TOWN OF Tecumseh
ONTARIO · CANADA

ENERGY CONSERVATION AND DEMAND MANAGEMENT (ECDM)

PLAN UPDATE 2019-2021

Introduction

Ontario Regulation 507/18 (Broader Public Sector: Energy Reporting and Conservation and Demand Management Plans) requires broader public sector (BPS) organizations, such as municipalities, to develop an Energy Conservation & Demand Management (ECDM) plan and update it every five years. The Town of Tecumseh (the Town) developed an updated ECDM plan in 2019 in compliance with the regulation and covers the period up to 2024.

The ECDM plan is a vehicle through which the Town's commitment to energy conservation can be expressed, monitored, measured, and realized. The updated ECDM plan builds on the municipality's first ECDM plan developed in 2014 and the experience gained in energy conservation over the previous 8 years. Hard copies of the previous ECDM plan are available at the Town Hall located at 917 Lesperance Rd, while annual summaries of energy consumption and greenhouse gas emissions for the operations of the municipality are posted on the Town's web site.

The contents of this document include updates to the Goals, Objectives, Actions and Targets designed to conserve and otherwise reduce the amount of energy consumed by operations and manage the demand for energy, including a forecast of the expected results of current and past measures.

The ECDM is to be updated every (5) five years, or less, and is to include:

1) A description of current and proposed measures for conserving and otherwise reducing energy consumption and managing its demand for energy;
2) A revised forecast of the expected results of the current and proposed measures;
3) A report of the actual results achieved; and
4) A description of any proposed changes to be made to assist the public agency in reaching any targets it has established or forecasts it has made.

Current State

Energy Conservation and Demand Management is becoming more important in the region, particularly upon the Town's Climate Emergency declaration in the form of Resolution # 390-19, which placed a prioritization on climate change mitigation, creation of economic efficiencies, and improvement of energy performance. Tecumseh Town Council further supported the importance of reducing overall GHG emissions by its involvement in the partnership between the Essex Region Conservation Authority (ERCA) and the surrounding Municipalities to develop a Regional Energy Plan to reduce GHG emission across the region.

To put the ECDM plans into action, the Town created the TecEnergy Team, consisting of representation from Facilities, Maintenance, Public Works and Transportation, Planning and Development, and Finance departments. With the mandate to initiate, implement, track and

oversee the progress on various energy conservation initiatives, the TecEnergy team functions collaboratively in a multi-disciplinary setting, regularly providing updates to the Council.

County of Essex Regional Energy Plan (REP)

In 2020, Essex County launched the development of a Regional Energy Plan through a cross-sector collaboration. A baseline for energy use, energy related emissions and energy costs for 2019 was established and a status quo Base Case projection to 2041 was modelled. The following goals were established to reduce the predicted energy use, energy related emissions and energy costs in 2041:

- Increase community-wide energy efficiency at least 50% by 2041 from 2019 levels
- Enable transition to carbon neutrality by reducing GHG emissions by at least 60% by 2041 from 2019 levels;
- Increase municipal water efficiency by 20% by 2041 from 2019 levels; and
- Reduce community-wide energy and water costs in the range of $13 to $18 billion through 2041.

The REP has recently been completed and was adopted by Essex County Council in May 2021. The REP proposes a Community Energy Strategy based on the following seven strategic directions:

1) Efficient homes and buildings;
2) Efficient industry;
3) Efficient greenhouses;
4) Efficient transportation;
5) Local supply and distribution;
6) Smart community information and optimization; and,
7) Community planning.

Although municipal operations do not account for a significant proportion of overall energy use and GHG emissions County-wide, it is important that the County of Essex and local municipalities lead by example if the goals of the REP are to be realized. The ECDM plan is a vehicle through which the Town's commitment to energy conservation can be expressed and realized.

As the County moves toward implementing the REP, the Town will join in with the larger community and economy efforts needed to meet the targets as set out in the plan.

Town of Tecumseh ECDM Plan

Based on Regulation 207/18, the Town facilities required to be included in the Plan are:

- Town Hall;
- Fire Halls 1 & 2;
- OPP Station;
- Arena;
- Outdoor Pool;
- Community Centres;
- Public Works Building and Garages;
- Parks Buildings;
- Water Tower; and,
- Sanitary and Storm Water Pump Stations.

Additional to the required facilities, the Town has elected to also include:

- Streetlights;
- Meter Chambers; and,
- Fleet and Transit.

Energy, GHG and water data for the above-mentioned facilities and assets, are presented below.

Energy and Greenhouse Gas (GHG) Emissions

Based on the required facilities listed above, the Town submitted initial consumption data for the base year of 2018. This ECDM update report includes updated energy, GHG and water data from 2019-2021. Electricity, natural gas, diesel, gasoline consumption, and GHG emissions, by sector, are represented in the following charts and tables.

Figure 1: Corporate Energy Consumption (2018 – 2021)

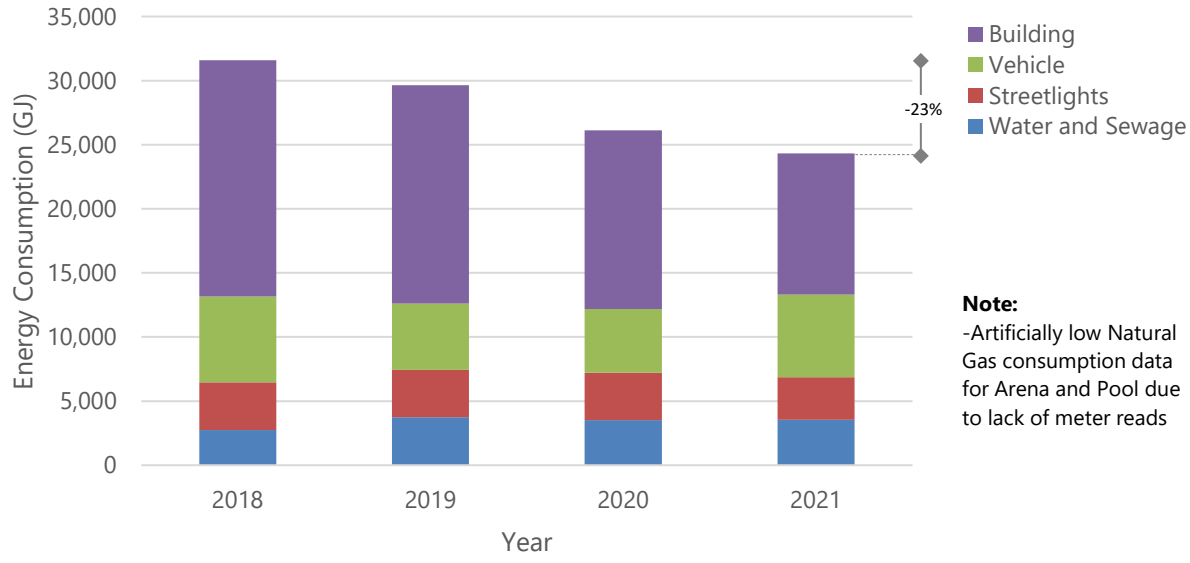


Figure 1 displays a trend of decreasing energy consumption over time, from 2018 to 2021. The 2021 data, however includes artificially low natural gas consumption data from one of the largest consumers – the Arena and Pool. The missing consumption data is a result of natural gas consumption estimates and reduced frequency of meter reads. Therefore, it should be noted that the 24% decrease in consumption from 2018 (baseline year) to 2021, is likely incorrect, and will be adjusted in the next ECDM update. There will be special consideration of the following natural gas accounts in the future:

- Arena (Account#: 165-1093 154-3712) reducing by 88,206m^3 from 2019 to 2021; and,
- Pool (Account #: 164-7837 246-3414) reducing by 15,616m^3 from 2019 to 2021.

Figure 2: Corporate Energy Expenditure (2018 – 2021)

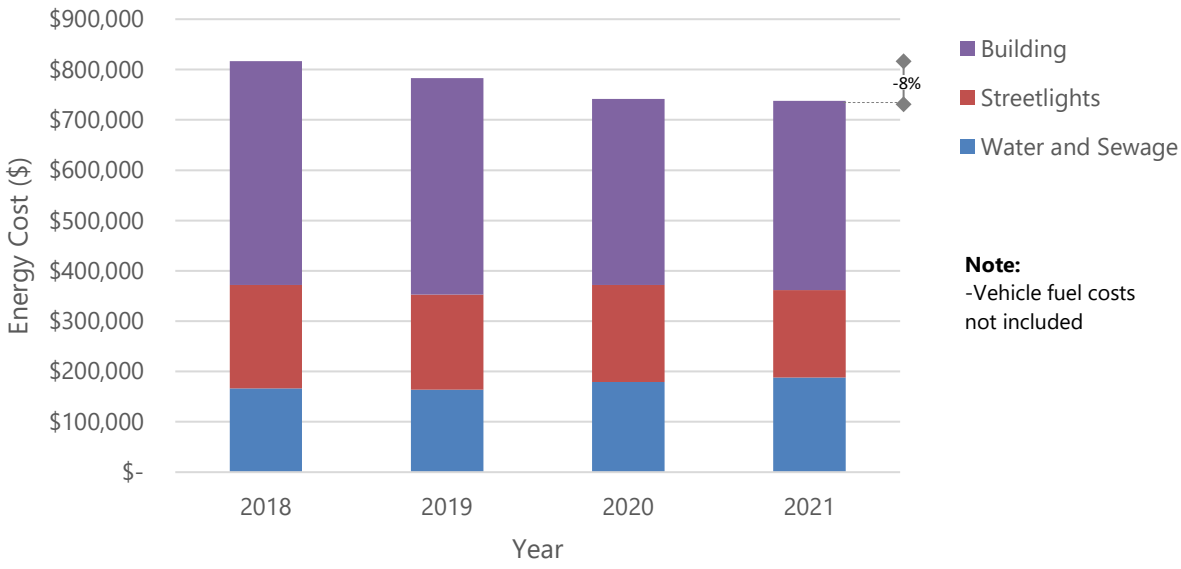


Table 1: Electricity and Natural Cost

Product	2018	2019	2020	2021
Electricity	$730,085	$707,915	$667,848	$668,564
Natural Gas	$83,597	$75,219	$73,703	$69,132
Total	**$816,694**	**$783,134**	**$741,551**	**$737,696**

Figure 2 and **Table 1** display corporate energy expenditures over time, in graphical and tabular formats, respectively. Corporate energy expenditures reduced by 8% from 2018 to 2021, with building energy expenditure increasing by $6,500 from 2020 to 2021. The increase from 2020 to 2021 is likely a response to reduced building usage during the first year of the COVID-19 pandemic (2020) and an increase in building occupancy the following year.

A more accurate assessment of energy cost and consumption trends will be available following the years 2022 and 2023, which should represent "business as usual" operations.

Figure 3: Total Corporate GHG Emissions by Source (2018 - 2021)

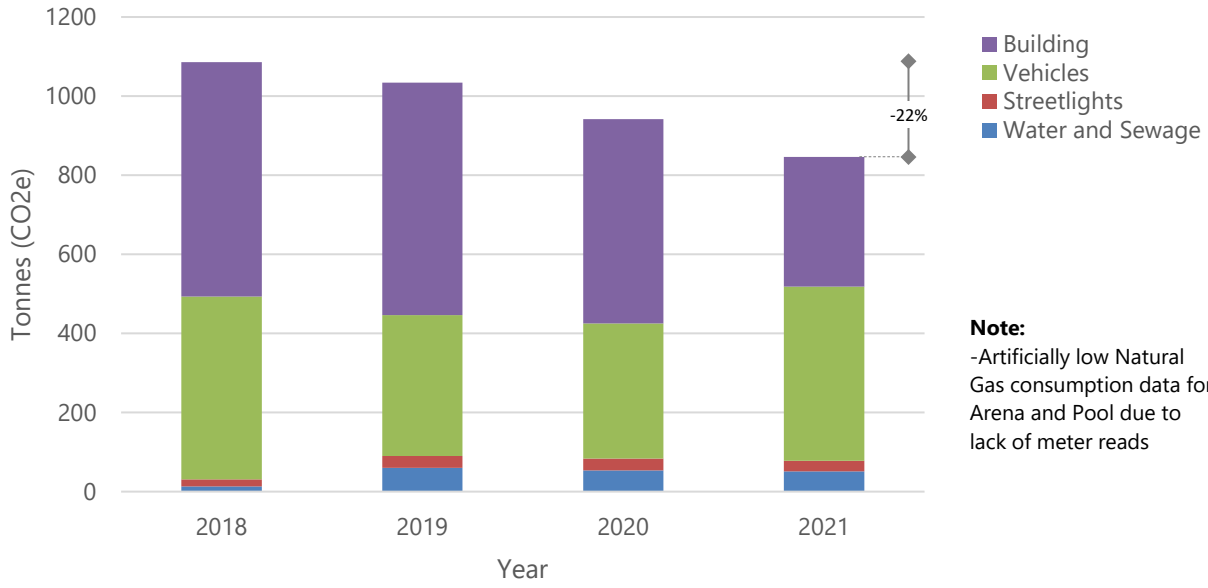
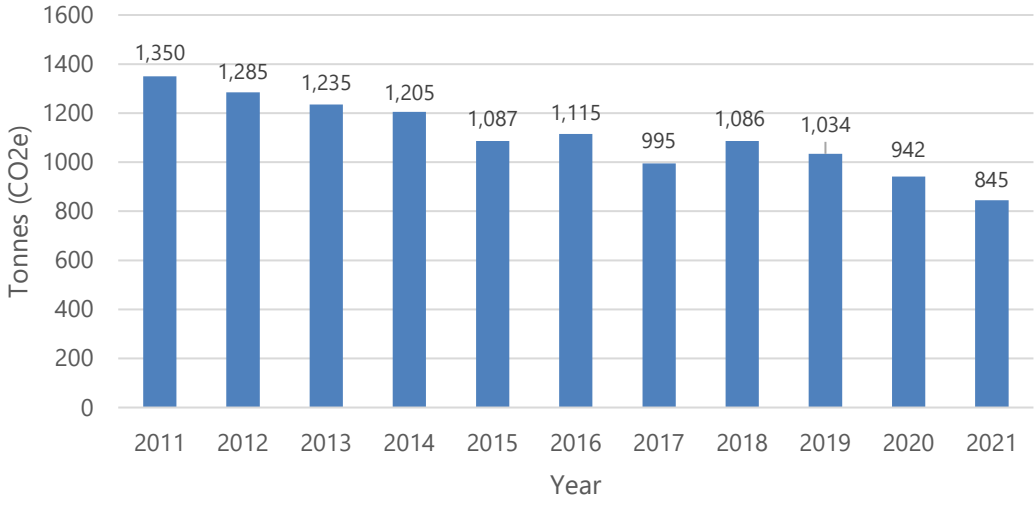


Figure 4: Total Corporate GHG Emissions (2011 - 2021)

displays the Town's GHG emissions by emissions source. As noted above, the 2021 data is likely artificially low due to missing natural gas data for the Arena and Pool; and vehicle emissions for the period of 2019-2021 were estimated based on a fixed mileage assumption for each vehicle.

Figure 4: Total Corporate GHG Emissions (2011 - 2021)



A review of total corporate GHG emissions over time, from 2011 to 2021 (**Figure 4**), demonstrates a general GHG emissions reduction trend.

Total GHG emissions, by sector and fuel type, for the 2021 year can be found in the tables below, along with the percent difference from the 2018 baseline year.

Table 2: Greenhouse Gas Emissions (tCO2e) by Sector (2021)

Sector	Emissions (tCO_2e) *% Difference from 2018*	Energy (GJ) *% Difference from 2018*
Building	328 -45%	11,007 -40%
Vehicle*	440 -5%	6,467 -3%
Streetlights	27 +50%	3,315 -11%
Water and Sewage	51 +292%	3,538 +29%
Total	**845** **-22%**	**24,327** **-23%**

* Assuming 15,000km driven annually per Fleet Vehicle.

Table 3: Energy (GJ) by Source

Source	Emissions (tCO_2e) *% Difference from 2018*	Energy (GJ) *% Difference from 2018*
Electricity	95 +69%	11,768 -40%
Natural Gas	310 -44%	6,092 -46%
Gasoline	161 -35%	2,019 -45%
Diesel	287 +35%	4,020 +34%
Propane	10 N/A	145 N/A
Total	**863** **-20%**	**24,043** **-24%**

Figure 5: Electricity Consumption and Emissions:

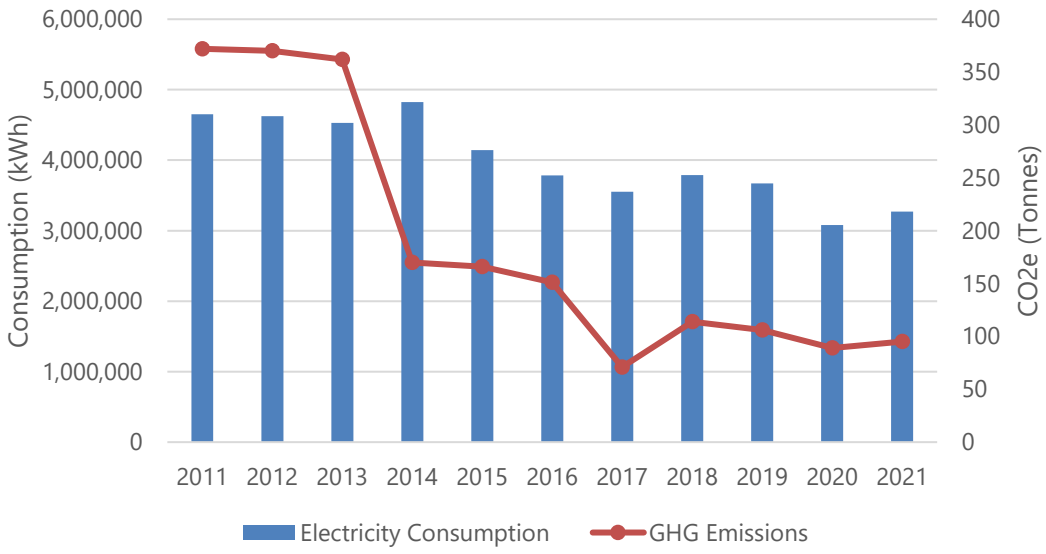
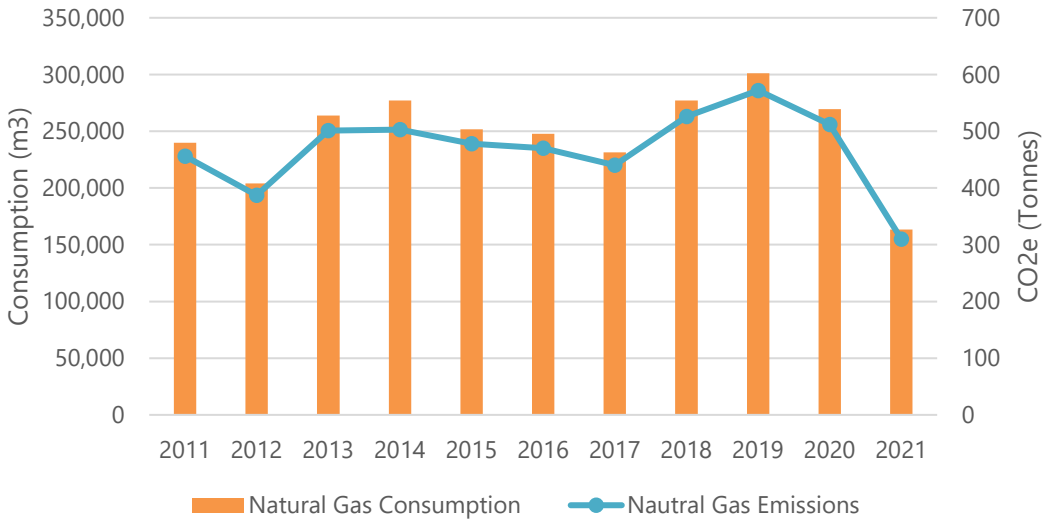


Figure 6: Natural Gas Consumption and Emissions



Water Consumption Data

Table 4 contains water consumption data from 2019-2021. An increase in consumption over this period may correlate to a return to work and occupancy in 2021. Building consumption decreased in 2020, likely due to Covid-19 shutdowns; water and sewerage increased that same year, likely representing a shift in general location of water users (from municipal buildings to home).

The following consumption graphs display the relationship between GHG emissions and electricity/natural gas consumption. Natural gas is highly correlated to GHG emissions; the emissions factor remains unchanged over time. For electricity, however, the GHG emissions signature of the electrical grid changes depending on the dominant types of electrical generation feeding the grid at any given time; annual GHG emissions factors are used.

Table 4: Water Consumption

Year*			
2018	35,679	11,442	**47,121**
2019	36,200	11,035	**47,235**
2020	33,754	13,513	**47,267**
2021	45,765	10,021	**55,786**

Goals and Objectives for Energy Conservation

The municipality's goal is to maintain the energy management and conservation in the Broader Public Sector (BPS) while also committing to working with other BPS organizations to better manage energy use across our community. The energy conservation objectives include:

1) Improve the energy efficiency of the Corporation by utilizing best practices to reduce the operating costs, energy consumption and greenhouse gas emissions;
2) Create a culture of conservation;
3) Improve awareness of greenhouse gas emissions and consumption behaviours; and,
4) Improve the efficiency of energy use through low-cost/no-cost opportunities by implementing the following:
    - Sound operating and maintenance practices;
    - Employee training and staff awareness;
    - Monitoring and tracking system;
    - Retrofitting of building envelopes;
    - Energy demand management program; and,
    - Investigate new and emerging technology.

The Team feels that if the Town meets its Goals and Objectives above it should be able to achieve the Targets outlined below.

Targets

The following targets represent reasonable objectives for the current circumstances given the years of 2020 and 2021 had been impacted by the COVID-19 pandemic that produced artificial reductions largely due to disruptions of operations and services.

1) Reduce corporate overall energy consumption by **5%** by 2024 (base year 2018)
2) Reduce water consumption in municipal buildings by **5%** by 2024 (base year 2018)
3) Reduce gasoline and diesel consumption by **5%** by 2024 for fleet and transit vehicles (base year 2018)

Target 1: Reduce corporate overall energy consumption by 5% by 2024

Table 5: Electricity and Natural Gas Targets

Energy Source	Unit of Measure	2018 Usage	5% Reduction	2024 Target Usage	2019 Usage	2020 Usage	2021 Usage
Electricity	kWh	3,788,065	189,403	3,598,662	3,671,339	3,079,419	3,268,964
Natural Gas	m^3	277,192	13,860	263,332	301,153	269,386	163,310**

* Electricity and natural gas includes buildings, streetlights and water & sewage

** Incomplete data provided for the Arena and Pool's natural gas consumption, leading to an underestimation of consumption

The Town is well on track to achieve its 5% reduction target from an electricity consumption perspective, having reduced Hydro usage by nearly 14% from the 2018 baseline year. The Town's Natural Gas consumption in on pace to reach the 5% target, given that the 2020 data is already at a 3% reduction from the 2018 baseline year.

Figure 7: Electricity and Natural Gas Reduction Targets

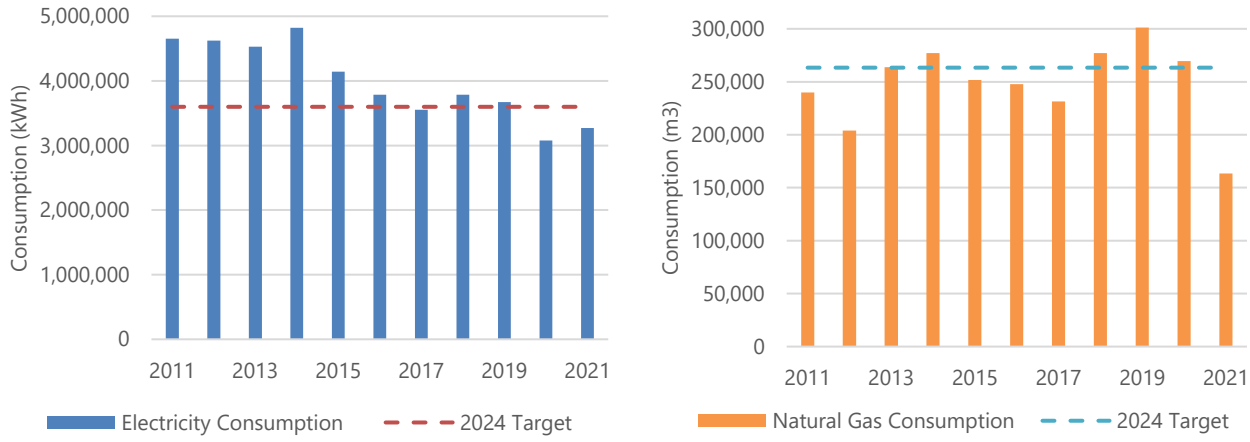


Table 6: Energy (GJ) Targets (assuming a 5% reduction for each energy consumption type)

Sector	2018 Energy Usage (GJ)	2024 Target Energy Usage (GJ)	2019 Energy Usage (GJ)	2020 Energy Usage (GJ)	2021 Energy Usage (GJ)
Buildings	18,416	*17,495*	17,019	13,916	11,007
Vehicle	6,694	*6,255*	5,184	4,976	6,467
Streetlights	3,735	*3,718*	3,688	3,698	3,314
Water & Sewage	2,739	*2,602*	3,742	3,520	3,538
Total	**31,584**	***30,070***	**29,633**	**26,110**	**24,326**

Accounting for the total energy consumption in GJ by energy consumption type, the Town has already surpassed the 5% target as of 2020, which was at a ~23% reduction of total GJ usage

when compared to the 2018 baseline year. With the exception of Water and Sewage, each sector has also met and surpassed the 5% target.

Table 7: GHG Emissions Targets

Sector	2018 Emissions (tCO2e)	Target Usage Emissions (tCO2e)	2019 Emissions (tCO2e)	2020 Emissions (tCO2e)	2021 Emissions (tCO2e)
Buildings	593	*563*	588	517	328
Vehicle	462	*439*	356	341	440
Streetlights	18	*17*	30	30	27
Water & Sewage	13	*12*	60	54	51
Total	**1,086**	***1,031***	**1,034**	**942**	**846**

*Refer to **Appendix A** for a complete detailed listing of the Town's 2019, 2020, and 2021 emissions including optional categories.

As of 2021, the Town has also met 2024 GHG reduction targets, primarily due to the GHG emission reductions from the Building sector, which has single-handedly accounted for emission reductions target. As noted earlier, the natural gas consumption from buildings in 2021 is artificially low, and therefore emissions are as well. Corrections will be made in the next update. Emissions from Vehicles, Streetlights, and Water & Sewage either remained stagnant or increased from 2018 – 2021.

Target 2: Reduce water consumption in municipal buildings by 5% by 2024

Table 8: Water Consumption Targets

Sector	2018 Usage	*Target Usage*	2019 Usage	2020 Usage	2021 Usage
Buildings	35,679	*33,895*	36,200	33,754	45,765
Water & Sewage	11,442	*10,870*	11,035	13,513	10,021
Total	**47,121**	***44,765***	**47,235**	**47,267**	**55,786**

The Town increased its water consumption by 15% between 2018 and 2021. Efforts will need to be made to reduce water consumption in order to achieve the 2024 target.

Target 3: Reduce gasoline and diesel consumption by 5% for fleet and transit vehicles

Table 9: Vehicle Fleet Consumption Targets

Category	2018 Total Usage (L)	Target Usage (L)	2019 Total Usage (L)	2020 Total Usage (L)	2021 Total Usage (L)
Fleet					
Gasoline	79,348	*75,381*	49,506	48,838	76,306
Diesel	73,874	*70,180*	58,879	56,590	70,494
Transit					
Diesel	26,449	*25,127*	32,262	29,714	30,215
Total	**179,671**	***170,688***	**140,647**	**135,142**	**177,015**

The Town has reduced its total fleet (transit + vehicle) consumption by 1.5% in 2021 when compared to the 2018 metrics. A key factor in the drop-off in the fleet fuel consumption numbers over 2019 and 2020 can be attributed to the severity of the winter weather each year paired with the pandemic, which directly impacted the fuel consumption levels from the fleet.

Measures will be investigated with the Tecumseh Transit Service (TTS) for the Town to further reduce transit fuel consumption to reach the 5% target consumption.

Tracking Energy Consumption and Savings

Annual energy reporting is required under Provincial regulation and informs the Town on our utilization of energy, identifies potential energy conservation opportunities and tracks progress on energy conservation efforts. As an update to the ECDM plan, this report outlines the energy consumption from 2019 to 2021 in comparison to the 2018 baseline year. It served as a means of measuring achievements since 2018. To keep the public informed of the developments in this area, the ECDM Annual Update, the previous years' annual energy reports and the 2014 ECDM Plan can be found on the Town's website.

Generally, the energy data collected indicated accelerated reductions specifically absorbed in the years of 2020 and 2021. It is recognized that these may be artificial outcomes emerging from impacts brought forth by the COVID-19 pandemic. A more precise analysis on energy cost and consumption will be available following the years of 2022 and 2023, which should represent regular operations and use of buildings.

- Overall, corporate GHG emissions (tonnes) across all sectors (i.e. buildings, streetlights, and water & sewage, and vehicles) reported were reduced by 20% from 2018 to 2021.
  Previous: Overall, corporate GHG emissions (tonnes) across all sectors (i.e. buildings, streetlights, and water & sewage) reported in 2014 were reduced 10% by 2018.

- Overall corporate energy consumption (GJ) across all sectors reported in 2018 was reduced 24% by 2021.
  Previous: *Overall corporate energy consumption (GJ) across all sectors reported in 2014 was reduced 12% by 2018.*

- Overall, corporate energy expenditures (dollars) across all sectors reported in 2018 were reduced by 10% from 2018. This is equivalent to $78,998 in savings on energy expenditures.
  Previous: Overall, corporate energy expenditures (dollars) across all sectors reported in 2014 were reduced 5% by 2018. This is equivalent to $51,889 in savings on energy expenditures.

Greatest sources of reductions in Electricity and Natural Gas

1) 79% of the absolute electricity reduction was related to the Arena operations;
2) 23% of the absolute electricity reduction was due to Streetlight LED conversion;
3) 16% of the absolute electricity reduction came from storm sewers operations;
4) 9% of the absolute natural gas reduction was attributed to Waterworks (General); and,
5) 7% of the absolute natural gas reduction was attributed to Parks Buildings.

Actions

Past Initiatives

Prior to the formation of the TecEnergy Team, there was a prioritization of focus on development of an energy conservation culture among the Town's staff and administration. Some conservation project initiatives undertaken prior to the formation of the TecEnergy Team include:

- Installation of programmable thermostats and motion detector lighting within Town buildings;
- 2009 – changeover from T12 fluorescent lighting to more efficient T8 fluorescent lighting in the Historical Society building;
- 2010 – Lighting retrofits to Green Acres Community Centre, Golden Age Community Centre and Arena ice surface lighting Arena – 1,000 watt metal halide to 540 watt fluorescent;
- 2010 – Arena improvements including fibreglass insulation enhancement of Rink B and dehumidifiers changed from four (4) mechanical to two (2) gas powered; and,
- 2010 – 500 kW photovoltaic solar panel installation on the arena rooftop through Essex Power Services.

After the formation of the TecEnergy Team, a more formalized focus was adopted with the objective of improving energy efficiency through low cost/no cost opportunities, including:

a) Adopting operating and maintenance practices;
b) Enhancing staff awareness;
c) Monitoring and tracking energy-consuming systems; and,
d) Energy management programs.

Over time, projects of larger magnitude were taken on with Council support through annual budgets. Specific actions were as follows:

- 2013 – Public Works Lacasse building and all public works garages changed from high pressure sodium lighting to T5 fluorescent;
  - Garages - 400 watt metal halide to 216 watt fluorescent.
- 2013 – Street light LED pilot project implemented;
- 2013 – Parking lot LED lighting, including McAuliffe and Lakewood parks;
- 2013 – Fire Hall – 70 watt high pressure sodium to 10 watt LED;
- 2013 – Arena energy audit completed;
- 2015 – Arena installation of Ice Temperature Control System;
- 2015 – Energy Audits on the Town Hall, OPP, detachment and Fire Hall;
- 2016 – Streetlight conversion to LED lighting completed;
- 2017 – Walkthrough audits at the Pool and Lacasse Baseball Diamond Buildings in August;
- 2017 – The Arena parking lot lights were replaced with proposed annual energy savings of 17,000 kWh;
- 2019 – St. Clair Beach tennis court lights were changed to LED with activation switches so the lights are on when activated by players;
- 2019 – Joined Partners for Climate Protection (PCP);

- 2019 – Council Declared a Climate Emergency Resolution # 390-19;
- 2020 – Installation of a Building Management System at Town Hall;
- 2021 - Installation of a Building Management System and lighting upgrades at OPP Station;
- 2021 – Lighting retrofits in the Arena converting to LED bulbs and fixtures; and,
- 2021 – Dillon Consulting retained to assist the Town in deepening its energy consumption and GHG emissions reduction efforts through capacity building workshops and meetings with the TecEnergy team and executive team, and updating the ECDM Plan.

Over time, more focus on energy conservation, reduction in GHG emissions and energy cost savings has been linked to broader initiatives to address climate change. For the Town of Tecumseh and many of its neighbouring municipalities within the County of Essex, this was acknowledged through a statement of a climate change emergency. The Town declared a climate emergency in December of 2019 (Resolution #390-19).

Future Initiatives

The TecEnergy Team recently participated in a workshop to review and assess the current state of ECDM initiatives and proposed several new initiatives to consider as the Town approaches the 2024 target year, and beyond.

Future energy conservation initiatives, presented below, are categorized into four (4) groups:

- Overarching
- Technical (ex. switching street lighting from high pressure sodium to LED);
- Organizational (ex. establishing policies for an 'Energy First Ethic'); or,
- Behavioral (ex. individual actions such as running a daylight harvesting campaign, where lights are turned off on sunny days).

Undertaking energy projects ideally involves evaluation of costs using an internal rate of return (the rate of interest the project could generate), along with simple payback (the number of years it would take to pay off the project from the savings). Typically, more costly conservation projects are bundled with more cost-effective ones, to leverage their development.

Implementation of proposed projects depends on:

- Annual operating and capital budget consideration;
- Establishment of an internal revolving fund;
- Incentives from the Independent Electricity System Operator and/or natural gas and other federal or provincial grant opportunities;
- Availability of qualified staff and contractors; and,
- An internal designated staff member, responsible to champion the ECDM Plan and be accountable for its implementation and results.

Progress on projects should be monitored through annual energy reports prepared under the regulation. All proposed projects, their costs and potential savings arising from this Energy Conservation & Demand Management Plan should be integrated with the Town's capital works plans and the Strategic Asset Management Policy #95.

Except for the Overarching project, the projects listed under the other group headings below have been selected as those that the Town can continue or initiate within normal operations. It is intended that these projects be undertaken in the next two years to continue to make progress while pursuing resources to conduct the Overarching project. The Overarching project is a GHG Reduction and Energy Management Strategy that will lay the foundation for a longer term, strategic plan in energy management.

Overarching

1) **GHG Reduction and Energy Management Strategy-** The Town has recognized that although energy projects are being implemented and savings are being realized, these projects are often initiated on an ad hoc basis, as the Town currently lacks a clear strategy to guide decision-making, project planning and implementation for GHG reduction and energy management projects. This ECDM plan update identifies future initiatives in the forms of one-off projects and change management activities, however there is a recognized need to develop a GHG reduction and energy management strategy and program, through which future coordinated activities and projects can be planned, budgeted, prioritized, initiated, and monitored. Examples of more substantial projects that such a strategy may consider include different approaches to stormwater ponds and reducing impermeable surfaces, alternate energy systems and sustainable building design.

Technical

1) **LED conversion of:**
   a. **Street lighting systems -** Continued conversion of high-pressure sodium and decorative streetlights or pedestrian lights with LED street lights; and,
   b. **Facility lighting systems -** Conversion of incandescent, florescent, and halogen lamps within corporate facilities to LED lights.

2) **Heating, Ventilation and HVAC Upgrades-** The Town has purchased ten new HVAC units for Town Hall; these high efficiency units will be installed by the end of 2022.

3) **Waste Audits in Municipal Buildings-** The Essex County Solid Waste Authority conducts waste audits free of charge. As a best practice, all municipal buildings in the Town will undergo a waste audit to identify measures that can be taken to educate staff on current waste and recycling practices.

4) **Upgrade Restrooms-** Continued replacement of all restroom fixtures with WaterSense certified low flow products where applicable.

5) **Energy Audits**- Complete energy audits in buildings not previously audited. Audits will assist the Town in prioritizing renewal of building components to increase energy efficiency. Previous audits conducted in 2015 resulted in replacement of Roof Top Units and LED lighting upgrades.

6) **Prioritized Retrofits-** Perform prioritized retrofits of inefficient end-of-life energy consumers such as pumping stations. These retrofits should prioritize energy efficiency.

7) **Energy Data Management (and dashboard)**- The Town has recognized the need for access to quality energy consumption data, especially to manage and monitor success of energy consumption and GHG emissions reduction projects. Particularly, assumptions made in vehicle fleet km data and missing natural gas data led to inaccurate consumption and GHG emission data for 2021. The Town has retained an energy data management firm affiliated with Essex Powerlines, to enhance data collection and initiate an energy dashboard.

8) **Tree Planting Campaigns-** A typical tree can absorb around 21 kilograms of carbon dioxide per year, and over a lifetime of 100 years, one tree could absorb around a tonne of CO_2. Tree planting initiatives not only sequester carbon, but also improve soil and water conservation, moderate local climate by providing shade, regulate temperature extremes, and provide a sense of wellbeing to residents. Tree planting in residential areas and parks by Town staff is a well-established practice and will be continued.

Organizational

1) **Efficient Driver Training Program-** Natural Resources Canada offers the SmartDriver program free of charge, giving practical training to help Canada's commercial and institutional fleets lower their fuel consumption, operating costs and harmful vehicle emissions. Fleet energy-management training helps truckers, transit operators, school bus and other professional drivers improve fuel efficiency by up to 35 percent. Courses are offered from Natural Resources Canada on Highway Trucking as web-based training for multiple fleet types, including forestry, transit, school bus, city fleet and general city driving. Measures will be taken to provide training for all municipal and affiliated fleet operators, including town vehicles, heavy equipment/truck operators, and transit operators.

2) **Green Fleet Policy-** Consideration will be given to developing a Green Fleet Policy. Such a policy would provide guidelines for the procurement, management, and operation of clean fleet vehicles to:
   a) Reduce the consumption of petroleum fuels and other non-renewable resources;
   b) Replace petroleum/diesel fuels with renewable/sustainable alternatives;
   c) Reduce vehicle emissions;
   d) Maximize fuel efficiency; and
   e) Reduce costs and save money.

Prior to consideration of a Green Fleet policy, a comprehensive fleet utilization analysis is needed to determine the appropriate number of vehicles, size of vehicles and lifecycle of equipment are required by the Town. This analysis will assess the degree to which the Town could incorporate a Green Fleet Policy into its operations. This initiative will look at options, both current and future, based on data available from the Town's operations, budgets and trends in the auto industry. New incoming personnel planned for 2024 in accordance with the Town's recent organizational review will serve to support and execute this initiative.

3) **Electric Transit Bus-** The current diesel consuming internal combustion engine transit buses account for approximately 10% of the Town's GHG emissions. A transition of the bus fleet to electric vehicle transit buses can reduce the Town's direct emissions and will help improve local air quality. The federal government via the Federation of Canadian Municipalities (FCM) has programs in place to provide financial aid to municipalities intending to transition the transit fleet to electric vehicles. In 2022, the Town submitted an application for consideration by Infrastructure Canada under the Rural Transit Solutions fund for the acquisition of electric buses. A decision on the application should be rendered soon.

4) **Water Monitoring-** Initiate monthly water consumption monitoring. New and existing fixtures will be monitored for leaks and repaired as required.

5) **On-Demand Transit-** The Town has been using on-demand technology as an alternative delivery model for the Tecumseh Transit Service (TTS) as part of a pilot project which extends to the end of 2022. On-demand transit service uses computer algorithms in response to service requests, made through an app on a smartphone, to develop instantaneous routing. As a result, stops can be served more efficiently as the bus goes directly to where and when people are waiting, instead of following a pre-planned route and schedule. Accordingly, depending on the extent of the use of the on-demand delivery model beyond the end of the pilot project, the amount of fuel used and GHG emissions can effectively be reduced as there may be periods of the day when the bus will not be running as demand does not warrant it.

6) **Collaborate with Other Broader Public Sector (BPS) Organizations-** work with other BPSs to develop relationships that collaboratively foster energy conservation and share best practices.

7) **Maintain Flexible Work Options-** During the pandemic, the world had to quickly adjust to remote and flexible work options, which has led to reduction in GHG emissions resulting from electricity and natural gas consumption reductions and decreased transportation emissions. Allowing the Town's employees to maintain flexible work options could continue to curb those emissions moving forward and has been implemented through a Flexible Work Policy approved by Council in mid-2022.

Behavioural

1) **Internal 'Energy First' Ethic:** It is recommended that Town of Tecumseh builds an "energy first" ethic across the organization by:
   a. Ensuring the Asset Management Plan integrates sustainability for community assets including energy infrastructure, with consistent measures to implement it;
   b. Amending the Town's Procurement Policy to incorporate consideration for the life-cycle implications of energy use of new community assets; and,
   c. Establishing a mechanism to re-invest energy dollars saved to fund other climate change and energy related initiatives.

2) **Staff Education –** bolster communications to keep staff apprised of trending energy conservation practices regularly, and for every season. This may include lunch and learn sessions, workshops, webinars, guest lectures, etc.

3) **Active Transportation Incentives-** Motivating employees to make use of alternate means of transportation, including walk and bike to work and use of public transit can make a significant impact to behavioural changes. This can be in the form of a financial reward system, or in the form of a subsidy towards the purchase of active transportation equipment (such as a bicycle or running shoes).

4) **Energy Use Gamification-** Use of personal energy use metrics, and consider developing staff energy "dashboards", to raise awareness and encourage staff to reduce their personal emissions (at home and at work). For example, an Energy Dashboard could make employees aware of their ecological impact on the environment by showing them the reduction of their GHG emissions when selecting a more sustainable travel alternative. It can also be utilized via gamification to have employees compete against each other to be the most environmentally-friendly Town employee.

5) **Online Platforms-** Continuing to promote and provide online or web-based platforms for remote and virtual meetings and engagement will reduce associated travel to meetings, events and conference venues by employees and elected officials.

Changes from Previous Plan

While the municipality met its modest conservation objectives from the 2014 plan, the Town's Administration recognizes that more can take place to ensure efficiencies and savings continue and that new conservation measures are identified and acted upon.

The key changes needed to ensure the success of the updated plan include:

- Incorporate energy management into a managerial job description to ensure that there is proper resourcing of and accountability for the ECDM Plan. This position will also serve as the Town's liaison with the County's Regional Energy Plan (REP) to coordinate municipal implementation efforts. In 2021, the Manager, Facilities and Energy Management (MFEM) position had been formalized and personnel employed.
- Make the necessary budget process adjustments identified in the ECDM to provide adequate resources needed to implement the Plan and participate in the implementation of the County REP;
- Seek external professional advice from time to time, such as the energy and waste audits set out in this Plan as well as best practices and strategies available to inform this Plan and keep it current;
- Take guidance from climate advisors under the newly adopted Partners for Climate Protection (PCP) Tool;
- Ensure staff are informed on energy conservation and promote a corporate-wide Energy First ethic; and,
- Adopt a continuous improvement approach to energy conservation, including annual monitoring of Plan performance and updates as needed, with a complete review at least every five (5) years.

COVID-19 Impact

Since the last ECDM, the world has experienced a major disruption through the means of the global pandemic, which temporarily and in certain cases, permanently shifted the behaviour of how individuals and communities interact and operate on a day-to-day basis. Since its inception in 2020, the pandemic has directly impacted the Town's:

- Building occupancy levels;
- Electricity, natural gas, vehicle km, water consumption levels; and,
- Transit utilization rate.

Whether these events will reshape the Town's future operations is yet to be seen. In certain cases the pandemic acted as an accelerator for changes that were already underway such as work from home arrangement and virtual meetings. In other cases, emission sources from business travel and energy consumption are projected to increase, as it becomes safer to have face-to-face interactions.

The pandemic has positively impacted the Town's efforts to reduce GHG emissions; however

these reductions may not persist. As the world transitions out of the pandemic, there may be an uptick in GHG emissions in the next 3-4 years, which may impact the approach to the ECDM plan update after 2024.

Next Steps

As Tecumseh approaches the 2024 milestone year for the ECDM plan goals, it is our intention to build momentum and continue taking action to reduce energy and emissions. The Town will maintain current targets until 2024 and re-evaluate conservation opportunities along with identifying prospective options that can be incorporated as part of routine operations while continuing to seek reduction strategies. In the meantime, there is a need in undertaking the GHG Reduction and Energy Management Strategy as outlined in this report. This will help the Town map out the strategic prioritization of initiatives by maximizing GHG reductions and optimizing costs to the Town. The TecEnergy Team will pursue partnerships and resources to enable this strategy.

Additionally, the TecEnergy Team will review the ECDM plan on an annual basis, with a report to Council. They will analyze the results of the proposed measures and determine if adjustments to the plan are required. Initiatives may be added to the plan as new opportunities arise.

Plan implementation will be conducted over the next few years with the next full review scheduled for 2024 and coordinated efforts will be instituted across Town departments for collaboration on the tasks and projects identified in this Plan.

Appendix A

2019 Energy and Emissions Data

			Electricity & Water						Natural Gas				Gasoline		Diesel		Total
Department	*#*	*Type*	*kWh*	*GJ*	*GHG(t)*	*Water (m3)*	*Sewer*	*$*	*m3*	*GJ*	*GHG(t)*	*$*	*Litres*	*GHG(t)*	*Litres*	*GHG(t)*	***GHG (t)***
Tecumseh Town Hall	1200	Building	131,247	472	4	831	831	$18,077	11,895	444	23	$3,037					**26**
Fire Hall 1	2100	Building	38,193	137	1	193	193	$6,976	9,088	339	17	$2,408					**18**
Fire Hall 2	2100	Building	43,550	157	1	121	-	$7,907	9,697	362	18	$2,517					**20**
Police Station	2200	Building	88,325	318	3	120	120	$12,226	6,388	238	12	$1,758					**15**
Roadways - PW Yard	3100	Building	30,231	109	1	348	348	$5,112	23,865	890	45	$6,040					**46**
Roadways - PW Shed	3100	Building	18,911	68	1	67	67	$3,722	5,871	219	11	$1,615					**12**
Street Lights	3500	Street/Traffic Lights	877,761	3,160	25	-	-	$168,898		-	-						**25**
Traffic Signal	3520	Street/Traffic Lights	146,647	528	4	-	-	$19,788		-	-						**4**
Sanitary Sewer	4100	Water and Sewage	192,305	692	6	12	12	$23,455		-	-						**6**
Storm Sewer	4200	Water and Sewage	570,966	2,055	17	-	-	$106,411		-	-						**17**
Waterworks (General)	4300	Water and Sewage	54,125	195	2	174	174	$8,102	18,963	707	36	$4,723					**38**
Watermain	4310	Water and Sewage	25,707	93	1	-	-	$7,659		-	-						**1**
Oasis Pump House	4340	Water and Sewage	-	-	-	10,849	-	$13,795		-	-						**-**
Golden Age Club	6200	Building	31,580	114	1	441	441	$5,525	5,689	212	11	$1,593					**12**
Parks (General)	7100	Building	105,558	380	3	20,474	2,345	$59,357	15,001	560	28	$5,180					**32**
Parks Building	7110	Building	15,722	57	0	701	701	$5,326	11,974	447	23	$1,906					**23**
Arena	7500	Building	1,222,923	4,403	35	10,495	10,495	$217,529	163,491	6,098	311	$39,517					**346**
Pool	7550	Building	69,280	249	2	2,392	2,392	$16,282	19,231	717	37	$4,926					**39**
Museum	7701	Building	8,310	30	0	17	17	$1,766		-	-						**0**
Fuel - Fleet		Vehicle											49,506	109	58,879	159	**268**
Fuel - Transit		Vehicle													32,262	87	**87**
~~Total~~			~~3,671,339~~	~~13,217~~	~~106~~	~~47,235~~	~~18,136~~	~~$707,915~~	~~301,153~~	~~11,233~~	~~572~~	~~$75,219~~	~~49,506~~	~~109~~	~~91,141~~	~~247~~	~~**1,034**~~
~~By Type~~		~~Building~~	~~1,803,828~~	~~6,494~~	~~52~~	~~36,200~~	~~17,950~~	~~$359,806~~	~~282,190~~	~~10,526~~	~~536~~	~~70,496.2~~	-	-	-	-	~~**588**~~
		Street/Traffic Lights	1,024,408	3,688	30	-	-	$188,687	-	-	-	-	-	-	-	-	**30**
		Water and Sewage	843,103	3,035	24	11,035	186	$159,422	18,963	707	36	4,722.9	-	-	-	-	**60**
		Vehicle	-	-	-	-	-	-	-	-	-	-	49,506	109	91,141	247	**356**

2020 Energy and Emissions Data

			Electricity & Water						Natural Gas				Gasoline		Diesel		Total
Department	*#*	*Type*	*kWh*	*GJ*	*GHG(t)*	*Water (m3)*	*Sewer*	*$*	*m3*	*GJ*	*GHG(t)*	*$*	*Litres*	*GHG(t)*	*Litres*	*GHG(t)*	***GHG (t)***
Tecumseh Town Hall	1200	Building	123,965	446	4	311	311	$16,440	15,080	562	29	$4,232					**32**
Fire Hall 1	2100	Building	40,922	147	1	167	167	$7,499	7,413	277	14	$2,203					**15**
Fire Hall 2	2100	Building	41,809	151	1	123	54	$7,516	10,166	379	19	$2,916					**21**
Police Station	2200	Building	82,501	297	2	265	265	$12,674	5,860	219	11	$1,781					**14**
Roadways - PW Yard	3100	Building	28,774	104	1	166	166	$4,867	25,927	967	49	$7,156					**50**
Roadways - PW Shed	3100	Building	17,906	64	1	43	43	$3,526	5,758	215	11	$1,777					**11**
Street Lights	3500	Street/Traffic Lights	881,267	3,173	26			$172,571		-	-						**26**
Traffic Signal	3520	Street/Traffic Lights	145,968	525	4			$20,284		-	-						**4**
Sanitary Sewer	4100	Water and Sewage	198,770	716	6			$25,482		-	-						**6**
Storm Sewer	4200	Water and Sewage	529,225	1,905	15			$116,514		-	-						**15**
Waterworks (General)	4300	Water and Sewage	54,383	196	2	155	155	$8,040	16,083	600	31	$4,438					**32**
Watermain	4310	Water and Sewage	28,776	104	1			$7,422		-	-						**1**
Oasis Pump House	4340	Water and Sewage		-	-	13,358	-	$17,298		-	-						**-**
Golden Age Club	6200	Building	14,166	51	0	79	79	$2,760	6,058	226	12	$1,852					**12**
Parks (General)	7100	Building	71,094	256	2	26,644	16,281	$84,468	13,916	519	26	$4,989					**28**
Parks Building	7110	Building	11,440	41	0	400	400	$4,060	9,714	362	18	$1,774					**19**
Arena	7500	Building	787,959	2,837	23	5,548	5,548	$150,992	139,767	5,213	265	$36,726					**288**
Pool	7550	Building	12,847	46	0			$3,796	13,645	509	26	$3,858					**26**
Museum	7701	Building	7,649	28	0	8	8	$1,638		-	-						**0**
Fuel - Fleet		Vehicle											48,838	107	56,590	153	**260**
Fuel - Transit		Vehicle													29,714	80	**80**
~~Total~~			~~3,079,420~~	~~11,086~~	~~89~~	~~47,267~~	~~23,477~~	~~$667,848~~	~~269,287~~	~~10,048~~	~~512~~	~~$73,703~~	~~48,838~~	~~107~~	~~86,304~~	~~234~~	~~**942**~~
~~By Type~~		~~Building~~	~~1,241,032~~	~~4,468~~	~~36~~	~~33,754~~	~~23,322~~	~~$300,237~~	~~253,304~~	~~9,448~~	~~481~~	~~$69,266~~					~~517~~
		Street/Traffic Lights	1,027,234	3,698	30	-	-	$192,855	-	-	-	-	-	-	-	-	30
		Water and Sewage	811,154	2,920	24	13,513	155	$174,756	16,083	600	31	$4,438	-	-	-	-	54
		Vehicle	-	-	-	-	-	-	-	-	-	-	48,838	107	86,304	234	341

2021 Energy and Emissions Data

			Electricity & Water						Natural Gas				Gas		Diesel		Total
Department	*#*	*Type*	*kWh*	*GJ*	*GHG(t)*	*Water (m3)*	*Sewer*	*$*	*m3*	*GJ*	*GHG(t)*	*$*	*Litres*	*GHG(t)*	*Litres*	*GHG(t)*	***GHG (t)***
Tecumseh Town Hall	1200	Building	121,678	438	4	853	853	$17,436	14,605	545	28	$5,515					**31**
Fire Hall 1	2100	Building	41,665	150	1	283	283	$8,056	5,137	192	10	$2,500					**11**
Fire Hall 2	2100	Building	81,842	295	2	108	-	$7,672	8,046	300	15	$3,069					**18**
Police Station	2200	Building	71,155	256	2	160	160	$11,206	4,083	152	8	$2,124					**10**
Roadways - PW Yard	3100	Building	26,897	97	1	683	2,001	$5,952	7,775	290	15	$3,007					**16**
Roadways - PW Shed	3100	Building	23,196	84	1	68	68	$3,885	3,943	147	7	$1,595					**8**
Street Lights	3500	Street/Traffic Lights	764,747	2,753	22			$152,891		-	-						**22**
Traffic Signal	3520	Street/Traffic Lights	156,029	562	5			$20,828		-	-						**5**
Sanitary Sewer	4100	Water and Sewage	204,416	736	6	2	2	$22,482		-	-						**6**
Storm Sewer	4200	Water and Sewage	507,242	1,826	15			$131,172		-	-						**15**
Waterworks (General)	4300	Water and Sewage	54,610	197	2	213	213	$8,215	13,907	519	26	$5,174					**28**
Watermain	4310	Water and Sewage	72,383	261	2			$7,776		-	-						**2**
Oasis Pump House	4340	Water and Sewage		-	-	9,806	-	$13,148		-	-						**-**
Golden Age Club	6200	Building	13,934	50	0	95	95	$2,694	6,391	238	12	$2,044					**13**
Parks (General)	7100	Building	146,867	529	4	35,067	17,627	$90,225	12,669	473	24	$4,868					**28**
Parks Building	7110	Building	13,895	50	0	841	848	$5,639	7,854	293	15	$3,943					**15**
Arena	7500	Building	903,820	3,254	26	5,954	5,954	$144,126	75,285	2,808	143	$32,837					**169**
Pool	7550	Building	56,552	204	2	1,640	1,640	$13,367	3,615	135	7	$2,456					**9**
Museum	7701	Building	8,037	29	0	13	13	$1,793		-	-						**0**
Fuel - Fleet		Vehicle											76,306	168	70,494	191	**358**
Fuel - Transit		Vehicle													30,215	82	**82**
Total			3,268,965	11,768	95	55,786	29,757	$668,564	163,311	6,091	310	$69,132	76,306	168	100,709	273	**845**
By Type		Building	1,509,538	5,434	44	45,765	29,542	$312,050	149,403	5,573	284	$63,958	-	-	-	-	328
		Street/Traffic Lights	920,775	3,315	27	-	-	$173,719	-	-	-	-	-	-	-	-	27
		Water and Sewage	838,651	3,019	24	10,021	215	$182,795	13,907	519	26	$5,174	-	-	-	-	51
		Vehicle	-	-	-	-	-	-	-	-	-	-	76,306.0	168	100,709	273	440