ENERGY CONSERVATION &
DEMAND MANAGEMENT PLAN
RFP #E17-01-1901

Prepared for:

THE TOWN OF HAWKESBURY
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Energy Conservation and Demand Management Plan 2019-2024

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1.0 Executive Summary

1.1 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 every 5 years. The Town retained J.L. Richards & Associates Limited to update their existing plan that was published in 2014. This plan seeks to improve upon the original plan while meeting the Town's obligations under the regulation. 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.

Electricity costs in Ontario are expected to increase over 20%, or roughly 4% per year, over the next five years. On April 1st, 2019 the federal carbon tax backstop came into effect at $20 per tonne of greenhouse gas emissions. 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. This further supports the need for Ontario municipalities to carefully manage their energy use.

1.2 Past Performance & Actions

This plan provides alternative benchmarks that will take into account expansion or increased usage, and will be detailed separately for facilities, plants and street lighting, as energy use intensity (EUI), which normalizes energy use of facilities of different sizes to common metric such as floor area or flow. Generally a low EUI signifies good energy performance.

Figure 1 displays the Town's combined equivalent energy consumption and the corresponding greenhouse gas emissions of all facilities 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

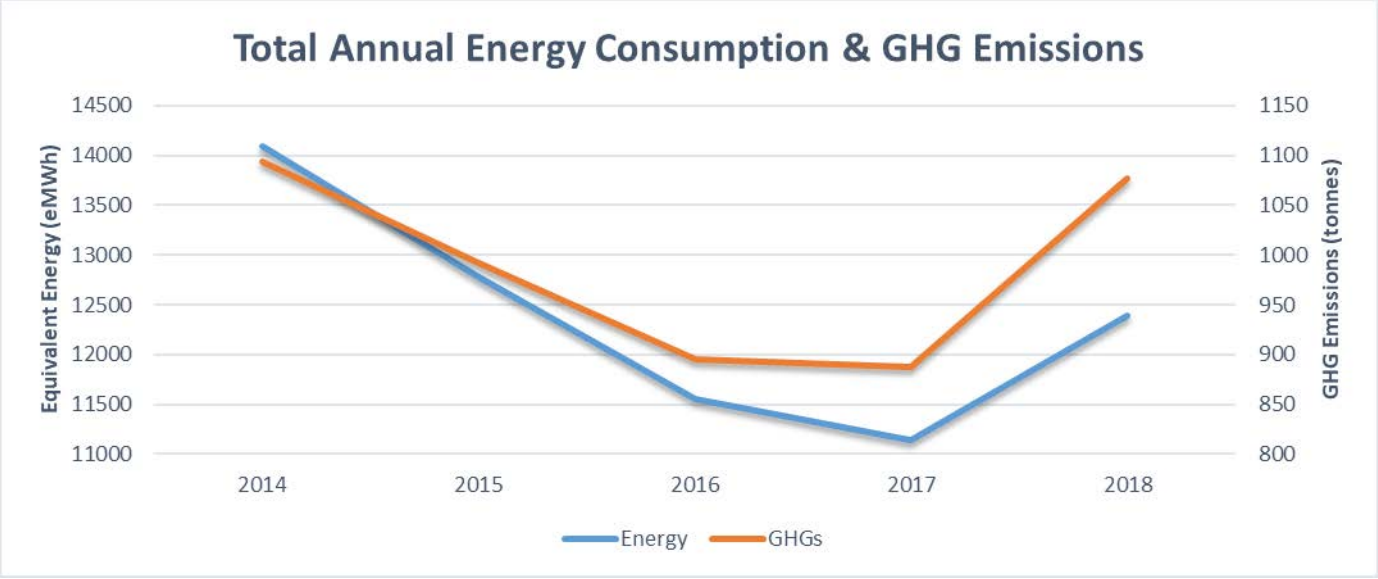

Figure 1: Town's total energy consumption and associated greenhouse gas emissions of all municipal buildings and streetlights from 2014 to 2018.

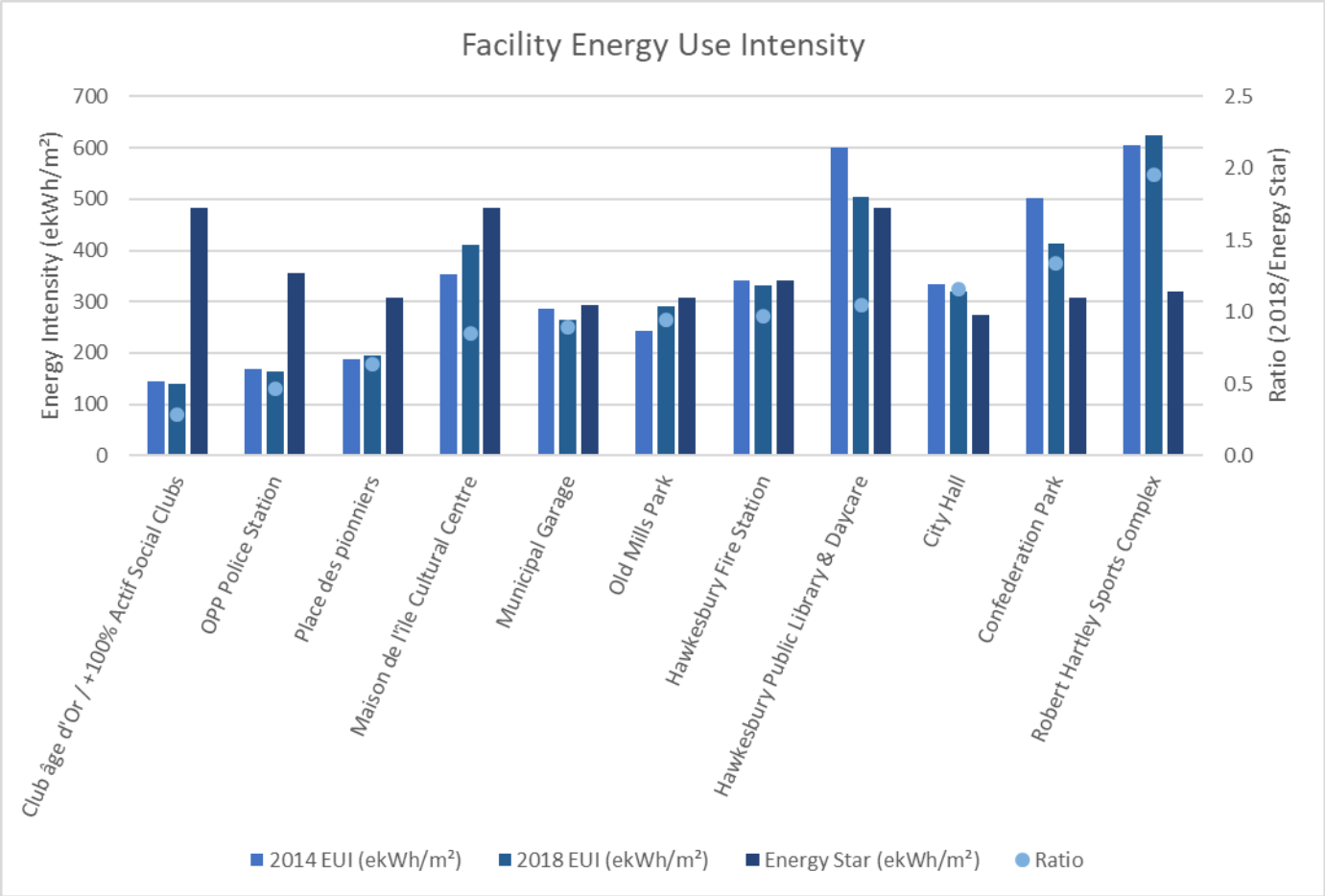

Figure 2: 2014 and 2018 energy use intensity for Town's facilities compared to Energy Star® Portfolio Manager® Canadian national median table for energy use intensity by property type.

consumption by more than half for street lighting. The increase in 2018 is largely associated with an increase in natural gas consumption at the sewer treatment plant.

All of the Town's facilities performed reasonable well against 2019 Energy Star® Portfolio Manager® Canadian national median (Figure 2). 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.

The Town's water and sewer treatment plants consume more energy than the national median. As these facilities are also the Town's greatest energy consumers they should be the focus of energy efficiency initiatives.

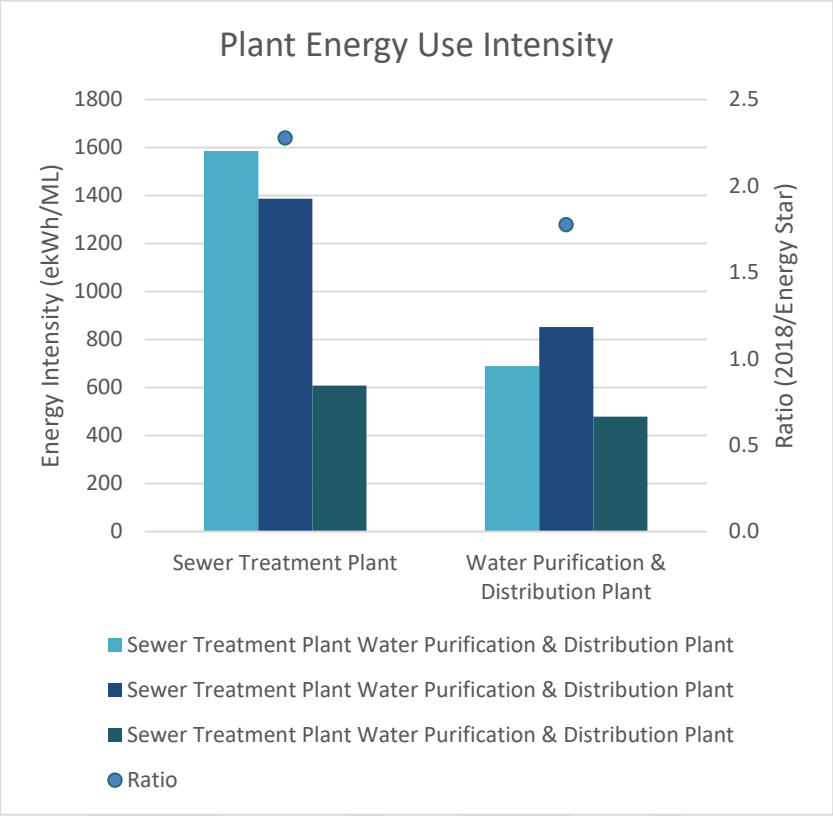

Figure 3: 2014 and 2018 energy use intensity for Town's plants compared to Energy Star® Portfolio Manager® Canadian national median table for energy use intensity by property type.

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 CDMP 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.

1.3 Energy Management

Energy management is the continuous process of managing change in the Town's behavioral, organizational, and technical practices. Based on a self-assessment, the Town's energy management performance were originally self-assessed for the 2014 CDMP across the eight categories and reassessed for this plan. Energy management practices have decreased in commitment, planning, projects and financing, and remained static in the other categories. The Town's energy management policy states its vision as:

> *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 Town has established the following objective for its energy management with this plan:

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.

Communication: *Level 3 practice*
Energy efficiency related activities are reported are marketed occasionally within the municipality. In general, the frequency of outreach should be based on the completion of projects.

Training: *Level 2 practice*
Town's Energy Officer has received training in energy efficiency management practices.

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

Target	Facilities	Plants	Streetlights
2024	7.5%	5%	65.5%
2029	10%	7.5%	66.6%

1.4 Future Actions

This plan provides a list of action items the Town can pursue in order to achieve their targets listed in the energy management policy. This include simple inexpensive energy efficiency projects that have a quick payback such as installing lighting controls in the garage at the Hawkesbury Fire Station to complex capital projects that result in substantial savings such as upgrading the aeration process at the Sewer Treatment Plant to high speed turbo blowers or conducting an energy optimization study at the Water Treatment plant.

In addition, there are general initiatives that the Town should pursue such as conducting energy audits of the major accounts (Robert Hartley Sports Complex, sewer and water treatment plants), replacing all lighting across all facilities to LEDs, establishing a Revolving Green Fund to finance future projects, and hiring an Energy Manager.

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. 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 simple payback of these systems ranges from 13 years to 20 years, which are all within the 35 year expected lifetime of a rooftop solar system. The Robert Hartley Sports Complex has the greatest potential for a 380 kW system that has a simple payback of 13 years.

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.

1.5 Expected Results & Continuous Improvement

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 will be reviewed on an on-going basis to re-assess objectives and associated actions based on the output of the monitoring process. The plan for undertaking this annual review will be conducted by the Energy Officer is the form of a short report.

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 (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 24th, 2019 council meeting.

The Town intends to revisit and update this Plan every five years, as required under the regulation. The Town's Energy Officer, Guillaume Boudrias has overall responsibility for the maintenance and implementation of this plan.

2.2 Plan Scope

This plan seeks to update and improve upon the CDMP 2014 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 to update the Energy Conservation & Demand Management Plan 2014 (CDMP 2014) through a competitive request for proposal process. J.L. Richards & Associates Limited (JLR) is a multidisciplinary practice offering services in all core engineering disciplines, architecture, planning, and project management. JLR worked with the Town's Energy Officer, Guillaume Boudrias and Gerry Dicaire, Municipal Building Superintendent 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.

Name	Address	Use	Floor Area (ft2)
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 & 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 & 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 street lights that are included in this plan.

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 & 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 previously quarter largely driven by the decrease in the commodity price. Although there are no reliable long-term forecast for the North American natural gas commodity price, there is certainty that the price of natural gas will be effected by the recently announced carbon tax. On April 1st, 2019 the federal carbon tax backstop came 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 a 80% increase in price relative to 2019 costs as shown in Figure 1.

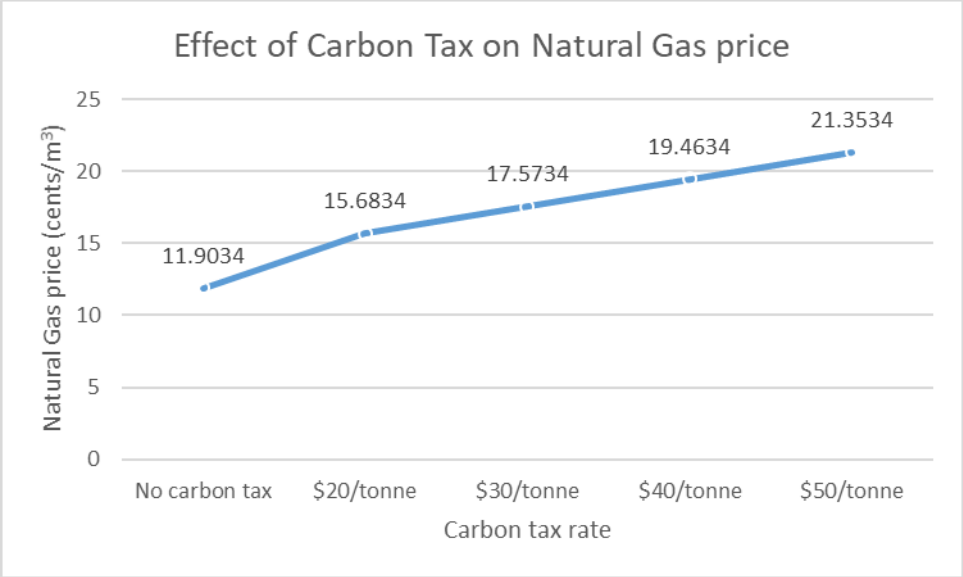

Figure 2: Projected increase of natural gas price due to carbon tax.

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 1st, 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
- 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 CDMP 2014 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 CDMP 2014 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 consumptions 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 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):

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

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.

Account	Total Floor Area (m²)	Electricity (kWh)	Natural Gas (m³)	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 Plants Benchmark

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):

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

EUI using flow rate is a commonly used metric for water and sewer plants 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.

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 affect their energy reduction targets the benchmark for street lighting is set as a ratio of energy consumption per light:

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

Using this metric for benchmarking will encourage the adoption of energy efficiency 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 & Emissions

This section will provide an overview of the Town's energy consumption and greenhouse gas emissions since CDMP 2014 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 facilities EUI and a year over year comparison against the benchmarks detailed in section 3.0.

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.

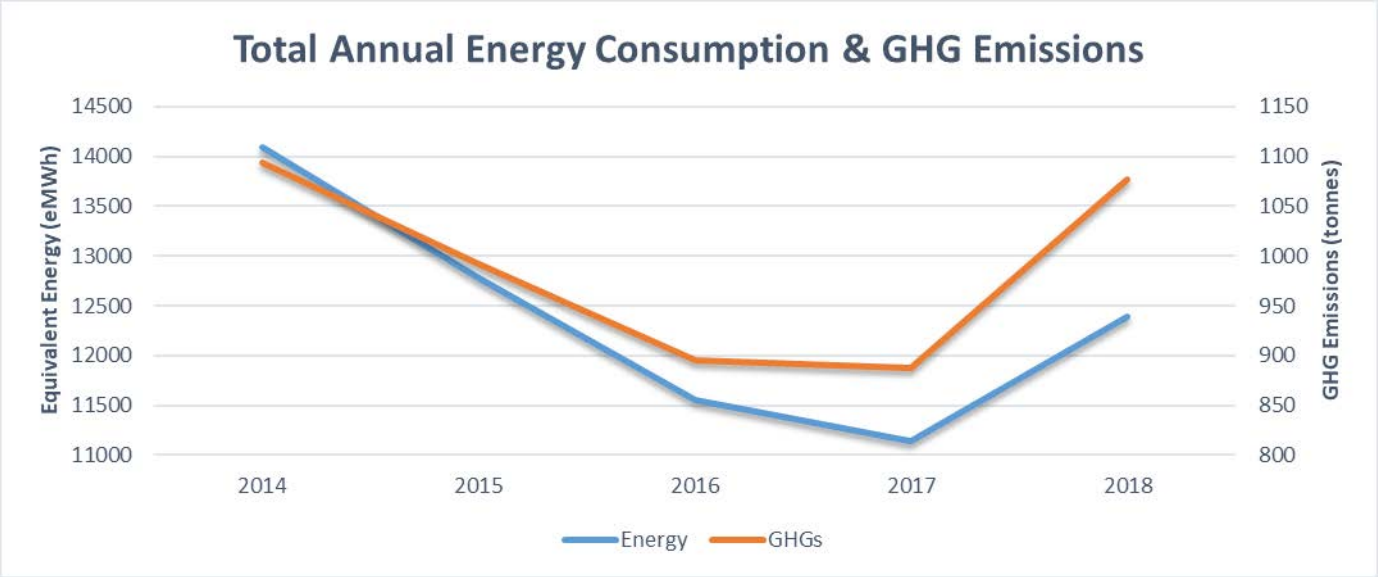

Figure 3: Town's total energy consumption and associated greenhouse gas emissions of all municipal buildings and streetlights from 2014 to 2018.

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 sewer 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 D'ile 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 sewer treatment plant, **and reduced electricity use.**

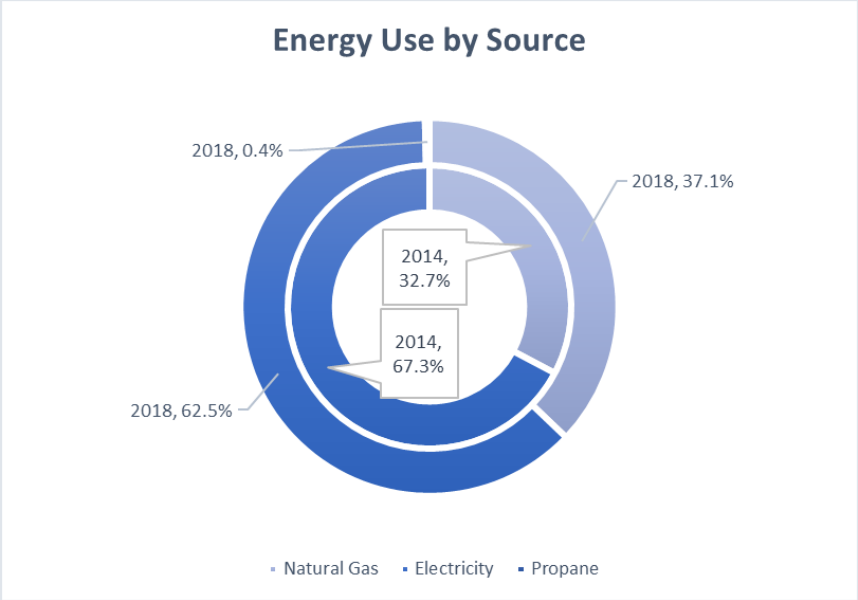

Figure 4: Town's total energy consumption by fuel source, 2014 compared to 2018.

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 decreased the percentage of energy use by 2018.

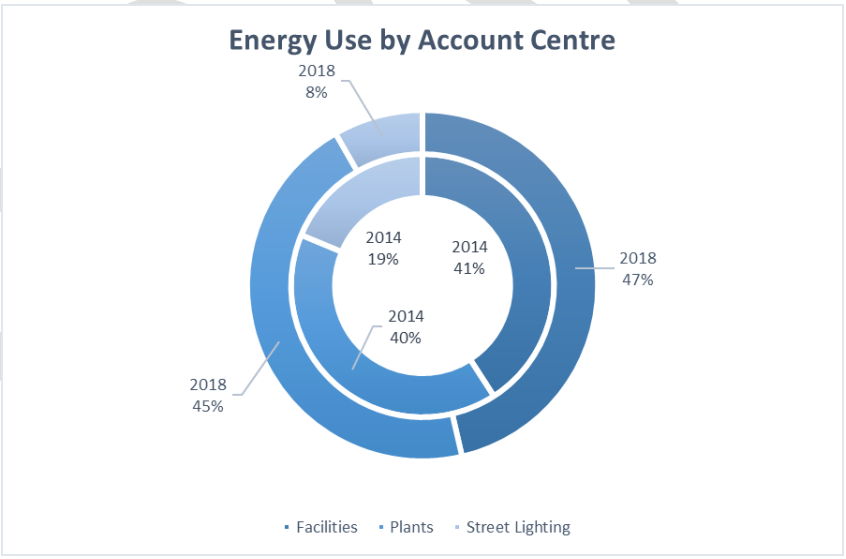

Figure 5: Town's total energy consumption by account centre categories, 2014 compared to 2018.

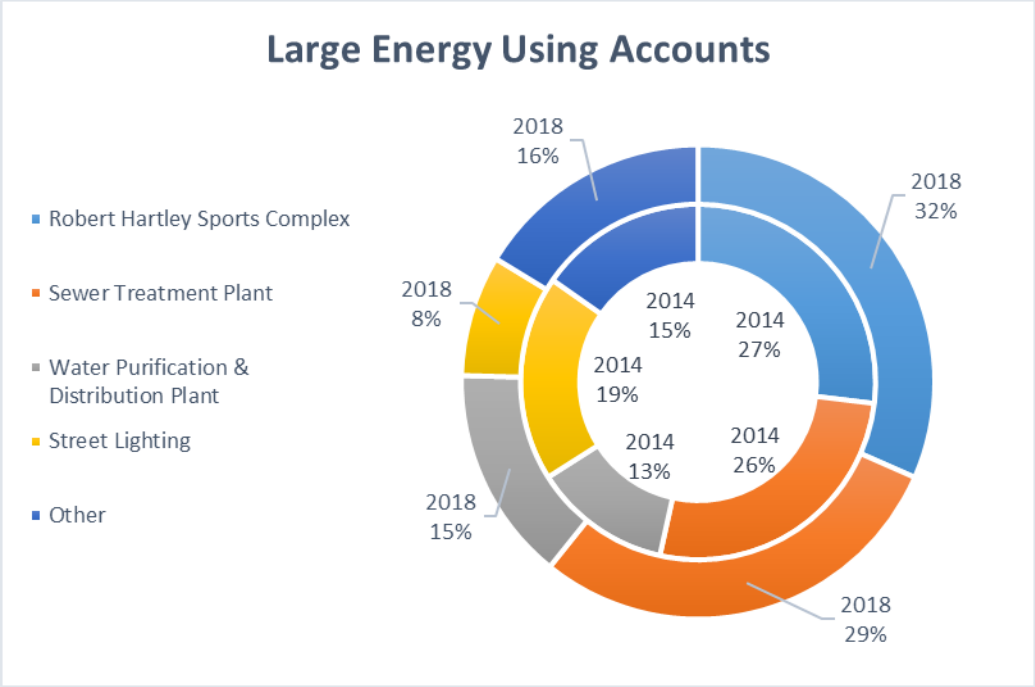

Figure 6: Town's largest energy using accounts, 2014 compared to 2018.

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 sewer 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 reasonable 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.

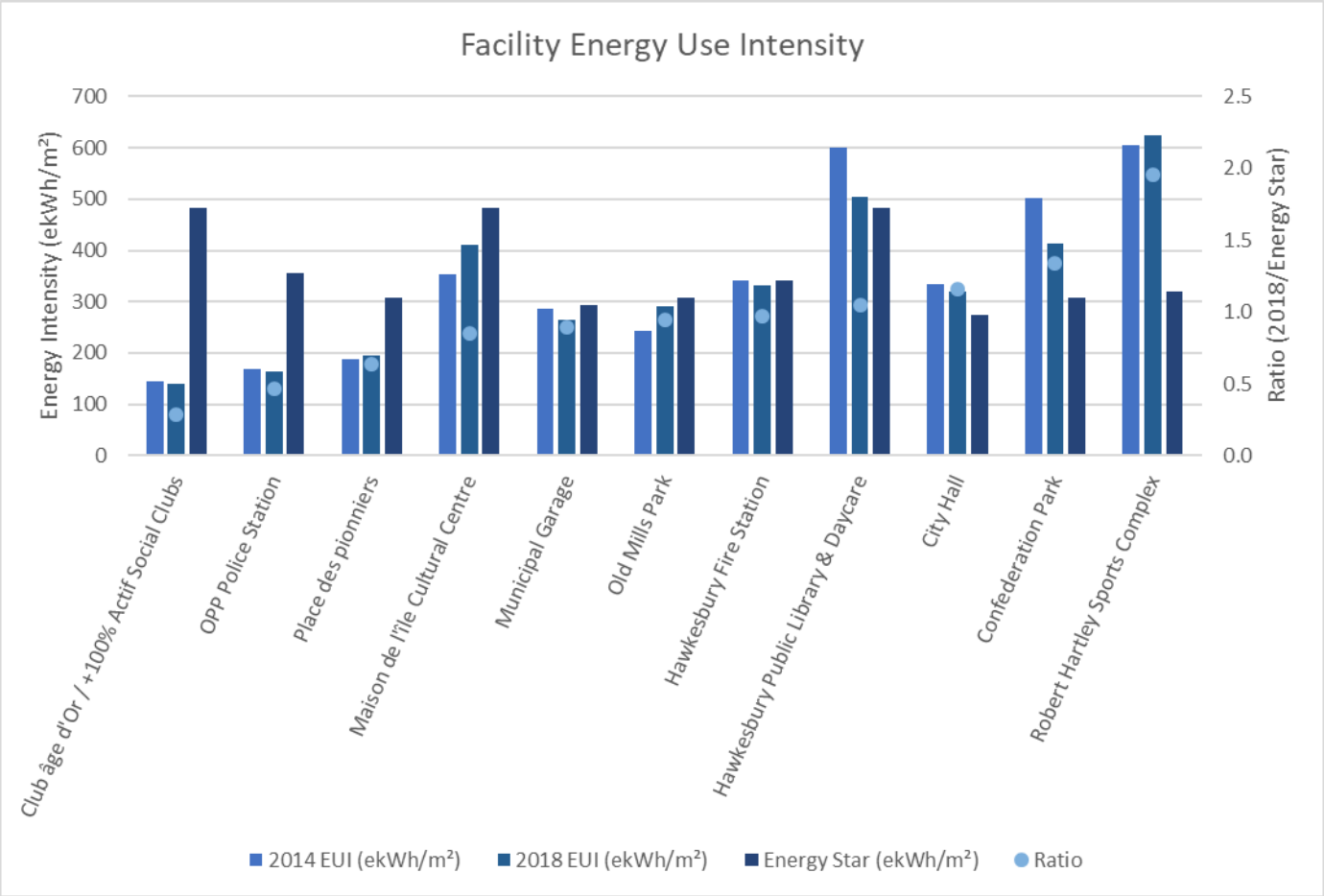

Figure 6: 2014 and 2018 energy use intensity for Town's facilities compared to Energy Star® Portfolio Manager® Canadian national median table for energy use intensity by property type.

Figure 6 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 represent a facility that consuming 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.

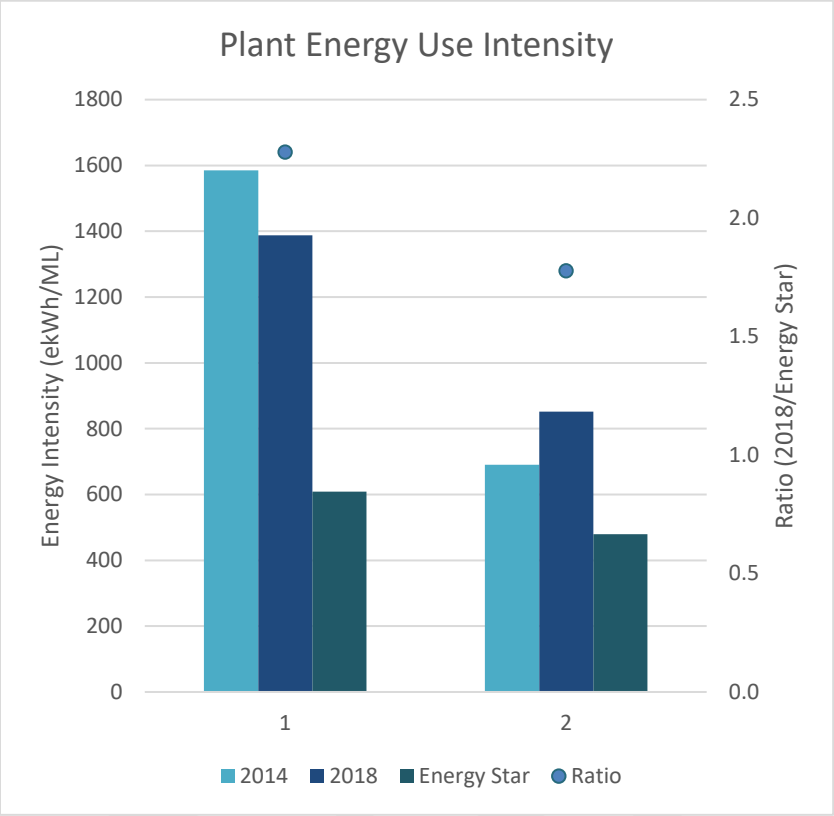

Figure 7: 2014 and 2018 energy use intensity for Town's plants compared to Energy Star® Portfolio Manager® Canadian national median table for energy use intensity by property type.

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 street light LED retrofit project undertake in 2015.

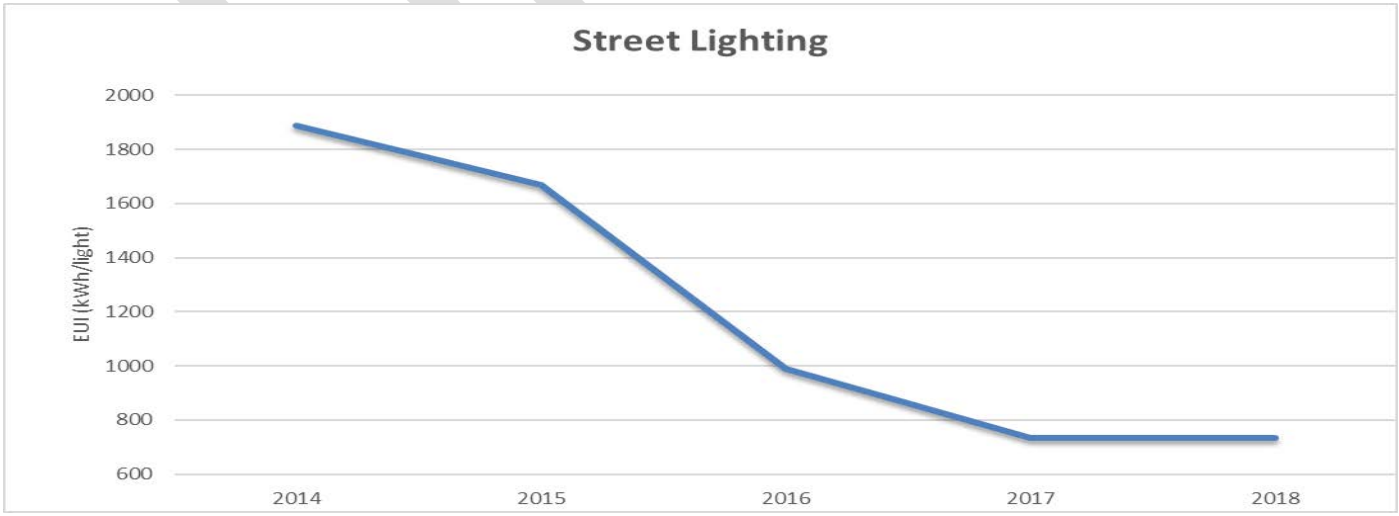

Figure 7: Town's street lighting average annual energy consumption per light from 2014 to 2018.

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 plant 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 Checkup Program	2016	All thermostats are consistently set based on seasonal and space needs. A checkup schedule has been established to ensure settings remain in place.
Robert Hartley Sports Complex	Pool Lighting Upgrade	2019	Pool area lighting fixtures have been replaced with LEDs.
Hawkesbury Fire Station	Programmable Thermostat	2015	A programmable thermostat was installed and a heating setback point was established for unoccupied spaces.
Maison D'Ile Cultural Centre	Propane Heating	2017	Electric heating was eliminated and forced air furnace was converted to use propane.

Table 5: Completed energy conservation measures by Town since CDMP 2014.

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 CDMP 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 Primer

Energy management is the continuous process of managing change in the Town's behavioral, 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. Table 6 defines these 8 practice categories. Energy management practices are improved by following the Plan-Do-Check-Act principles of ISO 50001, an international energy management standard.

- **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 Officer'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 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 that the Town optimizes the way it manages energy. Based on a self-assessment, the Town's energy management performance were originally self-assessed for the 2014 CDMP across the eight categories and reassessed for this plan, the results are displayed in Figure 8.

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

COMMITMENT	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	Energy policy exists with clear targets, and has commitment from mayor and 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.

PLANNING	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	An energy management plan covers all major practice categories, defines how targets will be achieved, and is implemented by all applicable municipal departments and staff
	Description of Current Practice: 3.5 – Only the Town's Energy Officer and Municipal Buildings Superintendent provided input into the development of this plan.				

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

ORGANIZATION	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 the 2014 CDMP, Guillaume Boudrias was named as the Energy Officer.				

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

PROJECTS	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 CDMP 2014 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

FINANCING	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 to measure energy efficiency projects by. This plan has utilized simple payback as the sole investment metric for comparing options.				

Tracking: You can't manage what you don't measure. Energy performance can be managed by monitoring and benchmarking.

TRACKING	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.
	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 CDMP 2014 and the metrics used in these benchmarks have been improved as a part of this plan.				

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

COMMUNICATION	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
	Description of Current Practice: 2 – Town council is informed of municipal facility improvements, up to and including energy efficiency projects.				

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

TRAINING	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.
	Description of Current Practice: 1 – Municipal staff have not taken part in any training related to energy management.				

As shown in Figure 8, the Town's energy management practices have decreased in commitment, planning, projects and financing, and remained static in the other categories.

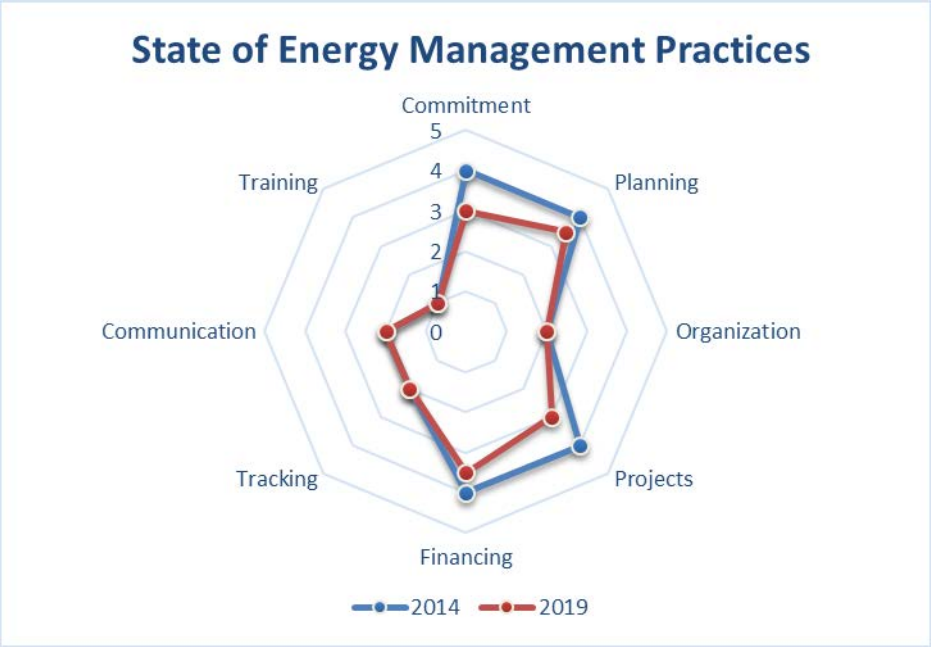

Figure 8: Town's state of energy management practices, 2014 compared to 2019.

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 CDMP 2014 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 & Demand Management Plan (Plan);*

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 are reported are 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*

Town's Energy Officer has received 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 space[2]:

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

8.4.2 Plants

Energy use intensity will be measured based on gross energy use intensity using flow rates[3]:

- ***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 streetlight[4]:

- ***Short Term:*** *65.5% reduction in EUI_S by 2024 over benchmark year of 2014.*
- ***Long Term:*** *66.6% reduction in EUI_S by 2029 over benchmark year of 2014.*

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

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

9.0 Future Actions

This section defines actions 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 rudimentary 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 8 displays a list of potential energy efficiency projects sorted by quickest payback the town can pursue to meet its energy reduction targets. Each action includes an order of magnitude cost estimate and energy savings with the associated greenhouse gas savings. Also listed are the various funding opportunities that would be applicable to each project (more information on these programs is detailed in section 8.4).

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 runtime 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

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
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
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
Robert Hartley Sports Complex Capital project to modernize refrigeration plant to utilize new equipment and controls technologies	$500,000	Q4 2020	135 MWh	$17,550	4799 kg	28 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

Action	Cost Estimate	Completion Date	Energy Savings	Annual Monetary Savings	Greenhouse Gas Savings	Simple Payback	Stakeholders	Funding Opportunities	Next Steps
Street Lighting Proceed with planned decorative streetlight LED retrofit	$550,000	Q4 2020	136 MWh	$17,680	4835 kg	31 years	Public Works	IESO Save On Energy Retrofit Program	Continue with selected contractor
Street Lighting Replace remaining decorative streetlights with LEDs	$211,000	Q4 2024	50 MWh	$6,500	1777 kg	32 years	Public Works	IESO Save On Energy Retrofit Program	Solicit and compare quotes from contractors

Table 6: Specific energy efficiency projects that can be pursued by Town to meet their targets.

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 that the Town should pursue to ensure they will effectively meet their targets.

9.2.1 Energy Audits of Major Accounts

As displayed in Figure 4, 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 & distribution plant are all over 40 years old and their respective EUIs are all higher than the national median. 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 8.4.1 the Green Municipal Fund will cover 50% of the costs for 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 CDMP 2014 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 spend 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 that makes it difficult to find additional funding to hire a 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 9.

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.

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 9: Rendering of a 380 kW roof top 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 car ports or ground mounted solar pergolas exist 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).

- **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:

- **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 saving 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
- The remaining 50% paid upon confirmation of the Project In-Service Date.

- **Project –** The project incentive is paid after the on 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**
- **Condensing Boilers**
- **Condensing Furnaces**
- **Condensing Make-up Air Units**
- **Condensing Storage and Tankless Water Heaters**
- **Demand Control Kitchen Ventilation (DCKV)**
- **Demand Control Ventilation (DCV)**
- **Destratification Fans**
- **ENERGY STAR® Qualified Equipment**
- **High Efficiency Boilers**
- **Heat Recovery Ventilator (HRV)**
- **Energy Recovery Ventilator (ERV)**
- **Infrared Heaters**
- **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 costs. 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 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 project 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.

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 have a

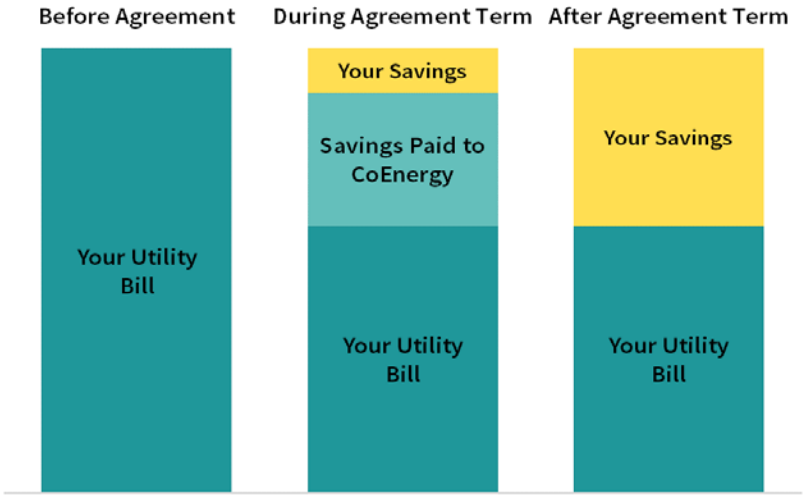

Figure 10: CoEnergy's comprehensive energy savings distribution (CoEnergy, 2018)

positive return on investment are 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.

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.

10.0 Expected Results

This section provides a forecast of the expected results if the Town pursues all of the energy efficiency initiatives outlined in section 8.1. Additional savings could be realized through the actions described in sections 8.2 and 8.3 but they have not been included in these forecasts.

Figure 13 displays the EUI of facilities, measured as total energy consumption per gross floor space. Figure 14 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.

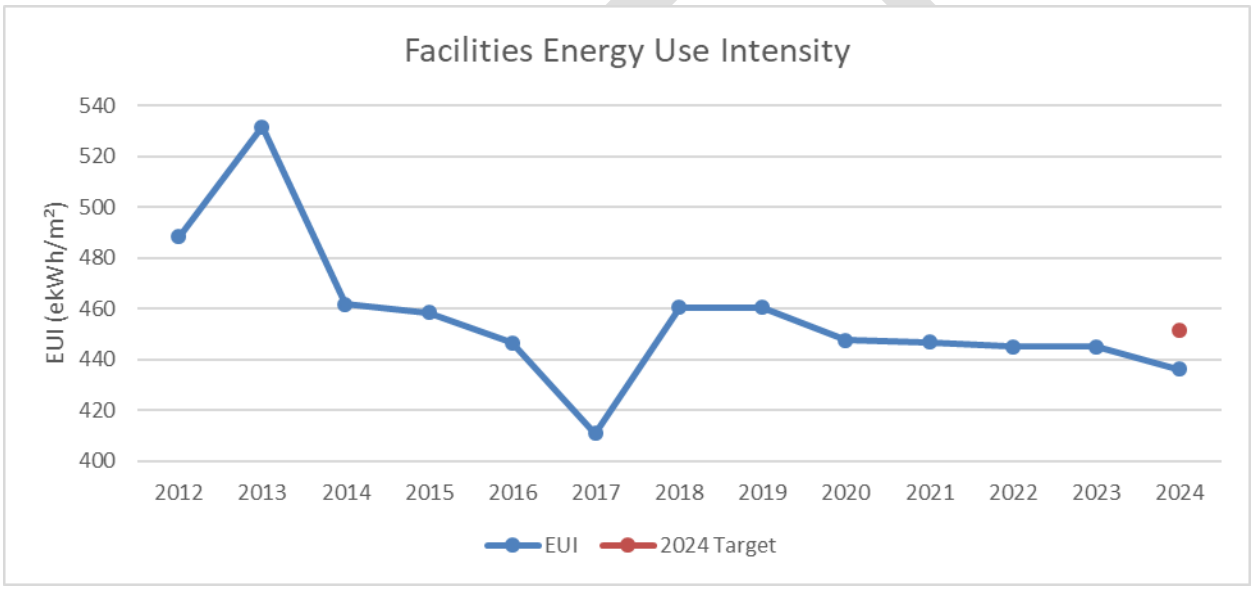

Figure 11: Gross energy use intensity of all facilities with 2024 energy reduction target.

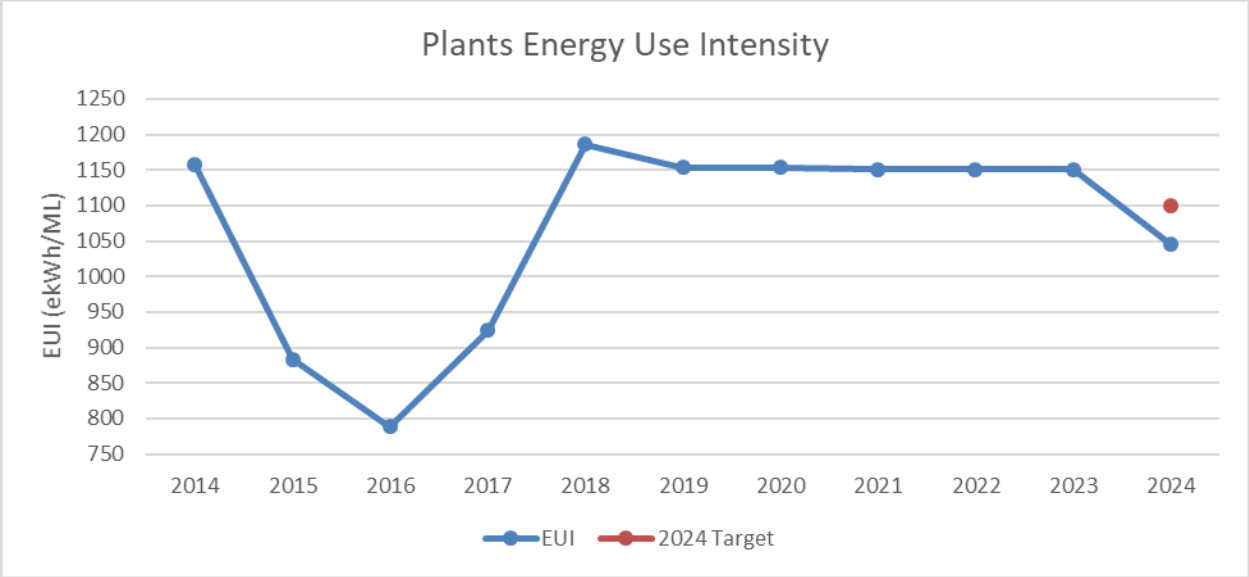

Figure 13: Gross energy use intensity of all plant with 2024 energy reduction target.

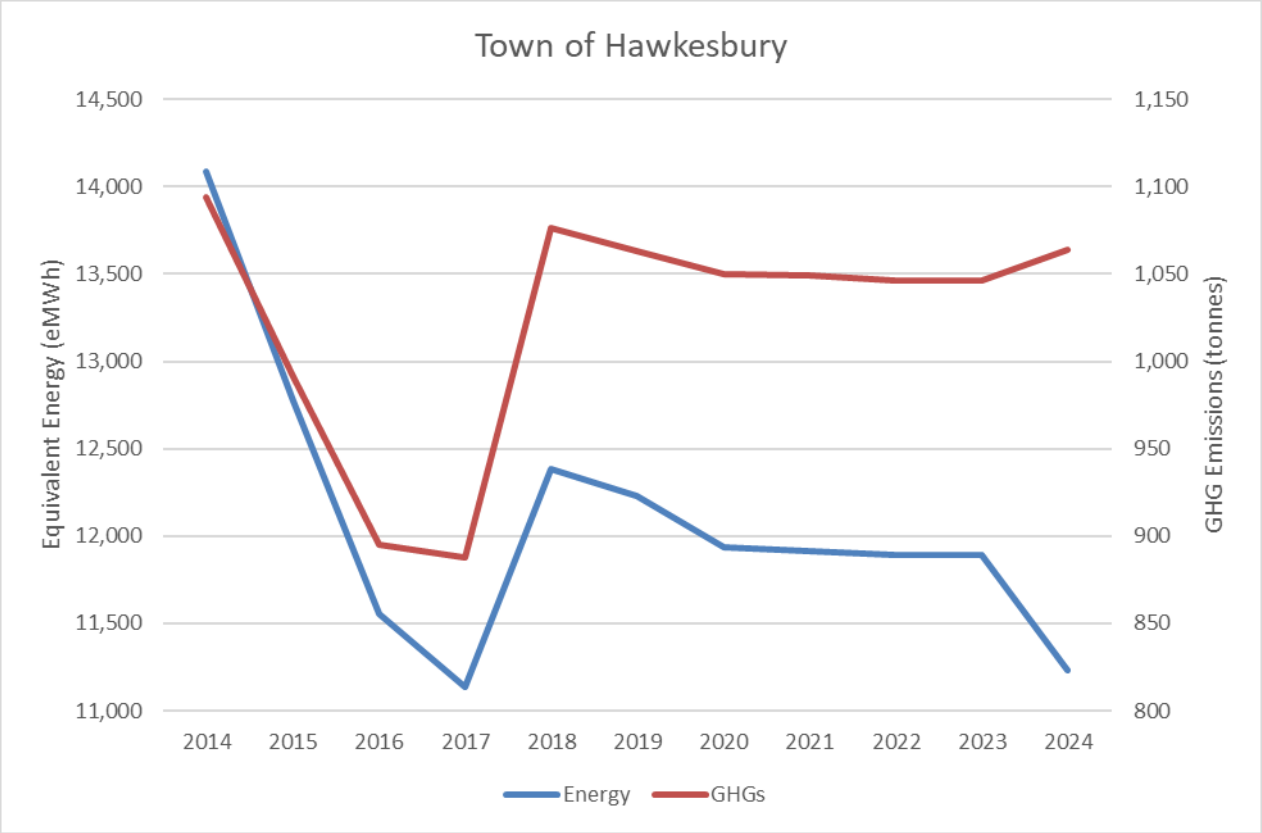

Figure 12: Total energy consumption and greenhouse gas emission for the Town of Hawkesbury projected to 2024.

11.0 Plan for Continuous Improvement

This plan will be reviewed on an on-going basis to re-assess objectives and associated actions based on the output of the monitoring process. The plan for undertaking this annual review will be conducted by the Energy Officer is the form of a short report that will consists 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 the 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.

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