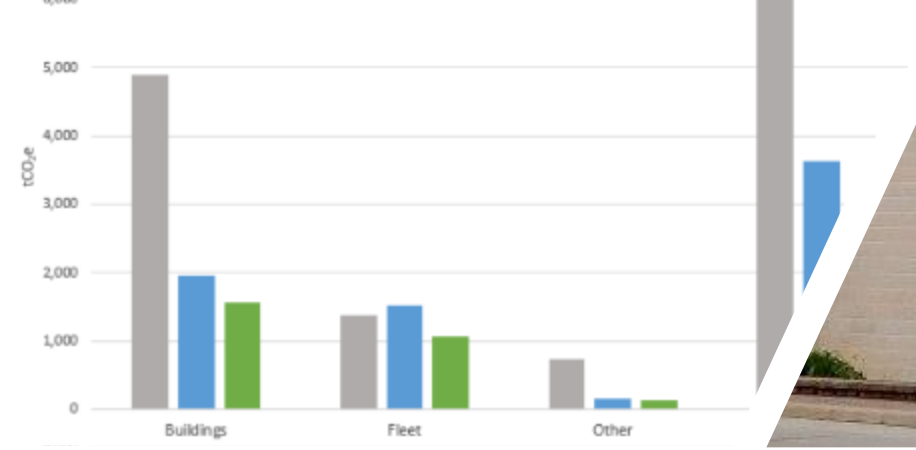


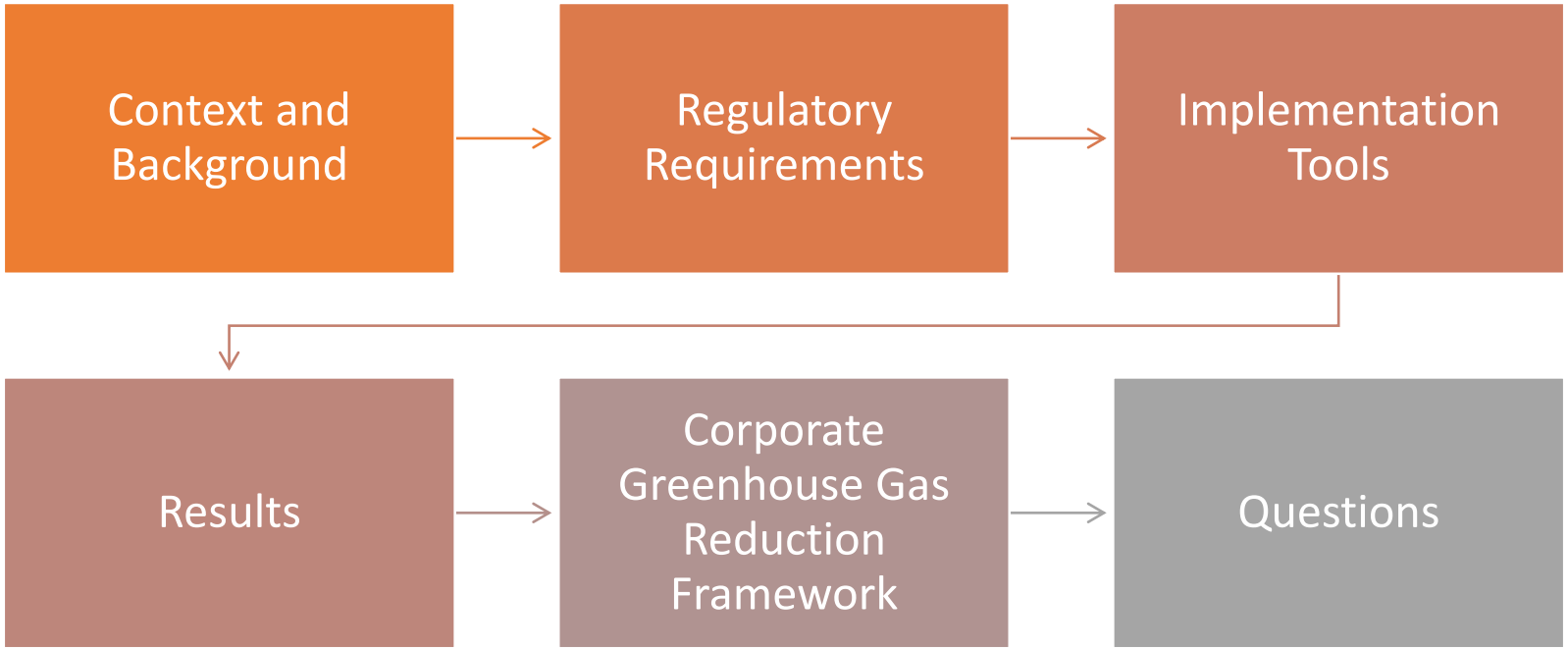
Town of Caledon's Corporate Energy Approach

Presentation for Rural Talks: Climate Change in Huron County

Presented by: Cristina Guido, Town of Caledon, Energy & Environment Specialist

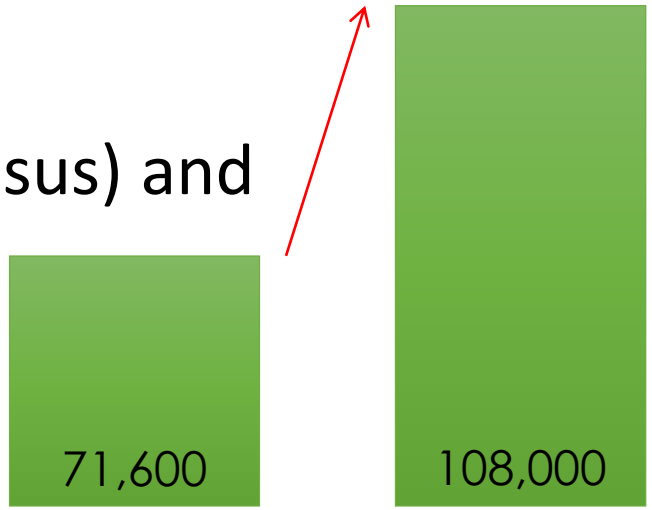
TOWN OF CALEDON

Agenda


Context and Background
Regulatory Requirements
Implementation Tools
Results
Corporate Greenhouse Gas Reduction Framework
Questions

Where in the world is Caledon?

- Most northern of three municipalities in the Region of Peel
- Predominantly rural with a mix of urban areas, villages, and hamlets
- Covers nearly 700 km2
- Population: 71,600 (2017 census) and anticipated to grow by 2031



Energy & Environment Team

Provides community and corporate stakeholders with guidance and tools for **addressing climate change, energy management** and **sustainable operation practices**. This is achieved through:

- Project implementation
- Facilitating strategic partnerships
- Building corporate and community capacity
- Conducting research

Manager, Energy & Environment

Specialist, Energy & Environment

- Corporate climate change initiatives and projects
- Energy, fleet, waste, water

Specialist, Climate Change

- Community climate adaptation, mitigation, capacity building

Regulatory Background

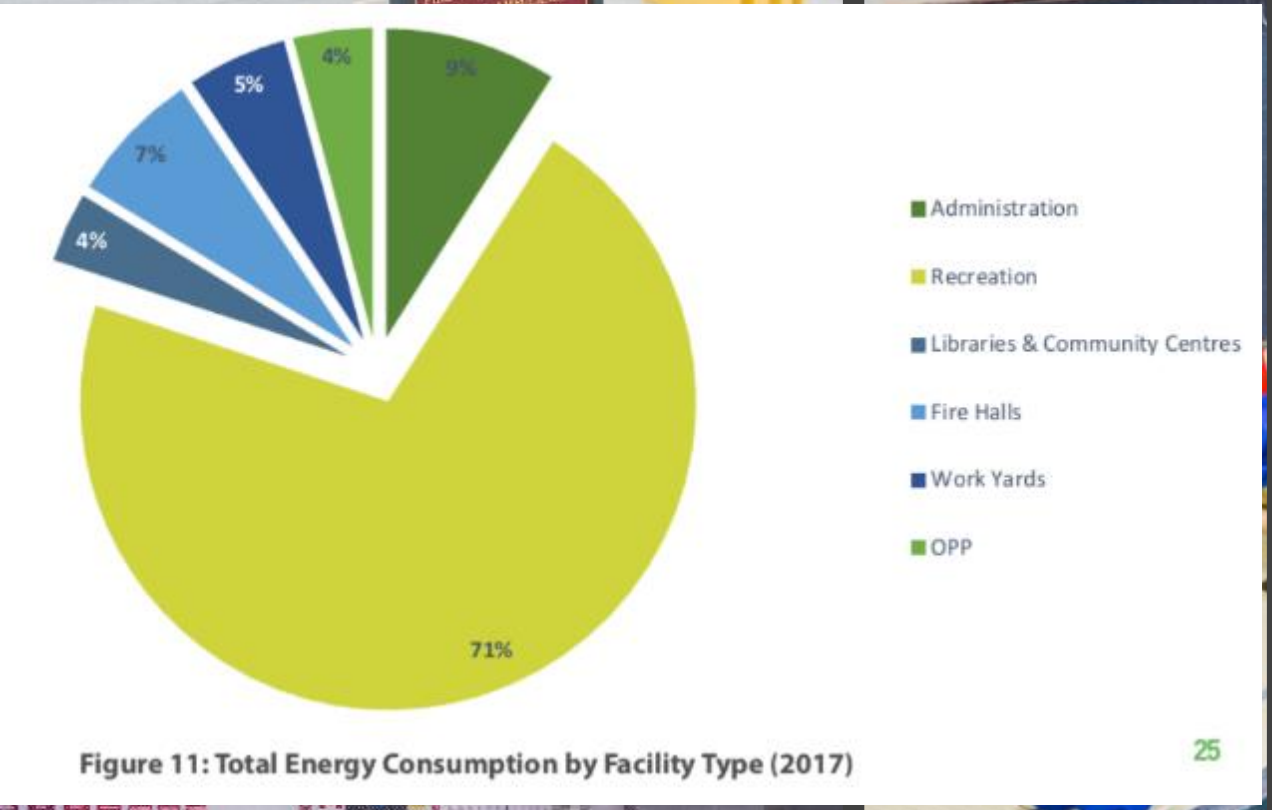
Ontario Regulation 507/18

2014-2019

- Corporate Energy Management Plan
- 36 actions on building energy conservation

2019-2024

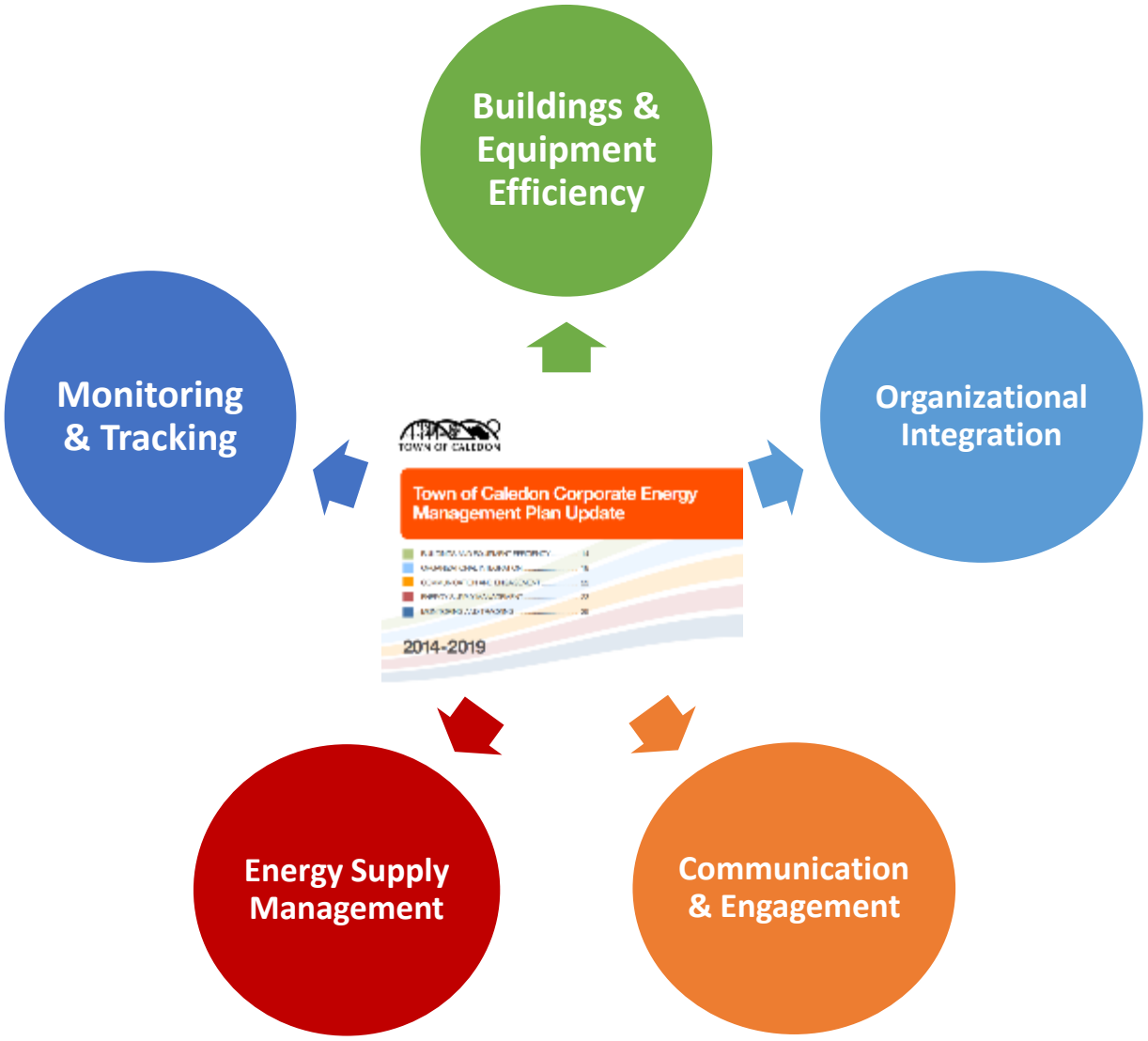
- Corporate Greenhouse Gas Reduction Framework
- 60 actions on corporate emissions



Building Portfolio

- 29 facilities of various types
  - 18,441,741 ekWh (2017)
  - $1,644,514 (2017)
  - 1,946 tonnes of CO_2e (2017)
- Organized into 4 facility families with facility supervisors, coordinators, and operations staff
- Energy consumption in all facilities is monitored using RETScreen Expert

Corporate Energy Management Plan (2014 – 2019)



36 actions under the following categories:

1. BUILDINGS AND EQUIPMENT EFFICIENCY:

Optimize operation schedules and investigate new technologies and systems to reduce energy consumption while improving the Town's service delivery.

2. ORGANIZATIONAL INTEGRATION:

Integration of energy management policies and procedures throughout the Corporation that requires staff to include energy management into decision making.

3. COMMUNICATION AND ENGAGEMENT:

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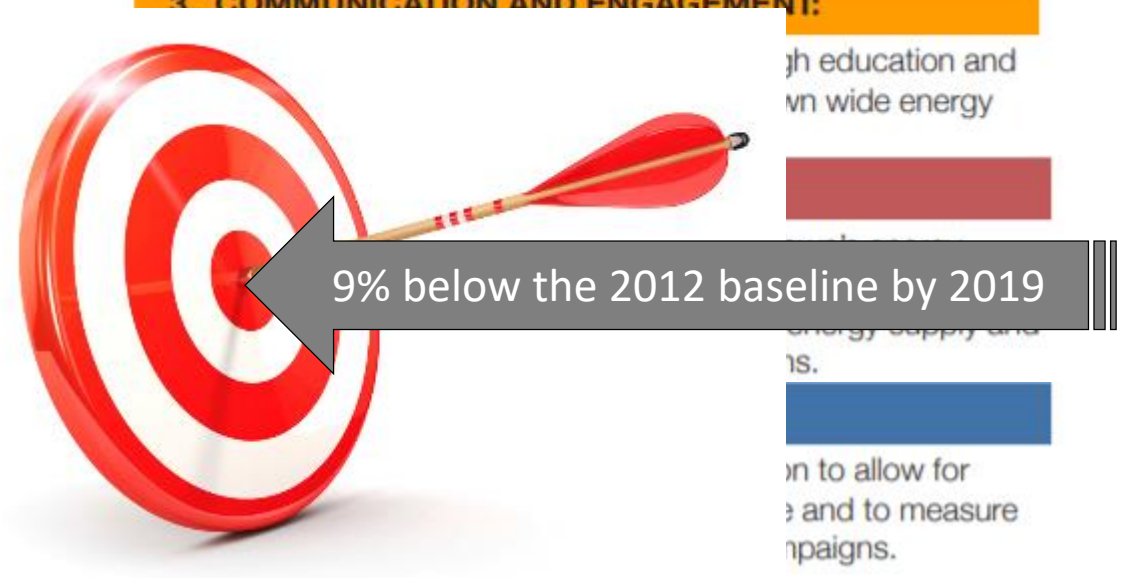

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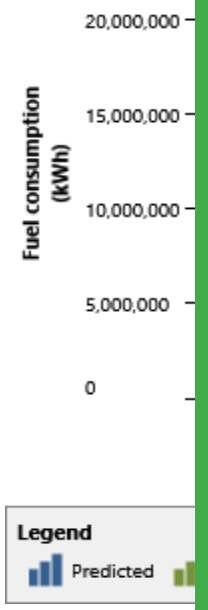

Energy Achievements 2014 – 2018

140
energy conservation measures complete

$248,039
of utility incentives have been received
from saveONenergy and Enbridge Gas

12.6%
reduction
of facility energy consumption in 2018 compared to 2012 levels

11
energy audits
completed between 2016-2017

Established a Corporate Energy Revolving Fund and spent
$171,567
on energy retrofits

Established a Corporate Energy Team and held
15 meetings

or
00 ekWh

Implementation Tool: Corporate Energy Team

energy

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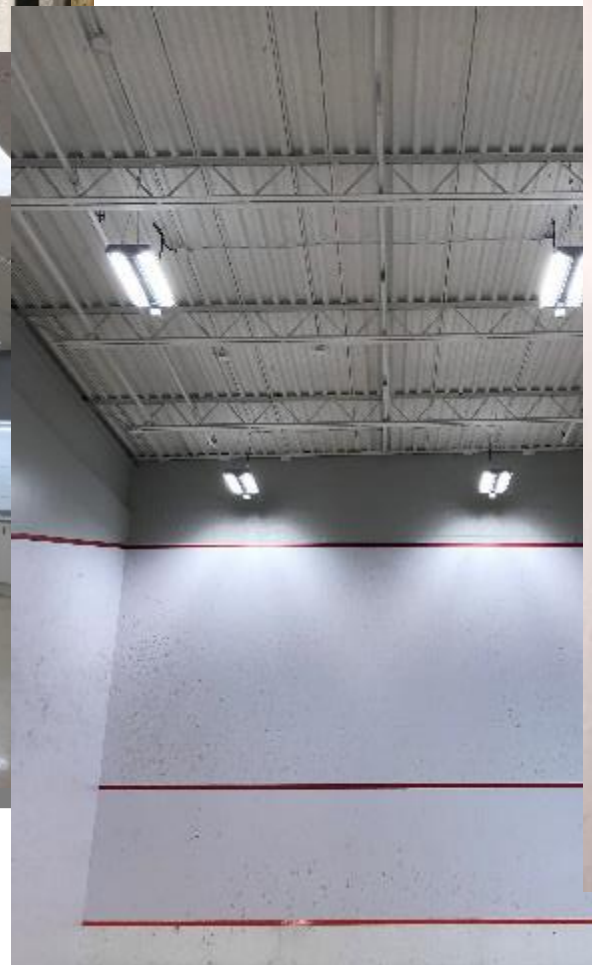
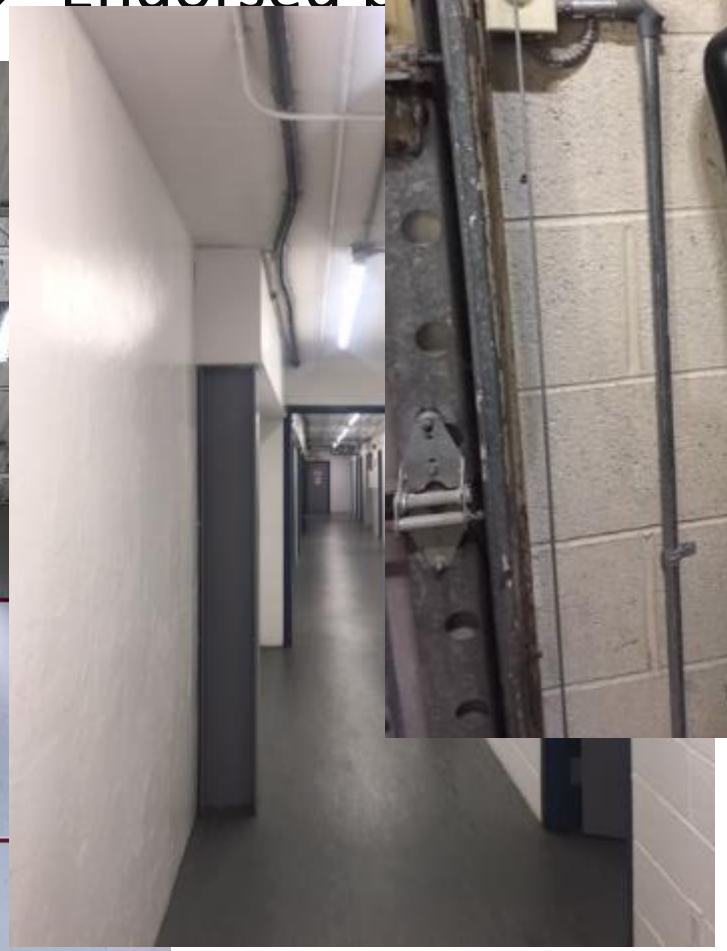
Implementation Tool: Corporate Energy Revolving Fund





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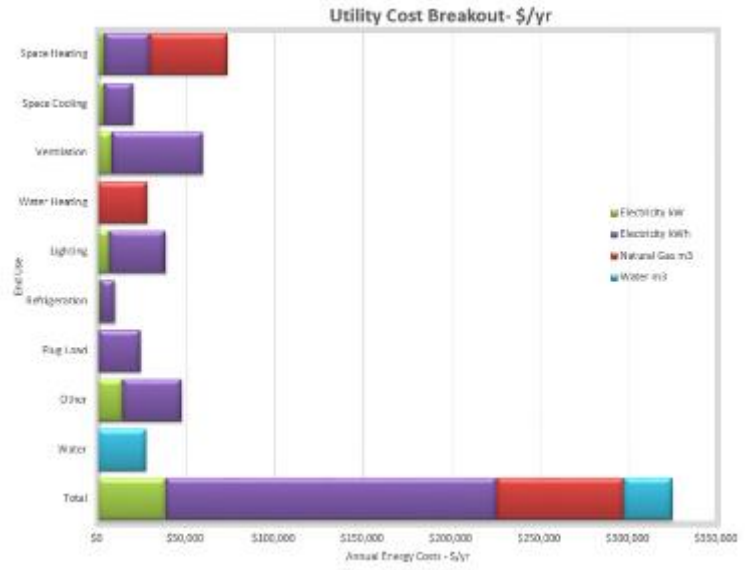
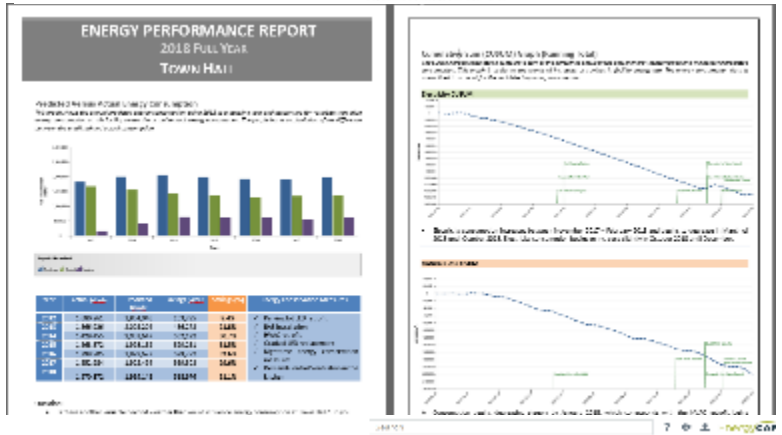
Implementation Tool: Energy Analysis & Benchmarking



- **2016 - 2018:** 11 energy audit reports completed, including Town's 'Big 7' facilities identifying potential retrofit projects



- **2017:** Staff developed energy performance analyses using RETScreen for each facility and corresponding reports

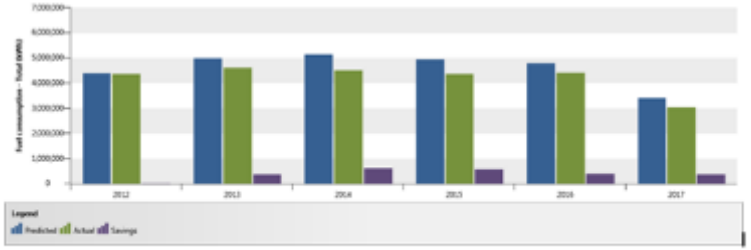
- **2018:** Town migrated to new energy management software that:
  - ✓ Automates receiving, storing and analyzing energy bills
  - ✓ Allows staff to easily access actual bills and track usage
  - ✓ Integrated with Town's accounts payable system

Energy Performance Reports

ENERGY PERFORMANCE REPORT
Caledon Centre for Recreation & Wellness

Predicted Versus Actual Energy Consumption

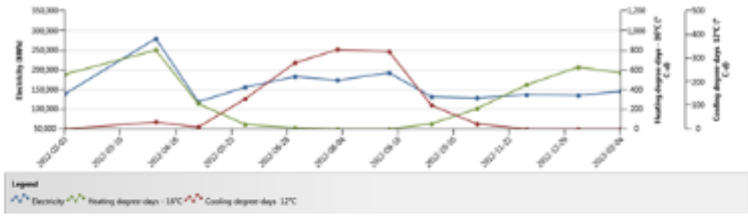
This graph shows the annual predicted energy consumption, using 2012 as a reference year and accounting for variables that drive energy consumption at this facility (weather) versus the actual annual energy consumption. The purple bar is a calculation of the difference between the predicted and actual consumption.



Year	Predicted (kWh)	Actual (kWh)	Savings (kWh)	Savings (%)	Energy Conservation Measures
2012	4,394,120	4,368,090	26,030	0.59%	✓ Recommissioning exercise ✓ Accu-Tab system for pool ✓ New hot water tank ✓ Manual lighting controls added ✓ Better controls of HVAC thru BAS ✓ Corrected placement of 2 thermostats ✓ Fieldhouse and Pool LED retrofit ✓ LED retrofit in Youth Centre & Squash Courts (upcoming)
2013	4,988,513	4,620,473	368,040	7.38%	
2014	5,137,145	4,513,562	623,583	12.14%	
2015	4,938,568	4,355,440	583,128	11.81%	
2016	4,792,463	4,406,657	385,807	8.05%	
2017	3,411,218	3,034,734	376,485	11.04%	

**Note 2017 does not have full data

Variables Influencing Consumption

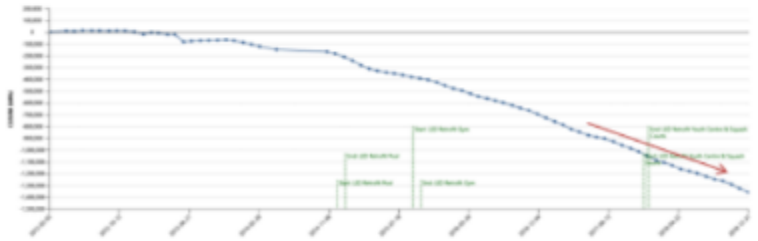


Electricity consumption: is driven by 2 variables: the amount of electric heat (heating degree days) and cooling (cooling degree days) needed to attain occupancy comfort. R^2 = 0.99
Natural gas consumption: is driven primarily by space heating. R^2 = 0.99

Cumulative Sum (CUSUM) Graph (Running Total)

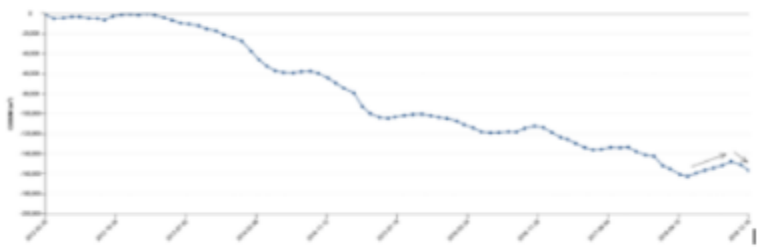
The CUSUM graph calculates a cumulative sum of the difference between the actual energy consumption and the baseline predicted consumption. This graph is useful to see trends of increases or savings in facility energy use.

Electricity CUSUM



- Electricity consumption is still consistently decreasing compared to the 2012 baseline year, with monthly savings on average of 25,000 kWh.

Natural Gas CUSUM



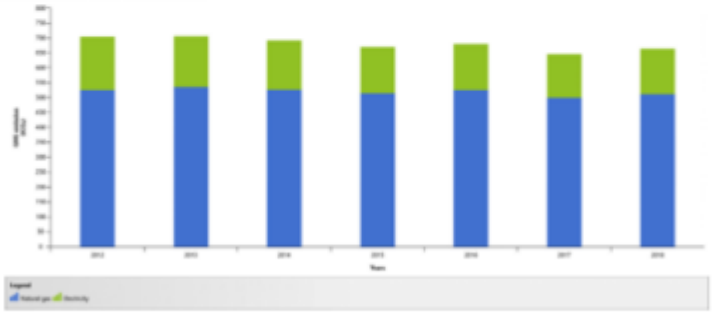
- Natural gas consumption increased slightly between May – October 2018, and is moving towards a downward trend between November – December 2018.
- **Question for reflection: What could have caused the increase in gas consumption between May – October of this year?**

Monthly Cost Avoidance (2018)

	Electricity			Natural Gas		
	Savings (kWh) (Reference year - Actual)	Difference (%)	Avoided Costs ($0.149/kWh)	Savings (m^3) (Reference year - Actual)	Difference (%)	Avoided Costs ($0.241/$m^3$)
Jan	37,564	23.90%	$5,597	1,237	-2.65%	$298
Feb	16,940	13.02%	$2,524	9,432	-21.14%	$2,273
Mar	24,891	19.32%	$3,709	3,175	-10.50%	$765
Apr	31,803	22.20%	$4,739	5,578	-13.18%	$1,344
May	16,221	11.53%	$2,417	1,958	-9.91%	$472
Jun	19,833	13.03%	$2,955	3,199	27.15%	$771.00
Jul	25,733	13.13%	$3,834	2,856	29.76%	$688.41
Aug	24,316	13.18%	$3,623	2,293	24.13%	$552.57
Sep	14,555	9.40%	$2,169	2,734	27.31%	$658.94
Oct	29,358	20.55%	$4,374	3,838	26.37%	$925.04
Nov	34,784	26.53%	$5,183	3,239	9.23%	$781
Dec	32,788	21.58%	$4,885	5,798	16.58%	$1,397
Annual	25,732	17.28%	$46,009	15,498	4.29%	$3,735

Note on Avoided Costs: Due to annual increases in utility rates, you won't be able to see a direct decrease in the utility budget line if your facility has cost savings. Avoided costs show what you would have spent or saved.

Greenhouse Gas Emissions



70.6 tons of CO^2 were avoided in 2018 compared to the 2012 reference year. This is equal to:

2,682 Incandescent lamps switched to LEDs

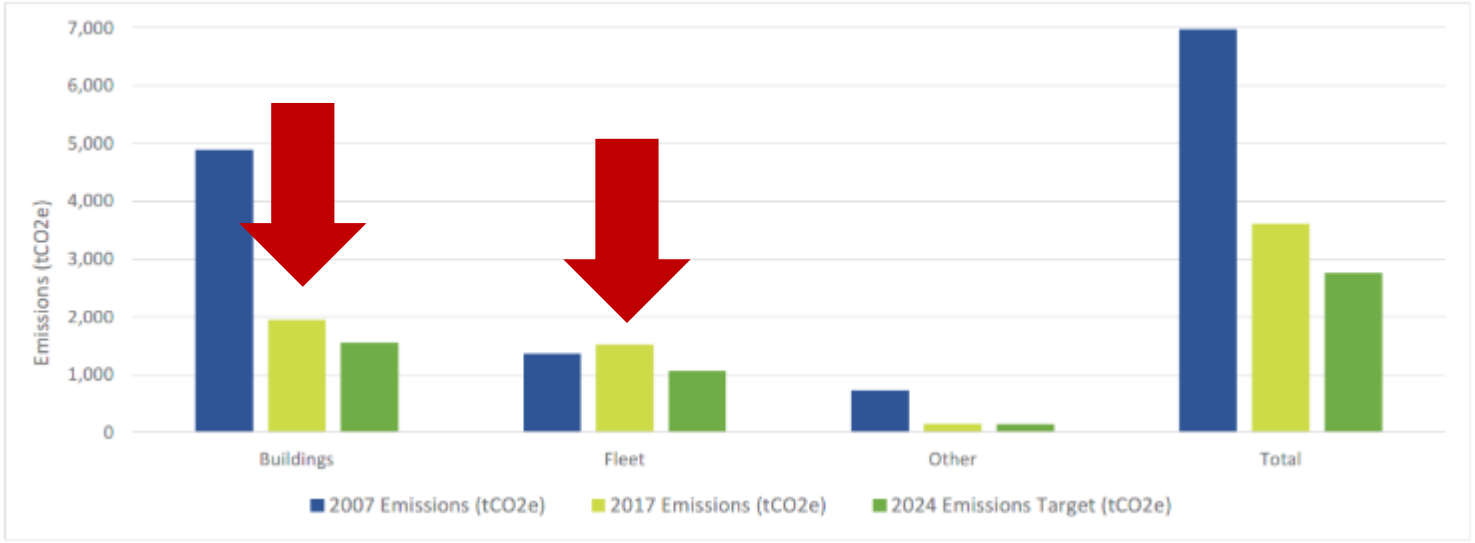
15 vehicles driven for 1 year

Corporate GHG Reduction Framework

- Outlines key strategies to reduce GHG emissions associated with the operations of Town services
- Council-endorsed Framework and targets (June 2019)
- **Timeline:** 5 years (2019-2024); updated every 5 years
- Developed in one year (July 2018 – July 2019)
- Contains **60 strategies** over 4 priority areas: energy, fleet, waste and water
- Targets for each section that scales up to a broader corporate GHG target

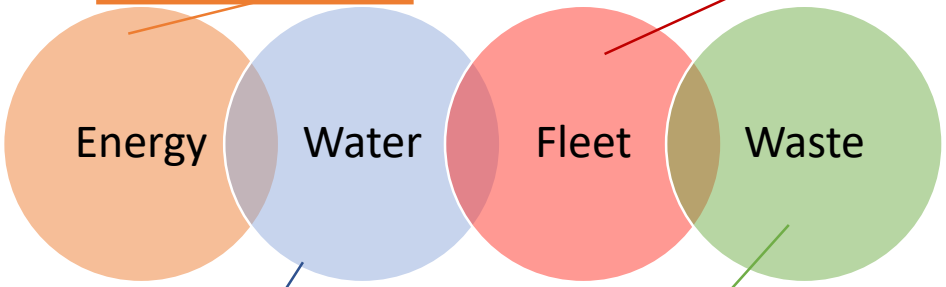
Where do corporate emissions come from?

Sector	Scope	2007 Emissions (tCO_2e)	2017 Emissions (tCO_2e)	2007 – 2017 % Change	2024 Target (tCO_2e)
Buildings[5]	Use of natural gas and electricity in corporate buildings and facilities	4,891	1,946	-60.21%	1,556
Fleet[6]	Combustion of fuels (i.e. gasoline) for corporate fleet and equipment.	1,364	1,519	+11.36%	1,063
Streetlights[7]	Use of electricity for streetlights, traffic signals and other types of outdoor public lighting such as parks.	723	85	-88.24%	85
Water[8]	Use of electricity and natural gas by municipal water and wastewater treatment infrastructure for the treatment of water consumed by the Town.	0	4.4	N/A	4.1
Waste[9]	Amount of solid waste collected from corporate-owned buildings and parks and resulting methane emissions released due to landfill decomposition.	0	57	N/A	51
	Total	**6,978**	**3,611**	**-48.25%**	**2,758**



Energy consumed in buildings is the largest source of corporate emissions

Heavy duty vehicles contribute most to corporate fleet emissions



Water and waste water treatment plants account for the Region's largest electricity consumption

Landfills produce **90%** of all GHGs from Ontario's waste sector

2024 Corporate Targets

Energy

15%

- **Lower carbon equipment** options for building renewal and capital projects
- **High-performance design standards** for new facility construction & renovations

Fleet

30%

- **Green Fleet Strategy**
- Identify fuel switching and fuel saving opportunities
- Monitor & track fuel use in fleet vehicles and equipment

Water

6%

- **Low-flow equipment replacement**
- Track and monitor water consumed in facilities
- **Indoor water assessments**

Waste

30%

- Purchasing materials with **reduced packaging**
- Retrofit of waste infrastructure and signage
- Exploring opportunities to **expand diversion programs**

24% below 2017 levels

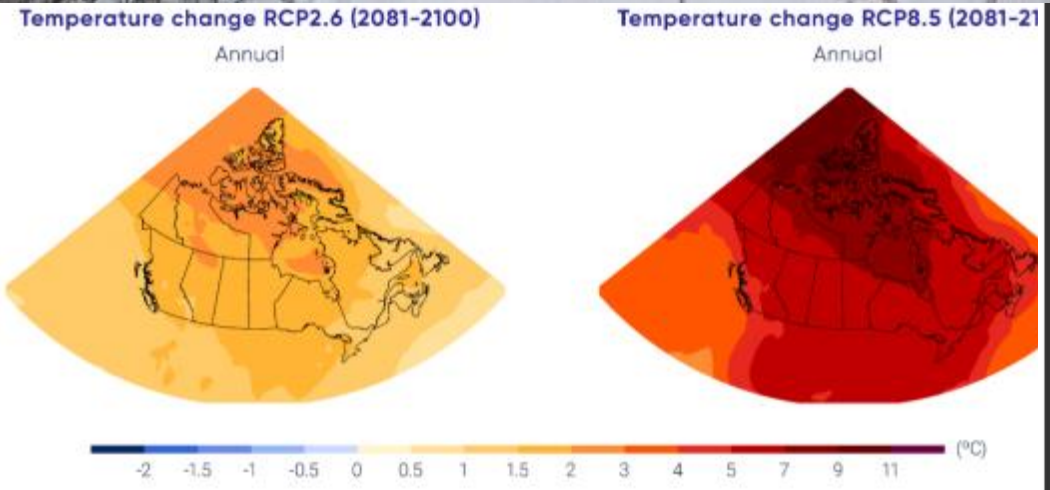
853 tCO_2e

24 BY 24

The Town is adopting a target of a 24% reduction in corporate emissions by 2024

Why it's important

Caledon Ice Storm (2013)



Aug 02, 2015 | Vote 0 0

Storm knocks down trees across Caledon

Caledon Enterprise

Windstorm causes power outages across the region

UPDATED: Credit Valley

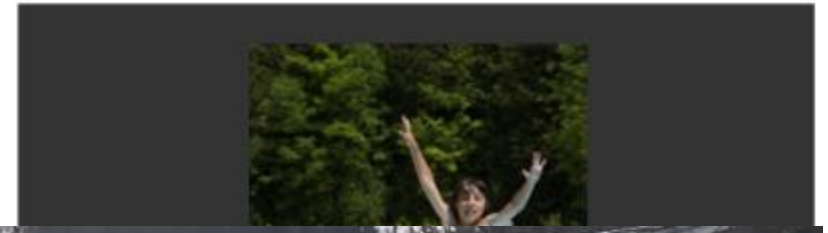
1, 2011 | Vote 0 0

PDATED: Heat rocks Caledon, half-century old cord shattered

don Enterprise

ndrew Livingstone, Enterprise Staff

peratures continue to stay in the high
es for a third day in a row as
dents try to cope with record-setting
ther conditions as Environment



Bolton flooding (2019)

Upper Credit Conservation Area in Alton and Island Lake Conservation Area in

Caledon's Climate Projections

- **Increase in temperature** in all seasons
- Increasing number of **extreme heat days**

- **Longer growing seasons** that start earlier and end later
- First frost days will begin later and last frost days earlier

- Short term **increase in freeze thaw** as temperatures increase in winter & shoulder seasons
- Long term decrease in freeze-thaw cycles

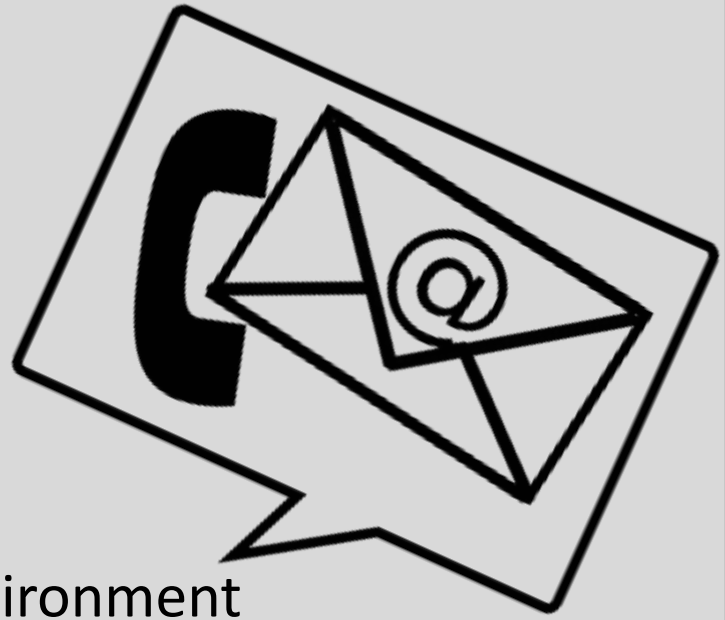
- Increase in annual precipitation in winter, spring & fall
- **More rain during average rainy days and extreme rain events**
- **Less rain in the summer months**

- Less certainty in the model to predict any changes in freezing rain

- Less certainty in the model to predict any changes in extreme wind events

CALEDON

CLIMATE CHANGE PLAN



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Thank you!