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Clarence-Rockland

Energy Conservation and Demand Management Plan 2019-2024

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ENGINEERS · ARCHITECTS · PLANNERS

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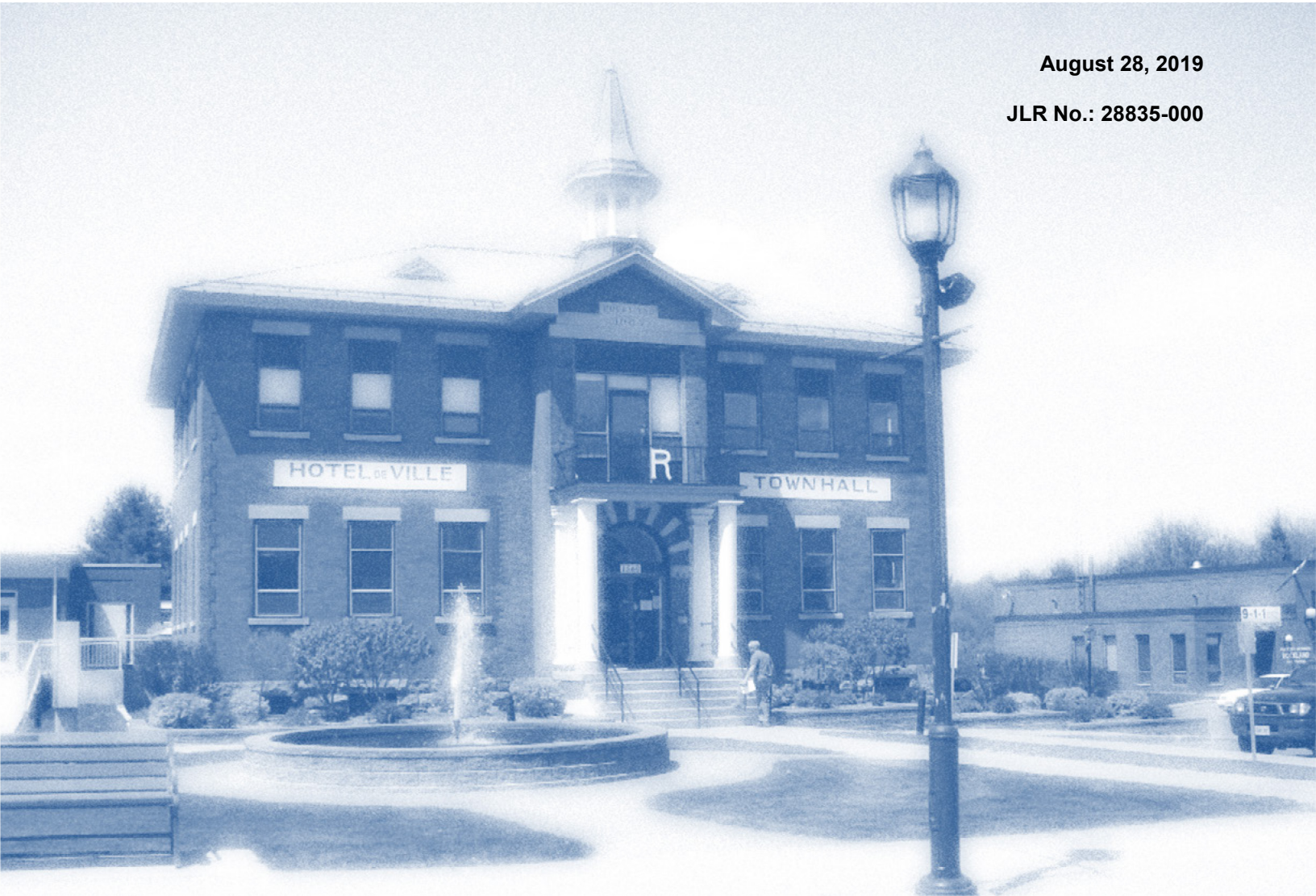

Table of Contents

1.0 Executive Summary

Context

Under O. Reg. 507/18 of the Electricity Act, the City of Clarence-Rockland 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 City with a 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; the latter price will result in 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 increase in the City's total energy consumption since 2012 is a result of additional facilities being built or purchased by the City. The decrease in greenhouse gas emissions (GHGs) is almost entirely associated with the greening of the Ontario electrical grid through the retirement of Ontario Power Generation's coal plants. The City has not seen the equivalent decrease in GHG emissions due to an increase in natural gas consumption and an overall increase in energy consumption.

All of the City's facilities performed reasonably well against the national median. 4 properties consume 52% of the City total energy consumption. Rockland's water and wastewater treatment plants are the largest energy consumers followed by the arenas in Clarence-Creek and Rockland (Jean-Marc Lalonde). Both of the plants consume more energy than the national median. As these facilities are also the City's greatest energy consumers, 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 City staff to take on new projects. The City does not currently generate any renewable energy.

City's Energy Management Practice Self-Assessment and Targets

The City's energy management practices from 2014 to 2019 have been self-assessed for this report. The levels have increased in commitment, planning, and organization. Training, communication, finance and projects have remained static since the 2014 plan.

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

> *The City of Clarence-Rockland will approach energy management proactively. We will pursue energy solutions that will lead to environmental, societal and economic benefits.*

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

> ***Projects:*** *Level 3 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 2 Practice*
Energy efficiency is promoted informally through the City's communication.

Training: *Level 2 Practice*
One city staff has received training in energy efficiency management practices.

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

Target	Facilities	Plants	Streetlights
2024	0%	20%	56.8%
2029	4%	25%	56.8%

Identified Energy Initiatives

This Plan provides a list of potential specific energy efficiency projects the City can pursue in order to achieve their targets. This list includes simple projects such as installing programmable thermostats, to complex capital projects such as modernizing the refrigeration controls at the Clarence Creek Arena. There are general initiatives the City should pursue, such as conducting energy audits of major accounts (Clarence Creek and Jean-Marc Lalonde Arenas as well as sewer and water treatment plants), assessing the solar photovoltaic capacity for all City facilities, establishing a "revolving green fund" to finance future projects, and establishing an energy retrofit management program.

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 City 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 Officer in the form of a short report.

2.0 Overview

2.1 Introduction

Under Ontario Regulation 507/18 of the Electricity Act, the City of Clarence-Rockland (the City) 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 City's senior management approved this Plan in early August 2019. The City's Council subsequently adopted this Plan at the September 4th, 2019 council meeting.

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

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 City's obligations under O. Reg. 507/18. The purpose of this Plan is to provide the City 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 City's facility buildings, water and sewer plants and street lighting (as displayed in Table 1). Energy consumption and greenhouse gases associated with the City's vehicle fleet are not included in this plan. This Plan does not include activities by the broader community within Clarence-Rockland's municipal boundary.

2.3 Plan Development

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

This Plan was created in four stages, by:

1. Reviewing the City's Energy Plan, reporting and initiatives;
2. Analyzing annual electricity, natural gas and heating oil 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 City'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			
Alphonse Carrière Community Center	3154 Gendron Street, Hammond	Community Centre	2,296
Ronald Lalonde Community Center	2564 St-Pascal Rd, St-Pascal	Community Centre	5,756
Bourget Community Center	19 Lavigne Rd., Bourget	Community Centre	10,686
Chamberland Center	1517 Laurier St, Rockland	Community Centre	2,128
Clarence Creek Arena	418 Lemay St., Clarence Creek	Indoor Ice Rink; Community Centre	35,165
Jean-Marc Lalonde Arena	1450 ave du Parc, Rockland	Indoor Ice Rink; Community Centre	41,171
Band Shell	1500 ave du Parc, Rockland	Cultural Facility	756
Arts and cultural Center	1500 ave du Parc, Rockland	Cultural Facility	1,430
Museum	687 Laurier, Rockland	Cultural Facility	6,879
Recreation Garage	2815 Chamberland, Rockland	Storage Facility	1,812
Municipal Garage	417 Lemay St, Clarence Creek	Storage Facility	6,297
Archives	2475 ch. St-Pascal, St-Pascal	Administrative Office	2,257
Rockland City Hall	1560 Laurier Street, Rockland	Administrative Office	10,626
Fire Department Admin Building	1536 Laurier Street, Rockland	Administrative Office	1,610
Rockland Fire Hall	1550 Laurier, Rockland	Fire Station	3,000
Clarence Creek Fire Hall	1484 Landry Street, Clarence Creek	Fire Station	2,400
Bourget Fire Hall	2163 Laval Street, Bourget	Fire Station	2,300
Clarence Creek City Hall	415 Lemay Street, Clarence Creek	Administrative Office	4,326
Bourget Train Station	139 Levis Street	Other	1,902
Water and Sewage			
Rockland Water Treatment Plant	125 Edwards Street, Rockland	Water Treatment	15,000
Rockland Water Booster Station	1441 Caron St., Rockland	Water Pumping	-
Water Tower 1	888 St-Joseph St., Rockland	Water Pumping	-
Water Tower 2	2340 Bouvier Rd., Clarence Creek	Water Pumping	-

Water Tower 3	205 Grand Tronc Road, Cheney	Water Pumping	-
Rockland Step Pump System	000 Edwards St., Rockland	Water Pumping	-
Rockland New Pumping Station	25 de la Berge St., Rockland	Water Pumping	-
Rockland Wastewater Treatment Plant	700 Industrial Road, Rockland	Sewage Treatment	30,000
Sewage Pumping Station 1	455 Notre Dame St., Rockland	Sewage Pumping	-
Sewage Pumping Station 2	St Jacques St., Rockland	Sewage Pumping	-
Sewage Pumping Station 3	2780 Chamberland St., Rockland	Sewage Pumping	-
Sewage Pumping Station 4	1797 Albert St., Rockland	Sewage Pumping	-
Sewage Pumping Station 5	210 Edwards St., Rockland	Sewage Pumping	-
Sewage Pumping Station 6	151 Laurier St., Rockland	Sewage Pumping	-
Sewage Pumping Station 7	871 Platinum St. Rockland	Sewage Pumping	-
Street Lighting			
Street Lights (9 accounts)	Various	Other	

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

2.4 Plan Structure

Details are presented under the following sections:

- Section 3 – Ontario's Energy Picture;
- Section 4 – Baseline Energy Use;
- Section 5 – Energy Consumption and Emissions;
- Section 6 – Conservation and Renewable Energy Measures;
- Section 7 – Current State of Energy Management;
- Section 8 – Energy Management Policy;
- Section 9 – Identified Energy Initiatives;
- Section 10 – Expected Impact of Initiatives;
- Section 11 - Plan for Review.

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.

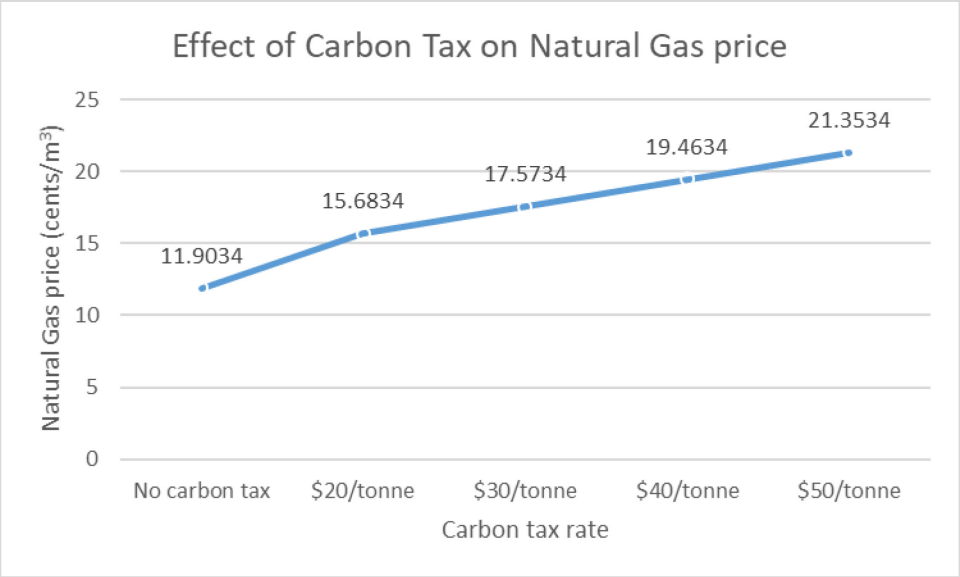

Figure 1: Projected Increase of Natural Gas Prices Due to Carbon Tax

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 City 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 City'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 City'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 City 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, natural gas and fuel oil 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 City as the benchmark to which targets for future years are measured against can result in the City unfairly missing their targets due to expansion or increased use of facilities that are out of their control. For example, if the City constructs a new fire hall, the *total energy consumption* of the City will increase due to this new load regardless of energy efficiency measures enacted at other facilities. If this new fire hall 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 City's control, 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. For this analysis, the benchmark energy consumption of the facilities was normalised to the gross floor space. The normalized energy consumption is known 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 which allows for additional facilities to be constructed or acquired by the City without negatively effecting their energy reduction targets. Generally a low EUI signifies good energy performance. Using this metric for benchmarking and targeting, rather than absolute energy consumption, allows for new facilities to be constructed by the City 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, fuel oil and equivalent energy consumption for 2012 of all of the City's non-water or sewage related buildings.

Account	Total Floor Area (m²)	Electricity (kWh)	Natural Gas (m³)	Fuel Oil (L)	Energy Consumption (ekWh)
Archives	210	13,440			13,440
Clarence-Creek Arena	3,267	624,420	17,201		807,228
Jean-Marc Lalonde Arena	3,825	180,960	48,620		697,683
Band Shell	70	14,595			14,595
Bourget Community Center	993	11,924			11,924
Bourget fire hall	214	37,457	2,743		66,609
Rockland City Hall	987	227,430	21,933		460,529
Rockland fire hall	279	29,284	5,263		85,218
Fire Department Admin Building	150	11,195			11,195
Alphonse Carrière Community Center	213	25,187			25,187
Ronald Lalonde Community Center	535	57,503			57,503
Arts and Cultural Center	133	14,595			14,595
Chamberland Center	198	50,576	2,372		75,785
Clarence Creek fire hall	223	19,126	4,130		63,019
Municipal Garage	585	142,180	2,702		170,896
Recreation Garage	168	70,500			70,500
Museum	639	23,490		6,929	98,169
Total	**12,688**	**1,553,862**	**104,964**	**6,929**	**2,744,075**

Table 2: City'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.

$$EUI_F = \frac{2{,}744{,}074\ \text{ekWh}}{12{,}688\ \text{m}^2} = 216\frac{\text{ekWh}}{\text{m}^2}$$

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 (EUIP):

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

EUI using flow rate is a commonly used metric for water and sewer 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 City to demonstrate the reduction in energy consumption due to energy efficiency measures independent of an increase in water consumption by the residents.

Table 3 displays the total flow rate, electricity, natural gas and equivalent energy consumption for 2012 of all of the City's water or sewage related buildings.

Account	Annual Flow (ML)	Electricity (kWh)	Natural Gas (m^3)	Energy Consumption (ekWh)
Rockland Water Treatment Plant	1,510.43	736,800	43,039	1,194,209
Rockland Water Booster Station	337.61	119,400	4,103	163,006
Rockland Water Tower 1	1,132.83	11,337		11,337
Rockland Water Tower 2	302.09	27,086		27,086
Rockland Water Tower 3	75.52	40,329		40,329
Rockland Wastewater Treatment Plant	1,252.81	907,200	26,080	1,184,372
Rockland Sewage Pumping Station 1	1,252.81	129,600		129,600
Rockland Sewage Pumping Station 2	626.40	102,000		102,000
Rockland Sewage Pumping Station 3	125.28	46,400		46,400
Rockland Sewage Pumping Station 4	125.28	38,000		38,000
Rockland Sewage Pumping Station 5	125.28	21,300		21,300
Rockland Sewage Pumping Station 6	125.28	16,600		16,600
Rockland Sewage Pumping Station 7	125.28	21,700		21,700
Total	**7,116.892**	**2,217,752**	**73,222**	**2,995,939**

Table 3: City's Plant 2012 Annual Flow and Energy Consumption

The flow rates through the sewer and water treatment plants and total equivalent energy consumption for 2012 is used to set the EUI benchmark that targets will be measured against.

$$EUI_P = \frac{2{,}995{,}939\ \text{ekWh}}{2{,}763\ \text{ML}} = 1{,}084\,\frac{\text{ekWh}}{\text{ML}}$$

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

4.3 Street Lighting Benchmark

In order to allow for new developments and roads to be constructed in the City 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:

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

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
1,601,592	1,603

Table 4: City's 2012 Electricity Consumption and Quantity of Streetlights

The electricity consumption and number of streetlights for 2012 is used to set the ratio of energy consumption per light that will be used as a benchmark for targets to be measured against:

$$EUI_S = \frac{1{,}601{,}592\ \text{kWh}}{1{,}603\ \text{lights}} = 999\ \text{kWh/light}$$

5.0 Energy Consumption and Emissions

This section will provide an overview of the City's energy consumption and greenhouse gas emissions since the previous Plan, including an overview of the City'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 City'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 City's combined equivalent energy consumption and the corresponding greenhouse gas emissions of all facilities from 2012 to 2018. Energy consumption is represented as equivalent kilowatt-hours, which is electricity as kilowatt-hours combined with natural gas and fuel oil converted to kilowatt-hours.

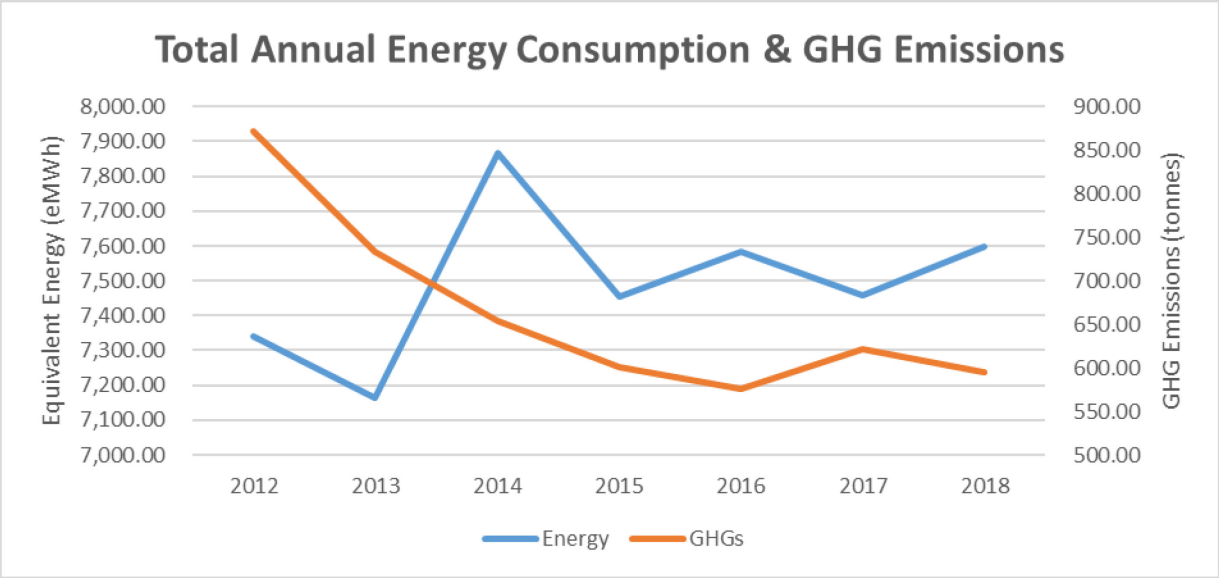

Figure 2: The City's Total Energy Consumption and Associated Greenhouse Gas Emissions of all Municipal Buildings and Streetlights from 2014 to 2018

The high energy consumption in 2014 is a result of abnormally high electric usage at the Clarence-Creek Arena. The increase in total energy consumption since 2012 is a result of additional facilities being built, purchased or the lease retained by the City such as Bourget Train Station, Clarence Creek City Hall and new water pumping stations in Rockland. The decrease in greenhouse gas emissions (GHGs) is almost entirely associated with the greening of the Ontario electrical grid through the retirement of Ontario Power Generation's coal plants. In 2012 the ratio of GHGs produced for electricity from the Ontario electrical grid was 100 g/kWh. By 2018 this ratio had decreased to 36 g/kWh. The City has not seen the equivalent decrease in GHG emissions due to an increase in natural gas consumption and an overall increase in energy consumption.

Figure 4 displays the City's energy consumption by fuel source for 2012 and 2018 (2012 data forms the inner ring, and 2018 data forms the outer ring). Electricity is the primary fuel source with natural gas and fuel oil used for space or process heating. The percentage increase in natural gas consumption in 2018 is due to fuel switching of a few facilities from electric heat or fuel oil to natural gas.

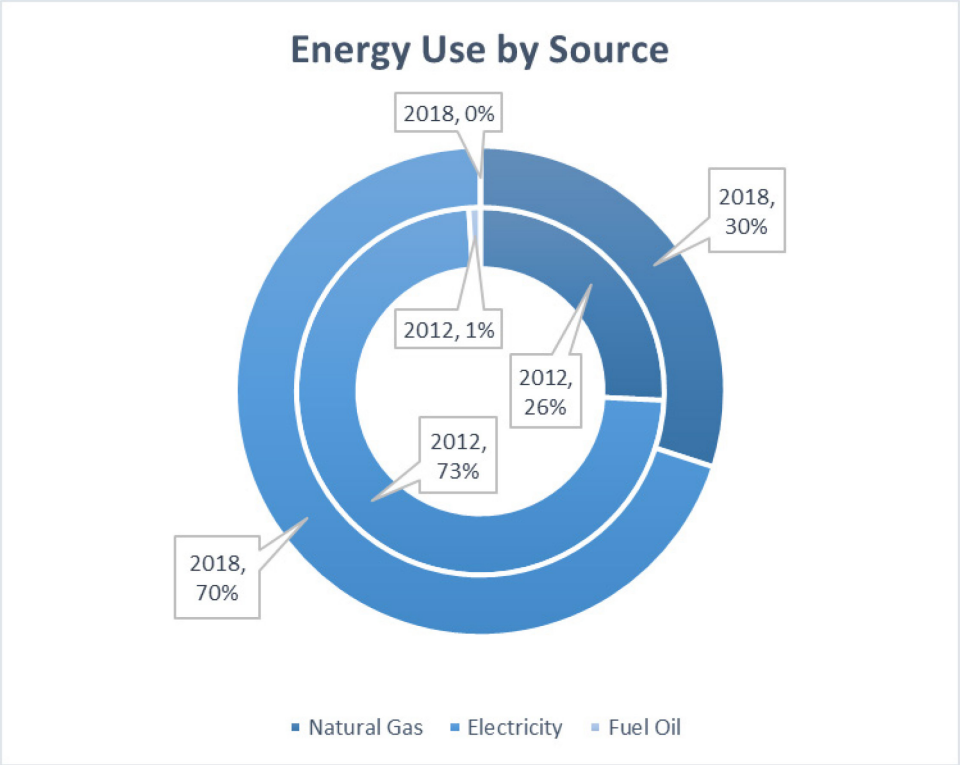

Figure 4: City's Total Energy Consumption by Fuel Source, 2012 Compared to 2018

Figure 3 displays the City's energy consumption by account centre categories for 2012 and 2018. Plants continue to be the largest account centre. Street lighting continues to be the smallest category and facilities has increase due to the new buildings constructed and acquired since 2012.

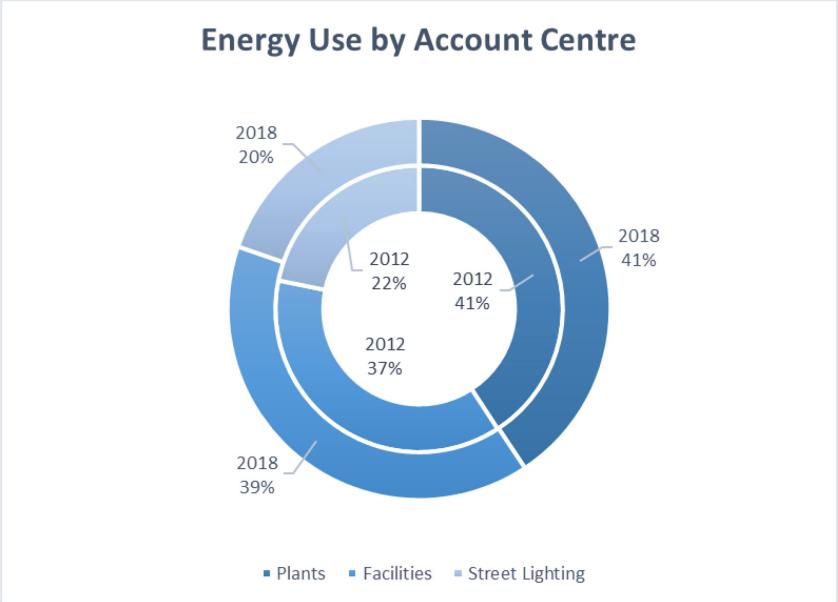

Figure 3: City's Total Energy Consumption by Account Centre Categories, 2012 Compared to 2018

Figure 5 highlights the City's largest energy consuming accounts in 2012 compared to 2018. The City's single largest account is street lighting. However, out of the combined 33 plants and facilities currently in use by the city, 4 properties consume 52% of the City total energy consumption. Rockland's water and wastewater treatment plants are the largest energy consumers followed by the arenas in Clarence-Creek and Rockland.

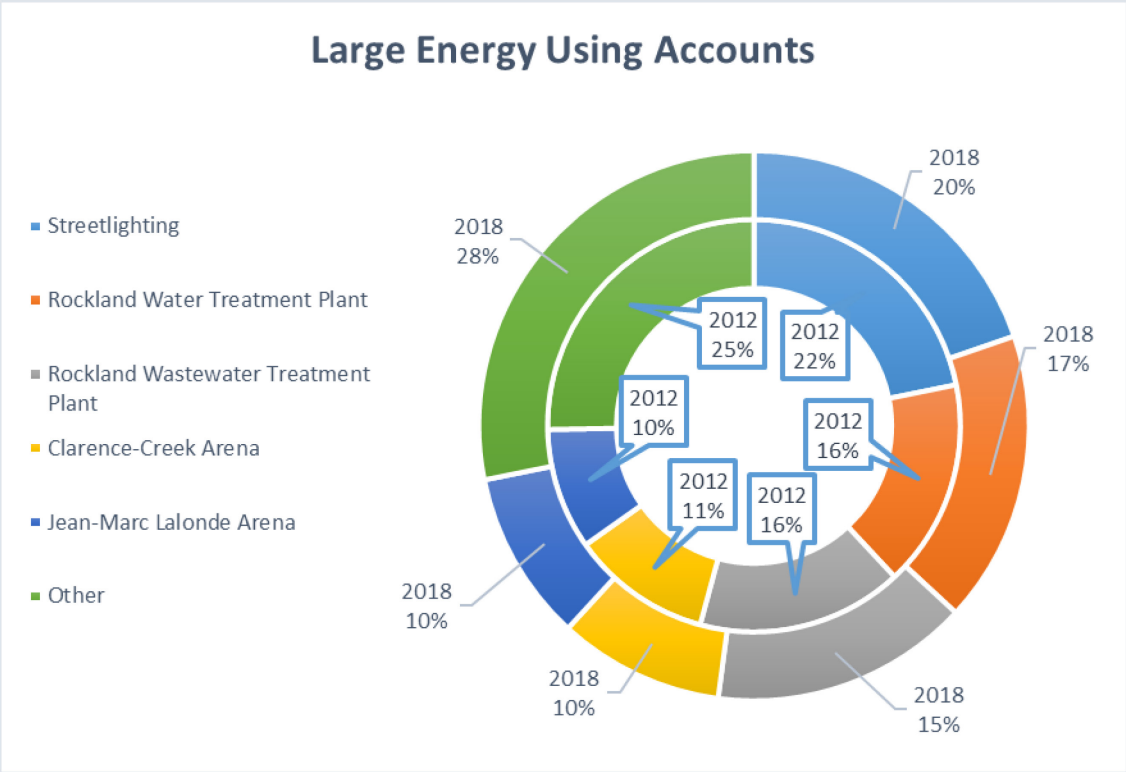

Figure 5: City's Largest Energy Using Accounts, 2014 Compared to 2018

Figure 6 displays the 2012 and 2018 energy use intensity for all of the City's facilities 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 lowest consumers (left) to highest consumers (right) when compared to the national median.

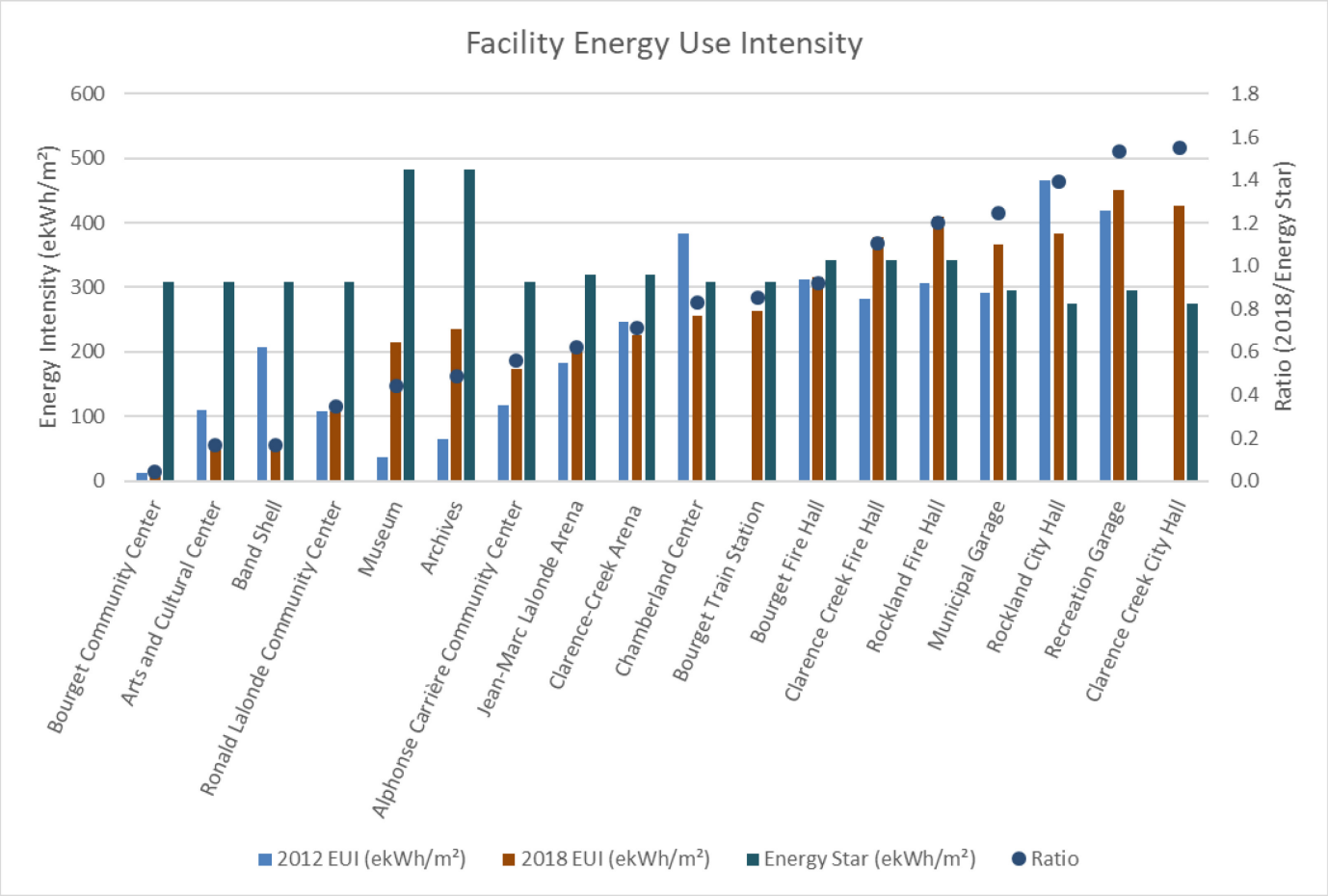

Figure 6: 2012 and 2018 Energy Use Intensity for City's Facilities Compared to Energy Star® Portfolio Manager® Canadian National Median Table for Energy Use Intensity by Property Type

All of the City'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 Clarence Creek City Hall is the worst performing facility and as a large energy user should be a focus for energy efficiency measures.

Figure 7 displays the 2012 and 2018 EUI for the City'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).

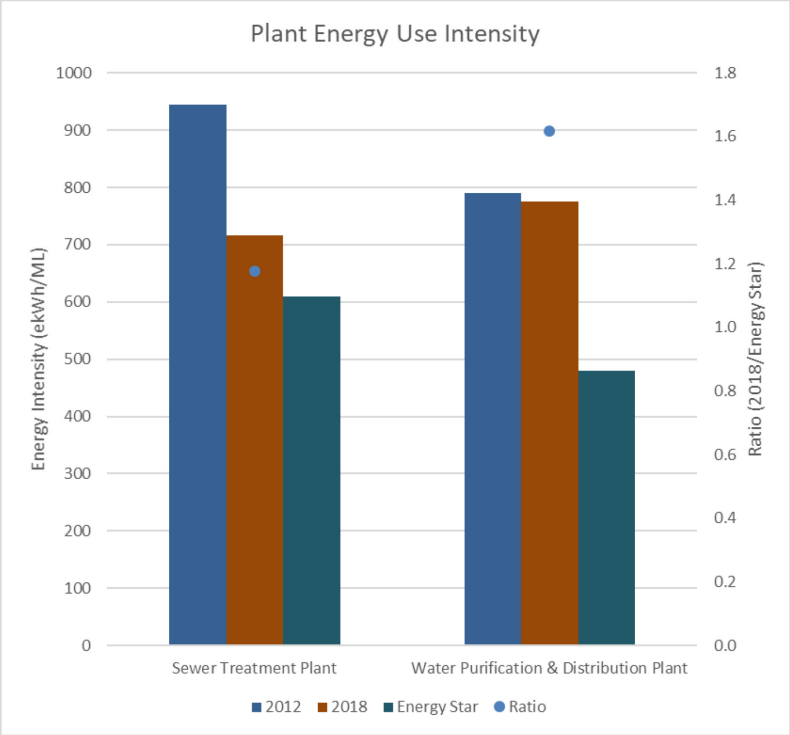

Figure 7: 2012 and 2018 Energy Use Intensity for City's Plants Compared to Energy Star® Portfolio Manager® Canadian National Median Table for Energy Use Intensity by Property Type

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 City's greatest energy consumers, they should be the focus of energy efficiency initiatives.

6.0 Conversation and Renewable Energy Measures

6.1 Energy Conservation Measures

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

Building	Project	Implementation Date	Description
Museum	Fuel switching and LED retrofit	2015	Converted from heating oil to natural gas and LED lighting replaced some incandescent lighting.
Clarence Creek Arena	LED lighting retrofit	2017	All lighting replaced with LED lights.
Bourget Community Centre	LED lighting retrofit	2018	LED lighting replaced some incandescent lighting.
Rockland City Hall	LED lighting retrofit	2018	LED lighting replaced some incandescent lighting.
Archives	LED lighting retrofit	2018	LED lighting replaced some incandescent lighting.
Band Shell	LED lighting retrofit	2018	LED lighting replaced some incandescent lighting.
Alphonse-Carrière Community Centre	LED lighting retrofit	2018	LED lighting replaced some incandescent lighting.
Recreation Garage	LED lighting retrofit	2018	LED lighting replaced some incandescent lighting.
Clarence Creek City Hall	LED lighting retrofit	2018	LED lighting replaced some incandescent lighting.
Arts and Cultural Center	Fuel switching	2018	Switching from electric baseboards to a natural gas forced air furnace.
Ronald Lalonde Community Centre	Fuel switching and LED retrofit	2019	LED lighting replaced some incandescent lighting.

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

The LED lighting retrofits are the most significant measure the City has completed since the last Plan resulting in electricity consumption decreasing for these facilities. 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 City staff to take on new projects.

City of Clarence-Rockland Street Lighting Policy

In 2017, the City of Clarence-Rockland approved a Roadway Lighting Policy in accordance with the Ontario Electrical Safety Code as well as the Illuminating Engineering Society of North America (IESNA). In addition to a planned retrofit of the existing streetlights, the City will install LED lighting instead of the previous high pressure sodium lights going forward. By using more efficient LED technology and photo sensors, the average energy use intensity of the streetlights will drop from its current annual usage of 934 kWh per light to an estimated 431 kWh per light, a drop of more than half. Light pollution has also been minimized through maximum lumen outputs as well as the use of semi or full cut-off luminaries which block light from needlessly shining into the sky.

6.2 Renewable Energy Measures

The City 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 City's behavioural, organizational and technical practices. The City'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.

- **Plan:** this Plan documents the City's energy management objectives and the actions that have been defined to improve its energy performance.
- **Do:** the City 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 City to readily measure whether change is successful.
- **Act:** the City 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 City's operations are aligned with best practices. Progressing upward across all eight categories will ensure the City optimizes the way it manages energy. The City'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.

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: 4 – In 2014 a formal energy policy was set in the form of an energy conservation and demand management plan. However, resource and budget allocations were not provided to accomplish the action items established in the 2014 plan.				

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 – Only the Municipal/Recreational Facility Manager and Wastewater/Water Treatment Plant Manager provided input into the development of this plan.					

Organization: Energy management is most effective when it's an integral part of all City 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: 3 – The Energy Officer designation is a part-time responsibility of a municipal staff member at the management level.				

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: 2 – Assessments are typically informal, with no policy for the development of energy efficiency opportunities. Many opportunities identified in the previous Plan were not implemented due to a lack of budget and City staff resources.				

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

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 – The City 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.				

Tracking: You cannot manage what you do not 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 City has been tracking cost using utility invoices on an annual basis and energy consumption in order to meet the ministry reporting requirements. Performance benchmarking is not part of the City'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.				

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: 1 – There is no active promotion of 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 City's energy management practices have increased in commitment, planning, and organization. The other categories have remained static since the 2014 plan.

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

8.0 Energy Management Policy

Whereas the previous sections present information on the City's current state of energy management, this section outlines the City'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.

City of Clarence-Rockland's Energy Management Policy

The City of Clarence-Rockland's Energy Management Policy outlines the City'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, city council and senior staff will incorporate energy management into all 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 City's Energy Conservation and Demand Management Plan (Plan);*
2. *Holding all city staff accountable and responsible for managing energy through corporate targets; and*
3. *Ensuring that city 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 City of Clarence-Rockland will approach energy management proactively. We will pursue energy solutions that will lead to environmental, societal and economic benefits.

8.3 Objectives

The City 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 3 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 2 Practice*

Energy efficiency is promoted informally through the City's communication.

*8.3.3 **Training:** Level 2 Practice*

One city staff has received training in energy efficiency management practices.

8.4 Targets

The following targets have been set in the context of the City'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:** Return EUI_F by 2024 to benchmark year of 2012.*
- ***Long Term:** 4% reduction in EUI_F by 2029 over benchmark year of 2012.*

8.4.2 Plants

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

- ***Short Term:** 20% reduction in EUI_P by 2024 over benchmark year of 2012.*
- ***Long Term:** 25% reduction in EUI_P by 2029 over benchmark year of 2012.*

8.4.3 Street Lighting

Energy use intensity will be measured based on energy use per streetlight[4]:

- ***Short Term:** Maintain current electricity consumption per fixture ratio.*

9.0 Identified Energy Initiatives

This section identifies initiatives that can be pursued by the City 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 City's facilities. This is followed by a general discussion on larger general initiatives the City can pursue to reduce energy consumption at their facilities. Finally a summary of available funding programs that provide incentives and financing for energy efficiency measures and renewable energy projects is included for the City to explore.

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

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

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

9.1 Energy Efficiency Initiatives

Table 6 displays a list of potential energy efficiency projects sorted by quickest payback the City 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 9.3). 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.

Action	Cost Estimate	Completion Date	Energy Savings	Annual Monetary Savings	Greenhouse Gas Savings	Simple Payback	Stakeholders	Funding Opportunities	Next Steps
All Facilities Replace standard thermostats with programmable thermostats. Recommission existing programmable thermostats.	$4,000	Q1 2020	114 MWh	$2,675	20223 kg	1 years	Public Works Administration Recreation Fire Department Library		Solicit and compare quotes from contractors
LED Street Lighting Upgrade all cobra heads street lights to LEDs	$245,000	Q4 2019	807 MWh	$104,910	28687 kg	2 years	Public Works Infrastructure & Engineering	IESO's Save On Energy	Currently underway
Clarence Creek Arena Modernizing Refrigeration System Controls	$30,000	Q4 2021	53 MWh	$6,826	1867 kg	4 years	Recreation	IESO's Save On Energy Retrofit Program CoEnergy Co-Op's Services	Conduct a condition assessment study of refrigeration system
Clarence Creek Arena Replace rooftop units with high-efficiency models.	$7,500[5]	Q2 2020	15 MWh	$1,950	533 kg	4 years	Recreation	Enbridge Smart Savings Fixed Incentive Program	Solicit and compare quotes from contractors
Rockland City Hall Replace rooftop units with high-efficiency models.	$7,500	Q2 2020	15 MWh	$1,950	533 kg	4 years	Recreation	Enbridge Smart Savings Fixed Incentive Program	Solicit and compare quotes from contractors
All Facilities Replace HID exterior fixtures with LED equivalents	$30,000	Q1 2020	38 MWh	$4,966	1358 kg	6 years	Public Works Administration Recreation Fire Department Library	IESO's Save On Energy Retrofit Program	Solicit and compare quotes from contractors
Rockland Water Treatment Plant Energy Optimization Study	$100,000	Q1 2020	100 MWh	$13,000	3555 kg	8 years	Public Works Infrastructure & Engineering		Solicit and compare quotes from energy engineering firms

Table 6: Specific energy efficiency initiatives that can be pursued by the City to meet their targets

[5] Incremental cost of a high-efficiency rooftop unit over a standard rooftop unit.

The 2014 plan listed many fuel switching initiatives mainly focused on changing the heating system at different facilities from electric heating or hot water to natural gas. Though switching to natural gas may reduce utility costs at present, it does not decrease the overall energy consumption. The focus of this plan is to reduce the City's energy consumption as measured by EUI and for that reason the fuel switching action items from the previous plan have not been included. Furthermore, switching from electric heating to natural gas will increase the City's greenhouse gas emissions. Due the recent introduction of the federal carbon tax this may increase the City's energy costs over time (see section 3.1).

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 City should pursue to ensure they will effectively meet their targets.

9.2.1 Energy Audits of Major Accounts

As displayed in Figure 5, four buildings consume more than 50% of the City's total energy, the water treatment plant, the wastewater treatment plant, the Clarence Creek Arena, and the Jean-Marc Lalonde Arena. The EUIs for both plants are higher than the national median. The arenas are both over 40 years old and the plants are due for major overhauls in the coming years. Rockland City Hall is the next largest energy user and its EUI is 40% above 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 City's biggest energy accounts, an energy audit will identify the biggest energy consumers within a facility, as well as opportunities to save energy. As explained in Section 9.3.1, 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 Energy Monitoring

In order to manage the energy consumption of its facilities and plants the City needs to have access to energy data. Installing energy monitoring equipment will allow City staff to be notified in real time when a location or piece of equipment is consuming an abnormally high amount of energy. This can result in small issues being corrected before they turn into expensive problems at the end of the month. As well, automated monthly and annual reports can assist in determining which location or equipment should be the focus of the next energy efficiency project.

Additionally, it is recommended that utility bills be summarized and reviewed on an ongoing basis. As apart of this plan a utility bill tracking tool was developed to allow for simple input of monthly utilities with automated graphs and summaries. This, in effect, is a simplified monitoring process and can identify anomalies or increase in building energy use as compared to a previously defined bench line.

9.2.3 Revolving Green Fund

Many of the initiatives identified in the previous Plan were not complete due to a lack of City resources and budget. However, due to the ongoing LED street lighting retrofit project, the City's electricity bill is expected to be reduced by more than

$100,000 annually. 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 savings 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 practices, equipment and technologies that are right for the City'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 dedicated energy manager on staff. The City 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.

9.2.5 Solar Photovoltaic Preliminary Assessment Studies

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. However, the deployment of solar carports or ground mounted solar pergolas is increasing and there exists a potential to utilize the City's parking lots and green spaces. 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 typical 300 kW rooftop system in this arrangement could pay for itself in 13 years out of an expected 30 year system life. If the City is interested in exploring the renewable energy capacity of their facilities they should consider hiring an engineering consultant to conduct a preliminary assessment of the PV capacity of each building. The most suitable sites have been identified a structural assessment by a qualified engineering firm and a grid impact assessment from the local distribution should be conducted.

9.3 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 City assets and the funds are suggested in blue font.

9.3.1 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 City in reducing their Energy Consumption:

- **Energy recovery or district energy - r**ecovered 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 or heat recovery from a modernized refrigeration system at the arenas).
- **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 Jean-Marc Lalonde Arena, 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 a new fire station).
- **Renewable energy production on a brownfield –** initiatives that generate renewable energy on a brownfield site with or without remediation.

9.3.2 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 City's initiatives.

9.3.2.1 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.

- **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 – t**he greater of $400/kW of demand savings or $0.05/kWh of first-year electricity savings (e.g., exterior lighting retrofit).

    - **Other Measures – t**he greater of $800/kW of demand savings or $0.10/kWh of first-year electricity savings.

9.3.2.2 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
- 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.

9.3.3 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 City's initiatives.

9.3.3.1 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**

9.3.3.2 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 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.

9.3.3.3 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.

9.3.4 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., City of Clarence-Rockland).

- **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 Clarence-Rockland).

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

9.3.4.1 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.

9.3.4.2 Comprehensive Energy Saving Services

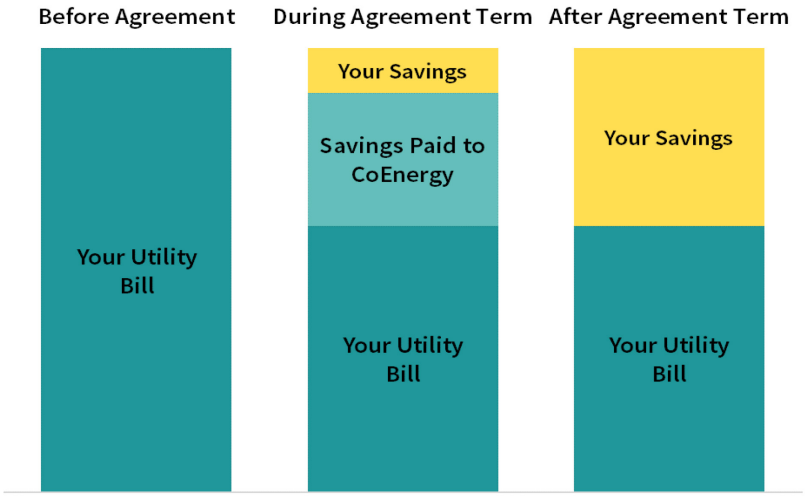

Figure 9: CoEnergy's Comprehensive Energy Savings Distribution (CoEnergy, 2018)

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.

9.3.4.3 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 Impact of Initiatives

This section provides a forecast of the expected impact if the City 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 but they have not been included in these forecasts. Figure 10

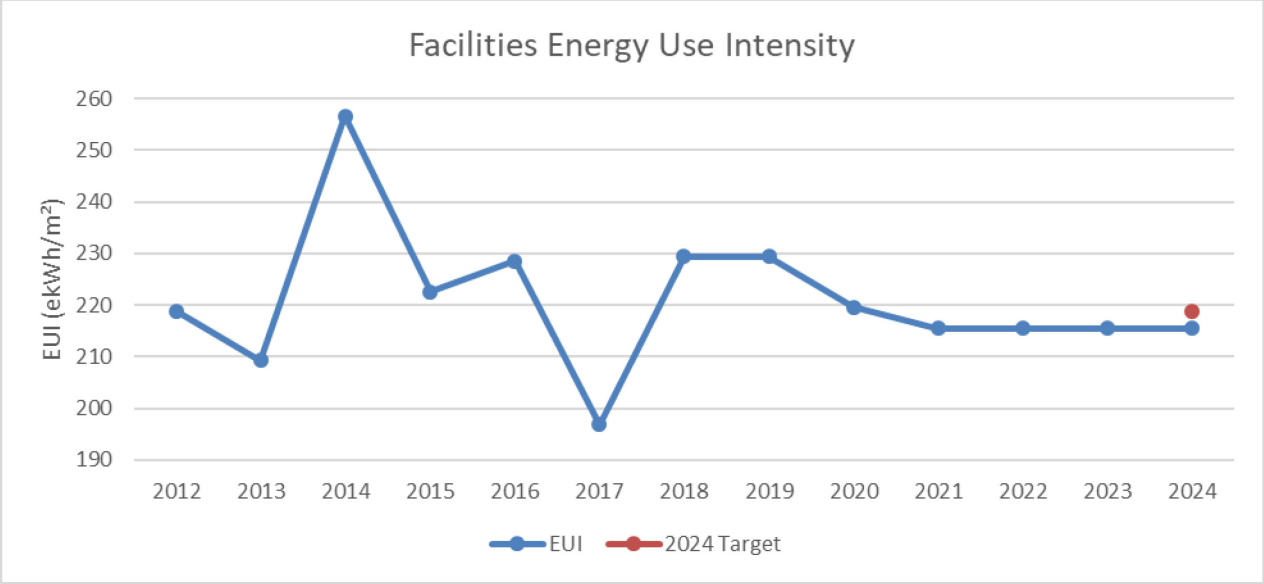

Figure 10: Gross Energy Use Intensity of All Facilities with 2024 Energy Reduction Target

displays the EUI of facilities, measured as total energy consumption per gross floor space. Figure 12 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 City pursues all of the energy initiatives for these facilities and plants, they will surpass their energy reduction target.

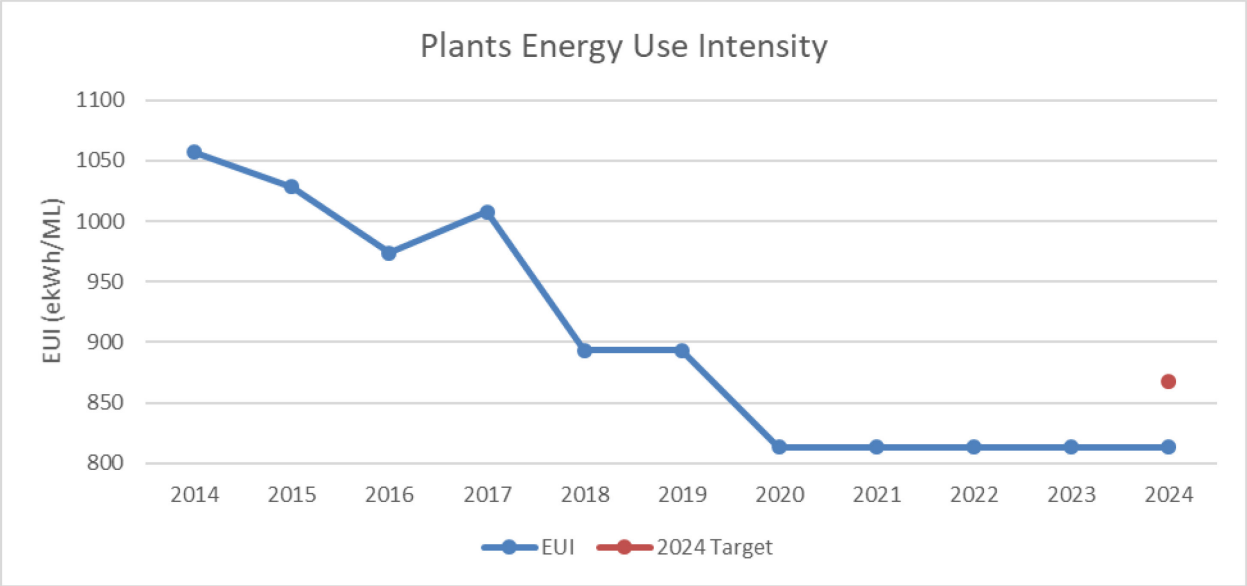

Figure 12: Gross Energy Use Intensity of all Plant with 2024 Energy Reduction Target

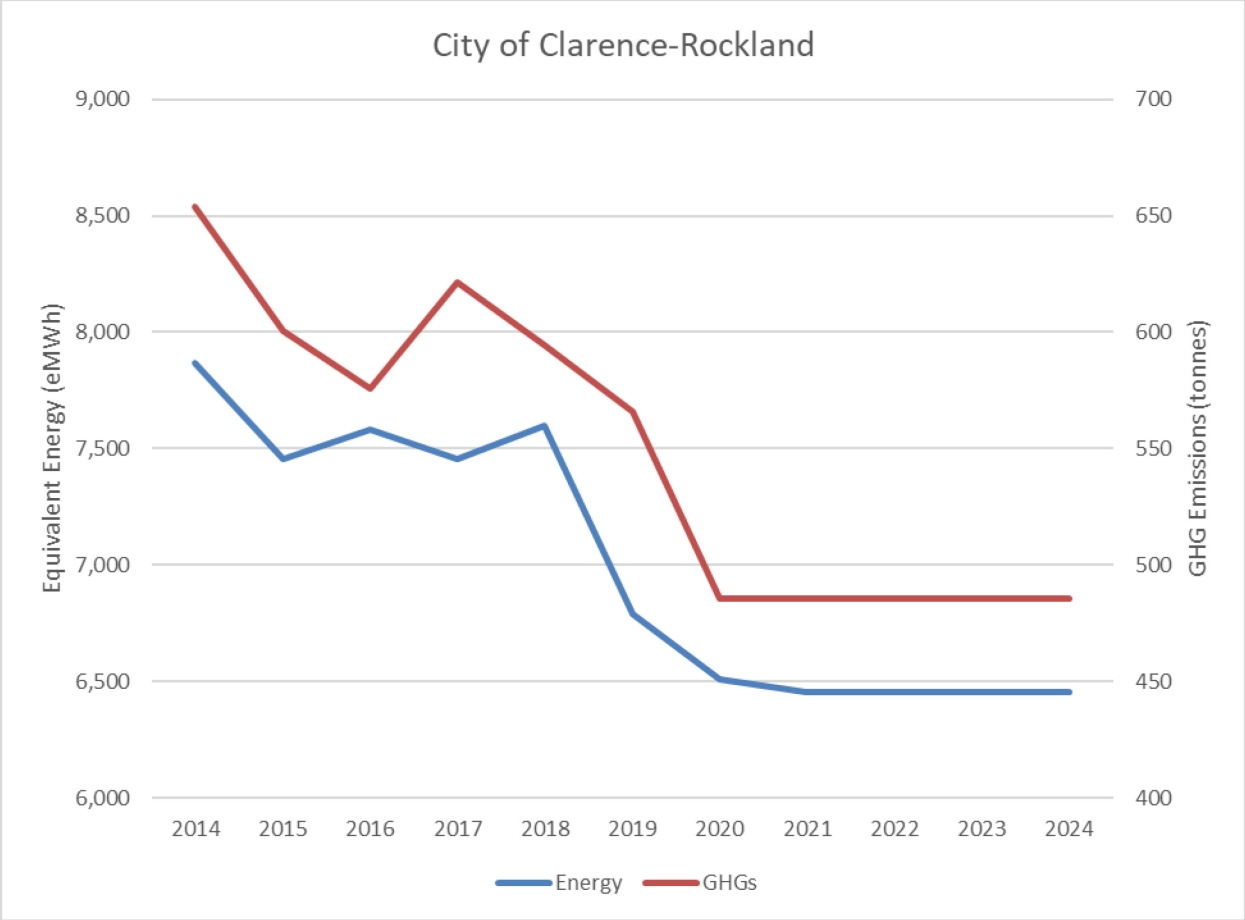

Figure 11: Total Energy Consumption and Greenhouse Gas Emission for the City of Clarence-Rockland Projected to 2024

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 Officer in the form of a short report that will consists of:

- Suggest revisions to the Plan's Objectives to ensure that they reflect the City'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.

This report has been prepared for the use of the City of Clarence-Rockland, for the stated purpose, for the named facilities. Information contained within this report is based on data provided by the City of Clarence-Rockland, J.L. Richards & Associates Limited makes no warranties or guarantees to the accuracy of this information. 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 City of Clarence-Rockland; any re-use or modification to this report and its appendices shall be at the sole risk of the City.

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