MIDDLESEX CENTRE
ENERGY CONSERVATION & DEMAND MANAGEMENT PLAN 2019-2024

Version: August 1, 2022

BACKGROUND

Ontario Regulation 507/18 (Broader Public Sector: Energy Reporting and Conservation and Demand Management Plans) of the Electricity Act, 1998 (hereafter *"O.Reg. 507/18"*) requires municipalities to prepare and submit to the Ministry of Energy (MOE) an energy conservation and demand management plan.

This 2019-2024 Energy Conservation and Demand Management Plan (hereafter "ECDM Plan" or "Plan") was developed to comply with the requirements of *O.Reg. 507/18*. The Municipality of Middlesex Centre's (hereafter the "Municipality") first ECDM Plan was published in 2014.

Municipalities are required to submit a five-year conservation and demand management plan to monitor progress and update their plans. This ECDM Plan was updated and approved by Council on August 3, 2022. The Plan will be available on the Municipality's website https://middlesexcentre.ca/.

The ECDM Plan includes the following core elements as required by *O.Reg. 507/18*:

- Summary of the annual energy consumption and greenhouse gas (GHG) emissions for municipal facilities;
- Description of goals and objectives for conserving and reducing energy consumption and managing energy demand; and
- Description of previous, current, and proposed measures for conserving and reducing the amount of energy consumption including a forecast of the expected results of current and proposed measures.

The Plan is a living document and to be used as a tool by the Municipality to manage our energy consumption to reduce our carbon footprint and to control our energy costs for heated and cooled facilities for electrical power and natural gas.

DECLARATION OF COMMITMENT

Middlesex Centre Council is committed in allocating necessary resources to develop and implement a five-year Energy Conservation and Demand Management (ECDM) Plan as required under *Ontario Regulation 507/18 (Broader Public Sector: Energy Reporting and Conservation and Demand Management Plans)* of the Electricity Act, 1998. This ECDM Plan will strive to reduce our energy consumption and its related environmental impact as outlined in our overall target. Council and staff will monitor our continuous progress towards the objectives set in this plan and will update as required under *O.Reg. 507/18* of the Electricity Act or any subsequent legislation.

VISION

The Municipality of Middlesex Centre 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.

GOALS

The Municipality of Middlesex Centre will continuously improve the energy efficiency of our facilities and processes in order to reduce our operating costs, our energy consumption and the concomitant greenhouse gas emissions. The Municipality of Middlesex Centre's Energy Conservation and Demand Management Plan will strive to achieve the following goals:

1) Maximize fiscal resources and avoid 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 municipal facilities.
4) Improve the reliability of municipal equipment and reduce maintenance costs.
5) Promote a culture of energy conservation within the municipality.

TARGET

The Municipality will reduce our consumption of fuels and electricity in all municipal operations by an average of 1% year after year.

STRATEGIC OBJECTIVES

In order to achieve the success of the strategic direction of the ECDM Plan, there are a number of goals and objectives that align with its development and implementation. The following are the strategic objectives:

1) The creation of a culture of conservation within the Municipality will serve to reduce greenhouse gas emissions and ensure the wise use of resources and fiscal accountability through savings and cost avoidance will lead to both direct and indirect savings.
2) Demonstrate leadership within the Municipality and community as to the commitment to energy management and the investigation of new and emerging technologies.

3) Demonstrate sound operating and maintenance practices to complement the energy efficiencies implemented through the capital asset renewal program.

4) Provide a forum for discussion within the Municipality on energy management to be able to explore new ideas and trends. With the development of the Energy Plan, all Corporate Departments will have a roadmap and a forum to continue to ensure energy management is a consideration in all operations and facility-based decisions. The integration of operational processes, facility-based infrastructure improvements and staff awareness is critical to move the Municipality towards the goal of reducing GHG emissions and transition to a carbon neutral future.

ENERGY CONSUMPTION BASELINE

The *O.Reg 507/18* requires the ECDM Plan to focus on buildings and facilities the municipalities own and lease that are heated or cooled including those related to the treatment of water and sewage. The following are building and facilities owned and leased by the Municipality:

Building/Facility	**Number**
Administrative offices and related facilities, including municipal council chambers	1
Cultural facilities, indoor recreational facilities, and community centres, including art galleries, performing arts facilities, auditoriums, indoor sports arenas, indoor ice rinks, indoor swimming pools, gyms and indoor courts for playing tennis, basketball or other sports.	6
Fire stations and associated offices and facilities	5
Storage facilities where equipment or vehicles are maintained, repaired, or stored.	2
Building facilities related to the treatment of water and sewage	2
Total number of facilities	**16**
Total floor area	**23,696 m^2**

Figure 1: The Municipality does not own, lease or operate any public libraries, ambulance stations, police stations or parking garages.

The first reporting year for the Municipality's energy consumption and GHG emissions was in 2012, as such will form the baseline from which energy reductions are evaluated.

Based on the 2012 Energy Consumption and Greenhouse Gas Emissions Reporting, the total energy consumption for electricity is 5,197,080 kWh and natural gas is 297,039 cubic metres for all buildings and facilities the Municipality owns or leases.

ENERGY CONSERVATION AND DEMAND MANAGEMENT PLAN 2014-2019

Under our first ECDM Plan, the Municipality committed to reducing our impact on the environment by reducing our consumption of fuels and electricity in all municipal operation by an average of 1% per year. In reporting the accomplishments at the end of the first ECDM Plan, the Municipality has made substantial progress towards incorporating energy conservation initiatives into corporate policies and practices.

Figure 2 shows the Municipality's electricity and natural gas consumption from 2014-2019. Based on the following, although the Municipality has fallen short with our target for natural gas consumption, the Municipality has met and surpassed our annual target for electricity with reductions of 2.22% in average annually and 11.10% total for the five-year period.

Year	Electricity (kWh)	Change	Natural Gas	Change
2012 (Base Year)	5,197,080		297,039	
2015	4,970,396	-4.36%	310,192	4.43%
2016	5,004,511	0.69%	249,615	-19.53%
2017	4,379,058	-12.50%	292,343	17.12%
2018	4,217,280	-3.69%	305,407	4.47%
2019	4,586,999	8.77%	304,244	-0.38%
5-Year Average		**-2.22%** ⬇		**1.22%** ⬆
5-Year Total		**-11.10%** ⬇		**6.10%** ⬆

Figure 2: Electricity and natural gas consumption for period 2014-2019.

Figure 3 shows the Municipality's total GHG emissions for 2014-2019. Due to drastic decrease in electricity consumption, there has been a reduction of 37.27% in GHG emissions during the five-year period with an annual average reduction of 7.45%.

Year	GHG Emissions (Kg)	Change
2012 (Base Year)	1,106,702	
2015	823,433	-25.60%
2016	693,498	-15.78%
2017	630,508	-9.08%
2018	702,024	11.34%
2019	714,992	1.85%
5-Year Average		**-7.45%** ⬇
5-Year Total		**-37.27%** ⬇

Figure 3: GHG Emissions for reporting period.

Figure 4 shows the breakdown of total energy use by facility type in 2019. The largest consumer is the recreational facilities, followed by water and wastewater facilities.

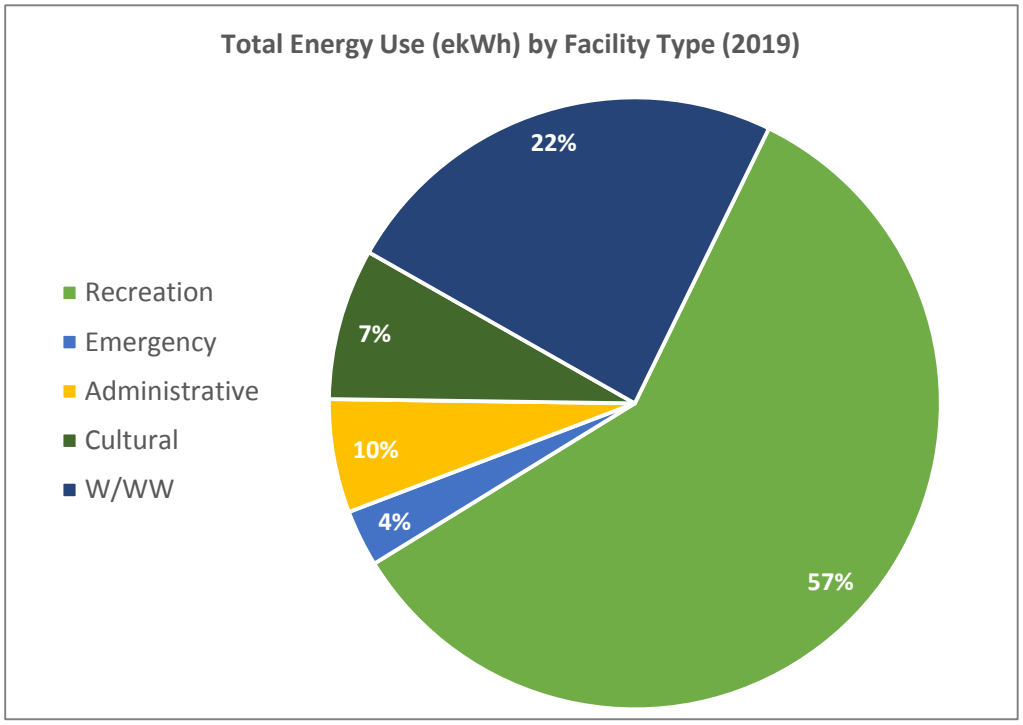

Figure 4: Total energy use by facility type

COMPLETED CONSERVATION MEASURES AND RESULTS

The Municipality of Middlesex Centre aspires to show leadership in the promotion and development of strategic energy management that are compatible with our asset management and land use planning objectives. Below are few highlights of green initiatives at the Municipality of Middlesex Centre:

1) The installation of solar photovoltaic system on the rooftop of the Middlesex Centre Wellness & Recreation Complex has reduced the electricity demand off the grid by 11.21% for the five-year period.

2) Coldstream Fire Station: Canada's first Net Zero Fire Station utilizing geothermal heating and cooling and photovoltaic power. The extra energy generated from the system is sent to the adjacent municipal office and the grid.

3) The Municipality has been actively engaged in seeking efficiencies in energy consumption for several years through participation in such initiatives as building automation, efficient lighting, green fleet projects, etc.

    a. Both Komoka Wellness Centre and Ilderton Arena have switched to LED linear bulbs over the rinks in 2017.

    b. Wall packs across all facilities are replaced with LED as they fail.

    c. Installation of timers at the Sports Field ensuring lighting only in the hours between 8 pm and 11 pm.

    d. Utilization of "Astral" timers at our many parks and outdoor facilities thus better following of sun set and sundown times.

    e. All Municipality's facilities have been outfitted with programmable thermostats on all HVAC units utilizing night setbacks.

    f. Replacements of old HVAC units with high efficiency mini split heat pump and radiant tube heaters.

    g. Installation of ceiling fans for better air circulations improving heat efficiency.

    h. At the refrigeration plants:

        i. 6000E BAS has been reprogramed to better utilize setbacks and unoccupied times.

        ii. The capturing of waste heat using hydronic heating loops and thermos-store tank to heat domestic water.

        iii. Installation of cooling tower full clean and high flow nozzles improving efficiency while saving water.

iv. Installation of soft starts in pumps and VFD on cooling tower fans for efficiency.

v. Switch to Moss in water tank to control water chemistry allowing for less water cycles.

vi. Installation of mini plates and frames for jacket cooling thus saving run hours on compressors.

vii. Installation of condenser clean plus nozzle improving heat rejections.

i. Green fleet:

i. Use of Level Ice Laser system and FastICE on ice resurfacers.

ENERGY CONSERVATION AND DEMAND MANAGEMENT PLAN 2019-2024

This 2019-2024 ECDM Plan will build on our successes from our previous Plan to further reduce our carbon footprint. The Municipality's success over the next five years will be measured against a target energy reduction of an average of 1% year after year.

The cumulative result of energy savings at the end of the five-year period is estimated at $45,000 not taking into account inflation and rising energy costs.

The following sections outline the proposed actions to conserve energy and manage demand.

1) The Municipality's energy consumption progress will be monitored on an annual basis as part of the plan review process to ensure the municipality is on target to achieve our goals.

2) To promote a culture of energy conservation within the municipality, the Municipality aims to create initiatives encouraging sustainable new residential home construction designs. Encouraging local builders to incorporate sustainable building features and practices in their construction.

3) The Municipality will adapt sustainable procurement processes. The Municipality will consider not only the lifecycle impacts of goods and services but also the sustainability practices (including but not limited to environmental, social and ethical) of our suppliers when purchasing.

4) Continuing to adopt green fleet policies will reduce GHG emissions as well as decrease fuel costs. The Municipality aims to reduce energy demand by introducing more efficient vehicles and electric vehicle technology to the fleet.

5) The Municipality will incorporate cutting-edge sustainable energy features to all our new facility constructions. The Municipality has partnered with the graduate students in the Masters in Environment and Sustainability program in the Centre for Environmental and Sustainability at Western University to identify new and emerging technologies and best practices for the construction of a new net-zero arena in Ilderton.

6) The Municipality will continue to explore various grant and subsidies on an ongoing basis. For example, the Municipality has submitted applications for lighting retrofits and re-design through the Save on Energy initiatives.

ENERGY LEADER

The Director of Community Services is designated as leader of energy planning and has been given overall responsibility for the Energy Conservation & Demand Management Plan. The Director of Community Services is supported in this role through collective decision making of the Management Team represented by the CAO, Departmental Directors and Supervisors across all municipal departments.

PROJECT EXECUTION – MUNICIPAL LEVEL

The administration and implementation of this plan will be responsibility of the Director of Community Services. Since we all use energy in our daily activities, it will also be the responsibility of all Municipal staff to be aware of their energy use and work towards a culture of conservation. Through staff training and web base energy management tools, staff will be able to see the results of their efforts, and benchmark between corporate facilities and with industry standards.

PROJECT EXECUTION – ASSET LEVEL

To sustain a corporate culture of conservation, staff must be engaged in an effective awareness and education program. Although facilities staff has the lead responsibility in ensuring municipal facilities operate efficiently, all municipal staff should be familiar with and utilize energy efficient measures where possible. The first step in implementing an energy management program is the completion of energy audits for municipal facilities. Audits involve a technical review of a facility and its operations, the development and analysis of a baseline energy profile for the facility and identification of energy management opportunities and savings.

ENERGY PLAN REVIEW

The Senior Management Team will review and evaluate the Municipality of Middlesex Centre's Energy Conservation and Demand Management Plan annually, revising and updating as necessary within the corporate budget planning process.