Haldimand County

Energy Conservation and Demand Management Plan 2024-2028

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1. Executive Summary

The intention of this Energy Management Plan is to specify and guide action on energy consumption reduction and to bring more focus on energy management across all Haldimand County departments. In addition, by setting clear goals and objectives, stakeholders will have targets to achieve and means to measure progress. Over time, the objective is a change in culture to integrate energy and carbon emissions management into the daily activities and decisions of the County.

Ontario Regulation 25/23: Broader Public Sector; Energy Reporting and Conservation and Demand Management Plans, under the Electricity Act, 1998, S.O. 1998, c.15, Sched. A, requires municipalities to develop and publish an Energy Conservation and Demand Management (ECDM) Plan every five years. This plan starts in 2024 and ends in 2028 and meets the requirements of O. Reg 25/23.

The plan outlines the direction and focus related to managing County energy and water consumption as well as greenhouse gas (GHG) emissions. It details the County's initiatives and activities across its operations, including but not limited to facilities, water and wastewater treatment plants and pumping stations; County owned lighting (e.g. parking lots, sports facilities, etc.); vehicles; and equipment.

2. Vision Statement

To unite Haldimand County's local government and stakeholders in a collaborative effort to optimize energy use, reduce demand, and advance conservation initiatives, ensuring a sustainable, resilient and prosperous energy future for Haldimand County's residents, visitors and neighbouring communities.

3. About Haldimand County

3.1 Community Profile

Haldimand County is located on the Niagara Peninsula in Southern Ontario. The County is within the Golden Horseshoe and features a primarily rural landscape with six main settlement areas covering 1,250 square kilometres, with 83 kilometres of shoreline along Lake Erie.

Haldimand County was established as part of the Niagara District in 1798 and opened for general settlement in 1832. In 1974 the County was amalgamated with Norfolk County to become the Regional Municipality of Haldimand-Norfolk.

In 2001, the regional municipality was abolished, and the local municipalities of Dunnville, Haldimand and part of Nanticoke were amalgamated into a single-tier authority. Although legally a city, it calls itself after its historic name Haldimand County.

Agriculture has long been the predominant land use in the County, and Haldimand County will continue to encourage the growth of a strong agricultural community. The County recognizes the opportunities of commercial and industrial expansion with the attraction of its unique location, resources, and rich natural environment.

There are twenty-five designated hamlets within Haldimand County that are developed as the residential, social, and commercial centres serving the surrounding agricultural community. Much of the growth in Haldimand County is distributed to the six fully serviced urban areas of Caledonia, Cayuga, Dunnville, Hagersville, Jarvis and Townsend.

Table 1 – Haldimand County Population and Land Characteristics

Census Characteristic	Haldimand County	Ontario
Population 2021	49,216	14,223,942
Population Change 2016-2021	7.9%	5.8%
Total Private Dwellings	20,710	5,929,250
Population Density	39.4/km^2	15.9/km^2
Land Area	1252 km^2	892,411.76 km^2

3.2 Haldimand County Climate Profile

Haldimand County is a rural city-status single-tier municipality on the Niagara Peninsula in southern Ontario. The County is expected to experience notable effects of climate change which include higher average annual temperatures, an increase in total annual precipitation, and an increase in the frequency and severity of extreme events. According to Climatedata.ca – a collaboration supported by Environment and Climate Change Canada (ECCC) – Haldimand County may experience the following trends:

1. Higher Average Annual Temperature

- Between the years 1981 and 2010 the annual average temperature was 8.7°C
- Under a high emissions scenario, the annual average temperatures are projected to increase to 10.6°C by the year 2050 and to 14°C by the end of the century

2. Increase in Total Annual Precipitation

- Under a high emissions scenario, Haldimand County is projected to experience a 7% increase in precipitation by the year 2050 and a 14% increase by the end of the century

3. Increase in Frequency of Extreme Weather Events

- It is expected that the frequency and severity of extreme weather events will increase over time

3.3 Integrating Climate Change in Asset Management

Asset management practices aim to deliver sustainable service without compromising the services and well-being of future residents. Climate change threatens sustainable service delivery by reducing the useful life of an asset and increasing the risk of asset failure. Desired levels of service can be more difficult to achieve because of climate change impacts such as flooding, high heat, drought, and more frequent and intense storms.

To achieve the sustainable delivery of services, climate change considerations should be incorporated into both asset and energy management practices. The integration of asset management and climate change adaptation observes industry best practices and enables the development of a holistic approach to risk management.

The County is in the preliminary stages of preparing a Climate Change Adaptation Plan. Adaptation to climate change can include any activity that reduces the negative impacts of climate change. This plan will investigate climate change impacts at a general level and devise strategies for addressing those impacts. It is anticipated that the County will work closely with residents and local businesses and take their local knowledge to develop a tailored adaptation plan to help increase the community's capacity to prepare for climate change.

3.4 Organizational Alignment

Organizations that are the most successful in reaching energy conservation goals all have one thing in common. They not only have a dedicated energy team focused on energy management but also have commitment from senior management and other departments to support the efforts of the team.

Part of this commitment is to make energy, water and carbon emissions reductions an integral part of the corporate organizational structure and culture.

It is understood that this commitment will take time, but a culture of managing energy, water and carbon emissions to reduce unnecessary consumption can yield many benefits, the most direct one being reduced operating costs.

This plan has been reviewed and has the support of the County's senior leadership and Council. They understand the importance of managing energy, water and GHG emissions and are committed to supporting the Energy Team and staff in achieving the goals and objectives of the plan.

3.5 Energy Consumption, Cost, Emissions

The plan uses fiscal year 2023 as the base year for the following five years from 2024-2028. Tables 2 and 3 summarize the total energy consumption, cost and emissions for the base year.

Table 2 – Total Energy Consumption, Cost and GHG Emissions

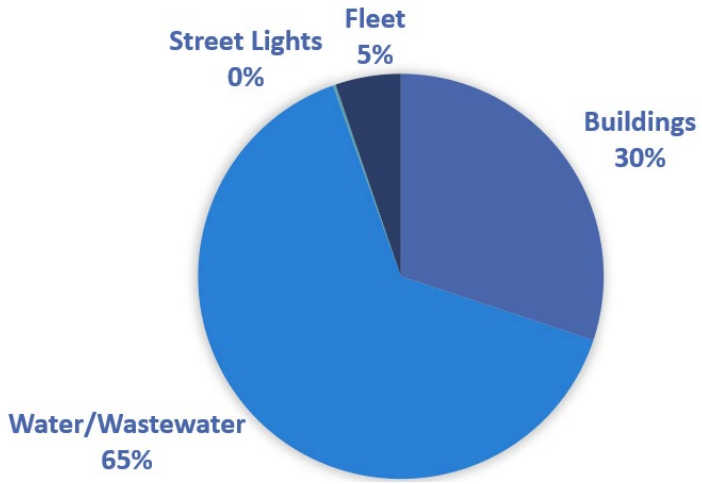
2023	Total Energy Consumption (ekWh)	Total Cost ($)	Total Emissions (tCO2e)
Buildings	10,955,314		1,586
Water/Wastewater	23,536,026		2,005
Street Lights	81,508		7
Total	**34,572,848**	**$4,964,836**	**3,598**

Note: Buildings included are listed in Appendix A

Table 3 - Fuel Consumption

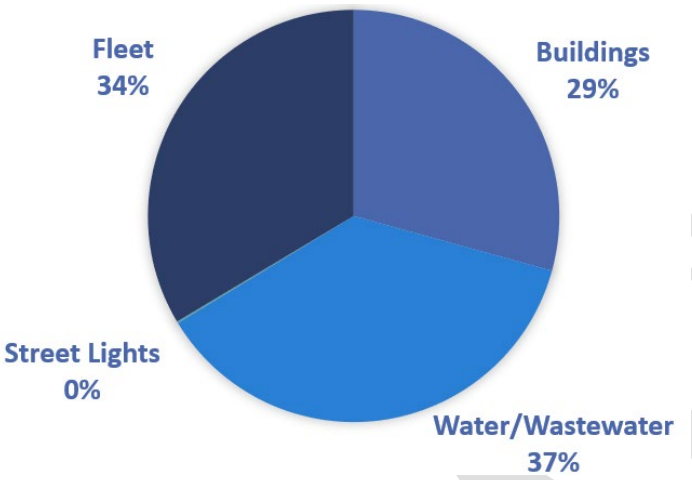
2023	Fuel Consumption (l)	Total Cost ($)	Total Emissions (tCO2e)
Fleet			
Gasoline	409,445	$861,074	945
Diesel	325,681	$469,101	873
Total	**735,126**	**$1,330,175**	**1,818**

Figure 1 – 2023 Total Energy Consumption by Category



Note: Street Lights are 0.2% of total energy consumption

Figure 2 – 2023 Total GHG Emissions by Category



Note: Street Lights are 0.1% of total GHG emissions

A detailed list of each facility's consumption, energy intensity and emissions for 2023 is in Appendix A.

4. Report on Previous Activities

Activities	Facility	Cost ($)	Annual Cost Savings ($)	Annual Estimated Energy Savings (ekWh)	Year completed
Facility Lighting Retrofits	HCCC Interior	$188,650			2019
	HCCC Parking Lot	$130,000			2019
	Dunnville Arena	$109,120	$9,280	43,380	2020
	Dunnville Multi-Purpose Building	$54,615			2020
	Cayuga Arena		$15,755	61,767	2020
	Jarvis Outdoor Courts	$85,000	$4,138	5,107	2022
HVAC Replacements	Canboro Community Centre	$19,500			2018
	Cayuga Seniors Centre	$18,600			2019
	Dunnville Multi-Purpose Building	$88,225			2020
	Dunnville Library	$71,537			2020
	Caledonia Library	$77,760			2021
	Cayuga Kinsmen Community Centre	$19,575			2021
	Jarvis Community Centre	$43,115			2021
	Canfield Community Hall	$35,900			2023
Building Envelope Retrofits	Jarvis Community Centre Energy Efficient Transfer Transformer Replacement	$10,000			2019

	York Community Centre Windows & Exterior Doors	$22,395	2020
	Jarvis Community Centre Attic Insulation & Exterior Door	$86,950	2022
Street Lighting Retrofits	LED Street Light Conversion (County wide)	$1,977,163	2018

Table 4 – Activities for 2018-2022

Table 4 summarizes the activities taken by the County from 2018 to 2022 to reduce energy consumption.

5. Goals & Objectives

Haldimand County has established the following energy and GHG emission targets in this plan. Note that 2023 serves as the base year for comparison with 2028, and the targets are set for a five year term.

- 10% overall County reduction in energy intensity consumption (ekWh/m2) from 2023 to 2028
- 10% overall reduction in County carbon emissions from 2023 to 2028

In addition, the County has set the following overall objectives for the next five years as listed below and described further in the plan:

- Creation of an Energy Team
- Improve facility energy monitoring and documentation methods
- Optimize facility equipment and operations
- Review new build green energy certification and design standards
- Explore an electric vehicle (EV) pilot program
- Communication and training improvements

5.1 Energy Team

An Energy Team will be created with key division members that will work together to drive the goals and objectives. The Energy Team intends to become a corporate resource as experts in energy management for the County. It will provide technical support and guidance on energy efficiency matters and will help facilitate better energy management understanding and practices across the corporation. The focus of the Energy Team will be to:

- Demonstrate leadership in energy and GHG management
- Meet and discuss opportunities for the County to save energy
- Share milestones and updates
- Sharing updates with their divisions
- Explore policies and standards that will encourage occupants towards energy-saving practices

The Energy Team will include a cross-section of members from the following divisions within the County:

- Facilities Capital & Asset Management
- Finance
- Facilities, Parks, Cemeteries & Forestry
- Roads Operations
- Environmental Operations
- Libraries
- Community Development & Partnerships (Museums)
- Emergency Services
- Grandview Lodge
- Planning & Development (GIS)
- Engineering Services
- Fleet Operations
- Innovations & Technology Services

The Energy Team will be structured as follows:

Steering Committee

Managers and Senior Management representatives who meet semi-annually and set higher level direction related to the plan and ongoing implementation for the entire organization.

Working Groups (Energy Team)

Managers, supervisors and Technologist meet more frequently, and this group would be the first point of contacts and work through energy projects – identifying and implementing various options for saving energy, leading awareness programs and monitoring energy consumptions.

5.2 Energy and Carbon Emissions Reduction Potential

Most buildings do not operate at optimal levels. Through benchmarking analysis, buildings can be ranked to determine which facilities are the most energy efficient and those that have the potential to improve. The benchmarking methodology groups Haldimand County facilities by type and ranks the total energy, electricity and natural gas intensities (ekWh/m2) for each facility. These intensity values are

then compared with similar facilities from six neighbouring municipalities*. Using data from nearby municipalities provides a more extensive dataset for comparisons and minimizes the effects of weather fluctuations on consumption patterns.

To determine the energy and GHG emissions reduction potential, the neighbouring municipal facilities are ranked by type and benchmarks are determined from the top 25% (quartile) electricity and natural gas intensities for each facility type. Using the top quartile intensity values as indicators of good operations, the reduction potential for each County facility can be calculated using these benchmarks as the target intensity values. Table 5 summarizes the potential of those facilities that were below the top quartile in electricity or natural gas intensity. The totals provide a benchmark of available portfolio reduction potential and guides the setting of targets.

Benchmarking energy performance through energy intensity metrics provides a reference point for setting a priority list of those facilities that can be further investigated for immediate action if they rank as poor performers in their facility type group.

Table 5 – Facility Energy Intensity, Energy and GHG Emissions Reduction Potential

Notes for Tables 5-7:

* neighbouring municipalities: City of Burlington, City of Cambridge, City of Guelph, City of Hamilton, City of London, and the Town of Oakville using 2019 Ontario Ministry of Energy BPS data which is the most recent, representative (non-pandemic) data set available. Haldimand County data is from 2023.

Not all facilities are included in the benchmarks as there was not a sufficient number of similar facilities across the other municipalities to provide meaningful comparisons.

Facility Name	Energy Intensity (ekWh/m2)	Modeled Energy Intensity (ekWh/m2)	Modeled Energy Savings (%)	Modeled Energy Savings Potential ($/yr)	GHG Emissions Reduction Potential (tCO2e)
Hagersville Water and Wastewater Shop	304.08	84.2	72	$3,133	2
Dunnville Multi Purpose Facility	700.07	270.1	61	$17,757	32
Caledonia Ambulance Station	543.45	259.0	52	$2,583	11
Dunnville Library	196.49	102.2	48	$3,641	16
Walpole Roads Yard	337.17	203.2	40	$3,168	14
Jarvis Library	277.12	181.1	35	$2,648	12

Kohler Administration/Garage	349.49	238.1	32	$6,926	18
Caledonia Storage	274.15	201.1	27	$273	1
Hagersville Arena	383.00	285.1	26	$32,192	28
Oneida Roads Yard	273.71	204.8	25	$2,242	10
Selkirk Wilson MacDonald Museum	239.49	184.8	23	$441	2
Caledonia Arena	348.86	285.1	18	$72,526	76
Dunnville Arena	268.17	222.8	17	$38,244	21
Dunnville Roads Yard	241.63	219.9	9	$2,420	1
Cayuga Arena	266.34	259.8	2	$5,023	3
Total				**$193,217**	**245**

Table 6 – Water and Wastewater Treatment Intensity, Energy and GHG Emissions Reduction Potential

Facility Name	Water Energy Intensity (ekwh/m3)	Modeled Water Energy Intensity (ekWh/m3)	Modeled % Water Energy Savings (%)	Modeled Energy Savings Potential ($/yr)	GHG Emissions Reduction Potential (tCO2e)
Cayuga WWTP	1.53	0.407	73	$62,403	32
Hagersville WWTP	1.30	0.407	69	$159,804	87
Caledonia WWTP	1.23	0.407	67	$212,549	115
Dunnville WWTP	0.75	0.407	46	$114,314	62
Nanticoke WTP	0.61	0.372	39	$976,512	518
Dunnville WTP	0.57	0.372	35	$31,290	16
Total				**$1,556,872**	**830**

Table 7 - Summary of Total Reduction Potential of Tables 5, 6

Total Energy Savings Potential (ekWh)	Total Energy Savings Reduction % (from 2023)	Total GHG Emissions Reduction Potential (tCO2e)	Total GHG Emissions Reduction % (from 2023)
11,796,342	38	1,075	25

5.3 Financing/Funding

Financing for energy conservation projects will continue through:

- Capital budget process
- Grant funding
- Incentives and rebates

6. Activities, Projects, Programs Planned/Proposed

The following table summarizes the activities and initiatives planned over the next five years (2024 to 2028). The first section identifies the activities that will be completed across the whole portfolio while the second section lists the specific activities to be completed at the facility level. It is recognized that the results of actions at the portfolio level will generate additional actions for specific facilities. These will be added to the plan over the next five years.

The County will track savings from activities implemented as appropriate, which will build additional support for new initiatives, demonstrating the effectiveness of tracking and managing energy usage more efficiently.

Table 8 – Activities and Initiatives Planned for 2024-2028

Activities	Facility	Cost ($)	Annual savings potential ($)	Timeframe
Across Portfolio				
Create roadmap with planned actions	All			
Select actions to be done	All applicable			
Review existing Building Automation Systems	All applicable			
Benchmark buildings by type to identify high energy users	All			
ASHRAE Level 2 energy audits on high energy users	All applicable			
Optimize operations of high energy users through Standard Operating Procedures, recommissioning, etc.	All applicable			

Develop training for facility operators/supervisors	All			
Develop Standard Operating Procedures document	All			
Facility Level				
Facility LED Lighting Retrofit	Kohler Fleet Garage Shop	$30,500	$5,895	2024
Envelope – Window replacement	Edinburgh Square Museum	$320,000		2024
Facility Lighting Retrofit	Hagersville Arena Parking Lot	$48,250	$2,511	2024
HVAC Replacement	Walpole Roads Yard	$120,000		2024
Envelope – Window Replacement	Dunnville Library	$50,500		2024
Envelope/HVAC	Hagersville Library and Active Living Centre	$15,000,000		2025
EV/Solar Ready	Caledonia Fire and EMS Station	$14,442,000		2025
Facility LED Lighting Retrofit	McKinnon & Grant Kett Park Baseball Diamond	$381,000	$22,804	2025
HVAC Replacement	Selkirk Community Center	$150,000		2027
HVAC Replacement	Jarvis Library	$60,000		2028

6.1 Operations

Optimizing ongoing operations of facilities such as tighter temperature control set points and operating schedules have a significant impact on energy costs and budgets. An initial focus on operating

performance is also one of the easiest actions that can be taken with little or no cost and generates immediate savings in almost all cases.

Standard Operating Procedures

The current Standard Operating Procedures documents will be updated to allow for better daily operational management of HVAC equipment and facility lighting across all facility types. It will describe the operating setpoints, schedules and sequences of HVAC equipment during each season. These standards will also take into account occupied and unoccupied space guidelines and metrics to help ensure the most efficient operation of equipment while maintaining comfort levels in the facilities.

Consideration will be given to developing standards and guidelines for ITS and other equipment such as HVAC, pumps, blowers, etc.

In addition, the County will:

- Assess training requirements for facilities staff
- Ensure facilities are operating optimally by monitoring and documenting energy intensities and equipment controls
- Identify high energy using facilities as those with higher than average energy intensities and assess for reduction of energy consumption and operating optimization opportunities

Occupant Behaviour

Facility users and maintenance staff can make a significant difference in energy use and a facility's carbon footprint but it is often a neglected area of focus. Through better communications and clear messaging of goals and practices and their importance, occupants can play a role in helping the County achieve its energy goals. Simple activities like communicating temperature setpoints or operating schedules for conservation can help set expectations with occupants and minimize complaints.

6.2 Capital/Retrofit Projects

Actions that will require capital investment have been listed in Table 8 above. Once operational opportunities are recognized, facilities identified through the benchmarking process will have ASHRAE Level 2 energy audits completed. Any recent building condition assessments completed for the facilities will also be reviewed and findings integrated into the actions list. This will help identify the equipment that is at or near end-of-life and appropriate to consider for replacement with high efficiency units. The audits will list actions with the cost, estimated savings and simple payback indicated. The audit process will also investigate opportunities for transitioning fossil-fuel based equipment to electric or other energy-saving equivalents, contributing to corporate emissions reduction goals.

ASHRAE Level 2 Audit – Energy Survey & Analysis

In this level of audit, a building's energy consumption is broken down by end-use, helping to identify areas with the greatest opportunity for improved efficiency. It also includes detailed energy calculations and financial analysis for the proposed energy measures.

Building Commissioning

The Save on Energy program: Existing Building Commissioning program (EBCx) identifies ways to reduce energy use and achieve a lower carbon footprint. The County will explore the program to assist with operator training on improving building management practices and implementing a continuous improvement process, ensuring that savings are sustained over time.

6.3 New Construction

New facilities have a long life span and much of a facility's lifetime energy use is determined at the beginning through construction design and HVAC equipment choices. These decisions have a long-term impact on the County's annual budgets. The higher efficiency equipment and building envelope decisions made during design can save decades worth of energy costs and carbon emissions. This can also include material selection which has the capacity to lock in embodied energy and carbon (energy and resulting carbon emissions required to extract, manufacture and deliver material) for the long-term.

Haldimand County has adopted an "Environmentally Conscious" guiding principle through Asset Management Policy 2019-03, Section 2.3.11 and will continue to investigate energy efficient and sustainable new construction options that adhere to performance levels beyond building code standards.

For new builds, the County will explore upgrading its Design Standards to include energy efficiency as a priority and:

- Investigate green building certification programs such as Canada Green Building Council's LEED certification as a minimum green building level for new construction
- Investigate standards such as ASHRAE 90.1 for energy efficiency in buildings, provide technical requirements and recommendations for new construction

6.4 EV Ready

To reduce the carbon footprint as a community, the process of converting the fleet vehicles to EV vehicles has been discussed as a future priority. The addition of EV charging stations to select facilities would become a requirement once that conversion begins. While the charging stations will be initially installed for Haldimand County fleet operational requirements, stations located at public facilities may be accessible to the public at some point in the future.

Haldimand County has taken measures to ensure it is prepared to install EV charging stations locally by installing the necessary connecting infrastructure into all County new build facilities moving forward. In the future, when the County is EV ready, this will allow it to move forward with charge station installations quickly and without added infrastructure expenditures exclusive of the actual charge station units themselves.

The following County facilities are considered “EV Ready”:

- Haldimand County Administration Building (HCAB)
- Cayuga Library & Heritage Centre
- Caledonia Fire and EMS Station
- Hagersville Library & Active Living Centre

6.5 Renewable Energy

Existing Solar Energy Facilities:

- Fisherville Lions Community Park - Solar Shade 2023

Rooftop solar panels generate power for the facility. The roof also gives the benefit of protecting the ice from the sun, offering better quality ice and the ability to extend the skating season.

The following County facilities are considered “Solar Energy Ready”:

- Caledonia Fire and EMS Station 2024

The infrastructure has been designed with conduits installed and ready for solar panel installations, avoiding future excavation and construction.

The County is not planning any additional renewable projects at this time. However, it will review opportunities to use renewable energy to offset energy costs or realize other benefits as technologies and market conditions change.

6.6 Fleet

The County currently has a total of 187 pieces of equipment/vehicles and uses 735,126 litres of fuel (gasoline, clear/dyed diesel) per year which makes up 34% of the County’s carbon footprint. The County plans to explore the development of a green plan for its fleet to set a path to lower fossil fuel consumption and GHG emissions. The County maintains 5 fuel stations, 4 located at each Roads Operations Yard and 1 at the Kohler Fleet Yard. There are currently 2 electric low-speed vehicles in the County’s fleet inventory that are used for special events and by-law operations.

The County’s fleet is comprised of the following vehicles:

- Light duty (under 4,500 kg) – 86 Vehicles
- Medium duty (4,500 kg to 12,000 kg) – 33 Vehicles
- Heavy duty (12,000 kg and over) – 68 Vehicles

As part of this plan the Energy Team will explore a pilot program to incorporate a full size electric vehicle into its fleet division. This introduction will give the operators a chance to test the vehicle’s capabilities through every day work tasks. This will also give the County a first-hand insight into the importance of

reducing fuel consumption. Staff will continue to be educated about electric vehicles and the associated long-term cost savings.

6.7 Procurement

The County will continue to participate in LAS hedging for natural gas and electricity supply.

For end-of-life equipment replacement, the County will prioritize high-efficiency options, such as ENERGY STAR equipment.

The Energy Team will also explore opportunities to include energy efficiency criteria or requirements in the capital budget rating system and through procurement and asset management processes.

6.8 Programs and Other Initiatives

Specific training will be organized for facility operators to ensure they have the latest knowledge for optimal operation and maintenance of HVAC equipment and energy management practices for their buildings.

There is significant activity across municipalities in Ontario to reduce energy and water consumption and GHG emissions. The Energy Team will be liaising and building closer relationships with other municipalities to share best operational practices and energy efficiency strategies.

In collaboration with Finance, the Energy Team will investigate incentives during the planning of capital projects, including applicable funding opportunities available through other levels of government and energy associations.

7. Systems

7.1 Tracking & Reporting

Having complete, accurate and easily accessed energy and water consumption data and costs for all facilities in the County is critical in order to optimally manage those utilities and costs.

The County will endeavour to implement automatic data collection activities to facilitate easier and more timely access to critical monthly utility consumption and cost data.

The Energy Team will meet quarterly to review energy consumption amounts, identify any irregularities to building operators for investigation and/or adjustment, discuss improvement recommendations, and make progress towards the objectives outlined in this plan.

The County is currently working with the contract operator (Veolia) to implement a real-time monitoring system at its wastewater treatment plants. This will allow the capture of performance of high-powered equipment such as blowers and pumps looking for anomalies, trends, patterns and comparisons. The goal is to identify optimization opportunities, cost savings and improvements through a collection of reliable continuous and consistent data.

The monitoring technology will be installed at the four WWTP locations in Hagersville, Dunnville, Cayuga and Caledonia.

Facility operators will receive quarterly reports on energy consumption for their facilities. Senior management and council will receive annual reports on energy consumption.

7.2 Communications

A good communications plan helps to build a culture of energy conservation within an organization and normalize activities that emphasize reducing unnecessary use of energy and water across all departments. The communications plan will inform internal stakeholders of the activities and progress of the Energy Team, building operators, contracted operators, etc. as well as help inspire staff to take action and offer suggestions themselves. It will be targeted to these key audiences: staff, management, Council members and users where appropriate.

While actions to reduce energy consumption, such as replacing lighting with higher efficiency and lower-cost LED lighting, have been implemented, the resulting energy savings data historically has not been studied nor communicated throughout the County.

Some of the communications activities will include:

Social Media Engagement – Use social media platforms to share good news stories, highlight energy projects and energy activity updates

Informational Campaigns – Launch campaigns using digital media, emails, etc. to raise awareness about the importance of energy and water conservation

Annual Updates – Provide documented energy management program and project update

Appendix A: 2023 Energy and Water Consumption, Intensity and GHG Emissions

Table 9 - Building Energy Consumption, Intensity and GHG Emissions

Facility Name	Facility Type	Address	Total Area (m2)	Total Energy (ekWh)	Electricity (kWh)	Natural Gas (ekWh)	Energy Intensity (ekWh/m2)	Electricity Intensity (kWh/m2)	Nat Gas Intensity (ekWh/m2)	Emissions (tCO2)
Dunnville Satellite Office	Administrative	111 Broad St. E.	734	0	0		0.0	0.0	0.0	0.0
Haldimand County Administration Building	Administrative	53 Thorburn St	5060	487,087	487,087		96.3	96.3	0.0	39.6
Riverside Cemetery Dunnville	Administrative	660 Main St. W.	251	11,342	11,342	82,952	375.7	45.2	330.5	16.4
Dunnville Multi Purpose Facility	Ambulance stations and associated offices and facilities	117 Forest St.	500	350,033	125,449	224,584	700.1	250.9	449.2	52.0
Caledonia Ambulance Station	Ambulance stations and associated offices and facilities	14 Kinross St.	214	116,298	16,978	99,320	543.4	79.3	464.1	19.9
Fire Communications Building	Ambulance stations and associated offices and facilities	Inman Road	10	7,775	7,775		777.5	777.5	0.0	0.6
Hagersville Farmers Market	Canopy	1 Main St. S.	284	2,436	2,436		8.6	8.6	0.0	0.2
Caledonia Cemetery Building	Cemetery storage/workshop	131 Renfrew St. E.	73	4,933	4,933		67.6	67.6	0.0	0.4

Selkirk Wilson MacDonald Museum	Cultural facilities	3513 Rainham Road	190	45,504	5,886	39,618	239.5	31.0	208.5	7.9
Caledonia Edinburgh Square Museum	Cultural facilities	80 Caithness St. East.	278	98,406	98,406		354.0	354.0	0.0	8.0
Cayuga Fire Station/EMS Station	Emergency Services	11 Thorburn St S	1469	0	0		0.0	0.0	0.0	0.0
Hagersville Fire/EMS Station	Emergency Services	124 Main St. S.	975	175,584	0	175,584	180.1	0.0	180.1	32.7
Canfield Fire Station	Emergency Services	357 Haldimand County Rd. 56	487	0	0		0.0	0.0	0.0	0.0
Dunnville Fire Station	Fire stations and associated offices and facilities	111 Tamarac Street	1928	143,344	42,435	100,909	74.3	22.0	52.3	22.2
Caledonia Fire Station	Fire stations and associated offices and facilities	18 Caithness St. W.	565	124,967	23,986	100,981	221.2	42.5	178.7	20.7
Fisherville Fire Station	Fire stations and associated offices and facilities	24 Erie Ave South	1133	101,195	10,874	90,321	89.3	9.6	79.7	17.7
Lowbanks Fire Station	Fire stations and associated offices and facilities	2633 North Shore Road	1298	81,171	36,568	44,603	62.5	28.2	34.4	11.3
South Haldimand Fire Station	Fire stations and associated offices and facilities	275 Haldimand Road 50	366	7,904	1,041	6,863	21.6	2.8	18.8	1.4
Dunnville Arena	Fire stations and associated offices and facilities	275 Ramsey Drive	5619	1,506,861	762,830	744,031	268.2	135.8	132.4	200.5
Jarvis Fire Station	Fire stations and associated offices and facilities	2985 Main St. N.	2926	114,228	26,663	87,565	39.0	9.1	29.9	18.5
Selkirk Fire Station	Fire stations and associated offices and facilities	34 Main St. W.	1605	92,509	10,475	82,034	57.6	6.5	51.1	16.1

Canborough Fire Station	Fire stations and associated offices and facilities	7 Darling St.	610	85,980	17,084	68,896	141.0	28.0	112.9	14.2
Caledonia Arena	Indoor ice rinks	100 Haddington St.	10090	3,519,979	1,669,139	1,850,840	348.9	165.4	183.4	480.2
Hagersville Arena	Indoor ice rinks	37 Sherring St. N.	2649	1,014,575	524,788	489,787	383.0	198.1	184.9	133.8
Cayuga Arena	Indoor ice rinks	55 Thorburn St. S.	5124	1,364,718	667,530	697,188	266.3	130.3	136.1	184.0
Hagersville Library	Public libraries	13 Alma St. N.	473	51,832	24,721	27,111	109.6	52.3	57.3	7.1
Cayuga Library and Heritage Centre	Public libraries	19 Talbot St W	600	0	0		0.0	0.0	0.0	0.0
Jarvis Library	Public libraries	2 Monson St.	650	180,128	51,283	128,845	277.1	78.9	198.2	28.2
Dunnville Library	Public libraries	317 Chestnut St	910	178,804	0	178,804	196.5	0.0	196.5	33.3
Hagersville Lions Pool	Public Pool	35 Alma St. S.	462	3,155	3,155	164,294	362.4	6.8	355.6	30.8
Kohler Administration/Garage	Storage facilities	1162 Kohler Road	985	344,249	104,030	240,219	349.5	105.6	243.9	53.2
Walpole Roads Yard	Storage facilities	1433 Haldimand Road 55	557	187,804	27,483	160,321	337.2	49.3	287.8	32.1
Cayuga Roads Yard	Storage facilities	20 Indian Street East	1856	108,297	48,792	59,505	58.3	26.3	32.1	15.0
Caledonia Storage	Storage facilities	53 Forfar St. E.	88	24,125	4,156	19,969	274.1	47.2	226.9	4.1
Hagersville Shop W&S	Storage facilities	54 Tuscarora St.	95	28,888	28,888		304.1	304.1	0.0	2.3
Oneida Roads Yard	Storage facilities	635 4th Line	767	209,938	39,111	170,827	273.7	51.0	222.7	35.0
Dunnville Roads Yard	Storage facilities	710 Main Street	741	179,046	78,540	100,506	241.6	106.0	135.6	25.1
Port Maitland Esplanade & Pier	Storage facilities	947 Port Maitland Road	102	2,219	2,219	115,790	1,157.0	21.8	1,135.2	21.7

Table 10 - Water and Wastewater Energy and Water Consumption, Intensity and GHG Emissions

Facility Name	Facility Type	Address	Total Floor Area (m2)	Total Energy (ekWh)	Electricity (kWh)	Natural Gas (ekWh)	Water volume (m3)	Water Energy Intensity (ekWh/m3)	Emissions (t CO2)
Parkview (Hunter) St. Pumping Station	Facilities related to the pumping of sewage	1 Hunter St.	1	34,048	34,048				2.8
Mary Street Pumping Station	Facilities related to the pumping of sewage	1 Mary Ave.	1	9,427	9,427				0.8
Nairn St. Pumping Station	Facilities related to the pumping of sewage	17 Nairn St.	1	88,790	88,790				7.2
McKeen St. Pumping Station (manhole)	Facilities related to the pumping of sewage	174 King St. E.	1	7,178	7,178		115,872	0.06	0.6
Stelco Pumping Station - delete	Facilities related to the pumping of sewage	1938 Haldimand Road 3	1	41,267	41,267				3.4
Townsend Pumping Station	Facilities related to the pumping of sewage	194 Townline Road	33	38,719	38,719				3.1
McKay St. Pumping Station	Facilities related to the pumping of sewage	20 McKay St. E.	1	1,214	1,214		170	7.14	0.1
Orkney St. Pumping Station	Facilities related to the pumping of sewage	200 Orkney St. N.	1	3,536	3,536				0.3
Kincardine Pumping Station	Facilities related to the pumping of sewage	3 Kincardine St.	1	7,402	7,402				0.6
Domtar Pumping Station	Facilities related to the pumping of sewage	320 Argyle St. N.	7	26,734	26,734				2.2
Jarvis Pumping Station	Facilities related to the pumping of sewage	35 Talbot St. E.	27	50,482	50,482				4.1
Tuscarora St. Pumping Station	Facilities related to the pumping of sewage	48 Tuscarora St.	3010	67,794	67,794		702,400	0.10	5.5
Ouse St. Pumping Station	Facilities related to the pumping of sewage	64 Ouse St. S.	1	36,150	36,150				2.9
Oswego Park Pumping Station	Facilities related to the pumping of sewage	66 Oswego Park Rd	1	8,325	8,325				0.7

Broad Street Pumping Station	Facilities related to the pumping of sewage	Broad Street West	1	3,138	3,138				0.3
John Street Pumping Station	Facilities related to the pumping of sewage	Cowan St. & John St.	1	2,764	2,764				0.2
Meritage Pumping Station	Facilities related to the pumping of sewage	Cross & Geo	1	2,762	2,762				0.2
Paisley St. Pumping Station	Facilities related to the pumping of sewage	MacCrae Drive	1	43,879	43,879				3.6
Walpole (Oak St.) Pumping Station	Facilities related to the pumping of sewage	Oak St.	1	12,461	12,461				1.0
Cayuga Booster Station Reservoir	Facilities related to the pumping of water	103 Hwy 54	382	82,158	82,158		201,074	0.41	6.7
Townsend Elevated tank	Facilities related to the pumping of water	1158 County Line	2300	19,177	19,177		202,150	0.09	1.6
Jarvis Water Depot	Facilities related to the pumping of water	1342 Haldimand Road 55	24	8,808	8,808		-		0.7
Dunnville Standpipe	Facilities related to the pumping of water	229 Park Ave. E.	7272	9,677	9,677				0.8
Caledonia Standpipe	Facilities related to the pumping of water	274 Argyle Street South	6363	19,698	19,698				1.6
Hagersville Booster	Facilities related to the pumping of water	3181 Hwy 6	146	119,572	103,875	15,697	757,116	0.16	11.4
Hagersville Standpipe	Facilities related to the pumping of water	52 Tuscarora St.	1	7,460	7,460				0.6
Dunnville Water Depot	Facilities related to the pumping of water	720 Main St. E.	145	209,912	24,338	185,574			36.5
Caledonia Reservoir (Caledonia Water Works)	Facilities related to the pumping of water	721 Hwy 6	187	336,886	315,844	21,042			29.6
McClung Chamber	Facilities related to the pumping of water	Haldimand Hwy 54 & McClung Road	1	4,382	4,382		10,800	0.41	0.4
Cayuga WWTP	Facilities related to the treatment of sewage	111 Ottawa St. S.	110	490,718	451,017	39,701	320,573	1.53	44.1

Hagersville WWTP	Facilities related to the treatment of sewage	3001 Concession 12	449	1,549,501	1,549,501		1,188,084	1.30	126.0
Caledonia WWTP	Facilities related to the treatment of sewage	320 Lanark St.	660	2,120,297	2,120,297		1,725,899	1.23	172.4
Dunnville WWTP	Facilities related to the treatment of sewage	700 Main St. E.	261	1,669,755	1,669,755		2,227,384	0.75	135.8
Nanticoke WTP	Facilities related to the treatment of water	33 Haldimand Road 55	110	15,488,490	14,942,387	546,103	25,245,107	0.61	1316.5
Dunnville WTP	Facilities related to the treatment of water	112 Main St. E.	973	545,985	516,140	29,845	960,215	0.57	47.5
Greens Road Chamber	Facilities related to the treatment of water	390 Argyle St. N.	1	7,790	7,790				0.6
Port Maitland Pump House	Facilities related to the treatment of water	597 Sandy Bay Road	117	359,690	327,481	32,209	1,148,758	0.31	32.6

Table 11 – Other Facilities: Energy Consumption, Intensity and GHG Emissions

Facility Name	Facility Type	Address	Total Area (m2)	Total Energy (ekWh)	Electricity (kWh)	Natural Gas (ekWh)	Energy Intensity (ekWh/ m2)	Electricity Intensity (kWh/m2)	Nat Gas Intensity (ekWh/m2)	Emissions (tCO2)
Bob Baigent Memorial Park	**Public Park Facility**	**19 Ouse St. S.**	**13**	**1,301**	**1,301**		**100.7**	**100.7**		**0.3**
Kinsmen Ball Park	**Public Park Facility**	**Munsee St. S.**	**11**	**1,404**	**1,404**		**126.9**	**126.9**		**0.4**
Dunnville Central Park	**Public Park Facility**	**200 Cedar St.**	**67**	**8,915**	**8,915**		**132.9**	**132.9**		**2.4**
Dunnville Lions Park	**Public Park Facility**	**640 Locke St. W.**	**625**	**131,897**	**23,939**	**107,958**	**210.9**	**38.3**	**172.6**	**15.2**
Centennial Park	**Public Park Facility**	**Hwy 3 & Robinson Road**	**66**	**1,103**	**1,103**		**16.6**	**16.6**		**0.3**
Dunnville Kinsmen Park	**Public Park Facility**	**985 John St.**	**211**	**9,617**	**9,617**		**45.5**	**45.5**		**2.6**
Ramsey Walkway (Park)	**Public Walking Trail**	**40 Forfar St. W.**	**65**	**7,026**	**7,026**		**108.0**	**108.0**		**1.9**
Grandview Lodge	**Residential Care Facility**	**657 Lock St. W.**	**8,360**	**4,707,497**	**1,651,281**	**3,056,216**	**563.1**	**197.5**	**365.6**	**690.1**

Appendix B: Emissions and Conversion Factors, Utility Costs

GHG Emissions Factors

Electricity 2023: 81.3 gCO2/kWh

Natural gas: 1,921 gCO2/m3

Gasoline 2023: 2,307 gCO2e/l

Diesel 2023: 2,681 gCO2e/l

from Government of Canada Environment and Climate Change Canada Data Catalogue, December 7, 2023 and Emissions Factors and Reference Values, June 2023

Conversions

Natural gas: 1 m3 = 10.32 kWh

Gasoline: 1 litre = 8.9 kWh