



The State of Climate Action Implementation in Ontario Municipalities

2021 Report



About The Clean Air Partnership

Clean Air Partnership (CAP) is a registered charity that works in partnership to promote and coordinate actions to improve local air quality and reduce greenhouse gases for healthy communities. Our applied research on municipal policies strives to broaden and improve access to public policy debate on air pollution and climate change issues. Clean Air Partnership's mission is to transform cities into more sustainable, resilient, and vibrant communities where resources are used efficiently, the air is clean to breathe, and greenhouse gas emissions are minimized.

About The Clean Air Council

The Clean Air Council is a network of 30+ municipalities and health units from across Ontario. Since 2000, Clean Air Council members have been working collaboratively on the development and implementation of clean air, climate change, sustainability and resilience actions.

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Executive Summary

Canadian municipalities and local governments play a critical role in achieving local, national and international greenhouse gas (GHG) reduction targets. Municipal policies, programs, and projects can reduce local emissions, enhance community resilience, and contribute to creating a low-carbon and resilient future.

The [Clean Air Council](#) (CAC), a project of [Clean Air Partnership](#) (CAP), is a network of 35 municipalities and Public Health Units across Ontario that are committed to taking climate action. CAC municipalities represents over 75% of the population of Ontario. CAC builds local capacity in municipalities through cutting-edge research on climate action.

This Report details climate actions captured in our online [Climate Action Atlas](#). The Atlas and Report profile ambitious municipal GHG-reduction actions undertaken or underway in Ontario. Profiling these actions will facilitate other municipalities in advancing similar progress in their jurisdictions. As of April 2022, the Atlas showcases 77 climate mitigation actions undertaken by CAC municipalities. Throughout the Report, when we refer to an action, we link it to the corresponding Atlas entry.

We envision this initiative as an ongoing mechanism to positively highlight current municipal GHG reduction efforts while simultaneously stressing the critical urgency to accelerate and scale-up ambitious climate actions. This Report will be created annually, highlighting where climate action is being advanced regionally, and where more needs to be done. While it currently profiles actions within the CAC jurisdiction, we encourage all Ontario municipalities to contribute actions for inclusion in future versions. Actions may be added through the Atlas portal at www.cleanairpartnership.org/atlas.

Introduction



Major Emission Sources

To break down our total emissions into manageable segments, we categorize them into relevant sectors. These sectors are often defined in GHG protocols that provide clear accounting and reporting guidelines for tracking climate action. In developing this Report, we have used the same sectoral segmentation as defined in GHG protocols, categorizing emissions into the following seven sectors:



Land Use - Land use planning shapes the patterns of energy use and development within communities. The form and function of different settlements can reduce or increase demands for energy, influencing how energy is produced, distributed, and used.



Transportation - GHG emissions from the transportation sector primarily come from burning fossil fuels for our vehicles. Our transportation emissions are heavily influenced by our land use planning.



Energy - The processes of energy generation, transmission, and distribution generate GHG emissions. Depending on the mix of sources used in energy generation, each province emits a different quantity of GHGs per unit of energy generated.



Buildings - GHG emissions from residential and commercial buildings arise primarily from using fossil fuels for space and water heating and electricity for cooling, lighting and appliances.



Industry - GHG emissions from industry primarily come from burning fossil fuels for energy and emissions from certain chemical reactions necessary to produce goods from raw materials.



Waste - Landfills release large quantities of GHGs such as methane through the decomposition of organic waste. In addition, anaerobic decomposition of wastewater and incineration of waste also produces GHG emissions.



Agriculture, Forestry and Other Land Use (AFOLU) - AFOLU category is unique as it includes both carbon sources and sinks. Agricultural practices, forestry, and land management influence various ecosystem processes that affect GHG emissions. Restoration and preservation of natural ecosystems enhances its carbon sequestration potential, thereby removing CO₂ from the atmosphere.

Ontario's Emissions



Ontario is Canada's second-largest province, covering more than a million square kilometers with a population of about 14.5 million. In 2019, Ontario accounted for 163MT of carbon dioxide equivalent emissions. Almost half of Ontario's emissions come from the Greater Toronto and Hamilton Area, a contiguous urban region of around 8,244 km² in Southern Ontario, which is a major commercial, distribution, and financial center.

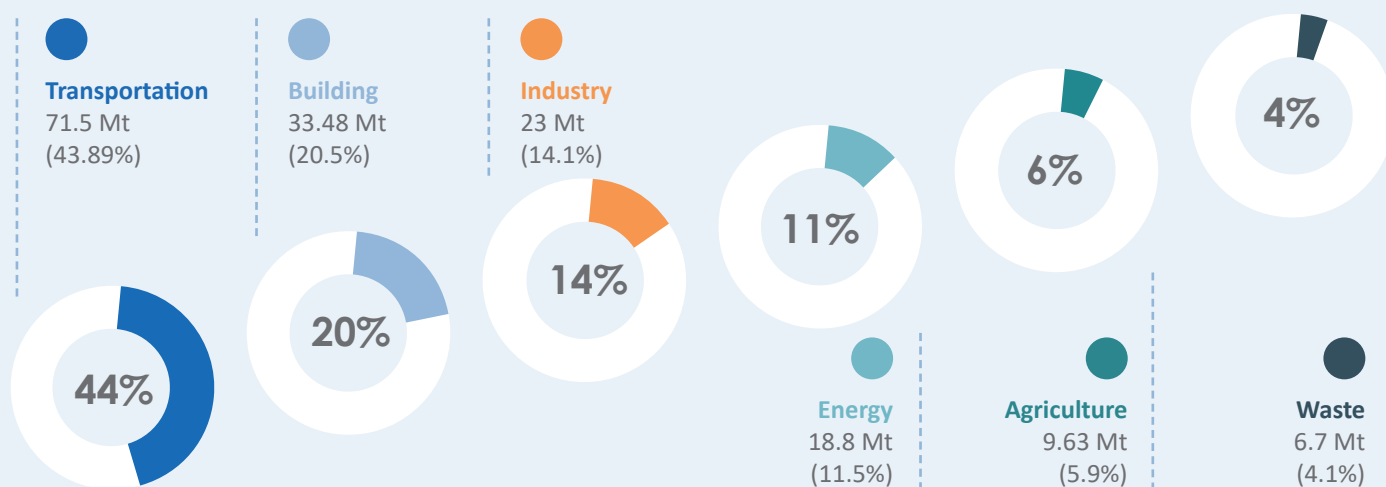
Municipal Emissions

In Canada, municipal governments influence approximately half of all GHG emissions. Consequently, local governments have an important role to play in mitigating the impacts of climate change. Through their own operations and decision-making, municipal governments have a major impact on patterns of urban and rural development, transportation, economic activity, and consumption of energy resources.

As a result, municipalities have both direct control and indirect control over how, where, and to what extent GHG emissions are produced:

- Emissions under the direct control of municipalities include those that arise directly from providing municipal services and operating municipal buildings, fleets and facilities.
- Emissions influenced indirectly include community emissions affected by urban planning, access to public transit, and policy mechanisms such as building codes and land use regulations, for example, development charges and zoning requirements.

Figure 1: Ontario's GHG emissions in 2019



Role of Municipalities in Climate Action

Municipalities are at the forefront of climate action, playing a central role in meeting Canada's emission reduction targets. With their deep understanding of local threats and risks, municipalities are well-positioned to lead climate action and deliver subsequent emission reductions.

Municipal planning decisions made today will have environmental impacts far into the future. For example, municipal infrastructure investments and land use planning decisions related to intensification of urban areas and the creation of complete, low-carbon communities will have environmental consequences for many decades to come.

In recent years, many municipal governments have shown increasing climate leadership, adapting their services to be more responsive to the impacts of climate change. Communities have demanded municipalities reduce GHGs from

their operations, and municipal governments have responded in a multi-faceted manner by developing climate action plans, strategies, emergency service planning and communications, and through infrastructure investments.

Municipal governments have increased investment in technologies and services that reduce emissions and increase resilience. Municipalities are advancing climate mitigation actions through active transportation, retrofitting residential and commercial buildings, and investments in services such as public transit, gas capture in wastewater treatment plants, and expanding public electric vehicle (EV) infrastructure to name but a few.

This report provides a summary of actions and strategies that the CAC municipalities are taking to reduce GHG emissions. It describes the ambitious actions taken by the municipalities of the [Clean Air Council](#) network across Ontario to reduce emissions and serves as a resource for other local governments nationally who are exploring ways to reduce emissions in their communities.

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Municipal planning decisions made today will have environmental impacts far into the future ”

Scope of this Report

Inclusion Criteria

This report showcases large-scale, municipal community-level GHG reduction actions. We have included only climate mitigation actions advanced by our 35 CAC member municipalities. In future years, the Climate Action Atlas will expand its scope and accept submissions of climate mitigation actions from municipalities across Canada.

Our database includes both fully implemented actions, and actions at advanced stages of implementation as of 2021. For projects at an advanced stage of implementation, we have included projects with an assigned budget and work-in-progress. Actions in our database reflect those undertaken by municipalities independently, or in partnership with the public or private sectors.

Exclusion Criteria

Because we are focusing on those actions that directly reduce emissions, we are excluding plans, policies, feasibility studies or projects at early stages without committed budgets. Also excluded are municipal corporate energy efficiency actions that have become standard practice, such as mechanical system replacements and lighting retrofits. Through this initiative, we are highlighting only those bold actions that showcase the movement of the climate needle, accelerating climate action and dramatically reducing emissions. As such, adaptation actions are also not included at this time.

Because of the greater role played by higher orders of government in regulating industrial emissions, no significant municipal industrial emission reduction actions were observed through this exercise. While that category is thus excluded from this report, it will be populated should these actions be undertaken by municipalities in the future.

Highlights



Overview

Clean Air Partnership's Climate Action Atlas consists of 77 ambitious climate mitigation actions taken by the CAC member municipalities.

Of these, 40 actions belong to the Transportation category. These actions are further divided into four subcategories:

- Electric vehicles (16)
- Public transit and transportation demand management (12)
- Active transportation initiatives (10); and
- Municipal fleet tracking (2)

The Energy category includes 15 actions divided into two subcategories:

- Renewable Energy Systems (13)
- District energy systems (2)

The Buildings category includes eight actions divided into three subcategories:

- Net-zero buildings (3)
- Incentivizing and building advanced energy performance buildings (3)
- Commercial and residential building retrofits (2)

The Land Use category highlights seven actions all around the adoption of Green Development Standards (GDS) in various CAC member municipalities.

The Agriculture, Forestry and Other Land Use (AFOLU) category includes three natural ecosystem restoration actions.

The waste category consists of four actions divided into two subcategories

- Municipal waste diversion programs (2); and
- Energy generation from waste (2)

Figure 2: Climate Actions Per Sector

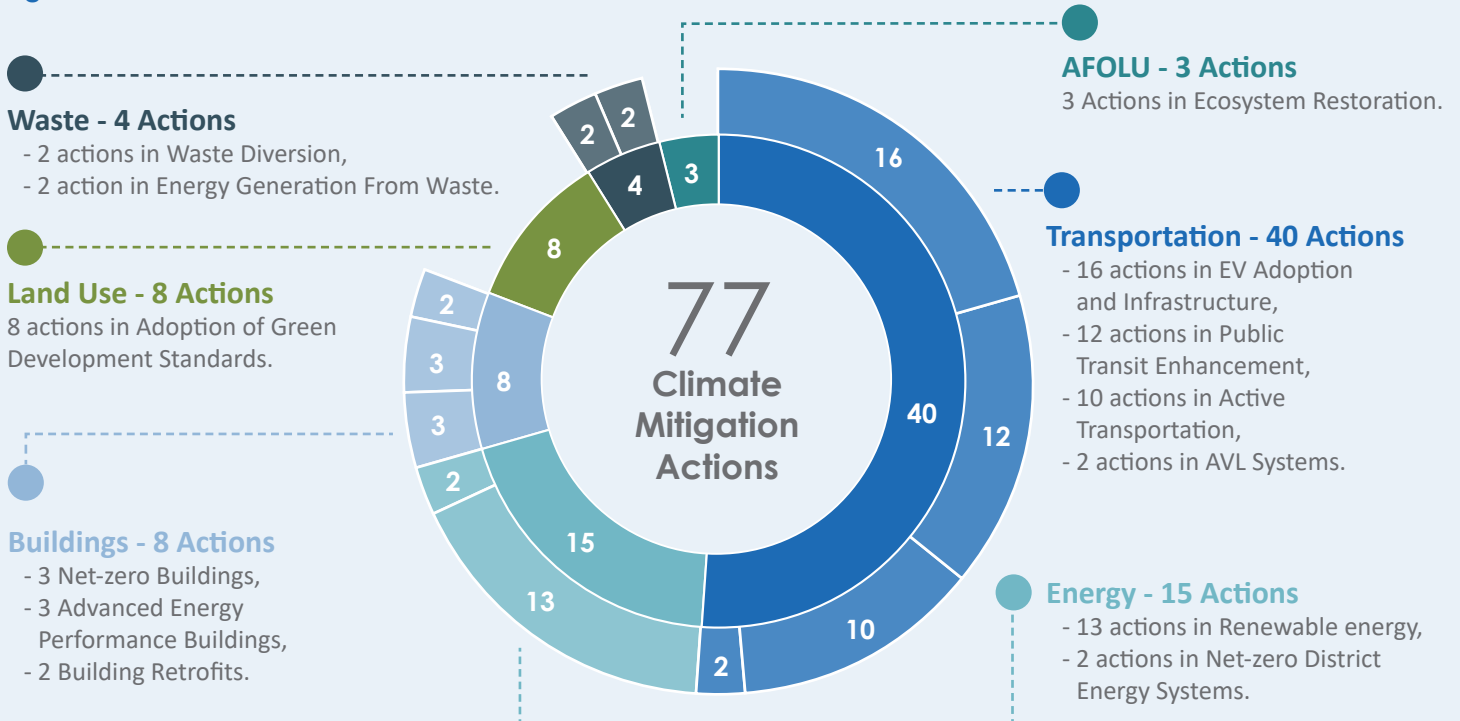
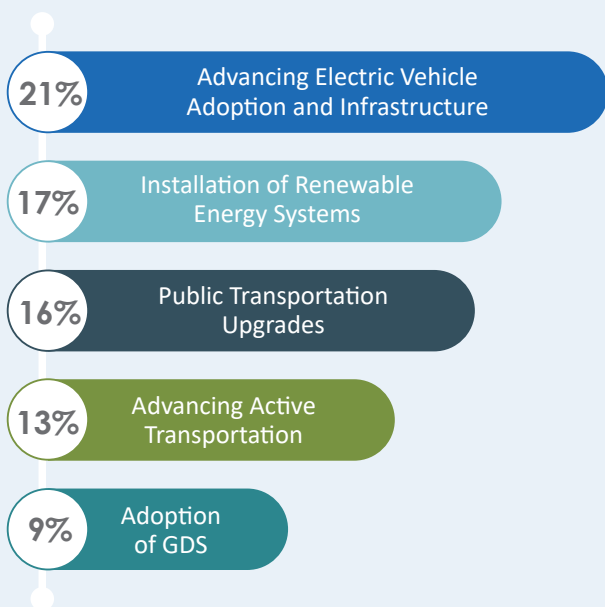


Figure 3: Top Five Most Commonly Implemented Actions



Clustering of Actions

There are many reasons behind why actions are clustered into certain sectors. Actions largely follow emissions. For example, transportation makes up over 50% of Ontario's emissions, a comparable proportion of transportation actions are also observed in the Atlas. Waste and AFOLU combined consist of about 10% of our emissions, and are similarly represented in the Atlas, with seven of 77 actions.

Many municipalities are adopting "low-hanging fruit" measures, actions that are often low-cost but can deliver considerable GHG reductions. For example, fleet electrification and charging infrastructure projects can be done relatively quickly and at a relatively low cost to the municipality. In addition, the costs of installation of renewable energy systems such as solar panels on municipal buildings have fallen substantially and translates directly into reduced energy dollars for the municipalities.

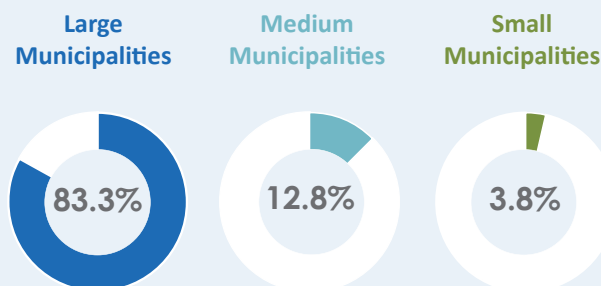
Municipal Size

The CAC network includes municipalities of various sizes. We have categorized them into three sizes based on population (small <10k; mid-sized 10k -100k; large >100k). Larger municipalities have more dedicated staff to undertake larger-scale climate actions. They also often have access to more funding and access to local partners to research and test out new initiatives for GHG reduction. Additionally, they have larger populations and therefore larger revenue bases.

The distribution of climate actions in the Atlas reflects this disparity, where small municipalities led on three climate actions, ten were implemented by mid-sized municipalities, and 64 (or 83%) were undertaken by large municipalities.

In a tiered government structure, larger upper-tier municipalities can support and collaborate with lower-tier municipalities on collective climate actions to reduce regional emissions. Smaller municipalities can benefit from collaborative networks such as the CAC to learn about climate actions taken by their peers, the challenges, best practices and project outcomes. This can assist in determining the type and scale of projects best suited for implementation in their own municipalities.

Figure 4: Percentage of Climate Actions in this report from Large, Medium and Small Municipalities



Sectoral Focus - Land Use



Land-use decisions can have a dramatic impact on the demand for transportation and energy in urban areas. The form and function of different types of developments can greatly reduce or increase demands for energy, influencing how energy is produced, distributed and used. Municipal Planners can take into consideration how emissions can be reduced through planning procedures and tools such as development plans, policies, zoning, development agreements and the subdivision application process.

Focusing on maximizing use of municipal infrastructure can reduce the financial implications of growth, and higher density development around existing or planned transit corridors can promote the use of public transit and active transportation. Municipalities can also require or encourage mixed-use development and higher density buildings that use less energy per unit area.

Green Development Standards

Green Development Standards (GDS) are beginning to take root across the province after Toronto's adoption in 2010. With mandatory efficiency standards, these regulations can greatly reduce emissions from new development associated with population growth. GDS are mandatory measures created by municipalities to encourage design that is environmentally, socially, and economically sustainable. They are comprehensive principles to guide development at a level of planning and design that focuses on the community as a whole. These standards are integrated into the planning approvals process, where development applications are asked to meet certain criteria in the GDS.



Planning and designing a new development in accordance with the local Green Development Standards

CASE STUDY

Whitby Green Standard

The Whitby Green Standard (WGS) follows a tiered approach by providing developers with mandatory and voluntary GDS checklists to ensure that minimum sustainability criteria are met during a development application.

The WGS metrics are organized under ten sustainable principles with corresponding performance measures. Each metric includes four tiers. Tier 1 is mandatory and required through the planning approval process. Tiers 2 to 4 are voluntary, and incentives are typically awarded to developers who achieve Tier 2 or higher.

Sectoral Focus - Transportation



Emission reductions from the [transportation sector](#) can be achieved through electrification, and by reducing private and commercial vehicle trips through urban design and planning initiatives that reduce urban sprawl. Municipalities can undertake many actions to decarbonize transportation, such as switching to low carbon electric fleet vehicles, improving public transportation options and providing active transportation infrastructure. These actions encourage residents to replace trips in private vehicles and can also encourage fuel switching from fossil fuels to renewable and low-carbon energy sources by providing publicly accessible EV charging infrastructure.

Public Transit Upgrades

Expanding public transit infrastructure shortens commute times and cuts emissions from traffic and cars through mode shifting. Transit upgrade measures include creating or expanding local transit networks within a municipality or between municipalities. Public mass transit benefits the economy and the environment and also helps people reduce their transportation costs and improves transportation equity.

[Upgrading public transit infrastructure](#) includes measures such as improving transit amenities such as bus stops, lighting and signage, implementing priority measures such as separate bus lanes, signal systems for transit and adopting real-time transit tracking technologies. These features make transit more competitive by reducing travel times and increasing public reliability, improving transit route coverage and frequency, improving transit accessibility through micro-transit connections and providing regional connections with other transit systems.

Transportation Demand Management

Some CAC municipalities have also adopted [Transportation Demand Management \(TDM\)](#) programs. TDM programs use policies, services, and products to influence whether, why, when, where, and how people travel. TDM redistributes travel demand on the transportation network by shifting the demand to a mix of travel modes and away from the busiest travel periods of the day. TDM offers travellers a variety of transportation options and increases the efficiency of existing transportation systems. This approach reduces travel

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Municipalities can undertake many actions to decarbonize transportation, such as switching to low carbon electric fleet vehicles, improving public transportation options and providing active transportation infrastructure ”

times, traffic delays, and vehicle congestion and lowers transportation costs and emissions.

Municipal TDM strategies include:

- Re-mode Trips: Switching from personal automobiles to walking, cycling, transit, carpooling
- Reduce Trips: Telecommuting or remote working
- Retime Trips: Travel during off-peak traffic periods
- Reroute Trips: Providing alternate routes to avoid congested areas

Municipalities in the CAC network have implemented a variety of measures to advance TDM, including:

- Site design
- Parking reduction
- Active transportation facilities
- Ride matching and carpooling
- Trip planning resources
- Promotion and outreach

Active Transportation Infrastructure

Investing in active transportation infrastructure provides low-carbon transportation options to residents and encourages healthy and active lifestyles. [Active transportation infrastructure upgrades](#) include building enhanced walking and cycling infrastructure such as sidewalks, multi-purpose trails, dedicated/separated bike lanes, and paved road shoulders. Municipalities are also adopting bylaws requiring bike parking facilities and lowering their minimum car parking requirements for new developments. In addition, providing or supporting educational programs to promote active transportation in the community is critical to raising awareness among residents and increasing uptake of active transportation modes.

EV Fleet and Infrastructure Investments

Sustainable transportation options like [fleet electrification](#) and community EV adoption are key to achieving transportation emission reductions. By installing a widespread public [EV charging network](#), municipalities can encourage residents to switch to EVs that operate on low or zero emission electricity. Given that transportation emissions make up a major portion of GHGs, municipalities have a significant opportunity to promote low-carbon transportation alternatives through regional planning and collaboration with other orders of government. Thirteen municipalities in the CAC network are advancing EV uptake by adopting EV fleets and are growing their public EV charging network, often in partnership with the federal funding programs.

Automatic Vehicle Location Systems

Automatic vehicle location (AVL) systems are powerful tools used by municipalities to manage vehicle fleets including service vehicles, emergency vehicles, and transit vehicles such as buses and trains. [AVL systems](#) can track a vehicle's fuel consumption and identify opportunities for route optimization. Municipalities can benefit from improved monitoring of vehicle use and understanding of the amount and type of fuel consumed and associated GHG emissions. AVLs can enhance municipal ability to conduct analyses of year-over-year fuel consumption and trends, can help reduce vehicle kilometres travelled and reduce fuel consumed through idling.



CASE STUDY

Markham Cycles

Markham Cycles is a community bicycle hub that involves residents in climate action by increasing opportunities for cycling in Markham. Over a quarter of trips in Markham are 5 km or less; however, less than 2% of trips are cycled. Markham Cycles taps into this potential through its community bike hub, launched in July 2019 at the Milliken Mills Community Centre and Library.

Funded by the Ontario Trillium Foundation and City of Markham, the hub offers access to bicycles and tools, cycling workshops and repair clinics, cycling mentorship, community rides, bike rescue and youth-focused programs. Bicycles can be borrowed for a week through a partnership with the Markham Public Library. Since its launch, Markham Cycles has organized over 48 bike pop-up booths, engaged with over 1,300 people, tuned up 800 bikes, held over 35 virtual sessions engaging over 1,500 people virtually.

Bikes lined up at Markham's Bicycle Lending Library

“ Markham Cycles involves residents in climate action by increasing opportunities for cycling in Markham ”



CASE STUDY

Kingston Transit Upgrades

Kingston transit recorded a massive uptake in ridership in the last decade. Census data from 2016 recorded a 33% increase in the number of people getting to work by bus in Kingston between 2011 and 2016. More than 30 percent of commuters in Kingston use a sustainable form of transportation – transit, carpooling, walking and cycling – to get to and from work.

The introduction of express bus routes, online availability of real-time bus arrival and trip information, extended Sunday and holiday service and improved fare options for commuters are some of the reasons for the increase in people using public transit. Kingston Transit’s annual ridership is close to 6 million people a year, and it has seen double-digit increases for several years.

Two buses on a street in downtown Kingston

“ More than 30 percent of commuters in Kingston use a sustainable form of transportation ”

Sectoral Focus - Buildings



Buildings accounted for about a fifth of Ontario's total emissions in 2019. Municipal governments both own buildings and influence emissions arising from privately owned buildings. Municipal governments are gearing their efforts to reduce building emissions by adopting Green Development Standards for new developments, developing residential and commercial building retrofit programs and paving the way for the construction of net-zero energy buildings.

The majority of GHGs from the buildings come from the use of natural gas for space and water heating. Building retrofits need to ensure that key building systems such as lighting, HVAC, water usage and building envelopes are upgraded to optimize energy savings and emission reductions.

Retrofits yield the best results when combined with building asset renewal events such as envelope and major equipment replacement, new ownership or occupancy, and green building certification. New buildings can meet their local municipality's Green Development Standards requirements to help attain high-performance standards and achieve GHG reductions.

Advanced Energy Performance

Municipalities are collaborating with developers and energy companies to research and design new neighbourhoods powered by their own renewable energy and serviced by a community-scale distributed geothermal energy system for heating, cooling, and domestic hot water. These low-carbon communities will benefit the residents in multiple ways, including greater energy efficiency through optimization, reduced energy costs for consumers; reduced maintenance costs; and reduced greenhouse gas emissions, resulting in better air quality and health.

Net-zero Municipal Buildings

Net-zero energy buildings form a key part of the climate action puzzle. These energy-efficient buildings are designed to produce as much energy as they consume annually. To qualify, the energy must be produced on-site and come from renewable sources such as solar, wind and geothermal. Municipalities in the CAC network are partnering on net-zero energy building projects that construct or renovate buildings such as daycares, parking lots, senior residences, and affordable homes. Net-zero residential buildings are resilient, comfortable, healthy, and affordable. Moreover, due to their limited operating costs, they have the potential to provide a secure home for low-income occupants facing energy poverty.

Retrofit Programs

The existing ageing residential and commercial building stock needs to be retrofitted to minimize energy consumption. There is growing market interest in energy-efficient buildings, and many provincial and federal programs seek to improve energy efficiency at the municipal level.

Municipalities in the CAC network are offering residential and commercial building owners upfront loans with convenient repayment schemes. Two common mechanisms employed for financing retrofits are on-bill financing, in which monthly payments are collected through utility bills, and through local improvement charges, in which the cost of retrofits is tied to the property and repaid through property taxes.



CASE STUDY

Markham - Enwave Project

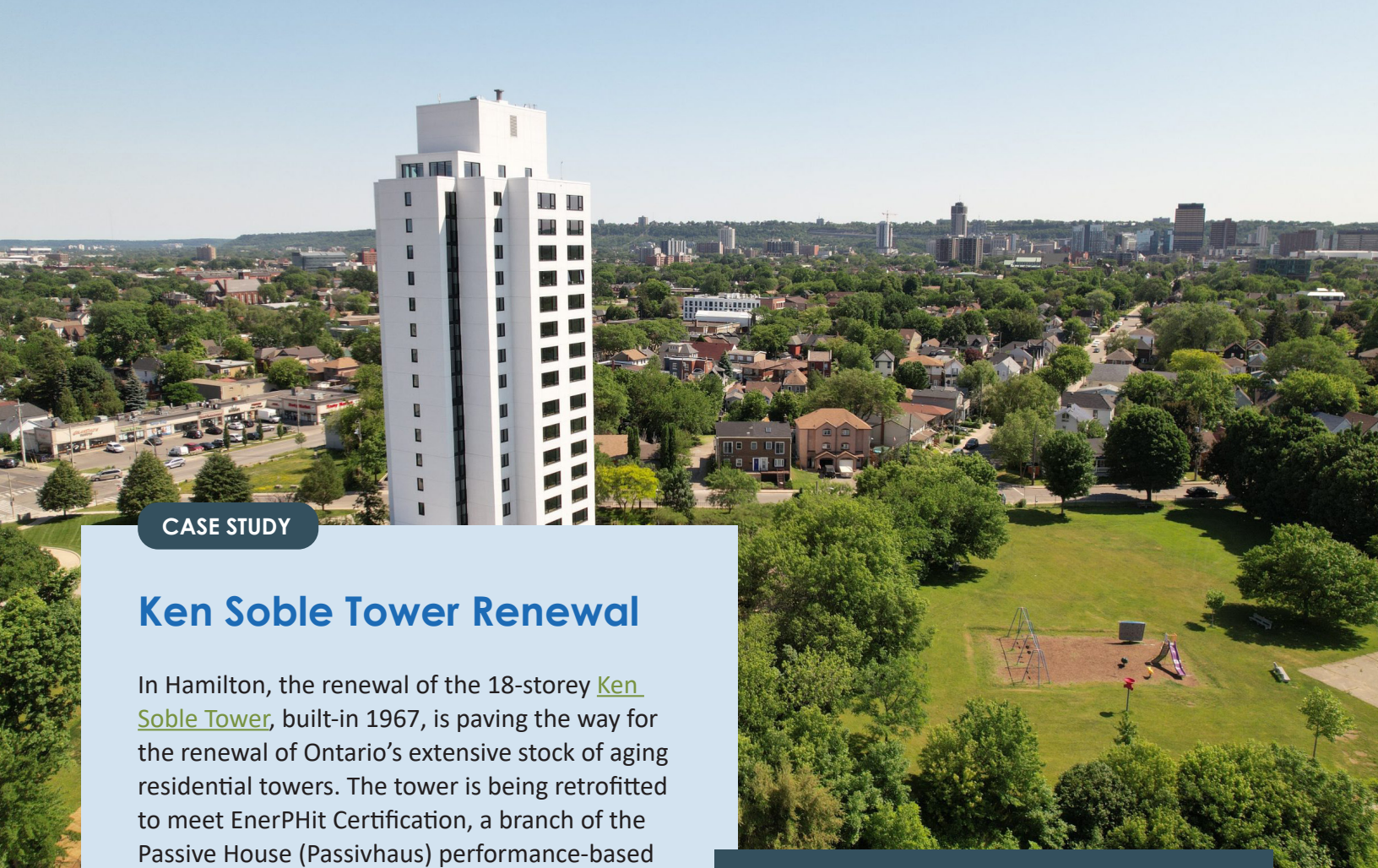
In 2018, the City of Markham, in partnership with Mattamy Homes Canada and Enwave Energy Corporation, collaboratively researched and [designed a pilot neighbourhood](#) of approximately 300 homes serviced by a community-scale distributed geothermal energy system for heating, cooling, and domestic hot water. Project construction began in 2020.

On completion, this project will be Canada's largest geothermally heated community, with the potential to transform the residential housing market. This community's heating and cooling system will be maintained, operated and delivered by Enwave Energy Corporation. Located in north Markham, the community will utilize deep wells up to 250 metres, allowing the community to tap into geothermal energy. Heating and cooling will be delivered at the neighbourhood level through a common ambient pipe buried underneath the community and connected to each home, similar to an electrical grid.



A rendering of Canada's largest geothermal net-zero emissions community in Markham, Ontario

“ This project will be Canada's largest geothermally heated community, with the potential to transform the residential housing market ”



CASE STUDY

Ken Soble Tower Renewal

In Hamilton, the renewal of the 18-storey [Ken Soble Tower](#), built-in 1967, is paving the way for the renewal of Ontario's extensive stock of aging residential towers. The tower is being retrofitted to meet EnerPHit Certification, a branch of the Passive House (Passivhaus) performance-based standard designed specifically for building retrofits.

Along with new electrical systems and plumbing, the project will install heat-recovery systems and fresh air ducts into all units. Other retrofitting plans include:

- Application of an air barrier to exterior brick topped by mineral wool;
- Balcony removal to eliminate thermal bridging and reduce maintenance; and
- Sealing fire-separation breaks throughout all units

The project aims to decrease overall energy intensity by at least 70%, reduce energy and maintenance costs significantly, and cut GHG emissions by over 90%. This project will be the first in North America to qualify for an International PH Certification.

The Ken Soble residential tower in Hamilton

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The Ken Soble Tower Renewal project aims to decrease overall energy intensity by at least 70%
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CASE STUDY

City of Toronto's Energy Retrofit Loan Programs

City of Toronto's Better Buildings Partnership provides funding, expertise and support to improve energy efficiency and reduce emissions in Toronto's commercial, industrial and institutional buildings. It provides building owners with a centralized resource to support them in understanding and accessing the various supports available to them in benchmarking and improving their assets' performance.

The [High-Rise Retrofit Improvement Support Program \(Hi-RIS\)](#) supports multi-unit residential building (MURB) owners to introduce building improvements that reduce energy and water consumption. This program provides Local Improvement Charge (LIC) financing of up to 20-year terms at competitive fixed rates to residential apartment buildings in Toronto at or above three storeys.

The [Home Energy Loan Program \(HELP\)](#) is similar to Hi-RIS but is targeted at single family homeowners of all income levels, providing financing of up to \$75,000 and flexible terms up to 20 years to cover the cost of home energy improvements such as air sealing, insulation, heat pumps, and renewable energy and energy storage technologies. BetterHomesTO provides Toronto's residents with a one-stop platform to help improve their home's energy efficiency and reduce associated emissions.

Undertaking a home retrofits in Toronto through The Home Energy Loan Program.

Sectoral Focus - Energy



Municipalities across the CAC network are implementing projects to [improve energy efficiency and reduce energy consumption and GHG emissions](#). Actions implemented by municipalities include installation of renewable energy sources and installing district energy systems, both of which can greatly reduce emissions from the energy sector.

Renewable sources generate electricity without (or with very few) GHGs. Locally generated energy from low carbon sources can contribute to a significant reduction of GHG emissions. Municipalities are installing infrastructure to locally produce renewable energy using solar, wind and geothermal energy. Municipalities are also establishing low carbon district energy system networks to heat and cool buildings.

Net-zero Carbon District Energy Systems

Municipalities are adopting [low carbon/net-zero district energy systems](#) that run on renewable energy sources such as solar thermal, sewer heat, biogas, cold lake water, biomass and ground heat to distribute thermal energy to multiple buildings

in an area or neighbourhood. Hot water and/or chilled water are produced at central plants and are distributed to surrounding buildings via a closed-loop underground distribution system known as a thermal grid. The thermal energy delivered to the buildings is used for space heating, domestic hot water heating and air conditioning.

Renewable Energy Systems

[Small and large-scale projects](#) implemented by municipalities to generate renewable energy are becoming more common. Municipalities across the CAC network have installed solar panels, solar thermal, wind turbines, geothermal loops and other sources to generate low-carbon electricity and heat on municipal buildings, community centres, etc.

The City of Toronto DLWC system employs three intake pipelines, each five kilometers in length, laid on the bed of Lake Ontario. This \$100 million system took over two and half years to complete but now supplies over 80 large downtown buildings with an alternative to electrical air conditioning —one that is sustainable, cost-effective, and efficient.



Toronto's Deepwater Lake Cooling System

CASE STUDY

Toronto's Deepwater Lake Cooling System

The construction of [Toronto's Deepwater Lake cooling system](#) was completed in 2004. After the installation of this system, water drawn from Lake Ontario for the city's potable water supply is now pumped from a deeper source. The cooler temperature of this water is used for air conditioning before being added to the municipal water supply.

Sectoral Focus - Waste



Municipal governments in Canada manage the collection, recycling, composting, and disposal of household waste. Decomposition of organic waste releases large quantities of methane and other GHGs. Diverting waste by recycling and composting can help reduce the impact of solid waste on the environment. Ontario municipalities have made significant progress in Ontario to reduce waste going into landfills using waste diversion, integrated waste management systems and incinerators. CAC municipalities are also adopting innovative technologies to collect fugitive emissions from sewer waste, landfills or agricultural waste and converting it into energy.

Waste Diversion

Municipal waste diversion programs direct waste away from landfills or incinerators through reuse, recycling, composting or anaerobic digestion. Waste diversion is a key component of effective and sustainable waste management. CAC municipalities are currently advancing waste diversion programs for organic waste, textiles, hazardous waste and recyclable waste.

Energy Generation from Waste

Municipalities across the CAC network are adopting innovative ways to convert waste into energy through renewable natural gas (RNG) generation and by capturing waste heat. RNG can be produced as an environmentally responsible alternative to natural gas from organic materials. RNG production generates lower emissions when compared to conventional natural gas.

RNG can be produced from various local community sources, including agricultural waste, municipal landfill gas, forestry waste, and other biomasses. RNG can be used instead of natural gas in combustion equipment for heating and electricity generation and as an alternative fuel for vehicles. Municipalities are also incinerating sewage and other organic waste to generate electricity and reduce GHG emissions.

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Municipal governments in Canada manage household waste. Decomposition of organic waste releases large quantities of methane and other GHGs. Diverting waste by recycling and composting can help reduce the impact of solid waste on the environment ”



CASE STUDY

City of London's Organic Rankine Cycling (ORC)

The City of London's Wastewater Treatment Operations Division incinerates dewatered waste solids at the Greenway Wastewater Treatment Plant. A by-product of the incineration process was heat that was lost through the facility's exhaust stack. Some of this heat had been captured and used to heat areas of the plant, but the remaining waste heat energy presented an opportunity for the City.

The design and procurement of an [ORC power generation system](#) for Greenway began in 2018. Commissioning was completed in October 2021. It is expected that the power generated by the ORC system will offset a quarter of the power consumption at Greenway, the City's largest wastewater treatment plant, saving a projected \$600,000 per year in electricity costs. The energy consumption reduction achieved through this project alone is expected to total 3,600 MWh per year and accounts for over 40% of the City's 2019-2023 Corporate Energy Conservation and Demand Management Plan's overall target. It will cut the City's greenhouse gas emissions by an estimated 800 tonnes of CO₂ per year.

OCR equipment at the Greenway Wastewater Treatment Plant in London, Ontario

“ It is expected that the power generated by the ORC system will offset a quarter of the power consumption at Greenway ”



Two men sort textiles at a facility in Oshawa, Ontario

CASE STUDY

Oshawa Textile Recycling Program

Oshawa launched its [textile recycling program](#) in 2018 in partnership with Diabetes Canada to increase recycling opportunities for textiles. Textile recycling bins have been installed at four city recreation facilities.

The bins provide secure access for unwanted textiles, including accessories and bags, clothing, curtains and general household items. Discarded and unusable textiles are sorted by material type, and buttons and zippers are removed. They are then shredded and turned into insulation, stuffing for car seats, under padding for carpet and many other uses.

Sectoral Focus - Agriculture, Forestry and other Land Use



The [AFOLU sector](#) includes GHG sinks, as well as sources. GHG reduction actions within the AFOLU sector involve one or more of three strategies:

- Reduction/ prevention of emissions by conserving existing carbon pools in soils or vegetation that would otherwise be lost;
- Carbon sequestration by enhancing the uptake of carbon in terrestrial reservoirs, and thereby removing CO₂ from the atmosphere; and
- Reducing CO₂ emissions by substituting fossil fuels and energy-intensive products.

Rural municipalities are working with farmers and landowners to encourage sustainable agricultural practices to preserve natural assets. Preserving natural or building engineered forests and wetlands can act as important carbon sinks.

Many CAC municipalities are primarily urban municipalities with relatively low emissions from the agricultural sector. Some CAC municipalities have undertaken ecosystem restoration projects to increase their capacity to provide ecosystem services such as flood protection and carbon sequestration.

Ecosystem Protection and Restoration

Boosting the carbon sequestration potential of ecosystems through the protection and restoration of existing ecosystems and creating new human-made ecosystems is an effective approach to reducing and removing carbon emissions. The carbon sequestration potential of ecosystems can be enhanced through practices such as conservation, restoration, reduced deforestation and degradation, as well as sustainable management and afforestation/reforestation. Several CAC municipalities are partnering on [ecosystem protection and restoration projects](#) with conservation authorities and local environmental organizations.

CASE STUDY

Kerrison Wetland Restoration Project in Ajax

In partnership with the Region of Durham, Toronto and Region Conservation Authority, and Ducks Unlimited Canada, the Town of Ajax is undertaking a large wetland restoration project within the Carruthers Creek watershed.

The [Kerrison Road Wetland Restoration Project](#) will expand marsh wetland habitat through site grading, decommissioning of remnant farm ponds, and extensive native tree and shrub plantings. The restoration will also stabilize existing stream bank erosion sites and address and manage invasive species found on site. In total, the Kerrison Project will create and enhance approximately 2.5 hectares of wetland and 6 hectares of riparian plantings, which will act as a carbon sink.



An aerial view of the wetlands in Ajax, Ontario

Conclusion



If Canada is to meet its national and international GHG reduction targets and avoid warming above 1.5° C, all levels of government will need to ramp up their efforts and implement transformative mitigation actions across all sectors. In 2015, Canada committed to reducing its annual GHG emissions by 30 percent below 2005 levels by 2030. Urgent action is needed to curb GHG emissions, meet Canada's GHG reduction target, and achieve net-zero emissions by 2050.

Municipalities across Ontario are advancing climate action, as demonstrated in this Report. Both large and small municipalities are undertaking initiatives to save energy and reduce emissions. More than ever, municipalities are designating specific staff and departments for climate action projects. Along with reducing the impacts of climate change, municipalities are also saving money and generating other community benefits.

“ *In 2015, Canada committed to reducing its annual GHG emissions by 30 percent below 2005 levels by 2030. Urgent action is needed to curb GHG emissions, meet Canada's GHG reduction target, and achieve net-zero emissions by 2050* ”

Municipal governments can advance climate action by:

- Collaborating with institutions, community groups, the private sector and non-profit organizations to widen their network, leverage resources and help ensure successful implementation;
- Identifying and acting on municipal authorities such as Climate Change by-laws, Planning Act and Site Plan authorities;
- Focussing on actions geared towards large-scale community emission reductions;
- Increasing investment in a dedicated department and staff positions to oversee climate and sustainability initiatives;
- Leveraging internal and external support for climate action by focusing on co-benefits, such as reduced operational or maintenance costs, improved safety, air quality and increased comfort;
- Leveraging funding for projects through various streams, including federal and provincial government programs, partnerships, municipal budgets, and green bonds;
- Requiring an application of climate lens to make decisions across departments, and;
- Establishing a project monitoring and reporting framework to increase the exchange of ideas and knowledge between other municipalities to accelerate local climate action.

Our Report focuses on what is currently underway in Ontario. It is important to mention that there are many actions underway in other jurisdictions that can result in significant emission reductions that are not yet happening here. For example, in transportation, many jurisdictions are applying [congestion pricing](#)

to reduce transportation emissions. In buildings, we are seeing advancements in [grid-interactive efficient buildings](#), where energy efficient buildings have seamless communications with energy grids. Regarding the waste sector, we are witnessing the emergence of [zero waste municipalities](#) with accompanying standards and certification processes. In the United States, [public-private collaborations](#) to tackle climate change through food and healthy soil on farms and ranches are producing considerable GHG reductions from the AFOLU sector. Addressing inefficient land use practices is slow to emerge in North America, however, Auckland, New Zealand specifically [targets land use in their decarbonization efforts](#). Finally, we have seen many [national](#) and [subnational](#) governments commit to 100% renewable power generation.

Significant reductions in municipal GHG emissions will require a shift in how we manage energy supply, natural and agricultural ecosystems, and how we inhabit and move in the urban spaces where most of the world's products, energy and materials are consumed. Technologies exist to achieve these reductions. We need leadership, ambition and creativity to achieve rapid deep decarbonization in our communities and prevent catastrophic climate change while we still can.



Clean Air Partnership