Energy Conservation & Demand Management Plan 2024-2029

The Township of West Lincoln

Prepared by Blue Sky Energy Engineering & Consulting Inc. with AMO/LAS

Our Commitment to Energy Conservation

On behalf of Council and Staff, I am proud to present the Township of West Lincoln's 2024-2029 Energy Conservation and Demand Management Plan. This plan represents our commitment to responsible energy use, environmental stewardship, and long-term sustainability.

Implementing environmentally sustainable practices at an operational and service level was identified in our strategic plan. We recognize the importance of efficient energy management, not only to reduce costs for taxpayers, but also to contribute to broader provincial and national climate goals.

As our municipality grows, so do the needs of our community. Having an energy plan that focuses on conservation and long-term sustainability allows us to take a step back and consider the big picture of energy. With this awareness, we can set realistic goals, and continue to keep a diversified energy portfolio while exploring a gradual transition to renewable energy opportunities where feasible.

We are proud to take this step toward a more energy efficient and sustainable future. This plan will help to guide decisions and policy as we continue to protect our natural assets, create efficiencies and savings and build a resilient community that is prepared for the challenges of tomorrow.

Cheryl Ganann, Mayor

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1.0 Introduction

Background

This report presents the Township of West Lincoln (the Township) Energy Conservation and Demand Management (ECDM) plan which has been prepared to comply with Ontario Regulation 25/23 of the Electricity Act. The Township adopted this plan in November 2024.

In an era of growing environmental concerns, rising energy costs, and evolving regulatory requirements, energy conservation and demand management have become critical priorities for organizations. An effective Energy Conservation and Demand Management Plan (ECDM) serves as a strategic roadmap to optimize energy usage, reduce greenhouse gas emissions, and achieve cost savings while supporting sustainability goals.

This plan outlines a systematic approach to identify energy-saving opportunities, implement efficient technologies, and foster behavioral changes across all levels of the organization. By focusing on both supply-side and demand-side management, the plan aims to minimize energy consumption during peak demand periods, enhance the reliability of energy supply, and contribute to a cleaner environment.

The Township's Chief Administrative Officer (CAO) has overall responsibility for the maintenance and implementation of this plan.

In line with our mission to promote sustainability and operational efficiency, we have developed a detailed Energy Conservation and Demand Management Plan. This plan is designed to:

1. **Reduce Energy Consumption:** Through the adoption of energy-efficient technologies and practices.
2. **Enhance Operational Efficiency:** By optimizing our energy use and minimizing waste.
3. **Promote Sustainability:** By integrating environmentally friendly practices into our core operations.
4. **Ensure Long-term Savings:** By lowering operational costs associated with energy use.

Our plan encompasses a range of strategies including, but not limited to, energy-efficient upgrades, the implementation of renewable energy sources, and the promotion of conservation practices among our staff.

The plan also examines past performance with summaries of the Township's energy baseline, carbon emissions and renewable energy systems. Our conservation successes are reviewed and a specific conservation action plan for the next five-year period is included with strategic priorities and targets. We are committed to regularly monitoring and evaluating the effectiveness of these measures and adjusting our approach as needed to achieve our energy-saving goals.

By committing to this plan, the organization positions itself as a leader in energy stewardship, ensuring a more sustainable and resilient future for all stakeholders.

Plan Development

This ECDM plan builds on previous energy management (the last ECDM plan published in 2019) in addition to supporting the requirements laid out in O. Reg. 25/23. It also supports the Township's capital plan, strategic plan, and asset management policy.

This work focuses on financial, environmental and social priorities. By creating a detailed conservation plan and increasing corporate awareness of energy consumption, total energy use and the related GHG emissions will decrease. It is recognized that this work will also enhance operational efficiency and improve long-term sustainability.

The ECDM plan was created in three steps, by:

1. Assessing the Township's current energy baseline
2. Revisiting its energy management vision & objectives, and targets
3. Identifying specific and measurable actions for improvement for the next five years to achieve the vision, objectives and targets.

The Township's energy conservation efforts follow the Phased approach illustrated in Figure 1.1 below. Phases 1, 2 and 3 have been completed and the Township is currently focused on Phase 4, 5 and 6.

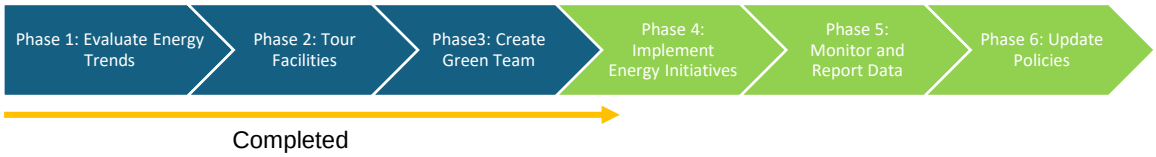


Figure 1.1: Plan Phases

The plan and supporting action list were developed by a multi-departmental team from Finance, Planning, and Parks and Recreation with support from outside expertise.

Ontario Regulation 25/23 of the Electricity Act

In 2008, Ontario's 445 municipalities spent $680 million on electricity, equating to 4.3% of Ontario's consumption (Power Application Group 2008). In response, Ontario's Green Act was created to expand renewable energy generation, encourage energy conservation and promote the creation of green energy jobs (Ministry of Energy 2014).

Under the Green Energy Act, Ontario Regulation 397/11 was introduced for public agencies- municipalities, municipal service boards, universities, colleges, hospitals and school boards to apply the Act's principles. This Regulation is now part of the Electricity Act, Ontario Regulation 25/23.

Under this Regulation, public agencies must report annual energy consumption and greenhouse gas emissions for buildings that have heating and cooling, and for operations related to water and sewer services. Public agencies must also create an Energy Conservation and Demand Management Plan (ECMP) which requires updating every five years.

The CEMP must include goals for increasing energy efficiency, measures for obtaining the goals, timelines for implementation, costs of implementation and estimated savings.

Energy management is important to the Township of West Lincoln because it results in reduced costs through better equipment maintenance, economic growth, facility upgrades and cost-effective planning. Responsible energy management promotes green development and sets a good example for the community.

Overview of Township Facilities

As discussed, the Regulation states that energy use and greenhouse gas emissions must be reported for buildings or facilities the Township owns or leases that:

> *"(a) the building or facility is heated or cooled, and the public agency is issued the invoices and is responsible for making the payments for the building or facility's energy consumption; or*
>
> *(b) the operation is related to the treatment of water or sewage, whether the building or facility is heated or cooled, and the public agency is issued the invoices and is responsible for making the payments for the building or facility's energy consumption.*
>
> *(O. Reg. 25/23 s. 6)."*

In addition to the mandatory facilities that are required by the regulation, the Township also tracks the energy use of several additional items including outside parks and streetlighting, The full list of Township facilities included in this report can be found below in Table 1.1.

Table 1.1 Township Facilities and Infrastructure Within This Plan's Scope

Facility	Address	Use	Area (ft^2)
Facilities Covered by the O.Reg. 25/23:			
Administration Building	318 Canborough St	Administrative offices and council chambers	14,671
Public Works Operations	6218 London Rd	Offices	7,427
Smithville Fire Station #1	344 Canborough St	Fire station, associated offices and facilities	12,424
Former Caistor Fire Station #2	8635 Regional Rd 65	Fire station, associated offices and facilities	4,978
New Caistor Fire Station #2	8635 Regional Rd 65	Fire station, associated offices and facilities	6,092
Caistorville Library	9549 York Rd	Public library	2,355
Wellandport Community Centre and Library	5042 Canborough Rd	Public library	8,700
West Lincoln Community Centre	177 West St	Indoor recreational facility	95,753
Silverdale Community Centre	4610 Sixteen Road	Community Center	1,500
Abingdon Community Centre	9184 Regional Rd 65	Community Centre	4,300
Optional Sites included in the Plan:			
Streetlighting	Various	Lighting	n/a
Christmas Lights		Lighting	n/a
Leisureplex	2543 S Grimsby Rd Six	Parks and Recreation	n/a
Caistor Park	9184 Regional Rd 65	Parks and Recreation	n/a
West Lincoln Community Centre Park	177 West St	Parks and Recreation	n/a
Murgatroyd Parkette	104 Griffin St	Parks and Recreation	n/a
St. Catharines Street Parkette	124 Griffin St N	Parks and Recreation	n/a
Water Bulk Fill Station	6253 London Rd	Environmental Services	n/a

Renewable Energy Sources

O. Reg. 25/23 requires the Township to consider renewable energy as a supplement to reducing energy consumption and electricity demand for its buildings/facilities.

The Township is currently home to seventy-six (76) industrial wind turbines operated by Boralex. The wind farm, operated by Boralex has a capacity of 230 MW and has no direct supply to the Township nor is the Township involved in its operations. The Township does not have any installed renewable energy systems. However, through asset and

capital management programs, will consider high efficiency upgrade measures such as air source heat pumps.

2.0 Our Accomplishments

The Township has delivered many improvements to its facilities over the last 5 years resulting in energy savings including the project listed below and shown in Figure 2.1 and 2.2.

- Town Hall Administration Building lighting upgrade to LED
- Two ball diamonds and lighting at Leisureplex Metal Halide to LED
- Completed conversion of all streetlights to LED

Although our total energy consumption has increased compared to 2014 (due to the increase in services and facilities from the addition of the new West Lincoln Community Centre), the energy use intensity (EUI) has dropped by almost 20%. This means that although we are growing, we are using our energy resources in a more effective manner.

Figure 2.1 Town Hall Lighting Upgrade

Figure 2.2 Ball Diamond Lighting Upgrade

3.0 Current and Historical Consumption and Emissions

Our Energy Baseline

This section provides a picture of energy consumption at the Township over the last decade and illustrates further detailed breakdowns for the current 2023 results. An energy baseline was established to provide a quantitative reference case for comparing the Township's energy performance. As in previous reports, 2014 has been selected as the energy baseline year for the Township.

Figure 3.1 below shows the total energy consumption at the Township by year along with the energy use intensity (EUI) for all facilities and sites outlined in Section 1.0.

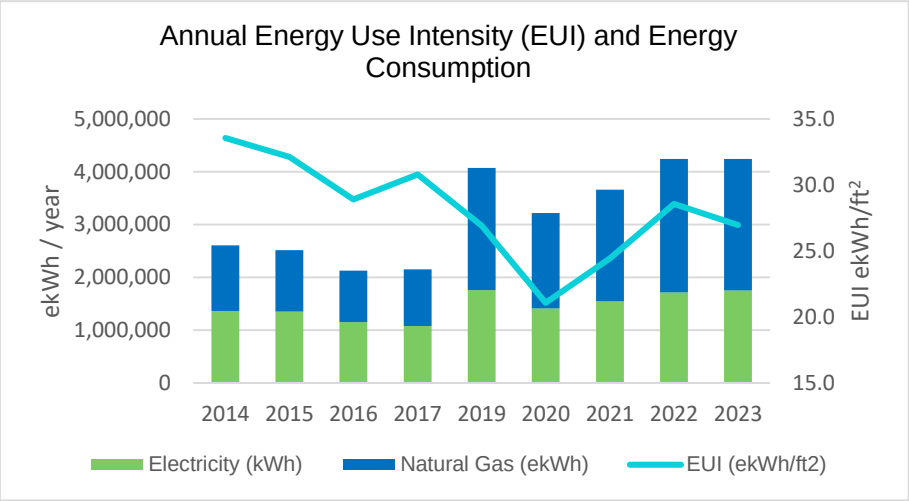


Figure 3.1 Total Energy Consumption and Energy Intensity 2014 - 2023

Energy use intensity (EUI) is the measure of total energy consumed by building area and in this case, we have used the units of ekWh/ft^2. Please note that 2018 was not included in this chart because the square footage was incomplete.

The energy consumption and emissions across the Township in 2023 have exceeded that of both 2014 and 2019 (an interim year from the last report). Although our total energy consumption has increased compared to 2014 (due to the increase in services and facilities from the addition of the new West Lincoln Community Centre), the energy use intensity (EUI) has dropped by almost 20%. This means that although we are growing, we are using our energy resources in a more effective manner.

The average energy intensity of all enclosed/heated facilities is shown in Table 3.1 below.

Table 3.1: Township Average Energy Use Intensity, All Facilities

	2014	2023	% Change
Energy Intensity (GJ/m^2)	1.30	1.05	-19.6%

Several other trends can be seen in Figure 3.1 including:

- The dip in energy consumption in 2020 and 2021 was predominantly influenced by COVID-19 closures.
- Gains in energy efficiency including a significant decrease in electricity consumption from street lighting improvements in 2016, have been obscured by the increases due to the addition of several new facilities (West Lincoln Community Centre and Caistor Fire Station #2).

Table 3.2 below presents the Township's 2023 energy performance, compared to the baseline year of 2014 and interim year 2019. Municipal facilities, Parks and Recreation, the Water Bulk Fill Station and Streetlighting have been represented separately.

Table 3.2: West Lincoln Energy Consumption Compared to Baseline

Account Centre	Energy Type	2014	2019	2023	% Change vs 2019	% Change vs 2014
Municipal Facilities	Electricity (MWh)	391.0	410.3	430.4	4.9%	10.1%
	Natural Gas (m3)	77,082	80,695	78,816	-2.3%	2.2%
	Subtotal (eMWh)	**1,185.2**	**1,241.9**	**1,242.5**	**0.1%**	**4.8%**
Water Bulk Fill Station	Electricity (MWh)	9.5	9.6	16.8	74.7%	76.7%
Parks and Recreation	Electricity (MWh)	458.5	1,112.0	1,174.0	5.6%	156.1%
	Natural Gas (m3)	43,334	143,664	162,526	13.1%	275.1%
	Subtotal (eMWh)	**906.1**	**2,596.0**	**2,813.7**	**8.4%**	**210.5%**
Streetlights	Electricity (MWh)	504.4	226.6	171.4	-24.4%	-66.0%
Total Energy	**(eMWh)**	**2,605**	**4,074**	**4,244**	**4.2%**	**62.9%**
Total GHG Emissions	**(tCO2e)**	**432.5**	**481.9**	**516.2**	**7.1%**	**19.3%**

Note 1: ekWh (equivalent kWh) is a calculated value using the thermal energy content of Natural Gas to convert consumption to units of "equivalent" kWh (ekWh) for comparison.

The following six facilities utilize over 90% of the total energy consumed at the Township (all fuel types combined). Table 3.3 lists their energy consumption along with the facility energy use intensity.

Table 3.3 Facilities with Highest Energy Consumption in 2023

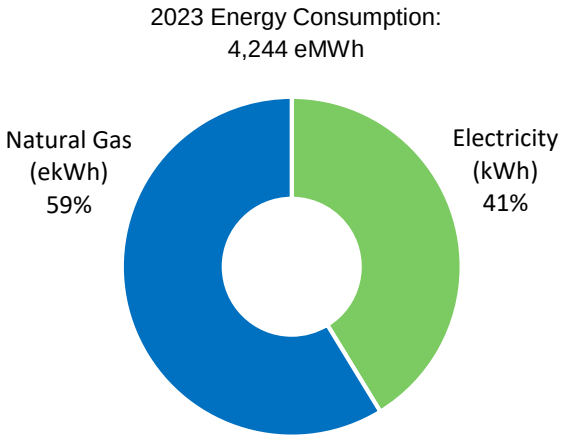
Facility	Address	Area (ft^2)	Energy Consumption 2023 (eMWh)	EUI 2023 ($ekWh/ft^2$)
West Lincoln Community Centre	177 West St	95,753	2,773	29.0
Administration Building	318 Canborough St	14,671	393	26.8
Public Works Operations	6218 London Rd	7,427	273	36.8
Caistor Fire Station #2[1]	8635 Regional Rd 65	4,978	222	44.5
Smithville Fire Station #1	344 Canborough St	12,424	190	15.3

Note 1: Please note that the Caistor Fire Station data refers to the older facility as the new facility opened in 2024.

Energy Consumption Breakdown

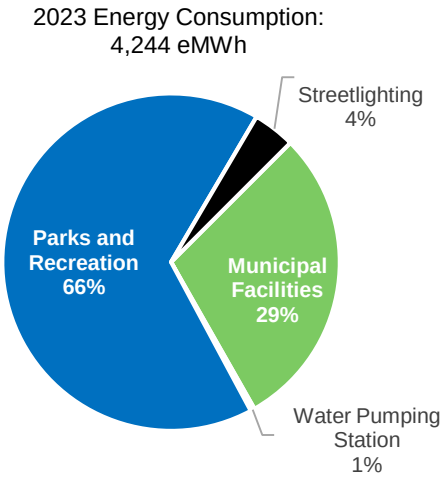
Historical energy consumption is broken down further to help understand the energy picture at the Township, to help identify opportunities for conservation and to measure progress.

Total Energy Breakdown:



The Township consumes two main fuels, electricity and natural gas. To compare different energy sources, the natural gas consumption was converted to equivalent kWh (ekWh) using standard conversion rates. Figure 3.2, illustrates energy consumed by the Township broken down by fuel type for 2023, with natural gas use (59%) followed by electricity (41%).

Figure 3.2: 2023 Total Energy Consumption by Fuel Source



The energy consumption is broken down by department in Figure 3.3. Parks and Recreation leads with 66% of the energy consumed in 2023 primarily at the new West Lincoln Community Centre.

Figure 3.3: 2023 Total Energy Consumption by Department

Electricity Breakdown:

The following section breaks down electricity consumption at the Township. Figure 3.4 illustrate electricity use by facility in 2023, and the graph on the right illustrates historical consumption from 2014 to 2023.

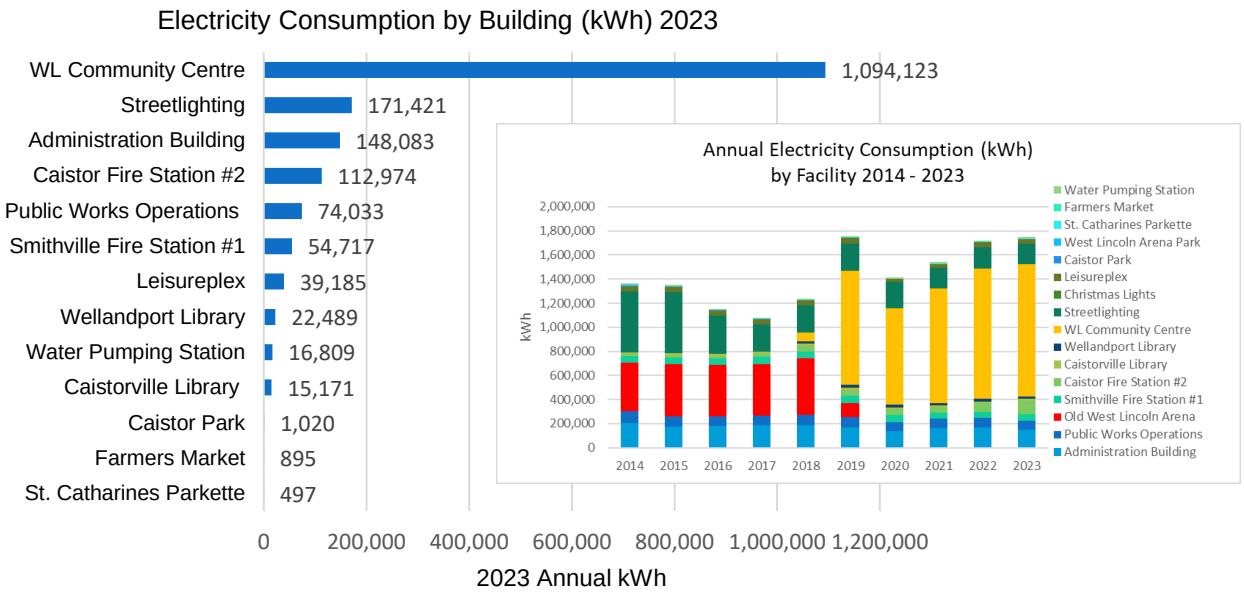


Figure 3.4 Electricity Consumption by Facility

The West Lincoln Community Center is the largest electricity consumer, responsible for over 60% of the total Township electricity consumption, followed by Streetlighting and the Administration building. Electricity use by department is shown below in Figure 3.5.

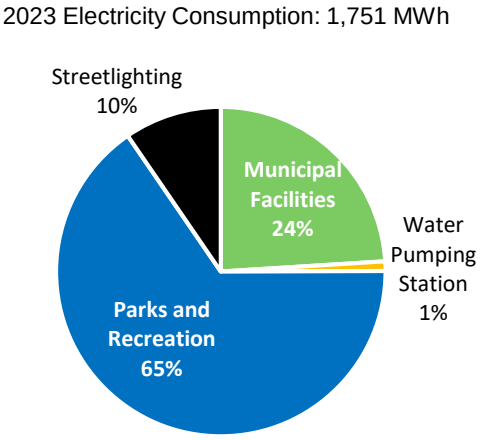


Figure 3.5: 2023 Electrical Consumption by Department

The Parks and Recreation department is the largest consumer of electricity followed by the municipal facilities (24%), and streetlighting (10%).

Natural Gas Breakdown:

Figure 3.5 below shows the natural gas consumption in order of greatest use, for 2023. The graph on the right trends this consumption by facility annually from 2014 to 2023.

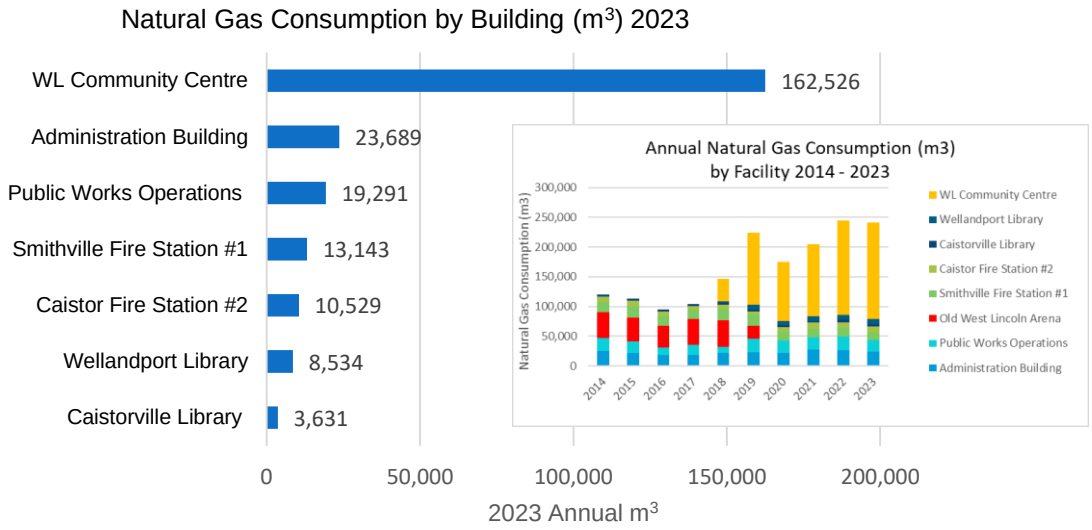


Figure 3.6 Natural Gas Use by Facility

The West Lincoln Community Center is also the largest natural gas consumer, responsible for over 67%, followed by the Administration building and the Public Works Operation. Natural Gas use broken down by department is shown below in Figure 3.7.

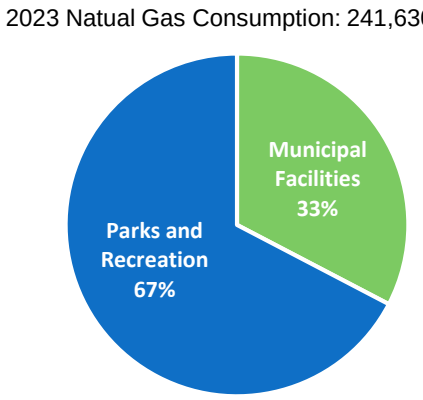


Figure 3.7 2023 Natural Gas Use by Department

The Parks and Recreation department is the largest consumer of natural gas (67%) followed by the municipal facilities (33%).

Carbon Emissions

The carbon footprint related to energy consumption by the Township is broken down below. The rate of greenhouse gas production varies by energy source and is directly affected by the emissions conversion factors and the Township consumption. Emission conversion factors used in this report were published values for Ontario and can vary year to year based on the how clean is the energy generation. The GHG emissions were calculated for the Township and are broken down by fuel source in Figure 3.8 below.

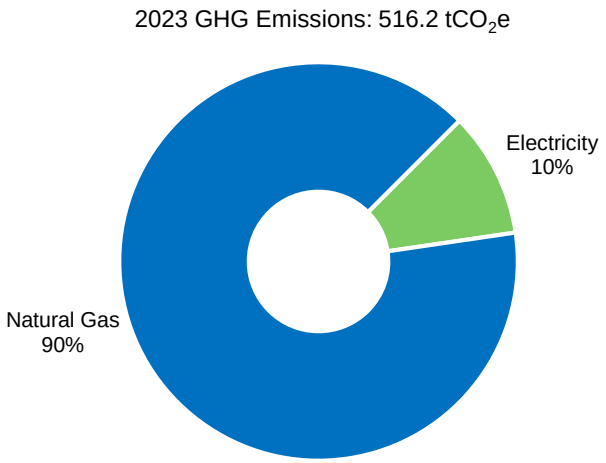


Figure 3.8 Total 2023 GHG Emissions by Fuel Source

In order to ensure that carbon emissions are reduced, the energy conservation plan will in part focus on measures to reduce natural gas use (heating system efficiency improvements) as it is responsible for 90% of the Township's emissions.

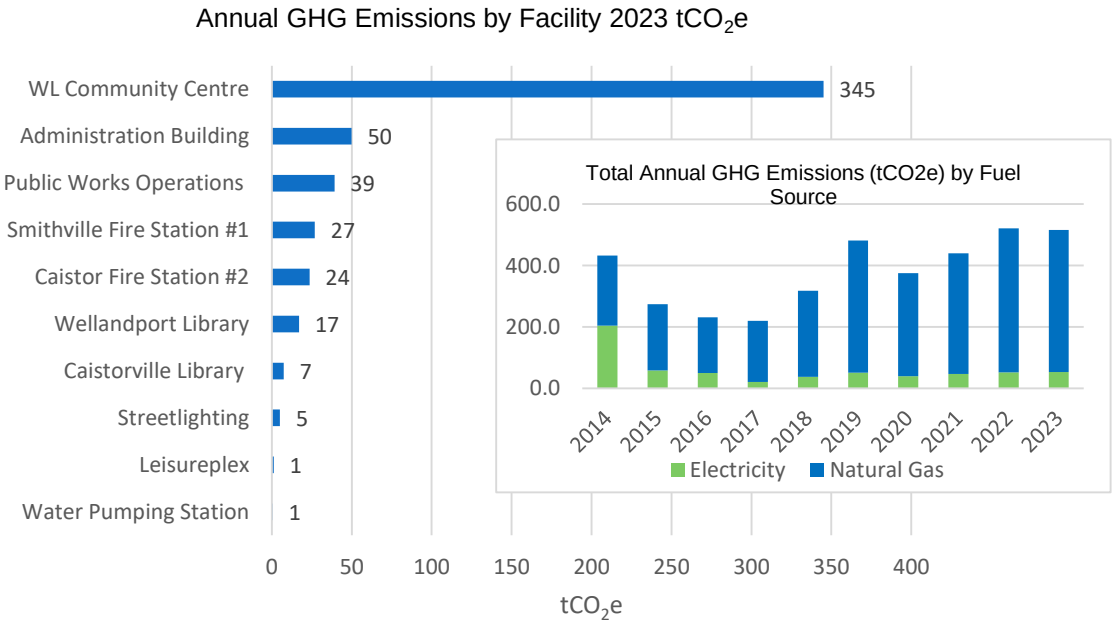


Figure 3.9 Total Annual GHG Emissions from 2014 to 2023 by Fuel Source

Figure 3.9 above shows the relative GHG emissions generated from energy consumption by facility for 2023, and the graph on the right illustrates total amount of GHG emissions annually from 2011 to 2023 by fuel type.

Please note that emissions conversion factors have changed significantly for electricity production in Ontario. Specifically in 2014 electricity became significantly cleaner when the last of the coal fired electricity generation plants were shut down which can be seen in Figure 3.9 above.

Emissions have risen approximately 19% since 2014 and 7% from 2019 primarily due to additional services provided by the new community center as discussed previously.

4.0 Energy Conservation Vision, Goals and Targets

Vision

The Township's 5-year Corporate Energy Conservation & Demand Management Plan lays our path to achieve our vision and continuing commitment to energy conservation. Our vision is simple:

Promote: energy conservation to staff and the community

Consider: energy conservation with all Township purchases

Incorporate: energy conservation initiatives through all Township departments

Objectives and Goals

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The Township will continue to support the objectives laid out in the previous 2019 Energy Conservation and Demand Management Plan including:

- Reduce energy consumption and GHG emissions across Township facilities
- Promote energy conservation for users of the facilities
- Increase the visibility of energy consumption data through monitoring and review
- Explore alternative and renewable energy opportunities
- Secure funding to implement energy efficiency savings

In addition, the Township will add the following objectives:

- Complete energy audits at each of our facilities to identify energy conservation opportunities
- Incorporate life cycle costing into capital equipment purchasing

Targets

Our energy reduction target is to reduce our consumption of fuels and electricity in all Township operations by 2% (128 eMWh) by 2029 measured against the total 2023 annual energy consumption of 4,244 eMWh.

5.0 Our Conservation Strategy

In order to achieve the vision, mandate and targets set out in Section 4.0 of this report, West Lincoln will focus on the following key conservation strategies.

Focus Area: Energy Management Leadership

To ensure that our energy management vision is realized, staff and council will be asked to incorporate energy management into all areas of activity including our procurement practices, financial management and investment decisions, and facility operations and maintenance.

This will be accomplished by:

1. Ensuring the necessary resources are allocated to enable the actions outlined in the Plan to be undertaken
2. Holding all staff accountable and responsible for managing energy through corporate targets
3. Ensuring that staff, council and residents are updated yearly on progress as measured against the targets and performance indicators included in this Plan.

Over the last decade, facility staff have provided the leadership required to achieve energy conservation savings across the built environment. The Township's Green Team, described below, will be responsible for delivering this plan's objectives and goals as well as maintaining the Township's focus on energy management in the years to come. The team members and responsibilities are as follows:

Green Leader – The lead will have the overall responsibility for corporate energy management planning. The leader ensures compliance regulations are met, the plan is executed as planned and works closely with council to make required changes.

Green Team – This will be comprised of staff members from various departments who are responsible for energy performance and can provide essential input to the energy management process. The green 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 and managing energy issues as required. The Green Team will have direct knowledge of the Township's major energy-using facilities and assets and are responsible for developing and maintaining the focus on energy conservation.

Finance – The role of Finance is to provide clear guidance and support to the energy conservation team on internal and external funding mechanisms and to include the team in relevant decision-making and budget discussions. Finance will also be responsible for providing the energy consumption data to the facilities staff and Council for review.

In addition to planning and executing energy conservation strategies, the team will be responsible for staff **energy training**. This training will include a communication strategy to educate all employees in conservation and efficiency opportunities associated with specific job functions. This will allow staff to understand energy consumption principles

and help foster a commitment to managing energy consumption as activities across all departments and buildings impact the GHGs emissions that the Township emits.

Focus Area: Capital Planning – Energy Efficiency Policies and Guidelines

The Township will consider developing a purchasing policy to ensure energy efficient standards are used in major capital purchases. The policy could include energy guidelines and standards as well as list of approved specific technologies best suited for application at the Township. The Township will focus first on the following topics and continue to build the policy through time:

- Heating systems - boilers, furnaces, packaged rooftop units, space heaters, heat pumps
- Air Handling – exhaust fans, energy or heat recovery ventilators (ERVs, HRVs)
- Cooling systems – air source heat pumps, refrigeration and cooling systems

Other focus areas which may be covered in the future include lighting, domestic hot water and building controls.

Focus Area: Efficiency Improvement Projects

Through the capital replacement process, the Township will improve the energy efficiency of building systems and deliver energy savings. In addition, energy conservation opportunities (process, program and project improvements) identified through energy audits or building reviews will be implemented. The opportunities will fall into the following categories:

- Heating systems - boilers, packaged rooftop units,
- Refrigeration and cooling systems – space cooling, refrigerators, freezer chests
- Air Handling
- Building and Process Controls
- Building Envelope
- Lighting
- Domestic Hot Water

Focus Area: Measurement, Monitoring and Tracking

The Township will aim to continue to improve energy measurement, monitoring and tracking systems to increase understanding and visibility of energy use across the portfolio. The objective will be to improve the data availability such that staff can access and use the information to track consumption, monitor progress from projects, and to identify opportunities.

6.0 Our Energy Conservation Action Plan

A critical part of any plan is the detailed list of specific actions needed to achieve the desired goals and objectives. Using the strategies outlined in Section 5.0, the Township of West Lincoln has developed a key project list to improve energy use and ensure the Township meets our energy reduction goals.

The list of projects and programs included in the conservation plan are shown on Table 6.1 below.

Table 6.1: West Lincoln ECDM Action Plan 2024 – 2029

Project Type	Measure	Description	Project Annual Savings
Monitoring and Tracking	Energy Consumption Tracking	Create a plan to effectively record and report energy data	Indirect Savings
	Capacity Building	Build relationships with representatives from NPEI and Enbridge	Indirect Savings
	Capacity Building	Create a long-term training program that will help improve the energy consumption behavior of staff	Indirect Savings
Administration	Policy Update	Develop a procurement policy that reflects energy conservation guidelines / savings opportunities and lifecycle costs for all large capital purchases	Indirect Savings
	Research	Research grant opportunities to purchase energy-efficient equipment	Indirect Savings
Project Identification	Energy Audit	Energy audits on Township facilities including the Community Centre	Will depend on final design
Building Envelope	Audit Results	Implement Energy Audit Recommendations	Dependent on Energy Audits
	Windows	Install new windows in Township Administration Building	Modest
		Old Smithville Fire hall (attached to Admin Building) window and overhead door replacement	Modest
Building Lighting	Controls	Install Occupancy sensors in the washroom, meeting rooms and offices in the Township Administration Building.	Potential reduction of 50% of kWh used
HVAC Systems	Controls	Program HVAC thermostats for Township facilities	3-4% savings for every Celsius setback
	Controls	Change large bay door control such that only one opens not multiple in Fire Station #1	TBD
Miscellaneous	Plug Load	Install vending machine misers and unscrew lighting on machines	$50
	DHW	Consider reducing the size of hot water tanks and switching from natural gas to electric wherever possible.	75% of annual kWh used currently
Building/Facilities	Fuel Switching Projects	Install electric, air source heat pumps when natural gas HVAC assets are due for replacement	
	Station #2	Removal of former Fire Station #2	Modest
	Public Works Yard	Initiate feasibility study for future replacement of Public Works Facility	Modest
Renewable Energy	Fuel Switching	Develop renewable energy implementation business case	Modest
Fleet and Facilities	Green Fleet Study/	Develop green fleet business case	Modest

Project Type	Measure	Description	Project Annual Savings
	EV Charging Station	EV Charger Implementation Review	Modest

7.0 Conclusion

The implementation of an effective energy management plan is the key to ensuring that energy is used in an efficient, effective and sustainable manner. An effective energy conservation strategy will continuously monitor, control and reduce our energy consumption and the related carbon emissions.

Our plan encompasses a range of strategies including, but not limited to, strengthening our energy conservation leadership, delivery of energy-efficient upgrades, the implementation of renewable energy sources, and the promotion of conservation practices among our staff. We are committed to regularly monitoring and evaluating the effectiveness of these measures and adjusting our approach as needed to achieve our energy-saving goals.

This plan builds on previous conservation work and planning by the Township staff and involves all facilities. It has been designed to deliver cost-effective programs, by identifying and addressing energy waste and by utilizing new efficient technologies. The Township of West Lincoln is committed to continuously improving our energy footprint to responsibly manage energy cost, reduce GHG emissions, and to be a responsible member of the community.