

MUNICIPALITY OF HURON EAST



ENERGY CONSERVATION AND DEMAND MANAGEMENT PLAN

2019 – 2023

Municipality of Huron East
Energy Conservation and Demand Management Plan (2019-2023)
Effective July 1st, 2019

Background – Regulatory Requirements

In 2009 the Province of Ontario enacted the *Green Energy Act* to expand renewable energy generation, encourage energy conservation and promote the creation of clean energy jobs.

Ontario Regulation 397/11 required all Ontario public agencies, including municipalities, to report annually on energy use and greenhouse gas emissions (by July, 2013) and by July 2014 prepare an Energy Conservation and Demand Management Plan. The energy use and greenhouse gas emission data for the 2014 reporting year was based on 2012 consumption data.

In 2018 the Province enacted the *Green Energy Repeal Act* (Bill 34) which repealed the *Green Energy Act* and all associated Regulations including O/Reg. 397/11. However, the provisions of amendments to the Electricity Act, 1988, resulted in a number of *Green Energy Act* requirements being retained including Conservation & Demand Management Plans and broader public sector energy reporting. O.Reg. 397/11 has been replaced by O.Reg. 507/18: Broader Public Sector: Energy Conservation & Demand Management Plans (ECDM).

Section 4(2) of O.Reg. 507/18 provides that an energy conservation and demand management plan is composed of two parts.

- (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.

Section 6(1) of O.Reg. 507/18 requires public agencies to publish on their website and make available to the public in printed form the requirements of Section 4(2) and in addition, Section 6(1)(c) requires the following information to be made available to the public.

- (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.

Huron East Goals and Objectives

The goals and objectives outlined in the 2014 ECDM were consistent with the requirements of Ontario Regulation 397/11 with a focus on conserving, reducing energy consumption and managing Huron East's demand for energy. To achieve these goals the Municipality of Huron East continued to record/monitor energy consumption, investigated measures to reduce energy consumption and in conjunction with financial incentives from the Province and local utilities, the Municipality committed financial resources to a number of retrofit measures to reduce energy consumption. While there was an underlying acknowledgement that a reduction in energy consumption was beneficial for the environment, the primary focus of the Municipality was fiscal in nature.

Evolving Context

In general, society is becoming more concerned with climate change. An October 23, 2018 report on the website of the Auditor General of Ontario notes the following with respect to greenhouse gas emissions in Ontario.

- when tracking began in 1990, Ontario emitted about 179 megatonnes (Mt) of carbon dioxide and other greenhouse gases. Emissions rose through the 1990's and peaked at 208 Mt in 2000.
- since 2000, the elimination of coal-fired power, the recession and more fuel-efficient vehicles have contributed to a reduction in GHG and in 2016, Ontario's emissions were 161 Mt.
- in 2016, 75% of Ontario's GHG emissions were produced by burning fossil fuels with transportation (35%) and buildings (21%) being the most significant contributors.
- Electricity generation was historically a major source of Ontario's GHG emissions. In 2016, only 3% comes from this sector. Since we stopped using coal to produce electricity, the ability to reduce GHG emissions from electricity production has been nearly exhausted (96% of our electricity generation comes from low-carbon sources).

2014 Energy Conservation & Demand Municipal Plan

The 2014 ECDM provided baseline consumption data for all Huron East facilities. It was noted that in 2012 the Municipality of Huron East consumed 4.1 million kWhs of electricity. At the time of the 2014 ECDM plan, an RFP had just been issued to convert 939 streetlights across 10 systems to LED fixtures and it was estimated that overall electricity consumption would be reduced by 10%. In addition recognizing the importance of reducing electricity demand during peak periods, other retrofit measures were proposed on other municipal buildings and sewage treatment facilities and the 2014 ECDM plan proposed a further 2% reduction in electricity consumption compared to the baseline established in 2012.

Energy Consumption Analysis

The table below shows the energy consumption of Huron East facilities from 2012 to 2018.

	2012	2013	2014	2015	2016	2017	2018
Electricity (kw)	4,089,655	4,302,912	4,199,228	4,001,366	3,519,752	3,403,787	3,380,917
Natural Gas (M ³)	184,076	203,524	252,844	235,257	194,780	204,202	206,832
Propane (l)	18,767	24,191	33,890	27,576	25,032	27,543	33,559
Oil (l)	5,563	5,124	6,645	9,078	5,522	--	--

Table 1 – Historical Energy Consumption (2012 – 2018)

Electricity consumption from the baseline consumption of 4,089,655 kwh rose to 4,302,912 kwhs in 2013 but then declined steadily to the 2018 consumption of 3,380,917 kwhs. The 708,000 kwh decline in consumption represents a 17% decrease from the 2012 baseline consumption. As expected the majority of the decline in consumption resulted from the conversion of streetlights to LED.

The 2014 ECDM report indicated that 70% of the electricity consumption was in 3 categories – streetlights, sewage plants and recreation facilities. The 2014 ECDM had a goal of a 2% reduction in peak demand. The table below demonstrates the electricity consumption of these 3 main categories from 2012 to 2018.

Electricity Consumption

2012 to 2018

	2012	2013	2014	2015	2016	2017	2018
Streetlights	670,273	671,363	659,551	659,314	343,284	268,047	255,020
Sewage - Brussels	281,117	290,885	304,588	316,038	297,152	304,214	320,153
Sewage - Seaforth	598,012	785,965	728,508	583,042	563,034	575,247	554,760
Sewage - Vanastra	<u>167,404</u>	<u>180,214</u>	<u>197,413</u>	<u>172,823</u>	<u>158,197</u>	<u>189,376</u>	<u>162,969</u>
Total Sewage	1,046,533	1,256,974	1,230,509	1,071,903	1,018,383	1,068,837	1,037,882
Recreation - BMG	420,521	369,197	373,527	396,809	341,365	334,257	325,800
Recreation - SDCC	592,443	607,693	548,865	604,432	600,704	548,748	546,000
Recreation - Vanastra	<u>147,481</u>	<u>154,837</u>	<u>144,280</u>	<u>117,882</u>	<u>100,895</u>	<u>122,143</u>	<u>122,316</u>
Total Recreation	1,160,445	1,131,727	1,066,672	1,119,123	1,042,964	1,005,148	994,116

Table 2 – Historical Energy Consumption By Service (2012 – 2018)

Using the table above and making reference to projections contained in the 2014 ECDM plan, several conclusions can be made.

- i) the 2014 ECDM projected annual electricity savings from the streetlight conversion of 460,000 kwh annually and consumption did drop by 415,000 kwh from 2012 to 2018.
- ii) the 2014 ECDM notes that sewage plants accounted for 21% of all electricity consumed by Huron East. The plan noted that the Municipality was considering upgrading its existing centrifugal blowers at two of the sewage plants with turbo blowers, but the Municipality only completed the energy audits. No upgrades have been completed and the energy consumption in 2018 of 1.037 million kwhs is virtually unchanged from the 2012 consumption of 1.046 million kwhs.
- iii) the 415,000 kwh savings from the streetlight accounts represents close to 60% of the total electricity reduction. As noted previously, the 2014 ECDM had a goal of a 10% overall reduction and a further 2% reduction during peak operating periods.
 - of the total 708,000 kwh reduction, only 415,000 kwh can be attributed to streetlighting. Close to 300,000 kwh can be attributed to other retrofit measures, many of which were completed with Save-On-Energy incentives. The additional 300,000 kwh saved represents savings during peak demand and represent 7% of 2012 consumption – the retrofits completed have achieved savings greater than the 2% envisioned in the 2014 plan.
- iv) Retrofit measures undertaken during the 2014-2019 ECDM are outlined in Appendix “A”. While retrofits on all facilities have produced savings, the measures undertaken at the three Huron East recreation facilities have contributed significantly to the reduction in electricity consumption as the facilities have a decreased combined consumption of 166,000 kwhs from 2012.

Greenhouse Gas Emissions

Greenhouse gas (GHG) emissions are expressed in terms of equivalent tonnes of Carbon Dioxide (tCO₂e). Table 1 (annual energy consumption) has been converted to equivalent tonnes of GHG emissions in Table 3 below.

	2012	2013	2014	2015	2016	2017	2018
Electricity	82	86	84	80	70	68	67
Natural Gas	360	399	495	460	381	400	405
Propane	6	7	10	8	7	8	10
Oil	15	14	18	24	15	--	--
	463	506	607	572	473	476	482

Table 3 – Historical Consumption Converted to Greenhouse Gas Emissions (tCO₂e) (2012 – 2018)

Conversions completed by carbon emissions calculator on carbonzero website (www.carbonzero.ca).

Proposed Measures For Energy Conservation

The Municipality is preparing for another series of lighting retrofits of municipal buildings. Energy savings and incentive programs will not be as significant as in previous retrofits and the Municipality will focus its resources on buildings with consistent occupancy and usage.



As noted previously, aeration systems will continue to be evaluated at sewage treatment plants for replacement with more energy efficient blower technology.

It is also anticipated that the induction lighting on the SDCC ice pad (installed in 2012) will be replaced with LED lighting during the term of the ECDM plan.

The Municipality adopted a Solar Photovoltaic Reserve Policy in August, 2016. The general intent of the policy is to use net revenues generated from the Municipality's renewable energy projects to fund all or parts of energy efficient upgrades to facilities. An annual report is provided to Council providing an update on the status of the reserve and a summary of projects funded from the reserve.

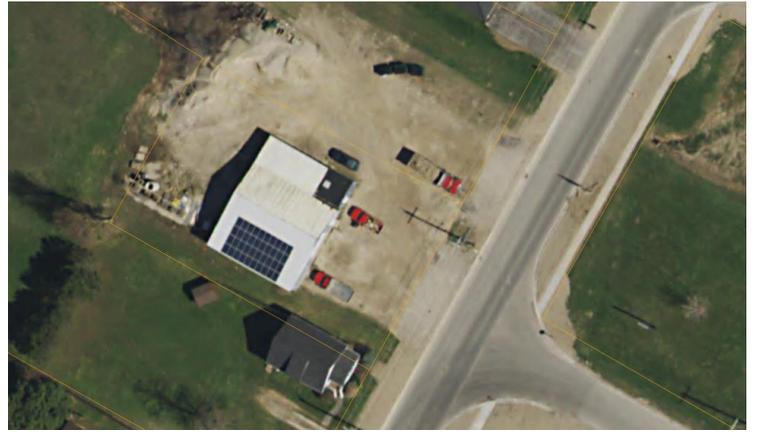
Renewable Energy Facilities

The Municipality has 8 MicroFit locations that have generated more than 550,000 kwhs from 2011 to 2018 as shown in the table below.

Brussels Sewage Treatment Plant (commissioned July 2011)	104,750	kwh
Seaforth Water Treatment Plant (commissioned July 2011)	143,783	kwh
Seaforth Water Treatment Plant (commissioned April 2014)	76,416	kwh
Brussels Cultural Centre (commissioned February 2014)	48,653	kwh
Brussels Public Works (commissioned March 2014)	53,536	kwh
Seaforth Fire Hall (commissioned February 2014)	51,646	kwh
Seaforth Public Works (commissioned November 2016)	23,543	kwh
Vanastra Recreation (commissioned April 2014)	<u>49,341</u>	kwh
	551,668	



10 kw Solar Trackers
at Seaforth Water Plant



10 kw Rooftop Solar
at Brussels Public Works Building

The renewable energy generated by Huron East institutions from 2011 to 2018 is equivalent to the annual electricity consumption at the Seaforth & District Community Centres.

As noted previously, net revenues from Huron East's renewable energy facilities have been dedicated to a reserve fund which is used to support energy efficiency projects in other facilities. To the end of 2018, two projects have received funding.

1. SDCC Floating Head Pressure system/Condenser VFD (2017) \$23,055
2. BMG Ice Pad Lighting upgrades (2017) \$24,000

Summary

Section 4(2) and Section 6(1) of O.Reg. 507/18 outlines the requirements of a municipal energy conservation and demand municipal plan and outlines additional information that must be presented to the public. The following is a brief summary of the requirements and the measures taken by the Municipality of Huron East to meet these requirements.

- 4(2)1 summary of annual energy consumption and greenhouse gas emissions – see Tables 1 and 3
- 4(2)2 description of previous, current and proposed conservation measures → conservation measures are documented in Appendix “A” and proposed measures are documented in page 7
- 6(1)(c)(i) information on annual energy consumption made available to the public – each year an energy report is presented to Council and the annual report is required by Section 5(3) of O.Reg. 507/18 is completed and posted on the municipal website
- 6(1)(c)(ii) goals and objectives for conserving/reducing energy consumption – the previous plan had set a goal of a 12% reduction and the Municipality has exceeded this goal as electricity consumption has decreased by 17%. Slight increases in the use of natural gas and propane were somewhat offset by the elimination of furnace oil at two locations. It is anticipated that proposed retrofits will generate additional electricity reductions of between 1% and 5% from 2019 to 2023 and the Municipality will take measures to ensure its consumption of other fossil fuels for heating does not increase.
- 6(1)(c)(iii) proposed measures for energy conservation → conservation measures are outlined in page 7
- 6(1)(c)(iv) cost and savings estimates for proposed measures → energy savings for upgrades at sewage plants are found in the energy audit reports for these facilities → cost estimates will be updated at Council’s direction.
- 6(1)(c)(v) description of renewable energy facilities and amount of energy produced – see Renewable Energy section on page 8
- 6(1)(c)(vi) description of ground source heat harnessed, thermal air or water energy operated – the Municipality does not operate any of these types of facilities.
- 6(1)(c)(vii) length of time the plan will be in place – the plan will be in place until June 30, 2023

6(1)(c)(viii) confirmation that the energy conservation and demand municipal plan has been approved by senior management – the plan was approved by Huron East Council on January 7th, 2020

Municipality of Huron East Energy Consumption & Demand Management Plan Appendix “A”

Retrofit Measures (2014 – 2018)

The Municipality of Huron East has utilized the Small Business Lighting Program and incentives through the Save-On-Energy program to upgrade lighting in most of its municipal buildings.



The Municipality has also engaged the services of Local Authority Services (LAS) to provide assistance with energy audits, facility lighting upgrades and streetlight conversions.



Summary of major retrofit measures undertaken are listed below.

2015 – 939 streetlights were converted to LEDs through the LAS streetlighting project

Project Cost - \$692,709
Incentives - \$95,709
Energy Savings – 415,000 kwhs



2017 – SDCC Arena/Community Centre – Floating Head Pressure System & Condenser VFD

Project Cost - \$23,055
Incentives - \$4,786
Energy Savings – 48,000 kwh (\$7,600 annually)



SDCC Arena/Community Centre

- BMG Arena/Community Centre – convert ice pad lights to LED

Project Cost - \$35,850

Incentives - \$2,579

Energy Savings – 29,000 kwh (\$4,800 annually)



BMG Arena/Community Centre

2019 – BMG Arena/Community Centre – replacement of two mechanical dehumidifiers with desiccant dehumidifiers

Project Cost - \$67,895

Incentives - \$2,592

Energy Savings – 25000 kwh (\$3,100 annually)