2019

Thames Centre Conservation and Demand Management Plan

Municipality of Thames Centre

Environmental Services Department

6/15/2019

Prepared by the Municipality of Thames Centre

Environmental Services Department

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1. Introduction

Energy conservation is directly linked to economic sustainability and environmental preservation. The Thames Centre Energy Conservation and Demand Management Plan is a strategic plan to achieve economic and environmental goals through the reduction of energy consumption.

O.Reg. 379/11 under the *Green Energy Act, 2009* requires all Municipalities, Municipal Services Boards, School Boards, Universities, Colleges, and Hospitals to report on their energy consumption and greenhouse gas emissions annually beginning in 2013. These public agencies are also required to develop and implement a five-year Energy Conservation and Demand Management (CDM) Plan starting in 2014. The CDM Plan must contain "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."

This plan acknowledges energy management's long term importance while satisfying existing municipal needs and future projects.

2. History

Thames Centre was actively managing energy consumption before it was legislated by the Ontario government. Energy benchmarking of most facilities began in 2008. In 2009, Thames Centre installed over $8500 in lighting retrofits at a cost of $750 through the Hydro One Power Saving Blitz program. The success of this program inspired Thames Centre to create a corporate energy policy and pursue other energy saving opportunities (Thames Centre Council Report #ES-003-10):

Municipality of Thames Centre Energy Policy

The Municipality of Thames Centre is committed to energy conservation and environmental accountability. Through public awareness, staff training, and continual improvement, the Municipality of Thames Centre will reduce its environmental footprint through energy, cost, and waste reduction by focusing on three primary goals:

1. Maximize energy efficiency in all new construction,
2. Retrofit existing buildings to incorporate energy-efficient technologies, and
3. Identify and implement demand reduction strategies throughout the community.

Thames Centre has been committed to implementing improvements to facilities and operations that reduce energy consumption, greenhouse gas emissions and their associated costs. The following table is a summary of some of the completed energy upgrade projects:

YEAR	FACILITY	PROJECT
2015	Dorchester Waste Water Treatment Plant	Install a control system to regulate the Variable Frequency Drive (VFD) aeration blowers
2015	Thorndale Wastewater Treatment Plant	Install a control system to regulate the VFD aeration blowers
2016	Dorchester Library	Lighting retrofit
2016	Street lighting	All Municipal street lighting upgraded to LED
2016	Dorchester Pool	VFD installed on the main pool pump
2016	Dorchester Wastewater Plant	Upgraded the cooling fan on the aeration blower motor
2017	FlightExec Centre	VFD installed on the evaporator/condenser
2017	FlightExec Centre	50% of the lights upgraded to LED
2017	Dorchester Water Treatment Plant	All interior and exterior lighting upgraded to LED
2017	Dorchester Wastewater Treatment Plant	All interior and exterior lighting upgraded to LED
2017	Thorndale Water Treatment Plant	All interior and exterior lighting upgraded to LED
2018	FlightExec Centre	Refrigeration VFD soft starts installed on all compressors
2019	FlightExec Centre	Refrigeration Smart Hub software system installed and designed to run at non-peak hours

3. Challenges

There are two primary challenges in the municipal environment: time and money. In a small municipality such as Thames Centre, there are limited financial and staff resources for energy efficiency planning and project implementation.

Councilors and upper management receive communications from residents about road conditions, water and wastewater rates, or recreation facilities availability. It is exceptionally rare that a resident would contact the municipality about natural gas usage at the Dorchester Firehall. The energy that is used to keep our municipality going is often forgotten in the background, but it is one of Thames Centre's greatest expenditures.

Between 2008 and 2019 Ontario electricity rates for off-peak pricing climbed from 2.7 cents/kWh to 6.5 cents/kWh; an increase of 140%.[1] This trend will continue as Ontario electricity rates are expected to continue to rise.[2] An energy project's reduction in energy use does not always translate into an immediate cost savings. Some projects may take three, five, ten years or more to benefit in cost from the reduction in energy. The lack of an immediate cost savings can have a negative impact on the decision to proceed with an energy project.

4. The Current State of Affairs

Thames Centre is required to report on 16 facilities for the 2017 reporting year. Energy usage and greenhouse gas (GHG) emissions are listed in Appendix A. A summary of the facilities is provided below:

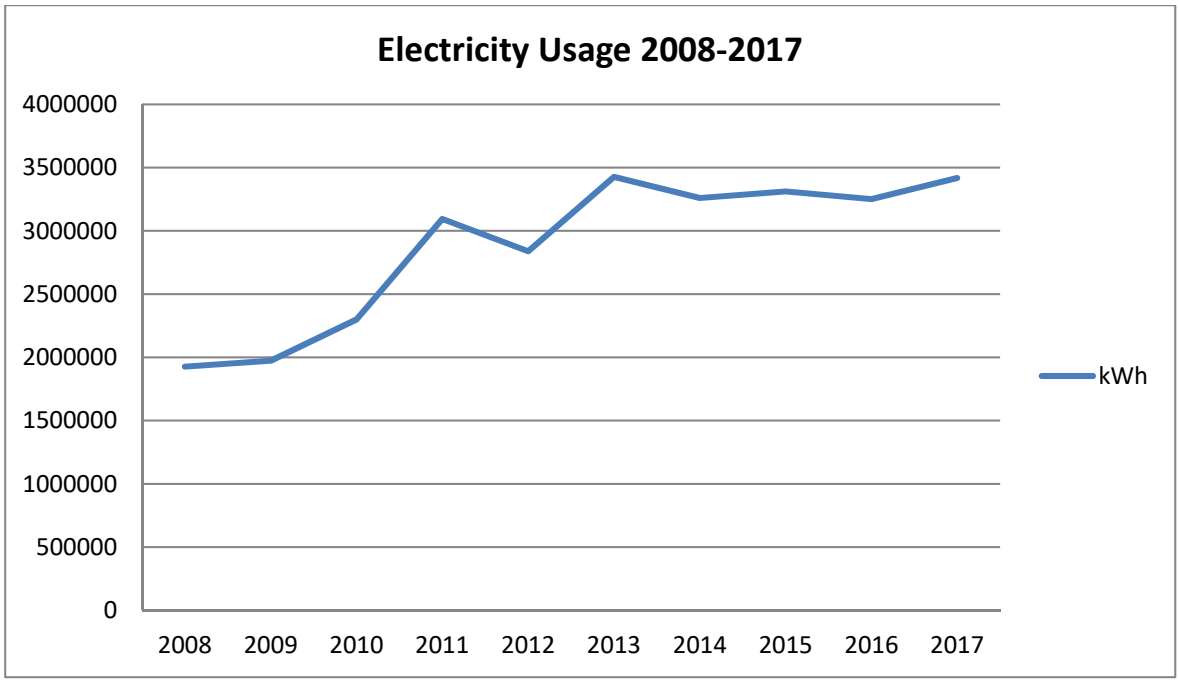
2017 Reportable Facilities

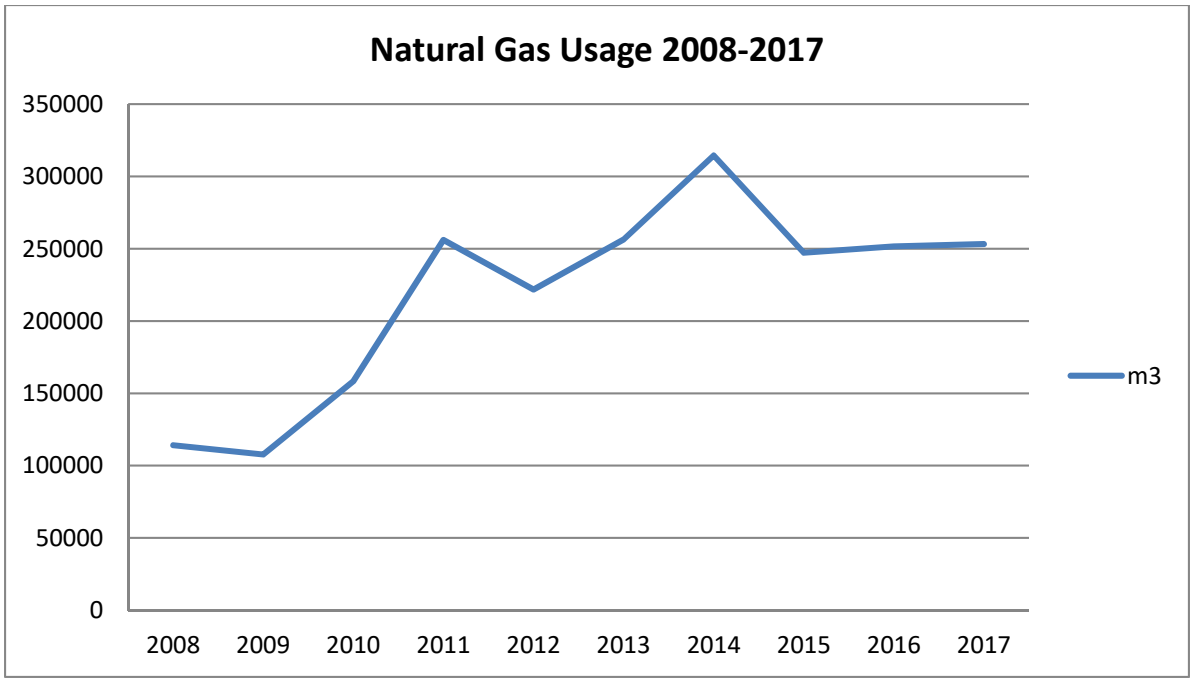
Facility	Address	Operation Type	Year Constructed
Thames Centre Municipal Office	4305 Hamilton Rd., Dorchester	Administrative offices and related facilities, including municipal council chambers	1959/1994
Dorchester Library	2123 Dorchester Rd., Dorchester	Public libraries	2001
Thorndale Library	21790 Fairview Rd., Thorndale	Public libraries	2006
FlightExec Recreational Centre	2066 Dorchester Rd., Dorchester	Indoor ice rinks	1976/1991/2011
Dorchester Firehall	2156 Dorchester Rd., Dorchester	Fire stations and associated offices and facilities	1991
Thames Centre Landfill	2015 Crampton Dr., Dorchester	Storage facilities where equipment or vehicles are maintained, repaired or stored	1985/2001/2002
Former MTO Building	78 Cromarty, Dr., London	Storage facilities where equipment or vehicles are maintained, repaired or stored	1960's
Catherine St. Sewer System	4182 Catherine St., Dorchester	Facilities related to the pumping of sewage	1983
Dorchester Water Treatment Facility	2620 Dorchester Rd., Dorchester	Facilities related to the treatment of water	2003
Thorndale Water Treatment Facility	17163 Thorndale Rd., Thorndale	Facilities related to the treatment of water	1975/2004
Dorchester Wastewater Plant	4835 Hamilton Rd., Dorchester	Facilities related to the treatment of sewage	2001

[1] Ontario Energy Board, https://www.oeb.ca/rates-and-your-bill/electricity-rates/historical-electricity-rates
[2] Alexandra Posadzki, The Globe And Mail, Ontario's soaring electricity costs result of poor government policies: report, April, 12 2018

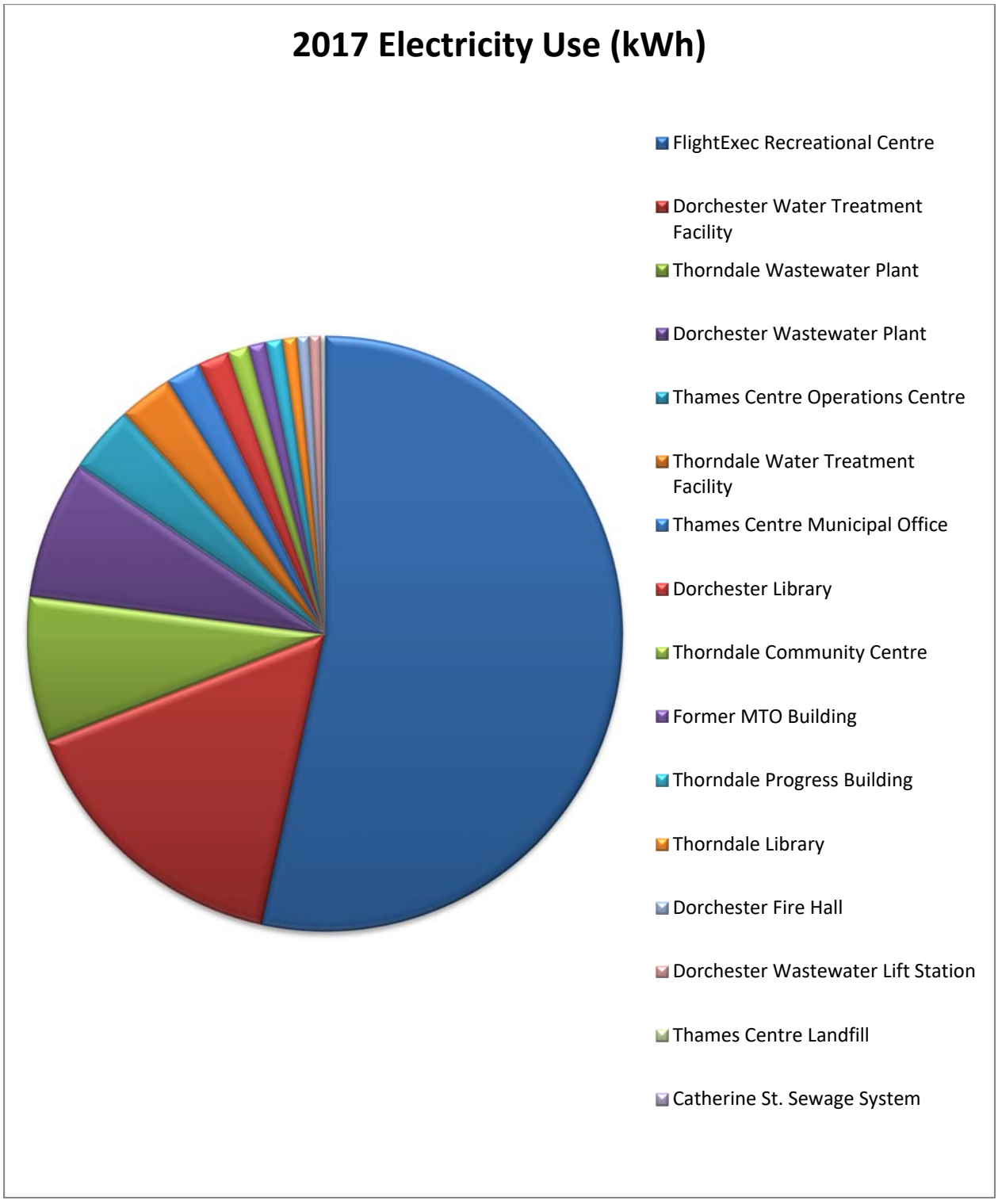
Dorchester Wastewater Lift Station	249 Mitchell Crt., Dorchester	Facilities related to the Pumping of sewage	2001
Thorndale Wastewater Plant	1135 Ideal Dr., Thorndale	Facilities related to the treatment of sewage	2012
Thames Centre Operations Centre	4475 Trafalgar St. Dorchester	Storage facilities where equipment or vehicles are maintained, repaired or stored	2013
Thorndale Community Centre	255 Upper Queen St. Thorndale	Community Centre	1952
Thorndale Progress Building	17198 Thorndale Rd. Thorndale	Community Centre	1955/1990

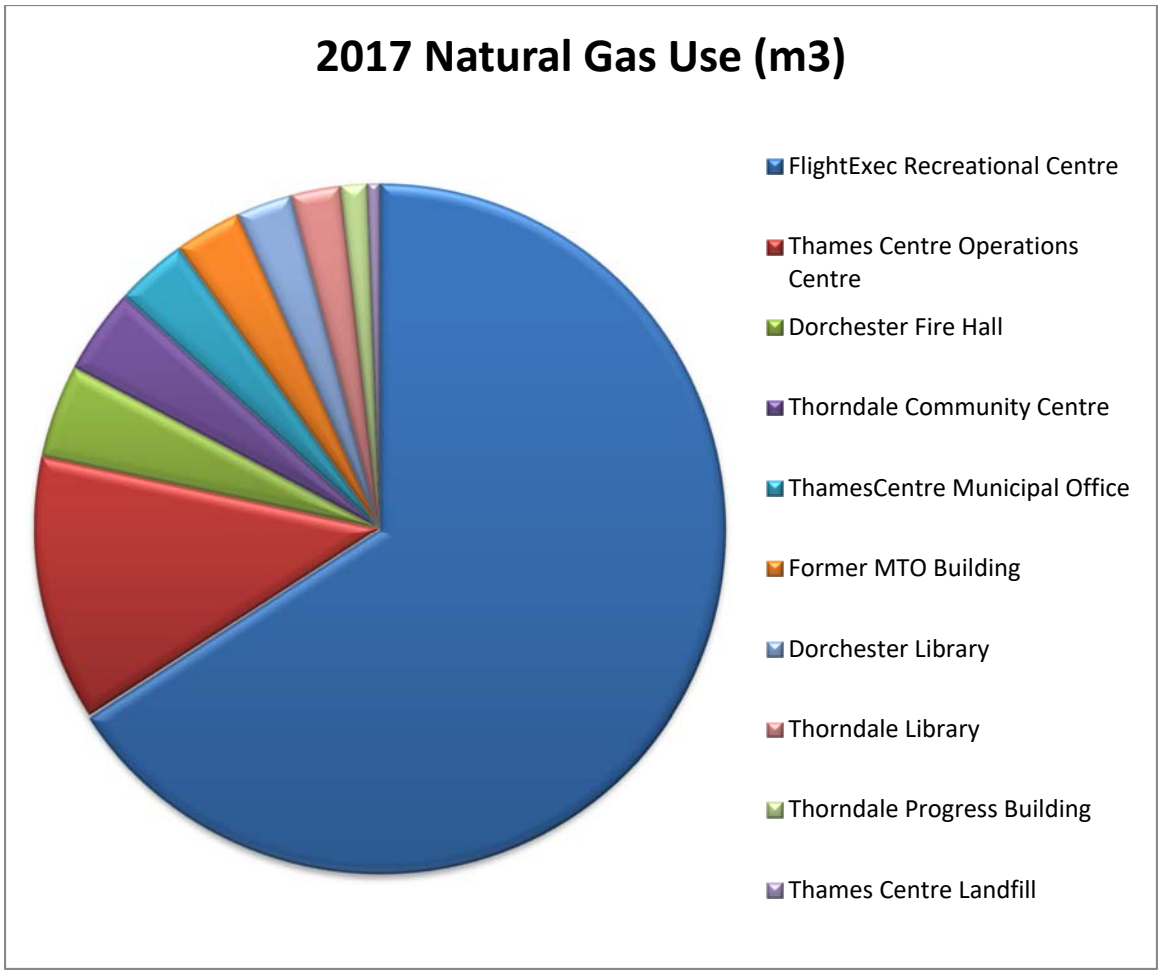
The following graphs show electricity usage and natural gas usage. The large jump from 2010 to 2011 in both gas and electricity was a result of the new addition to the Dorchester arena (now FlightExec Centre). The next jump in 2013 was a result of the addition of the Thames Centre Operations Centre and the municipality taking on the energy management of the Thorndale Community Centre and Thorndale Progress Building. Without these anomalies, Thames Centre's electricity usage increases approximately 6% per year, and natural gas approximately 9% per year from 2008 to 2013. From 2013 to 2016 Thames Centre was able to maintain or reduce energy usage in the reportable facilities. The 4% increase in 2017 in electricity usage was still below the historical 6% increase. These numbers are influenced by annual temperatures, building usage, and the removal or addition of facilities, but the overall trend in both electricity and natural gas usage is evidence that the municipality's energy projects are having a positive effect.





The following graphs show the largest users of energy on an annual basis. The FlightExec Recreational Centre uses more electricity and natural gas then all of the other reportable Thames Centre facilities combined. Environmental Services facilities (water and wastewater) are the next largest consumers. Savings and improvements can be found in every facility, but targeting the largest consumers for energy reduction projects will give the municipality the best results in lowering energy costs and GHG emissions.


2017 Electricity Use (kWh)
FlightExec Recreational Centre
Dorchester Water Treatment Facility
Thorndale Wastewater Plant
Dorchester Wastewater Plant
Thames Centre Operations Centre
Thorndale Water Treatment Facility
Thames Centre Municipal Office
Dorchester Library
Thorndale Community Centre
Former MTO Building
Thorndale Progress Building
Thorndale Library
Dorchester Fire Hall
Dorchester Wastewater Lift Station
Thames Centre Landfill
Catherine St. Sewage System



5. Current Energy Management Practices and Future Needs

Organizational Structure

Without the proper infrastructure in place no plan is successful. Currently, the Environmental Services and Finance departments complete the energy benchmarking and annual reporting of energy usage. This benchmarking is done only once a year which allows inconsistencies in billing and metering to go unnoticed for long periods of time. Each department has their own energy projects, and there is a lack of communication between departments. A lack of coordination can result in missed opportunities or overlapping grant applications.

An individual or team should be assigned to communicate potential energy projects to directors and coordinate these projects between departments. The individual or team would coordinate and investigate partnerships with the province or service providers in the form of refunds, incentives, and/or grants. Monthly benchmarking would identify errors in billing and metering before they become a serious problem. They would investigate energy reduction opportunities for new and existing buildings,

and assist directors in applying for grant funding and aid. Clearly defined roles and responsibilities will allow Thames Centre to take advantage of all available resources and funding options to successfully undertake energy projects. This responsibility would amount to a few hours of work per week, but could result in thousands of dollars in savings and GHG emissions reduction.

Energy Benchmarking, Audits, and Reporting

Benchmarking and energy audits are tools the municipality uses to get a better sense of where we need to focus our resources. Currently, the minimum number of required facilities are benchmarked for the legislated annual reporting to the Ministry of Energy. The data is entered on an annual basis which, as previously stated, has resulted in missed billing and metering errors. Accurate energy data will also aid in a more accurate budget process and forecasting.

It is recommended to go beyond the scope of the reportable facilities. Thames Centre would benefit from expanding the benchmarking to all facilities, streetlights, and outdoor recreational sites. This will allow the municipality to capture energy reductions through other projects. Eventually water and fuel usage may also be benchmarked to capture other areas where potential savings could be found.

As an ongoing commitment to energy conservation it is recommended to communicate energy success regularly to council and upper management. An annual energy report containing information on upcoming projects and the success of past projects would keep council and staff informed on energy management in the municipality.

Training

Currently there is minimal energy conservation awareness among the Municipal staff. Staff focuses on municipal operations rather than improving energy efficiency. Conservation improves when operations and awareness are combined. An energy plan will not succeed without staff and council commitment. Training for staff and council is needed to facilitate energy efficiency awareness and create a culture of conservation. A screen saver is not an energy saver, but turning off a computer and monitor at the end of each work day can save $50 per computer per year. Habits like turning off electronics and lights in offices can result in thousands of dollars in savings and GHG emission reduction, but these initiatives will only be effective if staff are dedicated to energy conservation. Staff suggestions can also be a great resource for new and innovative ideas. The people who work in the facilities every day know them best. Staff that have 'hands-on' involvement with energy conservation are more likely to achieve efficiency goals.

Current Projects

In 2013, the Ontario Clean Water Agency (OCWA) conducted an Eco-Efficiency Assessment of five Environmental Services facilities. The purpose of this assessment was to identify opportunities for improvements on energy efficiency and look for potential funding for energy reduction projects. The report identified 19 possible projects. Five of the recommendations have been implemented, one is

scheduled for 2019 (UV process system efficiency modification at the Dorchester Wastewater Plant), and several are being investigated for their long term viability.

Community Services & Facilities will be completing the other 50% of the LED lighting upgrade at the FlightExec Centre in 2019 and are continually looking for opportunities to reduce costs through grant funding and energy management.

Old Buildings and New Builds

Thames Centre has recently disposed of older and low use buildings. The sale of the Environmental Services Shop (built in 1948), the Dorchester Roads Garage (built in 1963), 160 King St. in Thorndale (built in 1924/1987), and the demolition of the Thorndale Roads Garage (built in 1966) has saved the municipality over $30,000 per year in energy costs and reduced GHG by 67,000 kg per year. Continued analysis through benchmarking and energy audits should be applied to existing buildings in consideration for their continued use or replacement.

Thames Centre has implemented a design standard that requires all new subdivisions to install LED street lights. This requirement has put the cost of LED lighting on the subdivision developer instead of the Municipality paying to upgrade the streetlights in the future.

The Leadership in Energy and Environmental Design (LEED) standard for new buildings should be considered when designing new facilities. Many municipalities have adopted this standard which has resulted in lower energy costs, lower GHG emissions for the new buildings, and a higher return on government and energy partner rebates. LEEDs design and renewable resources such as solar, wind, or geothermal energy should be investigated when building new facilities or retrofitting older facilities.

6. Planned Energy Management System: Goals and Targets

Recommendations and Future Initiatives		
Initiative	**Description**	**Operational Benefit**
Organizational	An individual or team should be assigned to the manage and coordinate the Municipality's energy systems.	Increased communication between departments, increased frequency of benchmarking, aid directors in funding applications
Audits	Conduct energy audits on all facilities.	Identifies inefficiencies and potential projects

Benchmarking	Maintain benchmarking data on a more frequent schedule expand benchmarking to all facilities and street lighting, expand benchmarking to water and fuel.	Identifies inefficiencies and potential projects, identifies billing and metering errors, required by O.Reg.397/11
Reporting	Prepare an annual energy report for staff and council.	Increased communication and energy awareness between staff and council, summary of data for directors
Training	Create a training program for staff to communicate energy awareness and promote conservation programs	Raise staff involvement, increase energy awareness, unknown reduction in annual cost and GHG emissions
Energy Reduction	Through continuous improvement, staff involvement, and project commitment the Municipality of Thames Centre is committed to cost and GHG emission reduction through energy conservation.	Thames Centre will reduce its energy consumption by 1% per year over the next five years for a total of 5% by 2024

7. Conclusion

The Thames Centre Conservation and Demand Management Plan establishes a starting point for energy management in the municipality. A 1% reduction in energy usage saves 35,000 kWh in electricity and 2,500 m3 of gas per year. This creates a savings of over $10,000 per year for Thames Centre. This plan's recommendations outline achievable goals in organization, administration, supports current initiatives, and begins the groundwork for more ambitious future projects.

Appendix A: 2017 Energy Reporting

Facility	Average Hours per Week	Floor Area (ft2)	Annual Flow (Mega Litres)	Electricity Consumption (kWh)	Gas Consumption (m3)
Thames Centre Municipal Office	65	5,404		64,222	8,526
Dorchester Library	30	3,853		5,8521	6,598
Thorndale Library	30	3,692		2,6422	5,906
Flightexec Recreational Centre	126	53,303		1,826,116	166,835
Dorchester Firehall	30	6,932		2,2566	11,063
Thames Centre Operations Centre	54	26,230		126,298	31,651
Thorndale Community Centre	25	11,725		38,528	10,169
Thorndale Progress Building	1	14,900		31,325	3,155
Thames Centre Landfill	20	565		4,992	1,453
Old MTO Building	1	3,681		32,855	7,895
Catherine St. Sewer System	168		4.036	2,550	
Dorchester Water Treatment Facility	168	1,873	459.026	535,405	
Thorndale Water Facility	168	1,292	92.006	99,045	
Dorchester Wastewater Plant	168	1,851	106.293	256,050	
Dorchester Wastewater Lift Station	168		106.293	21,671	
Thorndale Wastewater Plant	168	1963	72.874	271,390	