



## **THE TOWNSHIP OF MAPLETON**

# **Energy Conservation and Demand Management (CDM) Plan for 2020 to 2025**

Prepared in Consultation with Township Staff

**Prepared by: Local Authority Services**



**The Township of Mapleton  
Energy CDM Plan (2020 to 2025)**

**About the Township of Mapleton**

*Rooted in tradition, growing for the future!*

The Township of Mapleton is one of the seven lower-tier municipalities that form the County of Wellington. These municipalities are the Townships of Centre Wellington, Guelph Eramosa, Puslinch and Wellington North, as well as the Towns of Erin and Minto. The Township supports a mostly agricultural and rural population of approximately 11,000 residents. Following amalgamation in 1999, Mapleton began to focus on its new vision and mission: "rooted in tradition, growing for the future." Three small hamlets (Drayton, Moorefield and Alma) make up the "urban" centres of the Township.

In 2017, the Township of Mapleton was ranked as one of Canada's Best Places to live. From festivals, food and furniture to culture, crafts and community, the Township of Mapleton has it all! Our well-tended urban areas, prosperous farm community and locational advantages are major attractions to new residents. Mapleton is conveniently located within reasonable driving distances from major markets, such as Kitchener-Waterloo, Guelph and Toronto.



**The Township of Mapleton**  
**Energy CDM Plan (2020 to 2025)**

**INTRODUCTION**

Today, municipalities are faced with major challenges in addressing the issues of climate change, sustainability and resiliency within their communities. Energy and environmental planning are critical for mitigating rising energy costs, reducing greenhouse gas emissions and are an important step in improving our environment.

Energy reporting and conservation planning can assist municipalities in:

- Managing their energy and water use and to mitigate rising energy costs.
- Reducing greenhouse gas emissions.
- Demonstrating leadership and commitment to energy efficiency and sustainability.
- Developing best practices for identifying and evaluating energy-saving opportunities.
- Comparing results and strategies to similar organizations across the province.
- Assisting with setting goals, targets and timelines for energy and environmental reductions.
- To measure and report on energy and water efficiency improvements.
- Confirmation the plan has been supported by Council and Senior Leadership.

This report is intended to address the following:

- 1) To meet legislative requirements for all public agencies (incl. municipalities) under Ontario Regulation 507/18 of the Electricity Act 1988.
- 2) To provide an update on the progress of the Township's first Corporate Energy CDM Plan for 2014-2019.
- 3) To establish the Township's next five-year Energy CDM Plan for period of 2020 to 2025 and review any additions or updates to the township's previous energy plan.
- 4) To provide a summary of the Township's historical energy consumption and annual energy cost information and to compare the most recent reporting year of 2017 to the base year of 2012.

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**1.0 LEGISLATIVE REQUIREMENTS FOR ALL PUBLIC AGENCIES**

Ontario Regulation 507/18 of the Electricity Act 1988 requires that all public sector organizations update their 5-year Energy CDM Plans by July 1, 2019. The new regulation states that:

1. A public agency shall prepare, publish, make available to the public and implement energy conservation and demand management plans or joint plans in accordance with section 25.35.2 of the Act and with this Regulation.
  
2. An energy conservation and demand management plan are composed of two parts as follows:
  - a) A summary of the public agency's annual energy consumption and greenhouse gas emissions for its operations.
  - b) A description of previous, current and proposed measures for conserving and otherwise reducing the amount of energy consumed by the public agency's operations and for managing the public agency's demand for energy, including a forecast of the expected results of current and proposed measures.

For more information on Ontario Regulation 507/18 visit <a href="http://www.ontario.ca/laws/regulation/180507">www.ontario.ca/laws/regulation/180507</a>
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**The Township of Mapleton  
Energy CDM Plan (2020 to 2025)**

**2.0 ENERGY CDM PLAN FOR 2014-2019 – UPDATE & REVIEW**

The Township of Mapleton's first Energy Conservation and Demand Management (CDM) Plan for 2014 to 2019 was completed in June 2014.

The plan outlined **Council's Declaration of Commitment** which stated:

*We will allocate the necessary resources to develop and implement a strategic energy management plan that will reduce our energy consumption and its related environmental impact.*

This plan further outlined the Township's *Vision, Policy, Goals and Overall Targets* for energy reduction.

**VISION:** We will exercise stewardship in our use of finite energy resources to demonstrate leadership, optimize our delivery of services, and enhance the overall quality of life in our community. We will manage energy efficiently, reduce our total energy consumption. This will involve all municipal employees' participation to develop energy saving strategies, to implement the energy plan and to make the township an environmentally sustainable community.

**POLICY:** We will incorporate energy efficiency into all areas of our activity including our organizational and human resources management procedures, procurement practices, financial management, investment decisions, facility operations and maintenance. We will develop a purchasing policy to ensure that energy conservation and efficiency is a key factor in any new equipment purchasing and facility updates. We will develop corporate wide policy to engage employees in taking energy saving actions in at the workplace.

**GOALS:** We will continuously improve the energy efficiency of our facilities and processes in order to reduce our operating costs, our energy consumption and the associated greenhouse gas emissions.

**OVERALL TARGET:** We will reduce our consumption of in all municipal operations by an average of 2% per year between now and 2020.

To view the full version of the Township's Energy CDM Plan for 2014 to 2019 please visit the Township's website at: [www.mapleton.ca/en/township-services/energy-management-plan.aspx](http://www.mapleton.ca/en/township-services/energy-management-plan.aspx)

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**Energy CDM Plan for 2014-2019 – Results to Date**

The table below outlines a comparison of the total electricity consumption and costs between the base year of 2012 and 2017, along with the percentage change. The year 2017 represents year 3 of 5 of the townships first five-year Energy CDM Plan. The township has seen a significant reduction of -18.4 % in electricity consumption when comparing 2017 to the base year of 2012. The largest contributor to this reduction was street lighting which had a reduction of -54.0%. This reduction is a result of the township’s street lighting LED conversion project.

<b>Electricity Usage (kWh)</b>	<b>2012</b>	<b>2017</b>	<b>% Change</b>
Corporate Facilities	960,031	915,599	-4.6%
Water & Wastewater Stations	583,624	486,526	-16.6%
Street Lighting	399,360	183,696	-54.0%
<b>Total Electricity Consumption:</b>	<b>1,943,015</b>	<b>1,585,820</b>	<b>-18.4%</b>

kWh = kilowatt-hours

As a result of rising energy costs, even with the township’s efforts to reduce energy use, electricity costs have risen 61.6%. If energy efficiency improvements had not been made, electricity increases would have been significantly higher.

<b>Electricity Costs (\$)</b>	<b>2012</b>	<b>2017</b>	<b>% Change</b>
Corporate Facilities	\$147,278	\$287,780	95.4%
Water & Wastewater Stations	\$86,529	\$140,484	62.4%
Street Lighting	\$58,781	\$44,662	-24.0%
<b>Total Electricity Costs:</b>	<b>\$292,588</b>	<b>\$472,925</b>	<b>61.6%</b>

The table below outlines a comparison the total natural gas consumption (use) and cost between the base year of 2012 and 2017, along with the percentage change. Natural gas is only used for in the township’s corporate facilities and has seen an overall reduction in use of -8.2%.

<b>Natural Gas Usage (m<sup>3</sup>)</b>	<b>2012</b>	<b>2017</b>	<b>% Change</b>
<b>Total Natural Gas Use:</b>	<b>94,371</b>	<b>86,607</b>	<b>-8.2%</b>

m<sup>3</sup> = Cubic Metres

Natural gas has also seen a cost reduction of -6.5% when compared to the base year.

<b>Natural Gas Cost (\$)</b>	<b>2012</b>	<b>2017</b>	<b>% Change</b>
<b>Total Natural Gas Costs:</b>	<b>\$33,063</b>	<b>\$30,923</b>	<b>-6.5%</b>

**The Township of Mapleton  
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Overall combined energy costs show an increase of 54.7% in 2017 vs. 2012.

<b>Combined Energy Costs (\$)</b>	<b>2012</b>	<b>2017</b>	<b>% Change</b>
Total Energy Costs:	\$325,650	\$503,848	54.7%

As of the year end 2017, the Township of Mapleton's has exceeded its original Energy CDM Plans targeted energy reduction of an average of 2% per year.

**3.0 Energy CDM Plan Updates (2020 to 2025)**

This purpose of this section is to outline additions and updates to the townships previous Energy CDM Plan:

1. The Township's **Vision, Policy & Goals** remain the same expect that **water conservation** has been added.
  
2. The Energy Team will be responsible for providing council with an annual energy progress report that includes the following:
  - a. Compares the most recent full years energy and water consumption and cost data to the previous year and the base year (2012) e.g. 2018, 2017 and 2012.
  - b. Report on the township's ekWh, \$/ft<sup>2</sup> and energy intensity ekWh/sq.ft<sup>2</sup> for corporate facilities and \$/ML and ekWh/ML for water and wastewater stations.
  - c. Report on overall progress the township's Energy CDM Plan and targets and highlight any challenges or recommended changes to the plan.
  - d. Report on annual greenhouse gas emission reductions.
  - e. Highlight success stories and the value for money on the township's investments in energy and water conservation. Reports should include a summary by project name, type, location, existing and proposed energy consumption, costs, incentives, funding, GHG reductions and financial benefits e.g. life cycle costing, ROI, IRR, NPV, SIR etc.
  - f. Identify new opportunities for energy and water efficiency, renewable energy and energy storage
  - g. Identify market changes that may impact the township e.g. legislative, carbon markets, new energy conservation programs etc.
  - h. Post the report on the township's website.

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**Energy CDM Plan (2020 to 2025)**

3. That the year 2012 remain as the base year, unless otherwise recommended by the Energy Team and directed by Council.
4. The town will implement at a minimum ASHRAE Level 2 energy audits on its top 5 energy consuming facilities within the next 2-years. The township's top 5 facilities represent over 88% of the facilities portfolio's electricity use.
5. Energy and water efficiency will be specifically incorporated into the annual capital budget process for all capital projects and equipment that consume energy. Further consideration may be given to fuel efficiency opportunities for the townships fleet and equipment.
6. The township will utilize available incentive funding and favourable financing opportunities to improve energy and water efficiency.
7. Business cases will be provided for energy and water CDM projects, that include the project base case(s) vs. the alternative CDM option(s). For CDM retrofit projects the "base case" is usually the existing equipment. For capital or life cycle replacement projects the "base case" is typically the standard efficiency replacement option. Business cases are to include the following information:
  - a. Base case and energy efficient option(s)
  - b. Project / equipment costs. For capital replacement projects the business case should be made using the incremental cost differences.
  - c. Energy consumption and energy demand e.g. existing standard retrofit with proposed energy efficient option.
  - d. Energy and utility cost savings.
  - e. Annual maintenance and operational savings.
  - f. Financial or utility incentive funding.
  - g. Life Cycle Costing, payback and other financial measures as determined by Finance.
  - h. Energy rate escalators should be factored into the business case analysis using most recent forecasts.
  - i. Consideration may be given to the impact of future carbon pricing.
  - j. Determining equipment costs, energy consumption reduction and cost savings associated with all options is required for qualifying for incentive funding and tracking purposes.

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8. The township will work with the Ontario Clean Water Agency to explore and develop opportunities for energy and water efficiency improvements. All capital requests must explore options for energy efficiency improvements.
  
9. The Energy Team will be responsible for developing an Annual Energy and Water Conservation Action Plan for approval by the senior management team. These plans will also include opportunities for renewable energy and energy storage.

**Planned Energy CDM Projects for 2019/2020**

<b>Project/ Building Name</b>	<b>Budget Year</b>	<b>Approved Budget</b>	<b>Estimated kWh Saving /Year</b>	<b>Est. kWh Savings (\$) /Year (@ \$ 0.18/kWh)</b>	<b>Estimated Annual Maintenance Savings</b>
TWP Mapleton Office Building	2020	\$75,000	11633	\$2,094	\$1,000
Alma Community Center	2019	\$5,000	9548	\$1,719	\$1,000
PMD Arena - Building	2019	\$8,000	16620	\$2,992	\$1,000
MCC- Ball Diamond	2019	\$8,000	14853	\$4,000	\$4,000

**The Township of Mapleton**  
**Energy CDM Plan (2020 to 2025)**

**4.0 THE TOWNSHIP’S HISTORICAL ENERGY CONSUMPTION AND ANNUAL ENERGY COST INFORMATION**

The township’s base year is 2012 which is used as a comparator to the most recent reporting year of 2017. The following facilities and infrastructure are included in the plan:

Name	Address	Area Ft <sup>2</sup>
<b>Corporate Facilities</b>		
Alma Community Centre	51 Simpson Street East	4,887
Drayton Ball Park	51 Elm Street	398
Drayton Fire Station	12 Main Street West	4,790
Mapleton Health Centre	11 Andrews Drive West	10,990
Mapleton Township Office	7275 Sideroad 16	2,992
Maryborough Fire Hall	5 Hillwood Drive	5,490
Moorefield Community Centre	15 Ball Avenue	7,348
Moorefield Optimist Hall - Storage	14 Ball Avenue	1,076
PMD Arena (Total)	68 Main Street W	21,711
Roads Shop - Drayton	58 Wood Street	1,991
Roads Shop Maryborough	3 Hillwood Drive	8,191
<b>Water &amp; Wastewater Stations</b>		
Sewage lagoon - Drayton	7101 Sideroad 15	
Sewage Pumping Station - Drayton	20 Mill Street	
Sewage Pumping Station - Moorefield	20 Booth Street East	
Water Pump House - Drayton	60 Wood Street	
Water Pump House - Moorefield	2 Hillwood Drive	
<b>Street Lighting</b>		

*\* Note: The Roads Shop (Peel) was removed from this analysis due to a fire (closure) in 2014 and reconstruction to a larger facility in 2017. This facility will be re-introduced in future reviews.*

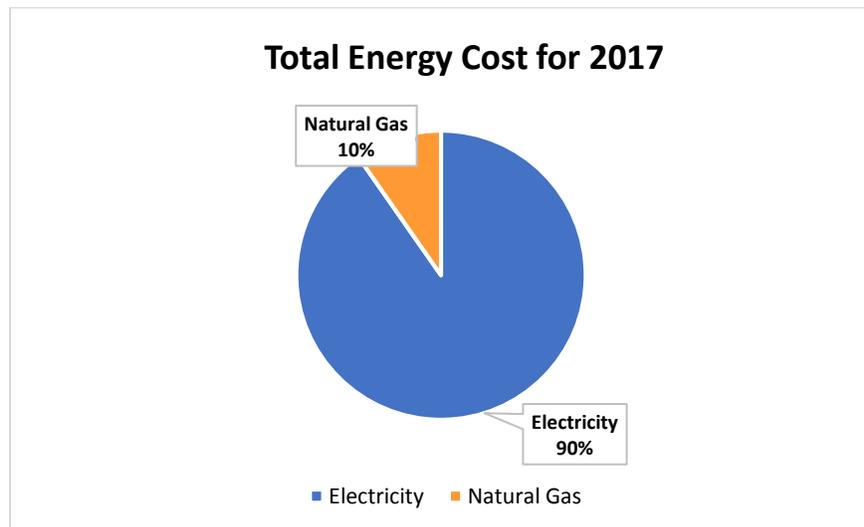
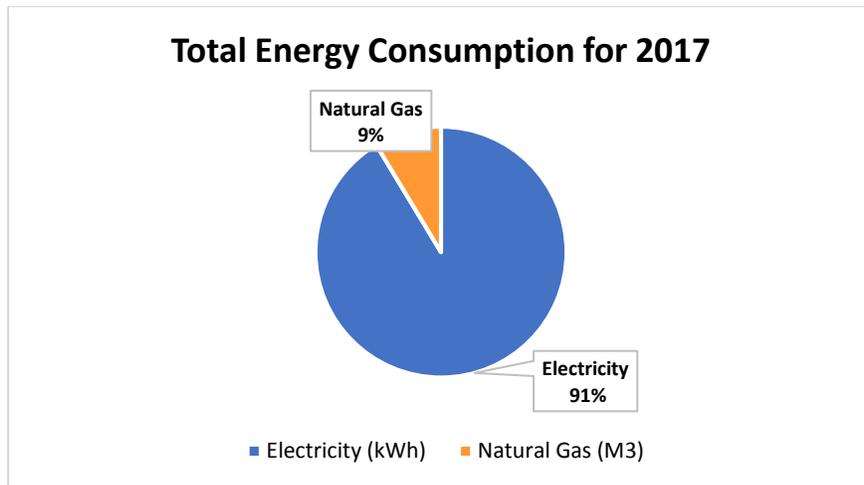
**The Township of Mapleton  
Energy CDM Plan (2020 to 2025)**

**Energy Overview**

The Township of Mapleton’s total annual energy consumption and costs for 2017 are outlined below. Electricity represents over 90% of the township’s annual energy usage and costs.

	<b>Electricity (kWh)</b>	<b>Natural Gas (m<sup>3</sup>)</b>	<b>Total Energy (ekWh)</b>	<b>Electricity (\$)</b>	<b>Natural Gas (\$)</b>	<b>Total Costs (\$)</b>
Corporate Facilities	915,599	86,607	1,833,634	\$287,780	\$30,923	\$318,703
Water & Wastewater	486,526	0	486,526	\$140,484	\$0	\$140,484
Street Lighting	183,696	0	183,696	\$44,662	\$0	\$44,662
<b>Totals:</b>	<b>1,585,820</b>	<b>86,607</b>	<b>2,503,856</b>	<b>\$472,925</b>	<b>\$30,923</b>	<b>\$503,848</b>

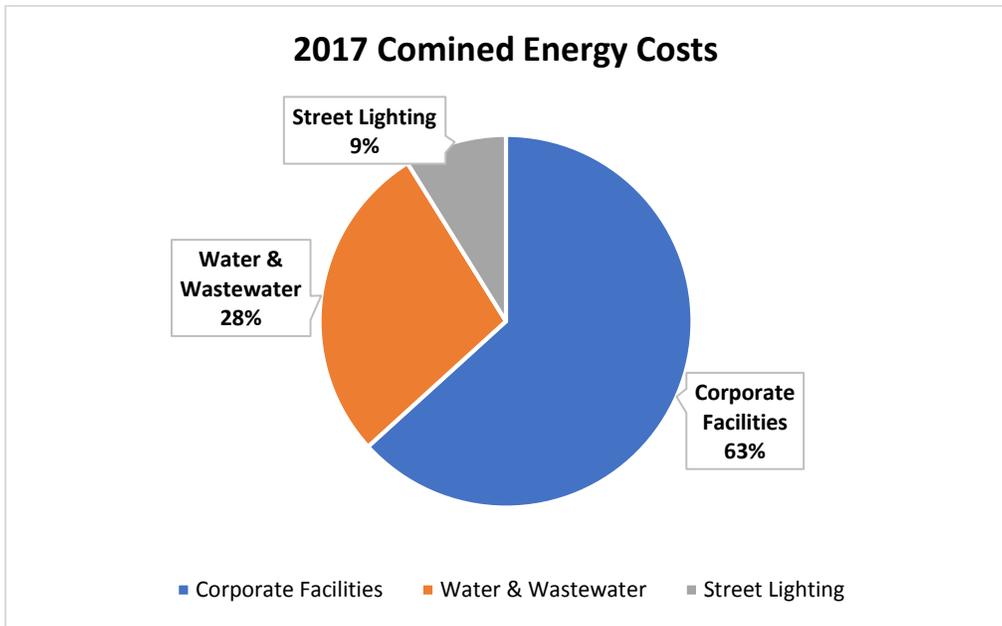
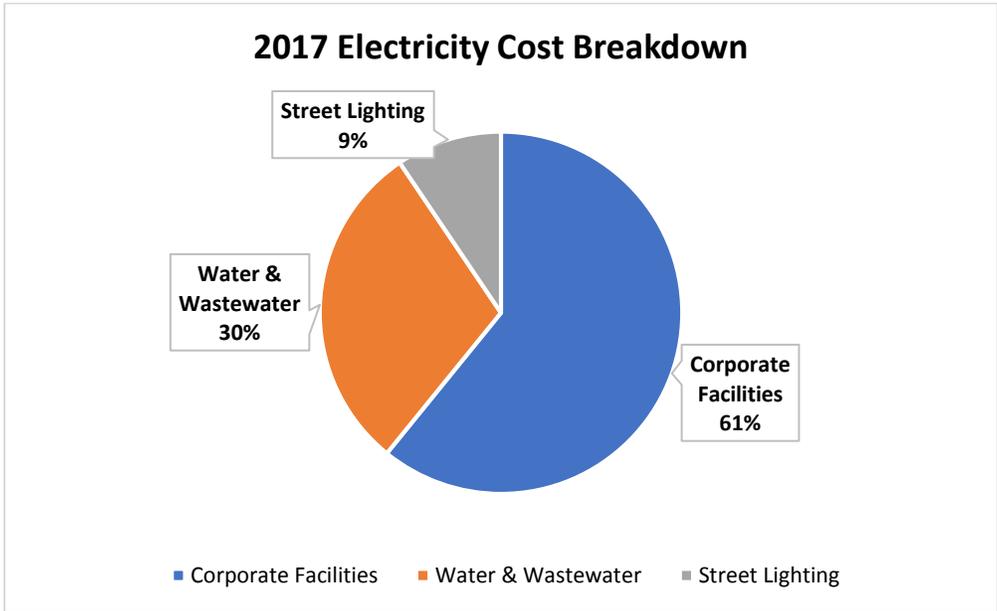
Equivalent Kilowatt Hours compares energy used by each facility in ekWh, which combines electrical and natural gas consumption.



**The Township of Mapleton  
Energy CDM Plan (2020 to 2025)**

**Energy Cost Breakdown by Cost Centre**

The township's corporate facilities accounted for 61% of the overall electricity costs in 2017 and over 63% of the combined (electricity & natural gas) energy costs.



**The Township of Mapleton**  
**Energy CDM Plan (2020 to 2025)**

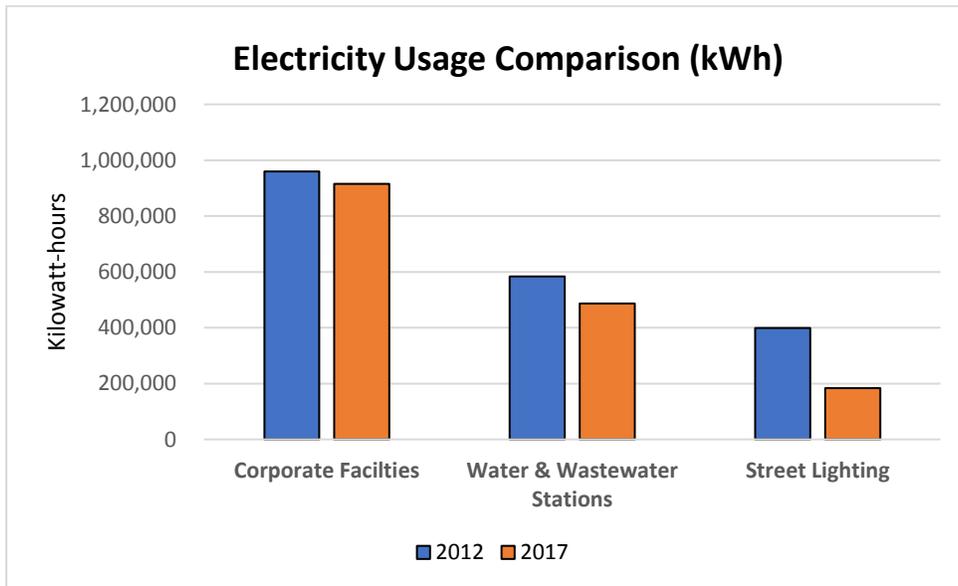
**Energy Comparison to Base Year (2012)**

This section provides a comparative review of energy costs and consumption between the township’s base year of 2012 and the most recent reporting year of 2017.

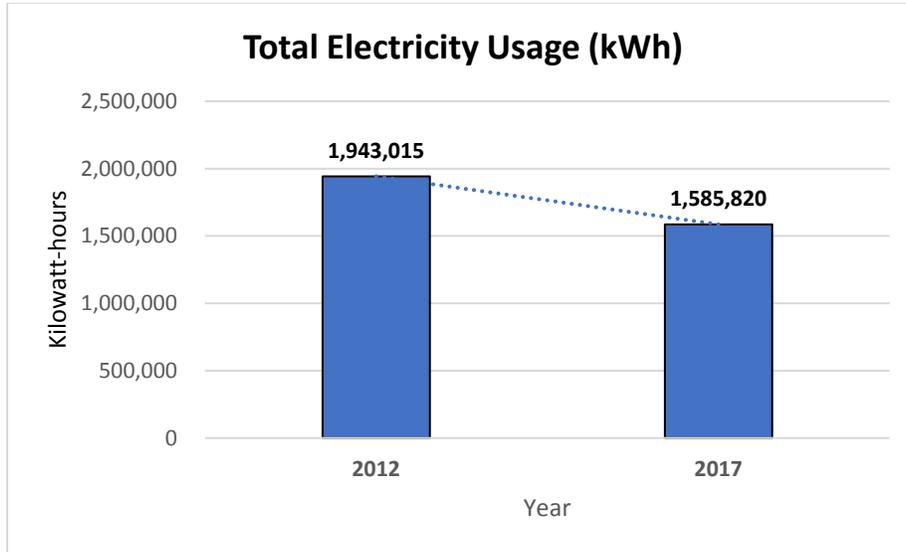
**Electricity Consumption (kWh)**

Electricity consumption (usage) saw an overall decrease of -18.4% between 2012 and 2017. The largest reduction of -54% was seen in street lighting, which was achieved through township’s retrofit project to LED lighting. Reductions in energy use can be due to several factors including energy conservation, weather and schedule changes.

<b>Electricity Usage (kWh)</b>	<b>2012</b>	<b>2017</b>	<b>% Change</b>
Corporate Facilities	960,031	915,599	-4.6%
Water & Wastewater Stations	583,624	486,526	-16.6%
Street Lighting	399,360	183,696	-54.0%
<b>Total Electricity Use:</b>	<b>1,943,015</b>	<b>1,585,820</b>	<b>-18.4%</b>



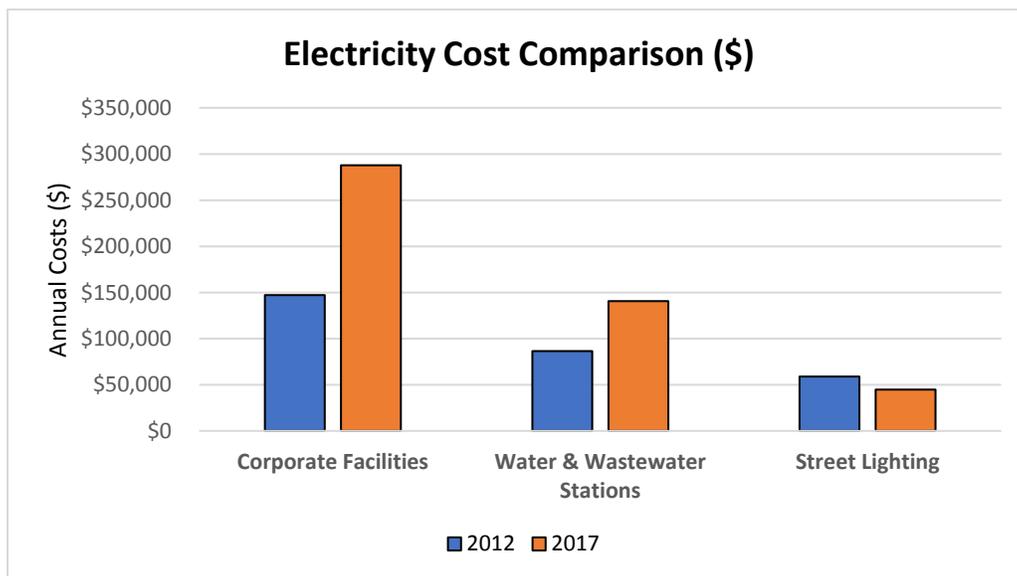
**The Township of Mapleton  
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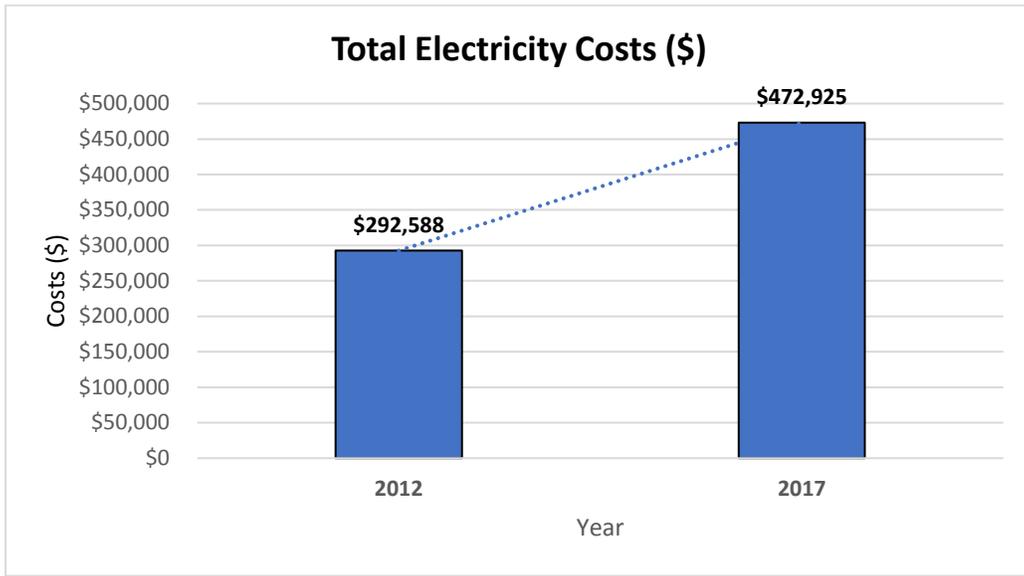
**Electricity Costs (\$)**

Electricity costs increased by 61.6% between 2012 and 2017. This is an overall increase in costs of \$180,337.

<b>Electricity Costs (\$)</b>	<b>2012</b>	<b>2017</b>	<b>% Change</b>
Corporate Facilities	\$147,278	\$287,780	95.4%
Water & Wastewater Stations	\$86,529	\$140,484	62.4%
Street Lighting	\$58,781	\$44,662	-24.0%
<b>Total Electricity Costs:</b>	<b>\$292,588</b>	<b>\$472,925</b>	<b>61.6%</b>

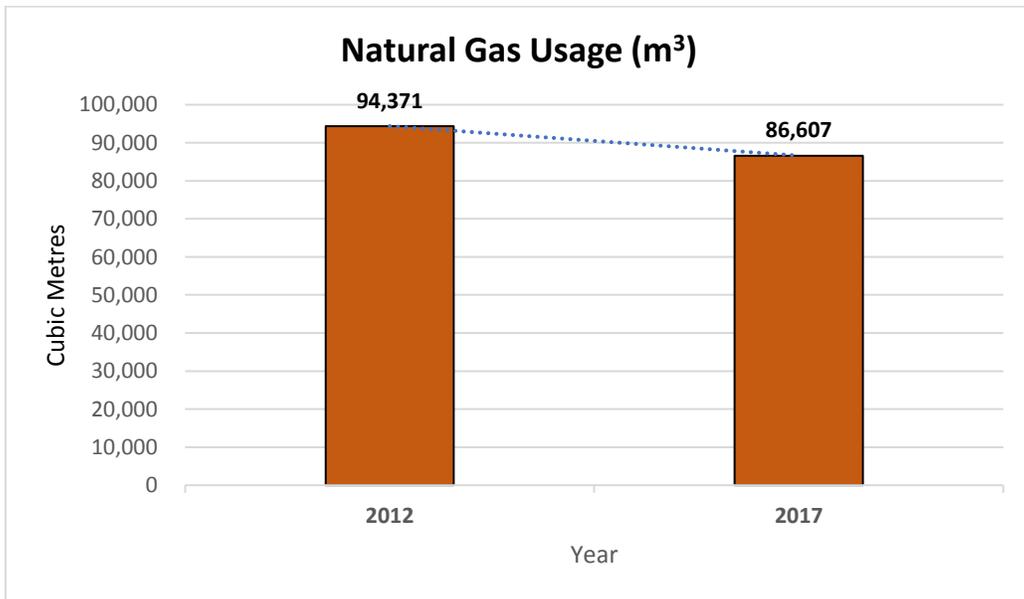


**The Township of Mapleton  
Energy CDM Plan (2020 to 2025)**



**Natural Gas Consumption**

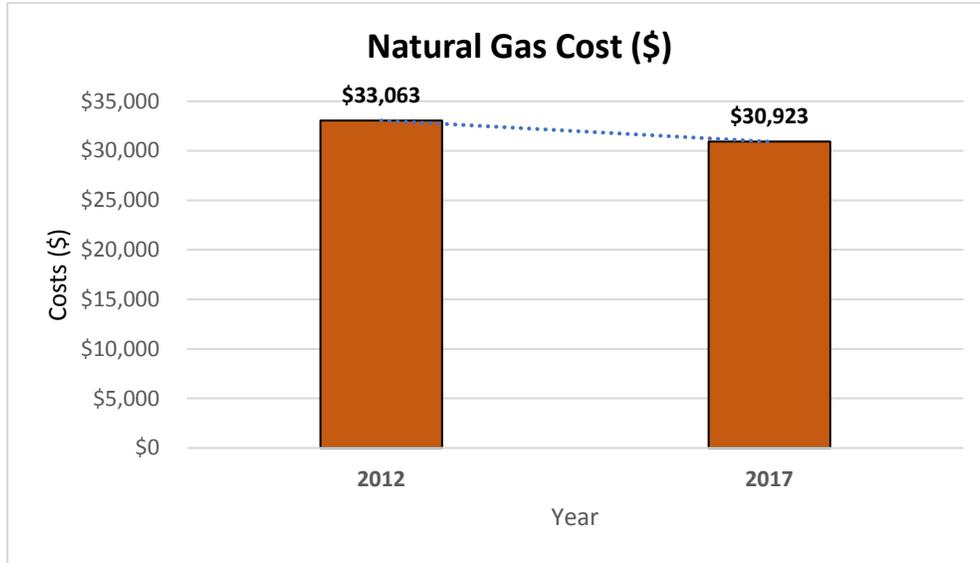
Natural gas consumption (or usage) had an overall decrease of 7,764 Cubic Metres (m<sup>3</sup>) or -8.2%. Note: The townships corporate facilities are the only assets that use natural gas.



**The Township of Mapleton  
Energy CDM Plan (2020 to 2025)**

**Natural Gas Costs**

Natural gas costs between 2012 and 2017 had an overall decrease of \$2,140 or -6.5%.



**Corporate Facilities**

The table below lists the townships owned corporate facilities and the square footage (ft<sup>2</sup>), by building and the totals.

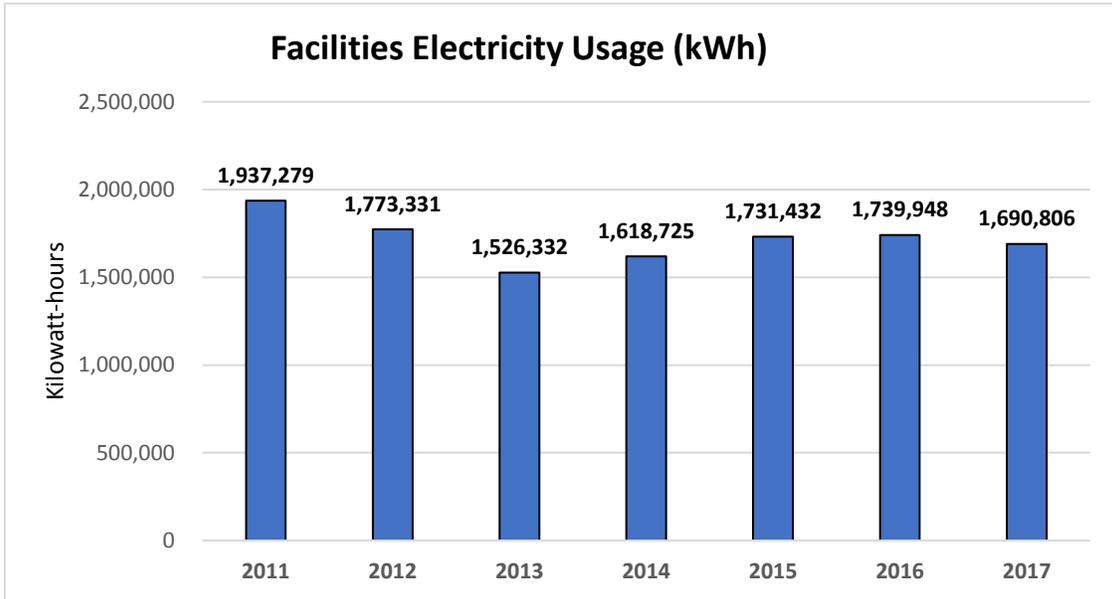
<b>Corporate Facilities</b>	<b>Site Address</b>	<b>Area Ft<sup>2</sup></b>
Alma Community Centre	51 Simpson Street E.	4,887
Drayton Ball Park	51 Elm Street	398
Drayton Fire Station	12 Main Street W.	4,790
Mapleton Health Centre	11 Andrews Drive W.	10,990
Mapleton Township Office	7275 Sideroad 16	2,992
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Moorefield Community Centre	15 Ball Avenue	7,348
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PMD Arena (Total)	68 Main Street W	21,711
Roads Shop - Drayton	58 Wood Street	1,991
Roads Shop Maryborough	3 Hillwood Drive	8,191
<b>Corporate Facilities Totals:</b>		<b>69,864</b>

The Township of Mapleton  
Energy CDM Plan (2020 to 2025)

**CORPORATE FACILITIES ENERGY OVERVIEW**

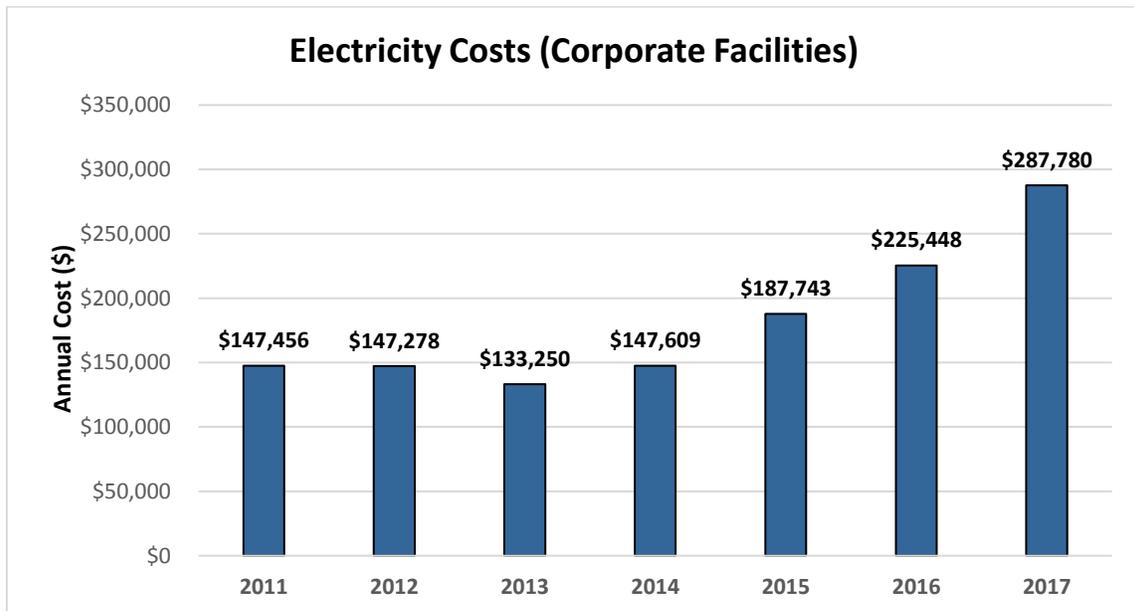
**Total Electricity Usage**

Corporate facilities total annual electricity consumption (kWh).



**Total Electricity Costs**

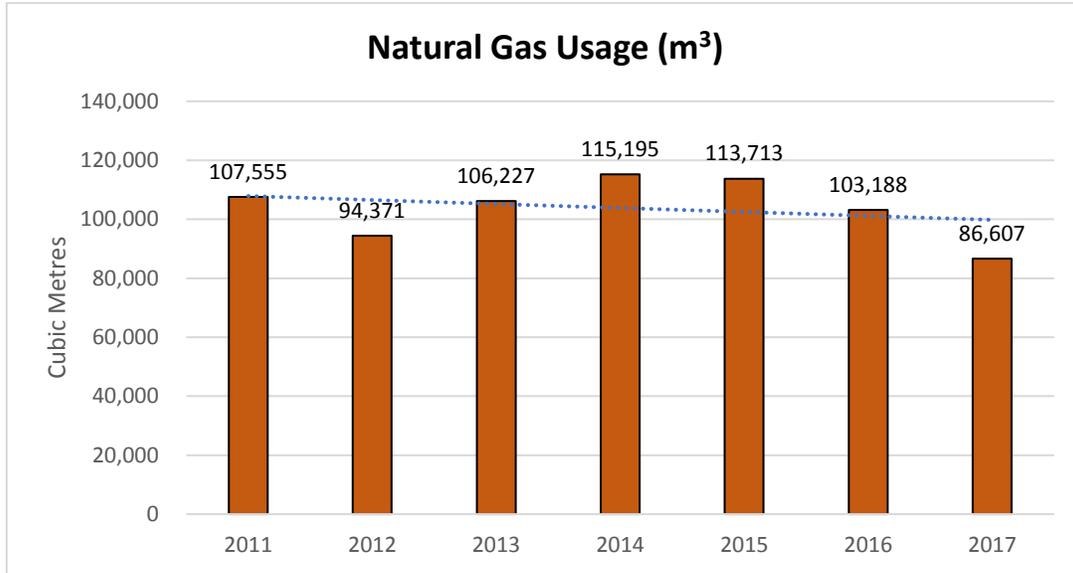
Corporate facilities total annual electricity costs (\$).



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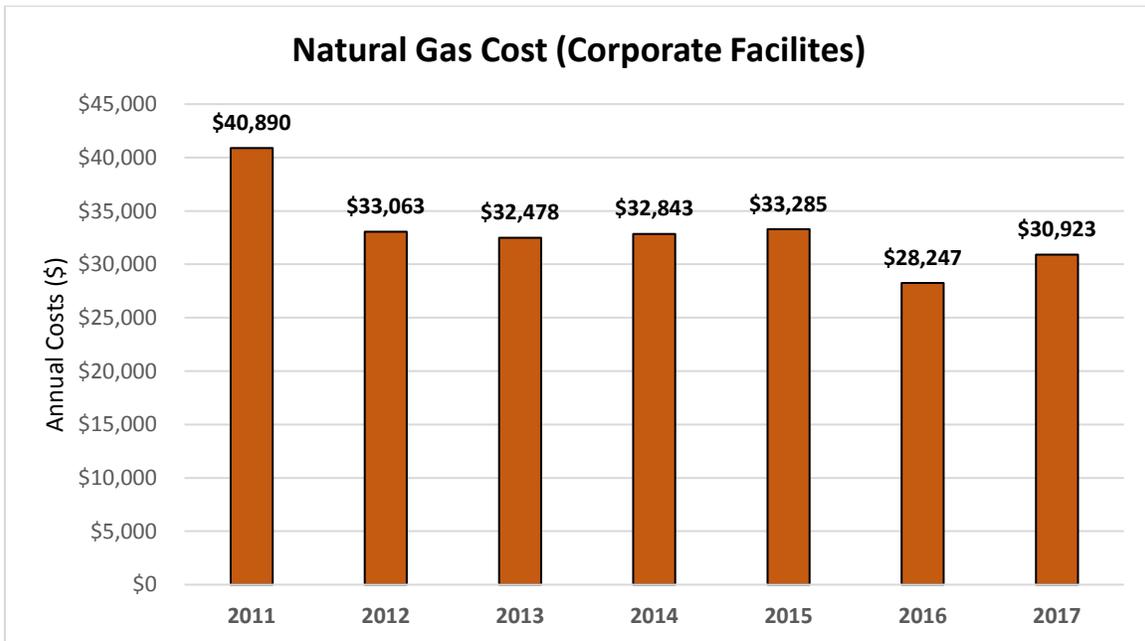
**Total Natural Gas Usage**

Corporate facilities total annual natural gas consumption (m<sup>3</sup>).



**Total Natural Gas Costs**

Corporate facilities total annual natural gas costs (\$).

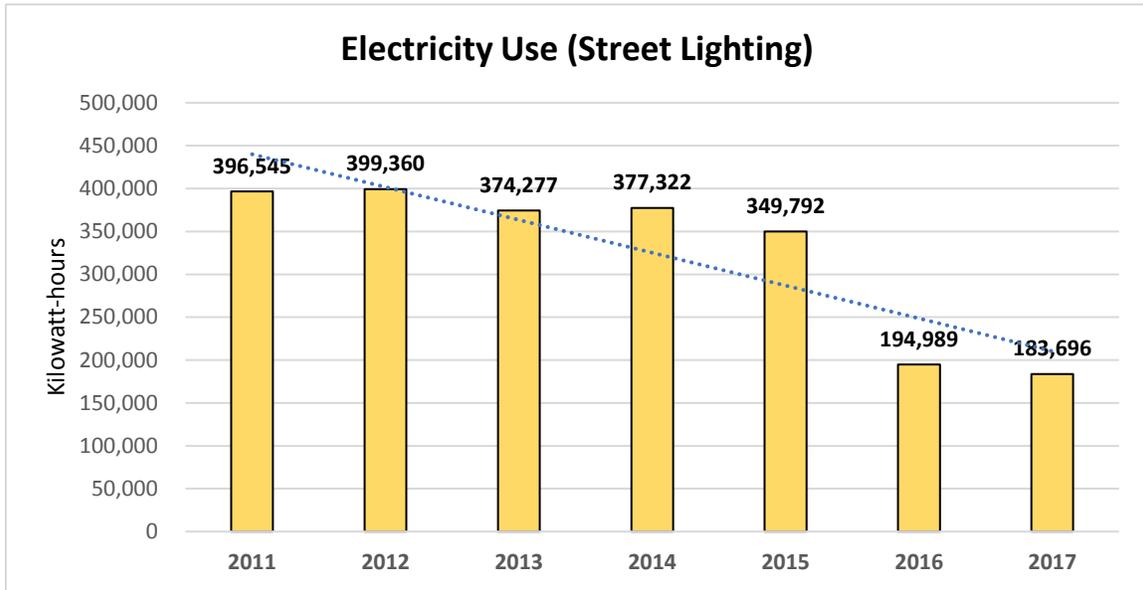


The Township of Mapleton  
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**STREET LIGHTING ENERGY OVERVIEW**

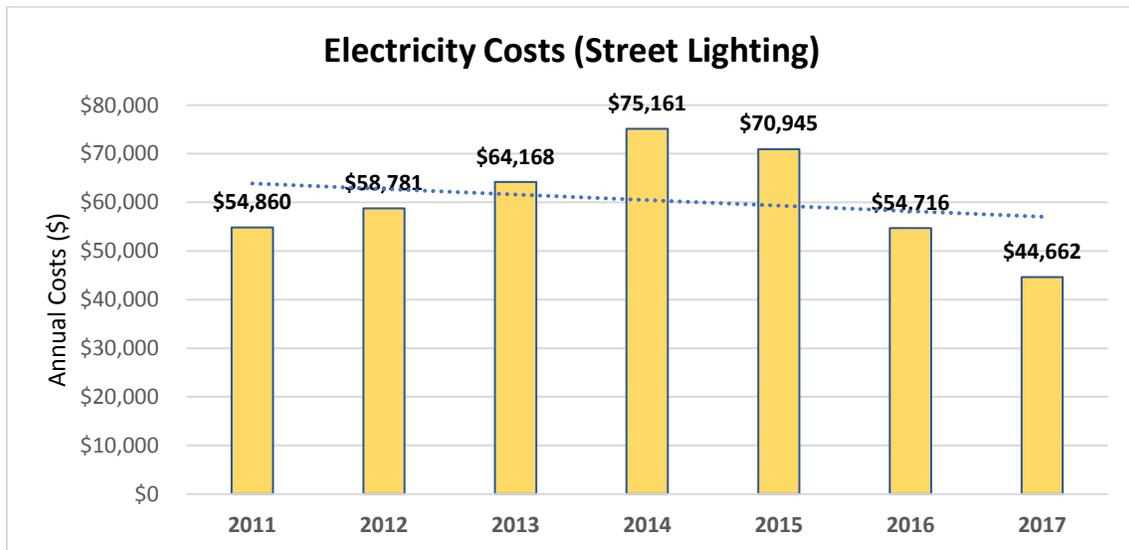
**Total Electricity Usage**

The townships street lighting annual electricity consumption (kWh).



**Total Electricity Costs**

The townships street lighting annual costs (\$).

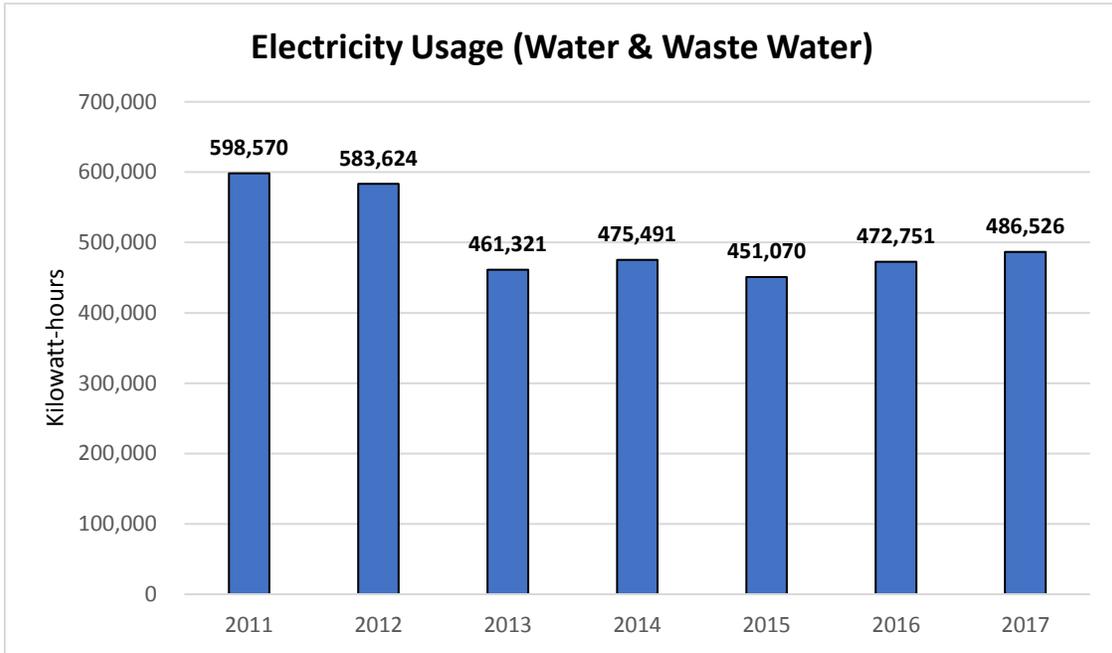


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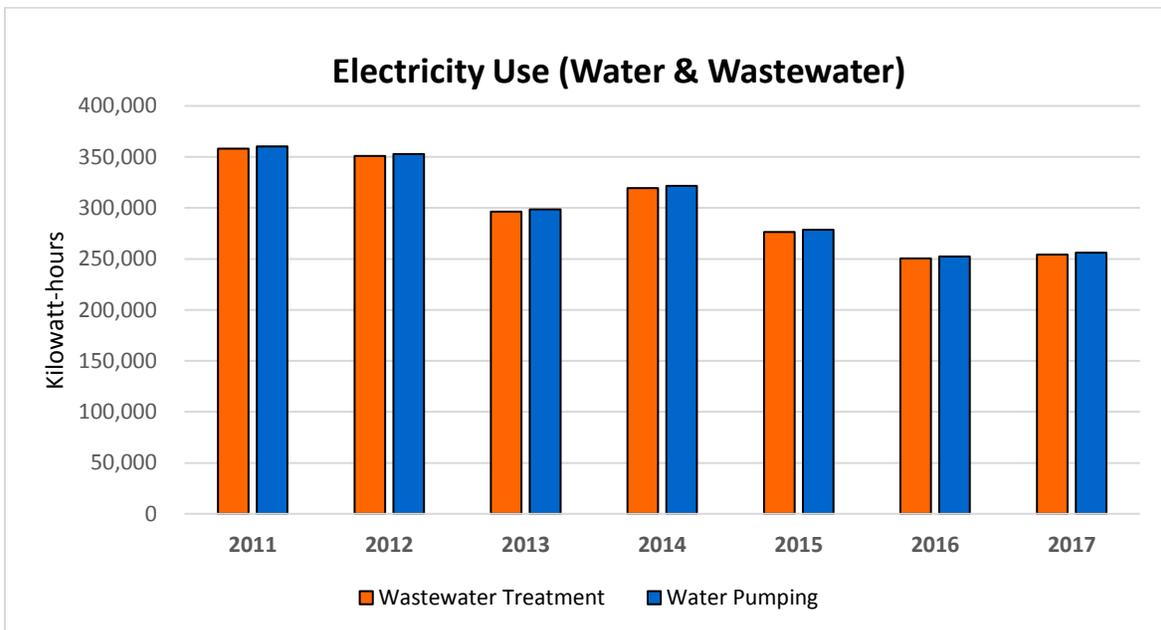
**WATER AND WASTEWATER STATION ENERGY OVERVIEW**

**Total Electricity Usage**

The townships water and wastewater stations annual electricity consumption (kWh).



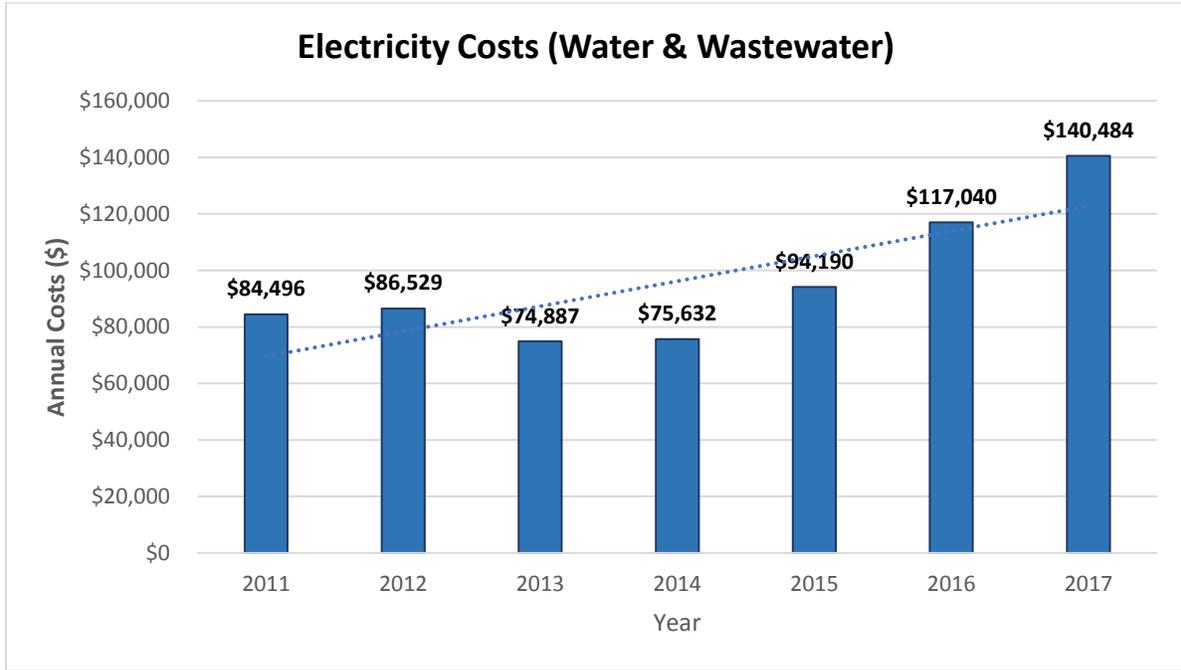
**Electricity Consumption (kWh) Breakdown Between Water Pumping and Water Treatment Facilities**



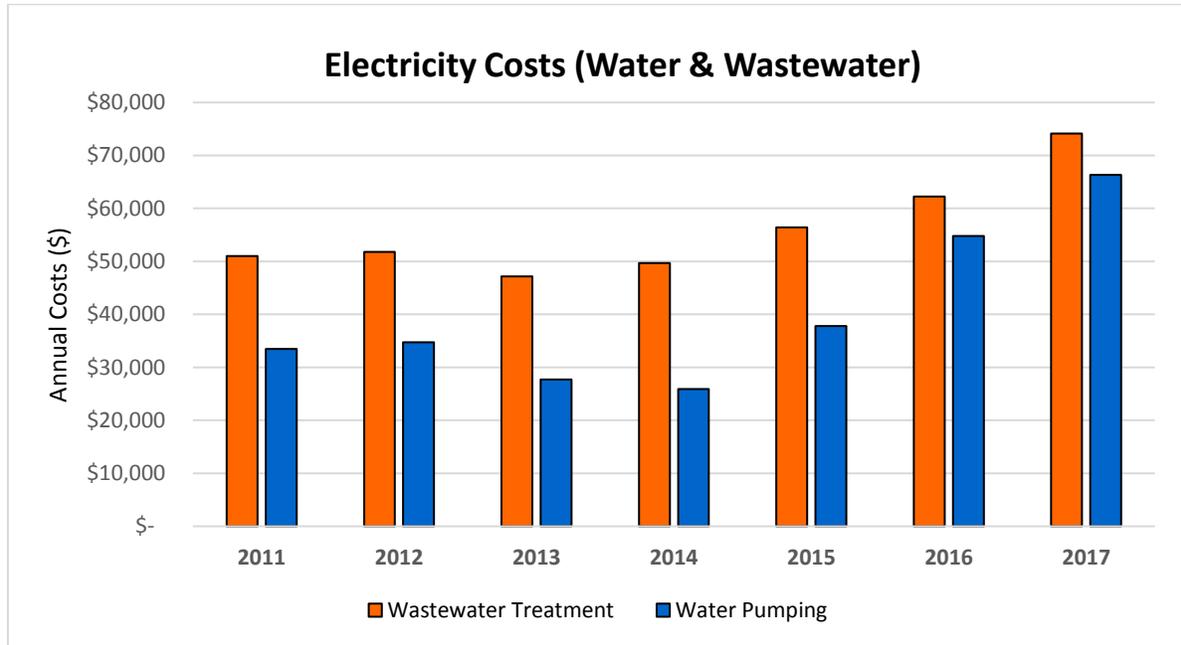
**The Township of Mapleton  
Energy CDM Plan (2020 to 2025)**

**Total Electricity Costs**

The townships water and wastewater stations annual electricity costs (\$).



**Electricity Cost (\$) Breakdown Between Water Pumping and Water Treatment Facilities**



**The Township of Mapleton  
Energy CDM Plan (2020 to 2025)**

**ENERGY INTENSITY OVERVIEW - CORPORATE FACILITIES**

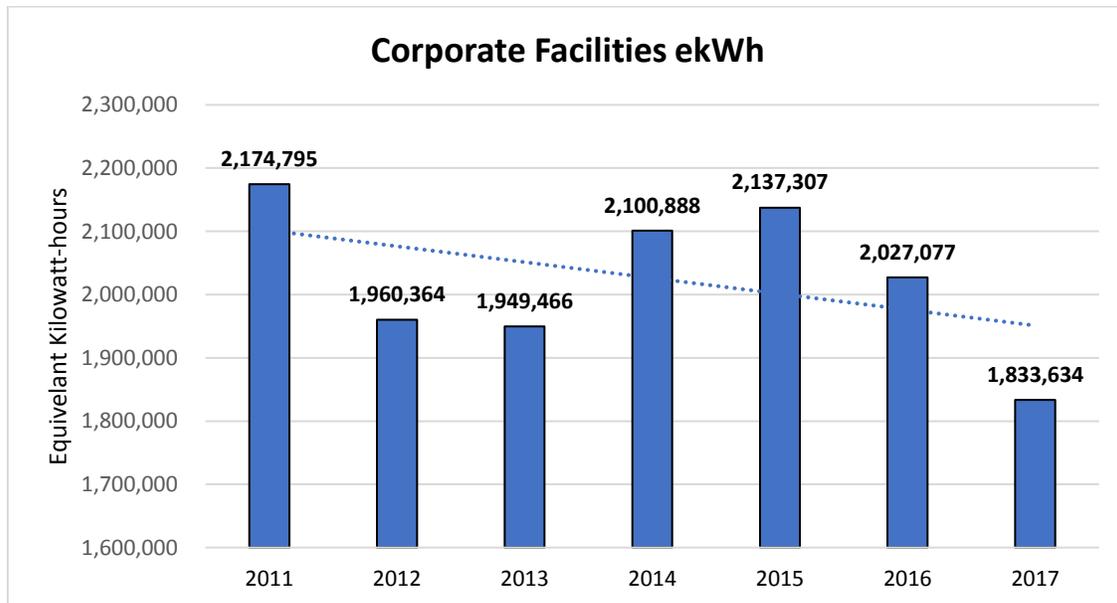
**Energy Intensity (ekWh/sq.ft.)** reports the equivalent kilowatt hours per square foot of each operation type reported. The Energy Intensity is calculated based on all the energy purchased and consumed for each operation type reported relative to floor area.

**Corporate Facilities Only**

Energy Consumption	Base Comparison			
	2012	2017	2017 vs. 2012	%
Electricity (kWh)	960,031	915,599	-44,432	-4.6%
Natural Gas (M <sup>3</sup> )	94,371	86,607	-7,764	-8.2%
ekWh	1,960,364	1,833,634	-126,730	-6.5%
ekWh/ft <sup>2</sup>	28.06	26.25	-1.81	-6.5%

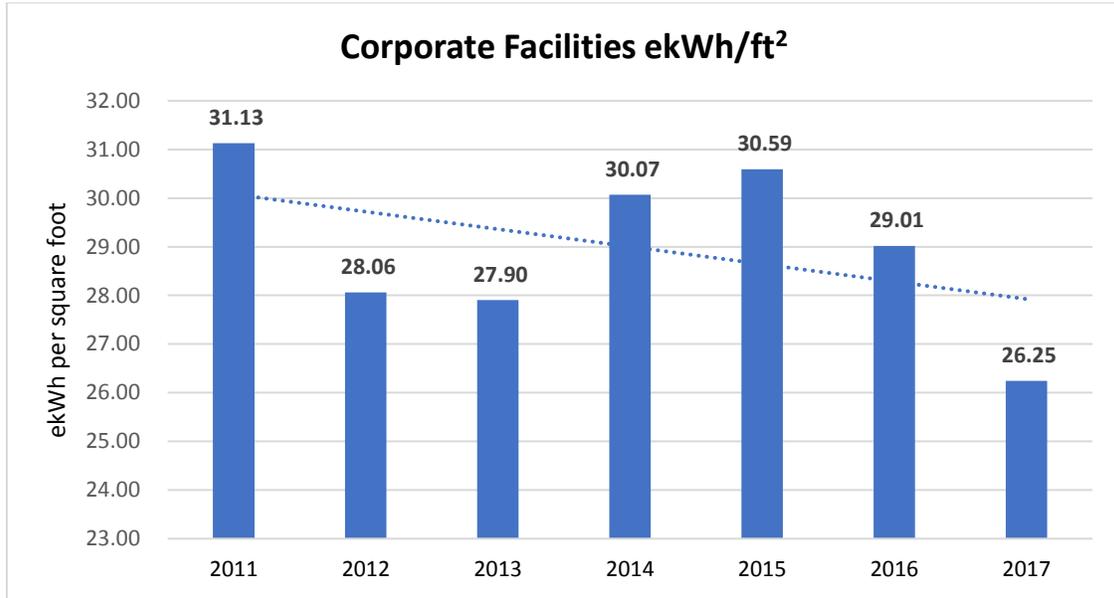
*Natural Gas = 10.6 ekWh/m<sup>3</sup>*

**Total annual equivalent kilowatt hours (Corporate Facilities)**



**The Township of Mapleton  
Energy CDM Plan (2020 to 2025)**

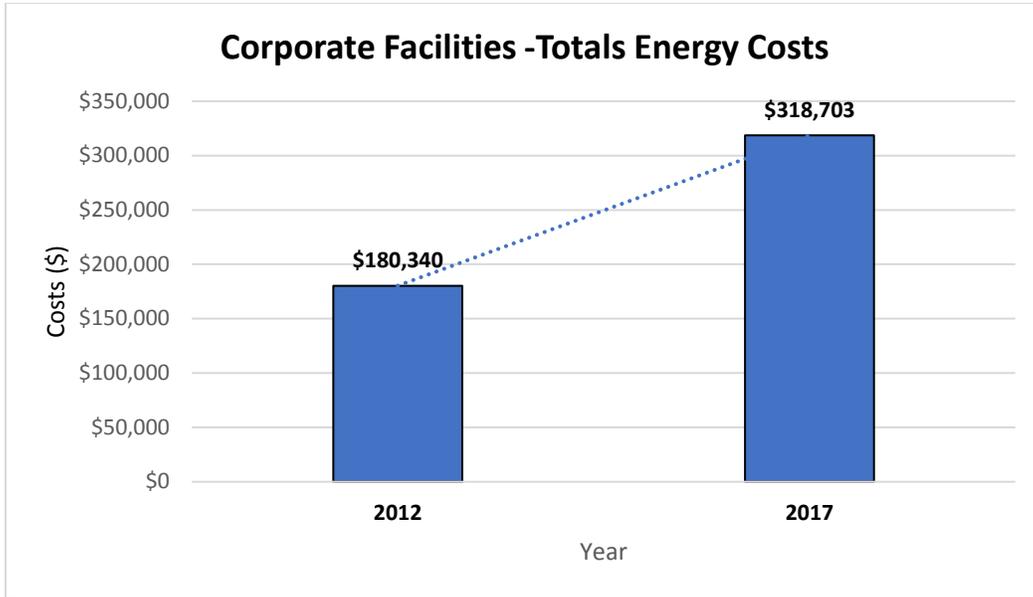
**Total ekWh per Square Foot (Corporate Facilities)**



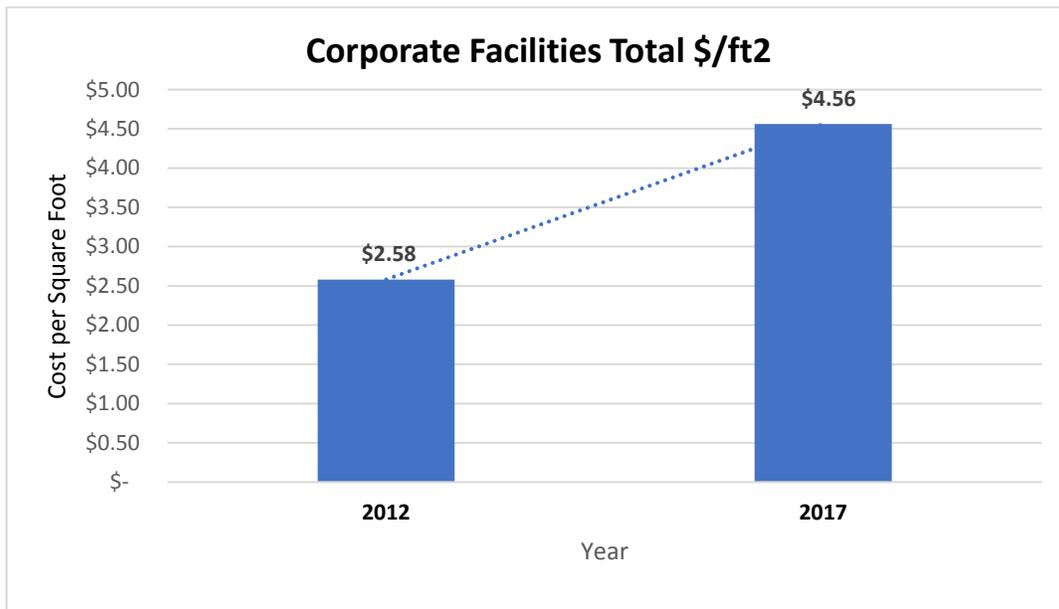
**Corporate Facilities – Total Energy Costs**

Energy Costs	2012	2017	% Change
Electricity	\$147,278	\$287,780	95.4%
Natural Gas	\$33,063	\$30,923	-6.5%
Totals \$	\$180,340	\$318,703	76.7%
\$/ft²	\$2.58	\$4.56	76.7%

The Township of Mapleton  
Energy CDM Plan (2020 to 2025)



Corporate Facilities Costs (\$) per Square Foot

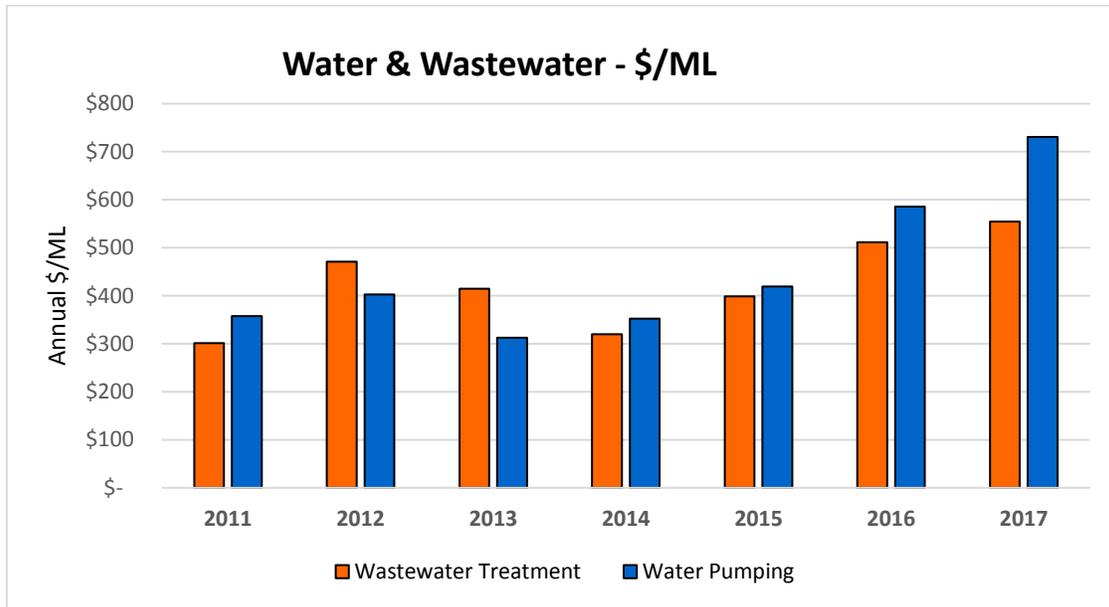


The Township of Mapleton  
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**ENERGY INTENSITY – WATER & WASTEWATER STATIONS**

Energy Intensity (ekWh/ML) reports the equivalent kilowatt hours per Megalitre of each operation type reported. The Energy Intensity is calculated based on all the energy purchased and consumed for each operation type reported relative to annual flow of water/sewage processed by a facility.

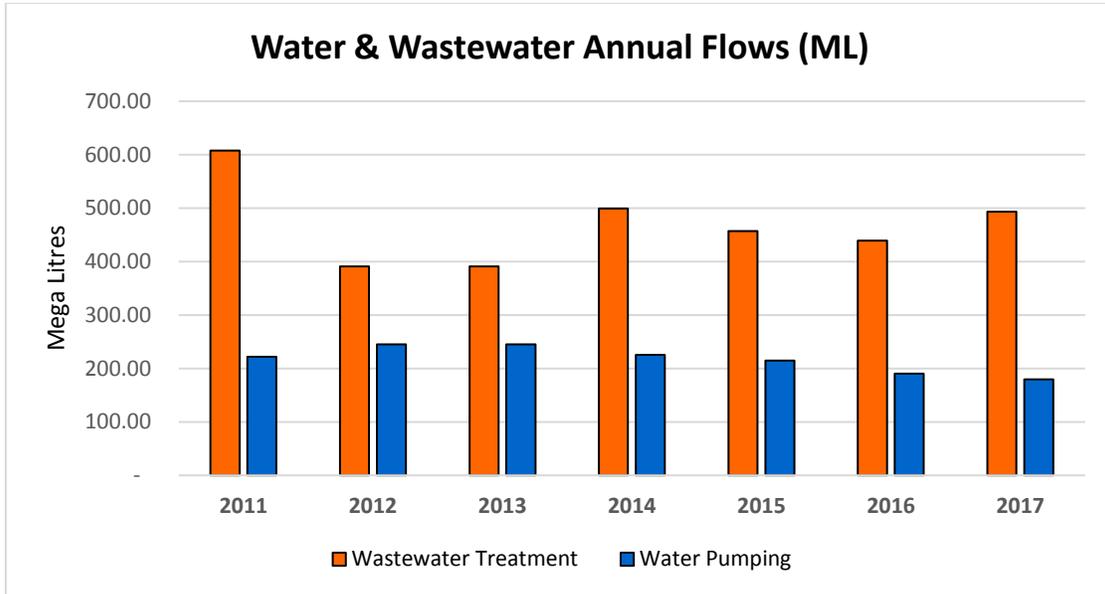
**Water & Wastewater Costs per Mega Litre (\$/ML)**



**Annual Flow**

The Annual Flow is the volume of water/sewage treated by a facility in a year in Mega Litres (ML). The Annual Flow is reported in order to calculate energy intensity for flow volumes.

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Water & Wastewater Energy Intensity (kWh/ML)

