

City of Sarnia



Energy Conservation and Demand Management Plan

2019 Update

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Executive Summary

This Energy Management Plan update is to comply with the requirements of Ontario Regulation 507/18 entitled "Broader Public Sector: Energy Reporting and Conservation and Demand Management Plans" passed under the Electricity Act.

The City of Sarnia is challenged with significant budget pressures to address infrastructure and energy costs. This plan outlines the Energy Management Plan Update for the City of Sarnia ("Sarnia") in order to help alleviate budget pressures and improve facility operation and energy conservation.

Ontario Regulation 507/18

In August 2011, the provincial government introduced Ontario Regulation 397/11 under the Green Energy Act, 2009. This regulation required certain public agencies, including Municipalities, to report on their energy consumption and greenhouse gas emissions annually, beginning in 2013. In addition to this, a five year energy conservation and demand management Plan was required in 2014, to be updated every five (5) years thereafter.

The Green Energy Repeal Act, 2018 was passed on December 2018 which repealed the 2009 Green Energy Act, and transferred authority of the reporting requirements to the Electricity Act, 1998.

Pursuant to the regulation: On or before July 1, 2019 and on or before every fifth anniversary thereafter, every public agency shall publish on its website and intranet site, if it has either or both, and make available to the public in printed form at its head office, all of the information that is required to be published and made available under subsection (1), the Energy Consumption and Greenhouse Gas Emission Template that is required to be submitted and published on or before July 1 of that year and the following information:

- A revised forecast of the expected results of the current and proposed measures.
- A description of any proposed changes to be made to assist the public agency in reaching any targets it has established or forecasts it has made.
- A description of current and proposed measures for conserving and otherwise reducing energy consumption and managing its demand for energy.

As part of the initial plan and continued efforts for energy demand management and conservation, the City of Sarnia team has worked closely with its energy provider, Bluewater Power, to:

- Investigate baseline energy usages
- Opportunities for energy reduction
- Submission of project information for incentives where available
- Tracking of energy usage and improvements

The plan is to serve as a guide for the staff and Council during the capital planning and budgeting process. This plan and the data analysis that has been completed is part of the requirements under O-Reg 507/18 and will be forwarded to the Ministry and made available to the public. The results of the completed efforts are outlined in this update, as well as projects that have been identified to date over the next five years.

Background

The City of Sarnia is located in Southwestern Ontario, and is a border city connecting with Port Huron Michigan along the southern shore of Lake Huron which flows to the west into the St. Clair River.

Sarnia's population is 71,594, per the 2016 census, and occupies a land area of 164.85 square kilometres with a population density of 434.3 per square kilometre.

An Energy Management Plan under O.Reg 507/18 focuses on buildings or facilities owned or leased by the municipality that are either heated or cooled, or are related to the treatment or pumping of water, or waste water.

As such, this plan relates primarily to Sarnia's 31 municipal buildings that are heated or cooled, and various pumping stations as well as two (2) waste water treatment facilities.

The total energy costs for the last four (4) years for reported City properties are:

| Year | Cost | Greenhouse Gas Emissions (GHG) | Kilowatt Hours |
|---------------|----------------|---------------------------------------|-----------------------|
| 2018* | \$3,961,802.89 | 3,393,548.33 | 39,402,168.96 |
| 2017 | \$4,351,726.36 | 3,250,531.50 | 39,265,809.23 |
| 2016** | \$4,569,573.31 | 3,118,469.50 | 38,871,469.21 |
| 2015 | \$4,304,051.35 | 3,244,882.38 | 40,346,952.74 |

*The reduction in cost in 2018 can be attributed to the change in pricing for Water Pollution Control Centre to Class A pricing model.

** The increase for usage energy usage is related to the start-up of the Bright's Grove Lagoons wastewater treatment facility after the capacity upgrades.

This include costs for Sarnia Harbor which has a cost recovery for ship power usage when docked at the harbour.

In June 2014, City Council approved the City of Sarnia's corporate Energy Conservation and Demand Management Plan to comply with the regulations. This plan outlined a goal of 2% energy reduction, over the next five years (2014 through 2018) based on a \$400,000 per year investment plan.

The street lighting retrofit program was established during this time to reduce overall energy consumption, improve lighting and reduce maintenance costs.

Starting with the 2016 Budget, \$300,000 per year was included for Energy Management Capital projects. Other funding has also been utilized for capital projects including energy projects.

Energy Trends

The forecasted trend in energy costs provides opportunity for cost avoidance by improving the energy requirements of a facility and associated reduction in maintenance costs by:

- Replacing aged heating ventilation and air conditioning (HVAC) equipment;
- Retrofitting or replacing aged lighting;
- Investigating and implementing equipment operation improvements for performance optimization and upgrades to improve control.

A higher commitment to energy reduction through capital upgrades will reduce the overall costs of operating and maintaining the facilities.

Conservation Efforts

With a list of forecasted projects currently estimated at more than \$2,800,000, there is no shortage of opportunity for continued improvements in energy conservation.

Based on the experienced trend and budgetary challenges, a spending target of a minimum of \$300,000 per year is to be spent on energy conservation projects for the next 5 years.

Solar Implementations

Over the initial plan period, a number of initiatives for solar power of low power site locations were implemented to reduce costs and the need for electrical power from the grid.

To date, these include 8 transit shelter, and 3 emergency sirens.

More solar bus shelters and emergency sirens are planned as the existing units reach life cycle replacement.

Facility Highlights

Arena Facilities

With the three arena facilities, the nature of the facilities results in high energy usage. Initiatives for energy reductions are being investigated for these facilities with consideration for any change in ice quality and risk management.

Progressive Auto Sales Arena

This facility, located at 1455 London Road, is comprised of twin ice pads, with the primary tenant being the Ontario Hockey League, Sarnia Sting Hockey Club.

Completed and in Progress Projects

The following is a summary of what has been completed or started for this facility to date:

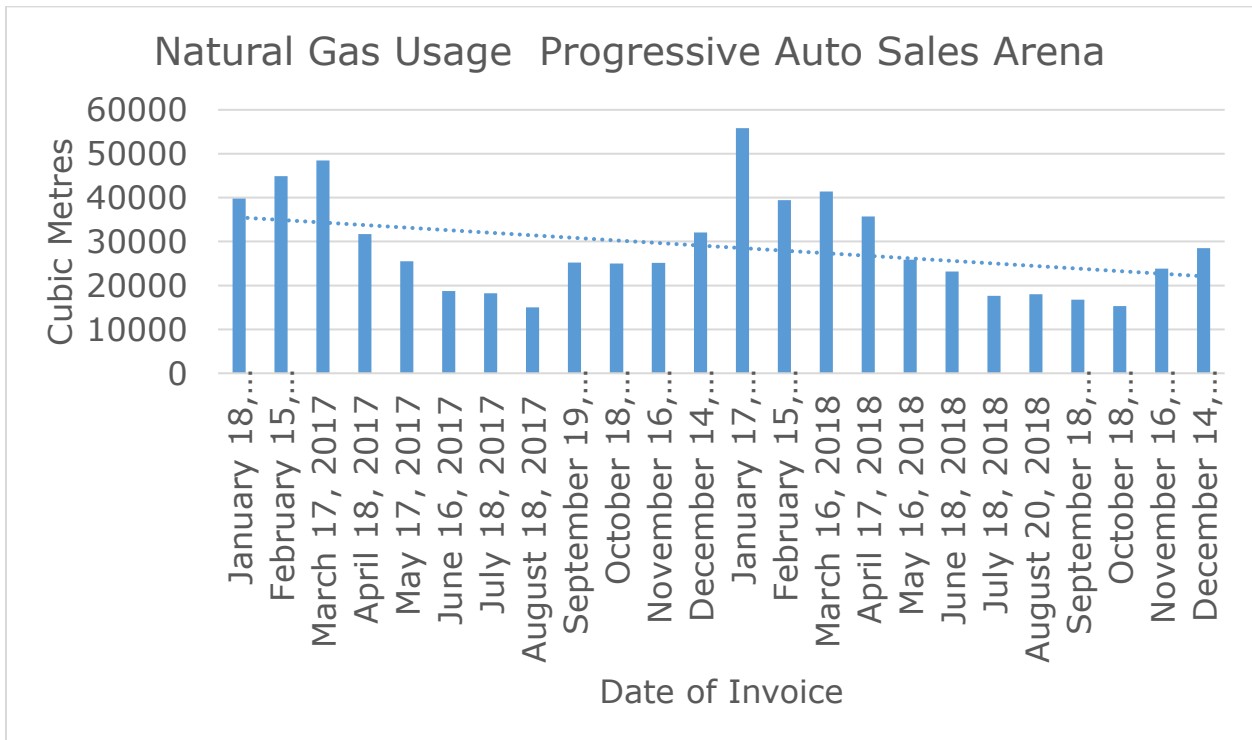
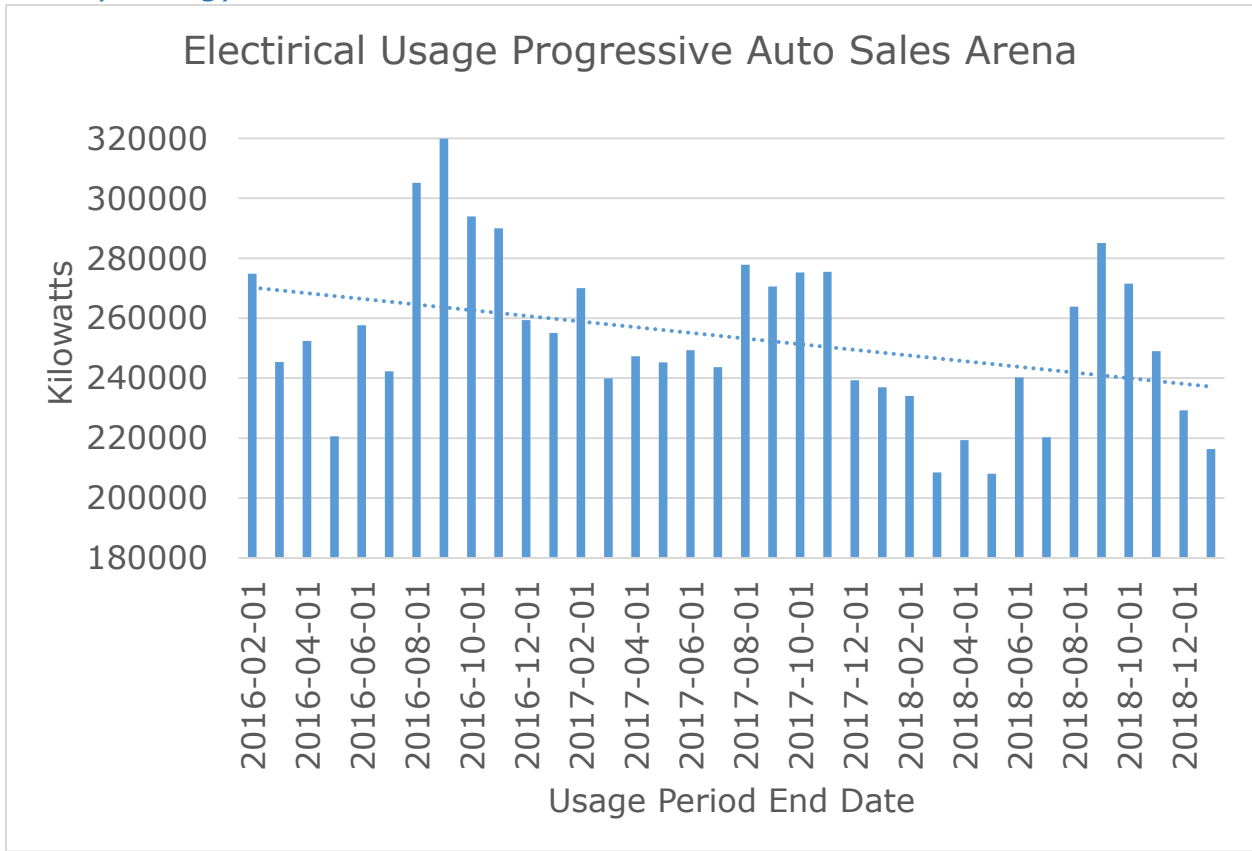
- Ice surface lighting replacement to LED (both ice surfaces);
- Low E ceiling installation (both surfaces);
- Ice plant optimization (started);
- Main rink air conditioning unit replacement (scheduled for spring 2019).

Identified Future Projects

The following is a summary of identified future projects:

- Cold water resurfacing;
- Roof top unit replacement;
- Lighting upgrade continuation;
- Ice plant optimization (completion).

Facility Energy Trends



Sarnia Arena

This facility, located at 134 Brock St. South, is the oldest arena facility, with the primary tenant being the Junior B Sarnia Legionnaires Hockey Club.

Completed and in Progress Projects

The following is a summary of what has been completed or started for this facility to date:

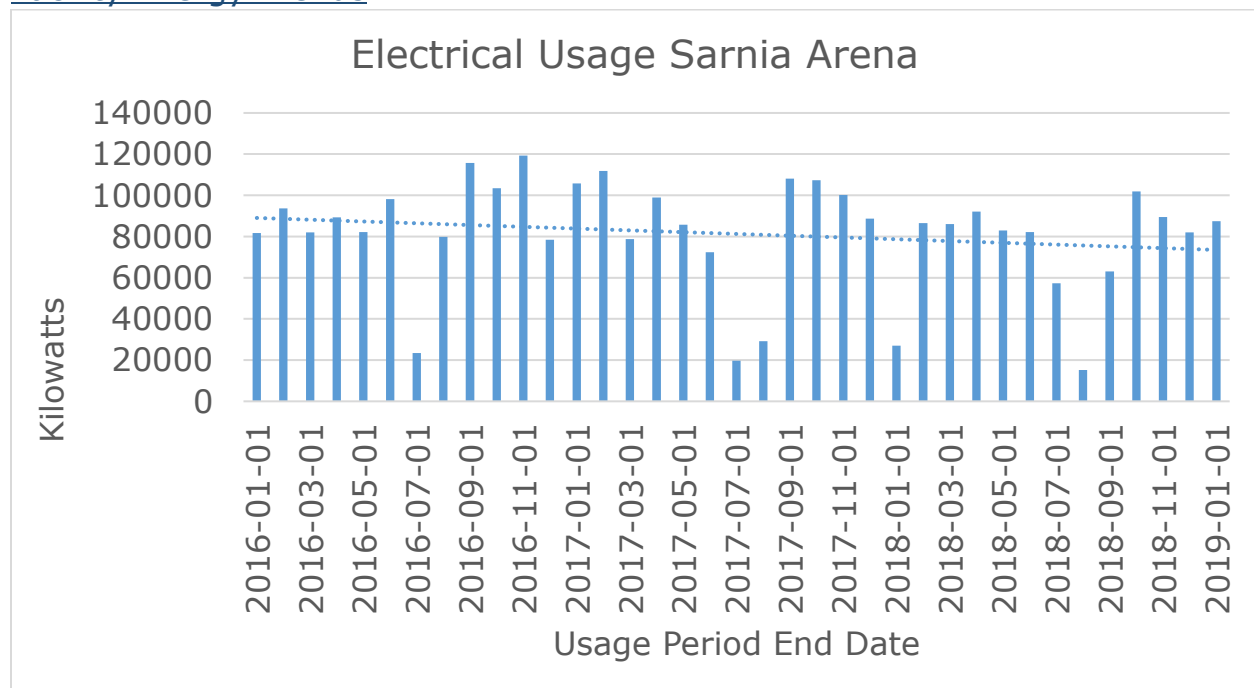
- Ice surface lighting replacement to LED;
- Lobby renovation including lighting;
- Roof top unit replacement.

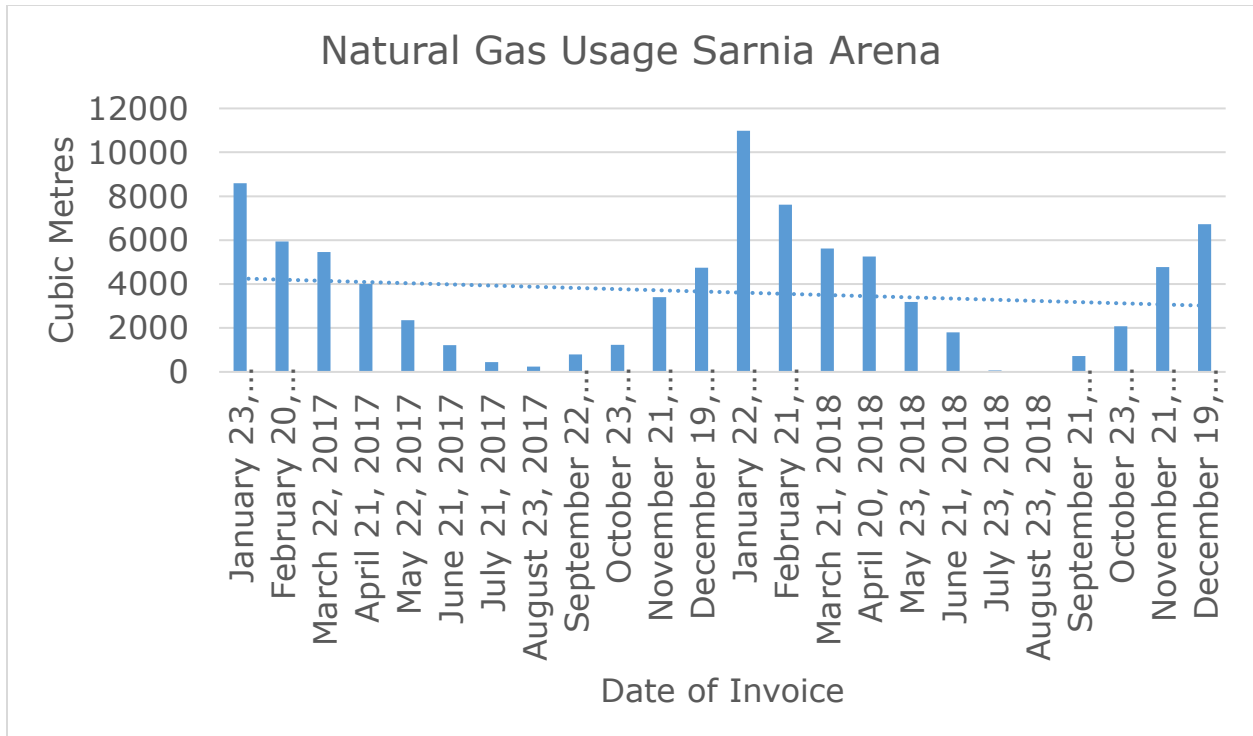
Identified Future Projects

The following is a summary of identified future projects:

- Lighting upgrade continuation;
- Ice Plant monitoring and optimization;
- Cooling tower system replacement.

Facility Energy Trends





Clearwater Community Centre

This facility, located at 1410 Wellington St., is comprised of twin pads, servicing community needs in concert with Sarnia Arena and the Progressive Auto Sales Arena.

Completed and in Progress Projects

The following is a summary of what has been completed or started for this facility to date:

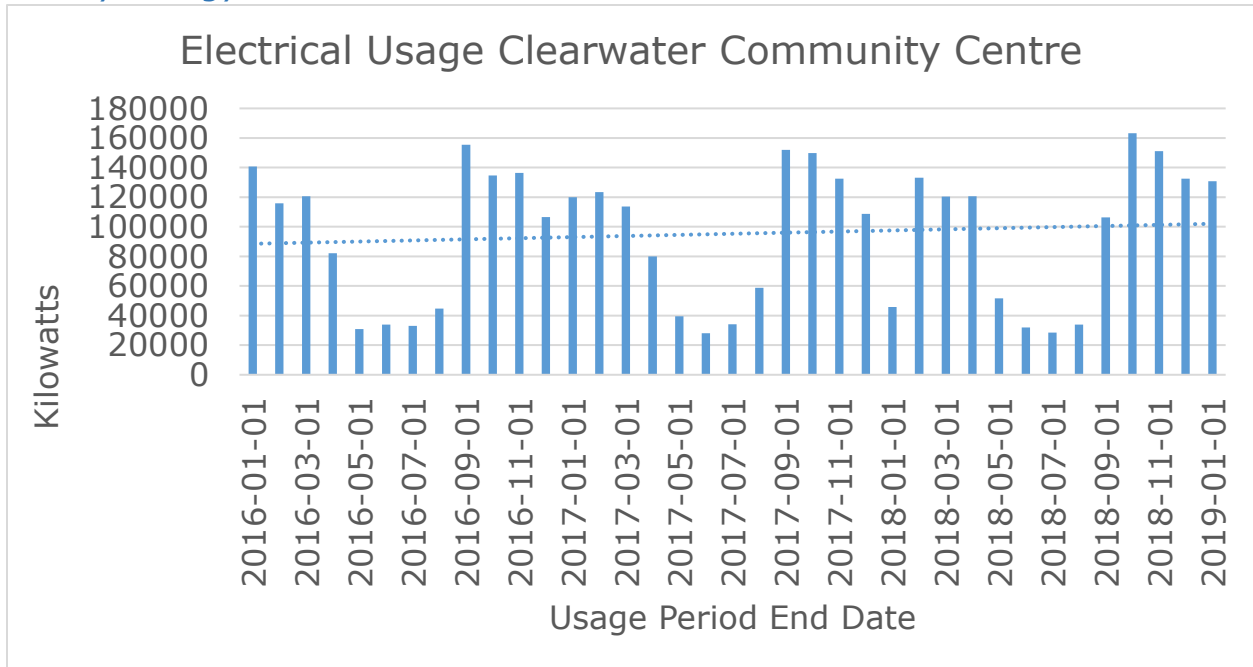
- Ice plant Monitoring;
- Ice plant controls (installation fall 2018).

Identified Future Projects

The following is a summary of identified future projects:

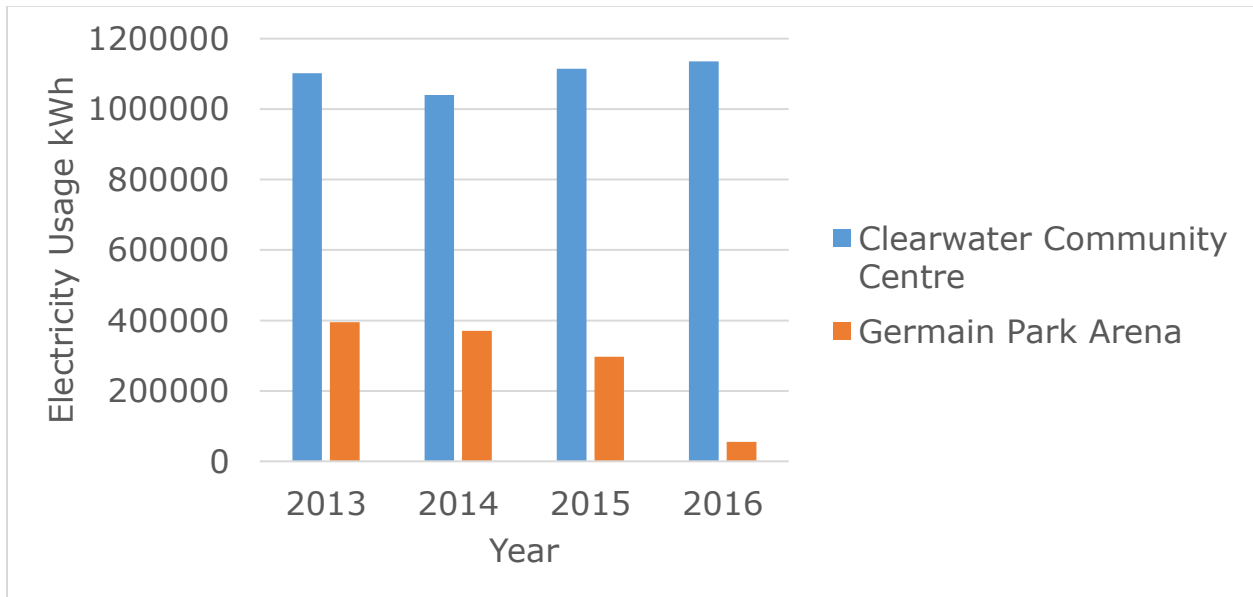
- Ice Plant optimization once controls are installed;
- Roof top unit replacement;
- Lighting upgrades;
- Cooling tower system replacement.

Facility Energy Trends

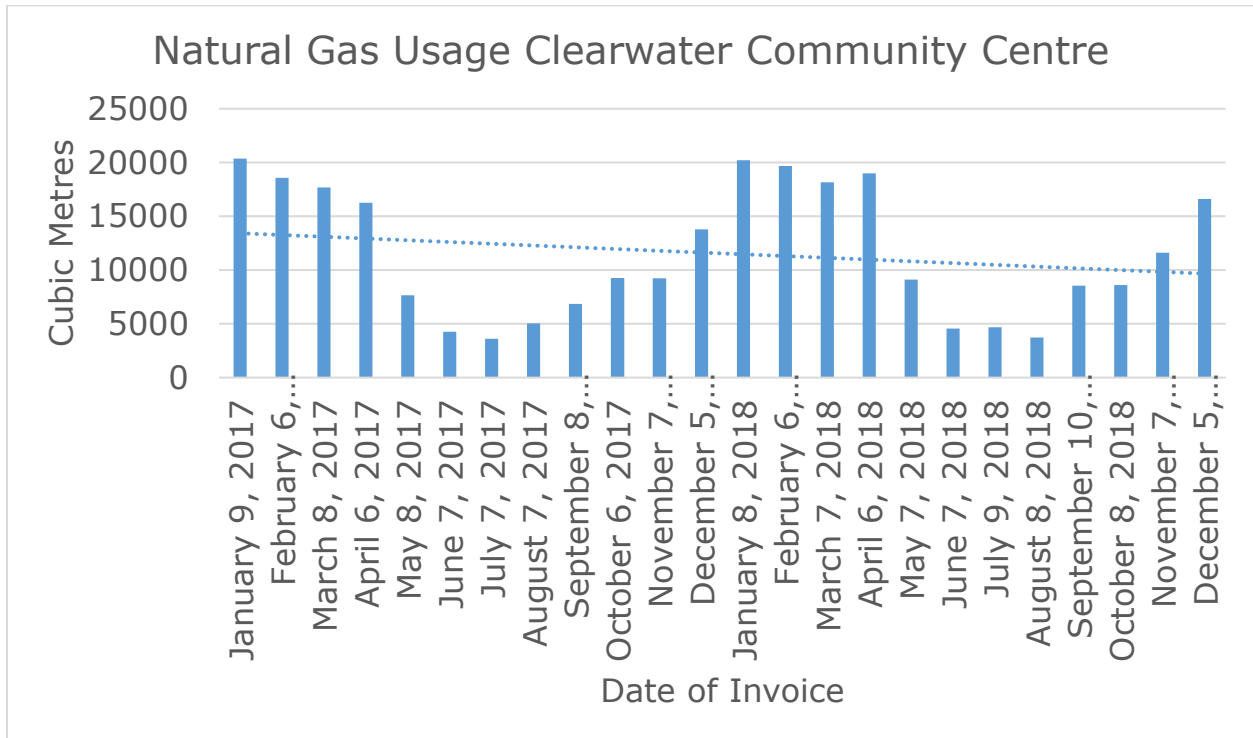


With the closure of Germain Arena, usage requirements at Clearwater Community Centre have increased resulting in additional electrical usage due to increase in facility usage. Ice plant controls were installed in December 2018 to improve the efficiency of the ice plants.

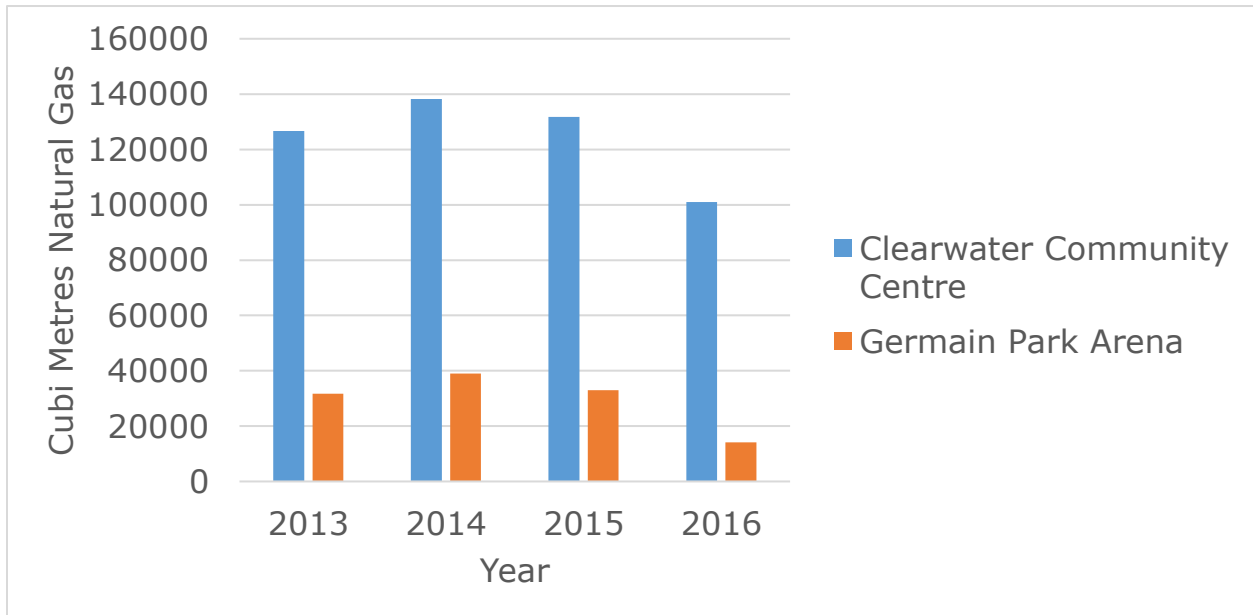
Comparison of electricity usage during the closure of Germain Park Arena.



Natural Gas



Comparison of Natural Gas Usage during the closure of Germain Park Arena:



City Hall

Sarnia City Hall, located at 255 Christina St. North, is the main administrative hub for the City, including many operating departments and Council Chambers.

Completed and in Progress Projects

The following is a summary of what has been completed or started for this facility to date:

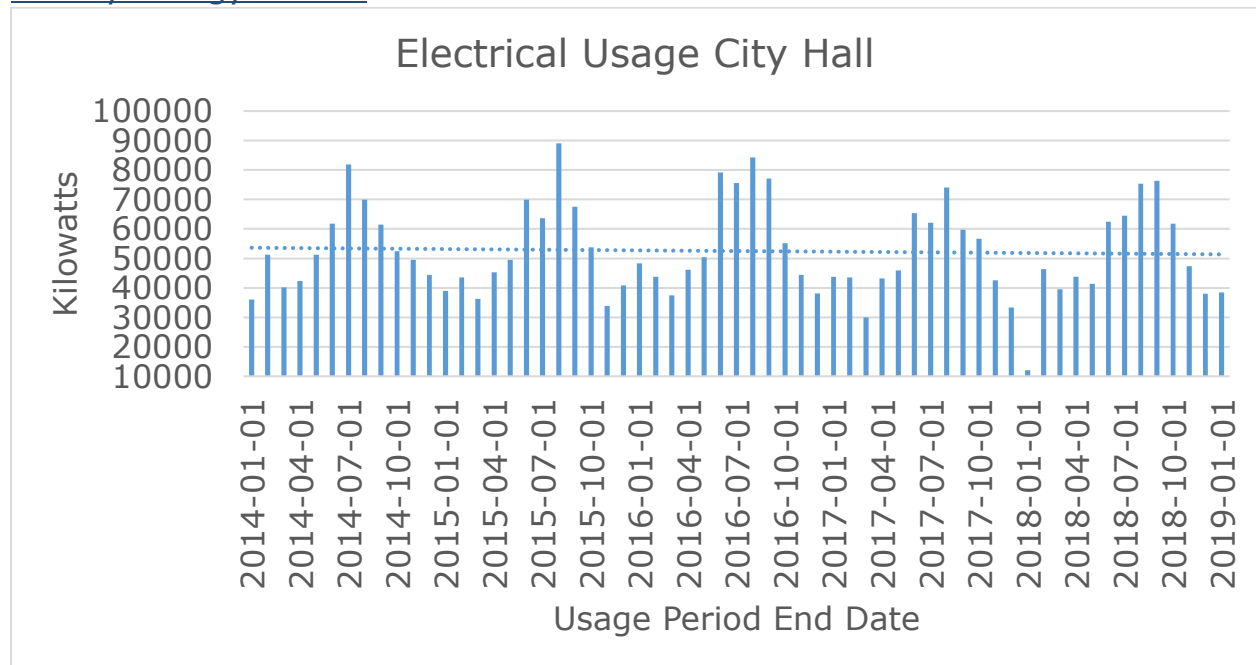
- LED Lighting retrofit;
- Variable frequency drive installed on air handler;
- Cooling tower replacement.

Identified Future Projects

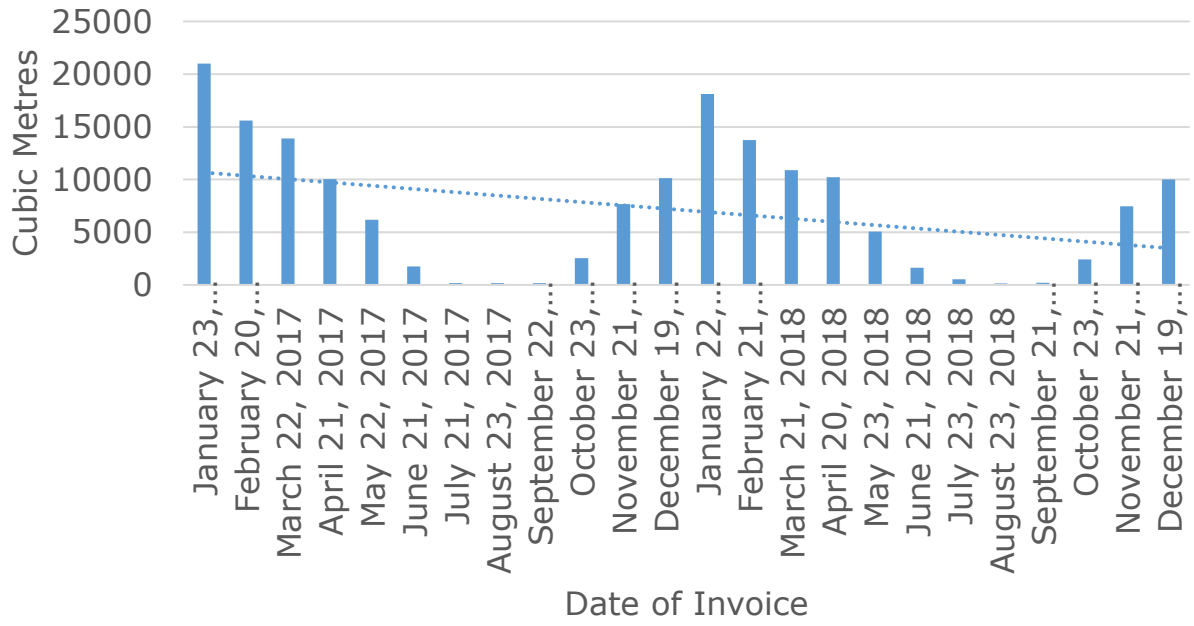
The following is a summary of identified future projects:

- Roof top unit replacement;
- Duct sealing;
- Secondary boiler;
- Updating building automation system and air flow controls.

Facility Energy Trends



Natural Gas Usage City Hall



Water Pollution Control Centre (WPCC)

The WPCC facility, located at 333 St. Andrew St, is the main waste water processing facility for the municipality. An additional site, known as the Bright's Grove Lagoons (BGL), is also part of the overall waste water treatment system for the City.

The WPCC is the highest energy consumer of all City of Sarnia facilities due to the nature of the processes required.

Completed and in Progress Projects

The following is a summary of what has been completed or started for this facility to date:

- Main blower variable frequency drive (VFD) installation and performance optimization;
- Lighting retrofit;
- Ultraviolet treatment system replacement (Complete and commissioning in early 2019).

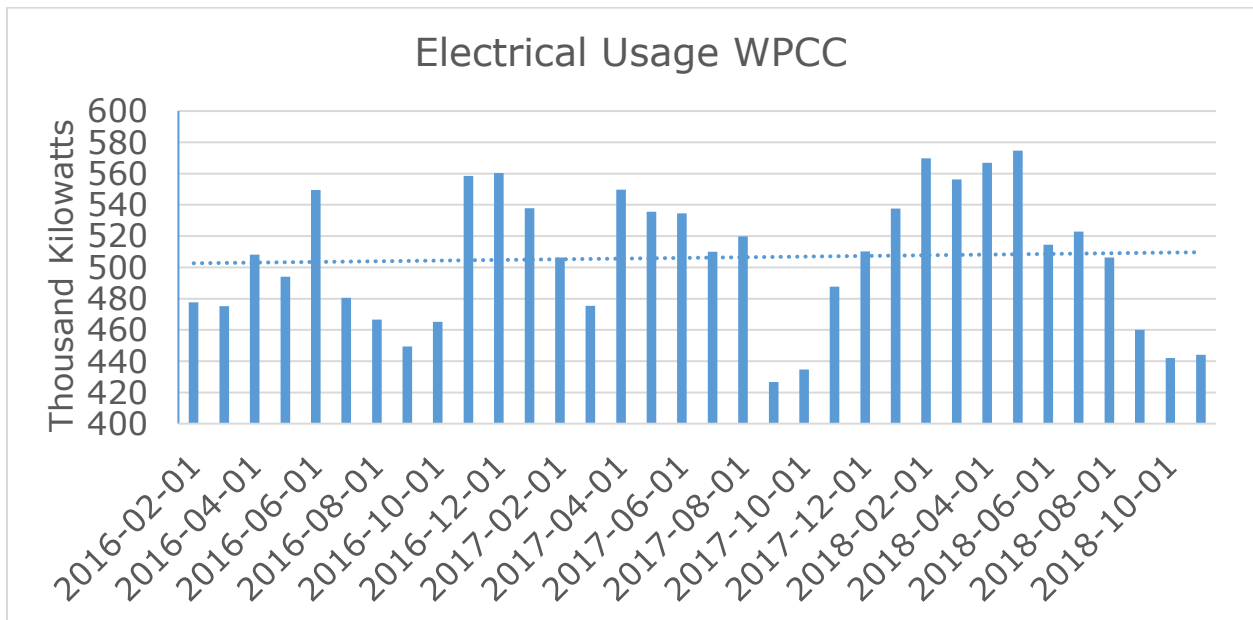
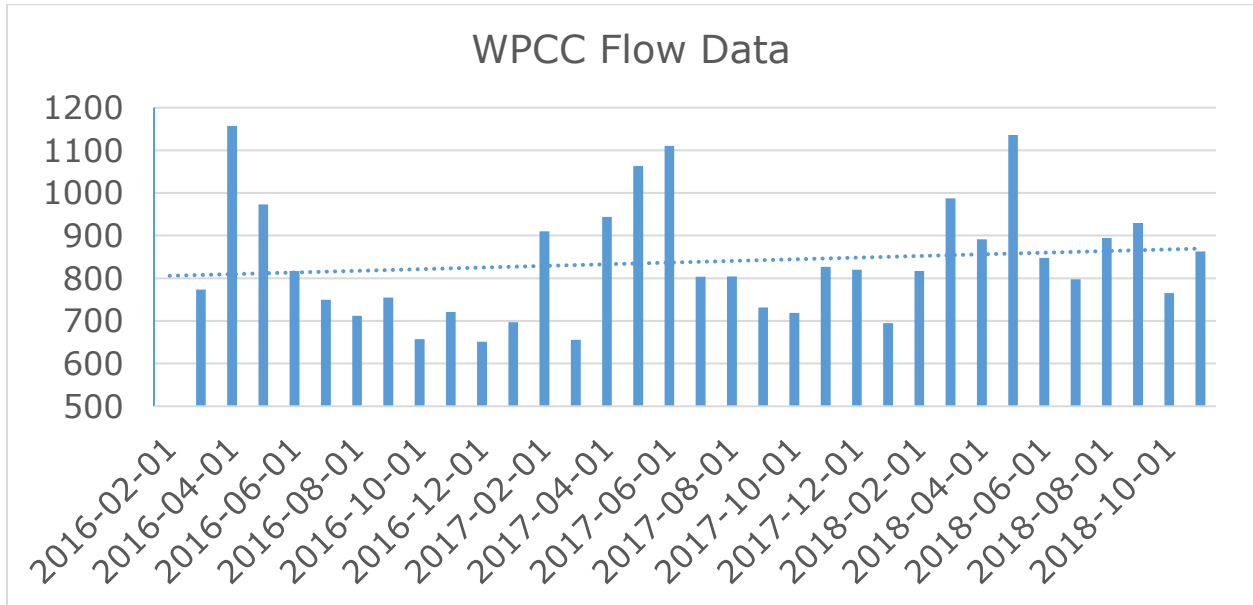
Identified Future Projects

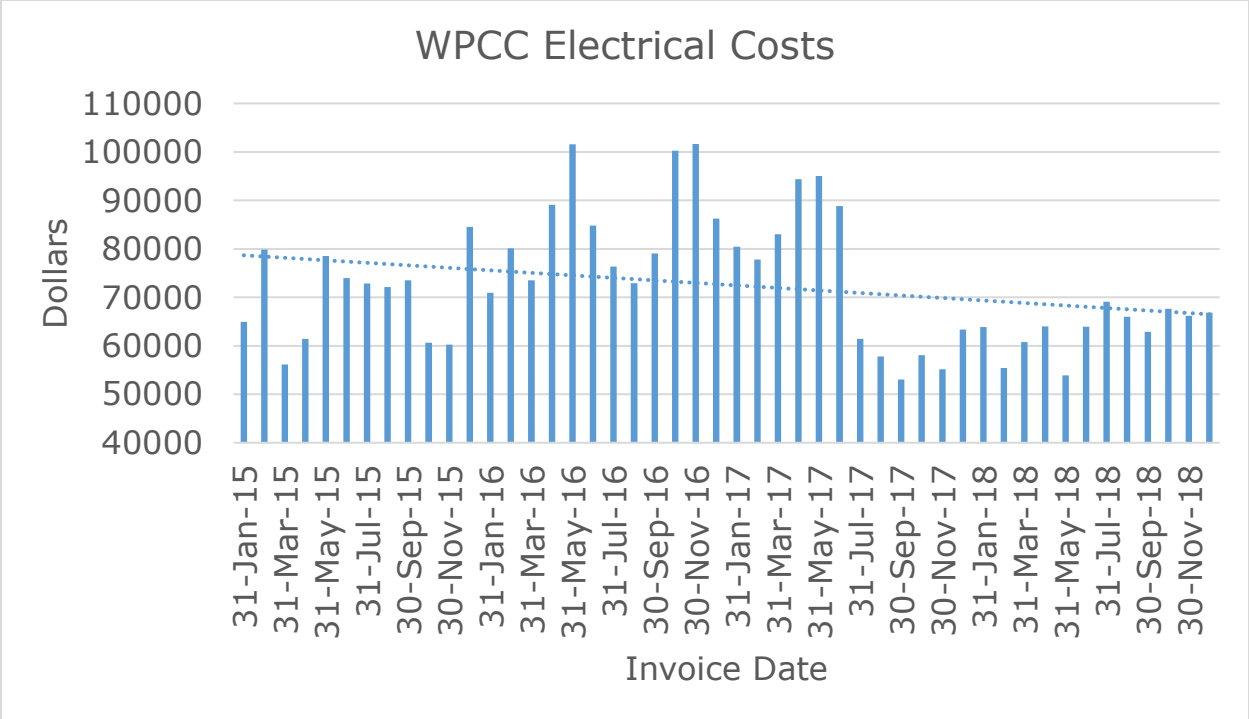
The following is a summary of identified future projects:

- Facility operation energy review to outline additional opportunities;
- Bio-solids kiln bypass (requires study and confirmation by Walker Environmental);
- Bright's Grove Lagoons aeration reduction pilot;
- Completion of an energy study to further identify conservation opportunities.

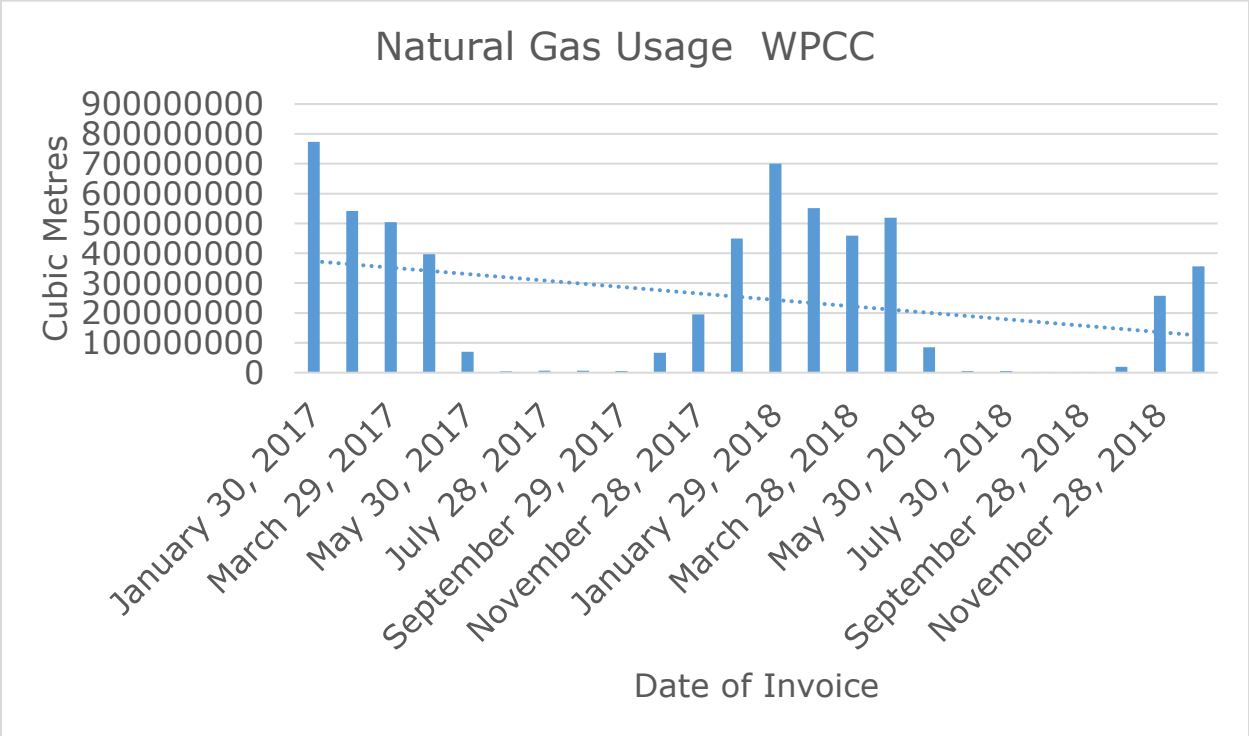
Facility Energy Trends

Through the data period, as this facility is based on the flow of water through the facility, the trend shows flows have been increasing over the last few years, requiring more electrical usage to maintain operations.





In July 2017, due to the electrical usage of the facility, this location was changed to Class A pricing model, which, through energy conservation efforts, can reduce the overall cost of electricity even with the increase in usage.



Additional Facilities

Facilities including fire stations, public works operation centres and smaller facilities are continually being considered for projects.

Completed and in Progress Projects

The following is a summary of what has been completed or started for various additional facilities to date:

- LED lighting retrofit, Strangway Centre;
- LED lighting retrofit, Fire Station 1, 2 (completed during construction), 4, and 5;
- LED lighting retrofit, Sarnia Transit;
- Sarnia Public Library roof top unit replacement;

Identified Future Projects

The following is a summary of identified future projects:

- Lighting retrofit various facilities;
- Sarnia Public Library HVAC upgrades;
- Ball Diamond lighting replacements;
- Germain Park Solar Lighting;
- HVAC unit replacements;
- Canatara Park Lighting.

Completed Projects from 2014 to 2018

Complete list attached.