

**ENERGY CONSERVATION & DEMAND MANAGEMENT PLAN R1
RFP NO. E17-01-1901**

Prepared for:

THE TOWN OF HAWKESBURY
600 Higginson Street
Hawkesbury, ON K6A 1H1

Prepared by:

J.L. RICHARDS & ASSOCIATES LIMITED
362 Bertha Street
Hawkesbury, ON K6A 2A8

Tel: 613-632-0287
Fax: 613-632-7603



**Energy Conservation and
Demand Management Plan
2019-2024**



June 24, 2019

JLR No.: 28755-000



Energy Conservation and Demand Management Plan 2019-2024

Table of Contents

1.0	Executive Summary.....	1
2.0	Overview	3
2.1	Introduction	3
2.2	Plan Scope.....	3
2.3	Plan Development.....	3
2.4	Plan Structure	5
3.0	Ontario’s Energy Picture.....	5
3.1	Energy Supply and Pricing Forecasts for Ontario	5
3.2	Electricity Act and Regulation 507/18	6
4.0	Baseline Energy Use	7
4.1	Facilities Benchmark	7
4.2	Plant Benchmarks	8
4.3	Street Lighting Benchmark	9
5.0	Energy Consumption and Emissions	10
6.0	Conservation and Renewable Energy Measures	15
6.1	Energy Conservation Measures	15
6.2	Renewable Energy Measures	15
7.0	Current State of Energy Management	15
7.1	Energy Management Practice	15
7.2	Self-Assessment of Current Practice	16
8.0	Energy Management Policy.....	19
8.1	<i>Commitment</i>	19
8.2	<i>Vision</i>	20
8.3	<i>Objectives</i>	20
8.3.1	<i>Projects: Level 5 Practice</i>	20

Energy Conservation and Demand Management Plan 2019-2024

- 8.3.2 *Communication: Level 3 Practice*20
- 8.3.3 *Training: Level 2 Practice*20
- 8.4 *Targets*.....20
 - 8.4.1 *Facilities*20
 - 8.4.2 *Plants*21
 - 8.4.3 *Street Lighting*21
- 9.0 Identified Energy Initiatives.....21
 - 9.1 Energy Efficiency Initiatives.....21
 - 9.2 General Initiatives24
 - 9.2.1 Energy Audits of Major Accounts24
 - 9.2.2 LED Lighting in All Facilities.....24
 - 9.2.3 Revolving Green Fund.....24
 - 9.2.4 Energy Manager24
 - 9.3 Solar Photovoltaic System Potential.....25
 - 9.4 Available Funding Programs26
 - 9.4.1 Green Municipal Fund26
 - 9.4.2 Save On Energy27
 - 9.4.3 Enbridge’s Smart Savings.....29
 - 9.4.4 CoEnergy Co-Op.....30
- 10.0 Expected Impact of Initiatives.....32
- 11.0 Plan for Review33

Energy Conservation and Demand Management Plan 2019-2024

1.0 Executive Summary

Context

Under O. Reg. 507/18 of the Electricity Act, the Town of Hawkesbury is required to update their Energy Conservation and Demand Management Plan (the Plan) every 5 years. The purpose of this Plan is to provide the Town with an energy picture of their facilities' current energy consumption, realistic and measureable targets to conserve energy, and actionable initiatives in order to achieve tangible energy reductions.

Ontario's 2017 Long Term Energy Plan estimates that electricity costs are expected to increase over 20%, or roughly 4% per year, over the next five years. The federal carbon tax has come into effect in 2019 at \$20/tonne and will increase by \$10/tonne each year until it reaches \$50/tonne in 2022; at the latter price, there will be an 80% increase in the price of natural gas relative to 2019 costs. This further supports the need for Ontario municipalities to reduce their energy use.

Past Performance and Actions

The Town achieved a significant reduction in energy consumption between 2014 and 2017, which is attributed to the Town's LED street lighting retrofit project, which decreased street lighting electricity consumption by more than half. However, there was an increase in energy consumption in 2018, which is largely associated with an increase in natural gas consumption at the sewer treatment plant.

Most of the Town's facilities performed reasonably well against facility-appropriate industry benchmarks for energy use intensity. The Robert Hartley Sports Complex is the worst performing facility, while the water and sewer treatment plants also consume more energy than the national median. As these facilities are the Town's first, second and third greatest energy consumers, respectively, they should be the focus of energy efficiency initiatives.

Many of the actions identified in the previous Plan were not completed over the last five years due to a combination of budget cuts and limited bandwidth from Town staff to take on new projects. The Town does not currently generate any renewable energy.

Town's Energy Management Practice Self-Assessment and Targets

The Town's energy management practices from 2014 to 2019 have been self-assessed for this report. The level was decreased in four of the nine categories of energy management practice (commitment, planning, projects and financing) and remained static in the other categories.

The Town's energy management vision remains unchanged since 2014 and is:

The Town of Hawkesbury will exercise stewardship in our use of energy resources in order to reduce costs, demonstrate leadership, and optimize our delivery of services to ratepayers.

The following three energy management objectives are identified as areas to focus on in the upcoming five years:

Projects: Level 5 Practice

Improve capacity to identify and develop energy efficiency opportunities, specifically in the context of scheduled capital renewal. Improved development of business case will help to navigate through the funding process.

Energy Conservation and Demand Management Plan 2019-2024

Communication: Level 3 Practice

Energy efficiency related activities will be reported and marketed occasionally within the municipality. In general, the frequency of outreach should be based on the completion of projects.

Training: Level 2 Practice

Energy Team members will receive training in energy efficiency management practices.

The Town's energy management policy also establishes targets for the next 5 and 10 years, expressed as a reduction in energy use intensity. The plant and streetlight targets are measured against the benchmark year of 2014 where as the facilities' benchmark is 2012.

Target	Facilities	Plants	Streetlights
2024	7.5%	5%	66.6%
2029	10%	7.5%	66.6%

Identified Energy Initiatives

This Plan provides a list of potential specific energy efficiency projects the Town can pursue in order to achieve their targets. This list includes simple projects such as installing lighting controls in the garage at the Hawkesbury Fire Station, to complex capital projects such as upgrading the aeration process at the Sewage Treatment Plant, to high speed turbo blowers. There are general initiatives the Town should pursue, such as conducting energy audits of major accounts (Robert Hartley Sports Complex, sewer and water treatment plants), upgrading all lighting across all facilities, establishing a "revolving green fund" to finance future projects, and establishing an energy retrofit management program.

This Plan also included an assessment of PV capacity for Town facilities. Overall, the Town's facilities have a total rooftop solar potential of 645 kW, which represents 850 MWh of energy production and over \$100,000 in annual electricity bill savings. The Robert Hartley Sports Complex has the greatest potential for a 380 kW system that has an estimated simple payback of 13 years and system lifespan of 35 years.

For each of the potential actions, the expected energy savings, the capital costs, the simple payback and greenhouse gas emissions reductions are provided. Possible funding opportunities that could reduce capital costs are identified but were not included in the payback calculation. Similarly, the cost of carbon, and its affect on future fuel price increases, have not been factored into simple payback. Both factors could improve payback.

There are several funding opportunities available for energy efficiency measures, which for a municipality, include the Federation of Canadian Municipalities, utility-managed electricity and gas savings programs. Furthermore, because a wide range of energy savings measures have financial returns, there is a new and growing industry of entities that provide third party financing for energy retrofits and renewable energy generation, and which might be a good mechanism for the municipality to use to improve their facilities and reduce future energy bills.

Expected Impact of Initiatives and Plan for Review

If the Town pursues all of the energy initiatives for these facilities and plants, they will surpass their energy reduction target for 2024. This Plan is intended to be reviewed on an ongoing basis to reassess objectives and associated actions based on the output of the monitoring process. This annual review is intended to be conducted by the Energy Team in the form of a short report.

Energy Conservation and Demand Management Plan 2019-2024

2.0 Overview

2.1 Introduction

Under Ontario Regulation 507/18 of the Electricity Act, the Town of Hawkesbury (the Town) is required to develop and publish an Energy Conservation and Demand Management Plan (the Plan). This Plan has been structured to comply with each of the requirements specified in the regulation.

The Town's senior management approved this Plan in June 2019. The Town's Council subsequently adopted this Plan at the June 24, 2019 council meeting.

The Town intends to revisit and update this Plan every five years, as required under the regulation. The Town's Energy Team has overall responsibility for the maintenance and implementation of this plan. The Energy Team will be comprised of the following positions: Superintendent of Municipal Facilities; Superintendent of Environmental Services and Superintendent of Public Works.

2.2 Plan Scope

This Plan seeks to update and improve upon the Energy Conservation and Demand Management Plan 2014 (the previous Plan) while meeting the Town's obligations under O. Reg. 507/18. The purpose of this Plan is to provide the Town with an energy picture of their facilities' current energy consumption, realistic and measureable targets to conserve energy and actionable initiatives in order to achieve tangible energy reductions. The scope of this Plan is specific to the energy consumption and associated greenhouse gas emissions of the Town's facility buildings, water and sewer plants and street lighting (as displayed in Table 1). Energy consumption and greenhouse gases associated with the Town's vehicle fleet are not included in this plan. This Plan does not include activities by the broader community within Hawkesbury's municipal boundary.

2.3 Plan Development

The Town retained J.L. Richards & Associates Limited (JLR) to update the previous Plan through a competitive request for proposal process. JLR is a multidisciplinary practice offering services in all core engineering disciplines, architecture, planning and project management. JLR worked with the Town's Energy Team to develop this Plan.

This Plan was created in four stages, by:

- 1) Reviewing the Town's Energy Plan, consumption, reporting and initiatives;
- 2) Analyzing annual electricity, natural gas and propane consumption from 2011-2018;
- 3) Updating targets based on analysis and trends in energy consumption; and
- 4) Drafting this Plan to meet the energy reduction targets.

Accordingly, this Plan identifies the Town's current energy management practices, its goals and objectives for improvement, specific actionable steps to achieve these goals, and a commitment to continually assess progress, revisit the contents of this Plan and make revisions as required.

Energy Conservation and Demand Management Plan 2019-2024

Name	Address	Use	Floor Area (ft ²)
Facilities			
City Hall	600 Higginson Street, Hawkesbury	Administrative Office	8,445
Municipal Garage	855 Main Street East, Hawkesbury	Storage Facility	9,955
Robert Hartley Sports Complex	425 Cartier Boulevard, Hawkesbury	Indoor Recreational Facility	67,371
Hawkesbury Public Library and Daycare	550 Higginson Street, Hawkesbury	Public Library	10,710
Maison de l'île Cultural Centre	2 John Street, Hawkesbury	Cultural Facility	2,410
Club âge d'or +100% Actif Social Clubs	421 Cartier Boulevard, Hawkesbury	Cultural Facility	7,052
Hawkesbury Fire Station	780 Spence Avenue, Hawkesbury	Fire Station	11,952
OPP Police Station	419 Cartier Boulevard, Hawkesbury	Police Station	13,908
Confederation Park	1 John Street, Hawkesbury	Cultural Facility	832
Old Mills Park	527 James Street, Hawkesbury	Cultural Facility	832
Place des Pionniers	351 Main Street East, Hawkesbury	Cultural Facility	832
Water and Sewage			
Water Purification and Distribution Plant	670 Main Street West, Hawkesbury	Water Treatment	16,911
Water Source Pumping Station	601 Main Street West, Hawkesbury	Water Pumping	9,965
Sewer Treatment Plant	815 Main Street East, Hawkesbury	Sewage Treatment	5,998
Giroux Sewage Pumping Station	McGill Street, Hawkesbury	Sewage Pumping	200
Chartrand-Mario Sewage Pumping Station	560 Mario Street Hawkesbury	Sewage Pumping	220
James Sewage Pumping Station	790 James Street, Hawkesbury	Sewage Pumping	410
Street Lighting			
Street Lights	Various	Other	N/A

Table 1: List of Town's Facilities, Plants and Streetlights included in this Plan

Energy Conservation and Demand Management Plan 2019-2024

2.4 Plan Structure

Details are presented under the following sections:

- Section 2 – Ontario’s Energy Picture;
- Section 3 – Baseline Energy Use;
- Section 4 – Our Consumption and Emissions;
- Section 5 – Our Successes;
- Section 6 – Current State of Energy Management;
- Section 7 – Energy Management Policy;
- Section 8 – Future Actions;
- Section 9 – Expected Results;
- Section 10 - Plan for Continuous Improvement.

3.0 Ontario’s Energy Picture

3.1 Energy Supply and Pricing Forecasts for Ontario

In 2018, Ontario had a total electricity supply mix of 147.6 terawatt-hours (TWh), including avoided energy use as a result of conservation. Looking forward, supply requirements are expected to increase by approximately 20% over the next fifteen years.

Electricity costs are expected to increase over 20%, or roughly 4% per year, over the next five years. This further supports the need for Ontario municipalities to carefully manage their electricity use. However, Ontario’s 2017 Long-Term Energy Plan was prepared under the previous provincial government. The current provincial government has yet to announce when they will release a revised energy plan, which has resulted in uncertainty surrounding the future of Ontario electricity market.

Natural gas prices have returned to the pre-2014 historically low rates. Enbridge’s April 2019 effective natural gas price is lower than the previous quarter, largely driven by the decrease in the commodity price. Although there are no reliable long-term forecasts for the North American natural gas commodity price, there is certainty the price of natural gas will be affected by the recently announced carbon tax. On April 1, 2019, the federal carbon tax backstop went into effect at \$20 per tonne of greenhouse gas emissions. This will result in a 30% addition to the commodity price of natural gas in Ontario. Under this plan, the carbon tax will increase by \$10/tonne each year until \$50/tonne in 2022, resulting in an 80% increase in price relative to 2019 costs as shown in Figure 1.

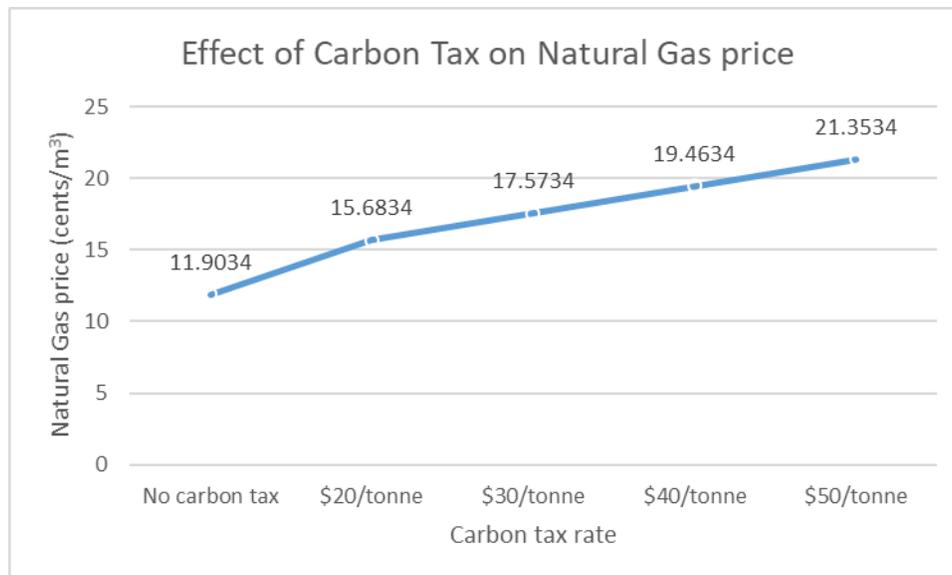


Figure 1: Projected Increase of Natural Gas Prices Due to Carbon Tax

Even though there is uncertainty surrounding the cost of electricity and natural gas over the next 10 years, energy sources powered by fossil fuels will undoubtedly increase as a result of the carbon tax.

3.2 Electricity Act and Regulation 507/18

On January 1, 2019 the current provincial government repealed the 2009 Green Energy Act which included O. Reg. 397/11: Energy Conservation and Demand Management Plans. However, the provincial government transferred the requirements of O. Reg. 397/11 to a new regulation O. Reg. 507/18: Broader Public Sector: Energy Reporting and Conservation and Demand Management Plans under the Electricity Act. This regulation is intended to continue to help public agencies, including municipalities, understand and better manage their energy consumption. Under the regulation, the Town is required to update their energy conservation and demand management plan every five years.

Energy conservation and demand management plans are required to include:

- A summary of the Town's energy consumption and emissions;
- A description of previous, current and proposed energy conservation measures;
- A forecast of expected results for current and proposed measures;
- Cost and savings estimates for proposed measures;
- A report of the actual results achieved;
- A description of any proposed changes to be made to assist in reaching the targets set;
- A description of renewable energy generation facilities and their energy production;
- Details on the goals, objectives and proposed measures that have been developed; and

Energy Conservation and Demand Management Plan 2019-2024

- Confirmation that this Plan has been approved by the Town's senior management.

This Plan has been structured to comply with each of the requirements specified in the regulation.

4.0 Baseline Energy Use

The Town developed an energy baseline of total annual energy consumption in the previous Plan in order to provide a quantitative reference case for comparing its future energy performance. Annual energy consumption of electricity and natural gas for 2012 were combined into an equivalent energy consumption value represented as an equivalent kilowatt hour (ekWh). The previous Plan then set targets based on an energy reduction relative to this 2012 baseline.

JLR would like to note that using *total annual energy consumption* of the Town as the benchmark to which targets for future years are measured against can result in the Town unfairly missing their targets due to expansion or increased use of facilities that are out of their control. For example, if the Town constructs a new arena, the *total energy consumption* of the Town will increase due to this new load regardless of energy efficiency measures enacted at other facilities. If this new arena were designed as a net-zero facility, this bold initiative in energy leadership would not be properly reflected in a target that uses the *total energy consumption*. Similarly, if the water or sewage flow through the treatment plants increased due to reasons out of the Town's control (such as the province dredging the sewage lagoons), the energy consumption at these plants would increase substantially. For these reasons, this Plan will provide alternative benchmarks that will take into account expansion or increased usage, and will be detailed separately for facilities, plants and street lighting, as explained in the next three sections. The benchmarks will be measured using energy use intensity (EUI), which normalizes energy use of facilities of different sizes to a common metric such as floor area or flow. Generally a low EUI signifies good energy performance.

4.1 Facilities Benchmark

We define facilities as all buildings except for those associated with water and wastewater buildings. In order to allow for additional facilities to be constructed by the Town and their energy consumption not negatively effect their energy reduction targets, the benchmark for facilities will be set as gross energy use intensity (EUI_F):

$$EUI_F = \frac{\text{Total Annual Energy Consumption for All Facilities}}{\text{Gross Floor Space of All Facilities}}$$

EUI is a commonly used metric to express a building's energy use as a function of its size. Generally a low EUI signifies good energy performance. Using this metric for benchmarking and targeting allows for new facilities to be constructed by the Town and will demonstrate the reduction in energy consumption due to energy efficiency projects or net zero new construction.

Table 2 displays the total floor area, electricity, natural gas and equivalent energy consumption for 2012 of all of the Town's non-water or sewage related buildings.

Energy Conservation and Demand Management Plan 2019-2024

Account	Total Floor Area (m ²)	Electricity (kWh)	Natural Gas (m ³)	Energy Consumption (ekWh)
Robert Hartley Sports Complex	6,259	2,301,600	187,945	4,299,038
City Hall	785	152,000	24,503	412,412
Hawkesbury Fire Station	1,110	145,767	23,187	392,193
Hawkesbury Public Library & Daycare	995	237,750	9,043	333,857
OPP Police Station	1,292	137,323	7,682	218,966
Municipal Garage	925	80,424	11,421	201,804
Club âge d'or+100% Actif Social Clubs	655	94,055		94,055
Maison de l'île Cultural Centre	224	74,173		74,173
Confederation Park	77	24,354		24,354
Place des Pionniers	77	20,054		20,054
Old Mills Park	77	18,086		18,086
Total	12,476	3,285,586	263,781	6,088,992

Table 2: Town's Facilities Total Floor Area and 2012 Energy Consumption

The gross floor area and total equivalent energy consumption for 2012 is used to set the EUI benchmark that targets will be measured against.

$$EUI_F = \frac{6,088,992 \text{ ekWh}}{12,476 \text{ m}^2} = 488 \frac{\text{ekWh}}{\text{m}^2}$$

4.2 Plant Benchmarks

We define plants as all municipal buildings associated with the pumping or treatment of water and waste water. The energy consumption of plants is heavily dependent on the flow through these plants. In order to separate deviations in annual flow rates from improvements in plant energy efficiency, the benchmark for water and sewer pumping stations and treatment plants will be set as gross energy use intensity (EUI_p):

$$EUI_p = \frac{\text{Total Annual Energy Consumption for All Facilities}}{\text{Total Flow Rate through Water and Sewer Treatment Plants}^1}$$

EUI using flow rate is a commonly used metric for water and sewer plant energy consumption to account for operation of the plants. Generally a low EUI signifies good energy performance. Using this metric for benchmarking and targeting allows for the Town to demonstrate the reduction in energy consumption due to energy efficiency measures independent of an increase in water consumption by the residents.

In 2014 the Town's new sewer treatment plant became operational. Due to the drastic change in size and capacity compared to the old plant, the benchmark for plant facilities was calculated using 2014 values. Table 3 displays the total flow rate, electricity, natural gas and equivalent energy consumption for 2014 of all of the Town's water or sewage related buildings.

¹ The flow through the pumping stations will flow through the treatment plants and as a result have been excluded from this calculation.

Energy Conservation and Demand Management Plan 2019-2024

Account	Annual Flow (ML)	Electricity (kWh)	Natural Gas (m ³)	Energy Consumption (ekWh)
Chartrand-Mario Sewage Pumping Station	0.003	1,386		1,386
Giroux Sewage Pumping Station	0.002	535		535
James Sewage Pumping Station	0.055	27,852		27,852
Sewer Treatment Plant	2,358.255	2,814,000	86,951	3,738,096
Water Purification & Distribution Plant	2,562.471	1,104,463	62,513	1,768,837
Water Source Pumping Station	2,693.329	157,200		157,200
Total	7,614.115	4,105,436	149,464	5,693,906

Table 3: Town's Plant 2014 Annual Flow and Energy Consumption

The flow rates through the sewer and water treatment plants and total equivalent energy consumption for 2014 is used to set the EUI benchmark that targets will be measured against.

$$EUI_p = \frac{5,693,906 \text{ ekWh}}{4,921 \text{ ML}} = 1,157 \frac{\text{ekWh}}{\text{ML}}$$

4.3 Street Lighting Benchmark

In order to allow for new developments and roads to be constructed in the Town and the additional load of new streetlights not negatively affecting their energy reduction targets, the benchmark for street lighting is set as a ratio of energy consumption per light:

$$EUI_s = \frac{\text{Total Annual Energy Consumption for All Streetlights}}{\text{Total Number of Streetlights}}$$

Using this metric for benchmarking will encourage the adoption of energy efficient street lighting for future developments and roads.

Electricity Consumption (kWh)	Number of Streetlights
2,634,796	1,395

Table 4: Town's 2014 Electricity Consumption and Quantity of Streetlights

The electricity consumption and number of streetlights for 2014 is used to set the ratio of energy consumption per light that will be used as a benchmark for targets to be measured against:

$$EUI_s = \frac{2,634,796 \text{ kWh}}{1,395 \text{ lights}} = 1,889 \text{ kWh/light}$$

5.0 Energy Consumption and Emissions

This section will provide an overview of the Town's energy consumption and greenhouse gas emissions since the previous Plan, including an overview of the Town's total energy consumption year over year, a comparison of energy consumption by fuel source, a breakdown of the different account types, a highlight of the Town's largest energy consumers, an overview of individual facility's EUI and a year over year comparison against the benchmarks detailed in Section 4.0.

Figure 2 displays the Town's combined equivalent energy consumption and the corresponding greenhouse gas emissions of all facilities from 2014 to 2018. Energy consumption is represented as equivalent kilowatt-hours, which is electricity as kilowatt-hours combined with natural gas and propane converted to kilowatt-hours.

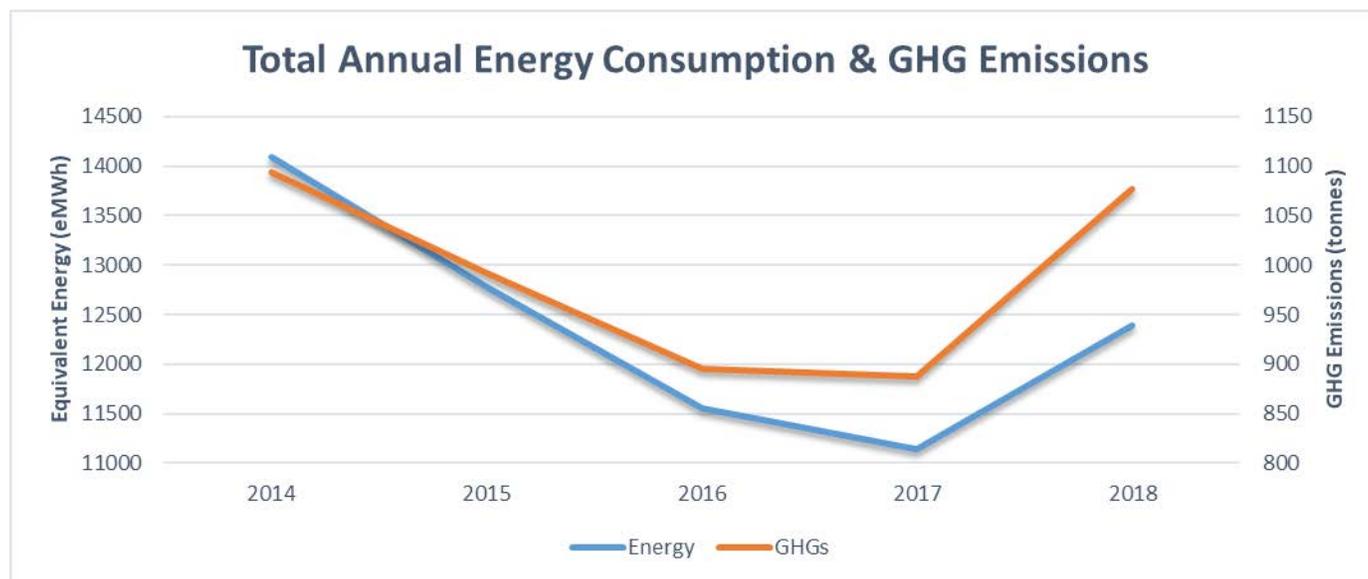


Figure 2: Town's Total Energy Consumption and Associated Greenhouse Gas Emissions of all Municipal Buildings and Streetlights from 2014 to 2018

The significant reduction in energy consumption from 2014 to 2017 can be attributed to the Town's LED street lighting retrofit project, which decreased electricity consumption by more than half for street lighting. The increase in 2018 is largely associated with an increase in natural gas consumption at the sewage treatment plant. This is one of the reasons behind the increase in greenhouse gas emissions, as well as converting electric heating to propane at the Maison de l'île, Cultural Centre.

Figure 3 displays the Town's energy consumption by fuel source for 2014 and 2018 (2014 data forms the inner ring, and 2018 data forms the outer ring). Electricity is the primary fuel source with natural gas and propane used for space or process heating. The percentage increase in natural gas consumption in 2018 is largely due to the increased heating requirement at the sewage treatment plant, and reduced electricity use.

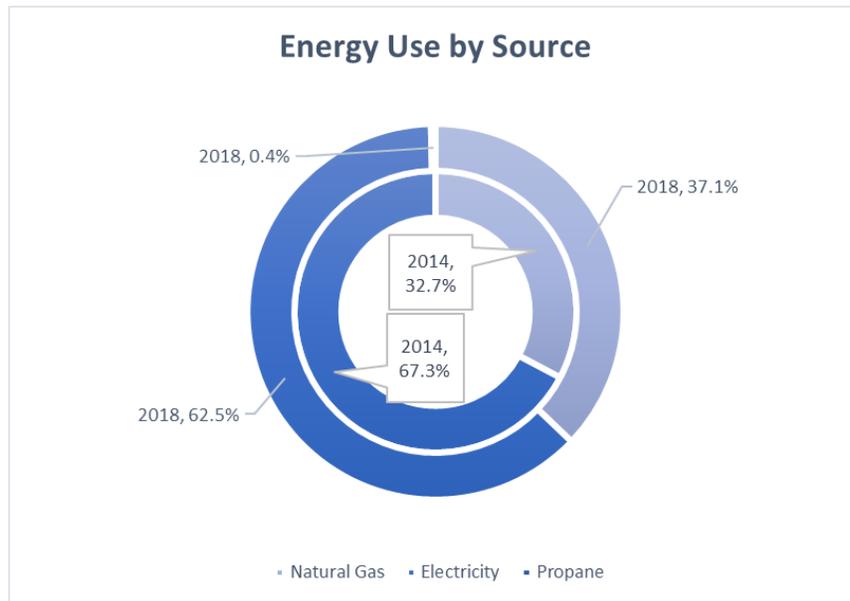


Figure 3: Town’s Total Energy Consumption by Fuel Source, 2014 Compared to 2018

Figure 4 displays the Town’s energy consumption by account centre categories for 2014 and 2018. Facilities continue to be the largest account centre. Street lighting continues to be the smallest category and significantly decreases the percentage of energy use by 2018.

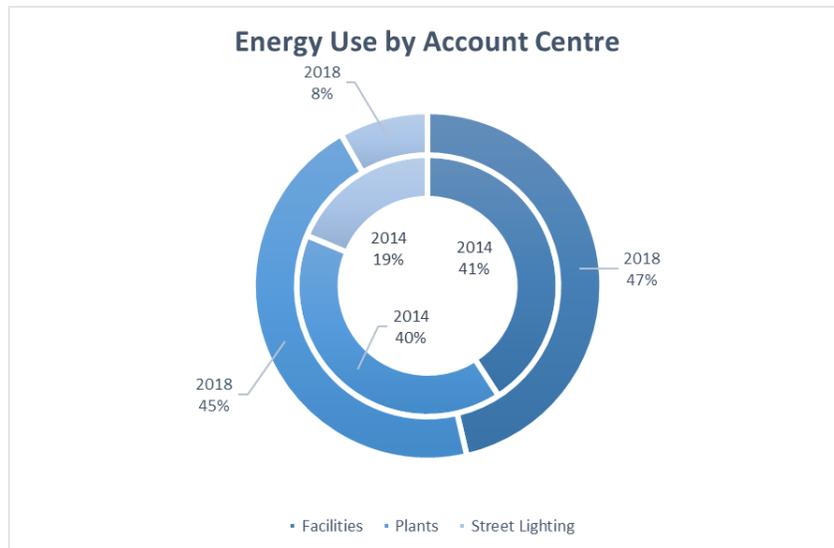


Figure 4: Town’s Total Energy Consumption by Account Centre Categories, 2014 Compared to 2018

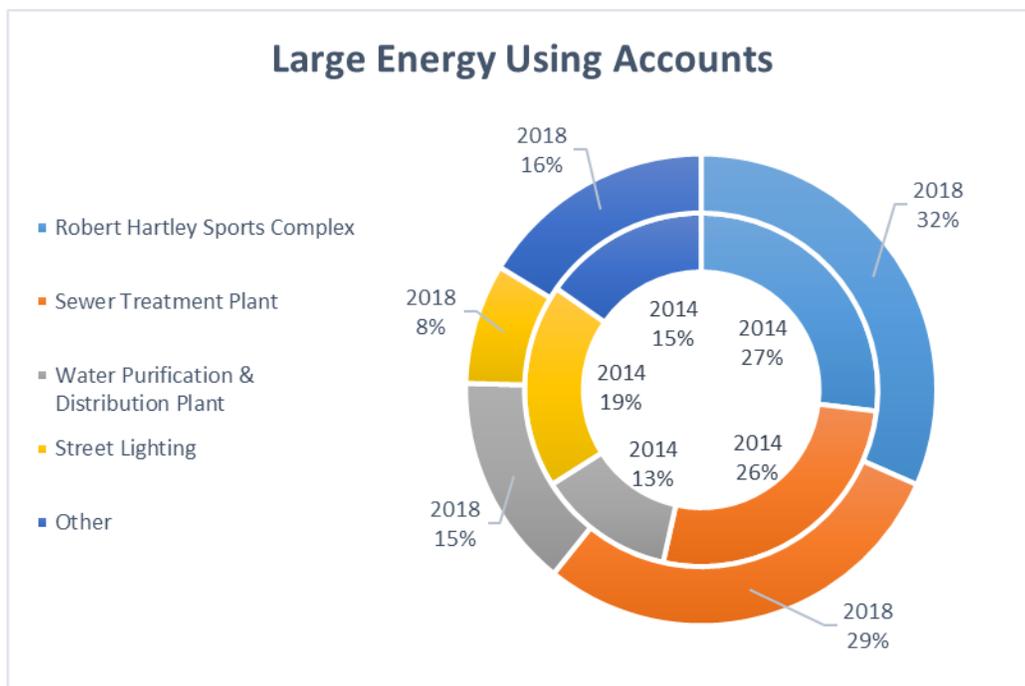


Figure 5: Town's Largest Energy Using Accounts, 2014 Compared to 2018

Figure 5 highlights the Town's largest energy consuming accounts in 2014 compared to 2018. The energy reductions due to the LED street lighting retrofit project are clearly displayed (19% in 2014 and 8% in 2018). This graph also demonstrates that two buildings make up 61% of the Town's total energy consumption. The Robert Hartley Sports Complex remains the Town's single largest energy user at 32%. This is the best target for energy efficiency projects as simple retrofits can have drastic effects. The sewage treatment plant is the next largest user and the drastic increase in natural gas consumption in 2018 warrants a natural gas energy audit or process improvement study.

Figure 6 displays the 2014 and 2018 energy use intensity for all of the Town's plants compared against the 2019 Energy Star® Portfolio Manager® Canadian National Median Site EUI for each property type. The median value is the middle of the national population – half of buildings use more energy, half use less. The facilities are ordered from best (left) to worst (right) when compared to the national median.

All of the Town's facilities performed reasonably well against the national median, a ratio of less than 1 represents a facility that is equal to or better than the national median for that facility type. The Robert Hartley Sports Complex is the worst performing facility and as the biggest user, and thus should be a focus for energy efficiency measures.

Energy Conservation and Demand Management Plan 2019-2024

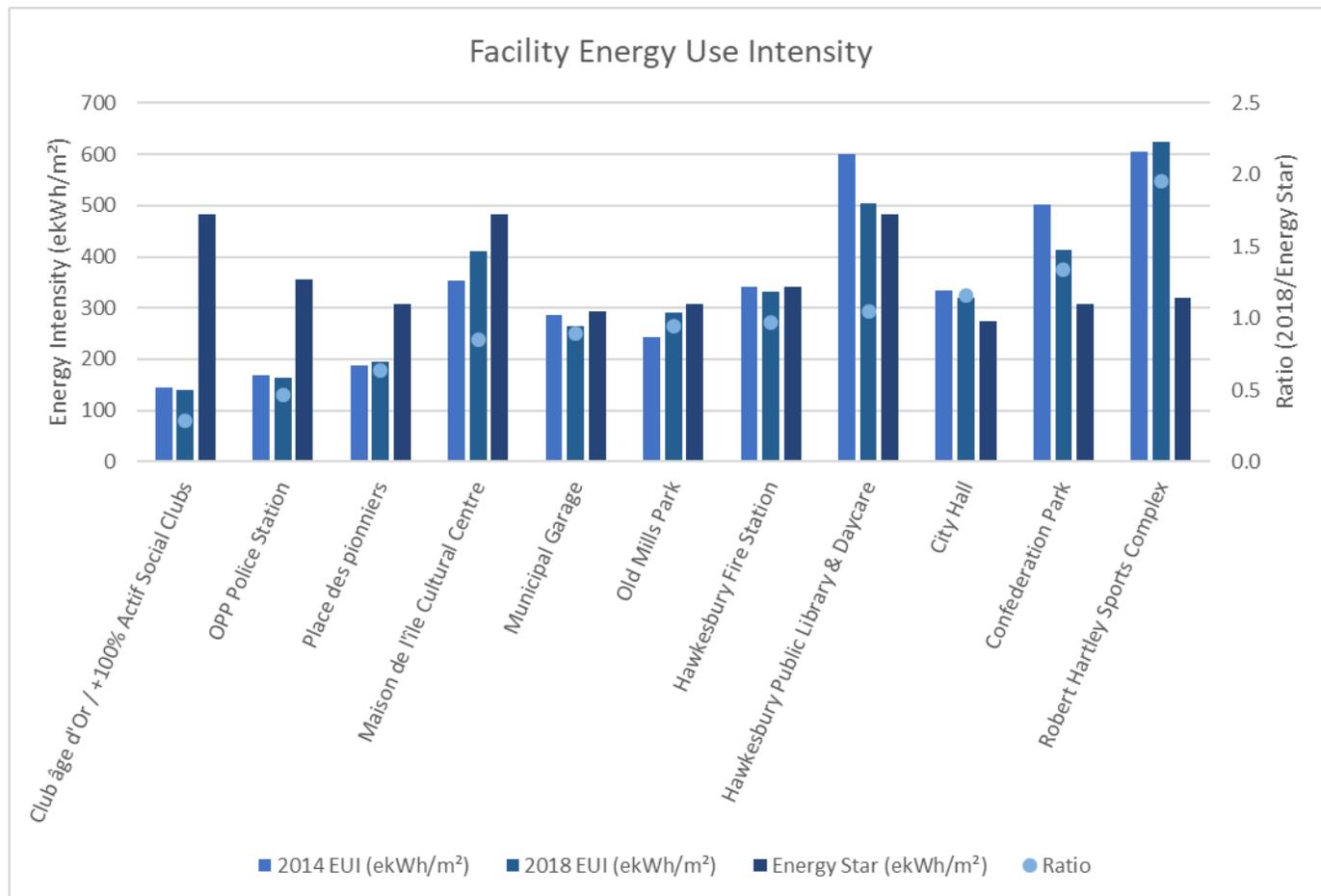


Figure 6: 2014 and 2018 Energy Use Intensity for Town's Facilities Compared to Energy Star® Portfolio Manager® Canadian National Median Table for Energy Use Intensity by Property Type

Figure 8 displays the 2014 and 2018 EUI for the Town's water and sewer treatment plants compared against the 2019 Energy Star® Portfolio Manager® Canadian National Median Site EUI for each property type. The EUI is measured as the total annual energy consumption over the annual flow through the facility measured in mega litres (ML).

Both of the plants consume more energy than the national median, a ratio greater than 1 represents a facility that consumes more energy than the national median for a facility of that type. As these facilities are also the Town's greatest energy consumers, they should be the focus of energy efficiency initiatives.

Energy Conservation and Demand Management Plan 2019-2024

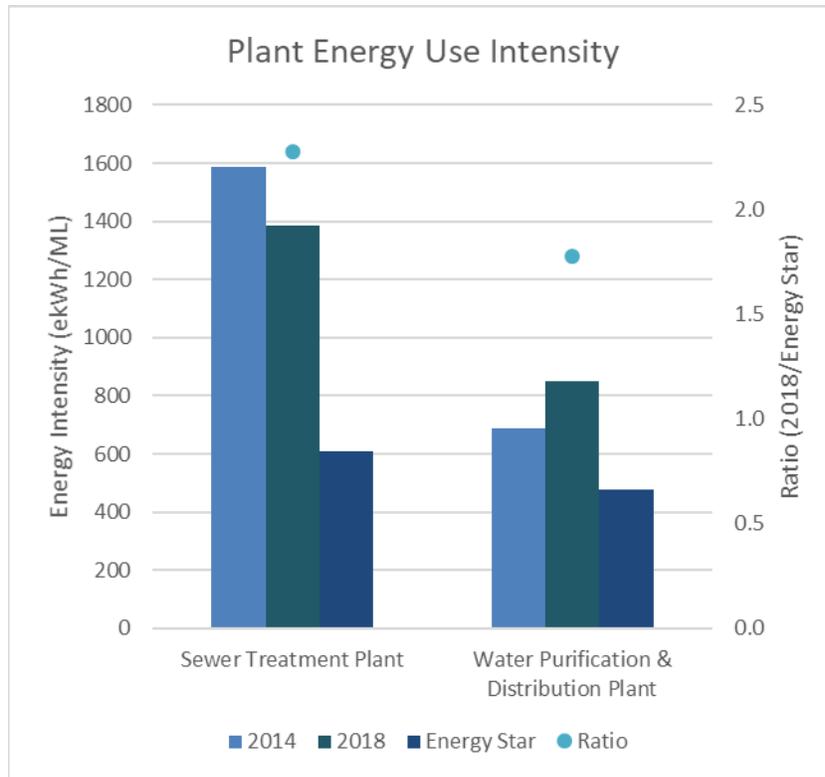


Figure 8: 2014 and 2018 Energy Use Intensity for Town's Plants Compared to Energy Star® Portfolio Manager® Canadian National Median Table for Energy Use Intensity by Property Type

Figure 7 displays the Town's electricity EUI from street lighting from 2014 to 2018. There has been a drastic decrease in electricity consumption since 2014, largely due to the streetlight LED retrofit project undertaken in 2015.

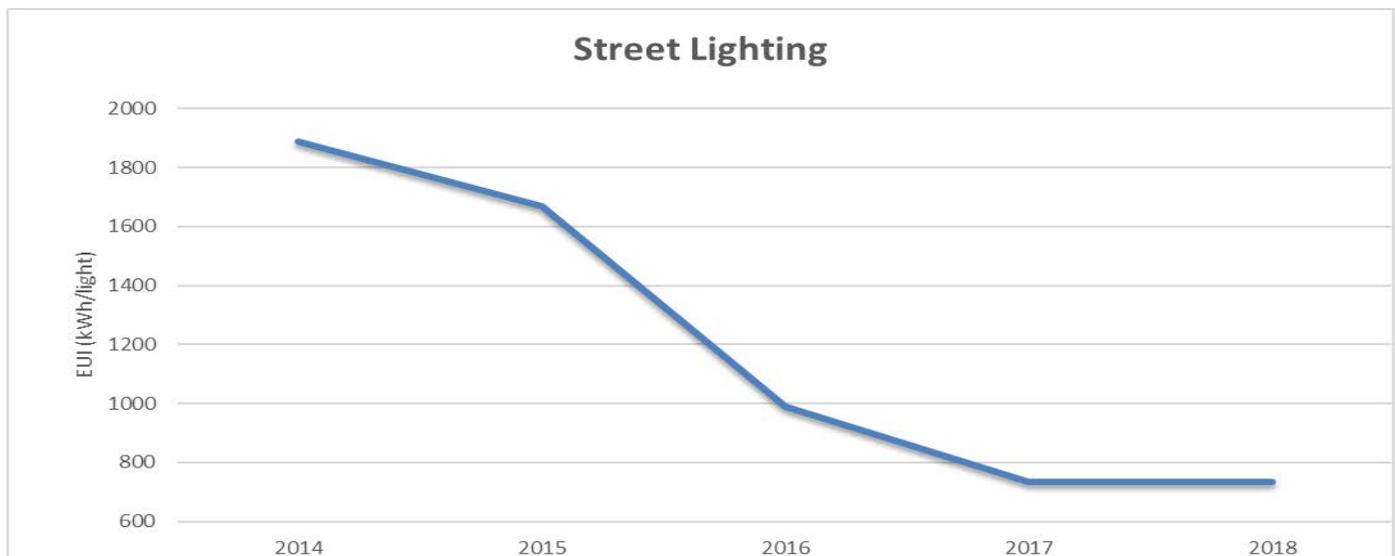


Figure 7: Town's Street Lighting Average Annual Energy Consumption per Light from 2014 to 2018

Energy Conservation and Demand Management Plan 2019-2024

6.0 Conversation and Renewable Energy Measures

6.1 Energy Conservation Measures

Table 5 lists the energy conservation measures the Town has completed since 2014 when the last energy conservation and demand management plan was published.

Building	Project	Implementation Date	Description
Street Lighting	LED Retrofit	2015	All HPS Cobra head streetlights have been retrofitted with LEDs.
All Buildings	Programmable Thermostat Check-up Program	2016	All thermostats are consistently set based on seasonal and space needs. A check-up schedule has been established to ensure settings remain in place.
Robert Hartley Sports Complex	Pool Lighting Upgrade	2019	Complex lighting upgrades were made to the pool, arena and lobby.
Hawkesbury Fire Station	Programmable Thermostat	2015	A programmable thermostat was installed and a heating setback point was established for unoccupied spaces.
Maison de l'Île Cultural Centre	Propane Heating	2017	Electric heating was eliminated and the forced air furnace was converted to use propane.

Table 5: Completed Energy Conservation Measures by Town since Previous Plan

The street lighting LED retrofit is the most significant measure the Town has completed since the last Plan resulting in electricity consumption from streetlights decreasing by more than half. Many of the actions identified in the previous Plan were not completed over the last five years due to a combination of budget cuts and limited bandwidth from Town staff to take on new projects.

6.2 Renewable Energy Measures

The Town does not currently generate any renewable energy.

7.0 Current State of Energy Management

7.1 Energy Management Practice

Energy management is the continuous process of managing change in the Town's behavioural, organizational and technical practices. The Town's current state of energy management has been assessed across eight equally weighted categories: Commitment, Planning, Organization, Projects, Financing, Tracking, Communication, and Training. Energy management practices are improved by following the Plan-Do-Check-Act principles of ISO 50001, an international energy management standard.

Energy Conservation and Demand Management Plan 2019-2024

- **Plan:** this Plan documents the Town’s energy management objectives and the actions that have been defined to improve its energy performance.
- **Do:** the Town intends to use this Plan as a roadmap to undertake actions and achieve its desired objectives.
- **Check:** the Energy Team’s annual reviews will allow the Town to readily measure whether change is successful.
- **Act:** the Town is committed to continually assessing progress towards this Plan, revisiting its contents and making revisions every five years.

7.2 Self-Assessment of Current Practice

Each of the eight energy management practice categories can be divided into practice levels: One is the lowest score and means there is plenty of room for improvement, while a score of five means that the Town’s operations are aligned with best practices. Progressing upward across all eight categories will ensure the Town optimizes the way it manages energy. The Town’s energy management performance was originally self-assessed for the previous Plan across the eight categories; this self-assessment has been refreshed for this Plan, with the results displayed below.

Commitment: an energy policy endorsed by Council, and with clear targets, catalyzes change from the top down.

C O M M I T M E N T	1	2	3	4	5
		No policies	An undocumented set of guidelines or policies	Un-adopted energy policy set by municipal staff	A formal energy policy exists but lacks active commitment from council
Description of Current Practice: 3 – In 2014 a formal energy policy was set in the form of an energy conservation and demand management plan. However, a significant reorganization of Town staff in 2015 resulted in energy conservation being marked as a low priority.					

Planning: An energy management plan provides a roadmap to achieve targets.

P L A N N I N G	1	2	3	4	5
		No energy management plan	One person delegated to develop an energy management plan	Only technical municipal staff are involved in developing an energy management plan	All municipal departments are represented on the planning team with some support from council
Description of Current Practice: 3.5 – Only the Town’s Energy Team provided input into the development of this plan.					

Energy Conservation and Demand Management Plan 2019-2024

Organization: Energy management is most effective when it's an integral part of all Town operations.

O R G A N I Z A T I O N	1	2	3	4	5
	No one is accountable for energy management	Energy management is the part time responsibility of a municipal staff member with limited authority	Energy management is the part time responsibility of a municipal staff member with authority	Energy is managed via an energy committee which works directly with municipal departments and staff	Energy management is fully integrated into council's agenda with clear delegation of responsibility to the energy committee, and subsequently to municipal departments and staff
Description of Current Practice: 2 – As part of this Plan an Energy Team has been established as a shared part-time responsibility of three staff members across multiple departments.					

Projects: Routine assessment of technical, behavioural and operational projects reduces missed opportunities.

P R O J E C T S	1	2	3	4	5
	No mechanism to identify or develop energy efficiency opportunities	Informal assessments with ad hoc resources to identify energy efficiency opportunities	Development of energy efficiency opportunities on an infrequent basis with selected implementation	Infrequent but formalized energy efficiency opportunity identification, basic business cases and implementation	Ongoing identification of projects (retrofit, renewable energy, behavioural, operational, and maintenance), development of business cases, and implementation
Description of Current Practice: 3 – The Town's energy efficiency opportunities development is dependent on the regulatory requirement to update their CDMP. Many opportunities identified in the previous Plan were not implemented due to a lack of budget and Town staff resources.					

Financing: A commitment to fund opportunities that meet established investment criteria facilitates project management.

F I N A N C I N G	1	2	3	4	5
	No investment in energy efficiency	Only low cost measures considered for financing	Investment using short term or simple payback criteria only, no consideration for life cycle costing	Investment using life cycle costing and/or internal rate of return	Clearly defined commitment (policy) to implementation and financing mechanism(s) for energy efficiency projects
Description of Current Practice: 3.5 – The Town does not have an established investment metric by which to measure energy efficiency projects. This Plan has utilized simple payback as the sole investment metric for comparing options.					

Energy Conservation and Demand Management Plan 2019-2024

Tracking: You cannot manage what you do not measure. Energy performance can be managed by monitoring and benchmarking.

T R A C K I N G	1	2	3	4	5
	No energy data being tracked or benchmarked	Cost reporting based on utility invoice data, no benchmarking	Facility level performance is monitored against baseline using utility data with ad hoc use of findings, no benchmarking	Facility level performance is monitored against baseline and benchmarked using key performance indicators, results from major projects are measured	Energy accounting system sets targets, forecasts use, monitors use against baseline and forecast, and identifies faults. Savings are tracked at a project and system level using sub-meters. Performance is benchmarked
<p>Description of Current Practice: 2 – The Town has been tracking cost using utility invoices. Performance benchmarking is not part of the Town’s regular activities. Some basic benchmarking was included as part of the previous Plan and the metrics used in these benchmarks have been improved as a part of this plan.</p>					

Communication: Showcasing the value and performance of energy management increases support and buy-in.

C O M M U N I C A T I O N	1	2	3	4	5
	No promotion of energy efficiency	Informal methods employed to promote energy efficiency	Energy efficiency related activities are reported or marketed occasionally within the municipality	The value of energy efficiency and the performance of energy management is reported and marketed routinely within the municipality	The value of energy efficiency and the performance of energy management is reported and marketed both within the municipality and externally to residents and stakeholders
<p>Description of Current Practice: 2 – Town Council is informed of municipal facility improvements, up to and including energy efficiency projects.</p>					

Training: Awareness and capacity development enable operational and behavioural change.

T R A I N I N G	1	2	3	4	5
	No energy management or operational training	One municipal staff member has received training in energy management practices	Technical municipal staff have received training in energy efficiency management practices	Energy committee members, and technical municipal staff have received training in energy management practices	Council has received training in energy management practices, and energy committee members, and technical municipal staff receive ongoing training.
<p>Description of Current Practice: 1 – Municipal staff have not taken part in any training related to energy management.</p>					

Energy Conservation and Demand Management Plan 2019-2024

As shown in Figure 9, the Town's energy management practices have decreased in commitment, planning, projects and financing, and remained static in the other categories.

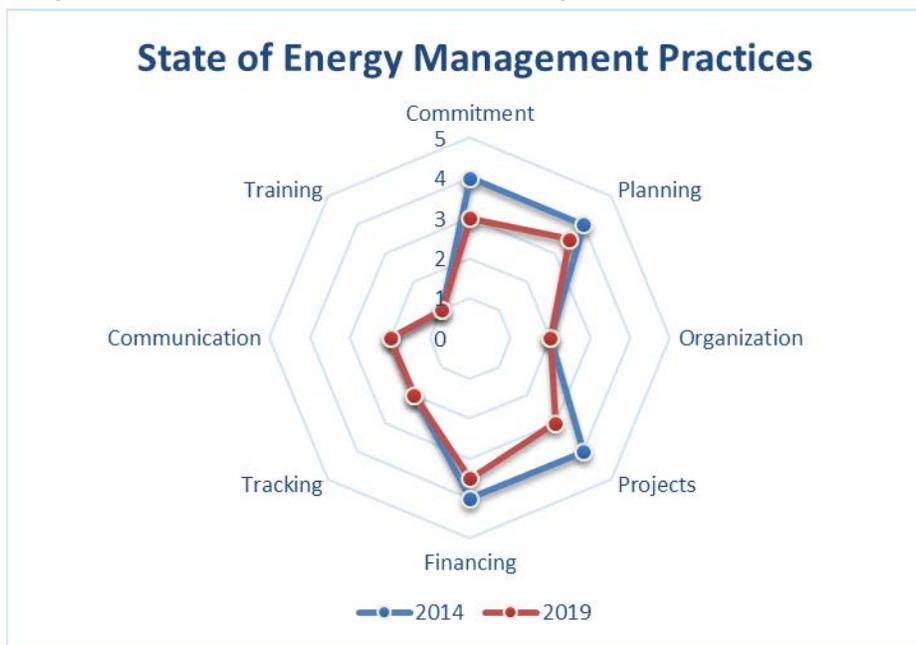


Figure 9: Town's state of energy management practices, 2014 compared to 2019.

8.0 Energy Management Policy

Whereas the previous sections present information on the Town's current state of energy management, this section outlines the Town's goals for improving its energy management practices in the form of a policy. This policy was originally developed as part of the previous Plan and has been updated accordingly for this plan.

The Town of Hawkesbury's Energy Management Policy

The Town of Hawkesbury's Energy Management Policy outlines the Town's commitment to energy management, its vision statement, strategic objectives, and short- and long-term targets.

8.1 Commitment

To ensure that our energy management vision is realized, Town Council and senior staff will incorporate energy management into all relevant areas of activity including our organizational management procedures, procurement practices, capital asset and investment decisions, and facility operations and maintenance. This will be accomplished by:

- 1. Ensuring the necessary resources are allocated to enable the implementation of actions outlined in the Town's Energy Conservation and Demand Management Plan;*

Energy Conservation and Demand Management Plan 2019-2024

2. *Holding all Town staff accountable and responsible for managing energy through corporate targets; and*
3. *Ensuring that Town staff, council and ratepayers are updated regularly on progress as measured against the targets and performance indicators included in the Plan.*

8.2 Vision

The Town of Hawkesbury will exercise stewardship in our use of energy resources in order to reduce costs, demonstrate leadership, and optimize our delivery of services to ratepayers.

8.3 Objectives

The Town is focused on changing the way energy is used across the facilities and infrastructure within the scope of the Plan. Our three core objectives, outlined below, will help us reach our targets:

8.3.1 **Projects:** Level 5 Practice

Improve capacity to identify and develop energy efficiency opportunities, specifically in the context of scheduled capital renewal. Improved development of business case will help to navigate through the funding process.

8.3.2 **Communication:** Level 3 Practice

Energy efficiency related activities will be reported and marketed occasionally within the municipality. In general, the frequency of outreach should be based on the completion of projects.

8.3.3 **Training:** Level 2 Practice

Energy Team members will receive training in energy efficiency management practices.

8.4 Targets

The following targets have been set in the context of the Town's current performance and the opportunities for improvement identified within this Plan. Progress toward these targets will be measured in terms of energy use intensity using the most appropriate meter for the type of target.

8.4.1 Facilities

Energy use intensity will be measured based on gross energy use intensity using gross floor space²:

- **Short Term:** 7.5% reduction in EUI_F by 2024 over benchmark year of 2012.
- **Long Term:** 10% reduction in EUI_F by 2029 over benchmark year of 2012.

² $EUI_F = \frac{\text{Total Annual Energy Consumption for All Facilities}}{\text{Gross Floor Space of All Facilities}}$

Energy Conservation and Demand Management Plan 2019-2024

8.4.2 Plants

Energy use intensity will be measured based on gross energy use intensity using flow rates³:

- **Short Term:** 5% reduction in EUI_P by 2024 over benchmark year of 2014.
- **Long Term:** 7.5% reduction in EUI_P by 2029 over benchmark year of 2014.

8.4.3 Street Lighting

Energy use intensity will be measured based on energy use per streetlight⁴:

- **Short Term:** 66.6% reduction in EUI_S by 2024 over benchmark year of 2014.
- **Long Term:** Maintain EUI_S achieved in 2024 by 2029.

9.0 Identified Energy Initiatives

This section identifies initiatives that can be pursued by the Town to meet the energy reduction targets identified in the previous section. The first list details specific energy efficiency initiatives that can be achieved some of the Town's facilities. This is followed by a general discussion on larger general initiatives the Town can pursue to reduce energy consumption at their facilities. As well, a pre-feasibility assessment of the Town's facilities for the potential of a solar photovoltaic system is assessed. Finally a summary of available funding programs that provide incentives and financing for energy efficiency measures and renewable energy projects is included for the Town to explore.

9.1 Energy Efficiency Initiatives

Table 6 displays a list of potential energy efficiency projects sorted by quickest payback the Town can pursue to meet its energy reduction targets. For each of the potential actions, order of magnitude cost estimate and energy savings, the simple payback and greenhouse gas emissions reductions are provided. Possible funding opportunities that could reduce capital costs are identified but were not included in the payback calculation (more information on these programs is detailed in Section 9.4). Similarly, the cost of carbon, and its effect on future fuel price increases, has not been factored into simple payback. Both factors could improved payback.

³ $EUI_P = \frac{\text{Total Annual Energy Consumption for All Facilities}}{\text{Total Flow Rate through Water and Sewer Treatment Plants}^3}$

⁴ $EUI_S = \frac{\text{Total Annual Energy Consumption for All Streetlights}}{\text{Total Number of Streetlights}}$

Energy Conservation and Demand Management Plan 2019-2024

Action	Cost Estimate	Completion Date	Energy Savings	Annual Monetary Savings	Greenhouse Gas Savings	Simple Payback	Stakeholders	Funding Opportunities	Next Steps
Hawkesbury Fire Station Install lighting controls to reduce run time in garage	\$1,000	Q2 2021	11 MWh	\$1,430	391 kg	1 years	Fire Department Public Works	IESO Save On Energy Retrofit Program	Solicit and compare quotes from contractors
Hawkesbury Public Library & Daycare Replace incandescent lighting in play area with LED alternatives	\$2,500	Q4 2020	6 MWh	\$780	213 kg	3 years	Library & Daycare Staff Public Works	IESO Save On Energy Retrofit Program	Solicit and compare quotes from contractors
Hawkesbury Public Library & Daycare Explore installing an automation system	\$2,000	Q4 2020	18 MWh	\$423	3201 kg	5 years	Library & Daycare Staff Public Works	IESO Save On Energy Retrofit Program Enbridge's Smart Savings Custom Retrofit Program	Solicit and compare quotes from contractors
Hawkesbury Public Library & Daycare Explore converting constant volume air system to variable air volume	\$10,000	Q4 2024	88 MWh	\$2,070	15650 kg	5 years	Library & Daycare Staff Public Works	IESO Save On Energy Retrofit Program Enbridge's Smart Savings Custom Retrofit Program	Solicit and compare quotes from contractors
City Hall Install lighting controls to reduce runtime in washrooms	\$4,000	Q4 2022	6 MWh	\$780	213 kg	5 years	Public Works Administrative Staff	IESO Save On Energy Retrofit Program	Solicit and compare quotes from contractors
City Hall Gradually reduce reliance on electric heating systems	\$50,000	Q4 2024	None	\$7,331	-9797 kg	7 years	Public Works		Conduct a engineering review of existing heating system and retrofit design
Water Treatment Plant Replace low-lift pumps motors and VFDs with Premium Efficiency motors	\$10,000	Q4 2021	11 MWh	\$1,430	391 kg	7 years	Public Works Environment	IESO Save On Energy Retrofit Program	Solicit and compare quotes from contractors
Water Treatment Plant Energy Optimization Study	\$100,000	Q4 2019	100 MWh	\$13,000	3555 kg	8 years	Public Works Environment	Green Municipal Fund RetroFit Program	Apply to FCM for Funding for Study
Sewer Treatment Plant Aeration Process High Speed Turbo Blower Upgrades	\$570,000	Q4 2024	500 MWh	\$65,000	17774 kg	9 years	Public Works Environment	IESO Save On Energy Process and Systems Upgrade Program	Conduct a pre-feasibility study to determine estimated cost and benefits for Process and Systems Upgrade Incentive Application

Energy Conservation and Demand Management Plan 2019-2024

Action	Cost Estimate	Completion Date	Energy Savings	Annual Monetary Savings	Greenhouse Gas Savings	Simple Payback	Stakeholders	Funding Opportunities	Next Steps
Hawkesbury Fire Station Rationalize HVAC systems to eliminate controls issues between office and dispatch	\$5,000	Q3 2024	22 MWh	\$518	3912 kg	10 years	Fire Department Public Works	IESO Save On Energy Retrofit Program Enbridge's Smart Savings Custom Retrofit Program	Solicit and compare quotes from contractors
Sewer Treatment Plant Natural Gas Energy Consumption Audit	\$15,000	Q4 2019	54 MWh	\$1,270	9603 kg	12 years	Public Works Environment	Enbridge's RunitRight Program	Solicit quote for an energy audit
OPP Police Station / Golden Age Club As rooftop ventilation units reach end-of-life, high efficiency alternatives should be specified	\$7,500	Q4 2022	15 MWh	\$353	2668 kg	21 years	Public Works OPP Golden Age Club	IESO Save On Energy Retrofit Program Enbridge's Smart Savings Fixed Incentive Program	Solicit and compare quotes from contractors
Street Lighting Replace remaining decorative streetlights with LEDs	\$761,000	Q4 2021	186 MWh	\$24,180	6612 kg	31 years	Public Works	IESO Save On Energy Retrofit Program	Solicit and compare quotes from contractors
Robert Hartley Sports Complex Capital project to modernize refrigeration plant to utilize new equipment and controls technologies	\$1,000,000	Q4 2020	135 MWh	\$17,550	4799 kg	57 years	Recreation Public Works	IESO's Save On Energy Retrofit Program CoEnergy Co-Op's Comprehensive Energy Saving Services	Issue RFP for refrigeration plan replacement project

Table 6: Specific Energy Efficiency Projects that Can Be Pursued by Town to Meet Their Targets

Energy Conservation and Demand Management Plan 2019-2024

9.2 General Initiatives

In addition to the specific projects identified in the section above there are general initiatives that cover a broad range of facilities and concepts the Town should pursue to ensure they will effectively meet their targets.

9.2.1 Energy Audits of Major Accounts

As displayed in Figure 5, three buildings consume more than 75% of the Town's total energy, The Robert Hartley Sports Complex, the sewer treatment plant and the water purification and distribution plant. Their respective EUIs are all higher than the national median. The Robert Hartley Sports Complex and the water purification and distribution plant are both over 40 years old. These facilities would benefit from further analysis to accurately identify costs and energy savings. JLR regularly conducts energy audits for municipalities that want to gain a deeper understanding of how energy is being utilized. Just as this Plan has identified the Town's biggest energy accounts, an energy audit will identify the biggest consumers on energy within a facility, as well as opportunities to save energy. As explained in Section 9.4.1, the Green Municipal Fund will cover 50% of the cost of feasibility studies into retrofits of municipal facilities, which can include an energy audit.

9.2.2 LED Lighting in All Facilities

LED lighting in some instances is 10 times more efficient than traditional incandescent lighting. With lighting incentives provided through the IESO's Save on Energy Program, some lighting retrofit projects can have a payback of less than one year. The Town should actively pursue replacing all of the lighting in all of their facilities with LEDs as soon as possible.

9.2.3 Revolving Green Fund

Many of the initiatives identified in the previous Plan were not complete due to a lack of Town resources and budget. However, due to the LED street lighting retrofit project, the Town's electricity bill has been reduced by more than \$500,000 over the past 4 years. In order to quantify and reinvest the savings from energy efficiency projects, many municipalities establish a Revolving Green Fund or "Green Bank". A revolving green fund quantifies the savings earned from energy efficiency projects and sets aside a portion of the revenue that would have been spent on energy into a segregated fund that can be used to fund future projects. This provides a continuous source of funding for future projects and an incentive to monitor and ensure completed projects provide the expected savings.

9.2.4 Energy Manager

Energy managers have the strategic and technical expertise to recommend the energy-saving equipment and technologies that are right for the Town's facilities and plants. They have the skills to implement the concepts outlined in this Plan working with various stakeholders across the municipality. The staff of many small municipalities are overburdened with their day-to-day responsibilities to take on the additional role of energy management. Small municipalities work hard to balance their existing budget which makes it difficult to find additional funding to hire a

Energy Conservation and Demand Management Plan 2019-2024

dedicated energy manager on staff. The Town should consider hiring an engineering consultant, such as JLR, to provide “as-needed” Energy Manager services. This format can provide the benefits on an Energy Manager on staff without burdening existing staff or the cost of a new full-time staff member.

9.3 Solar Photovoltaic System Potential

The cost of solar photovoltaic modules has significantly decreased over the past decade and can provide an economically viable means of producing a portion of a facilities’ electricity consumption on-site. Solar modules have a 25 year manufacturer’s warranty on performance and most systems are projected to have a 35 year life. Due to the Feed-In-Tariff program in Ontario, there are numerous installation companies and contractors that have over a decade of experience installing rooftop solar systems. Typically, PV arrays are deployed on flat roofs using commercial PV racking and held in place with ballasts to avoid roof penetrations. Presently in Ontario, PV generation is permitted on facilities in a net-metering arrangement where any electricity generated is consumed on-site and excess electricity is exported to the grid for a credit that can be used on future bills.

A preliminary assessment of the PV capacity of each building, at a pre-feasibility level, was conducted as a part of the update to this Plan and the results are summarized in Table 7.

Facility	Solar Potential	Cost	Estimated Annual Energy Production	Annual Savings	Simple Payback
Robert Hartley Sports Complex	380 kW	\$ 810,000	490,000 kWh	\$ 63,000	13 years
City Hall	70 kW	\$ 180,000	90,000 kWh	\$ 11,000	15 years
Club âge d'or/+100% Actif Social Clubs	60 kW	\$ 140,000	70,000 kWh	\$ 8,000	16 years
Hawkesbury Fire Station	50 kW	\$ 140,000	70,000 kWh	\$ 8,000	16 years
Municipal Garage	40 kW	\$ 100,000	50,000 kWh	\$ 5,000	17 years
OPP Police Station	25 kW	\$ 80,000	40,000 kWh	\$ 4,000	19 years
Sewer Treatment Plant	10 kW	\$ 50,000	20,000 kWh	\$ 2,000	21 years
Maison de l'île Cultural Centre	10 kW	\$ 40,000	20,000 kWh	\$ 1,000	20 years

Table 7: Summary of Solar Assessment Potential of Town's Facilities

Energy Conservation and Demand Management Plan 2019-2024

The Robert Hartley Sports Complex has the greatest potential for a rooftop solar array due its large flat roof with minimal obstructions. In order to determine the suitability of the complex, a structural assessment by a qualified engineering firm and a grid impact assessment from the local distribution should be conducted.



Figure 10: Rendering of a 380 kW Rooftop Solar Array on the Robert Hartley Sports Complex

This assessment solely focused on the potential for rooftop solar photovoltaic systems at each of the Town's facilities. Facilities with a small roof area or roofs with significant obstructions were removed from this analysis. The potential for solar carports or ground mounted solar pergolas exists in the Town's parking lots and green spaces and could be assessed in a future analysis.

9.4 Available Funding Programs

There are several funding opportunities available for energy efficiency measures, which for a municipality, include the Federation of Canadian Municipalities, utility-managed electricity and gas savings programs. Furthermore, the possibility of third party financing for energy retrofits can be considered. Some suggested matches between Town assets and the funds are suggested in [blue font](#).

9.4.1 Green Municipal Fund

The Federation of Canadian Municipalities established the Green Municipal Fund in 2000 to drive local green innovation across the country.



The Green Municipal Fund will provide funding for feasibility studies, pilot projects as well as capital projects:

- **Feasibility Studies** – Grant to cover up to 50% of eligible costs to a maximum of \$175,000 (i.e., \$350,000 feasibility study).

Energy Conservation and Demand Management Plan 2019-2024

- **Pilot Projects** – Grant to cover up to 50% of eligible costs to a maximum of \$350,000 (i.e., \$700,000 pilot project).
- **Capital Projects** – Low-interest loan of up to \$10,000,000 to cover 80% of eligible costs (i.e., \$12,000,000 capital project) including a grant for up to 15% of loan amount (i.e., \$1,500,000).

Eligible costs include items such as: consulting costs to write funding application incurred up to 90 days prior to application; fees for professional consultants; and in-kind contributions of staff salaries up to 10% of eligible costs.

The Green Municipal Fund currently provides funding for the following initiatives that can assist the Town in reducing their Energy Consumption:

- **Energy recovery or district energy** - recovered or renewable thermal energy in new or existing facilities to reduce fossil fuel or grid electricity by at least 40% (e.g., a combined heat and power system using biogas anaerobic digesters at the sewer treatment plant).
- **Retrofit of municipal facilities** – retrofits that improve energy efficiency by at least 30% in municipal facilities with a maximum of 10% through on-site, renewable energy (e.g., a deep green retrofit at the Robert Hartley Sports Complex, including a rooftop solar array, LED lighting upgrade, condensing boilers, and building automation system).
- **New construction of energy efficient municipal facilities** – net zero energy performance in new municipal facilities (e.g., net zero energy feasibility study for new municipal garage).
- **Renewable energy production on a brownfield** – initiatives that generate renewable energy on a brownfield site with or without remediation (e.g., ground mount solar array at former Canadian International Pulp and Paper brownfield site).

9.4.2 Save On Energy

The Save on Energy suite of programs offers incentives for energy-efficiency. Formerly, this program was delivered by local utilities but as of April 2019 all Save on Energy programs are delivered by the Independent Electricity System Operator (IESO), a provincial agency. Save on Energy has programs for home owners, businesses, industry and municipalities. Below is a sample of programs that would be applicable to the Town's initiatives.



9.4.2.1 Retrofit Program

The Save on Energy Retrofit program provides incentives to upgrade equipment to high efficiency models. The two types of applications are:

Energy Conservation and Demand Management Plan 2019-2024

- **Prescriptive Track** applications are ideal for quick system upgrades. Incentive levels are based on predefined amounts based on a number of units of product. Projects must be pre-approved and be worth a minimum of \$500. Examples of possible incentives include:
 - \$3,980 incentive on a variable frequency drive for a 75 HP motor at water pumping plant.
 - \$5 per lamp to replace incandescent with LED at daycare.
 - \$15 per wall switch occupancy sensor installed in washrooms at City Hall.
- **Custom Track** applications are designed to provide flexibility for more comprehensive projects, with opportunities for increased energy savings. Incentives are based on energy savings over pre-project baselines and are capped at 50% of project costs. Projects must be pre-approved, provide savings for at least 48 months and have an incentive of at least \$1500. Available incentives include:
 - **Lighting** – the greater of \$400/kW of demand savings or \$0.05/kWh of first-year electricity savings (e.g., decorative street lighting LED retrofit).
 - **Other Measures** – the greater of \$800/kW of demand savings or \$0.10/kWh of first-year electricity savings. (e.g., installing lighting controls at fire station garage).

9.4.2.2 Process and Systems Upgrades

The Save on Energy Process and Systems Upgrades program provides incentives for specialized upgrade projects for large energy consumers. This program focuses on large scale projects (minimum of 300 MWh in energy savings required) that require engineering design to optimize overall processes and systems (e.g., water treatment plant/ water distribution system improvements; waste water treatment plant aeration system improvements). Incentives are available for energy efficiency measure and behind the meter generation from waste energy recovery. They are provided in two phases:

- **Engineering Feasibility Study** – once an opportunity has been identified with energy savings and project costs determined, an engineering feasibility study can determine the base case energy usage of the current system and propose energy savings opportunities or technologies that could be implemented. This study can help to build a business case for process efficiency improvements and support a project application. Incentives for engineering feasibility studies are:
 - 50% of the cost of the study paid upon IESO approval of completed study; and

Energy Conservation and Demand Management Plan 2019-2024

- The remaining 50% paid upon confirmation of the Project In-Service Date.
- **Project** – the project incentive is paid after the one year measurement and verification of the project is complete. An advance payment of 50% can be paid upon approval of the IESO. The incentive will be the lesser of:
 - 70% of eligible project costs;
 - \$200/MWh for electricity savings;
 - Incentive required for a 1 year payback; or
 - \$10,000,000 per project.

9.4.3 Enbridge's Smart Savings



Enbridge is the natural gas utility serving Eastern Ontario, their Smart Savings programs offer incentives to homeowners, businesses, industry and municipalities to reduce their natural gas consumption by investing in energy efficiency upgrades. Below is a sample of programs that would be applicable to the Town's initiatives.

9.4.3.1 Fixed Incentive Program

This program provides incentives to offset the costs of installing energy efficient natural gas equipment in new and existing buildings. A variety of financial rebates are available for investing in energy efficient space heating and water heating measures, as well as ENERGY STAR® qualified equipment:

- | | |
|--|---|
| ● Air Doors | ● Destratification Fans |
| ● Condensing Boilers | ● ENERGY STAR® Qualified Equipment |
| ● Condensing Furnaces | ● High Efficiency Boilers |
| ● Condensing Make-up Air Units | ● Heat Recovery Ventilator (HRV) |
| ● Condensing Storage and Tankless Water Heaters | ● Energy Recovery Ventilator (ERV) |
| ● Demand Control Kitchen Ventilation (DCKV) | ● Infrared Heaters |
| ● Demand Control Ventilation (DCV) | ● Low-Flow Showerheads |

9.4.3.2 RunitRight Program

This program helps natural gas consumers find low or no cost operational improvements to reduce energy usage. Past program participants have found as much as 5% in energy savings for little cost. This program is conducted in three steps:

1. **Investigate** – Enbridge will fund \$1,000 towards a facility investigation to assess current energy performance and identify operational improvements to meet the goal of 5% natural gas savings. The results will be summarized in a report that will

Energy Conservation and Demand Management Plan 2019-2024

highlight estimated cost and energy savings for the most cost-effective improvements.

2. **Implementation** – Enbridge will provide up to \$8,000 towards implementation costs which could cover 100% of project costs.
3. **Monitor** – Enbridge will provide their Energy Management Information System (EMIS) free of charge for the first 12 months. Alternatively, you may install a third party EMIS and receive a \$1,000 incentive.

9.4.3.3 Custom Retrofit Program

An Enbridge Gas Energy Solutions Consultant will conduct a free site walkthrough to identify opportunities and calculate the estimated gas savings, as well as available incentives. Financial incentives are available to cover up to 50% of the project cost to a maximum of \$100,000 per project. The first 20% of gas savings receive an incentive of \$0.15/m³ and the remaining gas savings receive an incentive of \$0.30/m³)

9.4.4 CoEnergy Co-Op

CoEnergy is a local investment co-operative created by the members and staff of the Ottawa Renewable Energy Co-operative (OREC) in December 2018 to expand the adoption of sustainable energy technologies in Eastern Ontario. CoEnergy enables individuals to participate in the financing and ownership of energy efficiency and renewable energy projects. It is a multi-class co-op with two classes of membership:



- **Consumer Members** who are purchasing the energy services (e.g., Town of Hawkesbury).
- **Community Members** who support these projects in various ways including financial and benefit from a more resilient and sustainable local community (e.g., residents of Hawkesbury).

CoEnergy offers a variety of energy services available to municipal properties in Eastern Ontario including the following that may be of interest to the Town:

9.4.4.1 Net Metered Solar

Net metering allows for the generation and self-consumption of electricity on your property. The energy produced is first consumed on-site and any extra energy is fed into the grid in exchange for a credit that can be applied to a later bill.

CoEnergy will finance, install, operate and maintain the net metered solar system and in exchange will provide energy at a low stable electricity rate for 30 years to the property owner.

Energy Conservation and Demand Management Plan 2019-2024

9.4.4.2 Comprehensive Energy Saving Services

CoEnergy provides financing for green energy retrofits. CoEnergy works in collaboration with a third-party engineering firm such as JLR to conduct an energy audit that will identify energy saving opportunities. Working with the property owner, a portfolio of energy efficiency projects with a positive return on investment is selected. CoEnergy finances energy retrofits using investments from members of the community. Over the term of the agreement, a portion of the savings are directed to CoEnergy to repay its member while the property owner benefits from the energy savings. After the agreement term, the property owner continues to reap the savings from the project until the end of life of the equipment.

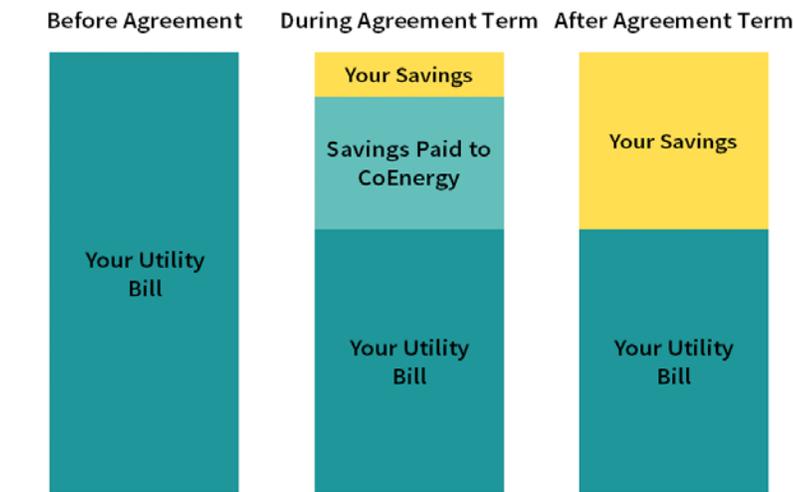


Figure 11: CoEnergy's Comprehensive Energy Savings Distribution (CoEnergy, 2018)

9.4.4.3 Federal Low Carbon Economy Fund

There are expected to be one or more programs launched by mid-2019 by the Federal Government's Low Carbon Economy Fund. The first will be in relation to proceeds raised from the carbon tax backstop program; the federal government has said that 10% of the proceeds will be returned to the MUSH++ sector (municipalities, universities, schools, hospitals, not-for profit, and first nations). The details of how this will operate are not yet known. Second, there is a strong likelihood of another round of Low Carbon Economy Challenge grants, similar to those that were open in late 2018. These were a national competition providing grant funding for up to 40% of project costs (for municipalities) that achieve a substantial reduction in carbon emissions.

Energy Conservation and Demand Management Plan 2019-2024

10.0 Expected Impact of Initiatives

This section provides a forecast of the expected impact if the Town pursues all of the energy efficiency initiatives outlined in Section 9.1. Additional savings could be realized through the actions described in Sections 9.2 and 9.2.3 but they have not been included in these forecasts.

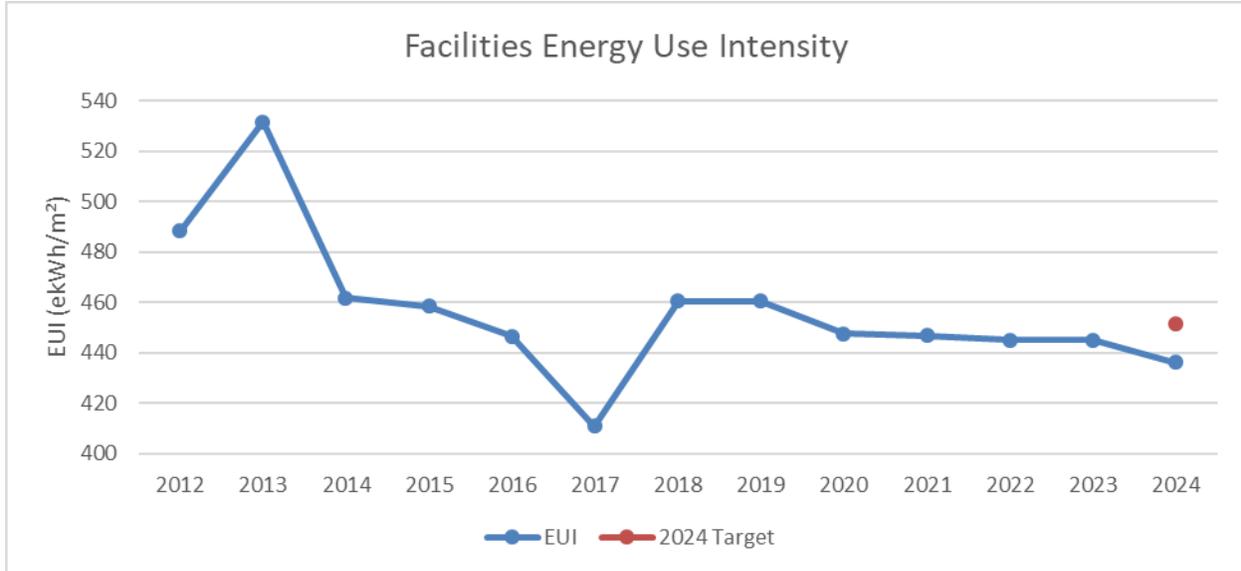


Figure 12: Gross Energy Use Intensity of All Facilities with 2024 Energy Reduction Target

Figure 12 displays the EUI of facilities, measured as total energy consumption per gross floor space. Figure 13 displays the EUI of Plants measured as total energy consumption per flow through the water and sewer treatment plants. The short term energy reduction for 2024 is also displayed as red dots on each graph. If the Town pursues all of the energy initiatives for these facilities and plants, they will surpass their energy reduction target.

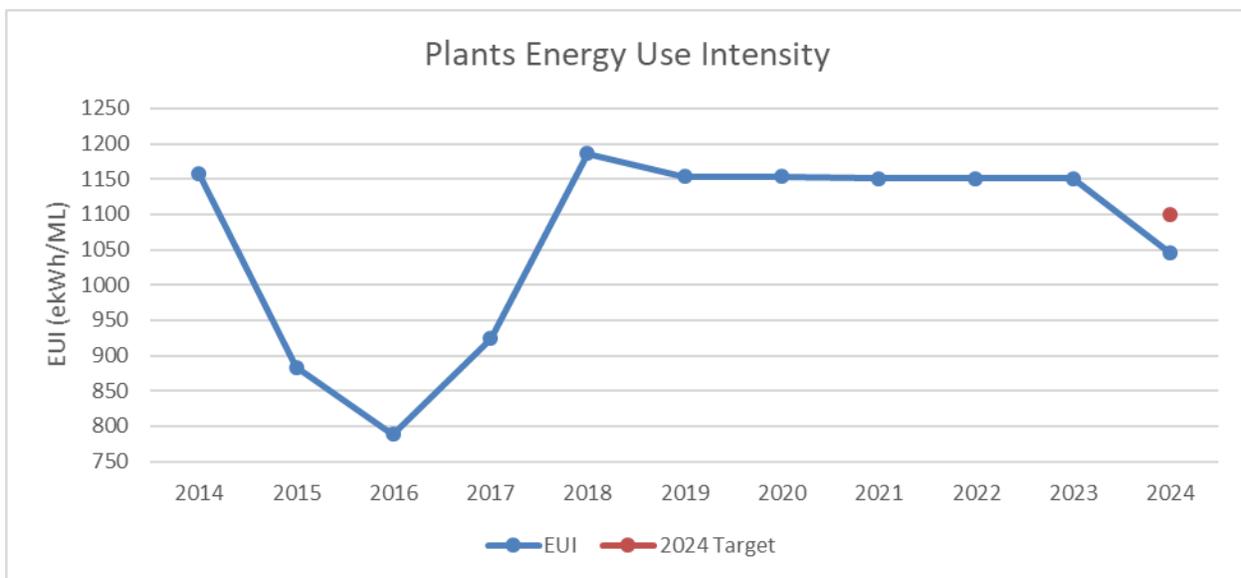


Figure 13: Gross Energy Use Intensity of all Plant with 2024 Energy Reduction Target

Energy Conservation and Demand Management Plan 2019-2024

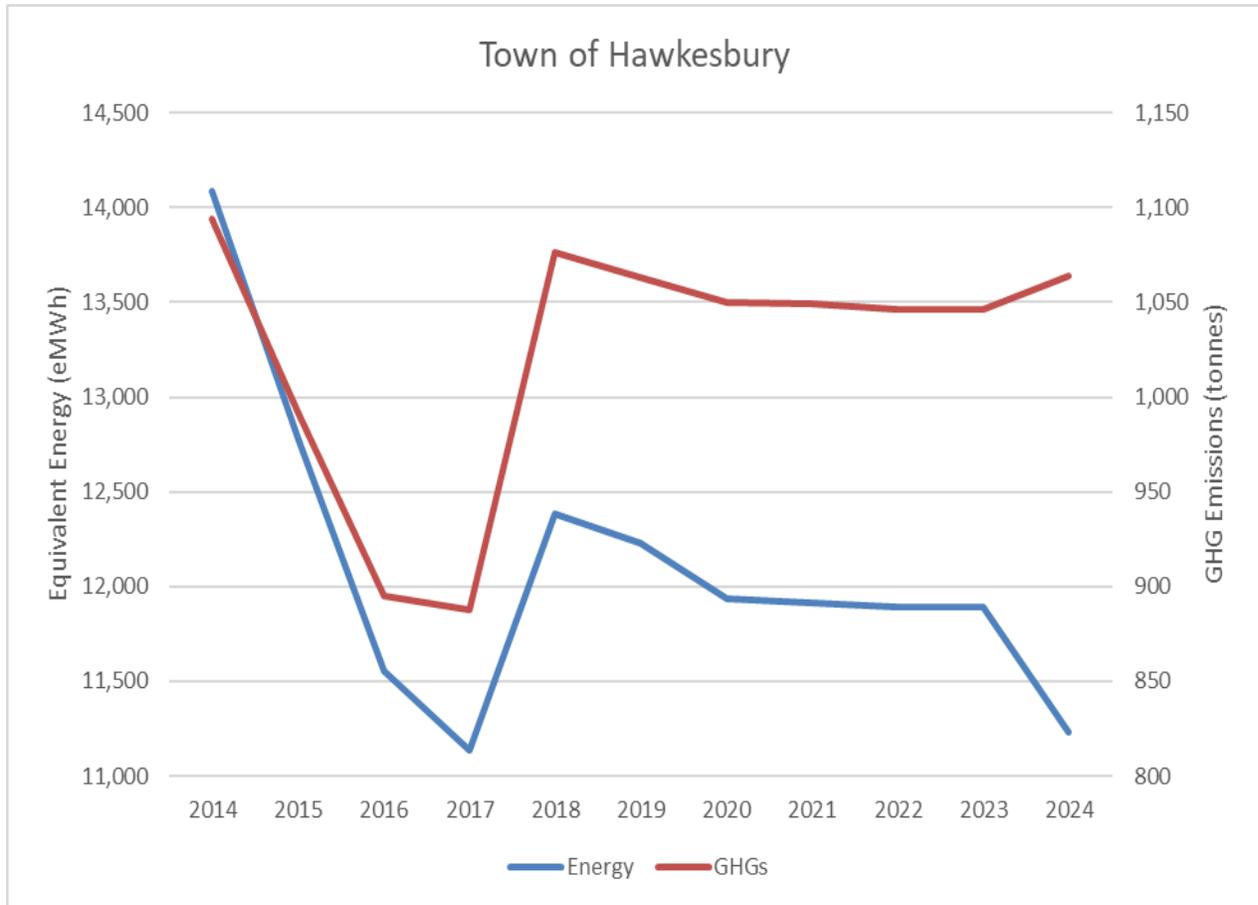


Figure 14: Total Energy Consumption and Greenhouse Gas Emission for the Town of Hawkesbury Projected to 2024

11.0 Plan for Review

This Plan will be reviewed on an ongoing basis to reassess objectives and associated actions based on the output of the monitoring process. This annual review will be conducted by the Energy Team in the form of a short report that will consist of:

- Suggest revisions to the Plan's Objectives to ensure that they reflect the Town's current priorities.
- Assess progress against energy use targets upon completion of each calendar year. This should occur in concert with annual energy use reporting to the Ontario Ministry of Energy.
- Assess progress toward completion of actions with a special emphasis on high priority actions.

This Plan is required by the Ontario Ministry of Energy to be formally revised every five years.

Energy Conservation and Demand Management Plan 2019-2024

This report has been prepared for the use of the Town of Hawkesbury, for the stated purpose, for the named facilities. Its discussions and conclusions are summary in nature and cannot be properly used, interpreted or extended to other purposes without a detailed understanding and discussions with the client as to its mandated purpose, scope and limitations. This report was prepared for the sole benefit and use of Town of Hawkesbury; any re-use or modification to this report and its appendices shall be at the sole risk of the Town.

This report is copyright protected and may not be reproduced or used, other than by Town of Hawkesbury for the stated purpose, without the express written consent of J.L. Richards & Associates Limited.

J.L. RICHARDS & ASSOCIATES LIMITED

Prepared by:



Mitchell Niles, P.Eng.
Energy Systems Engineer

Reviewed by:



Joan Haysom, P.Eng., Ph.D.
Innovative Energy Market Chief



www.jlrichards.ca

Ottawa

864 Lady Ellen Place
Ottawa ON Canada
K1Z 5M2
Tel: 613 728-3571

ottawa@jlrichards.ca

Kingston

203-863 Princess Street
Kingston ON Canada
K7L 5N4
Tel: 613 544-1424

kingston@jlrichards.ca

Sudbury

314 Countryside Drive
Sudbury ON Canada
P3E 6G2
Tel: 705 522-8174

sudbury@jlrichards.ca

Timmins

834 Mountjoy Street S
Timmins ON Canada
P4N 7C5
Tel: 705 360-1899

timmins@jlrichards.ca

North Bay

200-175 Progress Road
North Bay ON Canada
P1A 0B8
Tel: 705 495-7597

northbay@jlrichards.ca

Hawkesbury

326 Bertha Street
Hawkesbury ON Canada
K6A 2A8
Tel: 613 632-0287

hawkesbury@jlrichards.ca

Guelph

107-450 Speedvale Ave.
West Guelph ON Canada
N1H 7Y6
Tel: 519 763-0713

guelph@jlrichards.ca

