



Town of Aurora Energy Conservation and Demand Management Plan

2024-2029 Update
April 15, 2024

WALTER FREDY

AURORA TOWN HALL

PROJECT & **GOALS**

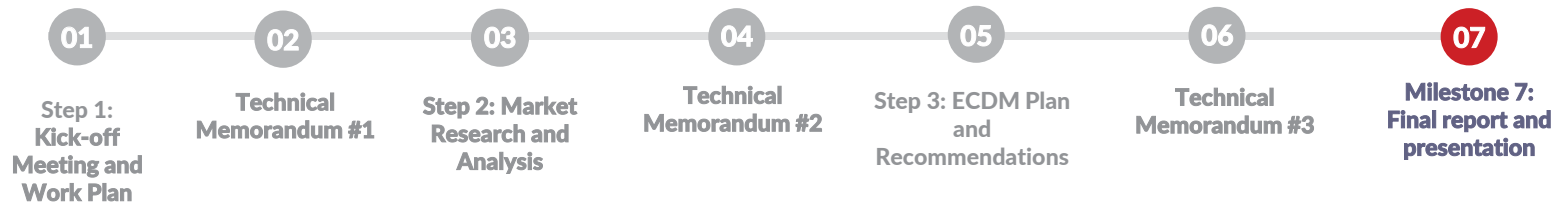
PROJECT

- Develop a 2024-2029 update to the Town of Aurora's ECDMP

PROJECT TARGETS

- Create interim targets to help achieve net zero GHG emissions by 2050 by building a measure implementation plan for the short-term (2025-2030), medium-term (2030-2035), and long-term (2035-2050).

PROJECT MILESTONES



Final Report and Presentation: We have completed an analysis of the Town of Aurora's emissions and compiled a plan involving different energy conservation measure recommendations to reduce the Town's GHG emissions. This plan is split into short, medium, and long term measures to implement. The plan was developed incorporating feedback from the relevant stakeholders from the facilities, fleet, waste, wastewater, and public lighting departments. We have written a draft of the 2024-2029 ECDM plan, and are presenting the plan to update and finalize the ECDMP.

BACKGROUND

Town of Aurora



INTRODUCTION

O.Reg. 25/23

- Requires public agencies (including municipalities) to report on annual energy consumption and GHG emissions
- Develop and implement Energy Conservation and Demand Management Plan (ECDMP), and update it every 5 years

New to this plan:

- More extensive list of facilities, GHG emissions due to street lighting and solid waste
 - In accordance with PCP Milestone 3

PCP Milestone Framework

- Milestone progress
 - Milestone 1: Create inventory
 - Milestone 2: Set target
 - Milestone 3: Develop plan
 - Milestone 4: Implement plan
 - Milestone 5: Monitor impact
- Separates community and corporate emissions
 - Community: Working towards Milestones 4 and 5
 - Corporate: Working towards Milestones 1-3 by adding solid waste to this report

COMMUNITY VS CORPORATE EMISSIONS

Plan	2024 ECDMP (Corporate assets)	2021 Community Energy Plan (Community-wide)
Assets included in plan	<ul style="list-style-type: none"> • Town-owned facilities • Town-owned fleet • GHG emissions from solid waste <ul style="list-style-type: none"> • Town-owned facilities • Public receptacles • Streetlights and public lighting • Water/wastewater sector 	<ul style="list-style-type: none"> • Residential home energy • Transportation • Energy from Town businesses • Community waste <ul style="list-style-type: none"> • Residential and businesses
Annual GHG emissions	3,100 tCO ₂ e/yr	326,000 tCO ₂ e/yr

TARGETS

Previous target: 80% reduction in GHG emissions by 2050

- Previous ECDMP goal: 16% reduction in GHG emissions from 2018 by 2023
- Community Energy Plan: 22% reduction in GHG emissions by 2030; 80% reduction by 2050

Best practices:

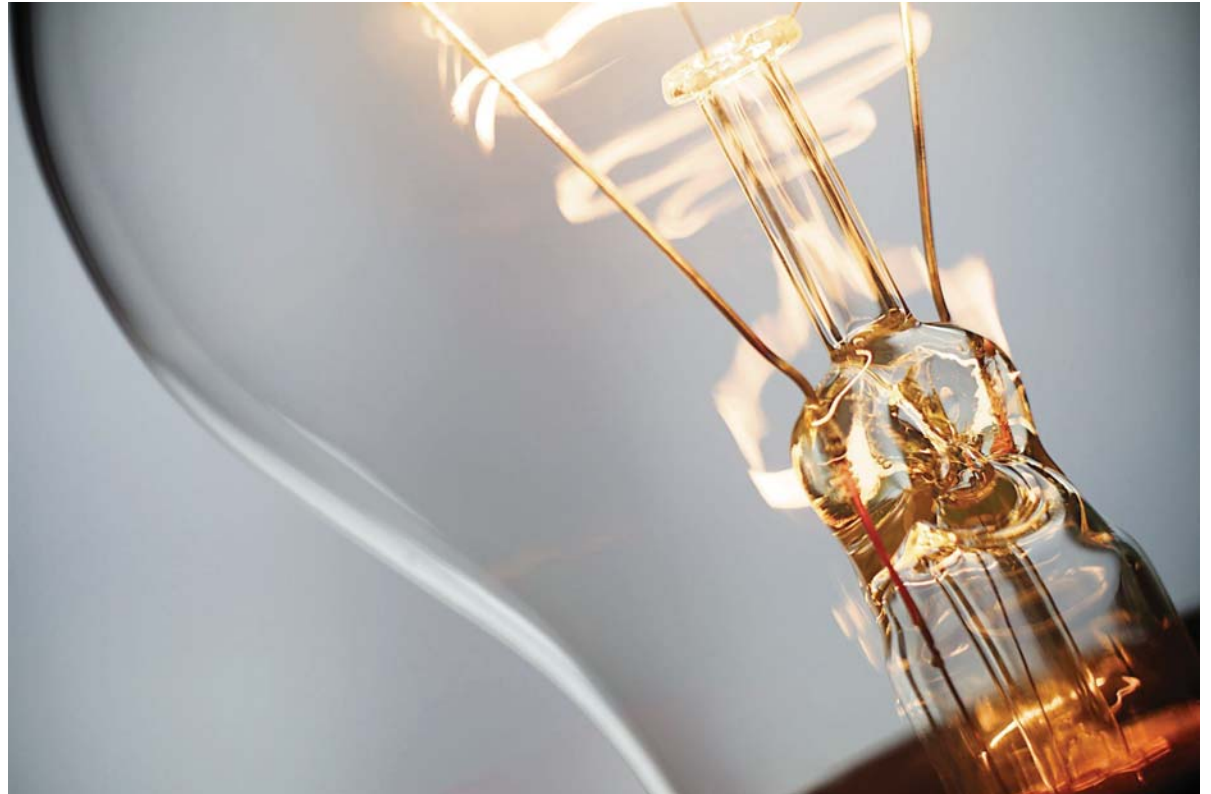
- Federal target: net zero GHG emissions by 2050
 - York Region and many municipalities have followed suit
- IPCC recommendations: 45% reduction by 2030; net zero emissions by 2050

New targets:

- Short term (2030): 20% reduction in GHG emissions from 2018
- Medium term (2035): 50% reduction
- Long term (2050): Net zero

OVERALL
ENERGY USE
AND GHG
EMISSIONS

**Town of
Aurora**



2022 GHG EMISSIONS

Asset type	2018 GHG Emissions	2022 GHG Emissions	Percentage Reduction
	[tCO2e/yr]	[tCO2e/yr]	[%]
Buildings	2,857	2,072	27
Corporate Fleet	556	556	-0
Public Lighting	59	56	5
Pump Stations	1	1	11
Waste	416	416	0
Total	3,889	3,100	20

CHANGE IN GHG EMISSIONS (2018-2022)

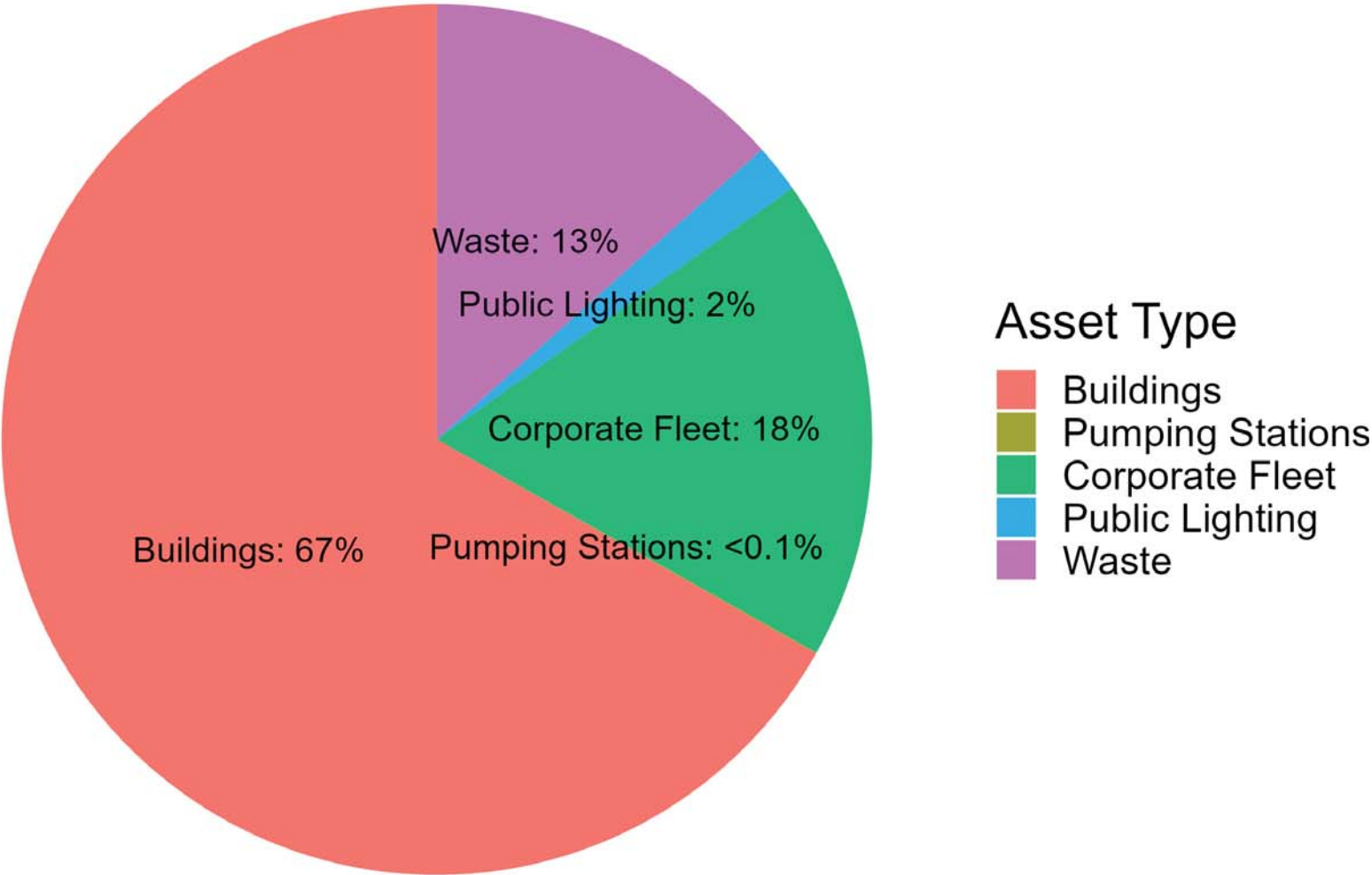
2019 ECDMP targets:

- Reduce electricity consumption by 10.5%; decrease natural gas consumption by 9.7%
- Decrease facilities GHG emissions by 15.3%
- Fleet: decrease fleet emissions by 50% by 2023 (timeline updated to 2028 in GFAP)

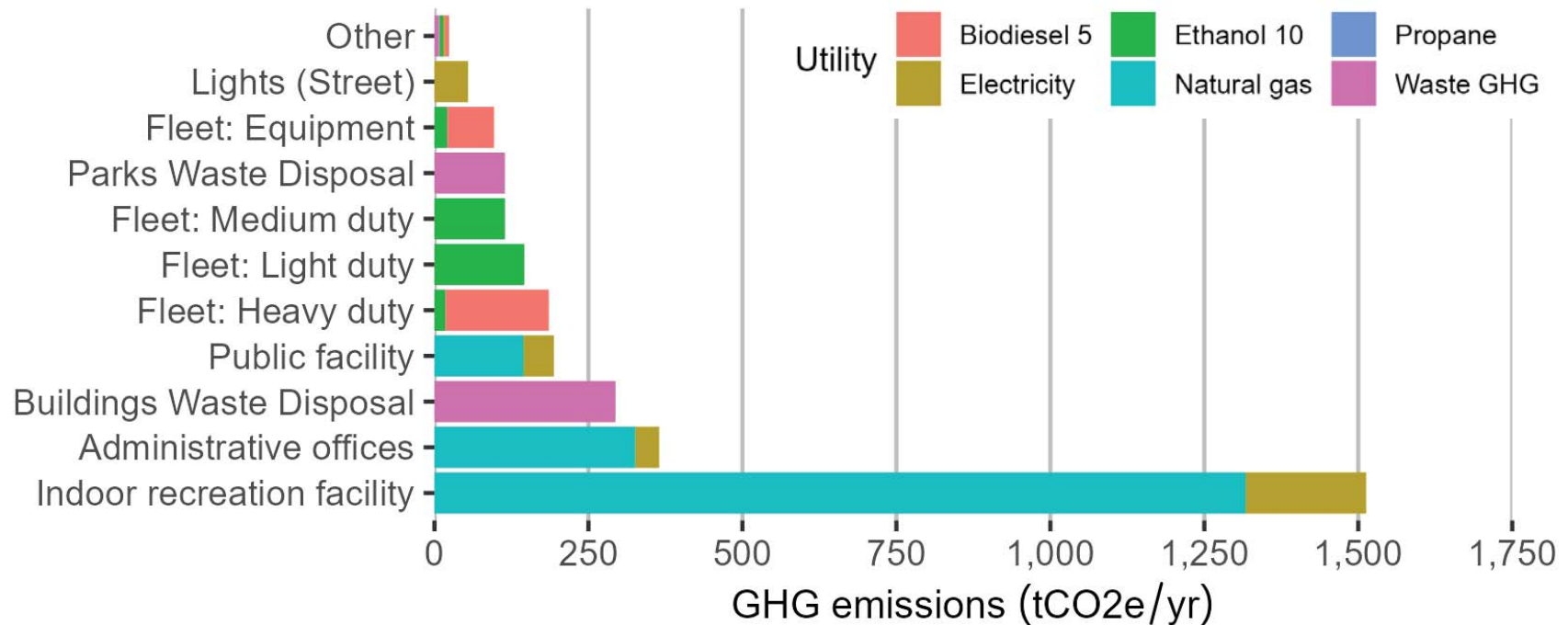
Actual:

Utility	Unit	2018		2022		Reduction from baseline		
		Consumption	GHG emissions	Consumption	GHG emissions	Consumption	GHG emissions	Percentage
-	-	[unit listed]	[tCO2e/yr]	[unit listed]	[tCO2e/yr]	[unit listed]	[tCO2e/yr]	%
Electricity	[kWh/yr]	11,571,403	347	11,368,706	341	202,697	6	2
Natural gas	[m3/yr]	1,337,896	2,570	930,583	1,788	407,313	782	30
Gasoline	[L/yr]	144,831	334	0	0	144,831	334	-
Ethanol 10	[L/yr]	0	0	136,804	305	-136,804	-305	-
Diesel	[L/yr]	82,185	220	0	0	82,185	220	-
Biodiesel 5	[L/yr]	0	0	96,252	250	-96,252	-250	-
Propane	[L/yr]	705	1	655	1	50	0	7
Waste GHG	[tCO2e/yr]	416	416	416	416	0	0	-
Overall	[tCO2e/yr]		3,889		3,100		788	20

GHG EMISSIONS BY SECTOR (2022)

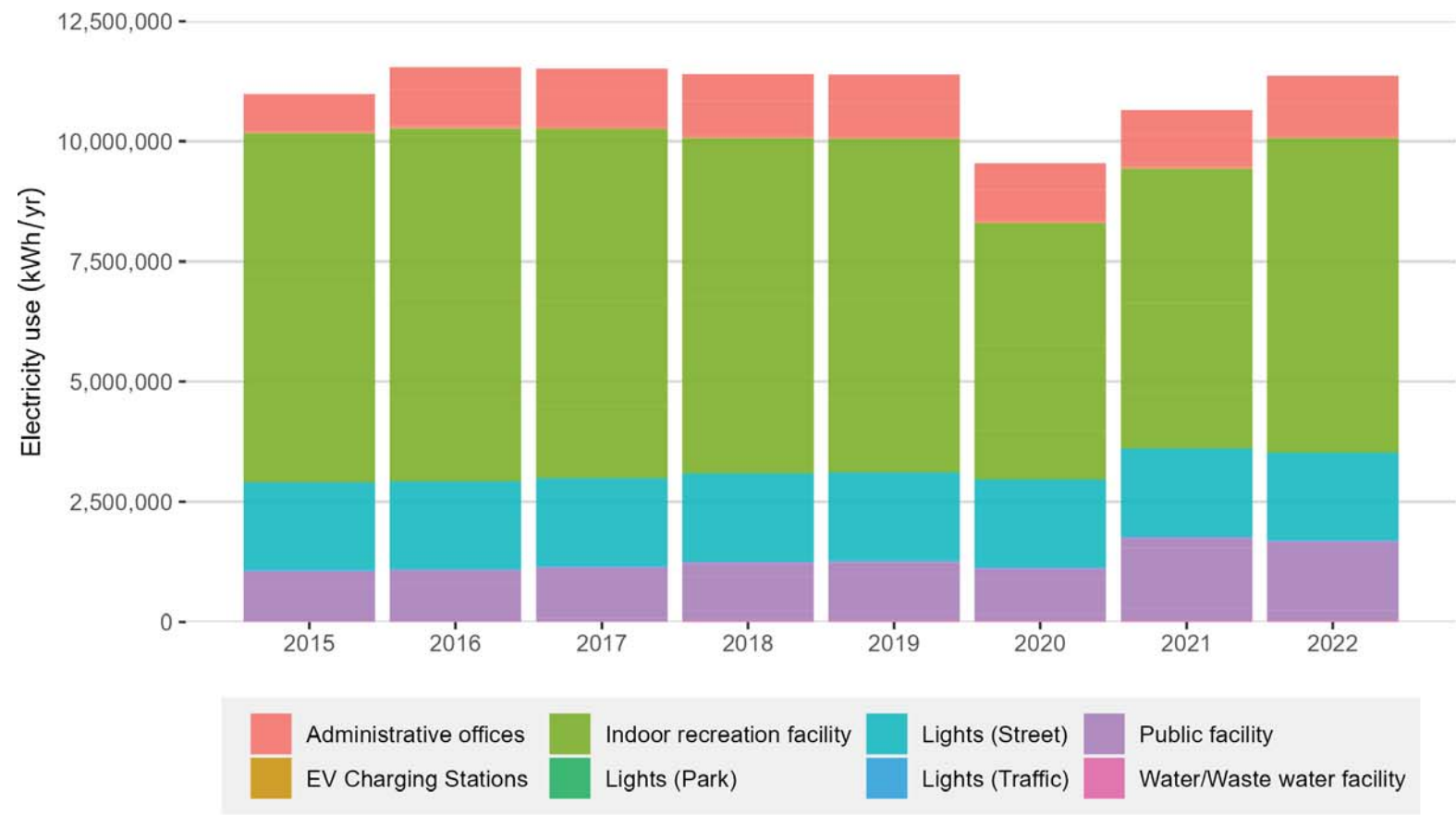


GHG EMISSIONS BY TYPE (2022)



Other: Asset contributions which collectively contribute less than 1% to corporate GHG emissions:
EV charging stations, Park lights, Traffic lights, Pumping stations, Ice resurfacers, Roads Waste Disposal

UTILITY USE TRENDS – ELECTRICITY

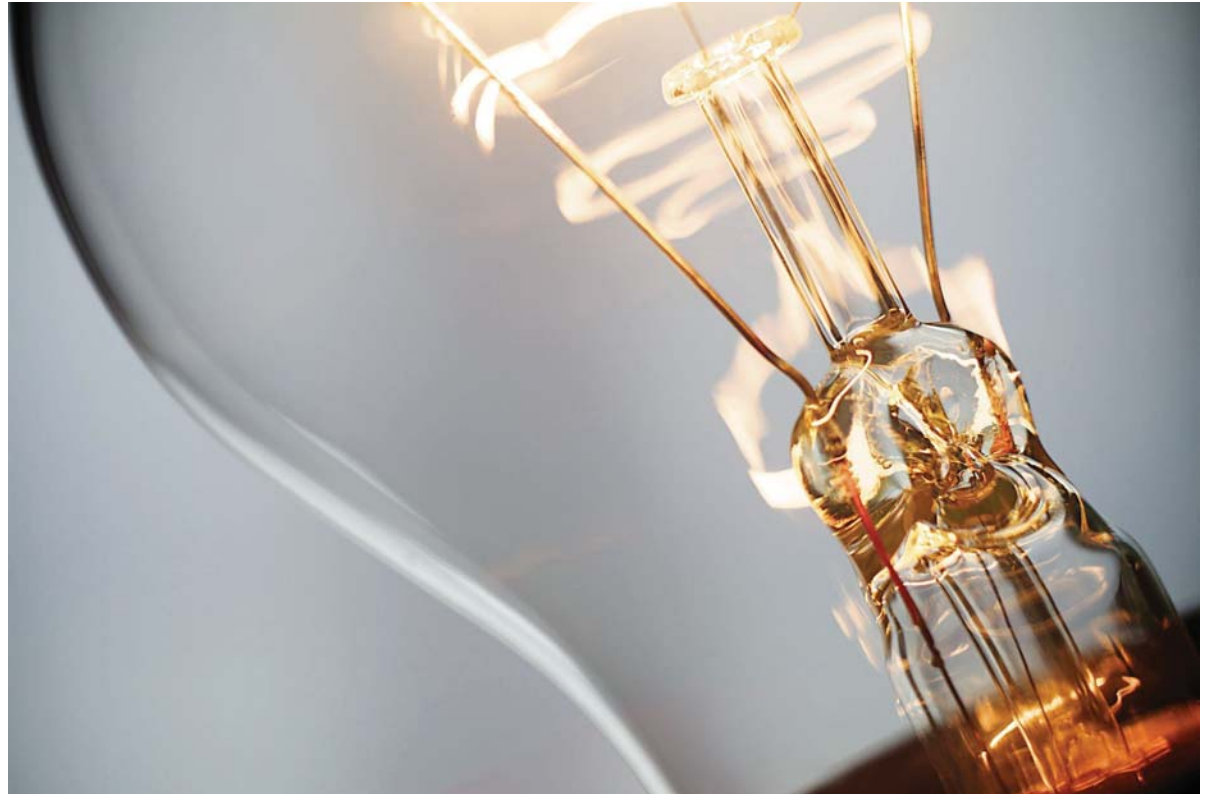


UTILITY USE TRENDS – NATURAL GAS



GHG REDUCTION PLAN

**Town of
Aurora**



ASSETS – FACILITIES

Facility Type	Building Name	% of Corporate GHG Emissions
Administrative offices	15165 A Yonge	<1%
	15171 Yonge	<1%
	Aurora Town Hall	2%
	Joint Operations Centre	9%
Indoor recreation facility	Aurora Community Centre	6%
	Aurora Family Leisure Complex	5%
	Aurora Sports Dome	6%
	Stronach Aurora Recreation Complex	31%
Public facility	Aurora Cultural Centre	2%
	Aurora Public Library	2%
	Aurora Seniors Centre	1%
	McMahon Clubhouse	<1%
	The Armoury	<1%
	Victoria Hall	<1%
Total		67%

PROJECTS FROM 2019-2024

Completed:

- Assorted LED retrofits
- Aurora Public Library demand control ventilation and replace rooftop HVAC
- Building operational optimization changes (e.g. Enbridge Run it Right program)

In progress:

- LED retrofits
- Replace and upgrade HVAC equipment
- Arena low-e ceilings

Planned:

- Low-flow water fixtures
- Occupancy sensors
- Optimum start/stop
- Programmable thermostats
- Demand control ventilation

SHORT TERM PLAN (2024=2029) - FACILITIES

Measure	GHG Reduction (tCO2e/yr)	Utility Cost Reduction (\$/yr)
Investigate and implement demand control ventilation	12.0	3,119
Remaining lights to LED	-25.0	178,997
Remaining measures from 2019 ECDMP	58.0	99,388
Remaining occupancy sensors	0.0	220
Remaining water fixtures to low-flow	196.0	38,094
Pool covers for rec centres	25.0	32,996
High efficiency boiler replacement	4.0	693
Optimum start/stop	4.0	1,954
Total:	274	355,461

SHORT TERM PLAN (2024-2029)

- FACILITIES

Remaining measures

- Wrap up remaining measures, LED retrofits, etc. which are underway

Pool covers

- Pool covers or liquid pool covers to reduce evaporation and conserve energy

Boiler replacement

- Replace boilers with more efficient alternative (95% thermal efficiency)

Optimum start/stop

- Software to calculate optimal HVAC schedule to reduce wasteful HVAC energy use

Ice resurfacer decarbonization

- Replace ice resurfacers with electric ones

ADDITIONAL RECOMMENDATIONS: FACILITIES

- Detailed feasibility study of major facilities
 - Follow FCM framework for GHG reduction pathway feasibility
 - Energy Audits
 - Update list of low-carbon measures for each facility, to be renewed every 5 years
 - Feasibility study on recommended measures
 - More detailed design and costing to prepare for larger measures within ten-year timeframe
 - Electrical infrastructure feasibility
- In medium and long term: implement ECMs revealed by feasibility study

MEDIUM TERM PLAN (2030-2035) - FACILITIES

Measure	GHG Reduction (tCO ₂ e/yr)	Utility Cost Reduction (\$/yr)
DHW to heat pump	496.0	-31,855
Electrification of ice resurfacing boiler	30.0	-15,237
HVAC to heat pump	525.0	-17,222
Increase roof insulation thickness	16.0	2,949
Arena low-e ceiling, if feasible	1.0	6,896
Electrification of dehumidification	26.0	-13,109
Pool heat to heat pump	12.0	-783
VVT or VAV system	1.0	-94

DHW: Domestic hot water

Negative utility cost reduction: anticipated increase in utility cost due to equipment electrification

LONG TERM PLAN (2035-2050) - FACILITIES

Measure	GHG Reduction (tCO2e/yr)	Utility Cost Reduction (\$/yr)
DHW to heat pump	24.0	-1,566
HVAC to heat pump	401.0	-25,745
Increase roof insulation thickness	25.0	4,588
Solar PV electricity generation	32.0	143,488
HVAC electrification	167.0	-82,984
Electrification of dehumidification	8.0	-3,786

DHW: Domestic hot water

Negative utility cost reduction: anticipated increase in utility cost due to equipment electrification

ASSETS – FLEET

Contributes 18% of Town's GHG emissions

Operational Area	Equipment	Light Duty	Medium Duty	Heavy Duty
By-Law	0	6	0	0
Facilities	10	4	2	0
Parks	30	1	12	7
Roads	15	8	5	17
Water/Wastewater	4	4	3	0

PROJECTS FROM 2019-2024

Completed:

- Implement anti-idling initiative
- Develop Green Fleet Action Plan
- Measure distance traveled and fuel consumed by fleet vehicles
- Consider opportunities to upgrade town-owned fleet vehicles
- Purchased electric ice resurfacers and hybrid SUVs
- Purchased plow trucks with high tier diesel engines
- Replaced low tier diesel equipment
- Incorporate ethanol 10 in all gasoline-fueled vehicles

Ongoing:

- Resize the fleet and dispose of antiquated equipment

SHORT TERM PLAN (2024-2029) - FLEET

Measure	GHG Reduction (tCO2e/yr)	Utility Cost Reduction (\$/yr)
Ice resurfacers vehicle decarbonization	1.0	282
Decarbonize 2 vehicles	18.0	10,874
Decarbonize 10 pieces of equipment	15.0	4,103

Decarbonization

- Replace assets with electric or low-carbon alternatives

SHORT TERM PLAN – FLEET

- Electrical infrastructure assessment and upgrade
 - Develop infrastructure necessary to install more EV chargers to support fleet decarbonization
- Undertake decarbonization of vehicles when feasible
- Renew Green Fleet Action Plan
 - Update based on current best practices and status of fleet
 - Compile list of potential decarbonization options for different fleet assets, and the advantages and disadvantages of each
 - Continue to take actions listed in the Green Fleet Action Plan
- Employee training for operations and maintenance of new technology

MEDIUM AND LONG TERM PLANS – FLEET

Medium Term:

Measure	GHG Reduction (tCO2e/yr)	Utility Cost Reduction (\$/yr)
Equipment decarbonization	83.0	26,400

Long Term:

Measure	GHG Reduction (tCO2e/yr)	Utility Cost Reduction (\$/yr)
Light vehicle decarbonization	136.0	81,375

ASSETS – WASTE

- Downstream emissions associated with landfilling or incineration of waste generated by the Town of Aurora's corporate activities
 - Solid waste in landfill produce GHGs, such as methane
 - Contributes 13% of corporate GHG emissions
- Corporate waste includes
 - Waste from corporate-owned buildings (71% of waste)
 - Waste from parks (28%) and public receptacles (2%)
- Included for the first time in this ECDMP, as per PCP framework

ASSETS – WASTE (CONT'D)

- Dog Diversion Program
 - Program to divert dog waste from public receptacles to facility where it can be repurposed to fuel
- Waste is managed by the region, and sent to either one of two landfill sites or one of three waste-to-energy centres in York Region
- GHG emissions calculation
 - Assume 50% of waste landfilled
 - 50% of waste sent to waste-to-energy program

SHORT TERM PLAN – WASTE

- Perform regular solid waste audits
 - Better understand contributions and trends for solid waste
- Develop Waste Reduction Plan
 - Increase focus on reuse activities
 - Increased availability and education regarding recycling and organics bins
 - Reduce use of single-use items
 - Research best green procurement practices
 - Investigate opportunities to promote a circular economy
- Long term GHG reductions from this plan:
 - Medium term: 10% reductions; Long term: net zero

ASSETS – PUBLIC LIGHTING

- Represents electricity use from streetlights, park lights, and traffic lights
 - Contributes ~2% of Town's GHG emissions
- 4,800 streetlights within the jurisdiction
 - Most retrofitted to LED in 2018
- Recommended conservation measures:
 - Review park lights and other public lighting
 - Determine whether there are any additional opportunities to conserve energy through LED retrofits
 - Review opportunity to convert stadium lights to LED

ASSETS – WATER/WASTEWATER

- Electricity consumed by pumping stations
 - Contributes <0.1% of Town's GHG emissions
- 10 pumping stations considered in the scope of this plan
- Recommended conservation measures:
 - Investigate pumping stations for opportunities to reduce energy use
 - E.g. install variable frequency drives on the pumps
 - Measure GHG emissions related to pumping station generators



ADDITIONAL RECOMMENDATIONS: ALL ASSETS

- Energy performance monitoring
- Incorporate life cycle cost analysis into budgeting, planning, and asset management
- Sustainable building standards for new and major renovations
- Investigate low-carbon electricity generation opportunities and feasibility
- Research new technology to identify additional opportunities to reduce GHG emissions
- Purchase carbon offsets as necessary to meet GHG reduction targets
 - Last-case; offset emissions through increase in carbon storage elsewhere
 - 2035: Annual budget of ~\$15,000 until 50% GHG reduction is reached
 - 2050: Annual budget of ~\$60,000 for net zero

ADDITIONAL RECOMMENDATIONS: CHANGE MANAGEMENT

- Steering committee to meet regularly throughout the year to guide the Town through a shift in operations
 - Regularly involve Senior Leadership
- Steering committee areas of expertise:
 - Energy and Climate Change
 - Water/Wastewater
 - Fleet
 - Facilities
 - Waste
 - Engineering and Capital Delivery
 - Procurement
 - Corporate Communications

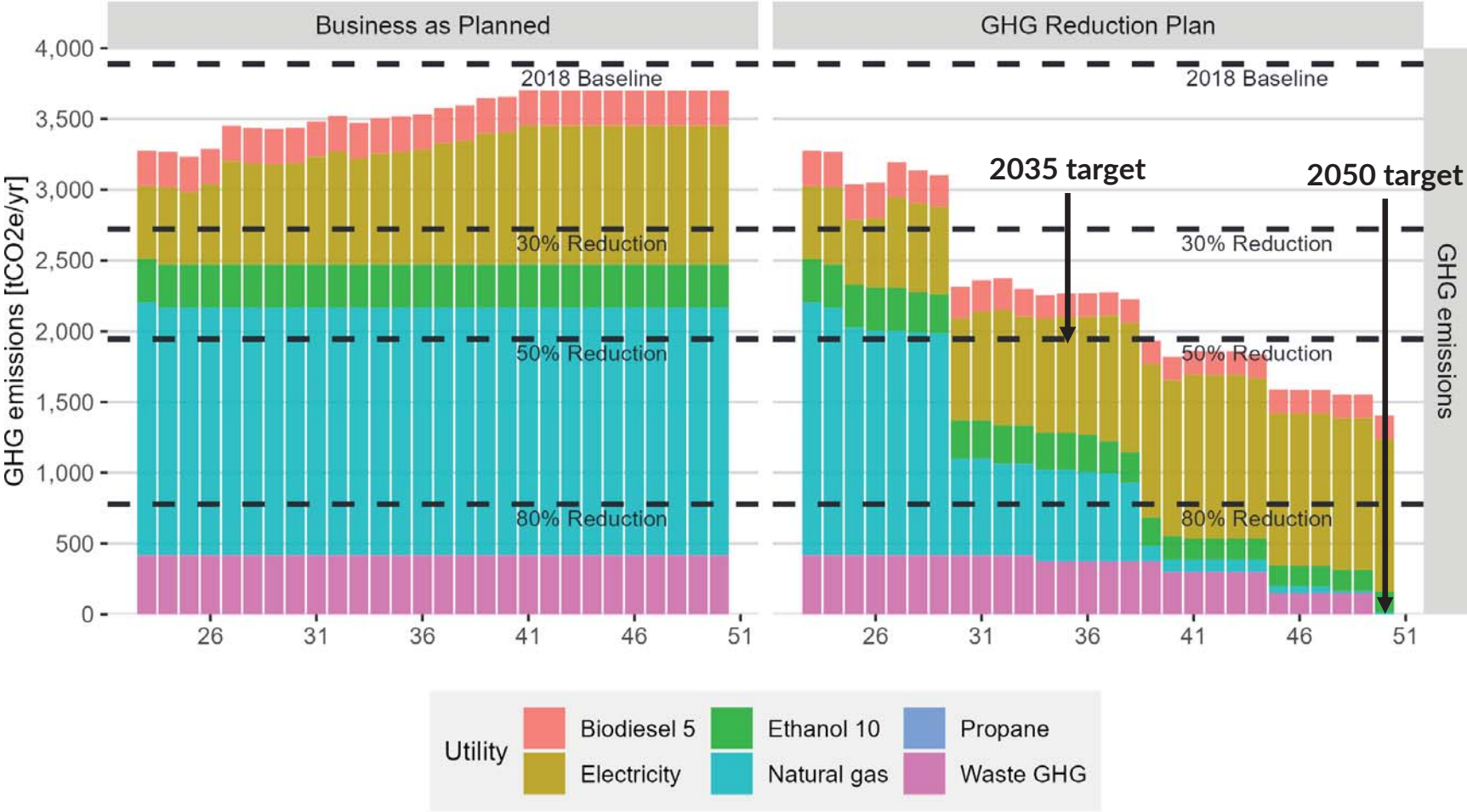
GHG REDUCTION PLAN RESULTS

Town of Aurora

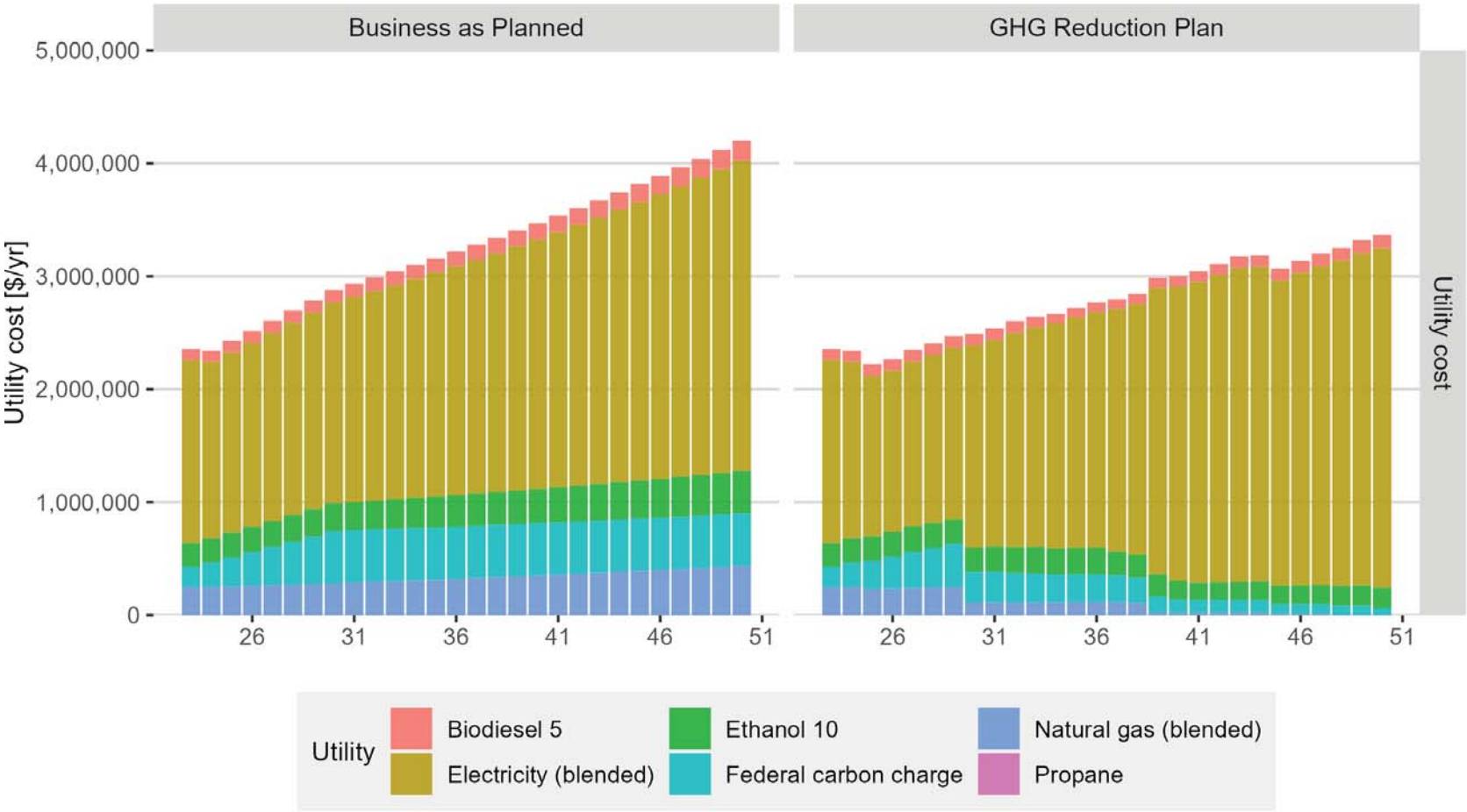


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GHG EMISSIONS IMPACT



UTILITY COST IMPACT



PROGRESS TOWARDS GOALS

Year	2030	2035	2050
Targeted reduction from 2018	20%	50%	Net zero
Projected reduction in GHG emissions	20%	42%	63%
Focus of measures	<ul style="list-style-type: none"> • Remaining low-hanging fruit capital and operational measures • Energy Audits • Net zero pathway planning • Electrification feasibility • Pilot new technologies 	<ul style="list-style-type: none"> • Decarbonization projects identified <ul style="list-style-type: none"> • Heat pump measures • Fleet decarbonization 	<ul style="list-style-type: none"> • Decarbonization projects identified <ul style="list-style-type: none"> • Heat pump measures • Renewable energy • Fleet decarbonization
Additional actions to reach target		<ul style="list-style-type: none"> • ECMs identified in feasibility studies • Carbon offsets 	<ul style="list-style-type: none"> • New technology <ul style="list-style-type: none"> • Fleet • Renewables • Carbon offsets



QUESTIONS



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