N	Minimal improvement	3	TBD	TBD	TBD
7.02	Energy Star Rated Office Equipment	N/A	-	-	-	-	-	-	-
<b>8.0 Training &amp; Awareness</b>									
8.01	Staff Training	Staff/Employees have been made aware of the goals, objectives, and benefits of the Municipality's energy conservation and demand management planning and associated measures.	-	-	-	1	\$1,000	\$200	5



Table 2-9  
Energy Conservation & Demand Management Measure Summary  
Municipal Energy Conservation & Demand Management Plan (2019)  
Township of Greater Madawaska  
102.19.024

Site: Griffith Rink

Address: 15 Ginza Street  
Griffith, Ontario

Area of Building (Sq.ft.): 1496

Primary Use: Community Centre

Primary Heating System: Forced Air Propane  
Furnace

Air Conditioning: None

Percent (%) Change (2011-2016) GHG Emissions (kg): N/A

Percent (%) Change (2011-2016) Energy Intensity (eWh/HDD/sqft): N/A

Percent (%) Change (2011-2016) Energy Intensity (ekWh/ML): -

Item	Measure Summary		Past Measures (2011 - 2017)			Current & Proposed Measures (2018 - 2023)			
	Type	Description	Priority	Completed Status Y/N (Year)	Interpreted Benefit	Priority	Estimated Capital	Savings (Annual)	Simple ROI (Years)
<b>1.0 Exterior Grounds</b>									
1.01	Exterior Lighting	Update existing LED outdoor lighting to have programmable controls.	-	-	-	5	\$225	\$45	5
<b>2.0 Building Envelope</b>									
2.01	Windows	N/A	-	-	-	-	-	-	-
2.02	Doors	N/A	-	-	-	-	-	-	-
2.03	Overhead Doors (As Applicable)	N/A	-	-	-	-	-	-	-
2.04	Insulation	N/A	-	-	-	-	-	-	-
2.05	External Service Penetrations	N/A	-	-	-	-	-	-	-
2.06	Building Envelope Integrity	N/A	-	-	-	-	-	-	-
2.07	Exterior Cladding	N/A	-	-	-	-	-	-	-
<b>3.0 Heating, Ventilation, Air Conditioning (HVAC) &amp; Domestic Hot Water</b>									
3.01	Heating & Cooling System	The existing HVAC system should be replaced to a new energy-efficient system.	-	Y (2016)	Substantial improvement	-	-	-	-
3.02	Ventilation System	Install a heat recovery ventilation system (HRV) on the existing HVAC system.	-	-	-	3	\$1,000	\$50	20
3.03	Duct Network	Insulate and/or seal existing HVAC ductwork to mitigate heating/cooling losses.	-	-	-	4	\$750	\$150	5
3.04	HVAC Controls	Install programmable thermostats to control the indoor air temperature and setback temperatures when the building is unoccupied.	-	-	-	4	\$250	\$500	1
3.05	Domestic Hot Water System	Install a programmable timer and insulate the pipework on the DHW system.	-	Y (2020)	Minimal improvement	-	-	-	-
<b>4.0 Electrical</b>									
4.01	Energy Efficient Lighting System	Replace the existing lighting system with an energy-efficient LED lighting system.	-	Y (2016)	Substantial improvement	-	-	-	-
4.02	Lighting Controls	Replace existing with occupancy-activated lighting controls.	-	-	-	2	\$1,200	\$210	6
4.03	Emergency Exit Signs	Install energy efficient, photo luminescent emergency exit signs.	-	-	-	3	\$500	\$60	8
4.04	Pumps	N/A	-	-	-	-	-	-	-
4.05	Monitoring and Targeting System	N/A	-	-	-	-	-	-	-
<b>5.0 Renewable Energy</b>									
5.01	Renewable Energy - Solar PV	Consider ground-mount or roof-mounted solar PV systems as a potential source of renewable energy to the building.	-	-	-	-	-	-	-
5.02	Renewal Energy Heating & Cooling - Ground Source or Air Source Heat Pump Technology	Consider implementing ground source and/or air source heat pump heating/cooling systems with next heating/cooling system replacement.	-	-	-	-	-	-	-
5.03	Renewable Energy - Solar Thermal Air	Consider solar air systems as a potential use of renewable energy to the building.	-	-	-	-	-	-	-
5.04	Renewable Energy - Solar Thermal Water	Consider solar water systems as a potential use of renewable energy to the building.	-	-	-	-	-	-	-
<b>6.0 Water Conservation</b>									
6.01	Low-Flow Toilets	At the end of an existing toilet's service life, replace with low-flow type.	-	-	-	4	\$1,000	\$100	10
6.02	Low-Flow Faucets	Install metered low-flow faucets for the hot & cold water services. Faucets are to have an adjustable timing sequence.	-	-	-	4	\$1,200	\$100	12
6.03	Automatic Equipment	N/A	-	-	-	-	-	-	-
<b>7.0 Energy Efficient Appliances / Equipment</b>									
7.01	Energy Star Rated Appliances	Replace the existing non-rated appliances with new Energy Star rated appliances at the end of service life.	-	-	-	5	TBD	TBD	TBD
7.02	Energy Star Rated Office Equipment	N/A	-	-	-	-	-	-	-
<b>8.0 Training &amp; Awareness</b>									
8.01	Staff Training	Staff/Employees have been made aware of the goals, objectives, and benefits of the Municipality's energy conservation and demand management planning and associated measures	-	-	-	1	\$1,000	\$200	5





Table 2-10  
Energy Conservation & Demand Management Measure Summary  
Municipal Energy Conservation & Demand Management Plan (2019)  
Township of Greater Madawaska  
102.19.024

Site: Matawatchan Salt Shed

Address: 3568 Matawatchan Salt Shed  
Griffith, Ontario

Area of Building (Sq.ft.): 990

Primary Use: Municipal Storage

Primary Heating System: Propane Garage Unit

Air Conditioning: None

Percent (%) Change (2011-2016) GHG Emissions (kg): 37%

Percent (%) Change (2011-2016) Energy Intensity (eWh/HDD/sqft): -21%

Percent (%) Change (2011-2016) Energy Intensity (ekWh/ML): -

Item	Measure Summary		Past Measures (2011 - 2017)			Current & Proposed Measures (2018 - 2023)			
	Type	Description	Priority	Completed Status Y/N (Year)	Interpreted Benefit	Priority	Estimated Capital	Savings (Annual)	Simple ROI (Years)
<b>1.0 Exterior Grounds</b>									
1.01	Exterior Lighting	Update existing LED outdoor lighting to have programmable controls.	2	N	Minimal improvement	4	\$150	\$30	5
<b>2.0 Building Envelope</b>									
2.01	Windows	N/A	-	-	-	-	-	-	-
2.02	Doors	Replace the existing person doors to meet the new energy efficiency requirements.	2	Y (2018)	Minimal improvement	-	-	-	-
2.03	Overhead Doors (As Applicable)	Repair overhead doors and associated seals.	3	N	Minimal improvement	3	\$500	\$50	10
2.04	Insulation	N/A	-	-	-	-	-	-	-
2.05	External Service Penetrations	N/A	-	-	-	-	-	-	-
2.06	Building Envelope Integrity	N/A	-	-	-	-	-	-	-
2.07	Exterior Cladding	N/A	-	-	-	-	-	-	-
<b>3.0 Heating, Ventilation, Air Conditioning (HVAC) &amp; Domestic Hot Water</b>									
3.01	Heating & Cooling System	Heating system has reached/exceeded its expected service-life and should be replaced with a new, high-efficiency system.	-	Y (2016)	Substantial improvement	-	-	-	-
3.02	Ventilation System	Install demand control ventilation system to regulate ventilation.	-	-	Minimal improvement	3	\$5,000	\$200	25
3.03	Duct Network	N/A	-	-	-	-	-	-	-
3.04	HVAC Controls	Install programmable thermostats to control the indoor air temperature and setback temperatures when the building is unoccupied.	2	N	Minimal improvement	2	\$250	\$500	1
3.05	Domestic Hot Water System	N/A	-	-	-	-	-	-	-
<b>4.0 Electrical</b>									
4.01	Energy Efficient Lighting System	Replace the existing lighting system with an energy-efficient LED lighting system.	2	Y (2016)	Substantial improvement	-	-	-	-
4.02	Lighting Controls	Replace existing with occupancy-activated lighting controls.	-	-	-	4	\$200	\$35	6
4.03	Emergency Exit Signs	Install energy efficient, photo luminescent emergency exit signs.	-	-	-	5	\$250	\$30	8
4.04	Pumps	N/A	-	-	-	-	-	-	-
4.05	Monitoring and Targeting System	N/A	-	-	-	-	-	-	-
<b>5.0 Renewable Energy</b>									
5.01	Renewable Energy - Solar PV	Consider ground-mount or roof-mounted solar PV systems as a potential source of renewable energy to the building.	-	-	-	-	-	-	-
5.02	Renewal Energy Heating & Cooling - Ground Source or Air Source Heat Pump Technology	Consider implementing ground source and/or air source heat pump heating/cooling systems with next heating/cooling system replacement.	-	-	-	-	-	-	-
5.03	Renewable Energy - Solar Thermal Air	Consider solar air systems as a potential use of renewable energy to the building.	-	-	-	-	-	-	-
5.04	Renewable Energy - Solar Thermal Water	Consider solar water systems as a potential use of renewable energy to the building.	-	-	-	-	-	-	-
<b>6.0 Water Conservation</b>									
6.01	Low-Flow Toilets	N/A	-	-	-	-	-	-	-
6.02	Low-Flow Faucets	N/A	-	-	-	-	-	-	-
6.03	Automatic Equipment	N/A	-	-	-	-	-	-	-
<b>7.0 Energy Efficient Appliances / Equipment</b>									
7.01	Energy Star Rated Appliances	N/A	-	-	-	-	-	-	-
7.02	Energy Star Rated Office Equipment	N/A	-	-	-	-	-	-	-
<b>8.0 Training &amp; Awareness</b>									
8.01	Staff Training	Staff/Employees have been made aware of the goals, objectives, and benefits of the Municipality's energy conservation and demand management planning and associated measures	-	-	-	1	\$1,000	\$200	5





Table 2-11  
Energy Conservation & Demand Management Measure Summary  
Municipal Energy Conservation & Demand Management Plan (2019)  
Township of Greater Madawaska  
102.19.024

Site: TGM Municipal Office

Address: 19 Parnell Street  
Calabogie, Ontario

Area of Building (Sq.ft.): 6300

Primary Use: Municipal Office

Primary Heating System: Forced Air Propane  
Furnace

Air Conditioning: None

Percent (%) Change (2011-2016) GHG Emissions (kg): 72%

Percent (%) Change (2011-2016) Energy Intensity (eWh/HDD/sqft): 41%

Percent (%) Change (2011-2016) Energy Intensity (eKWh/ML): -

Item	Measure Summary		Past Measures (2011 - 2017)			Current & Proposed Measures (2018 - 2023)			
	Type	Description	Priority	Completed Status (Y/N); Year	Interpreted Benefit	Priority	Estimated Capital	Savings (Annual)	Simple ROI (Years)
<b>1.0 Exterior Grounds</b>									
1.01	Exterior Lighting	Replace existing outdoor lighting with energy efficient LED lighting with control sensors.	5	Y (2013)	Minimal improvement	-	-	-	-
<b>2.0 Building Envelope</b>									
2.01	Windows	Replace existing windows in the building to meet energy efficient fenestration requirements.	5	Y (2013)	Minimal improvement	-	-	-	-
2.02	Doors	Replace the existing person doors to meet the new energy efficiency requirements.	5	Y (2013)	Minimal improvement	-	-	-	-
2.03	Overhead Doors (As Applicable)	N/A	-	-	-	-	-	-	-
2.04	Insulation	N/A	-	-	-	-	-	-	-
2.05	External Service Penetrations	N/A	-	-	-	-	-	-	-
2.06	Building Envelope Integrity	N/A	-	-	-	-	-	-	-
2.07	Exterior Cladding	N/A	-	-	-	-	-	-	-
<b>3.0 Heating, Ventilation, Air Conditioning (HVAC) &amp; Domestic Hot Water</b>									
3.01	Heating & Cooling System	The existing HVAC system should be replaced to a new energy-efficient system.	5	Y (2013)	Substantial improvement	-	-	-	-
3.02	Ventilation System	Install a heat recovery ventilation system (HRV) on the existing HVAC system.	5	Y (2013)	Minimal improvement	-	-	-	-
3.03	Duct Network	Insulate and/or seal existing HVAC ductwork to mitigate heating/cooling losses.	5	Y (2013)	Minimal improvement	-	-	-	-
3.04	HVAC Controls	Install programmable thermostats to control the indoor air temperature and setback temperatures when the building is unoccupied.	5	Y (2013)	Minimal improvement	-	-	-	-
3.05	Domestic Hot Water System	Replace existing tank with an energy-efficient DHWT with programmable timer.	5	Y (2013)	Minimal improvement	-	-	-	-
<b>4.0 Electrical</b>									
4.01	Energy Efficient Lighting System	Replace the existing lighting system with an energy-efficient LED lighting system.	5	Y (2013)	Moderate improvement	-	-	-	-
4.02	Lighting Controls	Replace existing with occupancy-activated lighting controls.	-	Y (Washrooms)	Minimal improvement	4	\$4,000	\$700	6
4.03	Emergency Exit Signs	Install energy efficient, photo luminescent emergency exit signs.	-	-	-	-	-	-	-
4.04	Pumps	N/A	-	-	-	-	-	-	-
4.05	Monitoring and Targeting System	N/A	-	-	-	-	-	-	-
<b>5.0 Renewable Energy</b>									
5.01	Renewable Energy - Solar PV	Consider ground-mount or roof-mounted solar PV systems as a potential source of renewable energy to the building.	-	-	-	-	-	-	-
5.02	Renewal Energy Heating & Cooling - Ground Source or Air Source Heat Pump Technology	Consider implementing ground source and/or air source heat pump heating/cooling systems with next heating/cooling system replacement.	5	Y (2013)	Moderate improvement	-	-	-	-
5.03	Renewable Energy - Solar Thermal Air	Consider solar air systems as a potential use of renewable energy to the building.	-	-	-	-	-	-	-
5.04	Renewable Energy - Solar Thermal Water	Consider solar water systems as a potential use of renewable energy to the building.	-	-	-	-	-	-	-
<b>6.0 Water Conservation</b>									
6.01	Low-Flow Toilets	At the end of an existing toilet's service life, replace with low-flow type.	5	Y (2013)	Minimal improvement	-	-	-	-
6.02	Low-Flow Faucets	Install metered low-flow faucets for the hot & cold water services. Faucets are to have an adjustable timing sequence.	-	-	-	5	\$1,200	\$100	12
6.03	Automatic Equipment	Replace existing manual plumbing fixtures and washroom equipment with automatic fixtures/equipment.	-	-	-	5	\$2,000	\$100	20
<b>7.0 Energy Efficient Appliances / Equipment</b>									
7.01	Energy Star Rated Appliances	N/A	-	-	-	TBD	TBD	TBD	TBD
7.02	Energy Star Rated Office Equipment	N/A	-	Y (2020)	Minimal improvement	TBD	TBD	TBD	TBD
<b>8.0 Training &amp; Awareness</b>									
8.01	Staff Training	Staff/Employees have been made aware of the goals, objectives, and benefits of the Municipality's energy conservation and demand management planning and associated measures.	-	-	-	1	\$1,000	\$200	5

## Appendix A



## ONTARIO REGULATION 507/18

made under the

### ELECTRICITY ACT, 1998

Made: December 12, 2018

Filed: December 14, 2018

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## **BROADER PUBLIC SECTOR: ENERGY REPORTING AND CONSERVATION AND DEMAND MANAGEMENT PLANS**

### **Definitions**

1. In this Regulation,

“municipal service board” means,

- (a) a municipal service board or joint municipal service board established or continued under the *Municipal Act, 2001*,
- (b) a city board or joint city board established or continued under the *City of Toronto Act, 2006*, or
- (c) a joint board established in accordance with a transfer order made under the *Municipal Water and Sewage Transfer Act, 1997*; (“commission de services municipaux”)

“post-secondary educational institution” means a university in Ontario, a college of applied arts and technology in Ontario or another post-secondary educational institution in Ontario, if the university, college or institution receives an annual operating grant; (“établissement d’enseignement postsecondaire”)

“public hospital” means,

- (a) a hospital within the meaning of the *Public Hospitals Act*, or
- (b) the University of Ottawa Heart Institute/Institut de cardiologie de l’Université d’Ottawa; (“hôpital public”)

“school board” means a board within the meaning of the *Education Act*. (“conseil scolaire”)

### **Application**

2. Sections 4, 5 and 6 apply only to public agencies prescribed by section 3.

### **Public agencies**

3. The following are prescribed as public agencies for the purposes of sections 25.35.2 and 25.35.3 of the Act:

1. Every municipality.
2. Every municipal service board.
3. Every post-secondary educational institution.
4. Every public hospital.
5. Every school board.

### **Energy conservation and demand management plans**

4. (1) A public agency shall prepare, publish, make available to the public and implement energy conservation and demand management plans or joint plans in accordance with section 25.35.2 of the Act and with this Regulation.

(2) An energy conservation and demand management plan is composed of two parts as follows:

1. A summary of the public agency’s annual energy consumption and greenhouse gas emissions for its operations.
2. A description of previous, current and proposed measures for conserving and otherwise reducing the amount of energy consumed by the public agency’s operations and for managing the public agency’s demand for energy, including a forecast of the expected results of current and proposed measures.

### **Summary of annual energy consumption and greenhouse gas emissions**

5. (1) Subject to subsections (2) and (4), a summary of the public agency’s annual energy consumption and greenhouse gas emissions must include a list of the energy consumption and greenhouse gas emissions for the year with respect to each of the public agency’s operations that are set out in Table 1 of this Regulation for the type of public agency to which the public agency belongs and that are conducted in buildings or facilities the public agency owns or leases that,

- (a) are heated or cooled and in respect of which the public agency is issued the invoices and is responsible for making the payments for the building or facility's energy consumption; or
- (b) are related to the treatment of water or sewage, whether or not the building or facility is heated or cooled, and in respect of which the public agency is issued the invoices and is responsible for making the payments for the building or facility's energy consumption.

(2) If only part of a building or facility where an operation is conducted is heated or cooled, the public agency's summary referred to in subsection (1) must only include energy consumption and greenhouse gas emissions for the part of the building or facility where the operation is conducted that is heated or cooled.

(3) The public agency's summary referred to in subsection (1) must be prepared using the form entitled "Energy Consumption and Greenhouse Gas Emissions Reporting" that is available from the Ministry and must include the following information and calculations for each of the public agency's operations:

1. The address at which the operation is conducted.
2. The type of operation.
3. The total floor area of the indoor space in which the operation is conducted and, in cases where subsection (4) applies, the total indoor floor area of the building or facility in which the operation is conducted.
4. A description of the days and hours in the year during which the operation is conducted and, if the operation is conducted on a seasonal basis, the period or periods during the year when it is conducted.
5. The types of energy purchased for the year and consumed in connection with the operation.
6. The total amount of each type of energy purchased for the year and consumed in connection with the operation.
7. The total amount of greenhouse gas emissions for the year with respect to each type of energy purchased and consumed in connection with the operation.
8. The greenhouse gas emissions and energy consumption for the year from conducting the operation, calculating,
  - i. the annual mega watt hours per mega litre of water treated and distributed, if the operation is a water works,
  - ii. the annual mega watt hours per mega litre of sewage treated and distributed, if the operation is a sewage works, or
  - iii. per unit of floor space of the building or facility in which the operation is conducted, in any other case.

(4) If a public agency conducts, in the same building or facility, more than one operation set out in Table 1 for the type of public agency to which the public agency belongs, it shall allocate the total amount of energy purchased and consumed for the year to the operation that occupies the most indoor floor area in the building or facility, and if more than one operation occupies the same amount of indoor floor area, may allocate the total amount of energy to any one of them.

(5) In preparing its annual Energy Consumption and Greenhouse Gas Emissions Reporting form, a public agency may exclude its energy consumption and greenhouse gas emissions relating to its temporary use of an emergency or back-up generator in order to continue operations.

(6) On or before July 1 in each year, every public agency shall submit to the Minister, publish on its website and intranet site, if it has either or both, and make available to the public in printed form at its head office the public agency's Energy Consumption and Greenhouse Gas Emissions Reporting form for operations conducted in the year following the year to which the last annual form related.

(7) The following information, if applicable, must also be submitted, published and made available to the public with every Energy Consumption and Greenhouse Gas Emissions Reporting form:

1. If the operation is a school operated by a school board,
  - i. the number of classrooms in temporary accommodations at the school during the year, and
  - ii. whether there is an indoor swimming pool in the school.
2. If the public agency is a public hospital, whether a facility operated by the public hospital is a chronic or acute care facility, or both.

#### **Energy conservation and demand management measures**

**6.** (1) Every public agency shall publish on its website and intranet site, if it has either or both, and make available to the public in printed form at its head office,

- (a) the information referred to in subsection 25.35.2 (3) of the Act with respect to each of the public agency's operations set out in Table 1 of this Regulation for the type of public agency to which the public agency belongs;



- (b) the information referred to in paragraph 2 of subsection 4 (2) of this Regulation with respect to each of the public agency’s operations set out in Table 1 of this Regulation for the type of public agency to which the public agency belongs; and
- (c) the following information:
  - (i) information on the public agency’s annual energy consumption during the last year for which complete information is available for a full year,
  - (ii) the public agency’s goals and objectives for conserving and otherwise reducing energy consumption and managing its demand for energy,
  - (iii) the public agency’s proposed measures under its energy conservation and demand management plan,
  - (iv) cost and saving estimates for its proposed measures,
  - (v) a description of any renewable energy generation facility operated by the public agency and the amount of energy produced on an annual basis by the facility,
  - (vi) a description of,
    - (A) the ground source energy harnessed, if any, by ground source heat pump technology operated by the public agency,
    - (B) the solar energy harnessed, if any, by thermal air technology or thermal water technology operated by the public agency, and
    - (C) the proposed plan, if any, to operate heat pump technology, thermal air technology or thermal water technology in the future,
  - (vii) the estimated length of time the public agency’s energy conservation and demand management measures will be in place, and
  - (viii) confirmation that the energy conservation and demand management plan has been approved by the public agency’s senior management.

(2) In addition to publishing and making available the required information with respect to the operations mentioned in clauses (1) (a) and (b), a public agency may also publish information with respect to any other operation that it conducts.

(3) On or before July 1, 2019 and on or before every fifth anniversary thereafter, every public agency shall publish on its website and intranet site, if it has either or both, and make available to the public in printed form at its head office all of the information that is required to be published and made available under subsection (1), the Energy Consumption and Greenhouse Gas Emissions Reporting form that is required to be submitted and published on or before July 1 of that year and the following information:

1. A description of current and proposed measures for conserving and otherwise reducing energy consumption and managing its demand for energy.
2. A revised forecast of the expected results of the current and proposed measures.
3. A report of the actual results achieved.
4. A description of any proposed changes to be made to assist the public agency in reaching any targets it has established or forecasts it has made.

**Commencement**

**7. This Regulation comes into force on the later of the day section 2 of the *Green Energy Repeal Act, 2018* comes into force and the day this Regulation is filed.**

TABLE 1

Column 1 Item	Column 2 Type of public agency	Column 3 Operation
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1.	Municipality	<ol style="list-style-type: none"> <li>1. Administrative offices and related facilities, including municipal council chambers.</li> <li>2. Public libraries.</li> <li>3. Cultural facilities, indoor recreational facilities and community centres, including art galleries, performing arts facilities, auditoriums, indoor sports arenas, indoor ice rinks, indoor swimming pools, gyms and indoor courts for playing tennis, basketball or other sports.</li> <li>4. Ambulance stations and associated offices and facilities.</li> <li>5. Fire stations and associated offices and facilities.</li> <li>6. Police stations and associated offices and facilities.</li> <li>7. Storage facilities where equipment or vehicles are maintained, repaired or stored.</li> <li>8. Buildings or facilities related to the treatment of water or sewage.</li> <li>9. Parking garages.</li> </ol>
2.	Municipal service board	<ol style="list-style-type: none"> <li>1. Buildings or facilities related to the treatment of water or sewage.</li> </ol>
3.	Post-secondary educational institution	<ol style="list-style-type: none"> <li>1. Administrative offices and related facilities.</li> <li>2. Classrooms and related facilities.</li> <li>3. Laboratories.</li> <li>4. Student residences that have more than three storeys or a building area of more than 600 square metres.</li> <li>5. Student recreational facilities and athletic facilities.</li> <li>6. Libraries.</li> <li>7. Parking garages.</li> </ol>
4.	School board	<ol style="list-style-type: none"> <li>1. Schools.</li> <li>2. Administrative offices and related facilities.</li> <li>3. Parking garages.</li> </ol>
5.	Public hospital	<ol style="list-style-type: none"> <li>1. Facilities used for hospital purposes.</li> <li>2. Administrative offices and related facilities.</li> </ol>

Français

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## Appendix B



## Statement of Service Conditions and Limitations

### Provision of Services and Payment

Upon documented acceptance of Greenview's proposed services, costs and associated terms by the client, Greenview may commence work on the proposed services directly. Upon retention of Greenview's services related to this project, the client agrees to remit payment for the services rendered for the specified period within (30) days of receipt as invoiced by Greenview on a typical monthly basis, unless otherwise arranged between the client and Greenview. In the event of non-payment by the client, Greenview reserves the right, without external influence or expense, to discontinue services and retain any documentation, data, reports, or other project information until such time as payment is received by Greenview.

### Warranty, Limitations, and Reliance

Greenview relies on background and historical information from the client to determine the appropriate scope of services to meet the client's objectives, in accordance with applicable legislation, guidelines, industry practices, and accepted methodologies.

Greenview provides its services under the specific terms and conditions of a specific proposal (and where necessary formal contract), in accordance with the above requirements and the *Limitations Act 2002*, as amended, only.

The hypotheses, results, conclusions, and recommendations presented in documentation authored by Greenview are founded on the information provided by the client to Greenview in preparation for the work. Facts, conditions, and circumstances discovered by Greenview during the performance of the work requested by the client are assumed by Greenview to be part of preparatory information provided by the client as part of the proposal stage of the project. Greenview assumes that, until notified or discovered otherwise, that the information provided by, or obtained by Greenview from, the client is factual, accurate, and represents a true depiction of the circumstances that exist related to the time of the work.

Greenview relies on its clients to inform Greenview if there are changes to any related information to the work. Greenview does not review, analyze or attempt to verify the accuracy or completeness of the information or materials provided, or circumstances encountered, other than in accordance with applicable accepted industry practice. Greenview will not be responsible for matters arising from incomplete, incorrect or misleading information or from facts or circumstances that are not fully disclosed to or that are concealed from Greenview during the period that services, work, or documentation preparation was performed by Greenview.

Facts, conditions, information and circumstances may vary with time and locations and Greenview's work is based on a review of such matters as they existed at the particular time and location indicated in its documentation. No assurance is made by Greenview that the facts, conditions, information, circumstances or any underlying assumptions made by Greenview in connection with the work performed will not change after the work is completed and documentation is submitted. If any such changes occur or additional information is obtained, Greenview should be advised and requested to consider if the changes or additional information affect its findings or results.

When preparing documentation, Greenview considers applicable legislation, regulations, governmental guidelines and policies to the extent they are within its knowledge, but Greenview is not

qualified to advise with respect to legal matters. The presentation of information regarding applicable legislation, regulations, not intended to and should not be interpreted as constituting a legal opinion concerning the work completed or conditions outlined in a report. All legal matters should be reviewed and considered by an appropriately qualified legal practitioner.

Greenview's services, work and reports are provided solely for the exclusive use of the client which has retained the services of Greenview and to which its reports are addressed. Greenview is not responsible for the use of its services, work or reports by any other party, or for the reliance on, or for any decision which is made by any party using the services or work performed by or a report prepared by Greenview without Greenview's express written consent. Any party that uses, relies on, or makes a decision based on services or work performed by Greenview or a report prepared by Greenview without Greenview's express written consent, does so at its own risk. Except as set out herein, Greenview specifically disclaims any liability or responsibility to any third party for any loss, damage, expense, fine, penalty or other such thing which may arise or result from the use of, reliance on or decision based on any information, recommendation or other matter arising from the services, work or reports provided by Greenview.

### Site Reviews and Assessments

A site assessment is created using data and information collected during the investigation of a site and based on conditions encountered at the time and particular locations at which fieldwork is conducted. The information, sample results and data collected represent the conditions only at the specific times at which and at those specific locations from which the information, samples and data were obtained and the information, sample results and data may vary at other locations and times. To the extent that Greenview's work or report considers any locations or times other than those from which information, sample results and data were specifically received, the work or report is based on a reasonable extrapolation from such information, sample results and data but the actual conditions encountered may vary from those based on extrapolations.

Only conditions, and substances, at the site and locations chosen for study by the client are evaluated; no adjacent or other properties are evaluated unless specifically requested by the client. Any physical or other aspects of the site that were not chosen for study by the client, or any other matter not specifically addressed in a report prepared by Greenview, are beyond the scope of the work performed by Greenview and such matters have not been investigated or addressed.

### Confidentiality

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For proposals specifically, the information contained therein is confidential, proprietary information, and shall not be reproduced or disclosed to any other party than to that of the addressee of the original proposal submission, without prior written permission of Greenview.