Corporate Energy Conservation and Demand Management Plan 2019 – 2024

Prepared in compliance with O. Reg. 507/18, requiring Ontario's Broader Public Sector to prepare an updated energy conservation and demand management plan every 5 years. Approved by Corporate Leadership Team.

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Section 1: Introduction

The City of Stratford's first Corporate Energy Conservation and Demand Management (CDM) Plan was created in 2014 in compliance with Ontario Regulation 397/11, the Green Energy Act 2009. The 2014 – 2019 CDM Plan presented baseline energy and utility data consisting of electricity and natural gas from 2011 and outlined several overarching strategies to enhance the City's energy conservation and efficiency efforts.

In line with the regulation's requirements, this Plan includes the following key elements:

- City Council and Corporate Leadership commitment and vision for managing energy usage within all corporate asset classes.
- Details about the City's energy and emissions baseline and a summary of past successes since 2014, present initiatives and planned future initiatives.
- A specific, actionable inventory of measures for energy conservation and demand management strategies which include associated estimated cost and energy savings information.

The City intends to revisit and update this Plan with long-term strategies in 2024 for the period 2024 – 2029, as required under the regulation.

Strategic Direction

This updated CDM Plan 2014 – 2019 is guided by three objectives to facilitate the achievement of energy conservation goals. These included: provision of tools to consistently monitor and track energy consumption across all corporate facilities, energy awareness and management training to enable Staff to identify energy and cost-saving opportunities, devise initiatives to deliver energy and cost savings projects, programs and processes across the corporate portfolio. These objectives were further strengthened by Council's Strategic Priorities that prioritized asset optimization and sustainability as key drivers.

Stratford City Council and Corporate Leadership have endorsed Staff efforts to develop long-term strategic plans that will drive efforts to advance emissions reduction efforts and embed a sustainability lens on the City's operations and processes.

Background on O. Reg. 507/18

O. Reg. 507/18 was created under the Electricity Act, 1998 on December 12, 2018. It was Filed on December 14, 2018. This Ontario Regulation was developed to replace the revoked O. Reg. 397/11, which was filed under the repealed Green Energy Act, 2009.

This Ontario Regulation requires that every municipality, municipality service board, post-secondary education institution, public hospital and school board (public agencies),

update their previous Conservation and Demand Management Plans by July 1, 2019, and update it every five years afterwards.

The Conservation and Demand Management plans should include two sections. The first section should discuss the public agency's annual energy consumption and the emissions associated with their operations. The second section must provide a description of previous, current, and proposed ways to conserve or reduce energy that is consumed by the operations of the public agency. This in turn assists in the management of the public agency's demand for energy and will forecast the results of current and proposed measures.

Each report must include:

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

Validity Period

This report is valid between the dates of July 1, 2019 – June 30, 2024. According to O. Reg. 507/18, this plan will need to be updated before or on July 1, 2024.

Scope and Methodology

The CDM Plan considers energy use and greenhouse gas (GHG) emissions within the corporation of the City; community initiatives are outside the scope of the plan. This plan addresses buildings, water and wastewater pumping and treatment facilities, solid waste, outdoor lighting, and fleet. Energy use and opportunities in social housing are not addressed by this Plan.

The plan also reviews energy use and emissions and plans for energy use and greenhouse gases over the period starting July 2019 to June 2024. GHG emissions are based on Scope 1 and Scope 2 inventory. Scope 1 emissions are direct greenhouse (GHG) emissions that occur from sources that are controlled or owned by an organization (e.g., emissions associated with fuel combustion in boilers, furnaces, vehicles). Scope 2 emissions are indirect GHG emissions associated with the purchase of electricity, steam, heat, or cooling. Although scope 2 emissions physically occur at the facility where they are generated, they are accounted for in an organization's GHG inventory because they are a result of the organization's energy use.

The assessment does not include Scope 3 emissions such as those from energy embedded in products purchased, employee commuting, or other activities from assets not owned or controlled by the organization.

Section 2: Vision and Objectives

The City is committed to delivering tangible results that showcase its leadership in the realm of energy efficiency and climate action The 2019-2024 CDM Plan lays out specific goals and strategic objectives:

Our Commitment: As part of our long-term financial planning strategy, the City of Stratford is committed to responsible energy management. To this end, the City will allocate the necessary staff and resources to implement a strategic energy management plan that will reduce energy consumption, and its related environmental impact.
We are committed to embedding a climate lens throughout our operations, and lead energy efficiency practices in the region.

Our Vision: Through a collaborative approach, the City will strive to continuously improve the energy performance of its built assets in order to minimize carbon emissions and energy costs.

Our Objectives:
Objective 1: Energy and Emissions Monitoring & Tracking
Track energy consumption and emissions generation annually, and present annual reports (e.g., using key performance indicators, or KPIs) thus ensuring usage is monitored and assessed as required. This approach is intended to make corporate energy and emissions data available to all Staff and Council and support the application of a climate lens in all decision-making, opportunity identification and continuous improvements.

Objective 2: Training, Capacity Development and Awareness
Develop a capacity-building and training program which ensures Staff have the appropriate knowledge regarding energy use and conservation. The program will support the creation of a conservation culture through engagement and awareness.

Objective 3: Opportunity Identification and Project Delivery
Deliver energy and cost savings through the implementation of processes and programs that advance energy efficiency and fuel switching efforts. Integral to this Plan and its implementation will be a robust energy management program and prioritization of energy efficiency measures for each identified corporate asset class.

Section 3: Energy Management Principles

The City of Stratford's energy management practices will focus on opportunities for energy efficiency, exploration of renewable energy generation, and identifying emissions reduction opportunities for all City's assets.

The main benefits to the City include:

- Reducing GHG emissions related to energy use, thereby enhancing environmental performance.
- Reducing energy use translates to cost savings and also mitigates rising fossil fuel costs.
- Durable and efficient assets ensure high performance equipment is prioritized, thereby reducing increased maintenance and replacement costs.
- Showcasing leadership in climate action and environmental stewardship

The City intends to continue pursuing optimized energy management and climate action planning, employing a consistent approach:

- Analyze energy sources and data.
- Standardize and categorize facilities by typology and area, identify actions, and develop performance indicators for tracking.
- Set clear energy objectives and emissions targets for each year.
- Create an action plan with specific strategies, projects and policies that align with objectives and support emission reduction targets.
- Monitor progress and evaluate performance through an annual monitoring mechanism such as KPIs.

Section 4: Energy and Emissions Trends

The City has been monitoring energy usage and tracking greenhouse gas (GHG) emissions from 2011 for corporate facilities and infrastructure including buildings, outdoor lighting, and water and wastewater. Corporate fleet was added as an asset class to envision a fulsome analysis of emissions trends and comply with Scope 1 and Scope 2 emissions.

An energy baseline of 2017 has been compiled as an accurate representation of energy and emissions for annual reporting to enable comparison with future milestones (2030, 2040 and 2050), and to provide a quantitative reference for annual energy and emissions tracking.

Energy consumption data were collected from Festival Hydro Inc. and Enbridge Gas Inc. for each of the City's facilities, as well as its water and wastewater facilities, solid waste, and outdoor lighting accounts. The resulting data set (Table 2) is representative of the City's current level of energy performance by fuel type.

Table 1 City Facilities

Building Name	Address	Operation Type
Avondale Cemetery	4 Avondale Ave, Stratford	Administrative offices and related facility
Boathouse Information Centre	30 York St, Stratford	Recreational facility
City of Stratford Annex Building	82 Erie St, Stratford	Administrative offices and related facility
City of Stratford City Hall	1 Wellington St, Stratford	Administrative offices and related facility
Community Services	27 Morenz Dr, Stratford	Administrative offices and related facility
Dufferin Arena	51 Oak St, Stratford	Recreational facility
Fire Station #1	388 Erie St, Stratford	Fire station and administrative offices
Fire Station #2	44 McCarthy Rd, Stratford	Fire station and administrative offices
Kiwanis Centre	111 Lakeside Dr, Stratford	Cultural facility
Police Station	17 George St, Stratford	Police station and associated facilities
Public Library	19 St Andrew St, Stratford	Public library
Queens Park Snack Bar	440 Richard Monette Way, Stratford	Recreational facility

Rotary Complex	353 McCarthy Rd, Stratford	Recreational facility
Tourism Alliance	47 Downie St, Stratford	Administrative office
Transit Garage	60 Corcoran St, Stratford	Administrative office
Wastewater Treatment Plant	701 West Gore St, Stratford	Infrastructure related facility
Water Treatment Facility	82 Erie St, Stratford	Infrastructure related facility
William Allman Arena	17 Morenz Dr, Stratford	Recreational facility
Youth Focus Centre	171 Downie St, Stratford	Community centre

Table 2 Total Fuel Consumption

Type of Energy Source	If Consumed by Municipality	Source Supplier	Unit of Measurement	Total Amount of Source Consumed
Water	Yes	City of Stratford	Mega Litre (ML)	10,676.47
Electricity (Hydro)	Yes	Festival Hydro	Kilowatt Hour (kWh)	10,244,950
Natural Gas	Yes	Union Gas	Cubic Meter (M^3)	1,023,808
Propane	No	N/A	Litre (L)	N/A
Fuel Oil (#1 & #2)	No	N/A	Litre (L)	N/A
Fuel Oil (#4 & #6)	No	N/A	Litre (L)	N/A
Coal	No	N/A	Mega Tonne (MT)	N/A
Wood	No	N/A	Mega Tonne (MT)	N/A
District Heating	No	N/A	Giga Joule (GJ)	N/A
District Cooling	No	N/A	Giga Joule (GJ)	N/A

The corporate emissions inventory from 2017 indicated that the total GHG emissions from all asset classes of corporate operations was 5,114.41 tCO_2e. Civic buildings, including airport buildings generated the largest quantity of GHGs (2,529 tCO_2e) followed by fleet which emitted 1,902.25 tCO_2e. Reductions in observed emissions are largely attributed to the updated conversion factors for gasoline, diesel, and electricity as set by the Province annually.

Emission trends from 2011 – 2022 suggest a consistent decrease in emissions for all asset categories as a result of ongoing corporate-wide energy conservation and emission reduction efforts.

Table 3 Corporate-wide GHG Emissions Inventory

Asset Class	2011 GHG Emissions (tCO_2e)	2017 GHG Emissions (tCO_2e)
Buildings	4,270.311	2,251.82
Corporate Fleet and Equipment	2,050	1,902.25
Outdoor Lighting	810	719.75
Solid Waste	157	145[2]
Water and Wastewater	125	57.18
Municipal Airport	38.4[2]	50.5
Total	**7,693.32**	**5,114.41**

Section 5: Energy Performance 2011 – 2019

Facility Trends

Over the time period between 2011 and 2019, changes occurred that influenced the energy usage in facilities, and contributed to a downward trend in resultant energy usage and emissions impact.

The omission of some facilities including the Discovery Centre, Economic Development Office, Youth Focus Centre, and the Kiwanis Centre has resulted in a slight decrease in net square footage, and therefore resultant emissions.

Facilities

Civic buildings used for service delivery of approved City services include 18 facilities which are powered by a mix of hydropower and natural gas (Table 5). The corporate GHG inventory includes all City-owned facilities. Facilities leased to third parties are considered Scope 3 and were excluded from this analysis.

Building emissions resulting from electricity and natural gas consumption account for approximately 42% of the City's total GHG emissions. A majority of this energy usage is as a result of on-site combustion of natural gas for space heating followed by electricity consumption.

Although electricity consumption is not responsible for most emissions, it is imperative that the City recognize the importance of energy efficiency as a way to reduce operational and equipment maintenance costs. Savings through energy efficiency retrofits can further fund fuel switching efforts, which in turn will continue to contribute to the City's energy conservation and management efforts.

Refer to Appendix B for an overview of energy management in the City's major facilities.

Table 4 Buildings Total Energy Consumption and Emissions, 2017

Asset Class-Buildings	Natural Gas Consumption (cu. m.)	Electricity Consumption (kWh)	GHG Emissions (tCO_2e)
Total Energy Consumption	560,125	58,930,865	2,252

Table 5 Buildings – 2017 Breakdown of Energy Consumption and Emissions

Asset Class	Natural Gas Consumption (cu. m.)	Electricity Consumption (kWh)	GHG Emissions (tCO_2e)	Area (sq. ft.)	% of Total Building Emissions
Avondale Cemetery	8,118.98	25,523.54	15.8	5,535	1.24
Boathouse Information Centre	3,612.24	16,643.84	7.12	335	0.56
City of Stratford Annex Building	22,339.61	342,240.00	48.16	26,054	3.8
City of Stratford City Hall	**45,561.82**	**384,160.00**	**92.79**	**23,400**	**7.31**
Community Services	11,017.40	20,927.10	21.20	3,064	1.67
Dufferin Arena	**39,973.43**	**405,840.00**	**82.60**	**35,000**	**6.5**
Fire Station #1	10,677.40	55,786.86	21.16	7,292	1.6
Fire Station #2	7,438.82	28,331.75	14.56	4,832	1.14
Police Station	**28,929.65**	**376,560.00**	**61.21**	**28,800**	**4.82**
Public Library	21,562.74	205,306.12	44.32	17,202	3.49
Queens Park Snack Bar	-	19,866.30	41.65	7,275	0.02
Rotary Complex and Agriplex	**225,479.35**	**1,906,039.20**	**459.27**	**155,600**	**36.1**

Asset Class	Natural Gas Consumption (cu. m.)	Electricity Consumption (kWh)	GHG Emissions (tCO_2e)	Area (sq. ft.)	% of Total Building Emissions
Tourism Alliance	8,898.10	31,900.00	17.38	5,610	1.3
Transit Garage	26,009.16	131,722.97	51.45	12,640	4.05
Wastewater	1,371.43	3,278,434.00	59.30	-	4.67
Water	-	1,831,445.00	31.68	-	2.5
William Allman Arena	**92,675.43**	**715,140.69**	**187.59**	**38,610**	**14.77**
Youth Focus Centre	6,459.20	24,362.27	12.64	3,500	1

* Note 1: Facilities in **bold** are the largest GHG emitters.

** Note 2: Kiwanis Centre is no longer a part of the City's assets, and thus has been omitted from current calculation, and energy and emissions reporting.

The Rotary Complex and Agriplex are the most significant consumers of energy and generate the highest emissions, closely followed by William Allman Arena, Dufferin Arena, City Hall, City Hall Annex and the Police Station. Based on this analysis and with an intention to tackle most energy intensive facilities, the City has prioritized projects and deep energy retrofits for these facilities within its short to medium term operational budget. Appendix A provides a high-level list of intended actions to be implemented to address energy management for these facilities.

Refer to Appendix C for energy usage tracking for facilities.

Corporate Fleet and Equipment

Vehicle and equipment fleet (termed collectively as "fleet") includes all motorized vehicles and equipment operated by the City. Corporate fleet predominantly consists of light, medium and heavy-duty vehicles. Emissions from fleet are the second largest source of GHG emissions after buildings, representing approximately 36% of the City's total emissions. In 2017, the City's vehicles emitted 1,902 tCO_2e (Table 6). These emissions were primarily from the use of diesel and gasoline.

Table 6 Fleet – Energy Consumption and Emissions, 2017

Fleet – by Sector	Gasoline Consumption (L)	Diesel Consumption (L)	GHG Emissions (tCO_2e)
Community Services, Water Engineering, Public Works	250,000	420,000	1,703.1
Police	86,211.37	-	199.15
Total	336,211.4	420,000	1,902.25

Notes: GHG emissions from fleet controlled by the City's external partners are not counted toward the 2017 corporate inventory as these emissions are not in direct sphere of influence of the City.

Emissions from fleet use (along with facility energy use, equipment use and outdoor lighting) at the municipal airport have been accounted for within the Airport section.

Outdoor Lighting

The majority of energy consumed in this asset class is related to streetlights and traffic lights. Other lighting assets include ornamental lighting, lighting used for parks, arenas, and sports fields. The emissions inventory for this asset class in 2017 amounted to 719.75 tCO_2e (Table 7). Most lighting accounts are metered which provide actual electrical consumption. For those assets billed under flat-rates, consumption is estimated (e.g., overhead street lighting, traffic signals).

The lighting asset class has been greatly influenced by changes in carbon intensity from Ontario's electrical power generation, and GHG emissions conversion factor. As a result, the asset class experienced a decrease in emissions by approximately 91 tCO_2e between 2011 and 2017 and consumption was reduced by 25%.

All traffic signals and streetlights are well into the process of being converted to LED lights from high pressure sodium (HPS) and metal halide. Upgrades to outdoor lighting within the municipal airport are also planned.

Table 7 Outdoor Lighting – Energy Consumption and Emissions, 2017

Energy type	Energy Consumption (kWh)	GHG Emissions (tCO_2e)
Electricity	2,879,039	719.75

Solid Waste

The City of Stratford owns and operates the City's Landfill under the Ministry of Environment (MOE) Certificate of Approval No. A150101. The landfill receives non-hazardous waste generated within the city from residential, industrial, commercial, and institutional (ICI) sectors. The site has provisions for composting (leaf and yard waste), processing construction waste (concrete crushing and recycling) and accommodates a recycling depot for plastic, glass, cardboard, textiles, electronic waste, and batteries. Most recyclables received are segregated and transported off-site for processing.

In 2017, the City generated 81,812.09 tonnes of solid waste materials; this amount includes waste from all waste streams including but not limited to: general waste, recyclable material (concrete asphalt, cardboard, metal), organic (food scraps, leaf and yard waste), electronic waste and hazardous waste (contaminated soil, asbestos). Out of this overall tonnage, 21,697.92 tonnes were considered Municipal Solid Waste (MSW) and sent to landfill. A total of 305 tonnes of MSW were produced by the City's corporate facilities; waste generated by corporate buildings will be further referred to as corporate waste. Resultant emissions from corporate waste in 2017 equaled 145 tCO_2e.

Waste generated at public buildings such as Rotary Complex, William Allman Arena and Agriplex Facilities are considered Scope 3 emissions and were excluded from this analysis.

Table 8 Solid Waste – Comparison of GHG Emissions Generation from Corporate Waste

Year	Waste Generation (tonnes)	GHG Emissions (tCO_2e)
2011*	325	157
2017	305	145

*Emissions from 2011 have been estimated from a study conducted by Consultant in 2005.

Water and Wastewater

The majority of the energy consumed in the asset class of water and wastewater is a result of motors that drive water sanitary and storm sewer pumps. City assets include 11 sanitary pumping station, 1 stormwater pumping station, 11 water production wells and 1 water pollution control plant. Energy is primarily derived from hydropower, or electricity and is therefore relatively low in emissions. Overall, for the water and wastewater asset class, 3,091,339 kWh (11,129 GJ) of electricity was consumed in 2017 which resulted in the generation of 57.2 tCO_2e (Table 9).

Table 9 Water and Wastewater – Energy Consumption and Emissions, 2017

Energy type	Energy Consumption (kWh)	Energy Costs ($)	GHG Emissions (tCO_2e)
Electricity	3,091,339	504,922.20	57.20

Section 6: Ongoing and Future Planning

The City's energy conservation initiatives will be guided by the goal of positioning Stratford as a leading municipality in energy management practices. This will include the evaluation of the City's energy consumption and demands, and introduce concepts such as energy mapping, to evaluate conservation opportunities and implement an ongoing energy management program for the City.

Key focus areas are planned to include:

- New facility construction, including design and procurement (e.g., energy efficient design, evaluating integrated renewable energy opportunities, low energy, and low carbon equipment alternatives).
- Facility retrofits, retro-commissioning and re-commissioning (e.g., targeting facilities with high energy intensities and poorly operating systems to improve operations).
- Efficient asset procurement, including fleet and equipment (e.g., incorporating energy and climate considerations into procurement decisions).
- Pro-active maintenance and cleaning of assets, to ensure efficient operations and longer lifespans (e.g., preventative maintenance programs to ensure asset operations and durability is optimized).
- Staff and operator training, education, and awareness (e.g., incorporating sustainability and energy management in current and future staff responsibilities, staff awareness and training of energy conservation opportunities).
- Funding opportunities to enhance project viability (e.g., grant and incentive sources, developing internal funding mechanisms).

While identified energy conservation measures will be applied across the organization, buildings and fleet asset classes offer substantial opportunity to accelerate energy efficiency while impacting the emissions trajectory. Some initiatives are listed in Appendix A.

Recognizing that the City of Stratford consumes a significant amount of energy, this plan will be used to guide the reduction of energy and to help in the implementation of

impactful strategies, retrofit management, as well as monitoring and tracking consumption patterns. Future energy plans and goals will be considered on a regular basis. The goals need to be annually established along with the Council's approval of the municipal budget.

Appendix A

Planned Upgrades- Buildings

Rotary Complex

-Energy audits (Level 1,2) required

-Refrigeration System

-HVAC system

-Smart Hub for ice plant

-Roofing repairs and upgrade (EPDM)

-Domestic Hot Water Boilers

Agriplex

-Energy audits (Level 1,2)

-Envelope upgrade

-Roofing repairs and upgrades

-Mechanical system

William Allman Arena

-Roofing

-Lighting (interior+exterior) and controls

-HVAC equipment & distribution system

-Exterior Insulation and Finish System (EIFS)

-Domestic Hot Water Heater

-Ice Resurfacer/s

-Washroom upgrades

-Refrigeration Distribution System

City Hall

-Energy audits (Level 1,2)

-Envelope Improvements: insulation, airtightness, vapor barriers

-HVAC system: AHUs, Condensers, Chiller System, Fan Coil Units

-Interior lighting replacements

-Washroom upgrades

Dufferin Arena

-Energy audits (Level 1,2) required

-Refrigeration System

-HVAC system

-Smart Hub for ice plant

-Roofing repairs and upgrade (EPDM)

-Domestic Hot Water Boilers

Public Works

-Energy audits (Level 1,2) required

-Envelope improvements including insulation

-Refrigeration System

-HVAC system

-Smart Hub for ice plant

-Roofing repairs and upgrade (EPDM)

-Domestic Hot Water Boilers

Public Works

-Energy (Level 1,2) audit required

-Envelope improvements including insulation

-Refrigeration System

-HVAC system

-Smart Hub for ice plant

-Roofing repairs and upgrade (EPDM)

-Domestic Hot Water Boilers

Police Station

-Envelope Improvements: insulation, airtightness, vapor barriers

-Roofing

-HVAC system: Make up AHUs, Heat Pump, Variable Volume Fan

-Interior light replacements

- Washroom upgrades

Transit Office

- Installation of charging infrastructure and vehicle storage

- Investigate infrastructure upgrades for an electrified fleet.

Public Library

-HVAC Makeup AHUs

-Heating Boilers

-Roofing

City Hall Annex

- Envelope Improvements (insulation, airtightness, vapor barriers)

-Windows

-Washroom upgrades

Airport Terminal

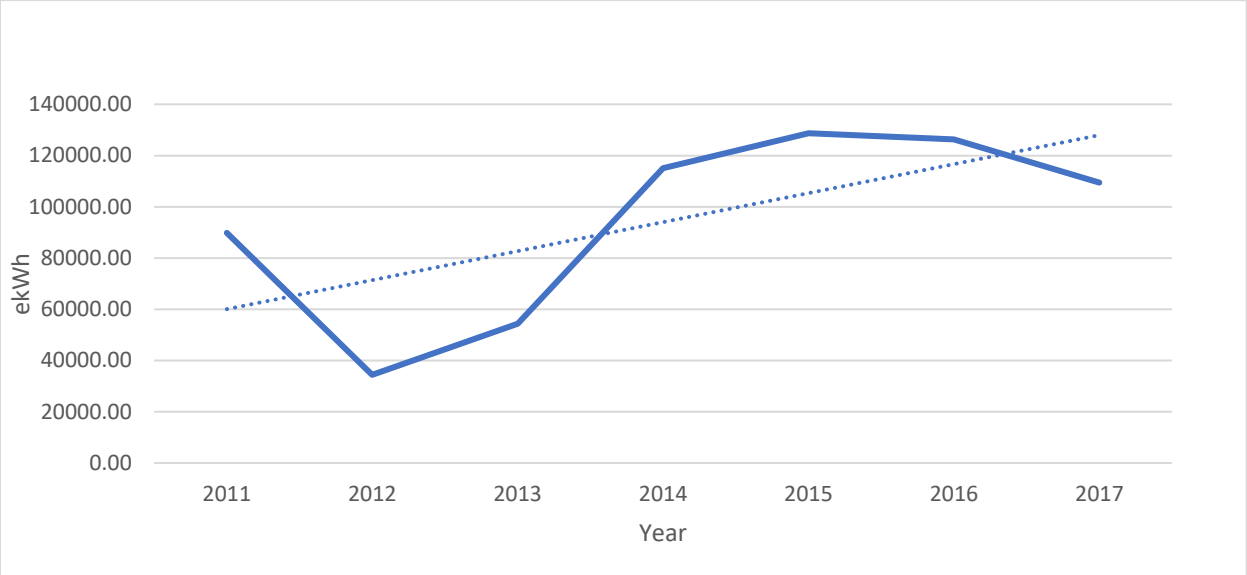
-Electric Heat Pump or low carbon fuel

-Envelope improvements

Appendix B

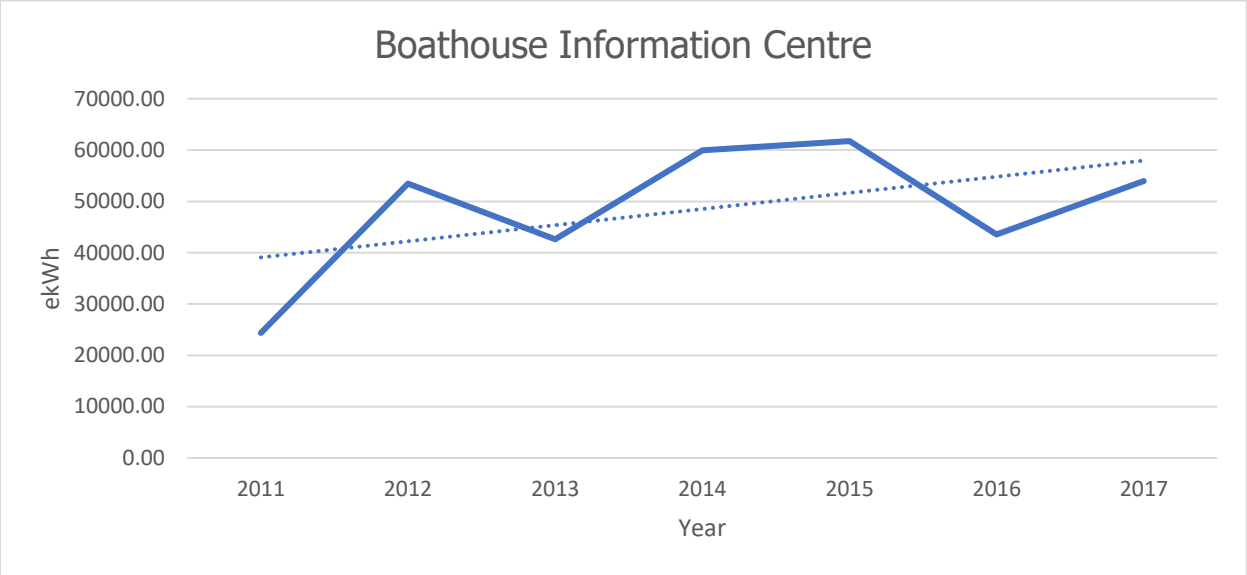
Energy Tracking and Management

Avondale Cemetery



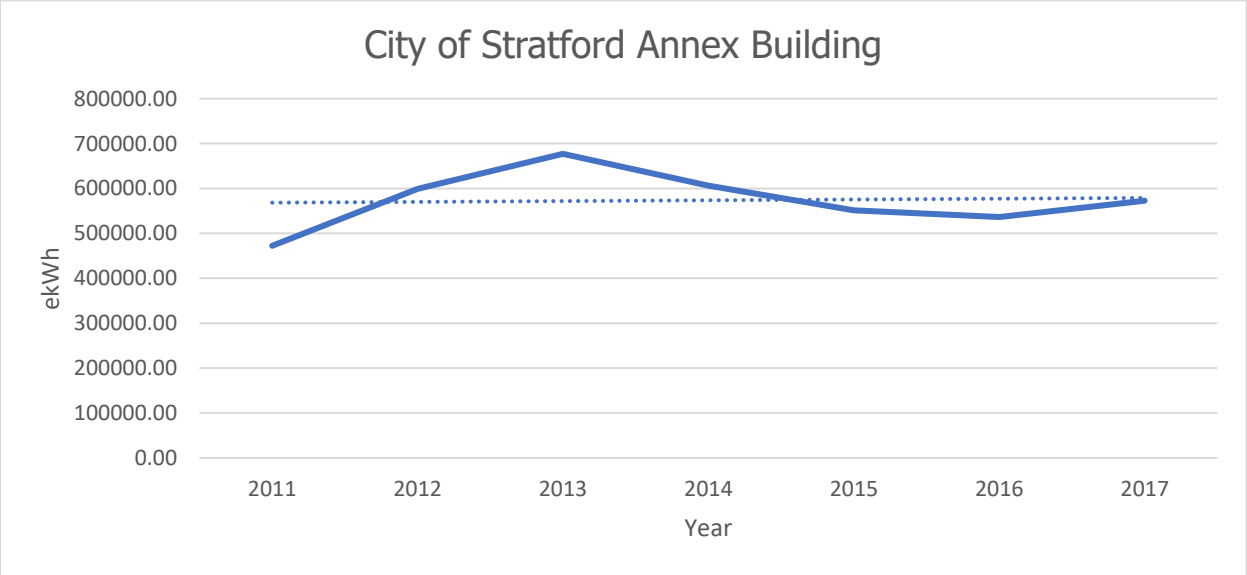
The Avondale Cemetery has increased its energy usage since 2011. In 2017, the total energy usage equaled to approximately 109,393ekWh, which is about a 22% or 19,584.3 ekWh increase in energy than the 2011 baseline year. Emissions also increased with the associated energy use. The Cemetery emitted a total of 16,450kg of CO_2e, which was an increase of approximately 2,008 kg of CO_2e.

Boathouse Information Centre



The Boathouse Information Centre has increased its energy consumption from the 2011 baseline year. The total consumption in 2017 was 53,958ekWh, which is an increase of approximately 121% or 29,590ekWh. The increase in energy consumption has also led to an increase in emissions. In 2017, emissions were calculated to be approximately 7,546 kg of CO_2e, which is an increase of over 3,000 kg of CO_2e, or a 69% increase from 2011.

City of Stratford Annex Building



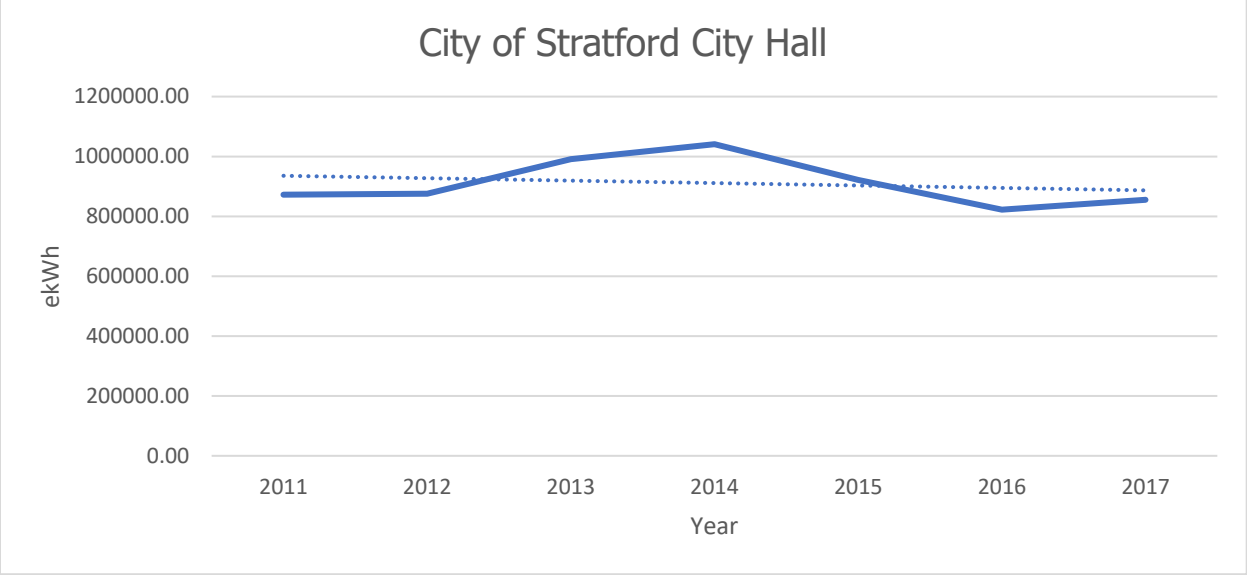
Between 2014 and 2019, the Annex building has undergone several upgrades. Low wattage radiant panel heaters have been installed. In 2016, one RTU was added to the

facility. 2017, the exterior lighting was updated to LED lighting. In early 2019, the Annex building installed an updated water heater.

There are proposed improvements for the building for 2020, specifically to get the boiler replaced.

The Annex Building has increased its energy consumption since 2011. In 2017, the facility consumed a total of 573,008ekWh, which was an increase of approximately 21%, or 100,620ekWh over the 2011 baseline year. The increase in energy use also led to an increase in emissions. In 2017, the facility emitted a total of 56,961 kg of CO_2e, which was an increase of about 37.5%, or 15,529 kg of carbon compared to 2011.

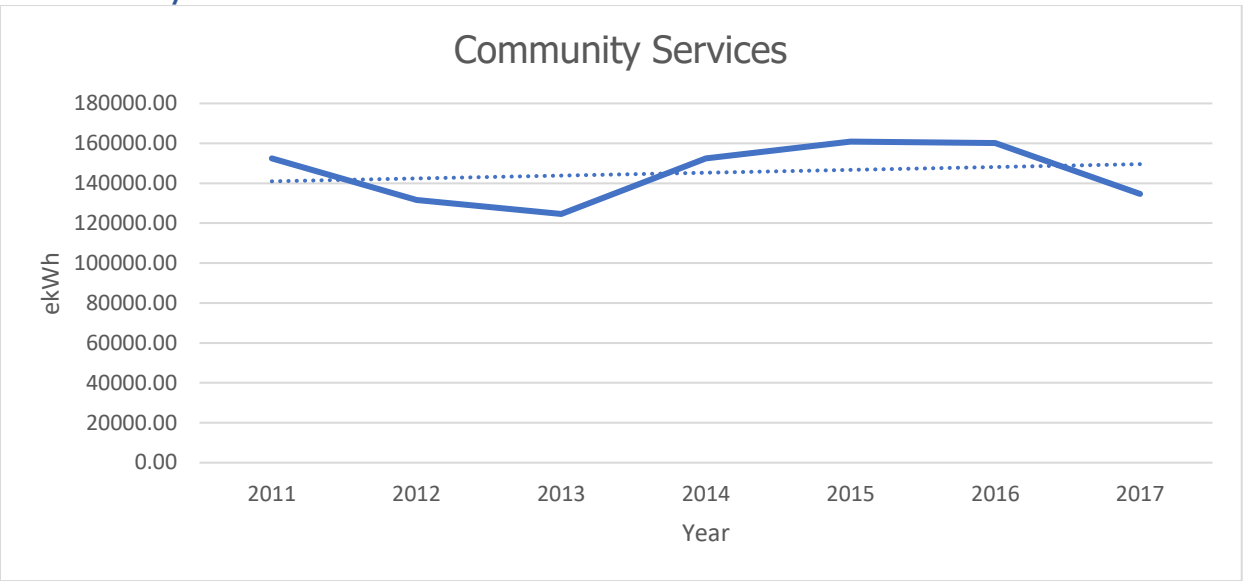
City of Stratford City Hall



Between 2014 and 2019, the City Hall has undergone some light retrofits. Low wattage radiant heaters have been installed in the building. In 2017, the elevator lighting was upgraded to T8 lighting. In 2019, some lighting was upgraded to LED throughout the building. A future proposed plan for the building in the upcoming year is to replace the boiler with a more energy efficient model.

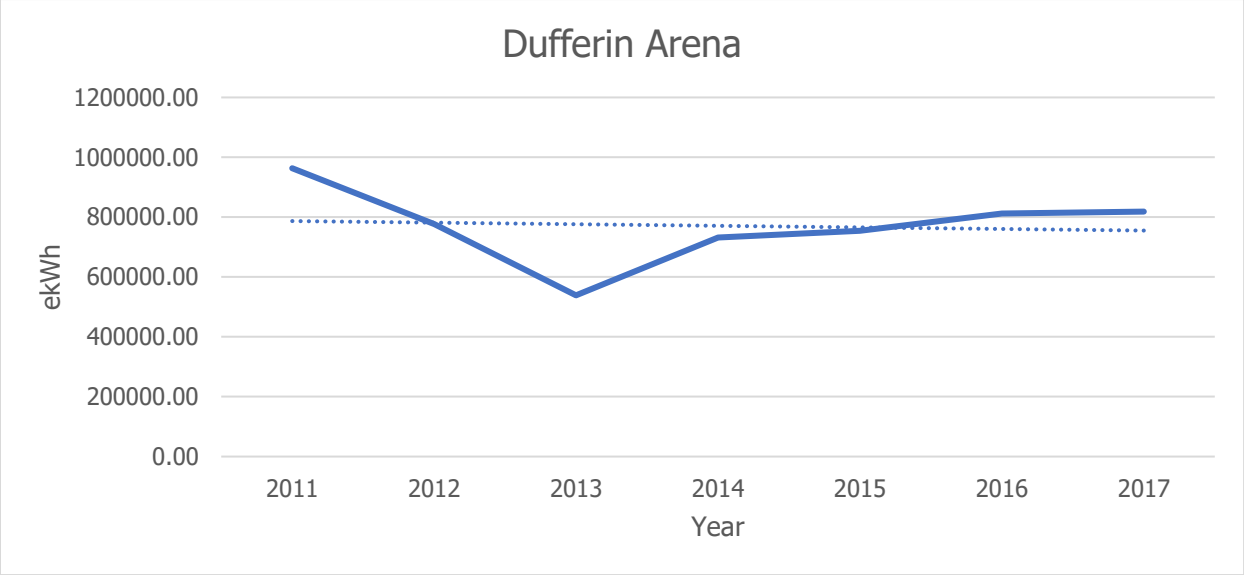
City Hall has been able to reduce its energy consumption slightly since 2011. In 2017, City Hall consumed a total of 854,845ekWh, which is about a 2%, or 17,489ekWh reduction from 2011 consumption. Emissions have reduced as well at the City Hall building by approximately 5.6% or by 6,120.3 kg of CO_2e. The total emission count of 2017 was approximately 102,682 kg of CO_2e.

Community Services



The Community Services facility has reduced its energy consumption since 2011. In 2017, the total consumption was 134,737ekWh, which was a reduction of nearly 12%, or 17,734.6ekWh. Emissions associated with the community services building have reduced as well to a total emission count of approximately 21,734 kg of CO_2e in 2017. This is a reduction of approximately 2%, or 432 kg of CO_2e.

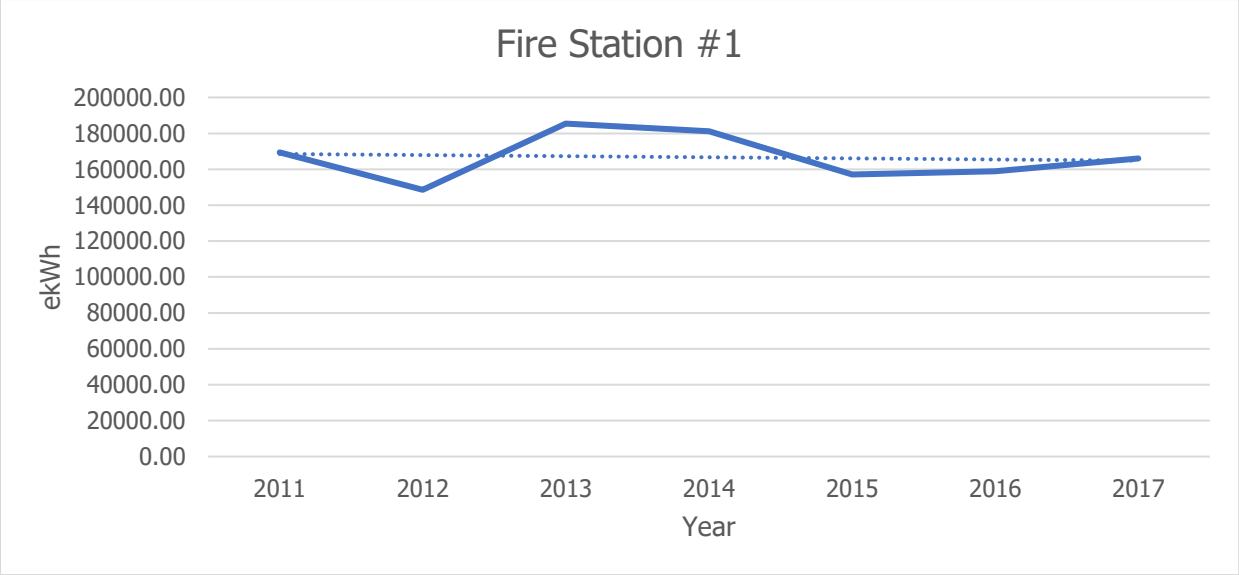
Dufferin Arena



In 2014, the Dufferin Arena received a lighting retrofit to an LED lighting system.

The Arena has decreased its energy consumption from the baseline year of 2011. The total energy consumption of the arena in 2017 was approximately 818,766ekWh, which is a reduction of approximately 15%, or 144,666.8ekWh. The Arena was also able to reduce its emissions by about 16% or about 17,844 kg of CO_2e, to emit a total of 93,041 kg of CO_2e.

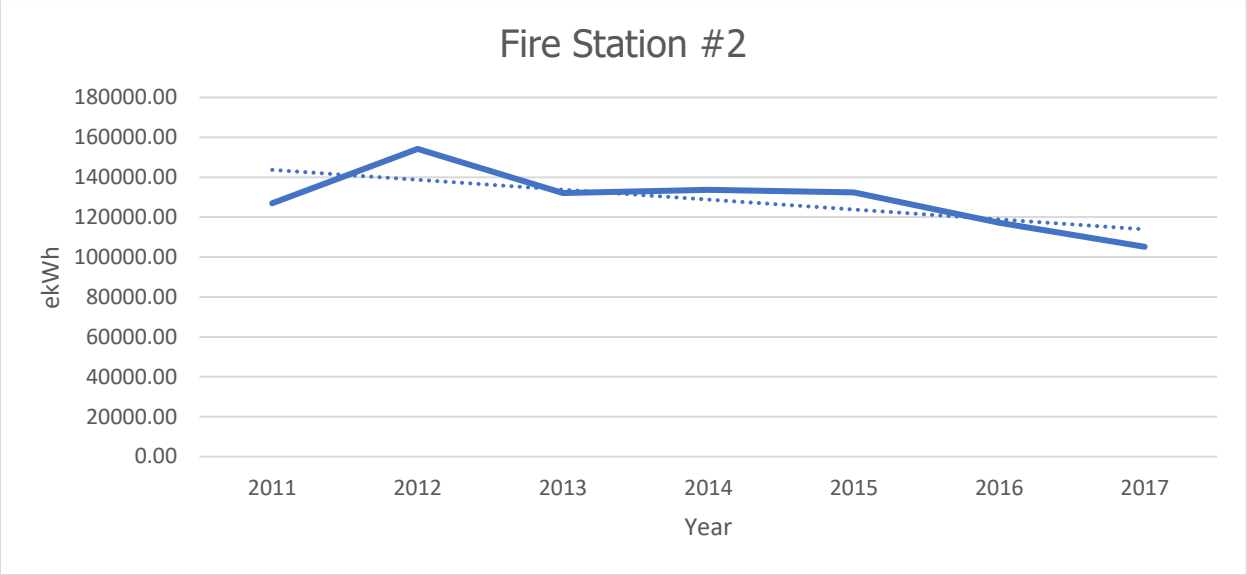
Fire Station #1



In 2017 and in 2019, the Fire Station had LED lighting installed. In 2019, in the winter, a draft reduction/window shrink wrap was added to the building. Between 2018 and 2019, a reflective window covering was added onto the bay windows. As potential future projects, a new water softener and air conditioning unit are being proposed.

This fire station was able to reduce its energy consumption by approximately 2% or 3,255.5ekWh compared to its 2011 consumption. The station consumed approximately 166,084ekWh in 2017. While the station decreased its energy consumption, it emitted more greenhouse gases compared to 2011. In 2017, the fire station emitted a total of 22,590 kg of CO_2e, which is about 94 kg more than 2011.

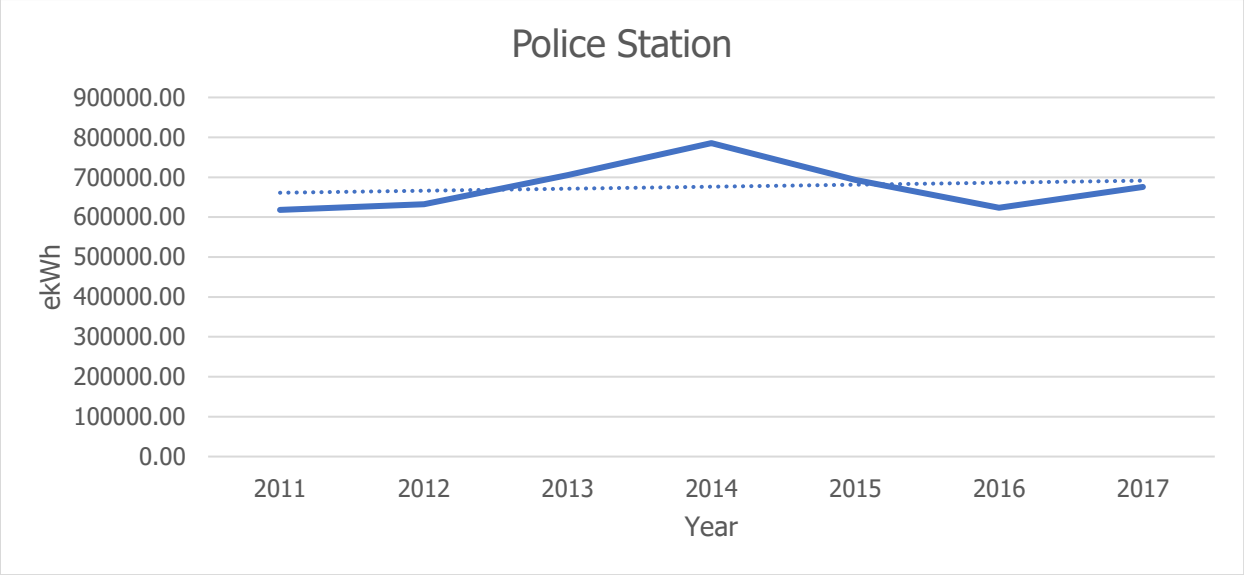
Fire Station #2



The fire station has received a number of upgrades between 2014 and 2019. In 2014, a programmable thermostat was added, timers for the A/C units were installed, weather stripping and caulking was redone, and occupancy sensors were installed. In 2018 to 2019, reflective window coverings on the bay windows were added. In 2019, weather-stripping and caulking was redone to ensure lower heat loss. A future proposed improvement to the Fire Station is a new Water Softening System.

The fire station has also decreased its energy consumption by about 17%, or 21,750ekWh, to consume a total of 105,175ekWh. The station was also able to reduce its associated emissions by approximately 24% or 4,877 kg of CO_2e by 2017. In 2017, their total emission count was 15,285 kg of CO_2e.

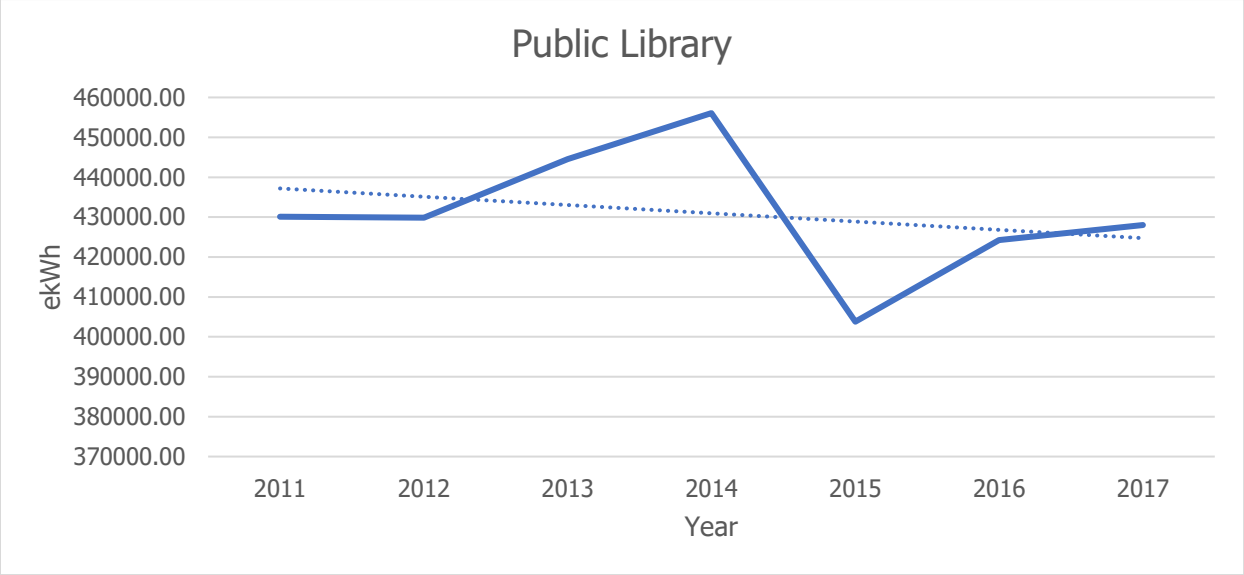
Police Station



The police station received a couple of improvements. In 2015, two RTUs were installed, and in 2017, two furnaces were installed in the building as well. Future plans into 2020 that are being proposed are installing another RTU.

The Police Station has increased its energy consumption compared to the 2011 baseline year. In 2017, the total consumption of energy equaled to approximately 675,403ekWh, which was about 9% or 57,176ekWh higher than 2011's consumption. Emissions have also increased at the Police Station. In 2017, the station emitted a total of 70,898 kg of CO_2e, which is about 20% higher than 2011's emissions, or about 11,755 kg more.

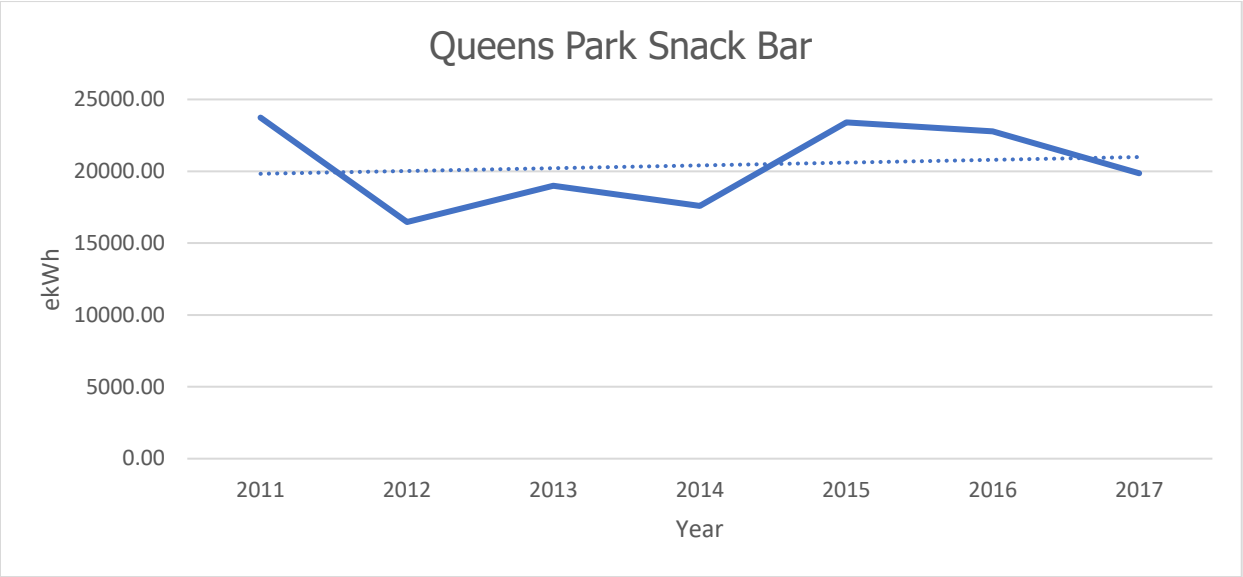
Public Library



The library has received many updates over the past five years, since the last plan was published. In 2015, two RTU's were installed. In 2016, the exterior walls of the Quiet Study Rooms were insulated, and weather caulking and insulation around the windows in these rooms was also added. In 2017, the lighting in the auditorium and MakerSpace was upgraded to LED lighting, the MakerSpace room was also insulated on the exterior walls and weather caulking and insulation was added around the windows as well. In 2018, one RTU was added, and in 2019 another was, as well.

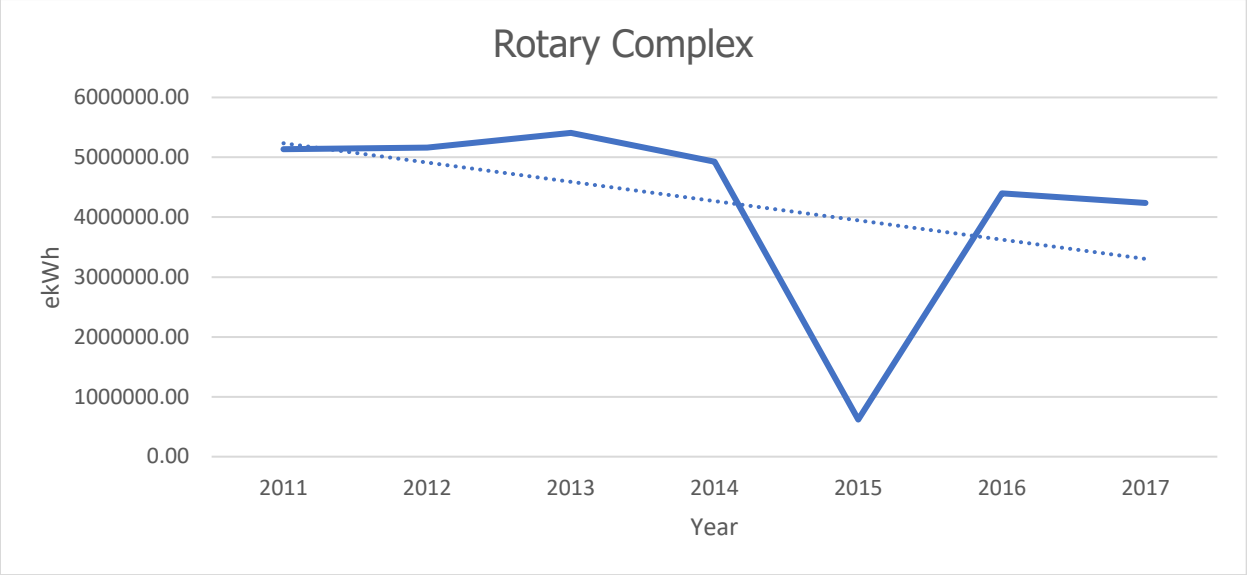
The Public Library has been able to level off their energy consumption, with a slight reduction in their consumption compared to 2011. In 2017, the Library consumed a total of 428,049ekWh, which is about 0.5% or 2,046.3ekWh less than what was used in 2011. The emissions associated with the Library reduced by approximately 1.05% or about 526.3 kg of CO_2e, compared to 2011. The building emitted a total of 49,603kg of CO_2e in 2017.

Queens Park Snack Bar



The Queens Bar Snack Bar has reduced its energy consumption since 2011 by about 16% or 3,870.7ekWh in 2017. In 2017, the total energy consumption for the Snack Bar totaled approximately 19,866ekWh. Emissions also decreased by about 16% or 166.4 kg of CO_2e, to emit a total of 854 kg of CO_2e.

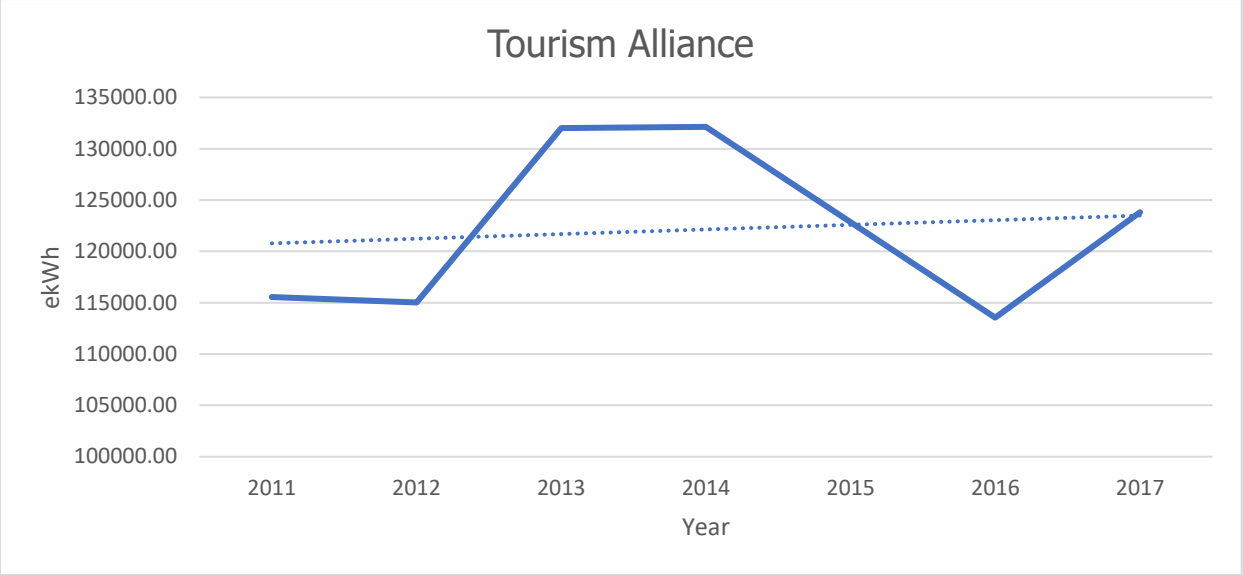
Rotary Complex



Between 2014 and 2015 the arena received a new LED lighting retrofit, and a new variable frequency drive motor was installed as well. In 2019, the parking lot lighting system was upgraded to LED lighting. There is a program in place to replace the lights in a phased manner, to more efficient LED lights.

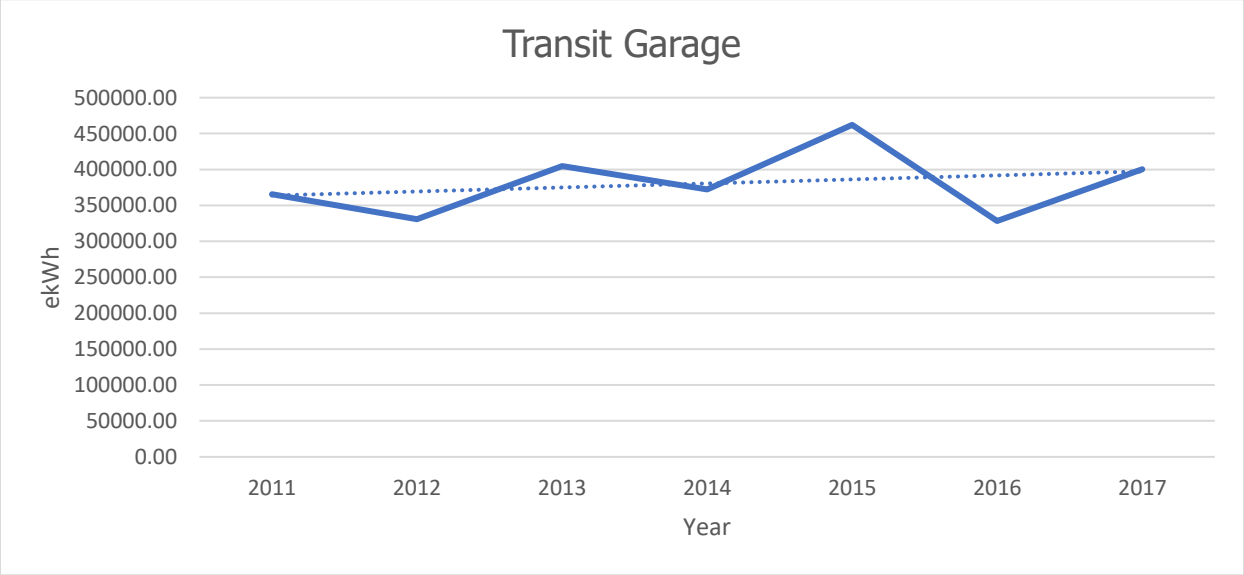
The Rotary Complex has reduced its energy consumption compared in 2017, compared to 2011 by approximately 17.5%, or 899,402ekWh. The total energy consumption in 2017 totaled to be approximately 4,235,241ekWh. The Rotary Complex has also reduced its emissions by nearly 15% or about 89,267 kg of CO_2e since 2011. The complex emitted a total of 508,341 kg of CO_2e in 2017.

Tourism Alliance



The Tourism Alliance facility has increased its energy consumption by approximately 7%, or 8,255ekWh compared to 2011. In 2017, the total consumption of energy was approximately 123,817ekWh. The emissions at this facility also increased by approximately 6%, or 1,038 kg of CO_2e. The total emission count at this facility was approximately 18,198 kg of CO_2e.

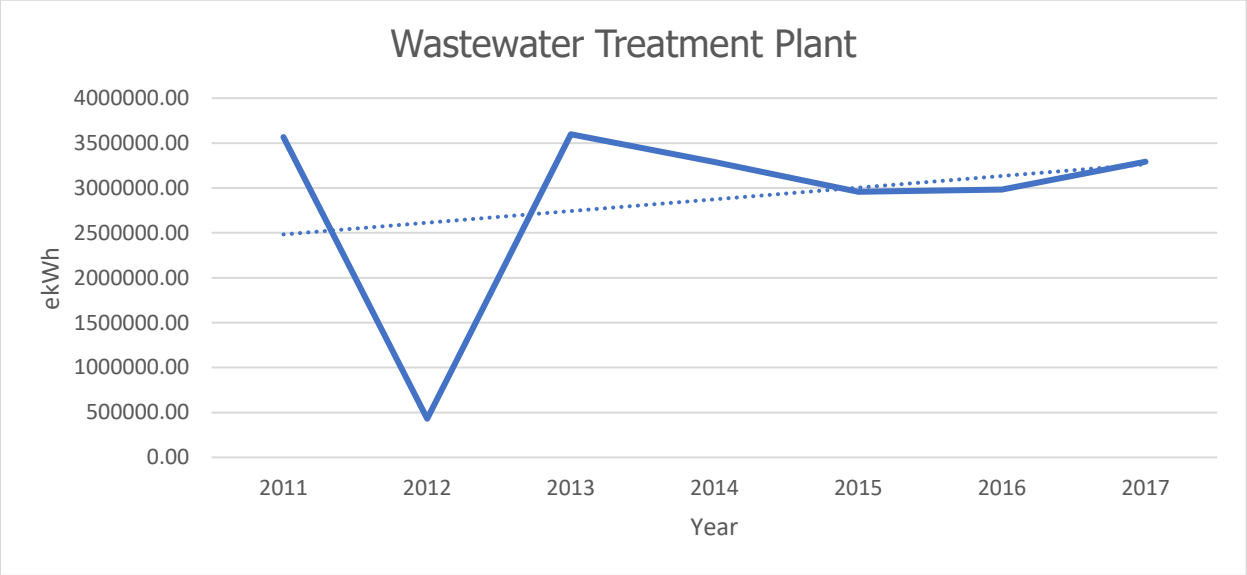
Transit Garage



The transit garage has increased its energy consumption by approximately 9.5%, or about 34,699ekWh, since 2011. The total energy consumption for the transit garage totaled to be approximately 400,398ekWh. Emissions also increased by about 10% or

about 5,108 kg of CO_2e in 2017 compared to 2011. In 2017 the garage emitted a total of 54,847 kg of CO_2e.

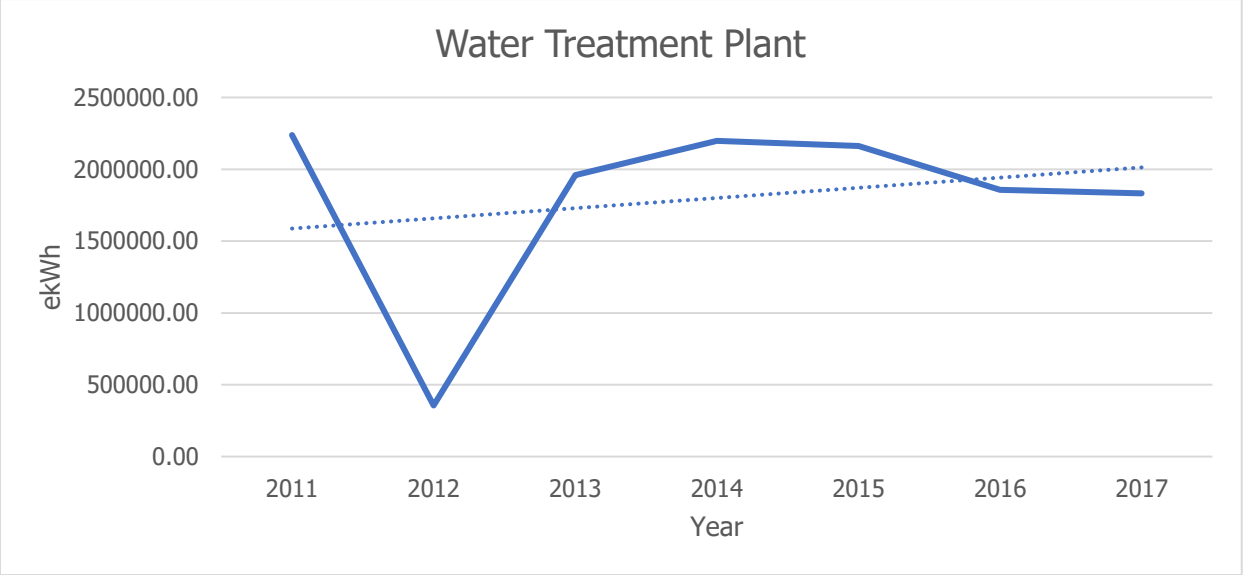
Wastewater Treatment Plant



In 2014, the facility installed a new 350 hp Turbo Blower with a variable frequency driver (VFD). In 2018, another upgrade was installed. Three dry weather influent screw pumps VFDs were installed.

The Wastewater Treatment Plant (WWTP or WPCP) has reduced its energy consumption by approximately 7.7% or 272,972.6ekWh compared to 2011. The WWTP consumed a total of 3,292,601ekWh in 2017. The WWTP decreased its emissions as well, by approximately 6.6%, or 10,199 kg of CO_2e compared to 2011. In 2017, the plant emitted a total of 143,566 kg of CO_2e.

Water Treatment Plant

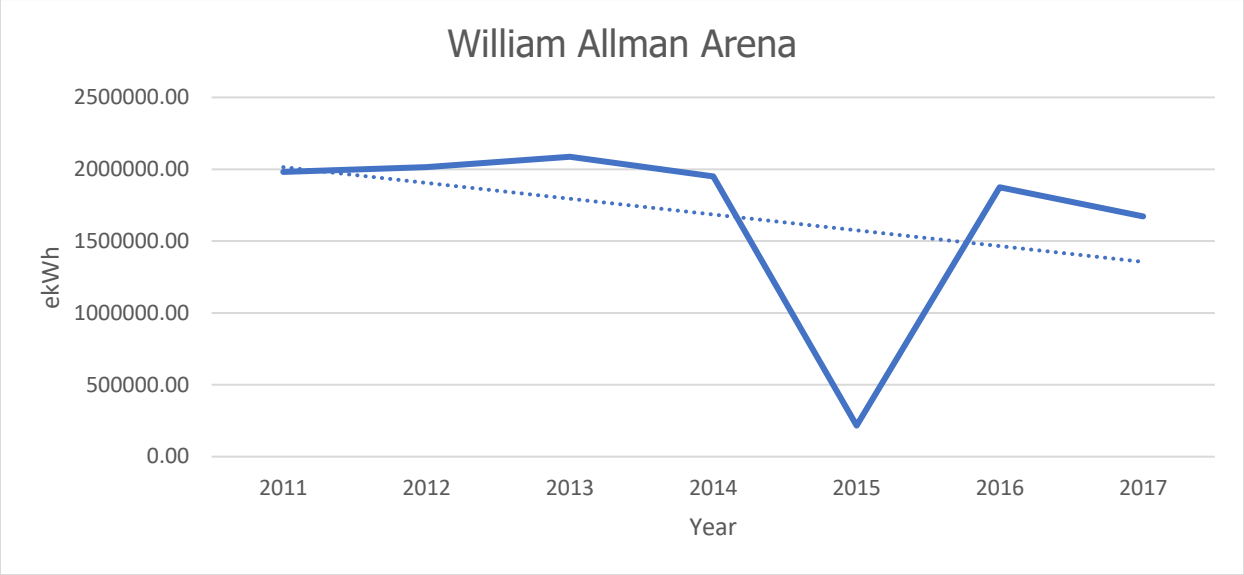


The water treatment facility has not received any new updates.

However, other related water facilities have received updates. The Dunn Road Water Supply, in 2015, upgraded the VFD, the Romeo Street Pumping Station in Well 6 and 7, in 2016, also had a VFD installation, in 2016 the O'Loane Avenue Pumping Station also had a VFD installed. In 2019, the Mornington Street Water Supply had a VFD installed with lowlift and highlift.

The water treatment facility has reduced its energy consumption by about 18%, or 406,737ekWh since 2011. The facility consumed a total of 1,831,445ekWh in 2017. The Water Treatment Plant has reduced its emissions since 2011 by approximately 18% or 17,489.7 kg of CO_2e. In 2017, the facility emitted a total of 78,752 kg of CO_2e.

William Allman Arena



Between 2014 and into 2015, the Arena received an LED lighting retrofit and a variable frequency drive motor was also installed.

The Alman Arena has experienced a reduction of energy consumption since 2011 of approximately 16% or 308,342ekWh. In 2017, the arena consumed a total of approximately 1,672,478ekWh. The arena emitted less than the 2011 baseline year by approximately 18% or 45,065 kg of CO_2e. In 2017, emissions totaled approximately 206,000 kg of CO_2e.