



Energy Conservation & Demand Management Plan 2024-2029

Town of Grand Valley



A message from the Mayor

For the 2022-2026 term of office, Council passed a list of four strategic priorities for activities during this term:

1. Community Building
2. Municipal Land Use
3. Equipping our Municipality for the Future
4. Maintaining the Town's Core Infrastructure

As work continues on these priorities, this Energy Conservation and Demand Management Plan will be included in our decisions and planning efforts to build our community, enhance how we use our land, help us prepare for the future and guide us in maintaining our core infrastructure.

I am proud of the progress we have made so far and look forward to continuing our efforts to look after our community.

Steve Soloman
Mayor

August 13, 2024



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1.0 Introduction

Background

Municipal Energy Management depends on the successful integration of energy-efficient practices into the “business as usual” conduct of the organization. It includes the regular assessment of energy use performance and requires the implementation of measures that reduce energy waste and increase efficiency.

Ontario Regulation 525/23 (Broader Public Sector: Energy Reporting and Conservation and Demand Management Plans) requires broader public sector organizations, including municipalities, to develop a CDM plan and update it every five years.

In 2014, the Town of Grand Valley (the Town) adopted its first Conservation and Demand Management (CDM) Plan. This report presents the updated CDM Plan for the Town which covers the period from 2024 to 2029. The plan will provide guidance to assist the Town to achieve reductions in overall energy use and GHG emissions across its existing operations, and to consider energy efficiencies in future capital projects.

This plan builds on previous CDM plans and includes the following key elements:

- Grand Valley’s conservation successes.
- Corporate goals, objectives and strategic priorities for managing energy use.
- The energy baseline, recent energy performance and GHG emissions.
- A specific, actionable and prioritized inventory of energy conservation and demand management measures planned over the next five years supporting the 2029 conservation goals.
- A commitment from the Town’s senior management

This plan has been developed to formalize and consolidate the Town’s energy management efforts and will be revisited and updated every five years, as required under the regulation.

Energy management is important to the Town of Grand Valley because it results in reduced costs through better equipment maintenance, high efficiency design and operation, and cost-effective planning. Responsible energy management promotes green development and sets a good example for the community.

Overview of Town Facilities

The Regulation states that energy use and greenhouse gas emissions must be reported for buildings or facilities the Town owns or leases that:

“(a) are 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) are 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. 525/23 s. 6)

The Town of Grand Valley has nine (9) primary facilities that are required under O.Reg. 525/23 to report energy use annually and have a robust energy conservation plan. In addition, there are seven (7) other facilities that are not covered by the regulation but are included in this plan (pumping stations, splash pads, the pavilion, and an EV charging station) along with four (4) street lighting accounts. For the purpose of this report, the four streetlighting accounts will be combined into one set of data for comparison with other facility loads. Details regarding the characteristics of the facilities are described below in Table 1.1.

Table 1.1: Town Facilities and Infrastructure within Boundaries of this Plan

Name	Address	Use	Area (ft ²)
PRIMARY FACILITIES			
Community Centre	90 Main St. N.	Community Centre and Arena	18,350
Library	5 Amaranth St. E.	Library	2,504
Medical Centre	21 Main St. N	Medical Centre	4,820
Municipal Office	5 Main St. N	Administrative Office	2,030
Fire Station	2 Industrial	Fire Station	6,744
Rural Shop	322366 Concession Rd. 7	Equipment & Vehicle Maintenance	3,173
Water Tower	173353 County Rd.15, L31 C3	Water Distribution	144
Sewage Plant	14 Industrial Drive	Wastewater Treatment	5,145
Urban Shop	56 Main St. N	Equipment & Vehicle Maintenance	3,860
OTHER FACILITIES			
Melody Lane Pumphouse	1A Melody Lane	Water Distribution	N/A
Pumping Station (Amaranth)	133 Amaranth St. E.	Wastewater Distribution	N/A
Pumping Station (Emma)	130 Emma St.	Wastewater Distribution	N/A
River Street Pumphouse	11 River St.	Water Distribution	N/A
Pavilion	34 Water St.	Other Services	N/A
Splash Pad	63 River St.	Other Services	N/A
EV Charging Station	15 West Back Lane	Other Services	N/A
STREETLIGHTS			
Monticello/Deaken	401179 County Rd. 15	Streetlights	N/A
Mount Haven	1 Mount Haven Cres.	Streetlights	N/A
Fire Station	2 Watson Rd.	Streetlights	N/A
Urban Streetlights	5 Main St. N	Streetlights	N/A

Renewable Energy Sources

Currently, the Town has two digital road signs (speed indicators) which are powered by photovoltaic panels. No other renewable energy sources are currently installed.

2.0 Our Accomplishments

Our Successes

Over the last five years the town has delivered several projects to improve efficiency and reduce energy consumption across the facilities. The Town has participated in County Wide initiatives relating to building design and engineering standards for new home construction. Recreation Master Plan work has started, with opportunities to create sustainable, energy-efficient recreation to be part of the plan.

The following are a few of the energy saving measures completed by the Town:

- Outdoor sodium lights were upgraded to LED at the Sewage Treatment Plant
- New By-law vehicle is electric, not gas or hybrid (see Figure 2.1 below)
- Lighting upgrades (to LED) in the Public Works shops
- Purchased 5 energy efficient laptops instead of desktop computer models

As mentioned above, the new Town By-law vehicle is electric, reducing carbon emissions related to gasoline consumption. Figure 2.1 below shows the new charging station, and Figure 2.2 show one of the new LED lighting fixtures.

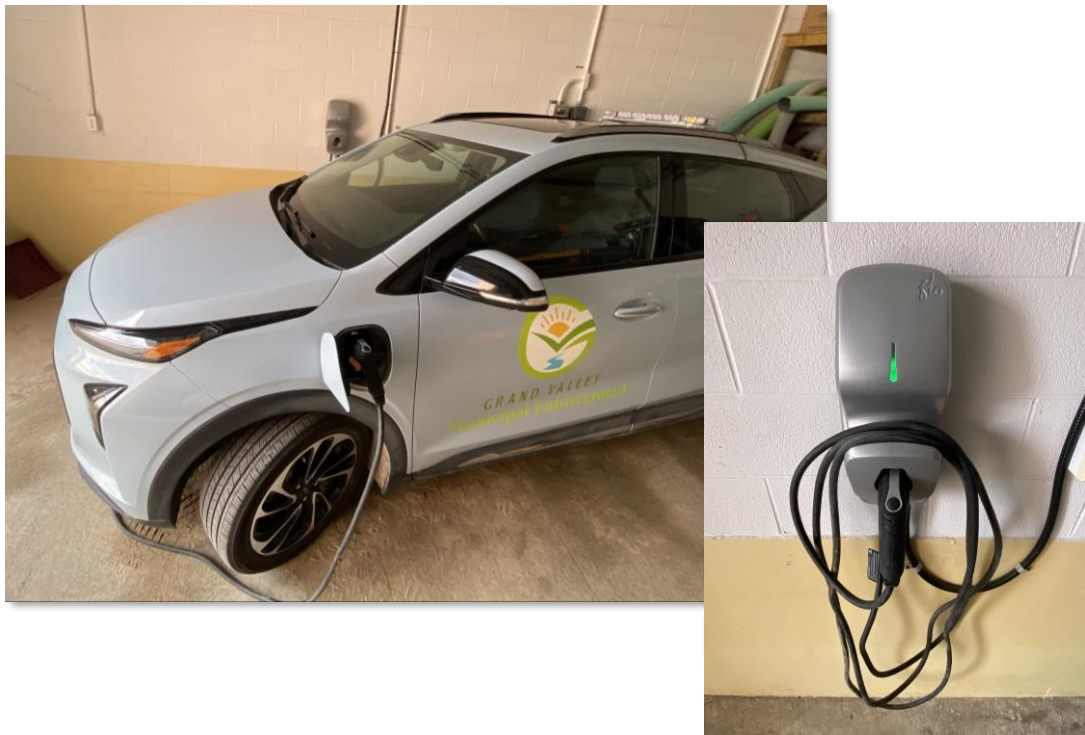


Figure 2.1 Electric Vehicle and Charging Station



Figure 2.2 New LED Lighting Fixtures

The community centre and arena have also delivered several energy efficient upgrades including:

- New exterior door on ice resurfacer room
- Changed natural gas space heaters in resurfacer room from natural gas to hydronic (electric boiler).
- Installed a new energy efficient electric boiler to heat water for ice resurfacing and some space heating.
- Installed insulation layer on bottom of ice surface, reducing cooling loads significantly (2022) and insulated the piping header.
- Replaced three (3) exterior doors with insulated doors with superior seals.
- Installed a variable frequency drive (VFD) on the ice plant brine pump

3.0 Current Energy Consumption and Carbon Emissions

Energy Baseline

In order to track progress, it is important to review past performance. Energy consumed by the Town of Grand Valley comes from several sources: electricity, natural gas and propane, from a variety of providers, including:

- Electricity from Orangeville Hydro (in the urban area) and Hydro One (in rural areas)
- Propane from local providers
- Natural Gas from Enbridge Gas

The 2022 and 2023 data were obtained from monthly invoices, and data from 2012 to 2021 was pulled from the previously submitted annual Energy Consumption and Greenhouse Gas reports. The dataset shown in Tabel 3.1 below presents the Town's baseline and current level of energy performance. A baseline year of 2012 has been selected however, for this plan, all future energy savings will be compared to 2023 values. The interim year of 2018 was selected as a reference to compare progress.

Table 3.1: Grand Valley Energy Consumption Compared to Baseline

Account Centre	Energy Type	2012	2018	2023	% Change vs 2018	% Change vs 2012
Facilities	Electricity (kWh)	1,472,203	1,343,044	1,337,110	-0.4%	-9.2%
	Natural Gas (m3)	51,235	66,353	59,484	-10.4%	16.1%
	Propane (L)	557	10,209	16,387	60.5%	N/A
	Subtotal (ekWh)	2,005,405	2,100,854	2,067,767	-1.6%	3.1%
Streetlights	kWh	117,267	84,041	111,186	32.3%	-5.2%
Total Energy	(ekWh)	2,122,672	2,184,894	2,178,952	-0.3%	2.7%
Total GHG Emissions	(tCO₂e)	336.0	186.0	182.5	-1.9%	-45.7%

Note 1: ekWh (equivalent kWh) is a calculated value using Natural Gas's and Propane's thermal content to convert consumption in volume units to "equivalent" kWh for comparison.

Table 3.1 above lists the energy consumption over various years with the facilities separated from the streetlighting consumption for clarity. Overall, the total energy consumption for the Town in 2023 has remained very close to 2012 levels (an increase of 2.7%). This is in spite of a significant decrease in electricity consumption from streetlighting in 2016 (discussed further below). The Town has achieved improvement in energy efficiency over the last decade, however progress has been obscured by addition of several new services/facilities listed below:

- Pavilion and EV Charging station in 2019
- Splash Pad addition in 2020
- 85% increase in the number of streetlights from 156 fixtures in 2012 to 288 fixtures in 2023.

A significant improvement in streetlighting efficiency is illustrated in detail in Figure 3.1 below where the savings can be seen in 2016. The overall electricity consumption, however, shows steady increases from 2016 to 2023. The continuous increase in consumption from 2016 onward is due to the increase in number of streetlight fixtures.

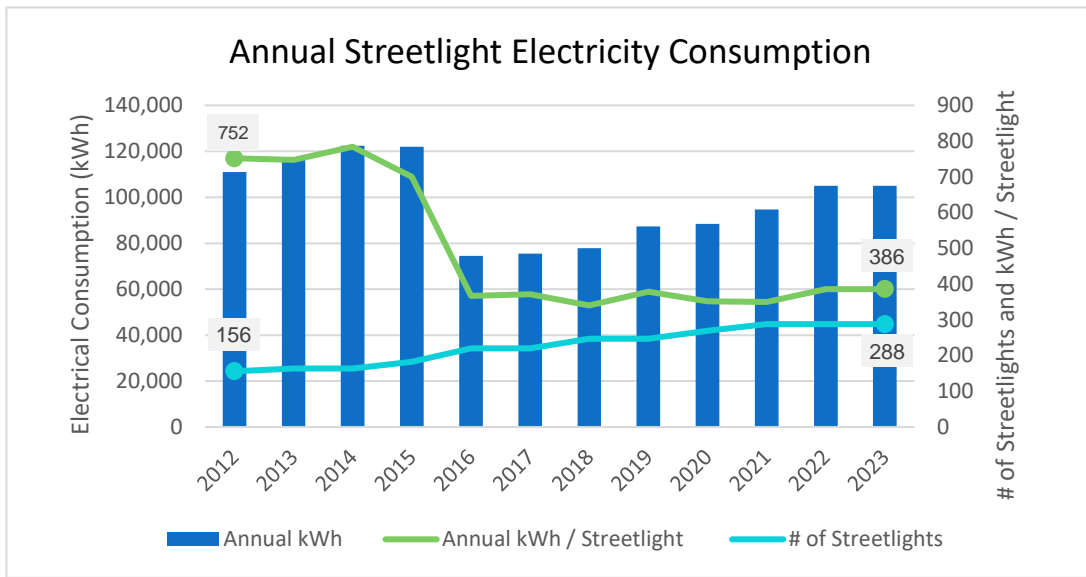


Figure 3.1 Annual Streetlight Electricity Consumption by Year

The blue line in Figure 3.1 shows the total number of fixtures at the Town and the green line illustrates the average kWh consumed each year per streetlight fixture. The average electricity use by fixture reduced significantly in 2016 when the upgrade was completed but has been level through to 2023.

Corporate Energy Consumption Breakdown

The following section presents a series of images that illustrate the energy consumption and greenhouse gas emissions for individual Town facilities and in summary. Grand Valley primarily uses electricity as an energy source; however six (6) facilities consume natural gas and one (1) currently uses propane.

Figures 3.2, and 3.3 below illustrate the electricity consumption for 2023 at various facilities throughout the Municipality, and the breakdown of 2023 electricity use by division.

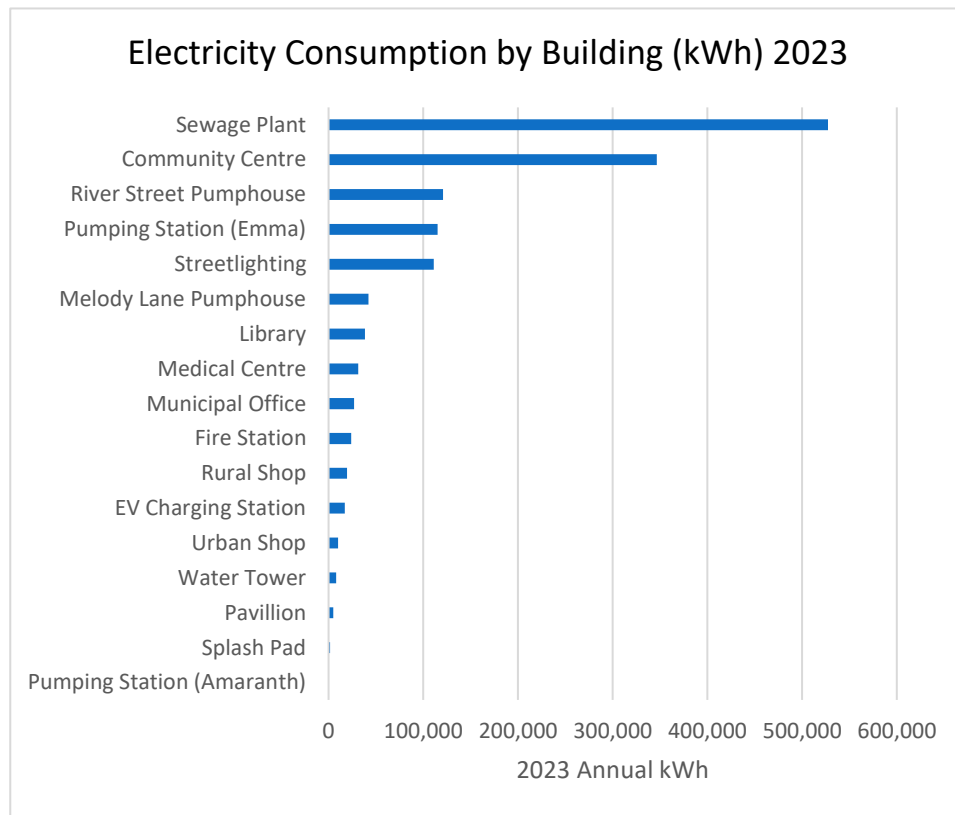


Figure 3.2 Electricity Consumption 2023 by Facility

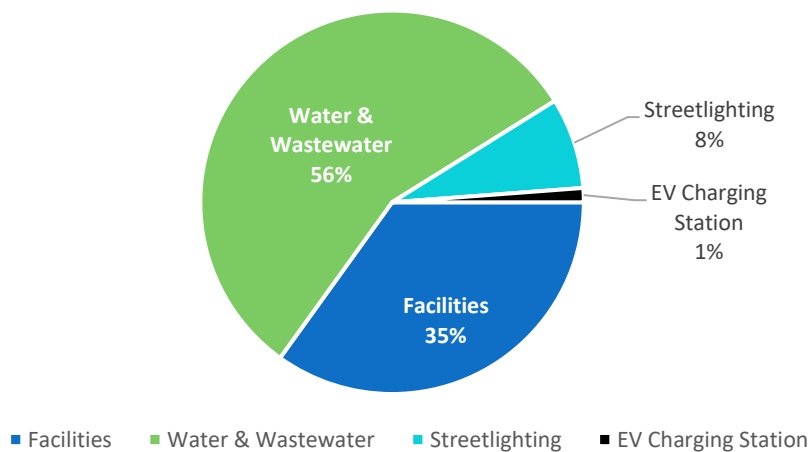


Figure 3.3 Electricity Consumption 2023 by Division

The sewage treatment facility, the community center, the largest two pumphouses and streetlighting are the largest consumers responsible for 84% of electricity use. Please note the EV Charging station electricity use is currently 1% of the total electricity picture and will likely grow.

Figures 3.4 and 3.5 below show the natural gas and propane consumption for 2023 by facility.

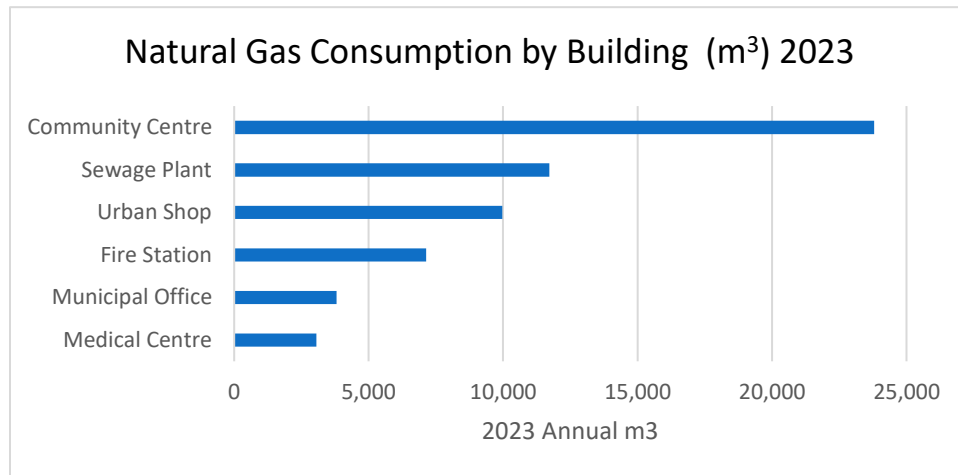


Figure 3.4 Natural Gas Consumption 2023 by Facility

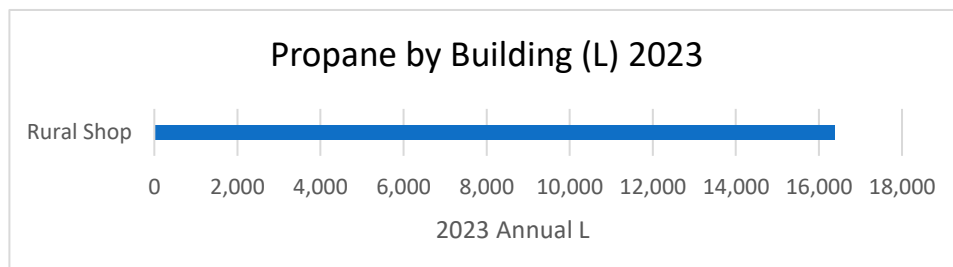


Figure 3.5 Propane Consumption 2023 by Facility

In order to compare and add different energy sources, the natural gas and propane consumption was converted to equivalent kWh (ekWh). Figure 3.6 below shows the total municipal annual energy consumption broken down by source for 2023 and Figure 3.7 illustrates this breakdown over several years from 2012 to present.

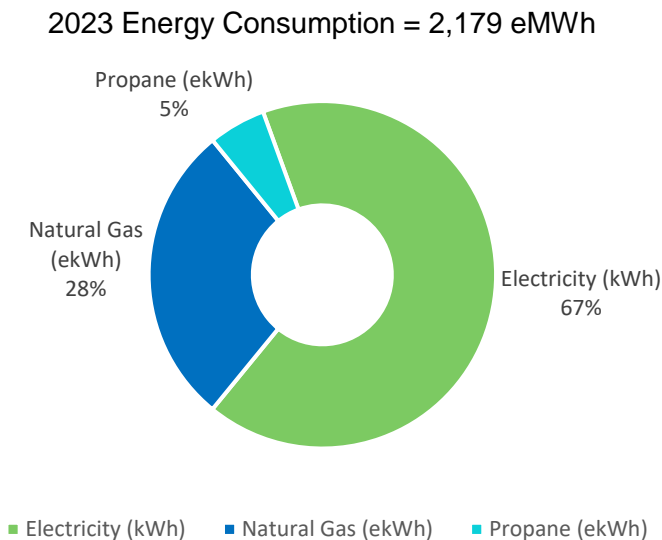


Figure 3.6 Total Town Energy Consumption by Source 2023

In 2023, the Town energy consumption was led by electricity use (67%) followed by natural gas (28%) and propane (5%). To reduce energy consumption alone would mean focusing on electricity, however, as will be noted in the subsequent section, natural gas is responsible for a significant portion of greenhouse gas emissions. As such, the reduction of natural gas consumption is equally important to this plan.

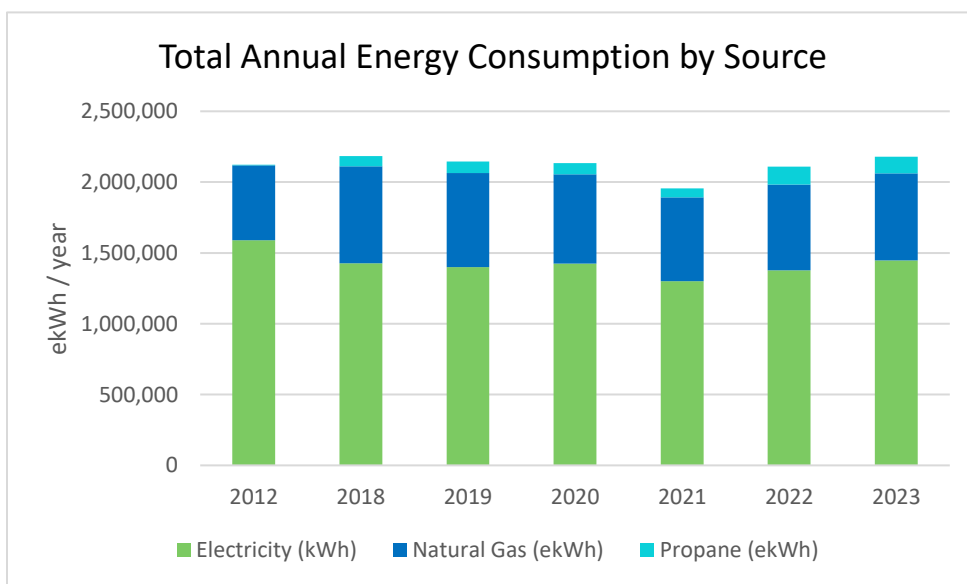


Figure 3.7 Total Town Annual Energy Consumption 2012 and 2018 to 2023

As noted in the sections above, the later years include increases in services and therefore efficiency has increased, although overall energy use has remained the same.

Greenhouse Gas Emissions

The consumption of energy from Town facilities results in the emission of greenhouse gas in two ways: directly from the consumption of natural gas and propane, and indirectly (from electricity generating power plants) for electricity. Carbon emissions resulting from energy consumption will vary based on the type of fuel being used due to the fuel specific conversion factors.

Emission conversion factors used in this report were published values for the Province of Ontario and can vary year to year based on the cleanliness of the energy generation. The GHG emissions resulting from Town energy use are broken down by fuel source in Figure 3.8 below.

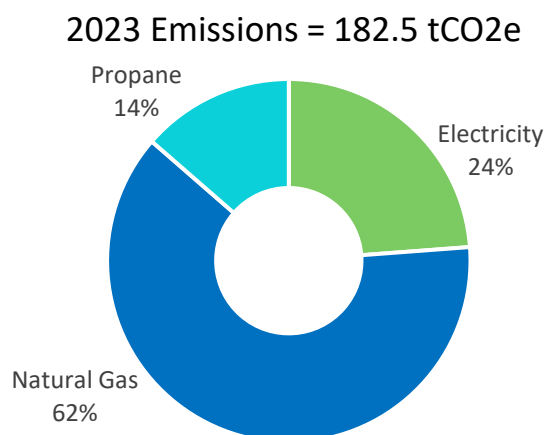


Figure 3.8 Total Annual GHG Emissions for 2023 by Energy Source

Note that although natural gas provides 28% of the total energy for the Town, it is responsible for 62% of the GHG emissions. Propane is only used at one facility, the Rural Shop, however it produces 14% of the GHG emissions. It is for this reason that any GHG emissions reduction plans must include a strategy for the reduction fossil fuel (natural gas, propane) use.

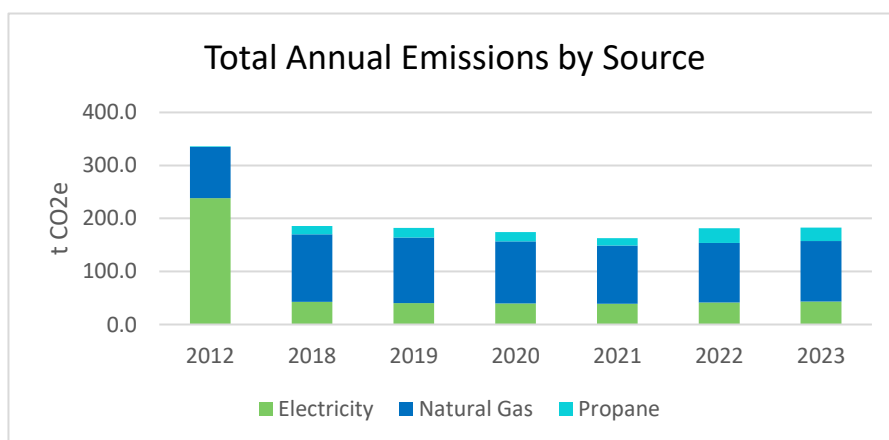


Figure 3.9 Total Annual GHG Emissions, 2012 and 2018-2023 by Energy Source

Please note that the emissions conversion factors changed significantly for electricity production in Ontario in 2014 when the last of the coal fired electricity generation plants were shut down. For this reason, as is evident in figure 3.9, the generation of GHGs from electricity consumption dropped significantly in 2015.

Figure 3.10 below illustrates the GHG emissions generated by energy consumption in each facility for 2023.

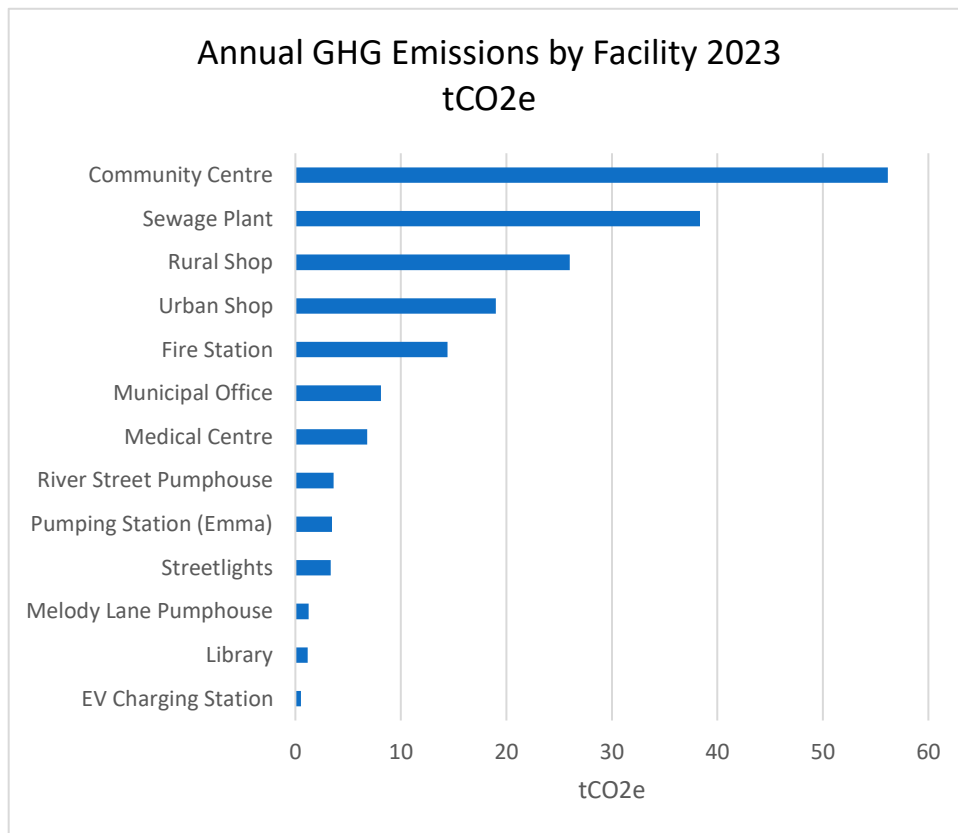


Figure 3.10 Total Annual GHG Emissions in 2023 by Facility

4.0 Energy Conservation Goals

Vision and Commitment

The Town of Grand Valley will strive to reduce our total energy consumption and associated GHG production through wise and efficient use of energy and resources, while still maintaining an efficient and effective level of service for our community. This will require a collaborative effort to increase the education, awareness and understanding of energy management within the Town.

Our Vision can be achieved through the integration of efficiencies into our infrastructure and operations, and by building a culture of energy awareness and knowledge within our community. While commitment and leadership from Council and Senior Management is crucial, everyone in our community has a role to play in reducing energy consumption and making wise use of energy.

The Town of Grand Valley commits to allocating the necessary resources to develop and implement this Conservation and Demand Management Plan as required under the *Electricity Act*, and Ontario Regulation 525/23. Council supports the execution of the plan and our efforts to avoid unnecessary cost increases and reduce our energy consumption and subsequent environmental impact. Both Council and Senior Management will ensure that the objectives presented in this plan are achieved and that progress is monitored on a continuous basis.

Goals

The Town of Grand Valley aspires to continue:

- ✓ Improving the energy efficiency of our facilities, using best practices to reduce our operating costs, energy consumption and GHG emissions.
- ✓ Creating a culture of conservation.
- ✓ Increasing the comfort and safety of staff and visitors to the Town's facilities.
- ✓ Improving the reliability and efficiency of the Town's equipment while reducing maintenance, time and costs.

2029 Energy Reduction Target

Our target is to reduce the consumption of fuels and electricity in all existing Town operations by an average of 5% (108.9 eMWh) by 2029 compared to 2023 levels (2,179.0 eMWh). As the Town will be growing, we also commit to meeting or exceeding the target energy intensity for any new buildings.

5.0 Action Plan – Looking Ahead

Our Plan for the Next Five Years

A critical part of any plan is the detailed list of specific actions needed to achieve the desired goals and objectives. The Town of Grand Valley has developed a key opportunity list which will help ensure the Town meets the energy reduction goals set out in Section 4.0 of this report.

Energy conservation measures can be categorized as technical (e.g. installing heat pumps in municipal facilities), organizational (e.g. establishing energy efficient policies or protocols), or behavioural (e.g. running a daylight harvesting campaign, where lights are turned off on sunny days). With these three categories in mind, the plan will focus on the following key focus areas.

Energy Efficient Guidelines/Standards for Capital Planning

Grand Valley will imbed energy management into the Town's capital and operational decision-making processes, including capital and asset management plans, budgeting, procurement and project design. The first step will be the development of an energy efficiency standard for future capital purchases covering various topics including:

- Heating systems - boilers, packaged rooftop units, baseboards, heat pumps
- Refrigeration and cooling systems – space cooling, refrigerators, freezer chests
- Air Handling – high efficiency fans, heat reclaim
- Domestic Hot Water – high efficiency, tankless options, converting natural gas to electric
- Building Controls

It is critical for the Town to ensure that the best decisions are made when replacing large capital equipment because they will often be in service for several decades. For this reason, high efficiency technologies are often financially and environmentally preferable to replacing units in kind, when comparing the total life of the system.

These guidelines will ensure that efficient technologies are selected consistently across the portfolio of facilities and that choices minimize the use of fossil fuels wherever possible.

Energy Efficiency Standards for New Buildings

Tied in with the guidelines and standards for asset management discussed above, the Town will begin the development of an energy efficiency standard for new buildings. This will include the following:

- Ensure new construction meets the standards set out by the National Energy Code of Canada

for Buildings (NECB)

- Commit to an integrated design process that takes a holistic approach, incorporating energy efficiency, renewable energy and sustainable green design features.
- Minimize or eliminate the need for fossil fuel consumption
- Create energy generation opportunities if economically viable.

Building and Operational Upgrades

The delivery of identified technical improvements to our facilities will support the continuous improvement of energy efficiency leading to savings and reductions in greenhouse gas emissions. Energy savings will be delivered through the identification and implementation of projects which reduce energy consumption across the facility portfolio. The majority of the projects fall into one of the following categories:

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

In addition to the three focus areas above, the following goals will also be included in the overall plan:

- Measurement and monitoring energy use: Monitor, then analyze and report on energy consumption at least annually to verify the financial and environmental return on investment in our projects.
- Energy Training: Increase Council and staff awareness regarding energy efficiency by communicating successes and presenting best practices.

Through application of this CDM Plan, the Town of Grand Valley has an opportunity to significantly reduce overall energy use leading to reduced greenhouse gas emissions and costs. The specific action plan is shown in Table 5.1 below.

Table 5.1: Town of Grand Valley Energy Conservation Action Plan

CONSERVATION TARGET: 5% Reduction in Energy Consumption (108.9 eMWh) by 2029 over 2023 levels (2,179 eMWh).

Facility	Strategic Focus	Project Type	Description	Responsible	Timing
All	Capital Planning	Standards	Develop energy efficient purchasing standards and guidelines for key infrastructure: Heating systems, pumping, cooling system, ice plant equipment, equipment controls, building envelope.	CAO	2025
All	Capital Planning	Standards	Develop natural gas reduction strategy which would be integrated into capital/asset management processes	CAO	2026
All	New Builds	Standards	Develop energy efficient standard for new buildings	CAO	2025
Community Centre	Upgrades	Lighting	Lighting upgrade to LED with improved controls to BAS	Community Centre Board	2027
Community Centre	Upgrades	HVAC	Investigate heat reclaim through (HRVs, ERVs) for future HVAC upgrades	Community Centre Board	2025
Community Centre	Upgrades	Building Envelope	Review insulation needs focusing on metal walls to reduce infiltration and heat exchange. Determine cost to upgrade.	Community Centre Board	2025
Community Centre	Upgrades	Building Envelope	Take infrared images of external walls to help identify infiltration, thermal bridging and insulation issues.	Community Centre Board	2025
Community Centre	Upgrades	Arena Equipment	Purchase electric ice resurfacers (now propane)	Community Centre Board	2032
Community Centre	Upgrades	HVAC	Replace three existing RTUs for change rooms with energy efficient models. Review whether air source heat pumps could be used.	Community Centre Board	2024
Community Centre	Capital Planning	HVAC	Review applicability of air source heat pump technology and heat reclaim (HRVs/ERVs) for future RTU replacements.	Community Centre Board	2026
Water System	Upgrades	Process Efficiency	Review pump curves to determine optimal running range for each pump and adjust programming limits as necessary.	CAO and Water contractor	2025
Water System	Upgrades	Process Efficiency	Complete a full water distribution system review to minimize parallel pumping from multiple wells to water tower	CAO and Water contractor	2025

Facility	Strategic Focus	Project Type	Description	Responsible	Timing
Water System	Upgrades	Process Efficiency	Review larger loads and consider installing electrical submeters on large pumps to assist with system optimization.	CAO and Water contractor	2025
Sewage Treatment Plant	Upgrades	Lighting	Upgrade internal fluorescent lighting to LED	CAO and WasteWater contractor	2029
Sewage Treatment Plant	Upgrades	UV System	Update existing and ensure new UV system has controls to adjust output based on plant conditions (flow, quality)	CAO and WasteWater contractor	2026
Sewage Treatment Plant	Upgrades	Equipment	At end of life, replace emergency generator fuel with natural gas	CAO and WasteWater contractor	2026
Sewage Treatment Plant	Upgrades	Metering	Ensure new systems include appropriate energy submetering	CAO and WasteWater contractor	2024
Rural Shop	Upgrades	HVAC	Investigate converting heating in shop from propane to electric	Director of Public Works	2029
Rural Shop	Upgrades	Building Envelope	Take infrared images of external walls to help identify infiltration, thermal bridging and insulation issues.	Director of Public Works	2025
Rural Shop	Upgrades	Building Envelope	Review/inspect all external doors and windows. Replace or maintain seals and caulking as necessary.	Director of Public Works	2025
Urban Shop	Upgrades	Building Envelope	Take infrared images of external walls to help identify infiltration, thermal bridging and insulation issues.	Director of Public Works	2025
Urban Shop	Upgrades	Building Envelope	Review/inspect all external doors and windows. Replace or maintain seals and caulking as necessary.	Director of Public Works	2025

