

Municipality of Kincardine  
Energy Conservation and  
Demand Management Plan  
2019-2024



# 1. Introduction

## 1.1. Overview

The Municipality of Kincardine's (Municipality) original energy conservation plan was developed and published in 2014. The Municipality's staff not only met, but exceeded, their conservation targets. Total energy consumption dropped by over 13% and green house gas emissions (GHGs) dropped by over 57%. This is a tremendous result from the Kincardine team.

This report is the next Energy Conservation and Demand Management Plan (ECDMP), developed by members of the Municipality's staff with support and direction from Blue Sky Energy Engineering & Consulting Inc. (Blue Sky) and the Local Authority Services (LAS). It builds on the previously published conservation efforts and is both an update and a refreshed commitment by the Municipality to conserve energy wherever possible. The following are the key elements to this plan:

- A clear corporate vision and policy that includes goals, objectives and strategic priorities for managing energy use.
- A description of Kincardine's current energy picture with a summary of past successes and present initiatives.
- A specific, actionable and prioritized inventory of energy conservation and demand management measures including estimates of their associated costs and energy savings.

The Municipality seeks to incorporate energy efficiency throughout all of its activities to minimize the fiscal impact of energy on operating costs and its related environmental impacts. This will include organizational and human resources management procedures, procurement practices, financial management and investment decisions, and facility operations and maintenance. All of the Municipality's departments have clear links to some, or all, of the goals and objectives of the ECDMP.

Ontario Regulation 507/18 of the Electricity Act, (previously O.Reg. 397/11 of the Green Energy Act) requires all municipalities to assemble and publish annually, a greenhouse gas emissions and energy consumption summary, on or before July 1<sup>st</sup> of each year. Additionally, a Corporate Energy Conservation and Demand Management Plan must be completed once every five (5) years; this plan covers the five (5) year period from 2019 through 2024.

The following sections outline the 5-year roadmap for energy conservation success in Kincardine:

- Current Municipal Energy Overview
- Kincardine Corporate Energy Conservation Commitment
- Our Successes
- Energy Conservation Team
- Current and Historical Energy Results
- Renewable Energy
- Update and Review Process
- The Energy Conservation Action Plan

## 1.2. Scope and Development of the Plan

The development of this plan involved three primary steps:

1. Assessing the Municipality's current energy consumption and energy management practices.
2. Establishing new energy conservation objectives and targets for the 5-year planning period.
3. Defining measurable and specific actions to achieve the objectives.

The requirements of Regulation 507/18 of the Electricity Act specify that the plan is to cover only the built environment (facilities that are heated), whose facilities are currently owned and operated by the Municipality. The full list of the Municipality's facilities included in the plan can be found in Table 1 below. Street lights, as an exception to this rule, have been included in this plan as they are a significant consumer of energy.

**TABLE 1: Kincardine Facilities and Infrastructure within the Boundaries of this Plan**

Name	Address	Use	Area (m <sup>2</sup> )
<b>FACILITIES</b>			
Municipal Administration Centre	1475 Concession 5 RR #5	Administrative office	1,337
Kincardine Fire Hall	127 Mahood-Johnston Dr	Fire Facility	894
Tiverton Fire Hall	15 McLaren St	Fire Facility	492
Underwood Municipal Office	1240 Con 6	Administrative Office	304
Armow Women's Institute	810 Con 7	Community Centre	144
Kincardine Library	727 Queen Street	Public Library	1,567
Tiverton Library	56 King St	Public Library	114
Davidson Centre	601 Durham St	Indoor Recreational facility	534
Tiverton arena	20 McLaren St	Indoor Sports Arena	266
Arts Centre	707 Queen St	Performing Arts Facility	254
Armow Garage	796 Con 7	Facility where equipment or vehicles are maintained or stored	1,022
Public Works 4 Bay Garage	140 Valentine Ave	Facility where equipment or vehicles are maintained or stored	626
Tiverton Equipment Garage	115 King St	Facility where equipment or vehicles are maintained or stored	204
Underwood Garage	1240 Con 6	Facility where equipment or vehicles are maintained or stored	1,394
<b>WATER AND SEWAGE FACILITIES</b>			
Water and Sewage Pumping Stations (9 accounts)	Various	Pumping and/or Treatment of Water	-
Connaught Park L.S	135 Broadway Street	Treatment of Sewage	-
Durham Street L.S	867 Olde Victoria Street	Treatment of Sewage	-
Effluent Station	169 Mahood Johnston	Treatment of Sewage	-
Briarhill Pumphouse	36 Conquergood Ave	Treatment of Water	-
KWWTP	520 Bruce Ave	Treatment of Water	-
Scotts Point Water Works	26 Zepfs Dr	Treatment of Water	-
Underwood Water Works	7 Concession Lot PT 5	Treatment of Water	-
Village of Tiverton Dent Pumphouse	6 Smith St	Treatment of Water	-
Water Treatment Plant	155 Durham St	Treatment of Water	-
<b>STREET LIGHTS</b>			
Street Lights	Various	Other	-

## 2. The Current Municipal Energy Overview

### 2.1. How We Manage Energy Today:

The management of our energy is a combination of energy data management, energy supply management, and energy use management.

**Energy Data Management:** Municipal energy data is managed through the Finance Department. The supplier invoices are received and summarized on a spreadsheet according to location. Senior management reviews the variances in comparison to the prior 3-month period to identify and monitor any unusual fluctuations in spending.

**Energy Supply Management:** Our municipal energy is supplied via a number of providers; electricity is supplied by Hydro One and Westario Power on an as needed basis and is priced at the standard rates offered by the provider; propane is obtained from local providers where appropriate and the commodity price fluctuates according to the market. Natural gas will soon be available in Kincardine and will be supplied by Epcor.

### 2.2. Our Municipal Energy Needs:

The Municipality requires reliable, low-cost, sustainable energy sources delivering energy to the most efficient facilities and energy-consuming technologies feasible. A natural gas pipeline will soon be constructed by Epcor, providing access to natural gas to residents and businesses in Kincardine, including the MUSH sector. This will primarily replace propane and electricity as the primary heating source at several facilities. Natural Gas is both less expensive and produces close to 20% less carbon dioxide (GHG gases) per BTU than Propane when combusted.

The Municipality anticipates significant growth in the next few years and expects energy consumption to grow with the population. As such, additional infrastructure will need to be available, and Municipal staff will be focusing on delivering services in this period. Energy conservation will therefore need to be woven into all improvement projects as time and resources will be tight.

#### **Stakeholder Needs:**

In order to implement a successful Energy Conservation and Demand Management Plan and achieve the conservation targets set forth in this plan, there must be adequate resources allocated towards energy planning initiatives. This will require both a financial commitment from Council through the annual budget process, as well as adequate staff resources and training. The overall conservation vision and energy consumption reduction targets cannot be achieved without the support of key stakeholders.

### **2.3. Strategic Energy Conservation Planning**

The Municipality will develop and implement energy policies, organize for energy management, develop the required skills and knowledge, manage energy information, communicate with stakeholders, and invest in energy management measures. As an integral component of the management structure, the ECDMP is to be coordinated with the Municipality's asset management plan, budgeting process purchasing policy, preventative maintenance plans, and the policy development process.

The availability of natural gas in parts of the community in the near future will also impact energy use at the Municipality. Natural gas is more cost effective than propane and electricity for heating spaces and, compared to propane, natural gas is generally a cleaner and more efficient energy source.

### 3. Kincardine's Corporate Energy Conservation Commitment

The following section outlines the Municipality's commitment to, and vision for, energy conservation. Delivery of this vision will involve a collaborative effort to increase education, awareness, and understanding of energy management within the Municipality. While commitment from Council and Senior Management is required, all staff have a role in energy usage, and to showcase appropriate leadership within corporate facilities and operation.

#### Declaration of Commitment

The Municipality of Kincardine will allocate the necessary resources to implement the Energy Conservation and Demand Management Plan (ECDMP) as required under *Ontario Regulation 507/18 of the Electricity Act*.

Council is committed to energy conservation and planning and will allocate resources to update the plan as required. Staff and council will strive to achieve the objectives presented in this plan and monitor progress on an ongoing basis. Staff and council will update the plan as required under *Regulation 507/18 of the Electricity Act* or any subsequent legislation.

#### Our Conservation Vision

*The Municipality of Kincardine will strive to continually reduce energy consumption and the associated greenhouse gases while maintaining a high level of service to our community.*

#### Our Goals

1. Maximize fiscal resources and mitigate future energy cost increases through direct and indirect energy savings.
2. Reduce the environmental impact of the Municipality's operations.
3. Increase the comfort and safety of staff and patrons of the Municipality's facilities
4. Create a culture of conservation within the Municipality.

#### Our Objectives

In order to meet the strategic goals of the ECDMP, there are several objectives that align with its development and implementation:

- A. **Energy Efficiency Standards:** Ensure energy efficiency measures are incorporated consistently across all municipal facilities, and standards are incorporated into purchasing practices.
- B. **Energy Monitoring and Tracking:** Monitor and report on energy consumption annually. Staff have implemented a review process of utility bills related to energy on a

monthly basis. Staff will also measure and verify the actual savings and return on investment of delivered energy.

- C. **Training and Capacity Development:** Raise staff and Council awareness around energy efficiency. This will include communicating successes to both internal and external stakeholders and providing energy training to key staff members.

## **Our Energy Conservation Target**

It is anticipated that Kincardine will experience significant growth over the next 5 years. As such, the municipal infrastructure and community buildings will be utilized more leading to higher energy consumption.

The Municipality will continue to seek reductions in energy consumption in light of population increases.

**Reduce energy consumption by 5% (329,993 ekWh) compared to 2016 over a 5-year period for all those facilities reported under Regulation 507/18 of the Electricity Act.**

## 4. Our Successes

The Municipality has completed a number of energy conservation projects which have contributed significantly to the control of energy costs. The Municipality has reduced its energy consumption by over 13% compared to the 2012 base year (see Section 6.0). This is an excellent example of how a strong staff, with a commitment to efficiency, can make a difference.

A list of over 25 completed energy conservation measures can be found in Table 1 below. The list illustrates the Municipality's leadership and commitment to actively managing energy consumption.

Facility	Measure Type	Project Description
Street Lighting	Lighting	Upgraded streetlight system throughout Kincardine from high pressure sodium (HPS) street lighting with LED cobra heads.
Kincardine Garage	Lighting	Upgraded T12 fluorescent high bay lighting with higher efficiency T8 fluorescent fixtures
Kincardine, Arnow and Tiverton Garage	Lighting	Replaced High Pressure Sodium outside wall lighting with LED
Underwood Garage	Building Envelope	3 large bay doors replaced with energy efficiency high R-value models
Municipal Administration Centre	Heating/Cooling	New variable speed heat pumps installed on geothermal system
Municipal Administration Centre	Building Renovation	Full Renovation - Lighting, windows, controls, tinted glass, caulking and weather stripping
Kincardine Library	Building Envelope	New front doors and replaced 2 bay windows
Kincardine Library	Lighting	Some lighting upgraded to LED
Tiverton Library	Building Envelope	Installed new front doors
Tiverton Library	Building Envelope	Installed new roof
Tiverton Library	Lighting	Some lighting upgraded
Medical Clinic	Heating	Upgraded one rooftop unit and reinsulated 3 others
Medical Clinic	Lighting	Some indoor lighting upgraded
Davidson Centre	Lighting	Replaced outdoor pole lighting with LED fixtures
Davidson Centre	Lighting	Upgraded interior T12 fluorescent lighting to higher efficiency T8s. High ceiling T12 fixtures upgraded to LED.
Davidson Centre	Building Envelope	Insulated roof
Davidson Centre	Controls	Motion sensors installed in most areas
Tiverton Arena	Lighting	Outdoor pole lighting upgraded to LED fixtures
Tiverton Arena	DHW	Replaced one large electric DHW heater with an instantaneous hot water heater.
Tiverton Arena	Controls	Motion Sensors installed in some spaces
Kincardine Fire Hall	Building Envelope	Weather stripping completed
Kincardine Fire Hall	Heating	New energy efficient furnaces and heaters with programmable thermostats
Kincardine Fire Hall	Lighting	Upgraded MH lighting to LED, motion sensors installed
Tiverton Fire Hall	Heating	Replaced Bay Unit Heaters with high efficiency infrared heaters
Tiverton Fire Hall	Building Envelope	Replaced large garage doors with new insulated doors
Tiverton Fire Hall	Lighting	Upgraded exterior HID lighting to LED wall packs
Arts Centre	Lighting	Upgraded exterior lighting to LED
Arts Centre	Heating	Replaced / Upgraded oil fired boiler system with high efficiency electric with setback controls

Photographs of several of the completed conservation projects are shown in Figures 1, 2, 3 and 4 below.



The largest energy conservation project undertaken by the Municipality was the conversion of over 1,100 street lighting fixtures to LED. This project saved approximately 600,000 kWh of electricity annually which translates to over \$80,000 per year in electricity cost savings<sup>1</sup>.

Note 1: The electricity and cost savings figures were obtained from the Realterm Energy report dated September 23<sup>rd</sup>, 2014.



**Figure 1:** Photographs of the new energy efficient LED outdoor street lighting



**Figure 2:** New high efficiency ceiling mounted furnaces, instantaneous water heaters, programmable thermostats and LED lighting fixtures at the Kincardine Fire Hall



**Figure 3:** Energy efficient LED lighting upgrades, motion sensors and new heat pumps at the Municipal Administration Centre

Renovation of the Municipal Administration Centre in 2014 have led to over 93,700 kWh of electricity savings over the period from the renovation to March of 2019. Continuous operations and maintenance improvements are showing additional savings over the 2018/2019 winter season which will continue in future years.



**Figure 4:** Energy efficient LED lighting upgrades, new windows and doors at the Kincardine Library

## 5. The Energy Conservation Team

The Municipality's team described below will continue to be responsible for delivering the plan's vision, objectives and goals as well as maintaining the Municipality's focus on energy efficiency in the years to come.

### **Energy Leader:**

The Chief Administrative Officer is assigned overall responsibility for corporate energy management.

### **Energy Conservation Champion – Finance:**

The role of the Finance Champion is to provide clear guidance, assistance and support to the conservation team on internal and external funding mechanisms and to include the team in relevant decision making and budget discussions.

This role will also be responsible for providing the energy consumption data on a monthly basis to the facilities staff and on an annual basis, to council for review and tracking.

The Finance Champion will support the use of life cycle costing and discounted cash flow-based assessments for capital projects and will include energy efficiency in procurement criteria where relevant. In addition, the Finance Champion will ensure that suppliers offer energy efficient alternatives/options where available and include energy criteria/performance in service contracts.

### **Energy Conservation Team – Facilities Staff and Fire Chief:**

The Energy Management Champions will have direct knowledge of the Municipality's major energy-using facilities and assets and are responsible for developing and maintaining the focus on energy conservation. The conservation team will ensure the delivery of energy conservation measures in each of the facilities and will be responsible for the consumption of energy within their respective departments. As such, they will be tasked with reviewing facility energy consumption data on a monthly basis, managing energy issues as required.

## 6. Current and Historical Energy Results

In order to track progress, an energy baseline was established from which annual energy consumption was compared. Energy consumption data was collected by the Municipality through Hydro One, Westario Power, and various propane and fuel oil companies for each of the Municipal buildings and water and sewage facilities.

The resulting dataset represents the Municipality's baseline and current level of energy performance however, it has not been corrected for yearly weather variations. Table 3 below presents Kincardine's 2016 energy data by fuel type, as well as an overall total, expressed in equivalent kilowatt hours (ekWh), compared to the baseline year of 2012. The energy consumption data shown below does not include some of the Municipality's smaller accounts like outdoor park lighting and facilities that are not heated. In 2012, the Municipality consumed approximately 7,600 ekWh and was responsible for 771.8 tonnes of associated green house gas (GHG) emissions. This was reduced significantly in 2016.

**TABLE 3:** Kincardine Energy Consumption (2016)

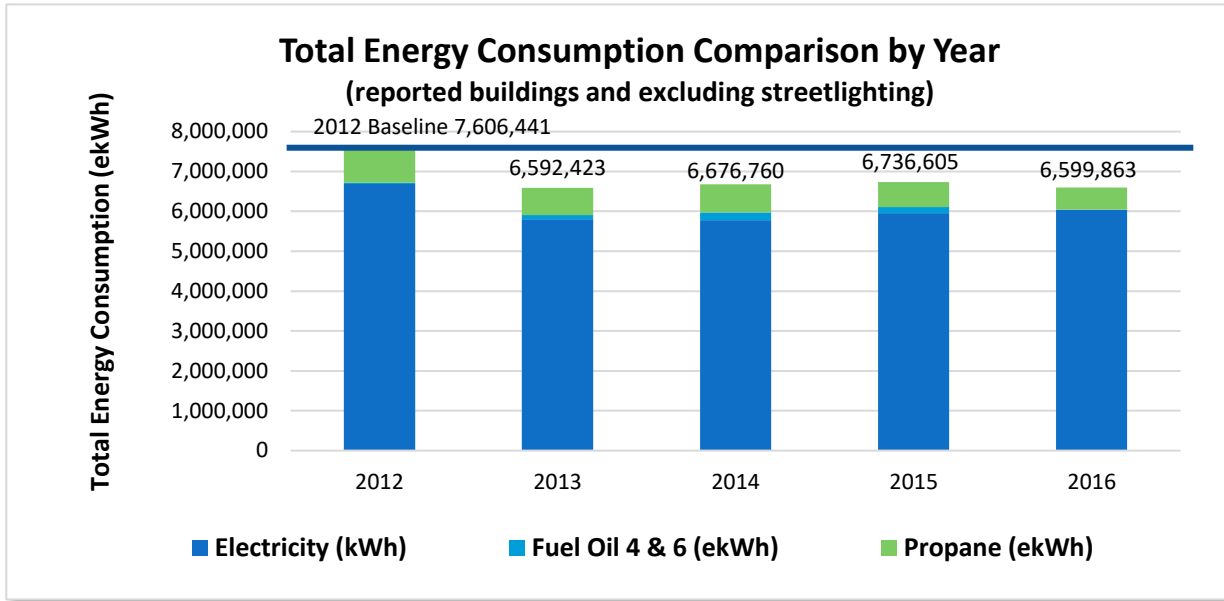
Account Centre	Electricity	Propane		Fuel Oil		Total	Baseline	% Change
	(kWh)	(L)	(ekWh) <sup>1</sup>	(L)	(ekWh) <sup>1</sup>	2016 Energy (ekWh)	2012 Energy (ekWh)	
Facilities	3,264,960	79,364	557,972	564	6,661	3,829,593	4,348,814	-11.9 ↓
Water & Sewage	2,770,270	0	0	0	0	2,770,270	3,257,627	-15.0 ↓
<b>Totals</b>	<b>4,984,053</b>	<b>79,364</b>	<b>557,972</b>	<b>564</b>	<b>6,661</b>	<b>6,599,863</b>	<b>7,606,441</b>	<b>-13.2 ↓</b>
	<b>Total Greenhouse Gas Emissions (tonnes)</b>					<b>331.4</b>	<b>771.8</b>	<b>-57.1% ↓</b>

Note 1: ekWh (equivalent kWh) is a calculated value using Natural Gas or Propane's thermal content to convert consumption in volume units to "equivalent" kWh for comparison.

As indicated in Table 3 above, Kincardine has achieved impressive 13.2% reduction in energy consumption over a five-year period ending in 2016, compared to the 2012 energy baseline. This improvement does not include the additional, and significant, savings that were achieved through the streetlighting upgrade in 2015. In addition, the related GHG emissions were reduced by over 57%, primarily due to the reduction of propane consumption.

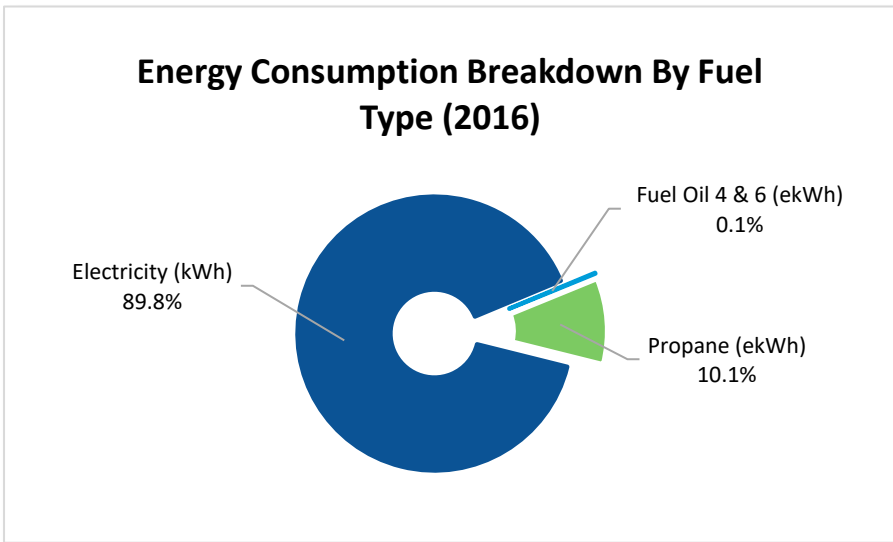
The following figures illustrate the energy consumption broken down by building, year and energy type.

Figure 1 shows the total energy by year consumed by all applicable buildings owned by the Municipality. The graph indicates a steady decline in energy consumption over the five-year period.



**Figure 1:** Total Annual Energy Consumption (ekWh) for all Reported Kincardine Facilities

It should be noted that Figure 1 above does not include street lighting, however it illustrates that the municipality has reduced its energy consumption by over 13% (1,006,578 ekWh, 440.1 tonnes CO<sub>2</sub>) in 2016 compared to the baseline year of 2012. This is the equivalent to removing approximately 85 cars from the road for one year. Approximately 469 acres of North American forest would be required to remove 440.1 tonnes of CO<sub>2</sub> from the atmosphere.



**Figure 2:** Energy Consumption Breakdown by Fuel Type.

Figure 2 above illustrates that Municipal facilities rely primarily on electricity for energy and heating, with propane used as the primary heating energy in some facilities. Fuel oil is only used in minor quantities. In the near future, Kincardine will be replacing some of the propane and electricity consumption with natural gas when it becomes available in the community.

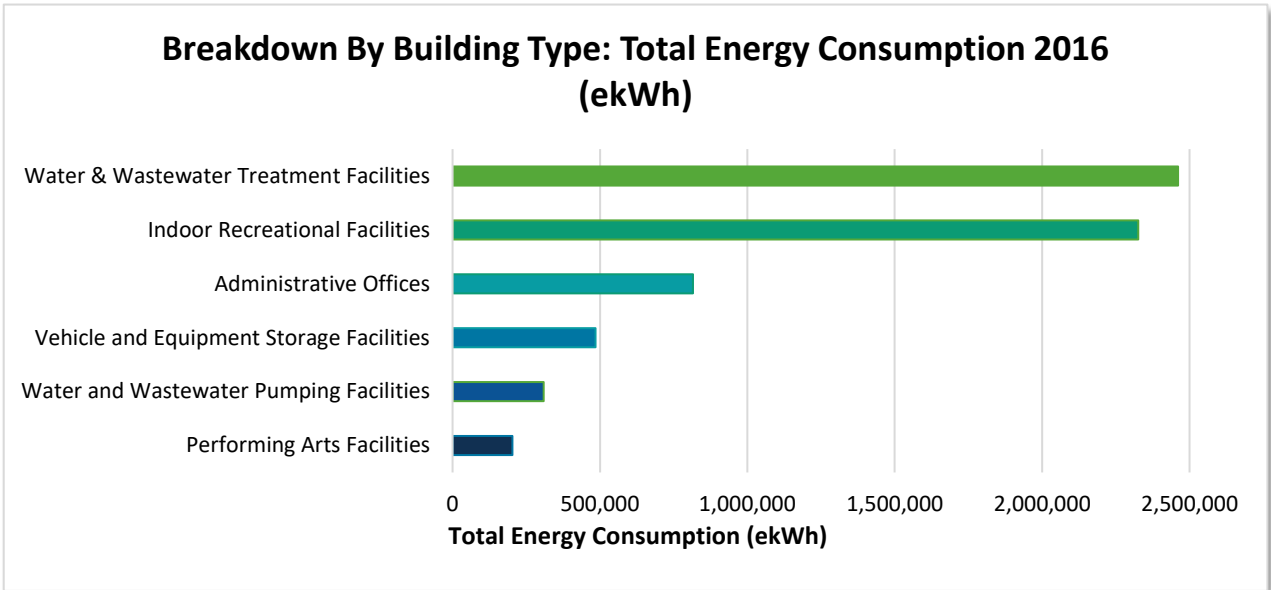


Figure 3: 2016 Energy Consumption by Building Type

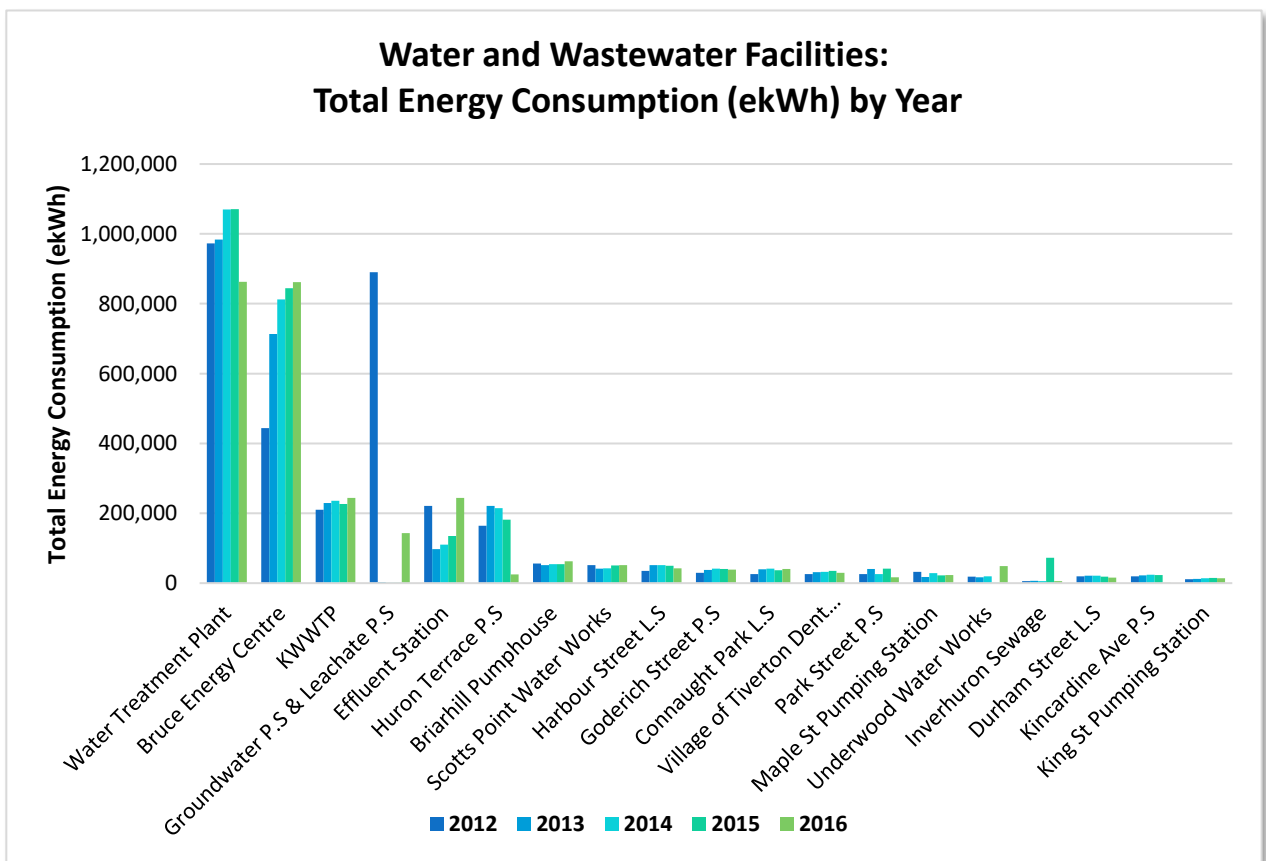


Figure 4: 2016 Energy Consumption by Water and Wastewater Facility

Figure 3 shows the energy consumption in 2016 by building type. This is further broken down in Figures 4 and 5 which illustrate the amount of energy consumed in the Water/Wastewater facilities and all other buildings over a five-year period, respectively. The Davidson Centre, the Water Treatment Plant, the Bruce



Energy Centre, the Tiverton Arena and the Municipal Administration Centre are the five largest consumers of energy in the Municipality, responsible for 65% of the total energy consumption.

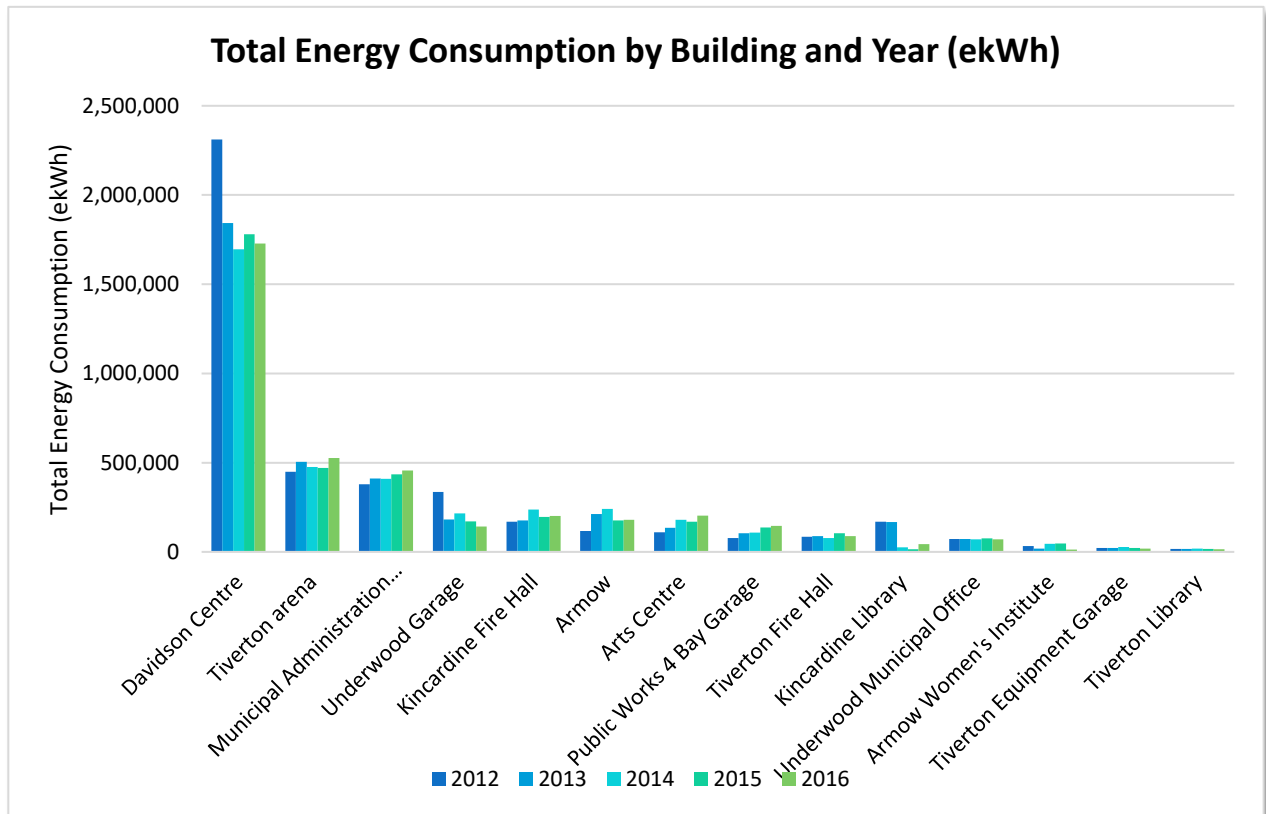


Figure 5: 2016 Energy Consumption by Building

## 7. Renewable Energy

**Renewable Energy Utilized or Planned:** Renewable energy is generated from natural sources such as sunlight, wind, and geothermal heat. Currently the Municipality has geothermal heat pumps used to regulate building temperatures at the Municipal Administration Centre and the Underwood Community Centre. In addition to these systems, the Municipality is also home to wind generation facilities.

The Municipality does not currently have any plans for new renewable energy generation.

## 8. Update and Review Process

**Energy Plan Review:** As part of any energy management strategy, continuous monitoring, verification, and reporting is an essential tool to track consumption and cost savings/avoidance as a result of implemented initiatives. The municipality will endeavor to create a useful energy reporting mechanism for key facility staff to ensure opportunities are managed appropriately.

As part of the Energy Plan, the implemented process improvements and projects will continue to be documented and reviewed annually to update consumption savings. By regularly monitoring consumption and cost savings/avoidance to its departments, the outcomes of the Municipality's participation in energy management initiatives can be demonstrated, and feedback can be obtained for any new ideas.

This monitoring will also align with the requirements of Regulation 507/18 of the Electricity Act and/or any subsequent legislation related to energy management.

## 9. The Conservation Action Plan

A critical part of any plan is the detailed list of specific actions needed to achieve the desired goals and objectives. The Municipality of Kincardine has developed a list of key projects which will help ensure the Municipality meets the energy reduction goals and targets set out in the Corporate Energy Conservation Commitment (see Section 3.0).

The plan has been divided into the following sections:

- A. **Creating a Culture of Conservation**
- B. **Energy Efficiency Standards and Policies**
- C. **Energy Monitoring and Tracking**
- D. **Energy Conservation Action Plan**

### 9.1. Creating a Culture of Conservation

**Energy Training:** The Municipality will develop and deliver energy training for relevant staff members. This training will not be limited to operators and maintainers with "hands-on" involvement in energy consuming equipment but will also include others since they also make energy consumption decisions in their daily work. Training focused on energy use, energy costing and conservation opportunities associated with employee job functions will be provided. (The Municipality of Kincardine will utilize both internal and external resources to provide this training as appropriate).

**Communication Programs:** Municipality staff will develop a communication strategy that creates and sustains awareness of energy efficiency as a corporate priority among all employees and conveys our commitment and progress to our stakeholders. Activities could include circulating reminder stickers to turn lights off, putting up energy conservation displays, promoting home energy audits, and hosting lunch-and-learns.

### 9.2. Energy Efficiency Standards

#### **Procurement Planning**

The intent is to make Life Cycle Cost Analysis part of the normal course of business for all facility and operational retrofits, including capital renewal and life cycle replacements projects. Success means incorporating energy efficient options at the initial stages of a project design. This ensures that options for improving energy efficiency are considered, evaluated and quantified in terms of life cycle analysis, including cost, maintenance and emission levels.

As energy is a major component of the operating costs of municipal facilities, energy costs will be considered in the lifecycle costing and procurement policies of the Municipality.

**Consideration of energy efficiency of acquired equipment:** Purchasing procedures will be modified as required to incorporate energy efficiency into the criteria for acquiring materials and equipment.

The Municipality will add energy consumption as a criterion in procurement of equipment and processes, in the request for proposals or quotations. In addition, the net present value (NPV) calculations to determine the 20-year impact of energy and maintenance costs will be required from suppliers and consultants to ensure the Municipality makes the best decisions regarding large capital purchases.

### **Implementation Planning**

**Building Standards:** Municipality staff will develop criteria for the design and/or acquisition of new buildings that include energy performance factors and that use as appropriate the principles embedded in performance standards such as the Model National Energy Code for Buildings.

The Municipality of Kincardine will investigate adopting such a standard for new buildings.

## **9.3. Energy Monitoring and Tracking**

**Energy Consumption:** Municipality staff will review and evaluate our energy plan, revising and updating it as necessary, on an annual basis as based on the Energy Consumption Reports that are submitted to the Ontario Government on an annual basis as required under *Regulation 507/18*. Monthly billing review will provide an opportunity to identify and recover any billing errors, or usage that requires further investigation.

**Green House Gas Emissions:** Governments at all levels are moving to address emissions of GHGs, in light of scientific evidence on how human activities are affecting the world's climate. For more information on the science, see <http://www.ipcc.ch/>. The combustion of fossil fuels in buildings is a major source of GHG emissions that fall under local government influence. Municipalities can lower emissions by improving energy efficiency of buildings and using more renewable energy. The Municipality is committed to both objectives through the development and implementation of this ECDMP. We will continue to track and report on GHGs as part of our regular reporting on energy consumption and will evaluate progress in this area against our overall reduction target.

## **9.4. Energy Conservation Action Plan**

The detailed list of projects included in the plan, which covers a period from July 2019 to June 2024, can be found in Appendix A.

The projects fall under the following broad categories; organizational improvements, lighting, HVAC, building envelope, domestic hot water (DHW), and general equipment improvements. The following themes can be found in the action plan:

- Adding energy consumption to the selection process criteria for large capital purchases;
- Upgrading space heating and cooling controls with programmable thermostats;
- Replacing remaining older lighting systems inside and outdoors with LED;
- Installing motion sensors where possible;

- Energy efficiency training for key staff;
- Replacing electric DHW tanks with instantaneous natural gas or propane;
- Upgrading some windows and a few large garage doors with high insulative materials;
- Installing interlocks on large garage doors to unit heaters to reduce heat losses;
- Investigation of higher efficiency ice plant technologies and equipment for the arena ice plants; and,
- Evaluation of heat reclaim opportunities from the ice plants.

**Appendix A: Kincardine Energy Conservation Action Plan**

## Kincardine Energy Conservation Work Plan 2019 - 2024

No.	Facility	Project Type	Description	Details
1	Across Organization	Standard or Program	Visual Displays	Make use of visual displays to demonstrate to staff the implications of current behaviors. Displays can include simple posters or screen savers that remind staff of the municipal energy conservation goal or specific measures such as turning of lights or appliances when not in use or to turn down thermostats.
2	Across Organization	Standard or Program	Energy Training	Arrange training for key staff on energy staff that covers energy sources, financing, technology and conservation. Consider LAS/AMO's Energy Efficient Building Operations 101 that is 50% subsidized by the ISO (with a potential additional 25% from natural gas suppliers) and can be customized.
3	Across Organization	Standard or Program	Procurement Practices - Incorporate Energy Consumption	Incorporate Life Cycle Costing (LCC) into procurement policy and related processes. Specifically include a requirement to specify power, energy consumption levels, and energy efficiency ratings in requests for proposal and quotation from suppliers.
4	Across Organization	Standard or Program	Monitoring and Tracking Energy Use	Investigate options for online energy tracking service to review and track electricity consumption at each facility.
5	Arts Centre	Heating	Controls	Install programmable thermostats for space heating and program setbacks for unoccupied periods.
6	Arts Centre	HVAC	Controls	Consider installing demand controlled ventilation in theatre space.
7	Arts Centre	Lighting	Interior Upgrade	Upgrade existing T12 fluorescent lighting to T8 lamps with electronic ballasts. Include replacement of all GU10 and MR16 lamps with LED. (50% remaining)
8	Municipal Administration Centre	Heating	Upgrade plug in heaters	Replace plug in space heaters with radiant panel heaters with timers and/or motion sensors
9	Municipal Administration Centre	Heating/Cooling	Program temperature setbacks	Program temperature setbacks during unoccupied periods both in the summer to reduce A/C load and winter to reduce heating load.
10	Municipal Administration Centre	Lighting	Upgrade remaining fluorescent lights to LED	Continue to change T8 lighting to LED with motion sensors on upper level of building.
11	Davidson Centre	Chillers	Replace existing ice plant with new ammonia system	Replace existing Freon ice plant with new ammonia system. Investigate incorporating premium efficiency motors, enabling floating head pressure, VFDs on brine pumps, installation of heat exchanger to heat pool water or building space heat, water purification. Investigate available incentives at time of upgrade. Scheduled for 2020
12	Davidson Centre	Lighting	Replace MH rink lighting with LED	Upgrade arena rink lighting from MH to LED technology.
13	Davidson Centre	Lighting	Replace Pool area lighting with LED	Upgrade high bay lighting around perimeter of pool from MH to LED technology.
14	Davidson Centre	Lighting	Upgrade Exterior Lighting	Upgrade exterior HID wall packs to LED technology.
15	Davidson Centre	Lighting	Interior Upgrade	Upgrade interior T12 fluorescent lighting to T8 technology with electronic ballasts. Retrofit hall lighting to T5 technology. Relamp entire building using 28W T8 fluorescent lamps. Approximately 70% complete.
16	Fire Hall, Kincardine	Heating	Install New Programmable Set-Back Thermostats for all electric baseboard heaters	Install programmable digital wall thermostats for all wall mounted electric baseboard heaters.
17	Fire Hall, Kincardine	Heating	Upgrade plug in heaters	Replacement of plug in electric space heaters with panel radiant heaters
18	Fire Hall, Kincardine	Lighting	Interior Lighting Upgrade	Upgrade all interior lighting from T12 fluorescent to T8 lamps with electronic ballasts. Include in project to upgrade all exit signage bulbs from incandescent to LED. Investigate Small Business Lighting Program for incentives, if not already being used.
19	Fire Hall, Kincardine	Lighting	Occupancy Sensors	Install occupancy sensors in washrooms and workroom.
20	Fire Hall, Kincardine	Lighting	Upgrade Exterior Lighting to LED	Upgrade exterior wall packs and pole lighting from HID to LED technology.
22	Fire Hall, Tiverton	Heating	Install Line-Voltage Programmable Thermostats on Electric Baseboard Heaters	Install programmable digital wall thermostats for all wall mounted electric baseboard heaters.
23	Fire Hall, Tiverton	Heating	Upgrade plug in heaters	Replacement of plug in electric space heaters with panel radiant heaters
24	Fire Hall, Tiverton	Lighting	Upgrade Exterior Lighting	Upgrade wall pack lights on exterior above doors HPS to LED fixtures.
25	Garage, All	Heating	Install Line-Voltage Programmable Thermostats on Electric Baseboard Heaters	Install Programmable Setback Thermostats on all office Electric Baseboard Heaters. Setback night time space temperatures. The Mechanics Room and Lunch Room have these electric baseboard heaters.

## Kincardine Energy Conservation Work Plan 2019 - 2024

No.	Facility	Project Type	Description	Details
26	Garage, All	Heating	Programmable Set-Back Thermostats for Propane Unit Heaters	Install Programmable Set-Back Thermostats on the Propane Unit Heaters in Bays. Reduce evening temperatures by 4 degrees during unoccupied times. Return temperature in the morning as required by occupancy.
27	Garage, Armow	Building Envelope	Bay Doors	Replace 3 large bay doors w ith high R-value insulated material.
28	Garage, Armow	Lighting	Interior Lighting Upgrade	Upgrade T12 fluorescent lighting to LED w ith motion sensors. Should investigate Small Business Lighting Program for incentives, if not already being used.
29	Garage, Kincardine	A/C	Upgrade Window A/C Unit to Energy Star Rated A/C Unit	Replace the existing w indow Air Conditioning Unit w ith an Energy Star Rated unit.
30	Garage, Kincardine	Lighting	Interior Lighting Upgrade	Upgrade T8 fluorescent lighting to LED w ith motion sensors. Should investigate Small Business Lighting Program for incentives, if not already being used.
31	Garage, Underwood	Building Envelope	Windows	Replace four (4) older aluminum frame w indow s w ith energy efficeint low -3 thermal w indow s.
32	Garage, Underwood	Lighting	Exterior Lighting Upgrade	Upgrade exterior HID lighting to LED w all packs.
33	Garage, Underwood	Lighting	Interior Lighting Upgrade	Upgrade T8 fluorescent lighting to LED w ith motion sensors. Should investigate Small Business Lighting Program for incentives, if not already being used.
34	Garage, Underwood	Lighting	Interior Lighting Upgrade	Upgrade highbay lighting w ith LED w ith motion sensors. Should investigate Small Business Lighting Program, if not already being used.
35	Garage, Underwood	Building Envelope	Insulation	Add insulation in office w alls and around exhaust fans to reduce heat losses
36	Garages: Armow, Underwood	DHW	Electric DHW Heater - Propane Instantaneous Heater Upgrade	Replace the existing Electric Element (4.5 kW's) domestic hot w ater tank heater w ith a propane fuelled Instantaneous Domestic Hot Water Heater. This w ill reduce standby losses from the existing DHW tank heater estimated at more than 750 kW's per year. Incentive on new heater may be available to shorten payback period.
37	Garages: Kincardine, Tiverton	DHW	Electric DHW Heater - Natural Gas Instantaneous Heater Upgrade	Replace the existing Electric Element (4.5 kW's) domestic hot w ater tank heater w ith a natural gas Instantaneous Domestic Hot Water Heater. This w ill reduce standby losses from the existing DHW tank heater estimated at more than 750 kW's per year. Incentive on new heater may be available to shorten payback period.
38	Library, Kincardine	Heating	Controls	Program temperature setbacks during unoccupied periods both in the summer to reduce A/C load and w inter to reduce heating load.
39	Library, Kincardine	Lighting	Interior Upgrade	Continue to update upper level lighting to LED.
40	Library, Tiverton	Heating	Controls	Install programable w all thermostats on electric baseboard heaters
41	Library, Tiverton	Heating	Controls	Program temperature setbacks during unoccupied periods both in the summer to reduce A/C load and w inter to reduce heating load.
42	Medical Clinic	Heating	Controls	Program temperature setbacks during unoccupied periods both in the summer to reduce A/C load and w inter to reduce heating load.
43	Medical Clinic	Lighting	Interior Upgrade	Continue replacing T12 and T8 Fluorescent lighting w ith LED
44	Tiverton arena	Chillers	Install Refrigeration Plant Controller for Floating Head Pressure Control and Scheduling	It is recommended to install a refrigeration plant controller such as a CIMCO 6000E system w hich w ill provide floating head pressure control, brine pump speed control, ice surface temperature control and other features. The system w ill provide accurate control of ice temperature, brine pump energy savings, compressor energy savings and w ill adjust w ith outdoor temperature and thermal loading on the ice pad. It can be programmed and scheduled according to occupant requirements and settings are easily changed.
45	Tiverton arena	DHW	Replace Kitchen Electric Water Heater with Propane Instantaneous Domestic Hot Water Heater	The Kitchen Area uses a small electric domestic hot w ater heater. It is recommended to replace this unit w ith propane fired, instantaneous domestic hot w ater heater. This w ill reduce standby heating losses from the hot w ater tank. Savings are estimated for electric heat standby losses only, additional savings are available from fuel sw itching to propane. The w ater lines should have insulation added to them to reduce radiant heat losses.
46	Tiverton arena	DHW	Replace Electric Domestic Hot Water Tank Heater with Propane Fired Heater	There is currently one large (100 Gallon, 8 kW's each approximately) electric Domestic Hot Water Tank Heater used to supply hot w ater to the dressing room that has not been updated. This unit has a large electrical demand (kW) and is an older model, w ith scaling w hich reduces heating efficiency. By replacing these units w ith high efficiency propane-fueled DHW tank heaters, electrical consumption and demand charges w ill be saved. An alternative is to use Instantaneous Domestic Hot Water Tank Heaters to reduce stand-by losses. At a minimum, the existing tanks should be insulated w ith blanket insulation to reduce stand-by losses. Savings is based on reduced stand-by losses only. Additional savings from fuel sw itch and efficiency increase w ill also be achieved.
47	Tiverton arena	Heating	Programmable Set-Back Thermostats on Change Room Electric Heaters	Install Programmable Set-Back Thermostats on electric space heating in all Change Rooms. The existing electric heating units w ithin all Change Rooms are manually controlled and can remain on during unoccupied periods. It is recommended to install programmable units on all electric heaters to shut them off w hen not required.



## Kincardine Energy Conservation Work Plan 2019 - 2024

No.	Facility	Project Type	Description	Details
48	Tiverton arena	Heating	Install Heat Recovery Ventilators in Change Rooms	The Change Room areas use fractional HP exhaust fans to remove warm, moist air from these areas. It is recommended to install Heat or Energy Recovery Ventilators for each Change Room exhaust air stream to recover heating energy and reduce the heating loads on the hot water heating system currently in use for these areas. Energy savings are in propane and also some electric (electric heaters).
49	Tiverton arena	Heating	Install Interlock Controllers on Olympia Garage Door Electric Heaters	It is recommended to install Interlock Controllers on the Olympia garage door electric heaters. This will prevent energy being wasted from these electric heaters when the garage doors are in the open position during the heating season.
50	Tiverton arena	Heating	Shut Off or Install Thermostat on Storage Area Electric Space Heater	Install a Programmable Thermostat on the Electric Space Heater located in the Storage Room at the back of the Arena. This area is not insulated and may not require heating at all. The heater was operating which is wasteful as the area is not occupied.
51	Tiverton arena	Heating	Programmable Thermostats on Front Lobby Electric Heating	Install Programmable Set-Back Thermostats on Front Lobby Electric Unit Heaters. Program these to set space temperature for occupancy 1 hour before opening hours. Set-back temperature 4 degrees or so F in evenings.
52	Tiverton arena	Lighting	Interior Lighting Upgrade	Upgrade all interior lighting from T12 fluorescent to T8 lamps with electronic ballasts. Include in project to upgrade all exit signage bulbs from incandescent to LED. 50% Complete
53	Tiverton arena	Lighting	Install occupancy sensors in various rooms	Install occupancy sensors in washrooms and dressing rooms to automatically shut off lights when unoccupied. Tie in exhaust fans where possible. 70% Complete
54	Tiverton arena	Lighting	Upgrade Rink Lighting	Upgrade (21) 1000W MH fixtures over ice surface to LED technology (option to T5).
55	Tiverton arena	Lighting	Upgrade Exterior Lighting	Upgrade exterior wall packs to LED technology.
56	Tiverton arena	Motors	Install Premium Efficiency 50 hp and 30 hp Compressor Motors	It is recommended to replace the lead compressor motor with a Premium Efficiency motor. The lead motors will have an increase of 2% in energy efficiency generating long term energy savings for the plant. A study should be completed to determine the actual operating hours for each motor in order to determine its current energy consumption.
57	Tiverton arena	Transformer	Install High Efficiency 4 kVA Electrical Transformer in Storage Room (Lighting Equipment)	It is recommended to replace the existing 4 kVA electrical transformer in the Storage Room area of the Arena to reduce electrical stand-by losses. The existing transformer uses power even when not loaded by lighting loads, which is greatly reduced by installing a high efficiency transformer. All similar transformers should be replaced as well as this equipment operates 8760 hours per year.
58	Underwood Community Centre	Heating	Upgrade Heat Pump	Replace existing heat pump with new energy efficient air to air heat pump
59	Underwood Community Centre	Heating	Controls	Program temperature setbacks during unoccupied periods both in the summer to reduce A/C load and winter to reduce heating load.
60	Underwood Community Centre	Lighting	Interior Upgrade	Upgrade T12 Fluorescent lighting to LED
61	Kincardine WWTP	Process Equipment	Aeration Upgrade	This may be incorporated into other offsite upgrades that will ultimately impact this site. Potential future project.
62	Kincardine WWTP	Lighting	Upgrade	Supplier has completed a walkthrough and upgrades are to begin in 2019 and run for several years as budget permits.
63	Kincardine WTP	Process Equipment	Optimization	Evaluate possibility of modifying production schedule to transfer burden of energy intensive processes to off-peak times.
64	Kincardine WTP and BEC WWTP	Lighting	Upgrade	Plant lighting will be changed to T5 high output in office and garage as well as BEC. Supplier report to follow. Upgrades to begin in 2019 and run for several years as budget permits.
65	Kincardine WTP	Lighting	Upgrade	Supplier has completed a walkthrough and upgrades are to begin in 2019 and run for several years as budget permits.
66	Various Well and Sewage Pumping Stations	Lighting	Upgrade	Supplier has completed a walkthrough and upgrades are to begin in 2019 and run for several years as budget permits.
67	Scott Point Well	Process Equipment	Upgrade	The duty pump's high lift motor has been upgraded while the stand-by will be upgraded prior to the duty's expected end-of-life.