The Corporation of the Town of Milton Energy Plan

2023 Corporate Energy Plan

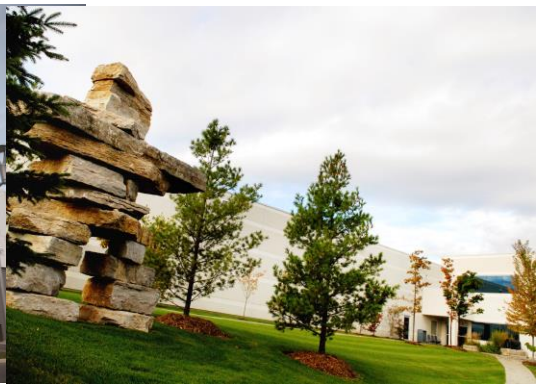


Table of Contents

Section I Milton's Commitment to Responsible Energy Management and Green Innovation 4
Overview and Intent of the Plan 4
Vision and Goals 5
Understanding Milton's Role in Energy Leadership 6
The Green Energy Act 6

Section II Understanding Energy and Emissions 7
Electricity 8
Electricity Generation 9
Uncertainty in Grid 10

Section III Corporate Energy Overview 11
Corporate Facilities Overview 11
Town Hall 12
Annex Building 13
FirstOntario Arts Centre Milton 14
Milton Sports Centre 15
John Tonelli Sports Centre 16
Mattamy National Cycling Centre 17
Milton Memorial Arena 18
Nassagaweya Community Centre 20
Milton Leisure Centre 21
Rotary Park Outdoor Pool 22
Milton Seniors' Activity Centre 23
Sherwood Community Centre 24
Beaty Branch Public Library 25
Hugh Foster Hall 25
Chris Hadfield Building 26
Fire Station Headquarters 27
Fire Station No. 1 28
Fire Station No. 2 28
Fire Station No. 4 30
Fire Station No. 5 31
Civic Operations Centre 32

Section IV Action Plan 33
Targets and Goals 33
Legacy Buildings 34
Section V Implementation 35
New Facilities 35
Employee Behaviour 36
Environment 36
Renewal Cycle and Reporting 39
Monitoring and Measurement 39
Oversight 40

Section I Milton's Commitment to Responsible Energy Management and Green Innovation

Overview and Intent of the Plan

The Town of Milton is one of the fastest growing municipalities in Canada, and adapting to an expanding population and substantial economic growth. To continue to serve this community, the Town of Milton must grow in conjunction with supporting economic development ensuring Milton remains a healthy and vibrant place to live and work.
The world is more aware of the impacts of energy consumption than ever before, and a conservation plan is key to ensuring responsible development and practical operations. By investing now in understanding our energy uses and emissions, there are incredible opportunities for Milton to plan for a vibrant future and emerge as a leader in this growing field. Now is the time to take advantage of those opportunities.

The Corporate Energy Plan is a comprehensive platform for the Town's commitment to responsible energy management and development. As part of this program, the Town established a baseline review of energy usage and emissions from the Town's assets and the community at large, and developed an action plan to ensure their responsible management. This document, the Corporate Energy Plan, is specific to the assets of the Corporation of the Town of Milton, while its companion document, the Community Energy Plan encompasses the broader community. These documents work in harmony to achieve the goals of the Milton Green Innovation Plan.

This Plan provides an overview of the corporate assets of the Town of Milton, looking at energy trend data and setting a baseline to measure against future performance, and a plan on how energy and emissions will be managed in years ahead. As municipal facilities make up a large portion of the Town's assets by energy usage, and can present significant potential reduction solutions, they are given the most focus in this document. Each facility's fact sheet includes energy trends, current and future management plans, and a brief description of its operation. A description of our goals across a multiyear plan and into the future, and how those goals will be reached are also documented in this plan.

Milton is a place for healthy growth and development, and this Plan ensures that it will remain so for many years into the future.

Vision and Goals

Milton is a strong and prosperous community that has laid the foundations of its development by focusing on the triple bottom line, **Economy**, **Society** and **Environment**.

As one of the steadiest growing municipalities in Canada with established potential for continuing development, it is crucial that the Milton Green Innovation Plan recognizes both the economic opportunities and challenges facing us. Energy conservation and responsible management have the potential to provide significant economic benefits to the town and its residents through managing energy costs and mitigating future expenses. However, the opportunity costs and budgetary planning requirements can be significant challenges. The tracking of our Corporate and Community Energy Plans, documenting where we are today and the opportunities that are ahead of us, is an important part in overcoming those challenges.

Supporting a healthy and prosperous community by providing access to exceptional public facilities has always been one of our most important duties. As Milton's community continues to grow, this creates added pressure on our existing public facilities and community centers, and the need to keep pace with our town's growth. Managing this intensification of use and expansion will be a critical challenge, however, towards the goal of controlling and reducing GHGs. Understanding the sources of emissions, separating areas of improvement from operational requirements, and directing new development will play an ever-increasing role in continuing to provide the services the community of Milton has come to expect and deserve.

To ensure our community remains a vibrant and healthy place to develop, now and in the future, we understand the importance of responsible energy management in all facets of our community.

The Green Energy Act

The Province of Ontario has developed the Green Energy Act (GEA) as "a mechanism to expand renewable energy generation, encourage energy conservation and promote the creation of clean energy jobs" (Ministry of Energy, 2012). The GEA requires public agencies, including municipalities, to follow reporting guidelines:

- Report annually on energy use and GHG emissions and post that information online; and
- Develop five-year energy conservation plans and post those plans online.

The Town of Milton has reported its energy use and GHG emissions as required under the GEA, and the Corporation Energy Plan in conjunction with the Community Energy Plan and regular reporting shall serve as the five-year conservation plan.

Section II Understanding Energy and Emissions

The energy we use in the every-day operation of our buildings and facilities is one of the most significant sources of GHG emissions that we produce. In Ontario, our energy principally comes in two sources, electricity and natural gas. By tracking our energy use, and understanding how it can be reduced or made more efficient, we can best manage and control our GHG emissions.

Emissions Conversion Factors

An equivalent greenhouse gas emissions conversion factor is used to convert various fuels consumed into an equivalent amount of GHG's emitted. The two main fuels focused on are electricity and natural gas.

Natural Gas

Natural gas conversion factors for converting m^3 to GHGe (in metric tons of CO_2) is a consistent value and is shown below (1.899 kg CO_2e / m^3).

Fuel	Emission Factor
Stationary sources	
Electricity	0.043 kg CO_2e / kWh
Natural gas	1.899 kg CO_2e / m^3
Propane	1.548 kg CO_2e / L
Heating oil	2.755 kg CO_2e / L
Mobile sources	
Diesel	2.754 kg CO_2e / L
Gasoline	2.462 kg CO_2e / L

Figure 1: SOURCE: Municipal GHG Challenge Fund Program Guide (from the CCAP)

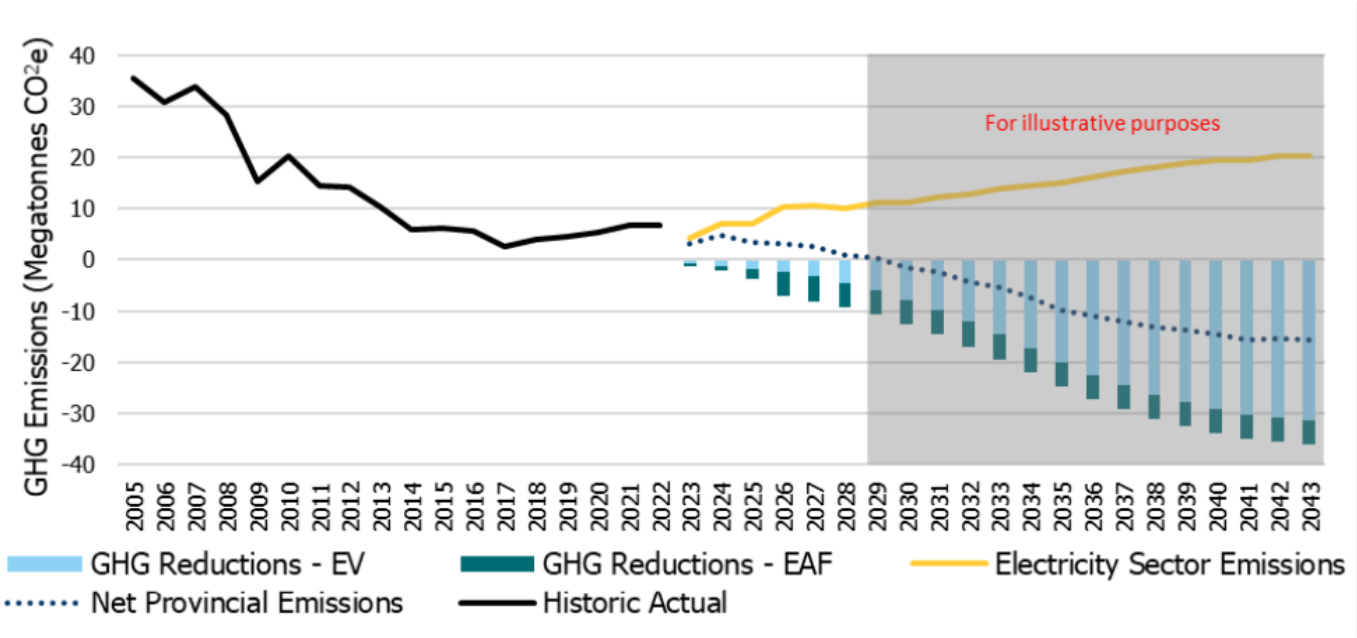
Electricity

Electricity GHGe factors have been variable in history and rely heavily on how the electricity is generated. In the past, Ontario used coal-fired generation to generate electricity, which contributed immensely to GHG emissions. More recently, coal has been phased out, and the only generation that contributes to GHGs is the natural gas peaking plants used to add power to the grid during peak demand times (typically 2pm – 9pm on the hottest and coldest days of the year). The following chart shows historical conversion factors used for both electricity and gas. Notice that gas has remained unchanged, but electricity has fluctuations.

Converting each fuel type to equivalent Greenhouse Gas Emissions (in kg CO2e)												
	2012	**2013**	**2014**	**2015**	**2016**	**201**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Electricity (kwh)	1.0134	0.0847	0.0500	0.0430	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043
Natural Gas (m3)	1.8906	1.8994	1.8994	1.8994	1.8994	1.8994	1.8994	1.8994	1.8994	1.8994	1.8994	1.8994

The figure below provides the outlook over the next 20 years.

Figure 48 | Electricity Sector GHG Emissions, Historical and Forecast



Source Independent Electricity System Operator | 2022 Annual Planning Outlook | Public

From 2018 to 2020 electricity generation stayed consistent, with only marginal increases in GHG emission from electricity generation. This marginal increase may be from the overall Ontario demand increasing, which caused more peaking plants to be running.

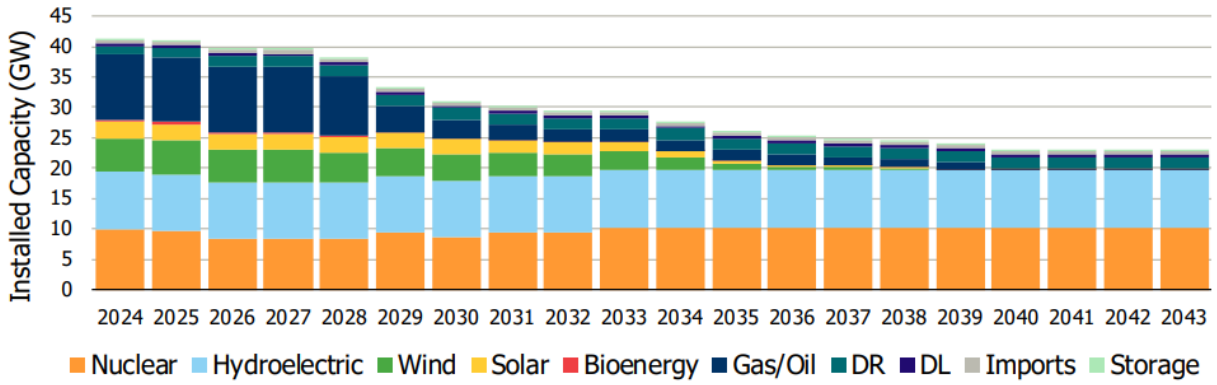
In 2020, a large increase in GHG emissions from electricity generation was expected. This can mainly be attributed to the expected Pickering nuclear station shut down. When the station shut down, more natural gas fired generation plants were required to make up for the loss in power generation. The increase is essentially double the GHG emissions from 2018 to 2023. After 2023, the higher GHG emissions are expected to stay where they are for the next 10 years.

Uncertainty in Grid

Figure 7 shows the total installed capacity by fuel type for the outlook period for Case 1.

Case 1 assumes that contract/commitments are not reacquired except for hydroelectric resources. Installed capacity decreases from about 41 to 29 GW in the next decade, before levelling off at approximately 23 GW through 2043.

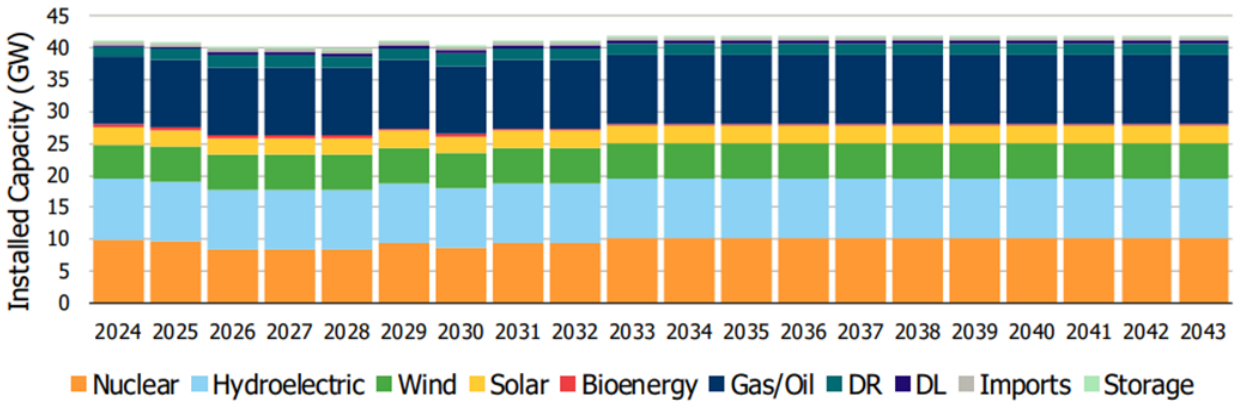
Figure 7 | Installed Capacity (Case 1)



Source Independent Electricity System Operator | 2022 Annual Planning Outlook | Public Demand response (DR) and dispatchable loads (DL) reflect the results of the IESO's 2021 Capacity Auction.

Figure 8 shows the total installed capacity by fuel type for the outlook period for Case 2, which assumes the continued availability of resources following the end of their contract term or commitment. Installed capacity varies between 40 and 42 GW in the next decade, before levelling off at 42 GW through 2043.

Figure 8 | Installed Capacity (Case 2)



Section III Corporate Energy Overview

Corporate Facilities Overview

- This section will feature a one-page informational overview of each of the town's corporate facilities
- Each overview will contain
    - Descriptive paragraph
    - Broad view chart of energy use by year
    - Graphic representation
    - Quick descriptions of what current and future actions are being undertaken to reduce energy usage
- Each facility sheet is a self-contained document that could be posted at the facility or used elsewhere

Municipal Facilities

- Town Hall
- Annex Building
- Civic Operations Centre
- Chris Hadfield Building

Activity Centre's

- Milton Sports Centre
- John Tonelli Sports Centre
- Mattamy National Cycling Centre
- Milton Memorial Arena
- Nassagaweya Tennis Centre & Community Hall
- Milton Leisure Centre
- Rotary Park Outdoor Pool

Community Centre's

- First Ontario Arts Centre Milton
- Nassagaweya Community Centre
- Milton Seniors' Activity Centre
- Beaty Branch Public Library
- Hugh Foster Hall
- Sherwood Community Centre

Fire stations

- Fire Station No. 1
- Fire Station No. 2
- Fire Station No. 3 Headquarters
- Fire Station No. 4
- Fire Station No. 5

Town Hall

150 Mary Street
Milton, Ontario

Milton Town Hall comprises the historical stone-exterior Town Hall building constructed in the 1800's, as well as a modern 50,000 square-foot addition constructed in 2009 and designed to LEED Certified standards. The two structures are connected by a glass walkway, which houses the Milton Walk of Fame.

Numerous energy efficiency measures are present in the facility including low flow fixtures, energy efficient lighting and occupancy controls.
The facility is open to the public from 8:30 AM – 4:30 PM, Monday to Friday.

	2014	2015	2016	2017	2018	2019	2020	2021	2022
GSF	105,194	105,194	105,194	105,194	105194	105194	105194	105194	105194
Electricity (kWh)	2,027,387	1,908,290	1,871,583	1,809,132	1,821,799	1,799,095	1,522,645	1,531,852	1,584,331
Natural Gas (m^3)	34,249	33,723	40,239	52,688	59,434	64,457	47,492	47,105	67,221
GHGe (tons CO_2)	166.42	141.38	151.29	172.44	166.19	177.87	142.42	135.44	176.93

WHAT WE ARE DOING

- Ongoing improvements to control systems and related mechanical equipment to maintain operating efficiency.
- Improved air filtration
- LED conversions

Annex/MEV Building

555 Industrial Drive
Milton, Ontario

The Town Hall Annex Building was constructed in 1984. It provides the town with additional administrative office space during periods of facility transition, as well as offering extra space as needed. The three-floor facility consists primarily of office and meeting space.

	2014	2015	2016	2017	2018	2019	2020	2021	2022
GSF	42,600	42,600	42,600	42,600	42.600	42,600	42,600	42,600	42,600
Electricity (kWh)	698,250	793,062	884,931	819,620	755,984	670,777	624,433	730,561	627,063
Natural Gas (m^3)	44,556	40,744	36,366	35,501	33,941	38,617	27,805	39,975	39,376
GHGe (tons CO_2)	119.54	109.19	104.47	100.21	86.51	94.25	79.86	98.35	94.43

WHAT WE ARE DOING

In 2017, structural repairs were made to improve the energy envelope of the building, including new insulation and cladding.

- New HVAC and building controls were installed.
- New exterior doors and windows installed
- Major renovations for Wilfred Laurier University occupancy Fall 2024

FirstOntario Arts Centre Milton

1010 Main Street East
Milton, Ontario

The FirstOntario Arts Centre Milton is public facility operating year-round. It has multiple spaces with different usages, a 500-seat theatre, Main Library Branch, auditorium, art gallery in the main lobby and two studios and meeting rooms on second floor.

The facility is a multiple story building constructed on grade. Designed to LEED Certified standards, numerous energy efficiency measures are present in the facility including low flow fixtures, energy efficient lighting and occupancy controls.

	2014	2015	2016	2017	2018	2019	2020	2021	2022
GSF	81,000	81,000	81,000	81,000	81,000	81,000	81,000	81,000	81,000
Electricity (kWh)	1,325,965	1,331,349	1,311,522	1,352,638	1,390,238	1,283,923	952,127	1,165,298	1,278,708
Natural Gas (m^3)	75,661	69,589	76,517	81,419	92,177	103,447	83,127	70,257	84,616
GHGe (tons CO_2)	210.01	185.54	197.79	208.75	215.35	237.08	188.32	170.88	201.65

WHAT WE ARE DOING

- Solar panels have been installed on the roof, generating renewable energy.
- Internal lights have been converted to energy-efficient LEDs.
- A highly reflective roof membrane was installed, reducing the heat island effect.
- LED conversion in main theatre

Milton Sports Centre

605 Santa Maria Blvd,
Milton, Ontario

Milton Sports Centre is a year-round multi-activity complex housing four ice pads, a gymnasium, elevated walking track, fitness studio, a gymnastics club, indoor pool, meeting rooms and other multi-use rooms.
Designed to LEED Certified standards, numerous energy efficiency measures are present in the facility including low flow fixtures, energy efficient lighting, occupancy controls and geothermal heat recovery system.

	2014	2015	2016	2017	2018	2019	2020	2021	2022
GSF	241,995	241,995	241,995	241,995	241,995	241,995	241,955	241,955	241,955
Electricity (kWh)	7,108,095	6,732,857	7,245,771	6,785,924	5,419,409	4,577,174	2,331,429	1,987,639	3,988,604
Natural Gas (m^3)	474,504	671,937	539,740	514,143	1.033,282	1,134,439	761,913	812,766	865,739
GHGe (tons CO_2)	1256.66	1543.37	1314.99	1247.98	2159.56	2325.98	1540.33	1,628.45	1788.86

WHAT WE ARE DOING

- Ice making equipment is being operated through a geo-thermal system.
- LED lighting has been installed in all four of the arenas.
- Solar panels have been installed on two of the arena roofs.
- In 2018, in partnership with Milton Hydro, a Combined Heat and Power System was installed to supply heat and electricity to parts of the building. This gas powered generator also provides critical power to areas of the building identified as a Halton Regional Evacuation site used in the case of Regional emergencies such as natural disasters and/or major power outages
- Additional LED conversions were completed throughout the facility to improve efficiency

John Tonelli Sports Centre

217 Laurier Ave
Milton, Ontario

John Tonelli Sports Centre consists of a single ice pad operational approximately 8 months of the year and is generally closed during the during the summer months. The facility is typically occupied during ice season between 3pm-11:30pm Monday through Friday and 7am-10:30pm on the weekends.

	2014	2015	2016	2017	2018	2019	2020	2021	2022
GSF	36,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000
Electricity (kWh)	548,350	544,356	589,224	590,269	552,246	571,822	512,222	365,883	383,201
Natural Gas (m^3)	58,601	56,973	52,721	48,570	47,638	64,457	47,492	44,690	58,044
GHGe (tons CO_2)	138.72	129.79	123.70	115.86	109.38	112.08	90.77	97.56	123.00

WHAT WE ARE DOING

- In 2017, in partnership with Milton Hydro, solar panels were installed on the roof.
- An all-Electric ice resurfacer is being used to flood the ice surface; this electric vehicle technology reduces operation costs and for the impact on the environment to be mitigated.
- Sections of the facility are retrofitted with new LED lighting; including the arena ice surface, bleachers, and arena changerooms.

Mattamy National Cycling Centre

2015 Pan Am Boulevard
Milton, Ontario

The Mattamy National Cycling Centre is a combination of a high-performance indoor track cycling facility and a community recreation facility designed to LEED Certified Standards. The facility features a 250-metre timber track designed to meet requirements set by the International Cycling Union for international competitions. The Centre includes a world class, 250-metre cycling track, as well as community sport and recreation facilities:

- Gymnasium courts 300-metre indoor walking/running track
- Fitness Centre including studio
- Bike shop
- Bike storage
- Meeting rooms
- Leased office space

	2014	2015	2016	2017	2018	2019	2020	2021	2022
GSF	95,368	95,368	95,368	95,368	95,368	95,368	95,368	95,368	95,368
Electricity (kWh)	491,023	3,020,339	2,920,078	2,997,494	3,479,974	3,133,778	2,524,883	2,656,245	2,739,210
Natural Gas (m^3)	0	192,368	216,262	222,600	208,967	215,236	187,976	199,392	254,815
GHGe (tons CO_2)	24.55	614.06	527.56	542.70	508.56	507.99	434.00	462.92	572.06

WHAT WE ARE DOING

- Daylight harvesting controls are in place to control when and where natural light is allowed in.
- All exterior lighting is using LEDs for high efficiency.
- Highly reflective roof membrane reduces heat islanding.
- New LED fixtures were installed in the stadium
- Electric vehicle chargers have been installed.

Milton Memorial Arena

77 Thompson Road
Milton, Ontario

Milton Memorial Arena is an all year facility and is accessible by the public, consisting of a single ice pad operating approximately eight months of the year, and acts as a multipurpose arena during the summer months. A Lions Club Hall located above the main foyer contains a large banquet hall and adjoining kitchen. The arena is home to the Milton Menace Junior "A" hockey team and is heavily used during the ice season between 3:00 PM – 11:00 PM Monday through Friday and 6:00 AM – 12:00 AM on the weekends.

	2014	2015	2016	2017	2018	2019	2020	2021	2022
GSF	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000	38,000
Electricity (kWh)	593,105	543,133	626,677	611,489	637,759	597,837	482,277	472,235	579,164
Natural Gas (m^3)	82,758	79,735	74,186	76,956	84,986	83,611	27,621	44,572	58,113
GHGe (tons CO_2)	186.84	172.77	165.97	170.63	183.87	179.43	67.19	100.08	129.22

WHAT WE ARE DOING

- Arena lighting has been converted to LEDs.
- Kitchen equipment has been converted from natural gas to electric.
  New exterior doors and windows were installed

Nassagaweya Tennis Centre & Community Hall

Guelph Line & Campbellville
Milton, Ontario

Completed in 2011, this mixed-use facility features a community hall, meeting room and kitchen tennis courts and clubhouse. The tennis court lights and clubhouse are separately metered. Designed to LEED Certified standards, numerous energy efficiency measures are present in the facility including low flow fixtures, energy efficient lighting and occupancy controls.

	2014	2015	2016	2017	2018	2019	2020	2021	2022
GSF	3,929	3,929	3,929	3,929	3,929	3,929	3,929	3,929	3,929
Electricity (kWh)	43,596	45,186	48,714	46,892	42,749	45,771	38,241	35,100	42,469
Natural Gas (m^3)	15,159	13,916	17,808	16,498	15,482	14,693	8,176	5,744.6	9,954
GHGe (tons CO_2)	30.97	28.14	35.77	33.21	31.40	30.66	17.16	12.80	20.22

WHAT WE ARE DOING

- Building control systems and mechanical equipment is being improved to maintain ongoing operating efficiency.
- Exterior lights are being converted to high efficiency LED lighting

Nassagaweya Community Centre

2005 Cameron Drive
Milton, Ontario

The Nassagaweya Community Centre is a year-round facility, serving many uses within the community. The facility, built in 1987, contains a main hall with a capacity of approximately 160 people, a full kitchen, meeting room and storage room. The hall is a community rental space only; as such it is not open to the public and is only open when rented.

	2014	2015	2016	2017	2018	2019	2020	2021	2022
GSF	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500
Electricity (kWh)	76,446	83,795	92,580	89,188	95,215	63,117	16,282	16,731	15,806
Natural Gas (m^3)	0	0	0	0	0	1,148	9,950	9,175.49	12,972
GHGe (tons CO_2)	3.82	3.40	3.70	3.57	3.81	4.23	32.05	18.45	26.88

WHAT WE ARE DOING

- 2019: Roof - replaced asphalt shingle roofing and improved attic ventilation by updating soffits and roof vents
- 2019: Updated Central HVAC units were added
- 2020: Exterior walls - replaced board & batten siding with a durable fiber cement cladding, adding water resistive membrane and insulation
- 2020: Exterior doors & windows - replaced doors & windows that had reached end of life

Milton Leisure Centre

1100 Main Street
Milton, Ontario

Milton Leisure Centre is a year-round multi-activity complex with facilities including a gymnasium, multiple swimming pools, fitness and weight studios.. The facility is open to the general public and can also be booked for private rentals.

	2014	2015	2016	2017	2018	2019	2020	2021	2022
GSF	49,700	49,700	49,700	49,700	49,700	49,700	49,700	49,700	49,700
Electricity (kWh)	1,502,464	1,429,710	1,602,121	1,518,881	1,482,298	1,414,396	724,924	1,165,298	1,009,528
Natural Gas (m^3)	221,922	219,144	205,195	224,487	238,874	241,785	68,318	99,584.42	151,907
GHGe (tons CO_2)	496.63	472.28	453.82	487.14	506.95	508.26	153.70	226.63	323.17

WHAT WE ARE DOING

- LED lighting was installed in the gym in 2016.
- HVAC replacements in 2017.
- LED lighting was installed for the pool and surrounding areas.
- Major outdoor patio improvements

Rotary Park Outdoor Pool

1 Garden Lane
Milton, Ontario

This facility consists of a public outdoor swimming pool combined with a splash pad operating 9 AM – 9 PM, seven days a week between late June and Labour Day (early September). A structure with washrooms, changerooms, storage rooms and a mechanical room containing water pumps, heater and filters is located at the facility. During the non-operational season, all loads including pumps and lighting at the facility are turned off.

	2014	2015	2016	2017	2018	2019	2020	2021	2022
GSF	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500
Electricity (kWh)	39,861	46,873	45,085	43,747	46,314	38,437	9,715	37,113	40,344
Natural Gas (m^3)	6,408	12,686	11,370	9,293	6,666	9.035	7,410	3,217	12,067
GHGe (tons CO_2)	14.16	25.89	23.40	19.40	14.11	19.24	15.90	7.00	24.00

WHAT WE ARE DOING

- Boilers were replaced in 2019 improving operating performance.
- New roof in 2020
- New pool heater in 2020
- New filter pumps in 2022

Milton Seniors' Activity Centre

500 Childs Dr.
Milton, Ontario

The Milton Seniors' Activity Centre is leased from Halton Region for use as a recreational facility for adults over 55 years of age. The facility offers programs, clubs, and support of varying descriptions designed to keep participants engaged in the community and ensure a high standard of life. In addition to the planned activities, the centre offers rentable hall space for private functions.

	2014	2015	2016	2017	2018	2019	2020	2021	2022
GSF	22,000	22,000	22,000	22,000	22,000	22,000	22,000	22,000	22,000
Electricity (kWh)	0	0	0	0	0	0	0	0	0
Natural Gas (m^3)	31,679	29,369	28,406	27,851	29,473	29,737	22.902	24,501	29,538
GHGe (tons CO_2)	60.17	55.53	53.95	52.90	57	58	44	47	57

Sherwood Community Centre

Main Street and Tremaine Rd.

This new facility, opened in the spring of 2019, it is a year-round multi-activity complex housing two ice pads, an indoor pool, neighborhood library, multi-use rooms, and an outdoor skate park and disc golf course on site.

	2014	2015	2016	2017	2018	2019	2020	2021	2022
GSF					133,059	133,059	133,059	133,059	133,059
Electricity (kWh)					1,903	947,747	2,375,129	2,673,156	1,937,748
Natural Gas (m3)						235,626	253,903	318,224	371,962
GHGe (tons CO_2)						198	797	690	763

WHAT WE ARE DOING

- The Sherwood Community Centre was engineered for the installation of solar panels on the roof and the use of the power generated for the operation of the facility. As part of the Green Innovation work plan, staff worked with Milton Hydro (MEGS) on this initiative to increase renewable energy solutions at Town facilities.
- MEGS provided a full turnkey service to the Town for the design, supply and installation of the solar panels. The covers the full facility (as opposed to just the arena), and offers the best payback period of 11.6 years should the value of the energy produced be fully utilized. The larger sizing is most consistent with the Town's Green innovation plan, and provides options to allow for future enhancement as technology and or energy regulations evolve.
- An energy model was performed to evaluate the energy performance of the Sherwood community Centre. The current design is performing 26.2% better than ASHRAE 90.1.2010 reference. The model is based on available drawings, validated assumptions and uses default values when detailed info is not available.
- The twin rinks are maintained using an all-Electric Ice Resurfacer which provides the capability to make ice through the power harvested from the sun.

Beaty Branch Public Library

945 Fourth Line
Milton, Ontario

The Beaty Branch public library is an 11,300 ft^2 (1,050 m^2) facility housing over 42,000 items of various media. The LEED Silver Certified building has been open to the public since November 17, 2009. The one-storey library is located adjacent a storm water channel and green space.

	2014	2015	2016	2017	2018	2019	2020	2021	2022
GSF	11,300	11,300	11,300	11,300	11,300	11,300	11,300	11,500	11,500
Electricity (kWh)	131,637	106,948	142,833	130,103	142,083	140,700	109,940	135,131	130,641
Natural Gas (m^3)	24,258	20,935	20,551	20,158	22.091	23,961	8,297	19,098	18,625
GHGe (tons CO_2)	52.66	43.92	44.75	43.49	47	50	37	41	40

WHAT WE ARE DOING

- Ongoing improvements to control systems and related mechanical equipment to maintain operating efficiency.

Chris Hadfield Building

1 Chris Hadfield Way
Milton, Ontario

Chris Hadfield Building is a heritage listed building, originally constructed in 1884 but relocated to its current location in 1973. Our building division staff currently occupy the building.

	2014	2015	2016	2017	2018	2019	2020	2021	2022
GSF	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600
Electricity (kWh)	36,579	33,346	31,153	24,348	23,657	22,445	19,792	22,173	26,910
Natural Gas (m^3)	4,418	3,910	3,620	3,491	2,219	1,886	2,617	3,635	2,650
GHGe (tons CO_2)	10.22	8.68	8.12	7.61	5	4	6	8	6

WHAT WE ARE DOING

- Ongoing improvements to control systems and related mechanical equipment to maintain operating efficiency.
- 2013 – replacement of all windows/doors
- 2021- roof shingle, eaves trough, downpipes and fascia (including any repurposing, attic ventilation, decorative gable trussed and other components); refurbishment of the wood soffit system, together with the installation of well-functioning attic ventilation system; refurbishment of decorative gable end trusses and other components

Fire Station No. 3 Headquarters

610 Savoline Boulevard
Milton, Ontario

Fire Station Headquarters, also called Station No. 3, is the newest fire department location, covering 15,000 square feet. It is the current home of the Fire Administration, Fire Prevention/Public Education and Support Services divisions, and includes a new state of the art communications center.

	2014	2015	2016	2017	2018	2019	2020	2021	2022
GSF	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000
Electricity (kWh)	166,846	167,742	180,732	194,112	192,807	185,816	178,942	164,205	155,627
Natural Gas (m^3)	33,672	29,550	28,435	27,125	27,818	31,562	22,411	22,714	25,070
GHGe (tons CO_2)	72.30	62.67	61.24	59.28	60	66	50	48	53

WHAT WE ARE DOING

- Ongoing improvements to control systems and related mechanical equipment to maintain operating efficiency.

Fire Station No. 1
405 Steeles Ave
Milton, Ontario

The station was built in 1977 and until 2012, functioned as the main Fire Station Headquarters for Milton. After 40 years, all fundamental facility systems have reached the end of their service life cycles.
The original structure was a pre-engineered building and required to be reinforced in order to meet current OBC requirements.
Original mechanical, plumbing, electrical and communication systems were all replaced with new material in 2020. The exterior building envelope and roof have also been replaced with new materials.

	2014	2015	2016	2017	2018	2019	2020	2021	2022
GSF	21,650	21,650	21,650	21,650	20,142	20,142	20,142	20,142	20,142
Electricity (kWh)	153,737	148,103	133,109	135,969	42,560	89,938	171,472	158,713	169,400
Natural Gas (m^3)	38,085	35,146	29,896	31,396	14,335	50,165	42,475	22,544	20,817
GHGe (tons CO_2)	80.02	72.45	62.11	65.07	29	100	106	48	45

WHAT WE ARE DOING

- In 2020, the building was fully redeveloped using current efficiency and structural standards.
- Major rehabilitation at Fire Station No.1 included bringing up to code structural, mechanical and electrical systems, as well as fire, plumbing, accessibility and building envelope
- Both interior and exterior finishes were upgraded. In addition, the asphalt area surrounding the fire station was resurfaced.

Fire Station No. 2

2665 Reid Side road
Milton, Ontario

Built in 2003, Fire Station No.2 is a year-round part-time facility shared with both Halton Emergency Management Services (EMS) and Halton Police with no full-time occupants. Three-hour training sessions are scheduled approximately once per week with approximately 20 occupants per training session. Facilities include a three-truck apparatus bay, training rooms, kitchen, and lounge and office space. Due to location, heating fuel comprises of on-site propane tank.


Station #2 Reid Side Road, Campbellville

	2014	2015	2016	2017	2018	2019	2020	2021	2022
GSF	5,912	5,912	5,912	5,912	5,912	5,912	5,912	5,912	5,912
Electricity (kWh)	152,533	154,752	143,516	121,047	126,311	126,968	121,427	111,590	111,087
Natural Gas (m^3)	42,692	27,371	34,157	32,180	11.863	27,745	32,277	19,743	18,966
GHGe (tons CO_2)	88.71	58.02	70.62	65.96	27	57	68	41	40

*unofficial data

WHAT WE ARE DOING

- Ongoing improvements to control systems and related mechanical equipment to maintain operating efficiency.
- 2016 - Structural beam and roof deck replacement
- 2017 – Parking lot lighting upgrades
- 2023 – Replace RTU #1 and RTU # 2 with high efficiency package units

Fire Station No. 4

405 James Snow Parkway
Milton, Ontario

Built in 2010, Fire Station No.4 is a LEED-NC (Leadership in Energy and Environmental Design – for New Construction) Certified facility approximately 10,000 ft^2 in size providing support to increasing call volumes in Milton's urban core. The facility is operational year-round with a fifteen-person crew based out of the station 24 hours per day, seven days per week and part-time staff responding as required. It is comprised of apparatus bays supporting four fire trucks; support facilities; meeting and training rooms; and a historical display area. Organized tours of the facility occur on an as-requested basis however the facility is not generally open to the public.

	2014	2015	2016	2017	2018	2019	2020	2021	2022
GSF	10,500	10,500	10,500	10,500	10,500	10,500	10,500	10,500	10,500
Electricity (kWh)	168,342	173,131	157,607	142,227	186,610	186,515	186,886	155,209	139,023
Natural Gas (m^3)	31,323	31,027	29,182	18,949	31,934	42,661	39,313	32,773	51,414
GHGe (tons CO_2)	67.91	65.68	61.73	41.68	67	88	81	68	103

WHAT WE ARE DOING

- Ongoing improvements to control systems and related mechanical equipment to maintain operating efficiency.
- Convert lighting in truck bays to LED fixtures

Fire Station No. 5

7825 Louis St. Laurent Ave
Milton, Ontario

Fire Station #5 is the newest fire station added in Milton. Opened in 2020 as a multi-purpose 8,369 sq. ft. building with an apparatus bay for three (3) fire trucks. It is the home of our Emergency Response Centre (EOC) in partnership with the Region of Halton who occupy the west side for Paramedic Services

	2014	2015	2016	2017	2018	2019	2020*	2021	2022
GSF							8,369	8,369	8,369
Electricity (kWh)							45,329	164,644	141,895
Natural Gas (m^3)							6,553	25,499	13,733
GHGe (tons CO_2)							14	54	30

*unofficial data

WHAT WE ARE DOING

Energy/sustainable design features:

- Building envelope insulation exceeding building code requirements
- Energy efficient curtain wall systems
- High albedo/white roofing membrane and concrete paving for mitigating heat island effect
- Maximized permeable surfaces
- Variable refrigerant flow (VRF) heat pump system and energy recovery units (ERV) in centralized HVAC system
- Low water consumption plumbing fixtures
- High efficiency LED lighting and programmable lighting control system
- Drought resistant landscaping for low irrigation water consumption

Civic Operations Centre

5600 Regional Road 25
Milton, Ontario

The Operations Yard is a year-round operations facility designed to LEED Certified Standards consisting of two main sections; office space, and truck bays that house a portion of the fleet of maintenance. Heating and cooling is provided to the office wing, while the truck bay is a heating only structure. The Civic Operations Centre, consisting of the following:

- Operations & Administration Building (45,000 sqft)
- Truck Shelter (7,100 sqft)
- Unheated Storage (4000 sqft)
- Wash Bay Facility (3,700 sqft)
- Fueling Station with 2 kiosks (2,500 sqft)

	2014	2015	2016	2017	2018	2019	2020	2021	2022
GSF	45,000	45,000	45,000	45,000	45,000	45,000	45,000	45,000	45,000
Electricity (kWh)	276,164	584,362	659,463	621,583	658,924	689.757	643,119	677,982	648,552
Natural Gas (m^3)	93,746	85,560	81,659	88,643	100,238	83,045	85,518	69,227	107,647
GHGe (tons CO_2)	191.87	185.46	181.48	193.23	213	180	184	153	226

WHAT WE ARE DOING

- Geo-thermal system provides consistent efficient heating
- Building automation system improves energy efficiency.
- Highly reflective roof membrane to reduce the heat island effect.

Section IV Action Plan

Targets and Goals

While the ultimate goal of the Town of Milton is to create a clean, sustainable and prosperous future of all of our community, we recognize the importance of setting targets and goals that are realizable within the scope of this action plan. Though there are unique challenges to both the Corporation and Community Energy Plans, the Corporation of Milton demonstrates its commitment to responsible energy leadership by committing to the same target goals that will be set out in the Community Plan.

Milton is committed to moving towards the emissions reduction targets established in the revised Ontario Climate Change Action Plan. These targets provide a measuring stick against which to weigh our performance, as well as a larger context to understanding our emissions reduction efforts.

Ontario Emissions Scenario as of March 25, 2022

Ontario has already achieved greater reductions of greenhouse gas emissions than any other province or territory in Canada. The province remains steadfast in its commitment to meet the 2030 emissions reduction target and is confident in the plan and trajectory to get there – catalyzed by recent major investments in automotive, steel, and industrial electrification.

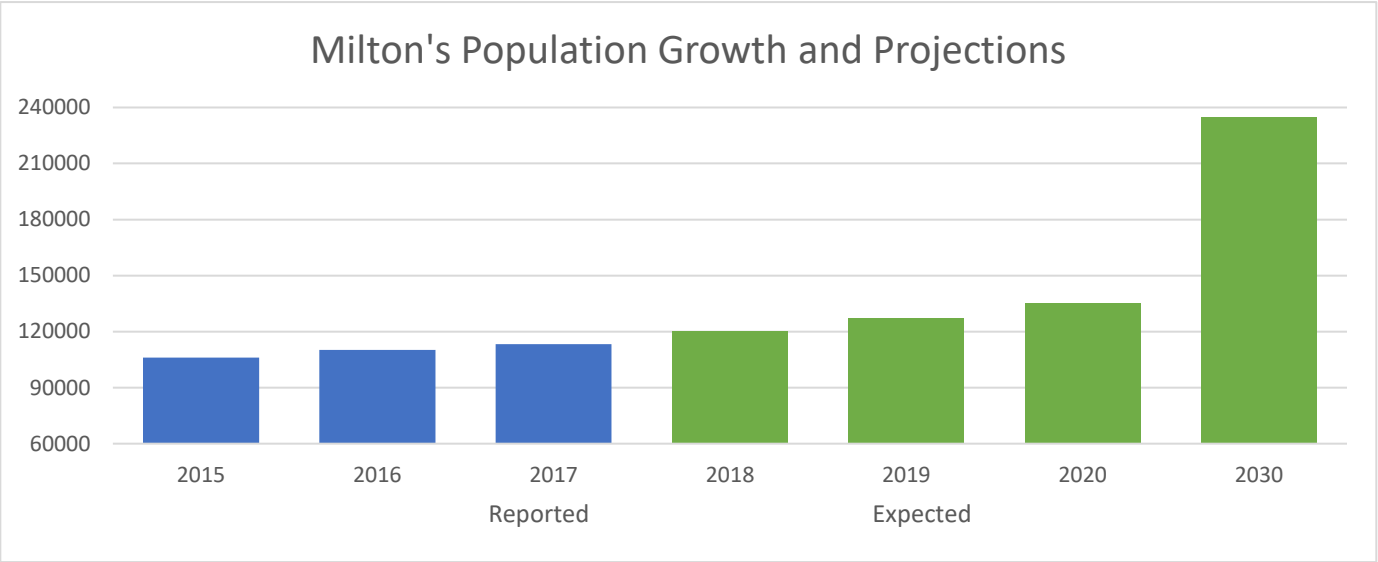
As the chart below shows, Ontario's plan is working and the province is on track to achieve its 2030 greenhouse gas emissions target. Ontario's reductions since 2005 surpass those of any other province or territory in Canada, in absolute terms.

This has been done while ensuring that our approach is flexible to the opportunities, needs, and circumstances facing job creators and not harmful to Ontario's economic growth.

The graph below presents Ontario's greenhouse gas emissions since 2018 along with a forecast of provincial emissions out to 2030. Emissions are estimated to be 143.7 Mt CO2e in 2030, indicating Ontario **is on track** to achieve its greenhouse gas emissions target of 144.0 Mt CO2e in 2030, or 30 percent below 2005 levels per the 2021 National Inventory Report.

The Ministry of the Environment, Conservation and Parks developed the forecast by applying gTech energy-economy model, created by the reputable and widely used third-party company Navius. The results demonstrate Ontario's clear trajectory toward the achievement of its 2030 emissions reduction target. The sophisticated model was used to incorporate actions that are either implemented or underway. Where feasible, policies included in both the business as usual and policy cases have been modelled in an integrated fashion (i.e., taking overlapping reductions from various policies into account).

However, there are a number of challenges making the targets established in the OCCAP unsuitable for the goals of this plan. Milton's population has expanded at a rate much higher than the provincial average. Older infrastructure, facilities, and community spaces, designed to fit the needs of the time, are being used more intensively, while the demand for new development is high. We are also attempting to catch up with many of our larger neighbors in developing and implementing a community-wide understanding of our energy uses and emissions. The Milton Green Innovation Plan was our first venture into creating comprehensive Corporation and Community Energy Plans, and we recognize that it will take time to develop the baseline information and understanding between stakeholders that will be necessary to achieve our OCCAP goals.


Milton's Population Growth and Projections
240000
210000
180000
150000
120000
90000
60000
2015
2016
2017
2018
2019
2020
2030
Reported
Expected

Section V Implementation

In the context of the Corporate Plan, we were able to construct energy and emissions baselines from the corporate facilities.

Emissions can also be viewed as a function of the total gross square footage (GSF) of all of the facilities. This has the benefit of normalizing the data against facility turnover. However, it is also limited in representing the difference in energy demand across different types of spaces, and in differentiating more intensive use from less efficient structures.

Population can also be used to normalize the emissions data. This has the benefit of tracking the emissions in proportion to the growing size of the community, and can in part account for the more intensive use of the facilities as demand grows. However, it is also not very representative of the performance of the facilities themselves.

Following targets for this 5-year action plan should reflect the challenges we are currently facing and what can be realistically realized within the plan's scope, while at the same time advancing the vision of the Milton Green Innovation Plan. Our goals with this plan are;

- Continue gathering energy use and emissions data to measure performance
- Update Milton's existing facilities through an equipment replacement strategy to persistently improve performance.
- Utilize innovative design and energy management in all new facilities to meet or exceed the highest standards in sustainable development.
- Foster energy conscious employee behavior to create a culture of conservation.

Seek out new opportunities to gain energy efficiencies, innovative developments and sustainable solutions across Milton.

Existing facilities present both a challenge and a number of opportunities to energy use management and emissions reductions. In comparison to modern facilities, legacy buildings are generally much less energy efficient, and were often not designed with such concerns in mind. However, this can often present significant opportunities to improve upon existing performance, as many relatively simple solutions can produce immediate results. While recommissioning an older building has the potential to produce the most significant change, it is often not an economical or practical choice. However, where improvements can be made, the opportunity must be taken.

Many of Milton's older facilities have already made progress in taking advantage of the most readily available avenues of energy use management. LED lighting fixtures are now installed in many of the older builds, while reflective roof membranes and building automation systems are being used to control energy demand. Some opportunities still remain, and are an important part in reducing the overall emissions generated by these facilities.

An Equipment Replacement and Energy Audit Strategy has also been developed to take advantage of opportunities for further improvement. This strategy looks at the budgetary equipment replacement cycle already in place and matches it with incentives and opportunities available to more energy efficient choices.

Milton is developing new buildings at a very high standard of environmental performance. Recent constructions such as the Mattamy National Cycling Centre and the Sherwood Community Centre were built to LEED certified standards and have incorporated numerous energy demand management and reduction strategies into their design.

Maintaining this strong commitment to energy conscious design will be an integral part to working towards the OCCAP goals. As Milton grows and new facilities are constructed, they will be contributing a net increase to our emissions totals, and therefore minimizing that increase while seeking reductions elsewhere will be necessary.

Employee Behavior

A significant avenue to emissions reduction on an individual level can be achieved through the behavioral training and education of Town employees. Workshops such as the Employee Engagement & Energy Awareness Program (EEEAP) designed to educate employees in incorporating simple changes that can achieve significant energy savings through operational energy efficiencies. Training with automation systems also allows for active adjustments to be made to changing conditions, taking advantage of all possible efficiencies. These efforts, taken on an individual level, can have a large cumulative impact and ensure that energy management best practices are achieved.

The Town has also committed to larger-scale events such as Earth Hour, powering down wherever possible. These events are important for fostering the wider culture of conservation among our employees and across our community. Education and awareness are crucial to an effective energy management plan, and will play an evolving role in the Milton Green Innovation Plan.

Environment

The Town of Milton invites residents to celebrate Earth Day. This special day is all about learning, sharing, and taking action to help our planet. It is a big deal all over the world, with over one billion people joining in to help fight climate change.
We want to keep our environment safe and clean for everyone. A healthy planet is not an option — it is a necessity.

We're expanding Milton's urban forest, we are planting hundreds of trees

The Town of Milton is working toward reducing its impact on the environment.
The Town applies a green lens to projects and initiatives using specific environmental, sustainable and energy conservation strategies. This year, we are planting hundreds of trees in streetscapes and parks. For reforestation efforts, an additional several hundred trees are being planted in partnership with Conservation Halton and Sustainable Milton.

Community Based Activities and Events

Earth Hour (March) - Town facilities power down and reduce consumption where feasible.

Expand efforts to engage the community, other stakeholders and partners to support various forestry and environmental initiatives. This includes events such as Earth Day Clean-Ups, Earth Week Clean-Ups, Spring Planting Days and Fall Planting Week.

Other ways to get involved

- Complete Milton's Earth Day scavenger hunt
- Use reusable bags and utensils
- Cook a plant-based meal
- Ride a bike
- Use a reusable water bottle
- Save electricity and turn off lights when you leave a room

Driving Towards Innovation

In addition to our emissions reduction efforts and commitment to responsible growth, the Town must be proactive in seeking out new and innovation solutions to sustainable development across our community.

Bike Lanes

The Town of Milton Trails Master Plan Update is a statement of Council's continued commitment to provide a range of leisure, learning and healthy lifestyle opportunities for the residents of Milton. With the on-going development taking place and the opportunity for on-street bike lanes to be implemented within subdivisions through the subdivision agreements.

Transit

Transit is undergoing an evaluation of fleet complement and recommendation for alternatives to achieve optimal capacity requirements. Review vehicle size availability in the marketplace (e.g. 12 meter, 9 meter, 8 meter, 7 meter, 6, meter, etc.). Explore and analyze benefits, costs, opportunities and risks (BCOR) of long-term fleet diversification, evaluate the implications of alternative fuel propulsion systems, mainly BEBs.

Fleet

The Town of Milton owns, operates and maintains approximately **262** vehicles and other equipment for the Facilities, Operations, Fire Services, and Transportation divisions. These vehicles are essential to maintain roads and parks, and provide many other community services. The large majority of vehicles are powered by diesel fuel and gasoline.
The Town has already taken substantive steps to address fleet and commuting emissions. New vehicles are required to be multi-use and "right-sized" – the smallest vehicle possible to do the job required. Grass cutting equipment is slowly being replaced with electric options; we have four (4) units to date. We also have two (2) Hybrid SUV's with six (6) more on order.
Our Arena facilities are equipped with three (3) electric ice-resurfacing machines, with a fourth unit going in to service this fall.

Oversight

Oversight of the Plans will remain with the Facilities, Operations, and Environment Department and any additional partners, as they are required.

Renewal Cycle and Reporting

GEA reporting requires an updated energy conservation plan be completed and publicly posted every five years, while energy use and GHG emissions data be submitted and made available every year. This plan should be updated quarterly to reflect the most recent energy use data and to update the facility sheets as recommended actions are undertaken and new initiatives are planned.

Monitoring and Measurement

As the five-year Corporation Energy Plan is updated, accurate accounting of energy demand and consumption will be required to sustainably satisfy the annual GEA reporting regimen. In addition to satisfying reporting requirements, monitoring and measuring consumption will allow the town to communicate successes to staff and residents.

Monthly utility billing data has been used to record facility-wide electricity and natural gas consumption and the derived GHG emissions, and will continue to be the primary data gathering method. Site-specific sub-metering and internal control data will be collected where available, and will be expanded upon as it becomes available at additional facilities.

Resource Implications

The Corporate energy plan is subject to the annual corporate review, including the operating and capital budget approved by council, and supported by facility condition audits and asset management plans