2024-2029 Conservation and Demand Management Plan

Corporation of the Township of Seguin

Authored by:

Preston Nielsen, Climate Change Intern
Forrest Pengra, Director of Strategic Initiatives

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Contents

Background

Report Background

The former Ontario Green Energy Act Regulation 397/11 (now Ontario Regulation 507/18 of the Electricity Act) requires Municipalities to report their 'goals and objectives' for conserving and otherwise reducing energy consumption and managing its demand for energy.

Every public agency shall publish on its website and intranet site a summary of:

1. its annual energy consumption and greenhouse gas emission for its operations, and
2. a description of previous, current, and proposed measures for conserving and otherwise reducing the amount of energy consumed by the public agency's operations and for managing the public agency's demand for energy, including a forecast of the expected results of current and proposed measures. The following report shall satisfy these requirements.

Municipal Profile

The Township of Seguin boasts extensive shorelines spanning thousands of kilometers, encompassing inland lakes, rivers, and access points to Georgian Bay. Situated within the Georgian Bay Biosphere region and nestled in the heart of Ontario's cottage country, Seguin's natural allure positions it as a prominent tourist destination. During the warmer months, the Township experiences a significant surge in population, welcoming thousands of seasonal residents.

Rooted in the "environment first" principle, Seguin Township is a community deeply committed to environmental stewardship. With a strong emphasis on sustainability, the Township prioritizes environment, climate and energy management and endeavors to seamlessly integrate conscious practices into all facets of municipal operations.

The plan presented herein offers a comprehensive review of the 2019 Energy Conservation and Demand Management plan, along with its implementation throughout the period spanning 2019-2024. Additionally, it presents Seguin Township's upcoming 2024-2029 plan in accordance with provincial regulations.

Evaluation of Seguin's 2019-2024 CDM

Energy Consumption and GHG emissions

Seguin Township's previous CDM plan, covering from 2019 to 2024, lacked definitive energy consumption and GHG emissions reduction targets. The plan's objectives were simply to reduce energy usage and GHG emissions by implementing effective energy reduction strategies.

Seguin Township's real-world results showed a reduction in both energy consumption and GHG emissions. When comparing the 2019 baseline consumption levels to the average energy consumption between 2020-2023 all three energy types showed a decrease in 5-year consumption. Electricity usage is down 4.7%, natural gas is down 12.2% and propane is down 16.0% (Figure 1). Similarly to energy consumption, GHG emissions from the 2019 baseline year compared to the average between 2020-2023 were down 14.9% (Figure 2). Although there were no defined goals, Seguin achieved its overall objective of reducing energy usage and GHG emissions.

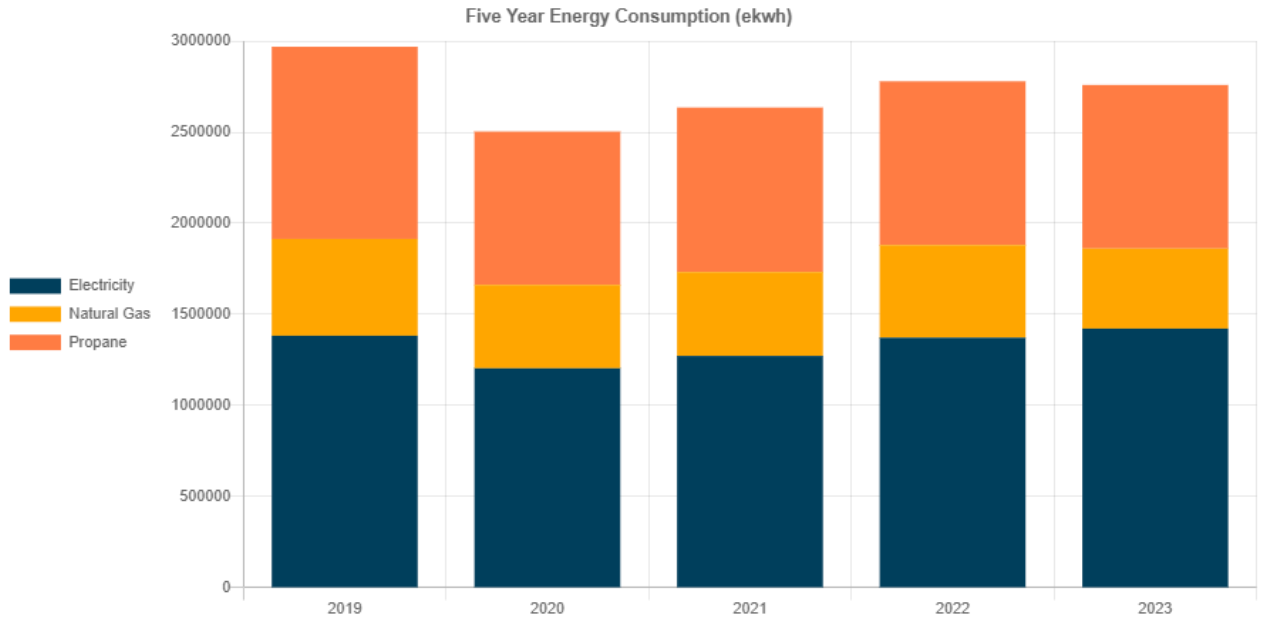


Figure 1 - Energy consumption, by fuel type, between 2019 and 2024.

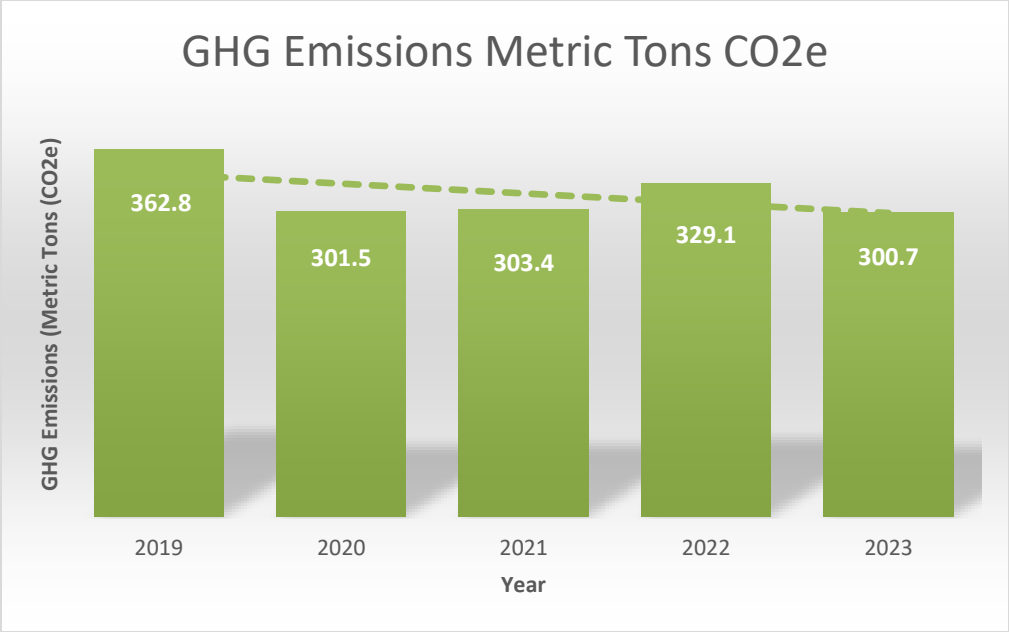


Figure 2 - GHG emissions from 2019 to 2024.

The reductions in energy consumption and GHG emissions observed from the 2019-2023 CDM can be attributed to several factors. One initial cause of the decrease can be explained by the operational changes resulting from the COVID-19 pandemic. Pandemic restrictions led to changes in Seguin facility usage including fewer programs and less bookings during the years 2020 and 2021. This resulted in the lowest energy consumption and GHG emission levels in the previous 5 years. Another factor contributing to the reduction in energy consumption from 2019-2023 is one that dates to before 2019. Between 2016 and 2017, Seguin Township phased out the use of fuel oil. However, despite this phase-out, there was an unexpected increase in propane usage in 2018 and 2019 in facilities previously heated with fuel oil. Causation for this unexpected increase remains unknown, despite significant investigative efforts; some factors may include equipment configuration, changes in human behavior, or other unidentified causes. As a result of this increase in propane usage, overall energy consumption and greenhouse gas emissions rose in 2018 and 2019, contributing to the high levels observed in the initial years of the previous report. On the initiative side of energy reduction, significant efforts have been made to lower both energy consumption and GHG emissions. Such actions include retrofitting lighting systems with LED alternatives, optimizing equipment operating procedures, installing a new arena compressor and numerous others. Another potential contributor to GHG emissions variation is the makeup of the IESO energy grid. The composition of the energy grid can change from year to year, affecting the emissions associated with energy consumption. Depending on the makeup of the grid, emissions could increase or decrease.[1]

[1] Transmission-Connected Generation (ieso.ca)

2024-2029 Conservation & Demand Management Plan

Our Commitments

Declaration of Commitment

Council Resolution:

1. On August 6th, 2019, the Council of the Corporation of the Township of Seguin adopted the 2019-2024 Energy Conservation and Demand Management Plan (CDM) (Resolution # 2019-295).

Other Council commitments and resolutions related to climate initiatives:

1. Seguin Township is committed to environmental sustainability, energy efficiency, and reducing the Townships carbon footprint.
2. Seguin Township Council voted in Favor of adopting a Community Climate Action Plan (Resolution # 2023-259) and a Corporate Climate Action Plan (Resolution # 2023-258) in September 2023. These documents were created in collaboration with the Georgian Bay Biosphere and the ICECAP collaborative. These documents are subject to revisions and updates.

Vision

Seguin Township will strategically reduce total energy consumption and mitigate costs through the wise and efficient use of energy and resources. The Township will exercise stewardship in its use of energy resources to demonstrate community leadership and enhance the overall quality of life in the community.

Objectives:

1. Reduce greenhouse gas emissions.
2. Improve energy efficiency.
3. Reduce the use of fossil fuels.
4. Adapt to a changing climate by building greater resilience.
5. To create a culture of energy conservation within the Township.

Overall Target

Overall targets shall align with the Federation of Canadian Municipalities – Partners for Climate Protection program commitments for both Corporate and Community emissions.

For the Townships corporate emissions (Buildings, Fleet, Waste & streetlights) Seguin aims to achieve a reduction target of 30% below 2016 emissions by 2030 and net zero by 2050.[2]

The Township of Seguin will also strive to reduce community GHG emissions by 6% below 2016 levels by 2030 and achieve net zero by 2050.[3]

The Conservation and Demand Management plan aims to curb total energy consumption, but detaching this objective from emissions reduction seems incongruent. Therefore, Seguin Township's objectives encompass a dual focus: decreasing both GHG emissions and energy usage concurrently. To achieve these aims, Seguin plans to implement targeted strategies across four key domains: municipal buildings, fleet/transportation, waste management, and municipal leadership. Each of these sectors presents ample opportunities to significantly curtail both GHG emissions and energy consumption. The Township currently tracks energy consumed in their native units as well as the corresponding tonnes of GHG emissions. Therefore, future updates on the Conservation and Demand Management plan will include both metrics. Nonetheless, setting goals using two different frameworks is not ideal at this juncture, therefore GHG emissions will be used when setting goals.

[2] Corporate-Climate-Action-Plan_Seguin_2023.pdf
[3] Corporate-Climate-Action-Plan_Seguin_2023.pdf

Organizational Energy Situation

Seguin's Municipal Energy Needs

Seguin Township requires reliable, affordable, and sustainable energy sources to power and heat the Townships 29 facilities. These facilities are currently powered and fueled by hydro (52% total energy), propane (31% total energy), and natural gas (175 total energy (Figure 3). Annual energy expenses are considerable and represent an essential operating cost in the Township (Table 1). With the cost of energy and operations rising in the Township, there is a need to reduce total energy consumption. These reductions can be accomplished through efficiency projects, adjustments to business processes, or both.

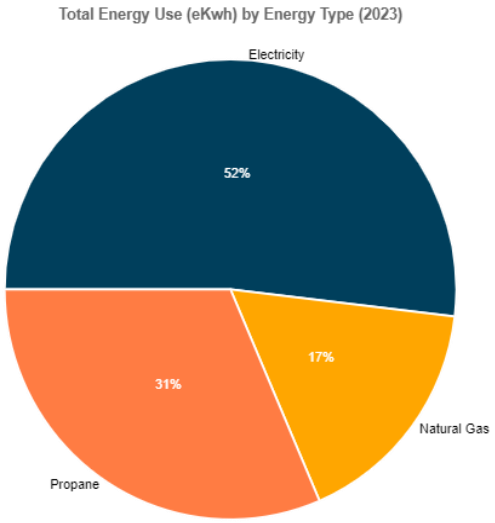


Figure 3 - Total energy use by fuel type for 2023.

Energy Type		Cost
Electricity	$	234,452.59
Natural Gas	$	33,198.43
Propane	$	93,651.59
All Types	$	361,302.61

Table 1 - Energy costs for all utility types (2023)

How Seguin Manages Energy Today

Energy Tools Used

Historically, Seguin Township has managed energy using the LAS Energy Planning Tool (EPT), Excel spreadsheets and other reports. In 2023, the Province of Ontario shifted energy management from an antiquated Microsoft SharePoint management portal to the Energy Star Portfolio Manager (ESPM). Seguin Township has embraced this tool to track energy consumption, performance and to better understand the resultant GHG emissions.

Energy Management Process

Currently, electricity data is automatically uploaded to the EPT tool from Hydro One. From there, municipal staff transfer the data to the ESPM tool for use through an export/import process. Propane and natural gas data comes from the utility companies in the form of traditional invoices and is not automatically uploaded into any online tool. With these invoices,

municipal staff must manually enter the data into a spreadsheet, which can then be uploaded into both the EPT and ESPM.

Once into one of these tools, the energy data must be examined for errors, omissions and outliers which may have resulted from the transfer of data. When the data is uploaded and verified, staff then examine the information for patterns, trends, and changes.

Provincial Reporting Mandates

The province of Ontario mandates that municipalities must report their energy consumption data on an annual basis. Previously, this reporting required the exporting of a report from the EPT tool and importing the output into the Ministry of Energy's Broader Public Sector SharePoint reporting portal. In 2023, this reporting was transitioned to the ESPM tool. Report templates are available in the ESPM tool and can be used to compile all the necessary data for the reporting year, including monthly utility entries, annual GHG emissions, building performance, and any other data required by the province. Although reporting is conducted annually, it pertains to the previous year; hence, a report based on 2023 data would be due in July 2024.

Organizational Structure

Energy Leader

Seguin's Director of Strategic Initiatives oversees the environmental portfolio including the Townships climate action plans, energy management, energy team, water quality testing and other objectives. The Director is heavily involved in the communications between energy team members, municipal staff, and Mayor/Council. The Director of Strategic Initiatives directly oversees the climate change intern in their role of implementing the goals and actions of this plan.

Energy Team

The Township believes that energy management and the understanding of our energy goals must be a collaborative effort and that all departments, staff and the municipal Council need to be included in responsible energy management. To effectively realize the goals and objectives outlined in this plan and to cultivate a more sustainable environment within Seguin Township, there will be a concerted effort to enhance interdepartmental cooperation, collaboration, and active participation. Within Seguin Township, the diverse array of departments, personnel, and leadership roles are integral to the successful execution of climate action initiatives. Consequently, specific departments and staff members have been identified to spearhead climate action endeavors in Seguin. The primary aim of this designated team is to collectively and harmoniously address the objectives and targets delineated within this report. This group may steer a future climate and environment staff committee (sample of proposed roles below).

Individual	Department	Role
Director of Strategic Initiatives	Strategic Initiatives	Chairperson
Climate Change Intern	Strategic Initiatives	Secretary / Vice-Chairperson
Communications Specialist	Office of CAO	Member Advisor
Chief Administrative Officer	Office of CAO	Member Advisor
Director of Community Services	Community Services	Member Advisor
Facilities Supervisor	Community Services	Member Advisor
Director of Public Works	Public Works	Member Advisor

Stakeholders & Stakeholder Needs

Internal Stakeholders (Council, CAO, Staff) need:

1. Up to date energy management plans with clear goals and objectives so that they can communicate the Townships corporate energy efficiency commitments.
2. Education and support are required to develop knowledge and skills to implement energy management practices.
3. Regular status reports so that internal stakeholders are up to date on energy usage and relevant action underway.

External Stakeholders (Seguin residents, community organizations, local businesses) need:

1. Municipal accountability for sustainable energy consumption, and fiscal responsibility.
2. The Township of Seguin to continue reducing community and corporate GHG emissions.

Energy Training

Seguin Township is committed to enhancing its workforce's energy literacy through the development of comprehensive educational training materials. The resources will be crafted to address key areas of importance, including energy conservation, environmental consciousness, procurement practices, and more. By prioritizing these topics, the Township aims to empower its staff with the knowledge and skills necessary to contribute effectively to sustainable practices and efficient operations. Through this training initiative, Seguin seeks to foster a culture of environmental responsibility and resource efficiency, benefiting both the community and the environment at large.

Organizational Linkages

Background

The Township of Seguin is actively engaged in various initiatives aimed at guiding municipal advancement. These include Seguin's Strategic Plan, the Corporate and Community Climate Action Plans, the Waste Strategy, and others. Additionally, Seguin's participation in programs such as the Federation of Canadian Municipalities - Partners for Climate Protection (PCP) program and the Integrated Communities Energy and Climate Action Plans (ICECAP) collaborative further underscores the Townships commitment to addressing ongoing and future environmental challenges.

Strategic Plan

On November 7th, 2023, Seguin Council adopted a new Strategic Plan. This Strategic Plan differed from those in the past by extending the outlook period. To accomplish this, the plan shifted operational actions to an Operational Plan, and kept the Strategic Plan higher level and future oriented. The plan introduced the concept of foundations, the fabric upon which all other municipal identities are based. The first of the five foundations is the prioritization of the environment which includes the protection, preservation, and investment in the natural environment.

Environment and energy, in addition to being one of foundations for the new strategic plan, is also included in its vision statement - Seguin will strive to become a bold, prosperous, and collaborative community with an unwavering commitment to prioritizing the environment while providing an exceptional quality of life for all who live here.

Integrated Communities Energy and Climate Action Plans (ICECAP) collaborative

ICECAP is a partnership between the First Nations and municipalities in the Georgian Bay Biosphere (GBB) region for the purpose of a collaborative, more cost-effective approach to energy management and the reduction of greenhouse gas emissions for the operations of each member, their communities, and for the broader region. The ICECAP program exists to support local and regional climate action planning. The inputs from ICECAP resulted in a West Parry Sound Regional Climate Action plan which includes all communities in the area.

The ICECAP program has four key Objectives:

1. Encourage the reduction of GHG emissions,
2. Improve energy efficiency,
3. Reduce the use of and reliance on fossil fuels,
4. Adapt to a changing climate by building greater resilience.

Partners for Climate Change Protection (PCP) program

Since 2019, Seguin Township has been a proud member of the Federation of Canadian Municipalities - Partners for Climate Protection (PCP) program. The program is designed to guide municipalities through the process of reducing greenhouse gas emissions through climate change and energy planning. It consists of a five- milestone framework that guides municipalities in their efforts to reduce corporate and community greenhouse gas emissions.

Five Milestones of the PCP:

1. Create a baseline emissions inventory & forecast.
2. Set emissions reduction targets.
3. Develop a local action plan.
4. Implement the local action plan.
5. Monitor progress and report results.

In September of 2024, Seguin Township resolved to adopt their corporate and community climate action plans. The plans aim to lower GHG emissions throughout the township. Currently, Seguin Township has completed step three of the PCP framework, the publication of climate action plans, and is currently working on steps four and five.

Corporate & Community Climate Action Plans

As discussed above, the Corporate Climate Action plan is a commitment from Seguin to lower GHG emissions from the 2016 baseline year by 30% by 2030 and achieve net zero operations by 2050. The Community Climate Action plan is a commitment to lower community GHG emissions from the 2016 baseline year by 6% in 2030 and achieve a net zero Seguin community by 2050.

These action plan commitments are aligned across many Seguin Township plans including this Conservation and Demand Management (CDM) plan. Additionally, they have been linked to other corporate publications (example – 2023 Waste Strategy) to underpin and support the actions contained therein.

Waste Strategy

On November 21st, 2023, Seguin Township's Council adopted the Waste Strategy. The need for this strategy comes from Seguin Township's 2019 to 2022 Environmental Leadership Council which set out a number of priorities, one of which calls for further study and implementation of waste diversion opportunities. This strategy is to serve as a guide to waste management in Seguin over the next 20 years. In its development, the strategy focused on three main questions: Where are we now? Where do we want to go? And how do we get there?

In answer to these questions the Waste Strategy considers:

1. The reuse and recovery of materials

2. Infrastructure needed throughout the waste management system.
3. Policy and accessibility updates.
4. Programs to reduce the quantity of waste going to the landfill.
5. Issues such as illegal dumping.
6. Promotion, education, and engagement to support the community in managing its waste.

Procurement & Investment Planning

Procurement

Seguin Townships existing procurement policy states, when purchasing goods and services, that it will minimize environmental impacts and promote and incorporate, wherever possible, environmental stewardship.

Seguin aims to enhance its sustainability efforts by developing a comprehensive policy that encompasses all procurement activities, regardless of scale, for both operational and capital budgets. This dynamic plan will remain adaptable, evolving in response to emerging issues and opportunities. Recognizing the significance of staff engagement, Seguin will gradually introduce this new procurement policy, ensuring active participation and alignment across the organization.

Investment Planning

Seguin Township is dedicated to ensuring the efficient use of resources and promoting sustainability within our community. As part of its commitment, Seguin will be incorporating building and energy conservation considerations into the annual municipal budgeting process. By doing so, Seguin aims to prioritize initiatives that not only align with environmental goals but also contribute to fiscal responsibility.

One such initiative involves the implementation of both low- and high-cost energy retrofit projects across municipal infrastructure. Such projects could include replacing the heating and cooling systems with high-efficiency alternatives, replacing the weather stripping on building doors, installing LED lighting, and incorporating building automation such as automatic lights, thermostat setbacks, and garage door closers wherever possible. These retrofits are carefully designed to optimize energy usage and reduce operational expenses, yielding a tangible return on investment in the near term while also reducing environmental impacts.

Furthermore, recognizing the importance of securing adequate funding for these initiatives, Seguin Township will seek external grant opportunities. By leveraging external resources, Seguin can supplement budgetary allocations and accelerate the implementation of crucial building and energy efficiency projects. This initiative-taking approach underscores the

Townships dedication to maximizing the impact of sustainability efforts while minimizing financial strain on our municipality.

Communication Programs

Communications Strategy

Seguin Township plans to develop a comprehensive communication strategy to enhance awareness among the public, staff, and Council. A key component of this strategy will be the creation of a regularly updated climate action webpage, focusing on ongoing sustainability initiatives. The webpage will provide supporting materials, volunteer opportunities for events, and project updates. It will focus on fostering community engagement and demonstration of the Township's environmental efforts.

Future Projects - Execution

Municipal Level

Seguin Township is committed to a comprehensive and pragmatic approach aimed at improving energy efficiency over the next five years, contingent upon available resources. This endeavor involves the development and implementation of new business procedures and policies.

As previously mentioned, one such initiative includes the incorporation of sustainability into the municipal decision making, budgeting, and spending processes. An additional initiative the Township of Seguin is exploring is the introduction of reporting mechanisms to provide updates to staff and council members on the status of the climate action plans, energy plans and/or consumption.

The creation and implementation of new policies are essential to address energy challenges and achieve targets. Over the next five years, Seguin Township aims to develop additional policies to further address energy efficiency, climate change, and adaptation. These policies include but are not limited to, green buildings, communications, public engagement, and low or zero emissions fleet and equipment. Through these measures, the Township is dedicated to fostering a sustainable and resilient community for the benefit of current and future generations.

Facility and Asset Level

To uphold a corporate culture dedicated to energy conservation, it is imperative that all staff members are actively engaged in energy, climate, and environmental initiatives. Building upon energy literacy training discussed earlier in this report, these initiatives should include the dissemination of educational resources and the provision of support as needed. While facility managers typically take the lead in operating their buildings, it is essential that everyone

understands their departmental consumption and GHG emissions and consistently utilize energy-efficient measures whenever feasible.

An essential initial measure for achieving energy efficiency is conducting facility energy audits. As of March 15th, 2024, Seguin Township started an energy audit program for municipal facilities. Audits provide comprehensive reports detailing each building's envelope and operational energy consumption characteristics. Furthermore, they include recommendations for improvements, retrofitting and operational adjustments aimed at reducing costs, energy consumption, and greenhouse gas emissions. These preliminary audits will serve as the cornerstone for identifying, initiating, and implementing energy efficiency projects across Seguin's facilities. The program will be semi-regular to account for changes in facility infrastructure, performance changes due to degradation, and business process. The preliminary audits concluded April 18th, 2024, and included 11 buildings (see Appendix C for details). The initial 11 facilities were selected based on data from the Energy Star Portfolio Manager data tool. The ESPM tool allows Seguin to examine buildings from both an energy consumption and intensity viewpoint. The 11 buildings chosen for the initial audit were selected for having the largest overall energy consumption or unexplainable energy intensity, based on size relative to yearly energy consumption.

The second phase of energy conservation planning involves executing the audit recommendations, with priorities placed on automation and building envelope enhancements. Automation improvements will focus on lighting systems, temperature controls, and, where applicable, garage door openers and closers. Building envelope improvements may include measures such as insulation, weather stripping, and window upgrades; they will be implemented as municipal budget and external funding is available.

Future Project Considerations

Although energy conservation and sustainability are foundational to Seguin's climate actions, the Township endeavors to implement processes that generate or store energy to minimize GHG emissions, offset consumption, increase resilience, and potentially participate in energy markets. These may include photovoltaic (solar power) systems, wind turbines, battery enabled storage systems (BESS), ground or air source heat pumps, and biofuels. Producing or otherwise consuming renewable energy locally has many benefits, and has been shown to:

1. Improve energy independence and resiliency, reducing pressures on external supply and fuel prices.
2. Provide affordable, reliable, clean energy.
3. Improve systems that transport, store, and use energy.
4. Increase local job opportunities.
5. Keep more energy dollars within the community.

Prior to the investment of any renewable or energy storage systems, Township owned buildings must first operate efficiently and have an effective envelope. After energy efficiency and heat recovery are addressed, renewable systems such as solar and battery storage should be considered for Seguin's buildings.

CDM Review Moving Forward

Energy Plan Review

Seguin Township is dedicated to conducting an annual review of the Conservation and Demand Management (CDM) plan, adjusting, and refining it as needed to maintain its efficacy. A designated staff member will assume responsibility for monitoring the action items discussed in the plan and identify new priorities for the forthcoming year, with a particular emphasis on initiatives that offer opportunities for operational savings, energy conservation, and GHG reductions. This staff member will also be charged with documenting and presenting a comprehensive progress report on the implementation of the energy plan, along with the status on the progress towards achieving the plan's set targets.

To track progress, Seguin will use the Energy Star Portfolio Manager Tool as well as the Local Authority Services (LAS) Energy Planning Tool. These tools will enable the Township to establish energy conservation targets, assess successes, and monitor energy consumption on a monthly, yearly, and multi-year basis. By utilizing these tools, Seguin aims to enhance its ability to effectively manage and optimize energy usage across various periods for all utility types.

Conservation Measures

Background

As discussed throughout this report, in 2023 Seguin Township adopted Corporate and Community Climate Action plans in line with the requirements of the Federation of Canadian Municipalities – Partners for Climate Protection program. Included in the plans are actions intended to lower GHG emissions and energy consumption. The actions of the Corporate and community action plans will serve as the actions of Seguin Townships 2024-2029 CDM. The conservation measures below include some of the completed, planned or pending actions for the 2024-2029 CDM. A summary of these measures can be found in Appendix A.

Appendix A – Conservation Measure Details

Completed

Action	Description
Incorporate regular energy audits into building operations	In February and March of 2024, the Township of Seguin has completed thirteen level 2 energy audits on municipality owned buildings.
Historic Energy Data Validation	Seguin Township has taken a deep dive into validating its historic energy data. Seguin has acquired and validated yearly energy consumption data dating back to 2013 that has been migrated to the new provincially mandated Energy Star Portfolio Manager Tool.
Hire a Climate Change Intern	Seguin Township has hired a Climate Change Intern to help with the implementation of the Climate Action plans and to champion climate action in the township and community.
Adopt a Corporate Climate Action Plan	In September of 2023 Seguin adopted a Corporate Climate Action Plan which includes climate actions designed to lower emissions from Seguin's fleet, buildings, and waste systems. This plan commits Seguin to achieve a reduction from 2016 GHG emissions levels by 30% in 2030 and achieve a net Zero corporate Seguin by 2050.
Adopt a Community Climate Action Plan	In September of 2023 Seguin adopted a Community Climate Action Plan which includes climate actions designed to lower GHG emissions from the greater community of Seguin's Transportation, buildings, and waste sectors. This plan commits Seguin to achieve a reduction from the community 2016 GHG emissions levels by 6% in 2030 and achieve a net Zero Seguin by 2050.
Develop a Waste Master Plan to coordinate waste reduction efforts across different waste streams.	This strategy provides recommendations to guide the future of waste management in the Township over the next 20 years.

In Progress

Action	Description
Integrate a sustainability criterion into procurement processes	The Township of Seguin recognizes that its Equipment, suppliers and contractors produce GHG emissions as they provide services. The Township of Seguin can influence the reduction of these emissions by introducing a new sustainability policy which considers energy use, GHG emissions and cost into all municipal purchases and external services.
Retrofit lighting systems with efficient LEDs	Switch all lighting systems in Seguin Township buildings to LEDs which will lead to less energy use, a decrease in energy costs and increased visibility in municipal buildings.
Support expansion of public level 2 & 3 (DCFC) EV charging infrastructure.	Seguin Township is looking into installing multiple level 2 & 3 EV charging stations at multiple publicly accessible Township owned facilities.
Consider ICECAP membership annually in municipal budgeting	ICECAP is a partnership between the Municipalities, First Nations, industry, and community groups located in and around the Georgian Bay Biosphere region for the purpose of a collaborative, more cost-effective approach to energy management and the reduction of greenhouse gas emissions. By participating in ICECAP, the Township of Seguin can learn about the efforts neighboring municipalities and First Nations are undertaking, and by sharing resources and knowledge, can implement its own initiatives more efficiently.
Annual Energy Reporting	Yearly energy reports are submitted to the provinces Energy Star Portfolio Manager Tool.
Identify and pursue external funding and partnerships to support climate action efforts and offset capital costs.	There are external funding opportunities available through federal and provincial agencies for climate action and energy management initiatives. By acquiring external funding, the Township of Seguin can expand its impact per dollar invested. Similarly, participating in partnerships such as ICECAP (Action 9.3) can create additional funding opportunities to advance climate action efforts.

Pending

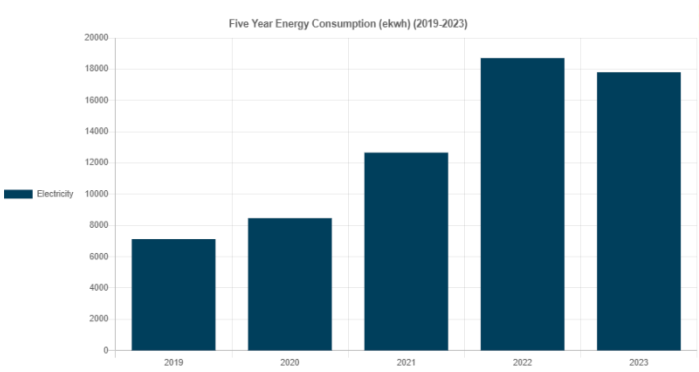
Action	Description
Install building automation systems where feasible	A building automation system (BAS) is a network designed to connect and automate certain functions inside a building. All a building's control systems are integrated into a single interface and can be monitored and adjusted remotely. This allows staff to quickly identify any problems that may arise and program occupancy and time-of-day settings to maximize energy conservation and efficiency
Replace heating and cooling systems with low or zero- carbon alternatives, where feasible.	Heating and cooling systems that use fossil fuels have the highest energy demand in buildings. Replacing these systems with low or zero carbon technologies can therefore lead to drastic reductions in GHG emissions. These efforts should align with scheduled replacements in asset management plans to maximize the useful life of the existing system and maximize the return on investment
Explore the integration of renewable energy systems into buildings systems	Installing on-site renewable energy systems such as rooftop solar panels or wind turbines is a crucial step towards decarbonizing buildings. However, prior to installing renewable energy systems, buildings must first operate efficiently and have an effective envelope. When integrated with fuel-switching initiatives, renewable energy systems can have profound GHG reduction benefits. This will also free up grid capacity for other electrification initiatives elsewhere, such as those occurring in the municipal fleet (Action 5.2 and Action 6.3).
Building Retrofits	As determined by the facility energy audits Seguin will look at implementing the recommended energy efficient retrofits to lower energy use and GHG emissions
Explore and pursue opportunities to replace existing vehicle stock with zero-emission vehicles or fuel-efficient alternatives.	Electrifying the municipal fleet or switching to more efficient vehicle models has immense potential for reducing GHG emissions. Additionally, the Township of Seguin must begin this transition in response to the federal government's ZEV mandate, requiring all new light-duty vehicle sales to be ZEV by 2035. These purchases should be aligned with the asset management plan to maximize the useful life of the existing vehicle and the return on investment of its replacement (Action 6.2). To accommodate the wide-spread use of zero-emission vehicles in municipal operations, it is also imperative that EV charging infrastructure is in place (Action 6.3).
Promote Staff and community education on sustainable buildings, transportation, and waste management.	Staff and community engagement is critical to the success of climate targets. Seguin will develop & provide educational materials and host training workshops to address sustainability in transportation, buildings, and waste management.

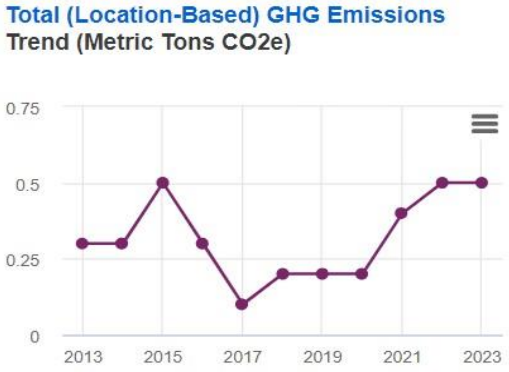
Conduct a waste audit to identify opportunities to improve waste diversion rates at municipal facilities & recreation areas.	In alignment with the Waste Master Plan (Action 7.1) a waste audit can identify the types of waste being disposed at various municipal facilities and recreation areas, as well as the quantity of each waste type being disposed. This information can be used to identify where separated waste receptacles may be required to improve diversion rates.
Where feasible and required, improve the building envelope of municipal buildings and facilities.	An energy-efficient building envelope refers to an effective boundary between the conditioned interior of the building and environment beyond it. An effective building envelope will lower the cost of fuels that power and control a building's interior temperatures. This can also improve the level of comfort and the health and safety of occupants. Insulation upgrades, weather stripping, and caulking are a few of many efforts that can be taken to ensure an airtight building envelope. Conducting regular energy audits (Action 1.1) can identify where building envelopes may be compromised and what measures can be taken to fix any issues.
Develop a Low Carbon Fleet Policy	A Low Carbon Fleet Policy can guide the use and purchase of municipal vehicles. It can offer direction into what criteria should be explored when purchasing new vehicles, optimizing the fleet by eliminating unused or underused vehicles, applying right-sizing principles, and increasing the use of zero-emission vehicles. It can also outline the use of any shared municipal vehicles or desired driving behaviors.
Explore initiating a green bin program and implement where feasible.	A green bin program helps keep waste out of landfill by collecting and processing organics into material that can be used to create nutrient-rich compost. This compost can also be used to create renewable natural gas that can be used to help power vehicles and buildings.

Appendix B – Facility Details

Brooks Road Waste Transfer Station

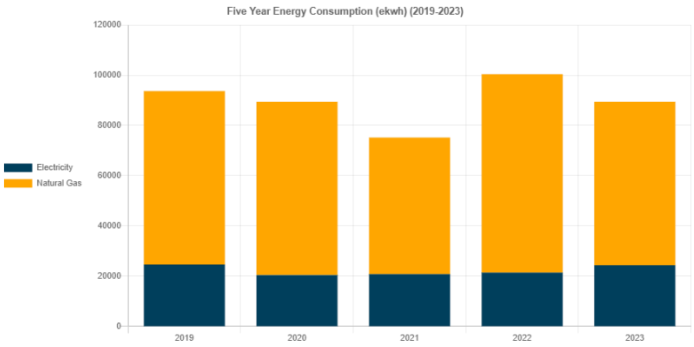
51 Brooks Road, Seguin ON P2A 2W8

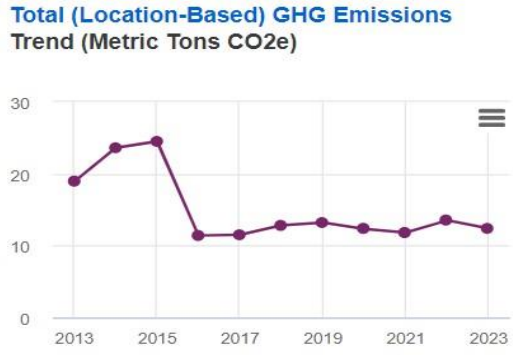




Christie District Public Works Garage

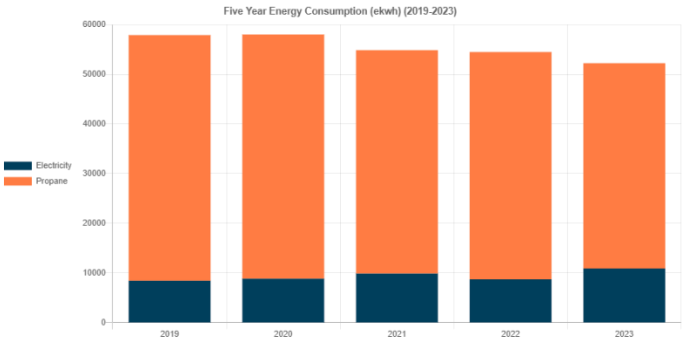
33 Star Lake Road, Seguin ON, P2A 0B6

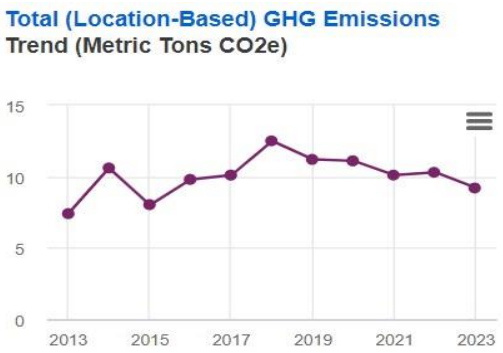




Christie Fire Hall

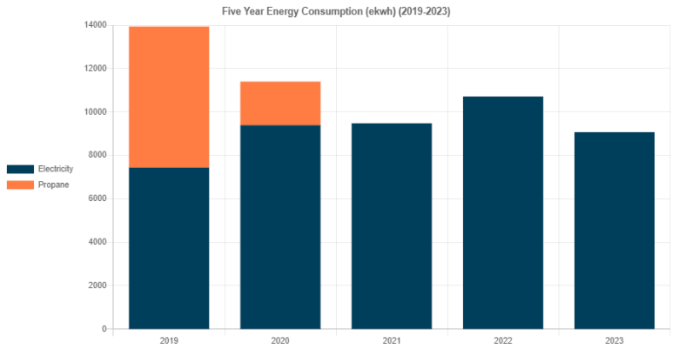
1040 Highway 518, Seguin ON, P2A 0B6

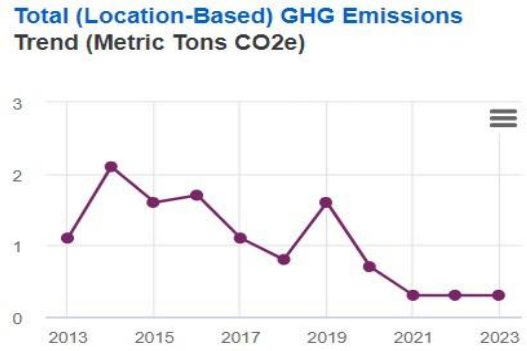




Christie Landfill

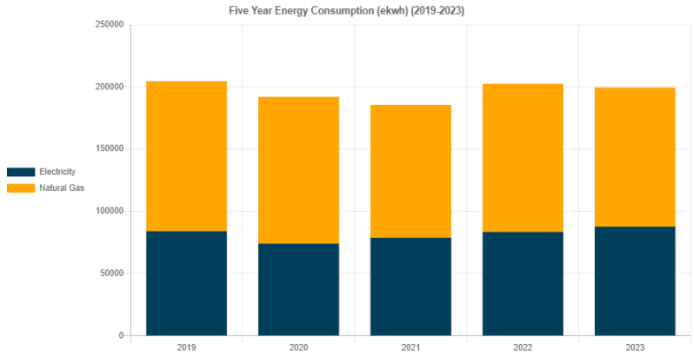
39 Star Lake Road Seguin ON, P2A 2W8

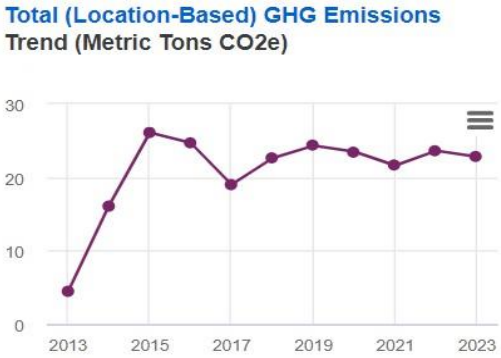




Foley Community Centre

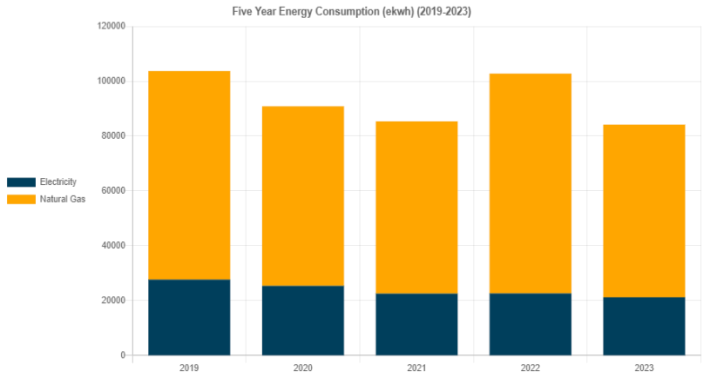
60 Rankin Lake Road, Seguin ON, P2A 0B2

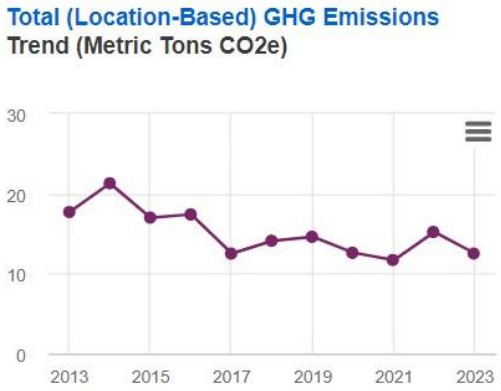




Foley Fire Hall #1

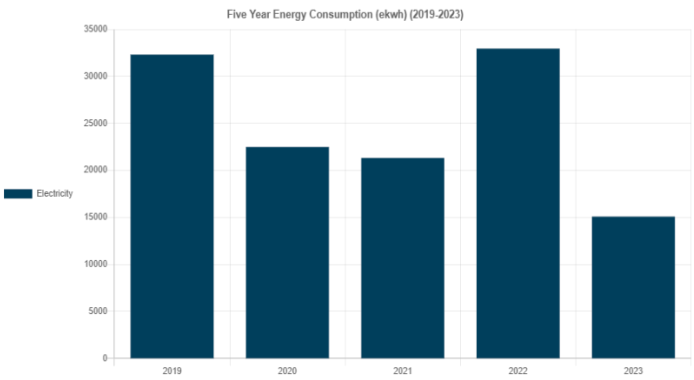
58 Rankin Road, Seguin ON, P2A 2W8

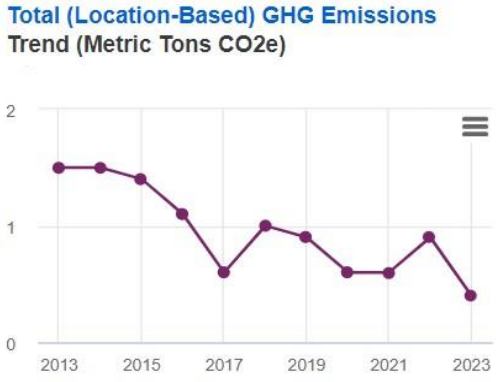




Foley Fire Hall #2

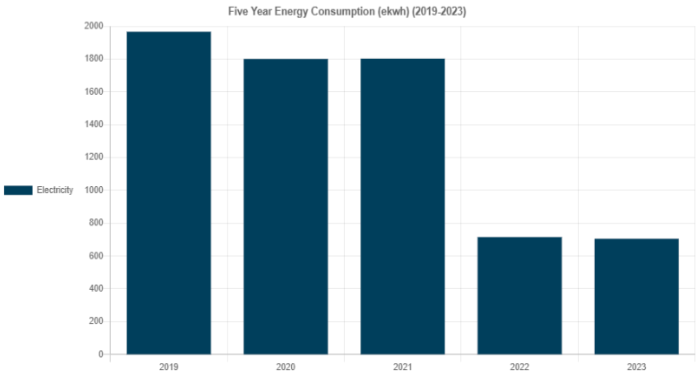
18 McKaig Road, Seguin ON, P2A 2W8

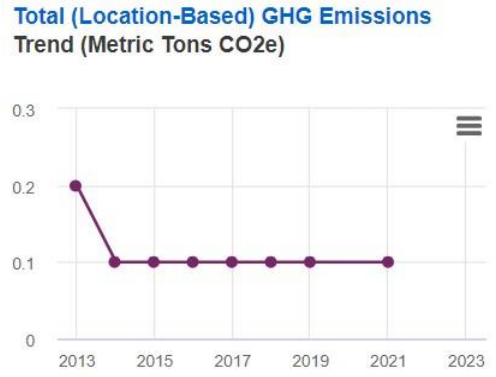




Foley Matheson Park

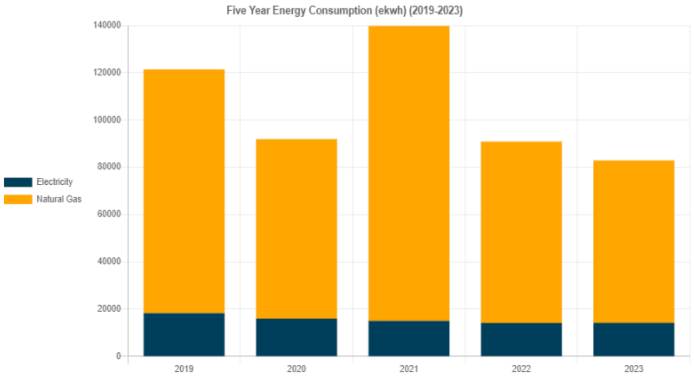
125 Rankin Lake Road, Seguin ON, P2A 2W8

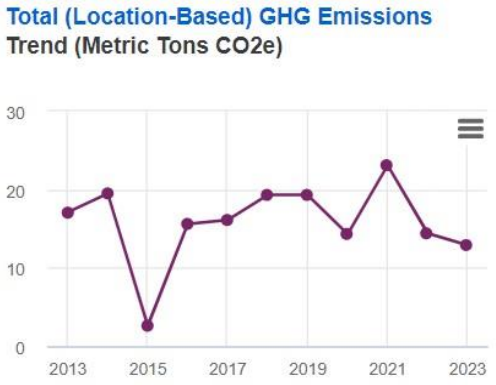




Foley Public Works Building

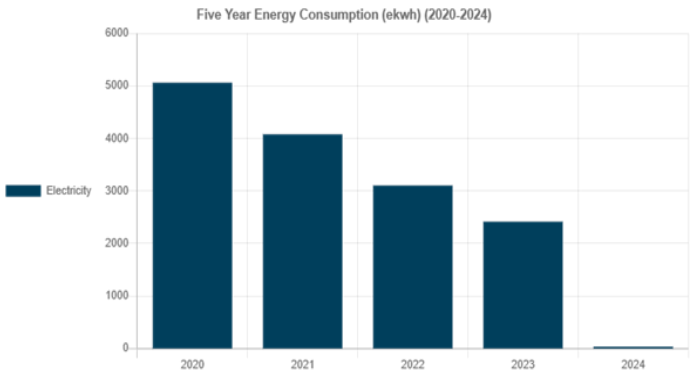
68 Rankin Road, Seguin ON, P2A 2W8

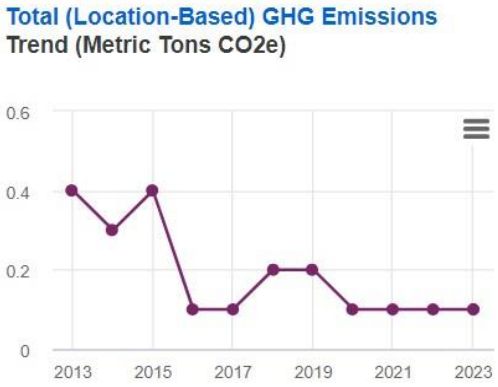




Hilltop Interiors (leased building)

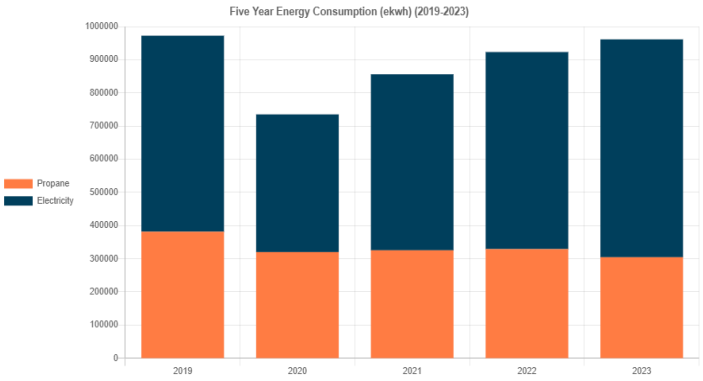
1142 Highway 141, Seguin ON, P2A 2W8

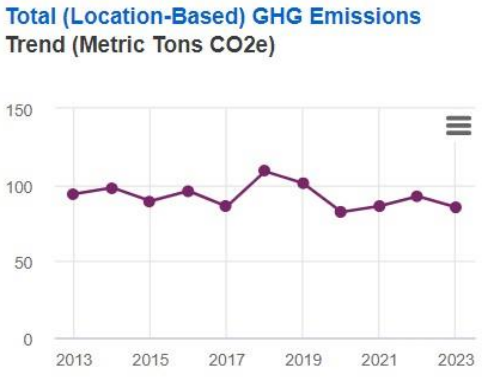




Humphrey Community Centre

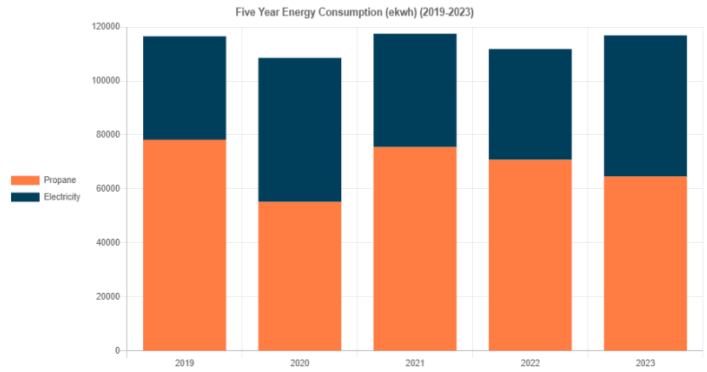
15 Humphrey Dr., Seguin ON, P2A 2W8

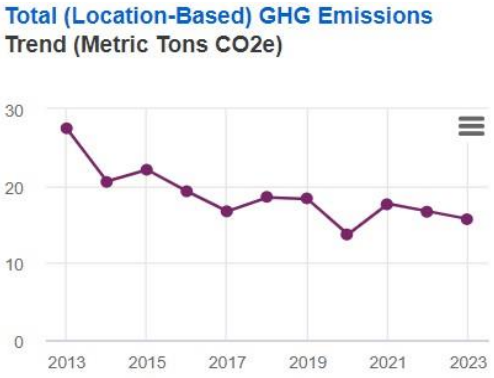




Humphrey Fire Hall

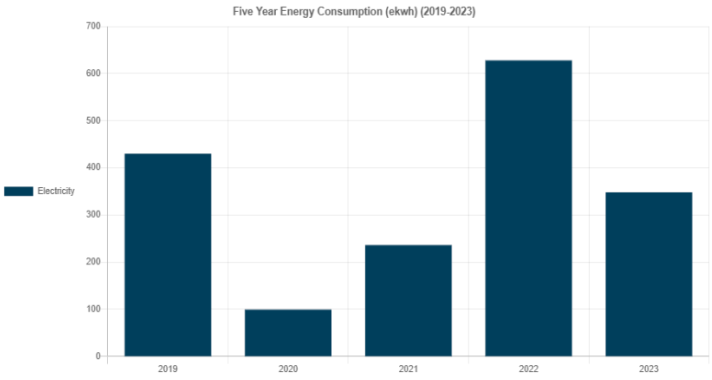
115 Highway 141, Seguin ON, P2A 2W8





Humphrey Museum

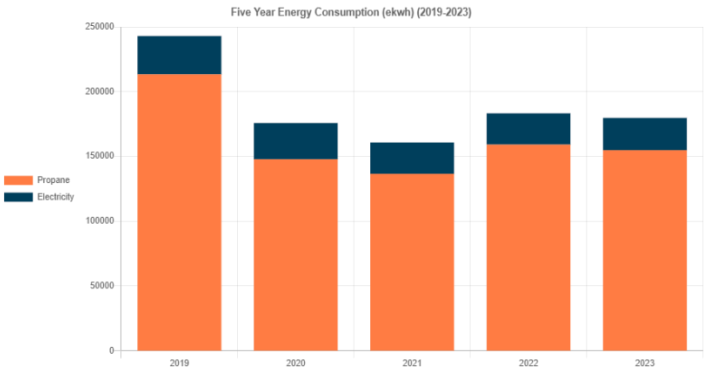
3 Museum Road, Seguin ON, P2A 2W8

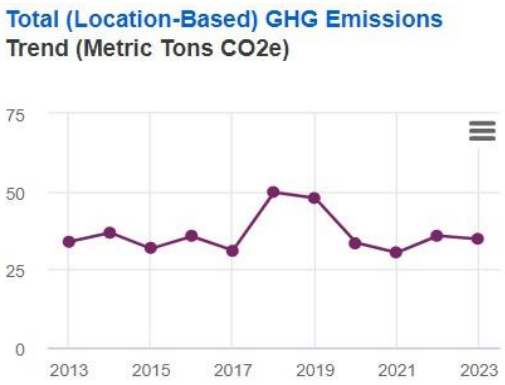


GHG emissions are too low to graph.

Humphrey Public Works Garage

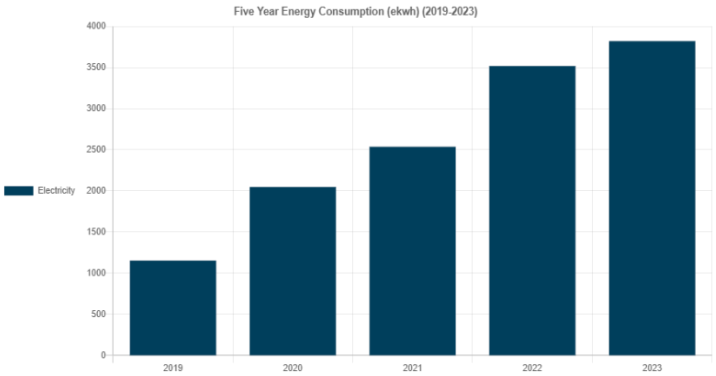
1 Humphrey Drive, Seguin ON, P2A 2W8

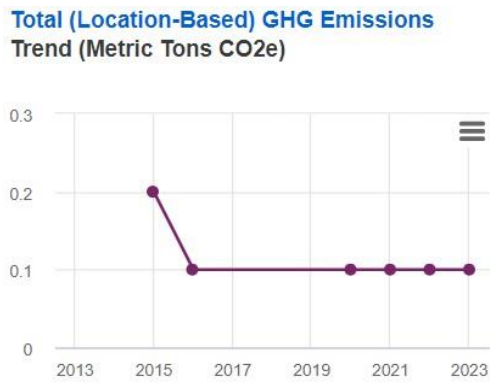




Humphrey Waste Transfer Station

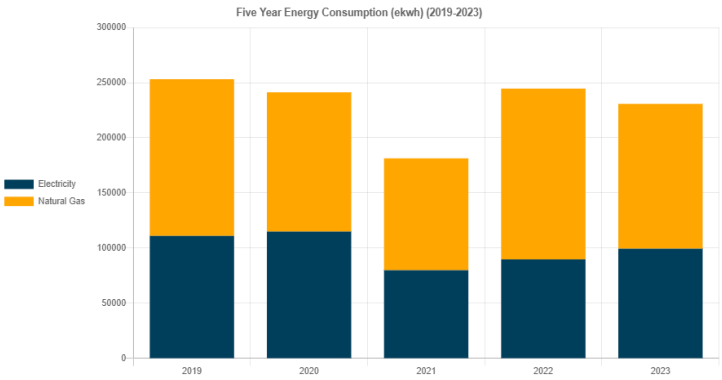
175 Highway 141, Seguin ON, P2A 2W8

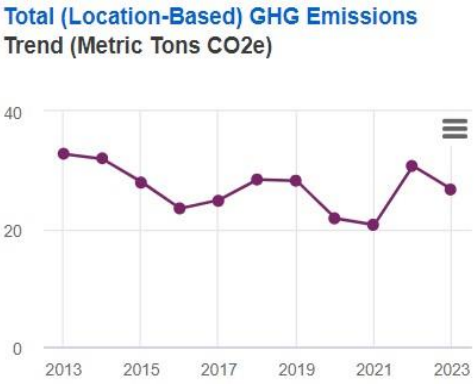




Orrville Community Centre & Seguin Public Library

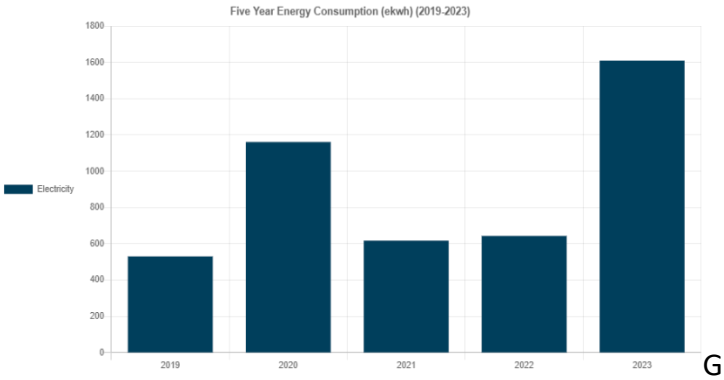
1207 Highway 518, Seguin ON, P2A 0B6





Parry Sound Area Municipal Airport - East Hanger Row A

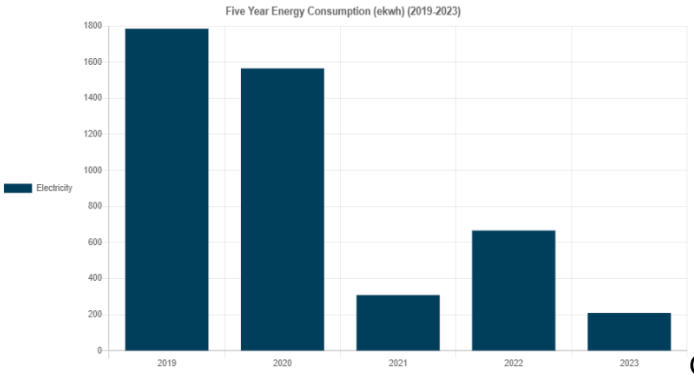
14 Access Rd, Seguin ON, P2A 2W8



GHG emissions are too low to graph.

Parry Sound Area Municipal Airport - East Hanger Row B

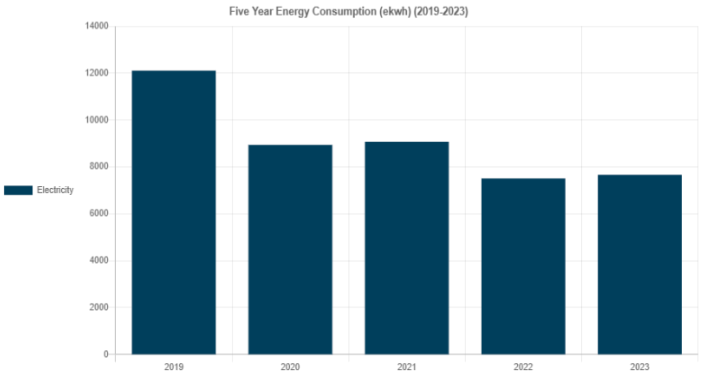
28 Access Rd, Seguin ON, P2A 2W8

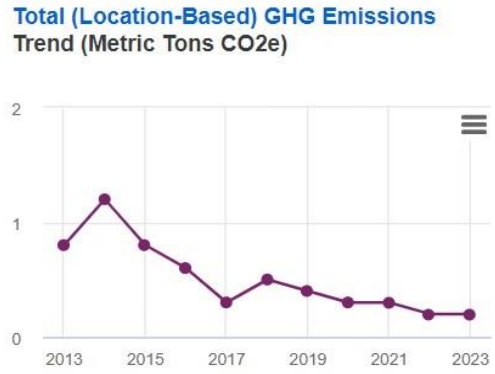


GHG emissions are too low to graph.

Parry Sound Area Municipal Airport - Hanger

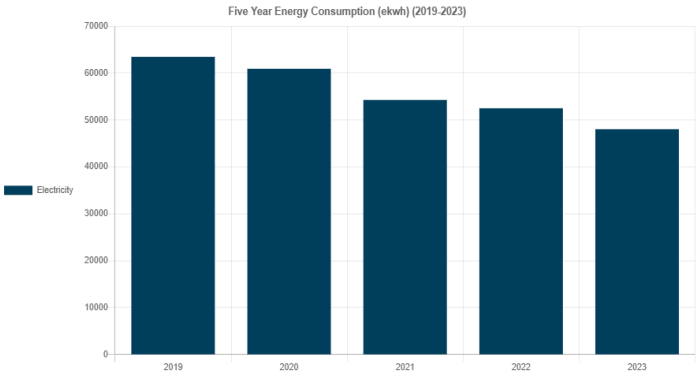
97 Airport Road, Seguin ON, P2A 2W8

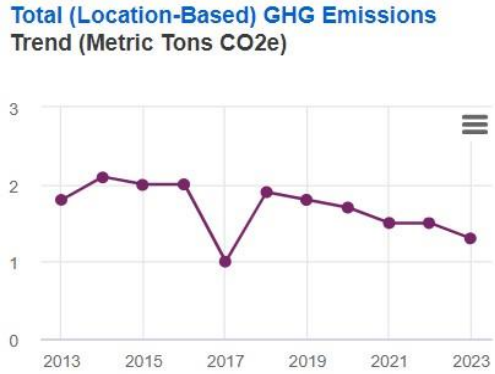




Parry Sound Area Municipal Airport - Main Terminal

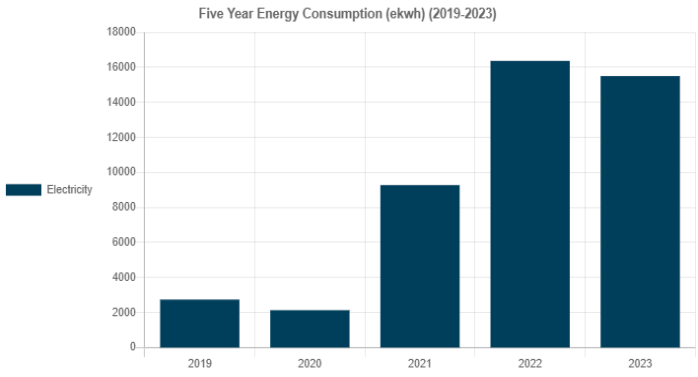
97 Airport Road, Seguin ON, P2A 2W8

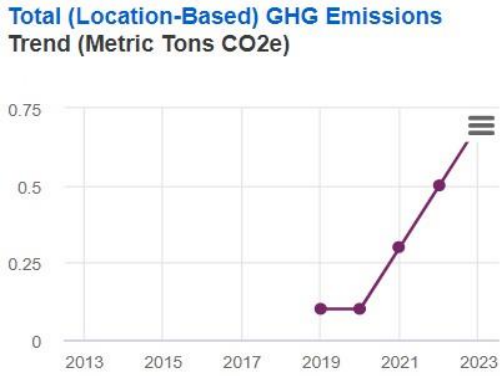




Parry Sound Area Municipal Airport - Wave Fibre Mill

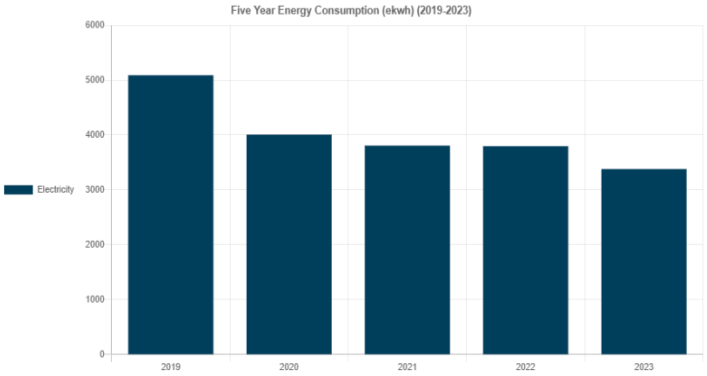
3 Murphy Rd., Seguin ON, P2A 2W8

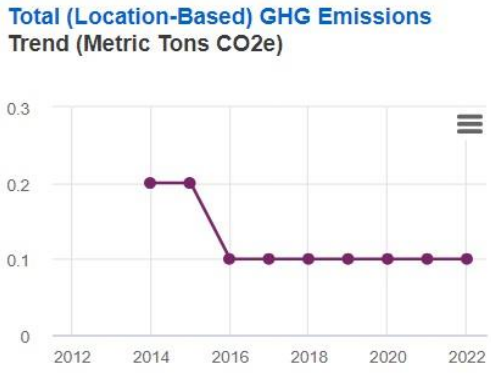




Parry Sound Area Municipal Airport East Washroom

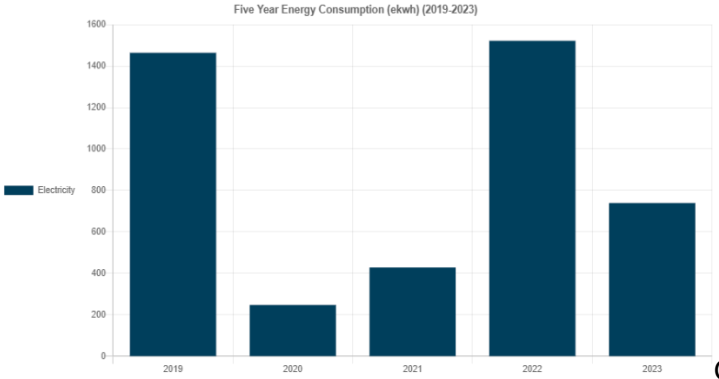
21 Access Rd, Seguin ON, P2A 2W8





Rosseau Field House

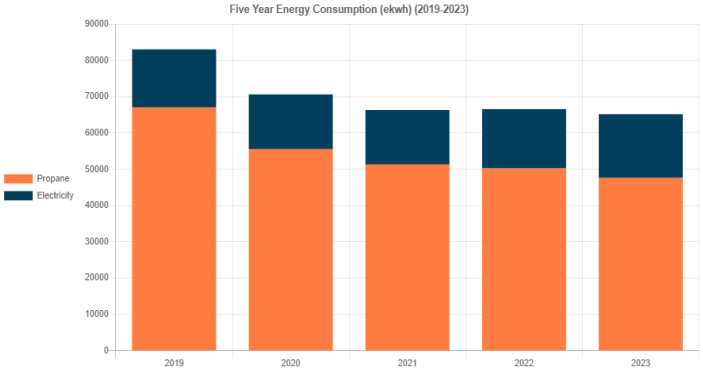
7 Ash Street North, Seguin ON, P2A 2W8

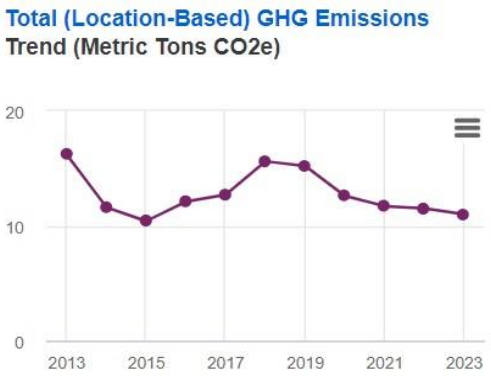


GHG emissions are too low to graph.

Rosseau Fire Hall

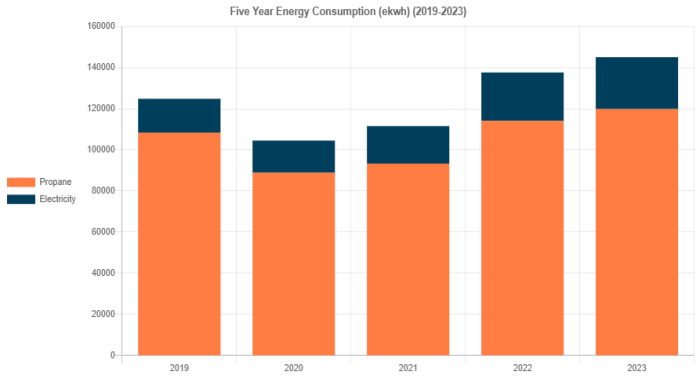
4 Victoria Street West, Rosseau ON, P0C 1J0

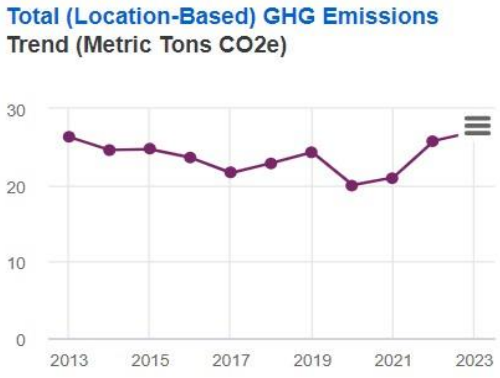




Rosseau Memorial Hall

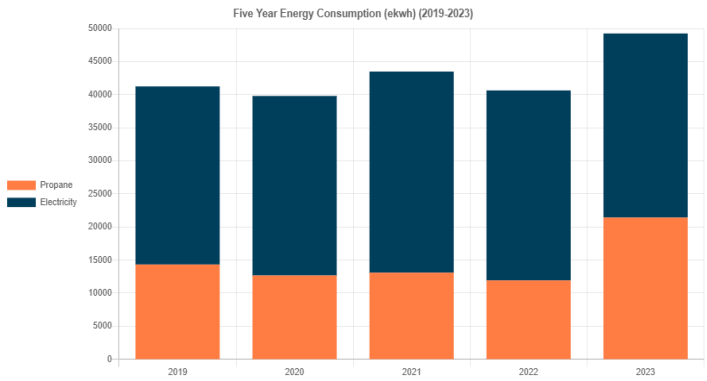
2 Victoria Street West, Rosseau ON, P0C 1J0

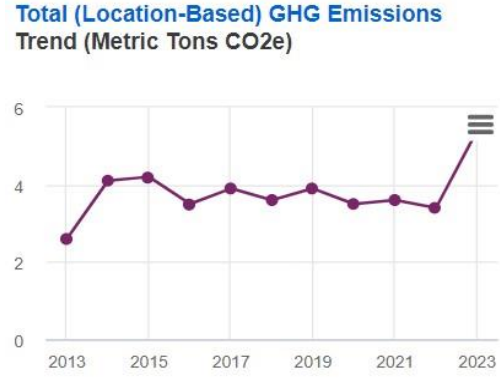




Rosseau Nursing Station (Ruth Date Health Clinic)

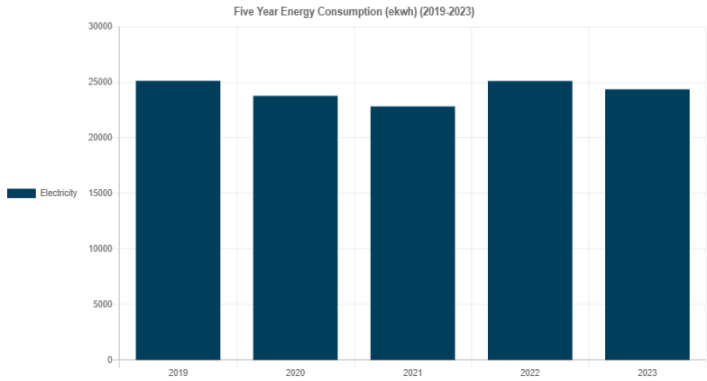
17 Victoria Street, Rosseau ON, P0C 1J0

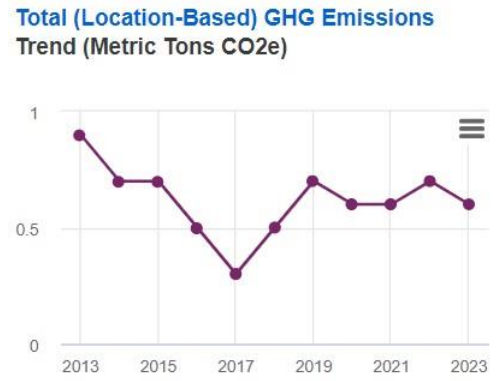




Rosseau Waterfront (Beach and Gazebo)

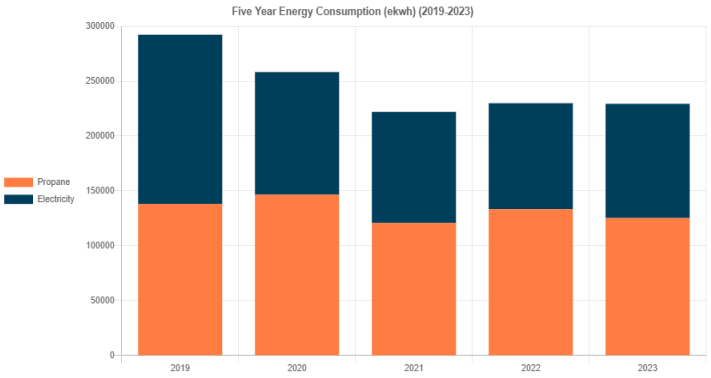
2 Jim Swift Drive, Rosseau ON, P0C 1J0

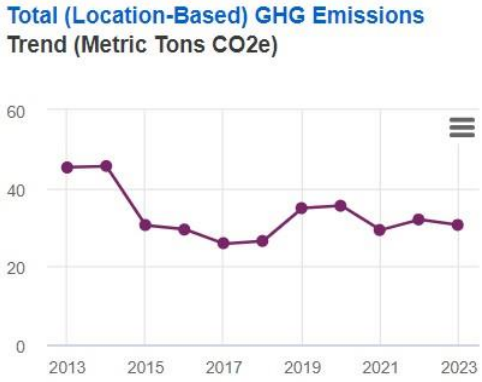




Seguin Municipal Office

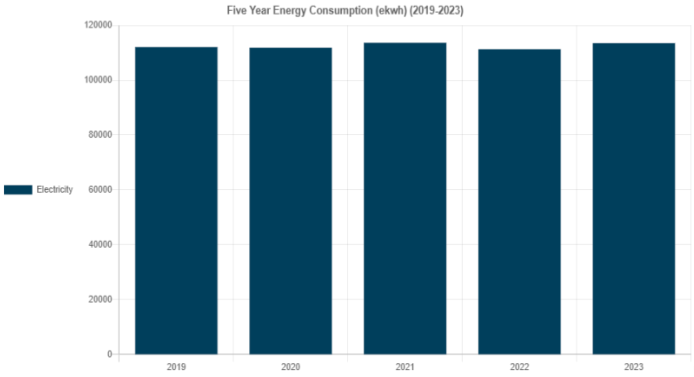
5 Humphrey Drive, Seguin ON, P2A 2W8





Streetlights (Accounts Aggregated)

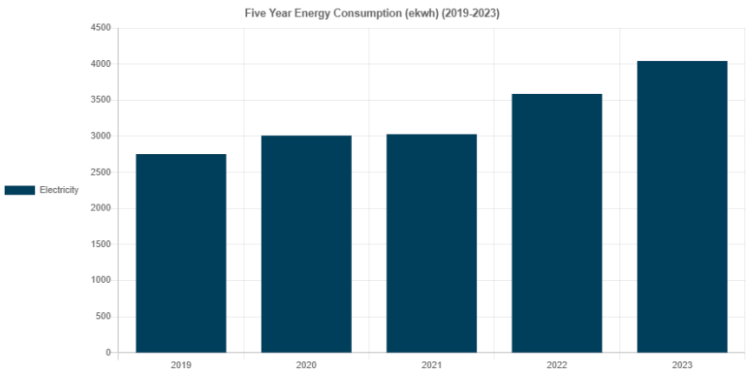
Various Locations throughout the Township

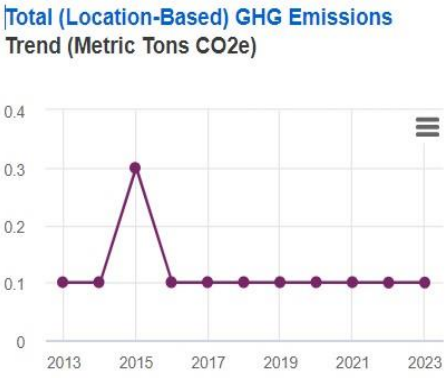


GHG emissions TBD

Turtle Lake Road Waste Transfer Station

Turtle Lake Road, Seguin ON, P2A 2W8





Appendix C – Facility Energy Audits

Municipal Building Energy Assessment Report

Prepared for:

Corporation of the Township of Seguin

5 Humphrey Drive,

Seguin, ON

Myles E. Donahue,

Building Performance Consultant

237 Lakewood Park, Huntsville, ON

705 788-1189/705 783-5784

Table of Contents

Background:

ASHRAE Level 2 energy audits are a comprehensive assessment of a building's energy usage and efficiency conducted according to the standards set by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE). This type of audit involves more detailed data collection and analysis compared to a Level 1 audit.

In an ASHRAE Level 2 energy audit, energy use data is collected over a longer period of time, to account for seasonal variations and to identify trends. Additionally, a more thorough analysis of building systems, such as HVAC (Heating, Ventilation, and Air Conditioning), lighting, and building envelope, is conducted. This may include measurements, simulations, and engineering calculations to assess the performance of these systems and identify opportunities for energy savings.

The audit reports include recommendations for energy efficiency improvements, along with estimates of potential energy and cost savings, payback periods, and implementation costs. Recommendations are often categorized based on their feasibility and cost-effectiveness, allowing building owners to prioritize actions based on their resources and goals.

At the request of the Township of Seguin, Level 2 Energy Assessments were performed on the following municipally owned buildings:

Seguin Municipal Office	5 Humphrey Drive	Seguin, Ontario
Humphrey Community Centre & Arena	15 Humphrey Drive	Seguin, Ontario
Humphrey Public Works Garage	1 Humphrey Drive	Seguin, Ontario
Humphrey Fire Hall	115 Hwy 141	Seguin, Ontario
Foley Fire Hall	58 Rankin Rd	Seguin, Ontario
Foley Public Works Garage	68 Rankin Rd.	Seguin, Ontario
Foley Community Centre	60 Rankin Rd	Seguin, Ontario
Orrville Community Centre & Library	1207 Hwy 518	Seguin, Ontario
Christie District Public Works	33 Star Lake Rd	Seguin, Ontario
Christie Fire Hall	1040 Hwy 518	Seguin, Ontario
Rosseau Fire Hall	4 Victoria St W.	Rosseau, Ontario

The purpose of each assessment was to document:

A. Building Envelope:

Assessment of the building envelope includes determining the effective thermal resistance values of the roof, wall structures, foundation and windows and doors as well as performing a blower door test to determine air leakage.

B. HVAC Systems:

Assessment of the HVAC system includes documentation of the fuel type, efficiency, approximate age and anticipated lifespan of the heating, cooling and

ventilation systems contained within the building. With information provided by the municipal staff, the daytime and nighttime thermostat settings will be included in determining the carbon footprint and energy consumption of the systems. Performance upgrades recommended will include estimates of the carbon footprint and utility use reductions.

C. Appliances/Systems/Lighting:

Assessment of the Appliances/Systems/Lighting contained within the building includes documentation of the fuel type, efficiency, approximate age and anticipated lifespan of the domestic hot water system(s), the efficiency of the lighting system(s), anticipated electrical consumption of equipment (i.e. ice making equipment) appliances and lighting. Performance upgrades will include estimates of carbon footprint and utility use reductions.

D. Building Operation:

As the operation of the building can significantly affect utility use, municipality staff will be requested to provide information regarding the operation of the building (hours of lighting, daytime/nighttime temperatures, ventilation rates).

Each of the buildings will be modelled in HOT2000 to determine anticipated energy consumption under Standard Operating Conditions. Modelled energy consumption will be compared to actual consumption of the calendar year 2022. Differences in consumption between modelled and actual are typically mainly due to activities within the building.

Upgrade recommendations provided for each building are based upon modelling and on-site observations. Recommendations may include automation or manual changes to set-back time/temperature, lighting, ventilation, and operation. Upgrade recommendations will include estimates of carbon footprint and energy use reductions.

Facilities:

Seguin Municipal Office

5 Humphrey Drive, Seguin, ON

The Seguin Municipal office contains a heated footprint of approx. 7494.7 sq. ft. with an additional second floor area of approx. 1642 sq. ft.

While the majority of the building is contained on a slab-on-grade foundation, a small portion of the building at the left rear contains a basement area.

2022 utility usage provided by public works indicates total utility usage of 103,067.4 kWh of electricity and 22,523.7 litres of propane.

Building Envelope:

The walls of the single floor space contain limited insulation (approx. R12) while those of the two-story portion located to the right consist of concrete walls with a brick facing.

While direct access to the flat roof construction was not available it appears that all flat roof sections contain approx. R20 insulation.

All windows are of dual pane construction and all entry doors are of steel construction. Windows and doors appear to be in good condition with minimal air leakage.

A blower door test conducted on the building observed an ACH50 of 5.61 with an Equivalent Leakage Area of approx. 931 sq. in. No major leakage locations were observed.

HVAC System:

The majority of heat is supplied by a condensing propane furnace and a condensing propane boiler, both located in the basement service area.
Some additional heat is provided by an Air source Heat pump located at the rear wall. Air conditioning is provided by the ASHP, an additional air conditioner located at the rear wall and a roof top unit mounted on the single-story section of the roof.

The majority of ventilation Is provided by the roof top unit. Interior air Is filtered by a HEPA air filter located in the basement service area and a second circulating unit located on the upper level. It was observed that the main ventilation system was in operation

outside of normal hours of operation on both occasions when the blower door test was attempted.

Lighting throughout the building consists of LED fixtures, the majority located in office spaces that contain individual controls.

Domestic hot water is provided by conventional electric storage tanks.

Modelling of the building envelope in HOT2000 observed the following breakdown of heat loss through the building envelope.

Component	Annual Heat Loss (%)
Ceiling	10.72
Main Walls	29.79
Doors	0.52
South Windows	8.34
East Windows	1.22
North Windows	2.20
West Windows	0.06
Slab-on-Grade	7.06
Basement Above Grade	10.08
Below Grade Foundation	4.72
Air Leakage and Ventilation	25.30

Modelling under Standard Operating Conditions anticipated a total utility usage of approx. 16,985.5 kWh of electricity and 22,356 litres of propane annually producing approx. 49.6 Tonnes/year of CO2. Actual consumption of the calendar year 2022 exceeded modelled consumption by 86,082 kWh and 167.13 litres of propane.

The major contributors to heat loss are the main walls (29.97%) and air exchange (25.30%).

Recommendations:

1. Suggest that the rooftop ventilator be equipped with either a timer or humidistat control to ensure that it is not in operation during evening hours. Modelling the system as operating for only 10 hours per day rather than 24 indicated a reduction in propane usage of approx. 472.92 litres and a decrease in CO2 output of approx. 1.04 Tonnes/year.
2. Suggest that, if a major renovation is planned for the building, all walls be increased to min. R20 insulation, and the roof be increased to R40. Estimated saving for this upgrade are 5,669.58 litres of propane and approx. 12.5 Tonnes of CO2 annually.

3. Actual electrical usage for 2022 is approx. 83.5% higher than modelling would indicate. While the building contains significant office/computer/communication equipment, it is suggested that an Electrician be consulted regarding the excess loading.

Humphrey Community Centre and Arena

15 Humphrey Drive, Seguin, ON

As interior conditions differ significantly between the arena area and the library/heated space adjacent to the arena, the two portions of the building were modelled separately.

The arena space occupies a footprint of approx. 26,331 sq. ft. while the heated space occupies approx. 6,464 sq. ft. with an upper level of approx. 5363 sq. ft Both portions of the building are constructed on slab-on-grade foundation.

2022 utility usage provided by public works indicates total utility usage of the facility to be 652,029.4 kWh of electricity and 60,087.6 litres of propane. It appears that approx. 2,158 kWh of electricity is used for exterior lighting as electrical grid #1 indicates consistent usage of 166 kWh/month.

Building Envelope:

> The arena is constructed with metal framing containing approx. R20 insulation in the walls and ceiling of the structure. The library/heated space is constructed of brick facing with approx. R20 insulation. All doors are of metal construction and all windows are dual pane units.
>
> The roof of the arena section appears to contain approx. R20 batt insulation while the flat roof section appears to contain approx. R40.
>
> Blower door tests conducted on the two sections of the building observed an AHC50 of 4.55 with an ELA of 1004 sq. in. for the arena and ACH50 of 3.57 with and ELA of 815.2 sq. in.

HVAC System:

> The major heat source for the heated portion of the building is radiant heat provided by a propane boiler. The machine area adjacent to the arena contains an exhaust fan and a balanced ventilation system is in use for the remainder of the heated portion of the building.

Lighting throughout the building consists of LED fixtures. It was estimated that the arena was lit 16 hours/day during summer months and 8 hours/day during the spring. It is estimated that this lighting schedule would consume approx. 31,600 kWh of electricity.

Facility staff indicated that the ice making equipment is in use for approx. 3 hours/day and operates for approx. 300 days/year. Given the size of the equipment it is anticipated that this equipment alone would consume approx. 80,568 kWh annually.

Modelling of the building envelopes in HOT2000 observed the following breakdown of heat loss through the building envelope.

Library/Heated Space:

Component	Annual Heat Loss (%)
Ceiling	11.65
Main Walls	9.31
Doors	5.50
South Windows	7.98
North Windows	2.03
West Windows	17.38
Slab-on-Grade	14.88
Air Leakage and Ventilation	31.2

Arena:

Component	Annual Heat Loss (%)
Ceiling	15.24
Main Walls	23.97
Doors	0.40
Slab-on-Grade	11.55
Air Leakage and Ventilation	48.84

Modelling under Standard Operating Conditions and including lighting and operation of the ice making system, the anticipated total utility usage is approx. 93, 178.9 kWh of electricity and 36,340 litres of propane annually producing approx. 64.2 Tonnes/year. of CO2. Actual consumption of the calendar year 2022 exceeded modelled consumption by 558,850 kWh and 23747.6 litres of propane.

It was noted that a number of other buildings are close to the facility. Given the large difference between modelled and actual consumption it may be possible that both the electrical and propane are shared by these buildings.

Recommendations:

1. It is possible that substantial electrical equipment is used that was not documented or that ice servicing equipment (i.e. Zamboni) uses substantial amounts of electricity

and/or propane during operation or that the estimates of system operating times are incorrect. In order to develop a plan for reducing energy consumption and the carbon footprint, suggest that a study be undertaken by staff to determine actual use time of equipment and its energy cost. From this data a plan could be made to reduce energy use in the operation of the arena.

2. When the current ice making equipment is to be replaced suggest consulting with the equipment manufacturer about installation of additional evaporators on the system to introduce the heat generated from ice making to the interior of the heated portion of the building during heating season.

Humphrey Public Works Garage

1 Humphrey Drive, Seguin. ON

The Humphrey Garage contains a heated area of approx. 7516 sq. ft. and contains six bays, each served by an overhead door, and a small office/storage area at the left end of the structure.

2022 utility usage provided by public works indicates total utility usage of 28151.47 kWh of electricity and 24,925.2 litres of propane.

Building Envelope:

The building walls of the shop space are of metal frame construction with sheet metal cladding on both the interior and exterior of the side and rear walls with stone facing on the front wall and contain R20 batt insulation within the framing. The rear and right side walls contain a concrete base (approx. 4' height) that is uninsulated and interior walls of the office/storage space are covered with drywall.

Roof construction consists of wood framed trusses @ 24" spacing containing approx. R20 blown cellulose insulation within the framing.

The foundation is slab on grade with a service pit located at the right end of the building.

Six metal overhead doors are located at the front wall of the bay area and one steel entry door is located on the front wall, one on the rear wall and one on the right side of the building. Each of the overhead doors contains fixed narrow space dual pane windows and dual pane windows were observed in exterior walls.

A blower door test conducted on the building observed an ACH50 of 7.3 with an Equivalent Leakage Area of approx. 1074 sq. in. The majority of air leakage was observed at weatherstripping and bottom sweeps of the overhead doors.

HVAC System:

The major heat source in the building consists of a series of propane fueled radiant heaters located just below the ceiling in the shop bays. These units are rated at 80% efficiency and are 20+ years old, which is at or near the end of their anticipated life expectancy.

A heat recovery ventilator provides fresh air to the office/storage space while the shop space contains an exhaust fan located at the right end of the building. An electric water heater provides domestic heated water to the washroom area.

Lighting in the shop area consists of 132 4' LED overhead lights contained in 44 fixtures.

The shop area contains 2 air compressors and equipment typical of a vehicle maintenance shop, including a gasoline powered pressure washer vented to the exterior of the building.

Operating Conditions:

During a conversation with staff in the building the following operating conditions were provided.

Lighting in the shop area is typically in operation from approx. 3 AM to 12 PM daily.

The thermostat set point in the shop area is typically 60 degrees F during the heating season.

It is typical during heating season for trucks to be loaded with sand/salt mix prior to being parked within the building overnight.

Modelling of the building envelope in HOT2000 observed the following breakdown of heat loss through the building envelope.

Component	Annual Heat Loss (%)
Ceiling	15.66
Main Walls	24.39
Doors	13.17
South Windows	0.53
South East Windows	0.74
North East Windows	1.49
South West Windows	5.79
Slab-on-Grade	14.95
Air Leakage and Ventilation	23.29

Modelling under Standard Operating Conditions anticipated a total utility usage of approx. 13,985 kWh of electricity and 16,653 litres of propane annually producing approx. 54.344 Tonnes/year of CO_2. Actual consumption of the calendar year 2022 exceeded modelled consumption by 14,166 kWh and 8,272 litres of propane.

The major contributors to heat loss through the structure are the uninsulated portion of the main walls (24.39%) and air leakage (23.29%). The ceiling also provides significant heat loss.

Recommendations:

When providing recommendations for any building it is typical to start with items that would reduce heat loss through the structure (insulation, air sealing, etc.) as these are upgrades that are considered permanent and they will also reduce HVAC requirements which could result in smaller units required for heating and cooling.

1. Suggest installation of R20 insulation on the interior surface of the exposed concrete wall portions on the rear and right sides of the building. This insulation should be covered with appropriate fire-rated material on the interior. Insulating these wall sections would reduce propane consumption by approx. 2,428 litres annually and reduce CO2 output by approx. 1.238 tonnes
2. Install new weatherstripping and door bottom sweeps on each of the overhead doors to reduce air leakage to approx. 5.0 ACH50. This would reduce propane consumption by approx. 1,049 litres annually and reduce CO2 output by approx. 535 Kg annually.
3. Increase insulation level in the attic to approx. R60 with the addition of blown in cellulose insulation. This would reduce propane consumption by approx. 2,126 litres annually and reduce CO2 output by approx. 2.2126 Tonnes annually.
4. Replace the current radiant heating systems with high efficiency (approx. 95% efficiency) forced air units. These units could be located on the rear wall of the building with heat ducting at just above floor level.
   If none of the building envelope upgrades are done prior to furnace installation the annual propane consumption would be reduced by approx. 3,822 litres annually and the CO2 output would be reduced by approx. 1.98 Tonnes annually. Combined with the upgrades to the building envelope the total consumption reduction would be approx. 8,468 litres annually with a CO2 reduction of approx. 4.32 Tonnes annually.
5. It was advised that shop lighting operates for approx. 21 hours daily, resulting in approx. 1,011.78 kWh of consumption annually. Installation of motion sensors on the lighting is estimated to reduce total lighting to approx. 6 hours/day resulting in an annual savings of approx. 772.7 kWh.
6. Loading trucks with sand/salt mix and parking them overnight in the heated shop creates a significant load on the heating system as well as potentially creating other problems.
   With the current heating system, it is calculated that bringing 8 Tonnes of sand from -15 C. to +15 C. would require 9.2 litres of propane. Six trucks parked overnight would require 55.2 litres of propane just for the sand/salt mix. This calculation does not include the heat required to bring the vehicle up to temperature.
   Should the sand/salt mix contain ice or snow, the melting could introduce a concentrated saline solution to portions of the truck located under the cargo bed resulting in significant rust potential. Additionally, melting of ice/snow could

dissolve a portion of the salt resulting in clumping of sand under freezing conditions which can interfere with application.
Suggest that the trucks not be loaded prior to parking overnight. This may require an earlier start time to load trucks in the morning.

7. It was observed that heating fuel consumption was substantially higher than modelling predicts indicating that overhead doors may be being left open for substantial periods during heating season. Suggest that all overhead door mechanisms be equipped with timers that will automatically close the doors after a 15-to-30-minute opening time.

Humphrey Fire Hall

115 Highway 141, Seguin, ON

The Humphrey Fire Hall contains a heated footprint of approx. 7566 sq. ft. with 4 bays and an office/storage space.

2022 utility usage provided by public works indicates total utility usage of 46,146 kWh of electricity and 12,651.2 litres of propane.

Building Envelope:

The building walls are of frame construction with sheet metal cladding on the exterior of the right side and rear walls with stone facing on the front and left side wall and contain R20 batt insulation within the framing. The interior finish is drywall.

Roof construction consists of wood framed trusses @ 24" spacing containing approx. R20 blown cellulose insulation within the framing.

The foundation is slab on grade concrete. As the slab contains in floor radiant heating, it was estimated that R20 insulation was installed under the entire slab foundation.

Four metal overhead doors were observed, three on the front wall and one on the rear wall. Four entry doors were observed, a single door on the left and two on the rear wall and a double door on the front wall. Nine dual pane vinyl windows have been installed on the exterior walls.

HVAC System: The major heat source in the building consists of a condensing boiler (95% efficiency) servicing in-floor radiant heating and an Enerzone air exchange space heating unit.

Lighting consists of 35 LED fixtures for a total of 1.4 KW of load. It was advised that lighting is in use for approx. 10 years/day which would require 6,132 kWh of electricity annually.

Modelling of the building envelope in HOT2000 observed the following breakdown of heat loss through the building envelope.

Component	Annual Heat Loss (%)
Ceiling	18.79
Main Walls	16.09

Doors	11.02
South Windows	0.53
West Windows	3.80
Slab-on-Grade	12.26
Air Leakage and Ventilation	34.12

Modelling under Standard Operating Conditions anticipated a total utility usage of approx. 1,335.8 kWh of electricity and 11,808 litres of propane annually producing approx. 31.039 Tonnes/year of CO2. Actual consumption of the calendar year 2022 exceeded modelled consumption by 44,810 kWh and 843.1 litres of propane.

It is suggested that the additional propane usage is due to re-heating of fire equipment after a call-out and operation of the overhead doors.

Modelling indicates that the major contributors to heat loss through the building envelope are air leakage and ceiling insulation.

Recommendations:

1. Increase insulation level in the attic to approx. R60 with the addition of blown in cellulose insulation. This would reduce propane consumption by approx. 1,731 litres annually and reduce CO2 output by approx. 882 Kg. annually.
2. Installing new weatherstripping and door bottom sweeps on the overhead doors and installing weatherstripping and a sweep on the rear entry door is estimated to reduce propane consumption by an additional 971 litres annually resulting in a reduction in CO2 output of approx. 492 Kg.
3. Actual electrical consumption exceeds anticipated consumption by approx. 600%. Suggest that an Electrician be consulted to determine the cause of the additional load which amounts to approx. 4.4 kWh continuous.
4. It was observed that heating fuel consumption was higher than modelling predicts indicating that overhead doors may be being left open for substantial periods during heating season. Suggest that all overhead door mechanisms be equipped with timers that will automatically close the doors after a 15-to-30-minute opening time.

Foley Fire Hall

58 Rankin Rd., Seguin, ON

The Foley Fire Hall contains a heated footprint of approx. 5782 sq. ft. which includes 3 bays and a 2-floor office/storage area located on the right of the building.

2022 utility usage provided by public works indicated total utility usage of 24,634.04 kWh of hydro and 8,519 cubic metres of natural gas.

Building Envelope:

The building walls are of metal frame construction with sheet metal cladding on the exterior of walls and contain approx. R 20 blanket insulation within the framing. The interior walls adjacent to the office space contains gypsum interior finish and metal finish was observed on the lower portion of the walls in the bay area. Upper bay area walls are unfinished.

Roof construction consists of steel framing @ 24" spacing containing approx. R40 blanket insulation over metal interior finish. Office space contains gypsum finish.

The foundation consists of a heated slab-on-grade foundation under the entire structure. As the slab contains radiant heat, it was assumed that the slab is insulated with approx. R20 insulation below the slab.

Five metal overhead doors were observed, 3 on the front walls and 2 on the rear. Four steel entry doors were observed. The front entry door contains windows in the door and to the side in the door opening. Fourteen dual pane vinyl windows have been installed on the exterior walls.

HVAC System: The heating system consists of two high efficiency condensing propane boilers which heat the entire structure through the radiant heat system.

Lighting consists of overhead LED fixtures.

Domestic hot water is provided by radiant heating boilers.

Ventilation consists of a heat recovery ventilator for the office space and an exhaust fan located on the right-side wall.

Modelling of the building envelope in HOT2000 observed the following breakdown of heat loss through the building envelope.

Component	Annual Heat Loss (%)
Ceiling	11.19
Main Walls	31.84
Doors	13.07
South Windows	4.54
East Windows	3.60
North Windows	1.48
Slab-on-Grade	20.78
Air Leakage and Ventilation	13.50

Modelling under Standard Operating Conditions anticipated a total utility usage of approx. 8,970.2 kWh of electricity and 7,679.53 cubic metres of natural gas which provide an annual CO2 footprint of approx. 17.12 Tonnes. Actual consumption of the calendar year 2022 exceeded modelled consumption by approx. 15,663.8 kWh and 839.47 cubic metres of natural gas.

Recommendations:

1. Given the insulation levels present in the building, the efficiency of the HVAC system and the lack of significant air leakage, there are no upgrades to the building envelope or HVAC system that would have a significant impact on operating expenses. The additional natural gas usage over modelled consumption appears to be the result of use of the overhead doors.
2. As the actual hydro usage is significantly higher than the modelled, suggest that an Electrician be consulted to determine the cause of the additional load which amounts to approx. 1.9 kWh continuous. Nothing was observed in the building that would use this amount of electricity.
3. It was observed that heating fuel consumption was higher than modelling predicts indicating that overhead doors may be being left open for substantial periods during heating season. Suggest that all overhead door mechanisms be equipped with timers that will automatically close the doors after a 15-to-30-minute opening time.
4. It appears that lighting is in use for the majority of the day. Installation of motion sensors could reduce electrical consumption to similar levels to the modelled consumption.

Foley Public Works Garage

68 Rankin Rd., Seguin, ON

The Foley Public Works Garage contains a heated footprint of approx. 5424 sq. ft. which includes 6 bays to the front of the building and a storage area to the rear.

2022 utility usage provided by public works indicated total utility usage of 16,298.73 kWh of hydro and 8,330 cubic metres of natural gas.

Building Envelope:

The building walls indicate that the building was constructed in two phases. The front portion appears to have been the original construction with block walls with wood framed interior and contains approx. R12 insulation within the framing. Approx. 20 feet of the right-side wall contains no insulation. Above the original structure additional wood framing has been installed which contains approx. R20 insulation. The entire surface has been covered with metal exterior siding. The rear portion is constructed of wood framing with R20 insulation, metal exterior and drywall interior.

Roof construction consists of two roof sections both of which are of truss construction @ 24” o/c with approx. R32 Insulation.

The foundation is constructed as a slab-on-grade. No indications of sub floor insulation were observed.

The building contains six overhead doors on the front wall, a single-entry door with window on the right-side wall and a solid metal door on the rear wall. Dual pane windows were observed on the rear and right-side walls.

HVAC System:

The heating system consists of medium efficiency gas fired wall mounted heaters.

No ventilation system has been installed.

Lighting consists of overhead LED fixtures which were modelled as in use for 8 hours/day providing a lighting load of 8,960 kWh annually.

Domestic hot water is provided by a natural gas condensing instantaneous water heater.

Modelling of the building envelope in HOT2000 observed the following breakdown of heat loss through the building envelope.

Component	Annual Heat Loss (%)
Ceiling	9.55
Main Walls	19.19
Doors	15.75
South Windows	1.27
East Windows	2.97
North Windows	2.35
West Windows	3.0
Slab-on-Grade	12.93
Air Leakage and Ventilation	30

Modelling under Standard Operating Conditions anticipated a total utility usage of approx. 10,880 kWh of electricity and 7,521 cubic metres of natural gas which provide an annual CO2 footprint of approx. 16.81 Tonnes. Actual consumption of the calendar year 2022 exceeded modelled consumption by approx. 5,718 kWh and 809 cubic metres of natural gas.

Recommendations:

1. Suggest that R20 insulation be installed on the interior of the bare concrete block exterior wall located at the right side of the building. This would provide a saving of approx. 626 cubic metres of natural gas with a CO2 reduction of approx. 1.38 Tonnes.
2. Significant air leakage was observed at weatherstripping and sill plates of the overhead doors. Elimination of this leakage could provide a saving of approx. 1,571.6 cubic metres of natural gas with a CO2 reduction of approx. 3.45 Tonnes.

3. It was observed that heating fuel consumption was higher than modelling predicts indicating that overhead doors may be being left open for substantial periods during heating season. Suggest that all overhead door mechanisms be equipped with timers that will automatically close the doors after a 15-to-30-minute opening time.

4. The heating system appears to be approaching the end of its anticipated lifespan. When replacement is required suggest replacement with condensing units with approx. 95% efficiency. This would result in a further reduction of approx. 860.8 cubic metres of natural gas with a CO2 reduction of approx. 1.9 Tonnes.

5. It appears that lighting is in use for the majority of the day. Installation of motion sensors could reduce electrical consumption to similar levels to the modelled consumption.

Foley Community Centre

60 Rankin Rd., Seguin, ON

The Foley Community Centre and Library contains a heated footprint of approx. 10,834 sq. ft. which includes the library to the right side of the building, a kitchen/storage/service area to the rear of the building and a community space located at the right side of the building.

2022 utility usage provided by public works indicated total utility usage of 91,416.9 kWh of hydro and 12,706 cubic metres of natural gas.

Building Envelope:

The building walls are of metal frame construction with sheet metal cladding on the majority of exterior of walls with stone facing on the lower portion of the front and part of the right side. Walls contain approx. R20 blanket insulation within the framing. The interior walls are finished with drywall.

Roof construction consists of two roof sections. The flat roof section (approx. 4,330 sq. ft.) contains approx. R40 insulation within the framing. The remainder of the roof consists of wood trusses @ 24" spacing containing approx. R40 blown-in insulation.

The foundation is constructed as a slab-on-grade.

All doors are metal construction, the majority containing windows. All door windows are dual pane vinyl units. All windows are dual pane vinyl units.

HVAC System:

The heating system consists of two zoned systems, one serving the library and one the community centre portion of the building. Each of the systems contains an air conditioning unit with compressors located at the rear of the building.

Ventilation consists of two heat recovery ventilators attached to the duct work of each system.

Lighting consists of overhead LED fixtures.

Modelling of the building envelope in HOT2000 observed the following breakdown of heat loss through the building envelope.

Component	Annual Heat Loss (%)
Ceiling	14.70
Main Walls	19.45
Doors	2.30
South Windows	2.17
East Windows	5.12
North Windows	3.66
West Windows	3.0
Slab-on-Grade	21.31
Air Leakage and Ventilation	28.30

Modelling under Standard Operating Conditions anticipated a total utility usage of approx. 20,603.9 kWh of electricity and 8,755.56 cubic metres of natural gas which provide an annual CO2 footprint of approx. 13.85 Tonnes. Actual consumption of the calendar year 2022 exceeded modelled consumption by approx. 70,813 kWh and 6,646.2 cubic metres of natural gas.

The building envelope does not contain components that would provide significant savings through upgrades.

The building contains a bar area, commercial kitchen and freezers, fridges and drink coolers. During the assessment it was noted that all fridges, coolers and freezers were in operation although the community centre portion of the building was not in use. Suggest that these appliances be disconnected when not in use.

Christie Fire Hall

1040 Highway 518, Seguin, ON

The Christie Fire Hall contains a heated footprint of approx. 2,576.5 sq. ft. on the main floor and an upper level of approx. 1548 sq. ft.

2022 utility usage provided by public works indicated total utility usage of 9,855.79 kWh of hydro and 7497.9 litres of propane.

Building Envelope:

The building walls are of frame construction with sheet metal cladding on the exterior of walls and contain R20 batt insulation within the framing. Interior finish is drywall. Approx. 3' height of the front and both side walls are of bare concrete construction.

Roof construction consists of wood framed trusses @ 24" spacing containing approx. R40 insulation within the framing.

The foundation consists of two slab on grade concrete areas on either side of a crawl space containing one of the heating systems.

Two metal overhead doors were observed on the front walls of the bay and three entry doors were observed, two on the mail level, and one on the upper level. Four dual pane vinyl windows have been installed on the exterior of the upper level.

HVAC System:

Two propane furnaces were observed within the building. The furnace located in the crawl space is a high efficiency (approx. 95%) condensing propane unit while the overhead furnace located in the right side bay is a standard efficiency (approx. 80%). The bay furnace heats the majority of the building.

Lighting consists of 42 LED fixtures for a total of 1.68 KW of load. It was advised that lighting is in use for approx. 10 years./day which would require 6,132 kWh of electricity annually.

Domestic hot water is provided by an electric water heater.

Modelling of the building envelope in HOT2000 observed the following breakdown of heat loss through the building envelope.

Component	Annual Heat Loss (%)
Ceiling	6.44
Main Walls	47.73
Doors	5.78
North East Windows	4.71
West Windows	1.16
South West Windows	5.97
Slab-on-Grade	14.03
Crawl Space	3.76
Air Leakage and Ventilation	10.43

Modelling under Standard Operating Conditions anticipated a total utility usage of approx. 9,344 kWh of electricity and 6,622 litres of propane annually producing approx. 3.61 Tonnes/year of CO2. Actual consumption of the calendar year 2022 exceeded modelled consumption by 522.79 kWh and 875.9 litres of propane.

It is suggested that the additional propane usage is due to re-heating of fire equipment after a call-out or operation of the overhead doors.

Modelling indicates that the major contributor to heat loss through the building envelope is the uninsulated portion of main level walls.

Recommendations:

1. Suggest installation of R20 insulation on the interior surface of the exposed concrete wall portions. An appropriate fire-resistant interior surface should be installed. This would reduce propane use by approx. 2,440 litres annually and reduce the carbon footprint by approx. 1.24 Tonnes.
2. It was observed that heating fuel consumption was higher than modelling predicts indicating that overhead doors may be being left open for substantial periods during heating season. Suggest that all overhead door mechanisms be equipped with timers that will automatically close the doors after a 15-to-30-minute opening time.
3. It appears that lighting is in use for the majority of the day. Installation of motion sensors could reduce electrical consumption to similar levels to the modelled consumption.
4. Overhead doors provide significant air leakage. Suggest that maintenance be conducted on the weatherstripping/sweeps of all overhead doors on a regular basis.

Orrville Community Centre & Library

1207 Hwy 518, Seguin, ON

The Orrville Community Centre and Library contains a heated footprint of approx. 9,210.5 sq. ft. which includes the library to the right side of the building, a kitchen/storage/service area to the rear of the building and a community space located at the right side of the building. Given the footprint of the building it was necessary to split the modelling of the building, modelling the library space separately from the remainder.

2022 utility usage provided by public works indicated total utility usage of 90,173.4 kWh of hydro and 15,569 cubic metres of natural gas.

Building Envelope:

The building walls are of metal frame construction with sheet metal cladding on the exterior of walls and contain approx. R20 blanket insulation within the framing. The interior walls are finished with drywall.

Roof construction consists of wood trusses @ 24" spacing containing approx. R40 blown-in insulation.

The foundation is constructed as a slab-on-grade.

All doors are metal construction, the majority containing windows. All windows are dual pane vinyl units.

HVAC System:

The heating system consists of three zoned systems, one located on the roof of the community hall area, with a second standard efficiency furnace located in the service area and a condensing natural gas furnace. Air conditioning is provided by the roof top unit.

Ventilation consists of a heat recovery ventilator attached to the duct work and exhausting through the upper wall behind the roof top unit.

Lighting consists of overhead LED fixtures.

Modelling of the building envelope as 2 sections in HOT2000 observed the following breakdown of heat loss through the building envelope.

Library Section:

Component	Annual Heat Loss (%)
Ceiling	36.17
Main Walls	18.76
Doors	0.87
North East Windows	2.53
North West Windows	5.07
South West Windows	8.96
Slab-on-Grade	17.18
Air Leakage and Ventilation	10.47

Community Hall Section:

Component	Annual Heat Loss (%)
Ceiling	15.56
Main Walls	6.07
Doors	1.40
South Windows	4.68
South East Windows	10.52
North East Windows	7.29
North West Windows	6.37
Slab-on-Grade	18.47
Air Leakage and Ventilation	29.63

Modelling under Standard Operating Conditions anticipated a total utility usage of approx. 19,059.4 kWh of electricity and 8,755.56 cubic metres of natural gas which provide an annual CO2 footprint of approx. 19.8 Tonnes. Actual consumption of the calendar year 2022 exceeded modelled consumption by approx. 7,114 kWh and 6,813.4 cubic metres of natural gas.

The building envelope does not contain components that would provide significant savings through upgrades.

The heating/cooling system is close to the end of its anticipated lifespan. Replacement of the current furnaces with 95% efficiency condensing units could provide a reduction in natural gas usage of approx. 1,296.9 cubic metres with a corresponding CO2 reduction of approx. 2.86 Tonnes annually.

The building contains a bar area, commercial kitchen and freezers, fridges and drink coolers. During the assessment it was noted that all fridges, coolers and freezers were in operation although the community centre portion of the building was not in use.

Christie Public Works

33 Star Lake Rd, Seguin, ON

The Christie Public Works Garage contains a heated footprint of approx. 3,076 sq. ft. which includes 3 service bays and a small office/storage area located to the right side of the building.

2022 utility usage provided by public works indicated total utility usage of 21,025.18 kWh of hydro and 6,554.5 cubic meters of natural gas. Additional on-site exterior lighting utilized 2,158 kWh of electricity.

Building Envelope:

The building walls are of metal frame construction with sheet metal cladding on the exterior of walls and contain approx. R20 blown cellulose insulation within the framing. There is no interior finish in the bay section and part of the right interior wall adjacent to the office space contains gypsum interior finish.

Roof construction consists of steel framing @ 24" spacing containing approx. R20 blown cellulose insulation. No interior finish was observed at the roof structure.

The foundation consists of a slab-on-grade foundation under the entire structure.

Three metal overhead doors were observed on the front walls of each bay and four steel entry doors were observed. Five dual pane vinyl windows have been installed on the exterior walls.

HVAC System: The heating system consists of two wall mounted forced air units located in the shop area and baseboard electric supplemental heat in the office space.

Lighting consists of 10 – 8' and 4 -4' overhead dual overhead LED fixtures.

Domestic hot water is provided by an electric water heater.

Modelling of the building envelope in HOT2000 observed the following breakdown of heat loss through the building envelope.

Component	Annual Heat Loss (%)
Ceiling	11.73

Main Walls	32.67
Doors	11.36
South Windows	2.04
North East Windows	0.96
North West Windows	2.16
South West Windows	1.02
Slab-on-Grade	12.68
Air Leakage and Ventilation	25.37

Modelling under Standard Operating Conditions anticipated a total utility usage of approx. 14,423.4 kWh of electricity and 6,637.5 cubic meters of natural gas annually producing approx. 14.96 Tonnes/year of CO2. Actual consumption of the calendar year 2022 exceeded modelled consumption by 6,601.78 kWh. Actual natural gas consumption was 83 cubic meters less than modelled which could be accounted for by the electric heating in the office area.

Recommendations:

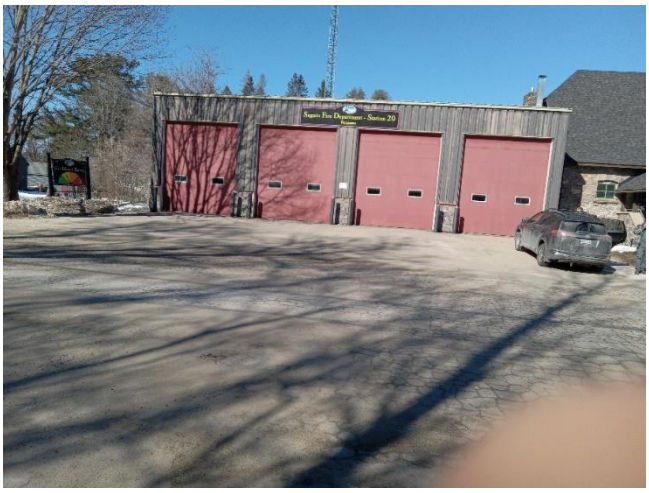
1. Modelling indicated that the major portion of heat loss is due to worn weatherstripping and sweeps on the overhead doors. Replacing the weatherstripping and door sweeps is estimated to save approx. 265 cubic meters of natural gas annually reducing the CO2 footprint by approx. 583 Kg.
2. It appears that, similar to the Humphrey Public works garage, lighting is in use for the majority of the day. Installation of motion sensors could reduce electrical consumption to similar to the modelled.
3. It was observed that heating fuel consumption was higher than modelling predicts indicating that overhead doors may be being left open for substantial periods during heating season. Suggest that all overhead door mechanisms be equipped with timers that will automatically close the doors after a 15-to-30-minute opening time.

Rosseau Fire Hall

4 Victoria St. W., Rosseau, ON

The Rosseau Fire Hall contains a heated footprint of approx. 2,808 sq. ft. which includes 4 bays and a small 2 floor office/storage area located on the rear of the building.

2022 utility usage provided by public works indicated total utility usage of 18,149.23 kWh of hydro and 8,656.1 litres of propane.



Building Envelope:

The building walls are of metal frame construction with sheet metal cladding on the exterior of walls and contain approx. R8 batt insulation within the framing. The interior walls adjacent to the office space contains gypsum interior finish and meal finish was observed on the lower portion of the walls in the bay area. Upper bay area walls are unfinished.

Roof construction consists of steel framing @ 24" spacing containing 30approx. R20 blown cellulose insulation. No interior finish was observed at the roof structure of the bay area. Upper level office space contains gypsum finish.

The foundation consists of a slab-on-grade foundation under the entire structure.

Four metal overhead doors were observed, one on the front walls of each bay and 3 steel entry doors were observed. Four dual pane vinyl windows have been installed on the exterior walls.

HVAC System: The heating system is a high efficiency condensing propane furnace which heats the entire structure.

Lighting consists of overhead LED fixtures.

Domestic hot water is provided by an electric water heater.

Modelling of the building envelope in HOT2000 observed the following breakdown of heat loss through the building envelope.

Component	Annual Heat Loss (%)
Ceiling	19.70
Main Walls	35.95
Doors	10.12
South East Windows	1.58
North West Windows	0.80
South West Windows	0.40
Slab-on-Grade	8.70
Air Leakage and Ventilation	22.74

Modelling under Standard Operating Conditions anticipated a total utility usage of approx. 13,184.5kWh of electricity and 8,480.22 litres of propane which provide an annual CO2 footprint of approx. 5.1 Tonnes. Actual consumption of the calendar year 2022 exceeded modelled consumption by approx. 4,964.7 kWh and 175.9 litres of propane.

Recommendations:

1. Modelling indicated that the major portion of heat loss is due to the wall insulation. Installation of an additional R12 over 100% of the interior wall surface would result in savings of approx. 1,689.24 litres of propane and a reduction of CO2 output by approx. 952.7 Kg.
2. Sweeps on overhead doors allow air leakage. Replacement of the sweeps could result in a further reduction of propane consumption of 759.6 litres with a further CO2 reduction of approx. 428.4 KG.
3. It appears that, similar to other garage areas, lighting is in use for the majority of the day. Installation of motion sensors could reduce electrical consumption to similar to the modelled.
4. It was observed that heating fuel consumption was higher than modelling predicts indicating that overhead doors may be being left open for substantial periods during heating season. Suggest that all overhead door mechanisms be equipped with timers that will automatically close the doors after a 15-to-30-minute opening time.

Conclusions:

1. It was observed that all building containing overhead doors (ie: public works facilities and fire halls) appear to have heating fuel consumption substantially higher than modelling predicts indicating that overhead doors may be being left open for substantial periods during heating season. Suggest that all overhead door mechanisms be equipped with timers that will automatically close the doors after a 15-to-30-minute open time.

2. A number of the overhead doors provide significant air leakage. Suggest that maintenance be conducted on the weatherstripping/sweeps of all overhead doors on a regular basis.

3. Insulation upgrades could substantially reduce heat loss through the envelope of a number of the building. Suggest that an insulation specialist be consulted regarding upgrades in insulation levels for these buildings.

4. A number of HVAC systems are nearing the end of their anticipated lifespan. Suggest that these systems be replaced with high efficiency condensing units when replacement is required.

5. Suggest that possibilities for installation of air source heat pumps be discussed with an HVAC contractor, particularly when AC systems require replacement. These systems could substantially reduce CO2 output and save on operating costs due to their efficiency.

6. A number of buildings contain electrical loads that are inconsistent with normal building operation. Suggest that an effort be made to determine the cause of the increased electrical loads and if there are opportunities to reduce these loads as they are not part of the operation of the building.