

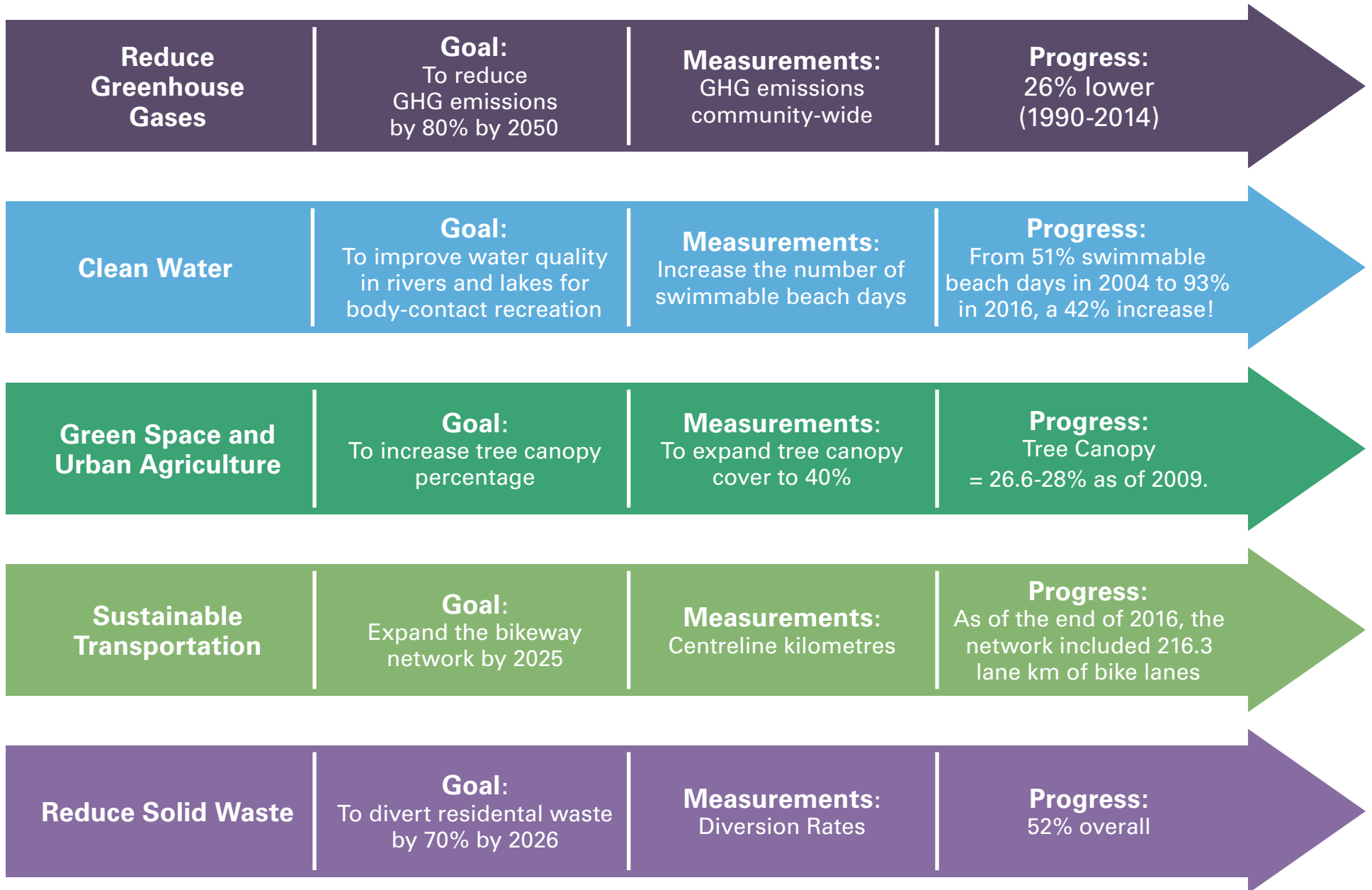


# Toronto Environmental Progress Report 2016

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# A snapshot of Toronto's Environmental Progress To Date





## Introduction

The City of Toronto is committed to reducing the environmental footprint of City operations, and to delivering programs, policies, and action plans to build a green and sustainable community that benefits everyone.

The vision of Toronto as a “clean, green and sustainable” city is enshrined in City Council’s Strategic Actions 2013-2018, and Toronto’s Official Plan, which governs city-building activities. City programs and policies work to enhance water and air quality, reduce greenhouse gas emissions and solid waste, build resilience against a changing climate, develop sustainable energy and transportation systems, and establish vibrant green spaces in Toronto.

This report identifies the environmental objectives that Toronto City Council has set, and measures the cross-corporate progress and contributions of all City Divisions, Agencies and Corporations. In addition to measuring our progress, this report highlights the initiatives that are moving us towards our goals and the impact they are having.

We are advancing towards our vision of a green city and are committed to making continuous progress.



## Overarching Strategies

- City of Toronto Strategic Actions 2013-2018
- Toronto Official Plan

## Plans, Strategies and Policies

- A Climate of Concern: Climate Change and Health Strategy
- Community Garden Action Plan
- Congestion Management Plan 2016-2020
- Consolidated Green Fleet Plan 2014-2018
- Energy Conservation and Demand Management Plan 2014-2019
- Green Roof Bylaw
- Growing Toronto's Tree Canopy ("Tree Planting Strategy")
- GrowTO: An Urban Agricultural Action Plan for Toronto
- Long Term Waste Management Strategy
- Our Common Grounds: Parks and Recreation Strategic Plan
- Parks Plan 2013-2017
- Resilient City: Preparing for a Changing Climate
  - Ahead of the Storm: Preparing Toronto for Climate Change
  - Climate Change Risk Management Policy
- Sustaining and Expanding the Urban Forest: Toronto's Strategic Forest Management Plan 2012-2022
- Ten Year Cycling Network Plan 2016-2025
- TOcore: Planning Downtown
- Toronto Beaches Plan
- Toronto Bike Plan
- Toronto Green Standard
- Toronto Transit Commission Environmental Plan
- Toronto Transit Commission Five-Year Corporate Plan 2013-2017
- Toronto Walking Strategy
- TransformTO: Climate Action for a Healthy, Equitable, Prosperous Toronto
- Wet Weather Flow Master Plan



## Reduce GHG Emissions

Toronto has an ambitious target to emit 80% fewer greenhouse gases in 2050 than in 1990, even as our city continues to grow in population and productivity. Toronto's commitment to reducing greenhouse gases was established in the *Climate Change, Clean Air and Sustainable Energy Action Plan* ("Climate Change Action Plan") (2007), unanimously adopted by City Council.

In 2015, the *TransformTO: Climate Action for a Healthy, Equitable and Prosperous Toronto* initiative began. In 2016, City Council approved strategies proposed under TransformTO to accelerate actions that address climate change, confirming Toronto's vision and trajectory towards a low-carbon future.

By reducing greenhouse gas (GHG) emissions<sup>1</sup> in Toronto, we reduce our contribution to climate change and advance complementary objectives at the same time, such as improvements to health, the economy, and social equity. Motorized vehicles and energy used in buildings for heating, cooling and electricity are the primary sources of greenhouse gas emissions in Toronto, together accounting for 80.5% of total GHG emissions in 2014. Identifying opportunities to decrease greenhouse gas emissions across all sectors, particularly transportation and buildings, will be key.

Great strides have been made to date owing to the efforts of a multitude of programs, policies and partners across the City – together we have lowered our emissions by 26% from 1990 levels as of 2014, well exceeding our goal of a 6% emissions reduction. Major contributing factors are the closing of Ontario's coal fired power plants, recognized as the single largest greenhouse gas reduction initiative in North America, and improvements to waste management practices that limit methane production in landfills, particularly as methane has a 21 to 25 times greater global warming potential than carbon dioxide.

Since the phase-out of coal, yearly greenhouse gas emissions reductions have been more incremental. Transformative action will be required to reach our 2050 low-carbon target.

<sup>1</sup> Unless otherwise stated, greenhouse gases are reported in tonnes of carbon dioxide equivalent (eCO<sub>2</sub>), a standard practice by which greenhouse gases are calculated in terms of the global warming potential of carbon dioxide.



*Together we have lowered our emissions by 26% from 1990 levels as of 2014, well exceeding our goal of a 6% emissions reduction.*

**Objective:** Significantly reduce our release of greenhouse gas emissions into the atmosphere.

Goal	Measure	Progress
1. Reduce greenhouse gas (GHG) emissions against 1990 levels: <ul style="list-style-type: none"> <li>• 6% by 2012</li> <li>• 30% by 2020</li> <li>• 65% by 2030<sup>*2</sup></li> <li>• 80% by 2050<sup>*3</sup></li> </ul>	GHG emissions community-wide	26% lower (1990-2014) <sup>**4</sup>
	GHG emissions corporate-wide (City operations)	46% lower (2013) <sup>***5</sup>

<sup>2</sup> City of Toronto (2017). [TransformTO Report 2: The Pathway to a Low Carbon Future](#).

<sup>3</sup> City of Toronto (2007). [Climate Change, Clean Air and Sustainable Energy Action Plan](#).

<sup>4</sup> City of Toronto (2017). [Toronto 2014 Global Protocol for Community-Scale Greenhouse Gas Emissions Inventory](#).

<sup>5</sup> City of Toronto (2007). [Climate Change, Clean Air and Sustainable Energy Action Plan](#).



## Achievements

### **Toronto's Climate Leadership and Global Impact**

Cities are recognized as leaders in the world's fight against climate change. Cities consume over two-thirds of the world's energy and account for more than 70% of global carbon dioxide equivalent (CO<sub>2</sub>e) of emissions. The Global Covenant of Mayors for Climate and Energy, previously known as the Compact of Mayors, is the world's largest coalition of city leaders addressing climate change. Members of the Covenant pledge to reduce local greenhouse gas emissions, enhance resilience against climate change impacts and track progress transparently. Commitments to the Covenant are set to deliver half of the global urban potential greenhouse gas emissions reductions available by 2020.

In 2015, the City of Toronto pledged its commitment through participation in the Compact of Mayors at the Conference of Parties twenty-first session (COP21). In doing so, the City vows to comply with GHG reporting requirements and confirm reporting to the Global Protocol for Community-Scale Greenhouse Gas Emissions Inventories (GPC), the world's most widely-endorsed GHG accounting and reporting standard for cities. A city's ability to take effective action in mitigating climate change and monitoring progress depends on access to good quality GHG emissions data. Toronto is working towards fulfilling its climate change policy objectives in part by ensuring that it has the capacity to quantify, track and report progress on the reduction of greenhouse gas emissions in a manner that is accurate, thorough, transparent and credible.





TransformTO community engagement included: four City hosted community consultations which drew over 2,000 participants, the engagement of 1,500 additional residents through Live Green Toronto events, the opportunity to complete an online survey, 900 e-newsletter subscribers, and 1,900 Twitter and Facebook engagements. An additional 11 consultations were led by community groups, with over 30 community presentations across the city.



## TransformTO

### **TransformTO: Climate Action for a Healthy, Equitable and Prosperous Toronto**

Initiated in 2015 to update the City of Toronto's Climate Change Action Plan (2007) and establish a long-term low-carbon framework, TransformTO identifies the key opportunities to significantly reduce greenhouse gas (GHG) emissions in Toronto by 30% by 2020 and by 80% by 2050, while supporting improvements to public health, social equity, and local economic prosperity\*.

Through a process that involved technical modelling and community engagement, TransformTO identified a viable pathway to achieve an 80% GHG emissions reductions by 2050, using currently available technologies, across key urban systems – land use, transportation, buildings, energy, and waste. TransformTO recognizes that the systems are interconnected, and that meeting the emissions reduction target will require transformational changes in the way we live, work, commute, build, and more.

In 2016, City Council adopted 23 short-term actions to accelerate and enhance existing City initiatives to help Toronto exceed its 2020 goal and pave the path to achieving its 2050 goal. The 2020 strategies focus on five key areas:

- supporting energy efficiency in buildings,
- raising the bar for new construction and community energy planning,
- advancing sustainable transportation,
- leading by example, and
- engaging and collaborating with stakeholders.

\*In June 2017, Toronto City Council adopted *TransformTO Report 2: The Pathway to a Low Carbon Future* which outlines a set of targets and actions to help Toronto realize its long-term goal of achieving an 80% community-wide reduction in greenhouse gas emissions against 1990 levels, including the interim target of reducing 65% of greenhouse gas emissions by 2030.  
Link: [www.toronto.ca/transformto](http://www.toronto.ca/transformto)



## Better Buildings Partnership 1996 – 2016



## Better Buildings Partnership

In 2016, the City of Toronto celebrated the 20<sup>th</sup> anniversary of its Better Buildings Partnership (BBP) program. Working with building owners, managers and developers in Toronto to improve the energy efficiency of their buildings and reduce greenhouse gas emissions, the BBP provides expertise, resources and financial assistance to maximize the outcomes of a wide range of energy efficiency projects.

Since 1996, the BBP has helped to facilitate 2,574 projects across the city, retrofitting a total of 566 million square feet of floor area, equivalent to the size of 6,500 Canadian football fields. These projects have resulted in 3.8 million MWh of electricity saved, \$380 million in cumulative energy cost avoided and 690,000 tonnes of CO<sub>2</sub> emissions reduced. In 2016, 52 projects totalling 14 million square feet of floor area, and generating 15,000 person years of employment were completed. On an ongoing basis, the projects completed in 2016 will achieve energy savings of 52,000 eMWh per year, CO<sub>2</sub> emission reductions of 10,000 tonnes per year and reduce energy costs by \$5 million per year.

Link: <https://www.toronto.ca/business-economy/business-operation-growth/green-your-business/better-buildings-partnership>



Live Green Toronto Volunteers educate residents on the City's environmental programs and priorities at 150 events each year.

### Live Green Toronto

Live Green Toronto is a multi-faceted program that engages residents and businesses in living and working in more environmentally sustainable ways, through a variety of programs, events and resources. By engaging the community through social media, the web, and at hundreds of events across the city, Live Green Toronto raises awareness, generates connections and inspires actions that make Toronto a healthier and more resilient city.

Live Green Toronto Volunteers, a dedicated team of 1,500 resident volunteers trained on a variety of environmental topics, including climate change, waste diversion, water and energy efficiency, sustainable transportation, and local food, significantly enhance the City's outreach capacity. Collectively, the volunteers, who speak over 110 languages, provided 5,460 hours of service at over 136 community events in 2016, and connected with over 100,000 residents across the city.

Through the Live Green Card program and mobile app, now known as Live Green Perks, Live Green Toronto also helps eco-conscious consumers connect with local businesses offering environmentally friendly products and services. By 2016 year-end there were 44,000 cardholders, over 3,000 app users, 13,000 subscribers to the monthly Live Green e-News, and 500 participating businesses.

Link: <https://www.toronto.ca/services-payments/water-environment/live-green-toronto/>



## Adapt to a Changing Climate

Toronto is experiencing altered patterns of weather due to a changing climate. The *Future Weather and Climate Drivers Study* (2011) predicts that Toronto will experience an increase in extreme weather events ranging from more intense rain events to more heat waves and higher average annual and maximum temperatures. The rainstorm of July 2013 resulted in over \$70 million in direct costs to the City while the Insurance Bureau of Canada reported about \$1 billion in (private property) insurance claims. Extreme weather events such as these are projected to occur with increasing frequency, duration and intensity.

It is a priority of the City to enhance the resilience of our infrastructure and services to reduce the risk of damage, injury, costs and emergency situations associated with a changing climate. We have been progressive in this area – Toronto has long since recognized the need and taken actions that both reduce greenhouse gases (mitigation) and improve our resilience and preparation against climate change (adaptation). Mitigation and adaptation strategies are embedded in the Council adopted Climate Change Action Plan (2007) and *Ahead of the Storm: Preparing Toronto for Climate Change* (2008) documents.

Climate change also represents an important health issue. Climate change poses significant risks to human health and well-being with impacts from extreme weather events and natural hazards, air quality, and water, food and vector-borne disease. For instance, Toronto Public Health estimates that extreme heat contributes to an average 120 premature deaths in the city each year, and that mortality related to heat could double by 2050 and triple by 2080 as heat waves become longer and more intense. Vulnerable populations are especially at risk, such as groups with pre-existing illnesses, infants, young children, the elderly, the marginally housed, the homeless, and people who work outdoors.

While all orders of government have important adaptation responsibilities, the local nature of many climate impacts means that municipalities are often on the front line to ensure effective management of risks, protect community safety and promote economic sustainability. Actions taken today to enhance community resilience to climate change will greatly improve livability in our city and help move us closer to a sustainable future.



## Objective:

Improve our resilience and reduce the negative impacts of climate change.

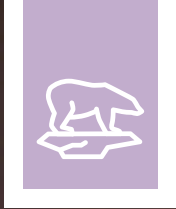
## Achievements

### Resilient City

Enhancing the resilience of Toronto's infrastructure and services to changing weather patterns to reduce the risk of damage and associated costs, injury and emergency situations is a priority of City Council. The Resilient City Working Group (RCWG) – a multi-sectoral team of 18 City divisions and external organizations – was established in 2013 to facilitate knowledge sharing and the provision of technical support to facilitate the implementation of resilience actions. In 2014, City Council adopted the Climate Change Risk Management Policy, which commits the City and its Agencies and Corporations to integrate climate change resilience into decision-making and co-ordination of operations and services. The City and the RCWG have been working to identify and assess potential risks of climate change and extreme weather, define the interdependencies between key infrastructure and service providers, and identify actions that could be taken to mitigate or reduce risks.

In 2016, high level risk assessments were undertaken in three key sectors – utilities, transportation and water. The assessments closely considered services and activities that include electricity, telecommunications, natural gas, district heating and cooling, public transportation, roadways, railways, airports, water treatment and supply, wastewater collection and treatment, and stormwater management. The assessment process identified the need for continuous, direct communication between critical service and infrastructure providers.

Link: <https://www.toronto.ca/services-payments/water-environment/environmentally-friendly-city-initiatives/resilientto/>



Mayor John Tory (L), City Manager Peter Wallace (R), and Elizabeth Mercer (C), Chief Operating Officer of 100 Resilient Cities at Toronto's Agenda Setting Workshop.



Residents and other stakeholders began to identify Toronto's resilience challenges and opportunities.

“*City governments are on the front line of dealing with acute shocks and chronic stresses. Toronto is part of a group of cities leading the way on resilience to better prepare for, withstand, and recover more effectively when disruption hits.*”

– Michael Berkowitz,  
President of 100 Resilient Cities

(Source: <http://wx.toronto.ca/inter/it/newsrel.nsf/7017df20edbe2885256619004e428e/d65f6e0c8fe4160185258140004d0fe9?OpenDocument>)

### 100 Resilient Cities Network

In 2016, Toronto was selected to join 100 Resilient Cities (100RC), a global initiative pioneered by the Rockefeller Foundation to help cities around the world become more resilient. Toronto was selected from almost 1,000 cities that applied over the last several years to be part of 100RC. As a member of the network, the City will gain access to tools, funding, resources and social and technical expertise to build Toronto's resilience to the physical, social and economic challenges of the 21<sup>st</sup> century. 100RC provides funding to hire a Chief Resilience Officer (CRO) to lead the city-wide resilience-building process and engage stakeholders from across government agencies, public and private sectors and various communities. In addition, the City will also receive technical support to develop and implement a resilience strategy that reflects Toronto's distinct needs, access to a global network of peer cities to share knowledge and best practices, and foster new relationships and partnerships. In December 2016, the City hosted its Agenda Setting Workshop, the first step in the development of Toronto's Resilience Strategy. The workshop brought together more than 110 stakeholders and community leaders from a broad range of sectors to discuss the critical issues to be considered in developing Toronto's Resilient City Action Plan.

Link: <https://www1.toronto.ca/wps/portal/contentonly?vgnextoid=82270093ae9b4510VgnVCM1000071d60f89RCRD>



City of Toronto, Footbridge over the Don River

### Canadian Climate Change Risk Assessment Software

Transportation Association of Canada (TAC) has funded the development of a national climate change risk assessment process and tool to allow transportation agencies to determine the type and level of risk to their infrastructure, services or operating practices due to climate and extreme weather events. The City of Toronto's Climate Change Risk Assessment Tool is being used as the foundation for the development of the web-enabled TAC software available to all jurisdictions.

Link: <http://www.tac-atc.ca/en/projects/production/risk-analysis-and-responding-climate-change>

### PlowTO Map

From November to April each year, Transportation Services staff patrol the expressways, arterial roads, and other potential trouble spots 24 hours per day, seven days per week, and monitor weather forecasts to respond to conditions in a timely manner. The PlowTO Map provides citizens with real-time information on activities carried out on city streets, which helps individuals to plan trips – walking, cycling or driving – knowing that routes have been made safe through plowing and salting operations.

Link: <https://www.toronto.ca/services-payments/streets-parking-transportation/road-maintenance/winter-maintenance/plowto/>

### Climate Change and Health Strategy



Climate change represents an important health issue, particularly as extreme weather events in Toronto are projected to increase in frequency, duration and intensity. Direct and indirect impacts on human health include cardiovascular and respiratory illnesses due to air quality concerns, and water- and vector-borne diseases stemming from increased rainfall and heat. Vulnerable populations are especially at risk, such as groups with pre-existing illnesses, infants, young children, the elderly, the marginally housed, and the homeless.

The *Climate Change and Health Strategy*, published in 2015, establishes a direction to better understand and respond to the health effects of climate change in Toronto. The strategy applies a health equity lens to balance the socioeconomic and environmental co-benefits of addressing health effects of climate change. The five-year strategy identifies 30 specific actions across nine topic areas to support climate mitigation and adaptation activities. Focus areas include extreme cold weather, extreme hot weather, air quality, vector-borne disease, food, and water.

By December 2016, 24 of the 30 actions had been implemented. This includes research with St. Michael's Hospital to analyze health impacts in vulnerable populations resulting from exposure to cold weather, an assessment of strategies to address extreme heat for those living in multi-unit residential buildings, and a study on health benefits of actions to reduce greenhouse gas emissions.

Link: <https://www.toronto.ca/legdocs/mmis/2016/h1/bgrd/backgroundfile-98552.pdf>



## Clean Air

Overall air quality in Toronto has improved in recent years. While any deaths are too many, the estimated number of premature deaths and hospitalizations due to air pollution has decreased from 1,700 premature deaths and 6,000 hospitalizations per year in 2004 to 1,300 premature deaths and 3,550 hospitalizations each year in 2014<sup>6</sup>.

Factors contributing to improved air quality include the phase-out of coal-fired generating stations in Ontario, the reduction of coal-generated power in the United States, improvements to vehicle fuel efficiency emissions standards, and industry caps on sulphur dioxide and nitrogen oxides emissions.

All Torontonians have the recognized right to breathe clean air and to know about pollutants and contaminants released into the local environment, as stated in *The Right of a Healthy Environment: An Environmental Bill of Rights for Toronto*, adopted by City Council in 2015.

A series of local air quality studies, launched by the City in 2011, evaluated the presence of pollutants and their potential cumulative health impacts on communities. Findings consistently show the two most significant sources of emissions affecting local air quality are fuels used in road vehicles, such as gasoline and diesel, and fuels used to heat homes and businesses. Similarly, transportation is identified as the main local source for many of the substances of greatest concern to human health<sup>7</sup>. In Toronto, vehicle emissions are especially of concern as they account for the majority – 80.5% – of locally generated air pollutant emissions throughout the city<sup>8</sup>. Heavy-duty vehicles in particular have a disproportionately large impact on air quality. Trucks make up an estimated 3 to 5% of all vehicles in Toronto and yet produce 45% of nitrogen oxides (NOX) of all road vehicles.

A focus on reducing emissions from vehicles is needed to achieve continued improvements to air quality in the city, such as through initiatives that reduce congestion, especially stop-and-go traffic, improve the efficiency of goods movement, and promote low-emission transportation options.

The City is currently investigating ways to reduce health risks from traffic-related air pollution (TRAP), and will publish a report in 2017. Findings indicate concentrations of TRAP are especially elevated along and near major roadways and highways.

The report recommends initiatives to mitigate traffic-related air pollution, including developing best practices for building design and operations, and collaborating with federal and provincial governments to improve fuel and vehicle emissions standards and reduce emissions from older model heavy-duty trucks.





*Toronto's air quality is improving. However, there is more work to be done as Toronto Public Health estimates that air pollution still contributes to 1,300 premature deaths and 3,550 hospitalizations in Toronto each year.*

### Objective:

Make substantive positive changes to our local air quality.

Goal	Measure	Progress
1. Reduce locally generated smog-causing pollutants against 2004 levels: <ul style="list-style-type: none"> <li>• 20% by 2012<sup>10</sup></li> </ul>	Nitrogen oxides (NOx) monitored emissions*	49.5% reduction in NOX concentration in Toronto's air (2004-2016) <sup>11</sup>

\*The City of Toronto's goal of reducing locally generated smog-causing pollutants was established in 2007. The monitoring of nitrogen oxides (NOx) was selected as the measure over other air contaminants, as the distribution of NOx concentrations is more certain and ubiquitous across Toronto. In lieu of locally-generated nitrogen oxides emission data, which is not currently available, the progress reported here reflects annual average hourly NOx concentrations (parts per billion), collected by the Ontario Ministry of Environment and Climate Change at its four monitoring stations. As such, the NOx data reflects air quality at these four particular sites and provides an overall picture of improved air quality in the city, but does not exclusively measure locally generated pollutants across the city. Ongoing efforts are made to better investigate local air quality, such as the traffic-related air pollution report that will be produced in 2017.

<sup>7</sup> City of Toronto (2014). Local Air Quality Study of Ward 5 and Ward 6. Report PE26.2.

<sup>8</sup> City of Toronto (2014). [Toronto 2012 Greenhouse Gas and Air Quality Pollutant Emissions Inventory](#).

<sup>9</sup> City of Toronto (2014). [Toronto 2012 Greenhouse Gas and Air Quality Pollutant Emissions Inventory](#).

<sup>10</sup> City of Toronto (2007). [Climate Change, Clean Air and Sustainable Energy Action Plan](#).

<sup>11</sup> Ontario Ministry of Environment and Climate Change. Air Pollutant Data.



## Achievements

### **Congestion Management Plan**

As Toronto's population and economy grows, so does travel demand within and around the city. The Congestion Management Plan (CMP) helps better manage traffic flow, reduce delays, improve safety, and reduce fossil fuel use. Updated in 2015 for the years 2016-2020, the CMP focuses on maximizing the safety, efficiency, reliability, and sustainability of the transportation network for all users while reducing impacts on the environment. Strategies include the use of technology and data analytics, operational enhancements and increased information sharing to improve incident and event response, construction coordination, curbside management, engineering studies and more.

The Plan also increases transportation demand management efforts to reduce travel demand and make the best use of the existing transportation network. In 2016, the City's Corridor Retiming Program resulted in an estimated 80.9 million fewer vehicle stops, and a 7.9% reduction in travel time resulting in 697,000 tonnes in greenhouse gas emissions and 3.9 million fewer litres of fossil fuels consumed by retiming 357 traffic signals.

Link: [https://www.toronto.ca/wp-content/uploads/2018/01/96a1-CMP-2016-2020\\_Final\\_Nov20\\_Web-a.pdf](https://www.toronto.ca/wp-content/uploads/2018/01/96a1-CMP-2016-2020_Final_Nov20_Web-a.pdf)

In addition, Transportation Services has identified accomplishments to date in the latest CMP Semi-Annual report.

Link: <https://www.toronto.ca/legdocs/mmis/2017/pw/bgrd/backgroundfile-109156.pdf>

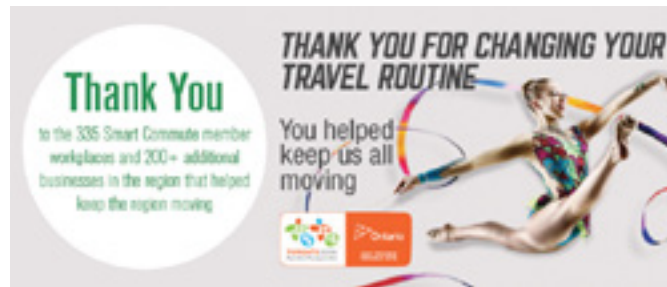
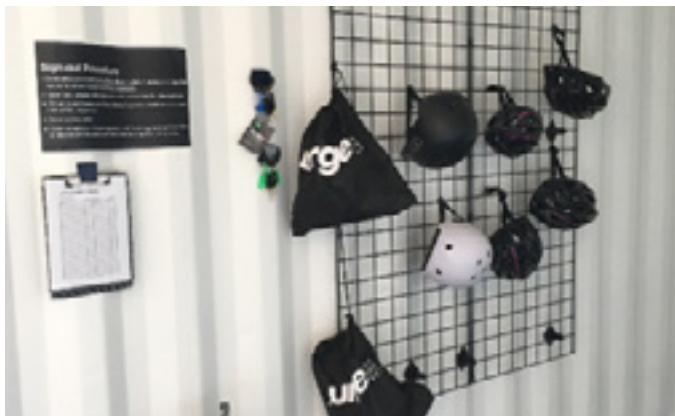


LUSH Cosmetics, the 2016 Smart Commute Toronto Employer of the Year Award recipient, was recognized for their outstanding support of sustainable travel through initiatives that include a bike share program with LUSH branded refurbished bikes, and a secure and covered employee bike parking facility made from a converted shipping container.

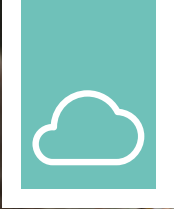
### Smart Commute Program

In partnership with Metrolinx, the City delivers Smart Commute Toronto, a program that engages businesses to promote sustainable commuting options such as carpooling, cycling and public transit, to their employees. By reducing single occupant vehicle trips and promoting sustainable alternatives, Smart Commute helps to improve air quality, reduce greenhouse gas emissions, and reduce congestion across transportation modes overall, particularly during peak periods. In 2016, Smart Commute Toronto partnered with 52 major employers at 91 work sites, representing over 265,000 commuters. LUSH Cosmetics, a Smart Commute Toronto client, was awarded the Smart Commute Toronto Employer of the Year Award in 2016 for their outstanding, proactive support of employees' sustainable travel which includes an employee bike share program, secure employee bike parking facilities, commuter competitions and subsidized transit passes for employees. In 2016, 79% of their employees commuted to work in sustainable ways.

Link: <http://smartcommute.ca/toronto-central>



Smart Commute played a role in transportation demand management across the Greater Toronto Area during the summer 2015 Pan Am and Parapan Am Games, the largest international multi-sport event ever held in Canada. The Games hosted 41 nations, over 12,000 athletes, coaches and officials, and 23,000 volunteers across the region. With the Athletes' Village and many of the competition facilities and celebration venues located in Toronto, transportation planning, communication and demand management were key to keeping the region moving.



### Green Taxis

Running 24 hours a day, seven days a week, the impact of taxicabs on local air quality is significant. Taxicabs contribute approximately 99,000 tonnes of greenhouse gas emissions in Toronto per year. In May 2014, Toronto became the first municipality in Canada to regulate both taxicabs' greenhouse gas emissions and air quality impacts. City Council directed all Toronto taxicabs to be 'green taxis'. When a taxi is replaced, the replacement vehicle must be an alternative fuel vehicle, hybrid vehicle, or vehicle that meets the City's definition of a low emission vehicle. More than 1,433 vehicles now meet the City's green taxi standard, up from 450 in 2014. Notably, 29% of green taxis are hybrid electric, which means they offer even greater improvements in fuel consumption and greenhouse gas emissions reductions when compared to alternative fuel and other green taxis. By 2021 all sedan taxicabs are expected to be green, which will reduce at least 20,000 tonnes of greenhouse gas emissions.

# Green Taxis 2014-2016

2014:



450

green taxis

2016:



1,433

green taxis



29%

of green taxis are hybrid electric

By 2021:



all sedan taxicabs are expected to be green, reducing at least

20,000

tonnes of GHG

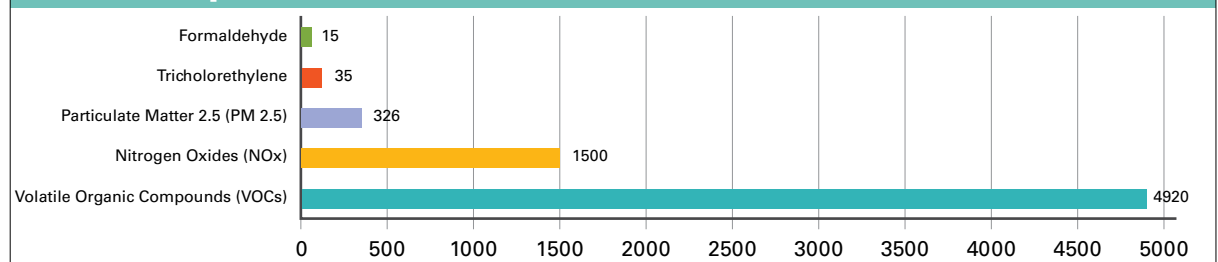


## ChemTRAC

Pollutants emitted from a variety of sources in and around an urban environment like Toronto can negatively affect air quality and health. ChemTRAC is a program developed by the City to better understand where priority chemicals come from and to encourage pollution prevention from local business and institutional sources. With the goal of protecting public health by reducing toxic chemicals in our environment, local facilities are required to track and report to the City their annual use and release of 25 priority substances commonly used and released into our environment at levels of concern for health. In 2016, 725 facilities reported on their 2015 operations: a total of 86,000 recorded tonnes of priority substances were manufactured, used or released, of which approximately 7,000 tonnes were released into the environment, primarily the air. Through ChemTRAC, the City also supports facilities with strategies to prevent pollution, and provides the public with information on the key chemicals in their community. The City is currently working with five business sectors to reduce their emissions of priority substances.

Link: <https://www.toronto.ca/community-people/health-wellness-care/health-programs-advice/chemtrac-chemical-tracking-in-industry/general-chemtrac-information>

## Top Five Substances Released into the Air, 2015



The three most released substances captured by ChemTRAC in 2015 were volatile organic compounds (VOCs), nitrogen oxides (NOx) and particulate matter 2.5 (PM<sub>2.5</sub>)\*. The 25 substances tracked by ChemTRAC are linked to short-term health effects such as respiratory problems. Prolonged exposure can lead to cancer and neurotoxicity. By requiring facilities to report, the City is able to work with businesses to find ways to prevent pollution, reduce releases, and monitor improvements.

\*For further information on VOCs, NOx and PM<sub>2.5</sub>, please refer to the Key Terms section of this report.

## Clean Roads to Clean Air Program

The Clean Roads to Clean Air Program promotes environmentally sustainable street sweeping technologies and evaluates the efficiency of sweepers in removing particulate matter from our roadways. Particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>) are tiny airborne particles that negatively impact air quality and human health. A major source of PM<sub>10</sub> and PM<sub>2.5</sub> is fine road dust, which results from the wearing down of asphalt, rubber tires, brake discs and brake pads of motor vehicles. The City's sweepers are capable of removing and containing over 90% of the fine road dust from road surfaces year-round, and can reduce airborne fine particulate matter at street level by at least 27% compared to conventional mechanical sweepers. In addition to improving air quality and human health, the reduction of fine road dust and silt in the storm sewer system improves water quality and lessens the cost of water treatment. In both 2013 and 2014, the City removed an average 15,791 tonnes of silt from the streets and about 450 tonnes of PM<sub>10</sub> and PM<sub>2.5</sub>.

Link: <https://www.toronto.ca/services-payments/streets-parking-transportation/road-maintenance/clean-roads-to-clean-air-program/>



## Energy

*With 53% of GHG emissions in Toronto associated with buildings, improving energy conservation and security while reducing energy use and greenhouse gas emissions is key.*



Despite a surge in population growth and new construction in the city, Toronto's overall electricity demand has been relatively flat, and natural gas consumption has substantively decreased over the past decade. Energy conservation, efficiencies, and industrial relocations have contributed to the decline. In some parts of the city, however, electricity demand is on the rise due to high density residential and commercial developments. New development presents the opportunity to develop and integrate energy solutions that support community-wide social, environmental, and economic objectives, particularly when energy is considered early in the design and development process for a building or neighbourhood.

Toronto's energy conservation and renewable generation targets, established in the *Climate Change Action Plan* (2007) and *The Power to Live Green* (2009), continue to be explored through current and emerging initiatives, including *TransformTO*, which, as a first step, proposes the expansion of existing energy efficiency programs that target existing buildings, and continual improvements to energy performance of new buildings and low-carbon community energy planning. More aggressive action in these two areas is anticipated to reduce GHG emissions by up to 480,000 tonnes and 110,000 tonnes respectively by 2020<sup>12</sup>. With 53% of GHG emissions in Toronto associated with buildings<sup>13</sup>, addressing energy conservation and security while reducing energy use and greenhouse gas emissions is key.

Sustainable site and building design requirements for new developments, and energy efficiency programs for existing properties have played a key role in our progress. Under the Toronto Green Standard, new buildings are required to achieve an energy improvement of at least 15% over the current Ontario Building Code, and all new City-owned buildings, such as community centres and recreational facilities, must generate at least 5% of total modeled building energy use from on-site renewable technologies, such as solar photovoltaic (PV) panels. Toronto's energy retrofit programs – the Better Buildings Partnership (BBP) and Tower Renewal – encourage energy efficiency projects by providing expertise and financial incentives to property owners.



## Awards

### **Sustainable Communities Award 2016 (Energy Program)**

#### – Federation of Canadian Municipalities

Toronto's Home Energy Loan Program (HELP) and High-Rise Retrofit Improvement Support Program (Hi-RIS) were both awarded the 2016 Sustainable Cities Energy Award by the Federation of Canadian Municipalities. The Award recognizes and promotes successful municipal programs that improve sustainability.

### **Minister's Award for Environmental Excellence 2015**

#### – Ontario Ministry of Environment and Climate Change

The Toronto Atmospheric Fund (TAF) and Toronto Community Housing Corporation (TCHC) were recognized for energy efficiency retrofits that reduced energy use and operating costs in seven TCHC buildings and improved occupant health and comfort.

*Toronto supports advancements towards an energy neutral, zero emission built environment. We continue to build a resilient grid by smartly distributing energy systems and advancing low-carbon and renewable energy networks.*

Efforts to improve energy consumption also exist at the neighbourhood level. Toronto's Official Plan requires an Energy Strategy to be submitted for large development proposals, and encourages the completion of Community Energy Plans in designated growth areas of the city, and a connection to district energy systems where feasible. In addition, new developments on public lands in the waterfront, one of the fastest growing areas in the city, must meet the Waterfront Toronto Minimum Green Building Requirements, which include a reduction in peak heating demand 65% less than Canada's Model National Energy Code for Buildings (1997). Opportunities to address energy conservation, infrastructure resilience, and efficient distribution are increasingly prioritized on an area basis.

Toronto supports advancements towards an energy neutral, zero emission built environment. We continue to build a resilient grid by smartly distributing energy systems and advancing low-carbon and renewable energy networks. In fact, more renewable energy has been installed in Toronto in the past two years (2015-2016) than in the previous eight years (2007-2014), thanks in part to rising interest and uptake, which has driven advancements in technology and decreased prices. With our strong policy foundation, innovative programs and solutions, and leadership in the community, Toronto is well positioned to reach its energy goals.

<sup>12</sup>City of Toronto (2016). [TransformTO: Climate Action for a Healthy, Equitable and Prosperous Toronto – Report #1](#)

<sup>13</sup>City of Toronto (2017). Toronto 2014 Global Protocol for Community-Scale Greenhouse Gas Emissions Inventory.



## Objective:

Significantly conserve energy, increase renewable energy generation, and efficiently distribute energy.

Goal	Measure	Progress
1. Reduce peak electricity demand against 2007 levels* by: <ul style="list-style-type: none"> <li>• 530 MW by 2012</li> <li>• 880 MW by 2020<sup>14</sup></li> </ul>	Peak summer electricity demand (Mega-watts (MW))	Decrease of 197 MW (2007-2016) <sup>15</sup>
2. Reduce natural gas consumption against 2007 levels* by: <ul style="list-style-type: none"> <li>• 240 Mm<sup>3</sup> by 2012</li> <li>• 730 Mm<sup>3</sup> by 2020<sup>16</sup></li> </ul>	Annual natural gas consumption (million cubic metres (Mm <sup>3</sup> ))	Reduction of 734 Mm <sup>3</sup> (2007-2016) <sup>17</sup>
3. Increase renewable energy generation capacity against 2007 levels* by: <ul style="list-style-type: none"> <li>• 120 MW by 2012<sup>18</sup></li> </ul>	Installed renewable energy generation capacity (MW)	8 MW of solar PV capacity installed on buildings in City of Toronto since 2007* <sup>19</sup>

\*2007 actual electricity demand and natural gas consumption

\*\*Photovoltaic (PV) Feed-in Tariff (FIT) program

<sup>14</sup>City of Toronto (2009). [The Power to Live Green: Sustainable Energy Strategy](#).

<sup>15</sup>Ontario Energy Board (2005-2015). Yearbook of Electricity Distributors 2005-2015. For the City of Toronto, the greatest peak electricity demand occurs in the summer months from the use of air conditioning. Various factors affect electricity demand, including weather and the efficiency of a building.

<sup>16</sup>City of Toronto (2009). [The Power to Live Green: Sustainable Energy Strategy](#).

<sup>17</sup>Enbridge Gas Distribution (2017). Special Request. Values reflect actual natural gas consumption between 2007-2016.

<sup>18</sup>City of Toronto (2009). [The Power to Live Green: Sustainable Energy Strategy](#).

<sup>19</sup>Toronto Hydro (2017). Special Request. Values reflect actual renewable energy capacity from photovoltaic (PV) Feed-in Tariff (FIT) program between 2007-2016.

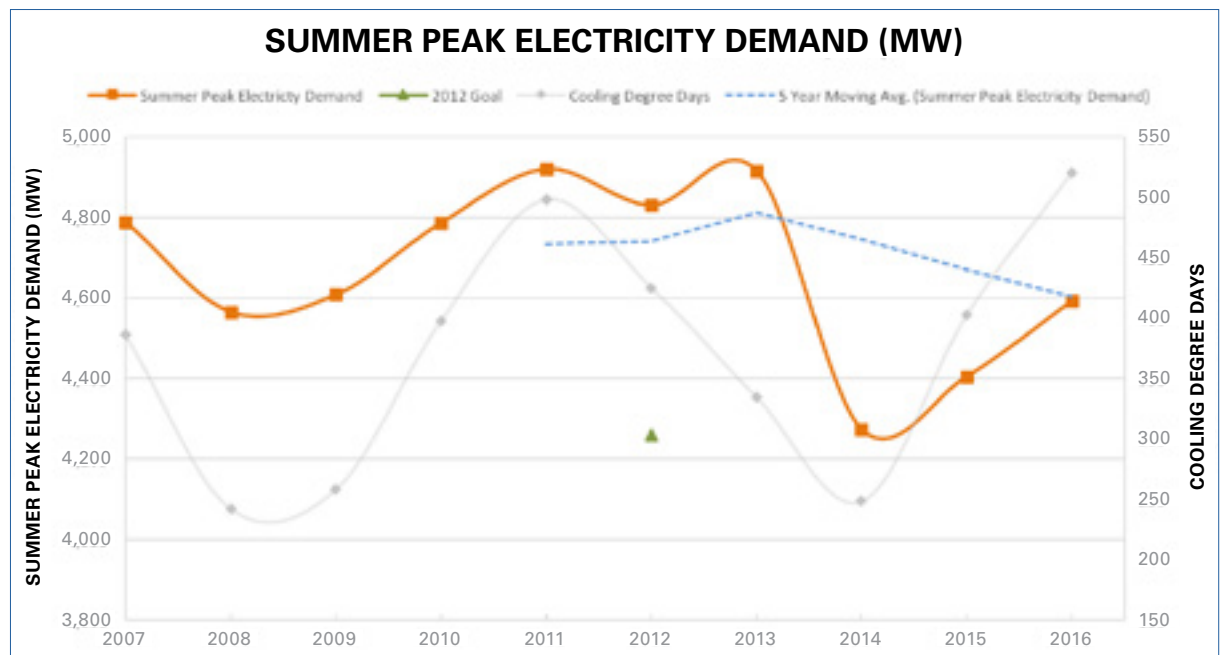




Overall electricity demand in Toronto has decreased primarily due to a decline in industrial activity and an increase in distributed (on-site) power generation. However, the decrease is counterbalanced by population growth and highly variable summer temperatures. Areas such as downtown Toronto and south Etobicoke are experiencing significant growth in multi-residential and commercial developments.

Peak electricity demand in Toronto stems from the use of air conditioning. Cooling degree days is a measurement to quantify the demand for energy needed to cool a building and suggests how temperature changes affect electricity demand.

Additional factors influence electricity demand over time, including more energy-efficient systems and appliances, better-insulated buildings, and behaviour change.



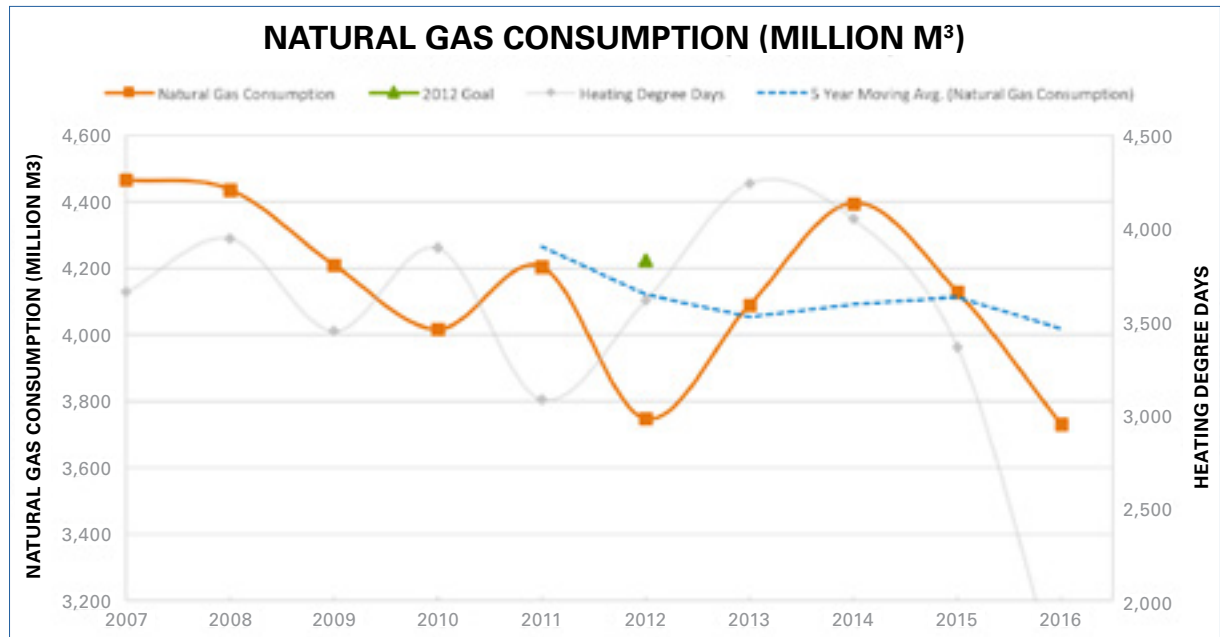
Sources:  
 Canada Weather Stats (2007-2016). Toronto Cooling Degree Days 2007-2016. Data courtesy of Environment and Climate Change Canada.  
 City of Toronto (2009). [The Power to Live Green: Sustainable Energy Strategy](#).  
 Ontario Energy Board (2007-2016). Yearbook of Electricity Distributors 2007-2016.



With financing from the City of Toronto, Exhibition Place (foreground) has implemented energy conservation and demand management measures in many of its buildings.

The overall decrease in natural gas consumption in Toronto is largely explained by declining industrial activity and energy efficiency gains through improved building standards and energy retrofits. Natural gas consumption is also highly dependent on population growth, building development and winter temperatures.

Heating degree days quantifies the demand for energy to heat a building and suggests how temperature changes affect natural gas consumption.



Sources:  
 Canada Weather Stats (2007-2016). Toronto Cooling Degree Days 2007-2016. Data courtesy of Environment and Climate Change Canada.  
 City of Toronto (2009). [The Power to Live Green: Sustainable Energy Strategy](#).  
 Enbridge Gas Distribution (2017). Special Request. Values reflect actual natural gas consumption between 2007-2016.



The Toronto Green Standard will be updated in 2017 to include four tiers – one mandatory tier for all development going through the planning process, and three higher level tiers containing voluntary standards associated with financial incentives once verified post construction.”

## Achievements

### Toronto Green Standard - Energy Efficiency Requirements

The Toronto Green Standard (TGS) is a two-tier set of performance measures for sustainable site and building design. Greening new development helps to reduce future infrastructure demands and environmental impacts, making for a healthier, more livable city.

The TGS integrates environmental performance requirements in the early stages of development planning to improve air and water quality, reduce greenhouse gas emissions, curtail solid waste from the landfill, and enhance urban ecology. Tier 1 is required for all new construction in Toronto, and Tier 2 is a higher, voluntary level of performance with a financial incentive.

Since 2010, the TGS has been applied to over 1,200 new developments across the city, with 16 projects certified as Tier 2 as of 2016. It is estimated that implementation of the TGS energy efficiency requirements will result in an estimated 115,205 tonnes of avoided greenhouse gas emissions between 2010 and 2016 once all the projects are completed. In 2014, the TGS was updated with new Minimum Energy Performance criteria that require new developments be more energy efficient than the current Ontario Building Code (OBC).

Design and construction of Tier 1 buildings now must exceed the energy efficiency requirements of the OBC by at least 15%, and Tier 2 by at least 25%. In 2016 alone, 197 new development applications were required to comply with the TGS, and six construction projects became Tier 2 certified.

Link: <https://www.toronto.ca/city-government/planning-development/official-plan-guidelines/toronto-green-standard/>



Toronto's Home Energy Loan Program has yielded annual natural gas savings of 204,000m<sup>3</sup>, annual electricity savings of 158,230 kWh, annual greenhouse gas savings of 395 tonnes CO<sub>2</sub>e, annual utility cost savings of \$81,735, and has stimulated 30 person years of employment.

### Home Energy Loan Program

Through the Home Energy Loan Program (HELP), the City provided low-interest loans, as a local improvement charge (LIC), to homeowners who wish to undertake home energy retrofits. Eligible improvements include energy efficient furnaces and air conditioners, windows, doors and insulation. A more energy efficient home requires less energy for heating and cooling, which translates into energy bill savings, increased home comfort and reduced greenhouse gas emissions. From its inception in 2014 to 2016-year end, HELP has:

- facilitated 125 home retrofit projects
- disbursed over \$2.1 million in loans, an average of \$15,800 per home.

Completed retrofit projects have saved homeowners an average of 34% in natural gas bills, and 12% in electricity bills, which equals \$560 saved per year per home.

Link: <https://www.toronto.ca/services-payments/water-environment/environmental-grants-incentives-2/home-energy-loan-program-help/>

### Energy Efficiency Retrofits in Toronto Community Housing Buildings

About half of Toronto's greenhouse gas emissions are associated with buildings, so accelerating energy efficiency is important. In September 2015, the Toronto Atmospheric Fund (TAF) and (TCHC) announced a joint project to retrofit more than 1,200 households across seven TCHC buildings. The buildings, an average of 45 years old, needed component replacements and energy efficiency upgrades.

Delivered through TAF's residential high-rise retrofit program, TowerWise, this \$4.2 million investment allows TCHC to accelerate high-impact upgrades to improve energy performance, lower operating costs, and ultimately better the living conditions and comfort of residents. Retrofit upgrades include low-flow faucets and toilets, boilers, motors and lighting. Construction began in January 2016, and when complete, is projected to reduce greenhouse gas emissions by 30% and utility costs by 20%. The savings will support Toronto Community Housing's capital repair plan, which will create significant economic, environmental and social benefits for its residents and the entire city.

With the goal of improving air quality and indoor comfort, TAF and the University of Toronto began a joint study to evaluate indoor conditions of the seven TCHC buildings before and after construction. The findings will inform future retrofit designs of multi-residential buildings that seek to maximize energy and water conservation, greenhouse gas reductions and improve resident comfort. The research, the first of its kind in Canada, involves installing cutting-edge environmental monitoring equipment in 75 homes.

Link: <https://www.torontohousing.ca/Pages/TowerWise-Retrofit-Project.aspx>



Toronto Hydro executives present a one-time incentive cheque for \$1.62 million to Toronto Water and York Region for the Transmission Operation Optimizer program.

### Water Transmission Energy Efficiency (Transmission Operations Optimizer)

Toronto’s water treatment and supply system services 3.6 million people and consists of four water treatment plants, 18 water pumping stations, 126 pumps, 11 reservoirs and 4 elevated storage tanks. The Transmission Operations Optimizer (TOO) initiative was launched in late 2015 in an effort to minimize energy use and costs for pumping. The project combines load shifting and energy efficiency techniques to deliver financial, energy and environmental benefits and improve the overall efficiency and resilience of the system, even during unplanned downtime and demand variations.

Toronto Hydro estimates the project saves approximately 16.3 GWh of electricity and reduces greenhouse gas emissions by 1,256 tonnes CO<sub>2</sub>e on an annual basis. The estimated annual savings for Toronto Water is approximately \$0.7 million to \$1.0 million per year.

### Community Energy Planning

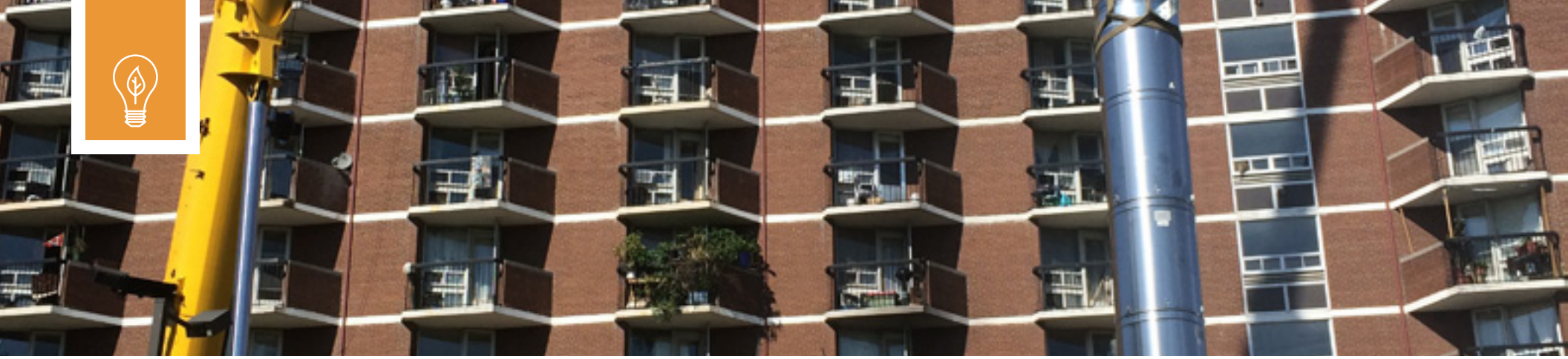
Managing Toronto’s rapid growth requires a plan to address increasing demand for energy and related greenhouse gas emissions, impacts on infrastructure, and vulnerability during power outages. Community Energy Planning (CEP) addresses these challenges by calculating potential energy use and emissions of an area early in the land use and infrastructure planning process. CEP identifies opportunities to reduce energy demand and integrate low-carbon local energy solutions at a neighbourhood-scale. Initiatives include energy conservation, peak demand reduction, district energy systems, backup power and on-site generation of power, including the use of renewable energies.

As of 2015, Toronto’s Official Plan requires an Energy Strategy to be prepared for large development proposals, and developments within a Community Energy Plan area. In 2016, construction of the Exhibition Place district energy system was completed, and the City published *The Minimum Backup Power Guidelines for Multi-Unit Residential Buildings* to improve building resilience and residents’ safety and comfort during power outages and emergencies.

Link: <https://www.toronto.ca/services-payments/water-environment/environmentally-friendly-city-initiatives/community-energy-planning/>



Photo: Key focus areas of Community Energy Planning are growth, climate change, resilience and the economy.

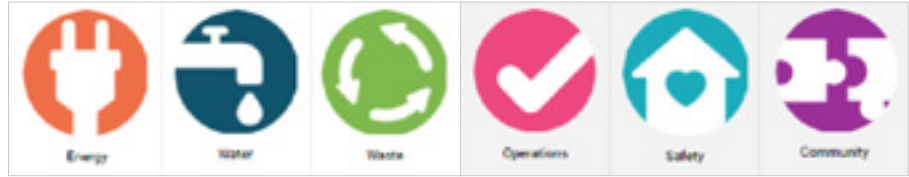


### Tower Renewal: Sustainable Towers Engaging People (STEP) Program and High-rise Retrofit Improvement Support (Hi-RIS)

More than 1,000 concrete residential apartment towers, built across Toronto between 1945 and 1984, house over 500,000 residents – about 20% of Toronto’s population. Through the City of Toronto’s Tower Renewal program, the High-rise Retrofit Improvement Support (Hi-RIS) and Sustainable Towers Engaging People (STEP) programs offer expertise and financial assistance to spur energy efficiency measures that will reduce operating costs and greenhouse gas emissions, and improve residents’ quality of life.

Since Hi-RIS began in 2014, \$4.2 million in funding has been awarded, including \$387,000 for projects in two Neighbourhood Improvement Areas. In 2015 and 2016, \$3.3 million worth of projects were completed, benefiting residents of 800 apartment units. On average, each awarded project has a value of \$833,000, and yields an energy savings of 19%, and reduction of 1,700 tonnes of GHG emissions annually.

Link: <https://www.toronto.ca/community-people/community-partners/apartment-building-operators/hi-ris/>



7 and 11 Arleta Avenue, 710 and 720 Trethewey Drive and Robert J. Smith apartments on Kendleton Drive. Through TAF’s TowerWise project all sites received energy efficient upgrades to lighting systems, new low-flow toilets, heating, hot water and ventilation systems.



STEP works with property owners and managers to identify opportunities for building improvements across six key areas – energy, water, waste, safety, operations, and the community.

Hi-RIS offers low-interest financing to multi-unit residential building owners and managers to support energy efficiency and water conservation improvements.

Since 2010, over 250 buildings across Toronto have requested energy, water and waste performance benchmarking through STEP, and over 140 of those received detailed site assessment reports with recommendations for building improvements to lower costs and increase tenant satisfaction. Of these, 56 buildings totalling over 11,400 residential units made voluntary improvements and were reassessed.

## In 2016 alone, the buildings saved:



**235,062,401 kWh**  
of electricity



**8.15 billion**  
litres of water  
(3,260 Olympic-sized swimming pools)



**141,538,727 ekWh**  
of natural gas



reduced/diverted  
**389,780 m<sup>3</sup>**  
of solid waste



avoided  
**37,700 tonnes**  
of annual greenhouse  
gas emissions

STEP was updated in 2016 to emphasize best practices such as resilience planning and enhanced resident engagement.

Link:

<https://www.toronto.ca/community-people/community-partners/apartment-building-operators/sustainability-assessments/how-does-step-work/>



## Green Space & Urban Agriculture

### **Award of Excellence and Innovation 2015 – Parks and Recreation Ontario**

Franklin's Pollination Station and Teaching Garden, at Toronto Island Park, explains the role of pollinators and offers a path to explore the sights and smells of pollinating plants, received an award for its exceptional design and educational value.

*Toronto is home to more than 8,000 hectares of designated parkland that includes over 1,500 parks and 600 kilometres of trails.*

Often referred to as a city within a park, Toronto is home to more than 8,000 hectares of designated parkland. Consisting of more than 1,500 parks and 600 kilometres of trails, this parkland covers about 13% of the city's total area. Most residents live within 500 metres, or a five to 10-minute walk, of these parkland spaces.

Toronto's greenery includes our urban forest, ravine system, natural features, gardens and streetscapes. Green spaces offer a broad range of social, economic and environmental benefits, and help to make our city an attractive place to live, work and play. Green space also provides outdoor leisure and recreational opportunities, encourages active lifestyles, and provides habitat for species to thrive.

Toronto's urban forest is comprised of 10.2 million trees that provide the equivalent of over \$28.2 million in ecological services each year, including the removal of 1,905 tonnes of air pollution, is valued at \$16.9 million per year<sup>20</sup>. The *Green City: Why Nature Matters to Health* (2015) report highlights the significant mental and physical health benefits of green space, which include increased happiness, cognitive restoration, social connectivity, physical activity, improved air quality, heat and humidity regulation, a reduction in cardiovascular disease and overall morbidity and mortality.

In 2013, City Council approved the first *Strategic Forest Management Plan (2012-2022): Sustaining and Expanding the Urban Forest*. The Plan highlights six strategic goals to protect and improve the urban forest, including the goal to expand tree canopy cover to 40%, achieve equitable distribution of canopy cover, and increase biodiversity in Toronto. Multiple strategies and programs work together to advance environmental sustainability, increase awareness and connect people with Toronto's lush green spaces.





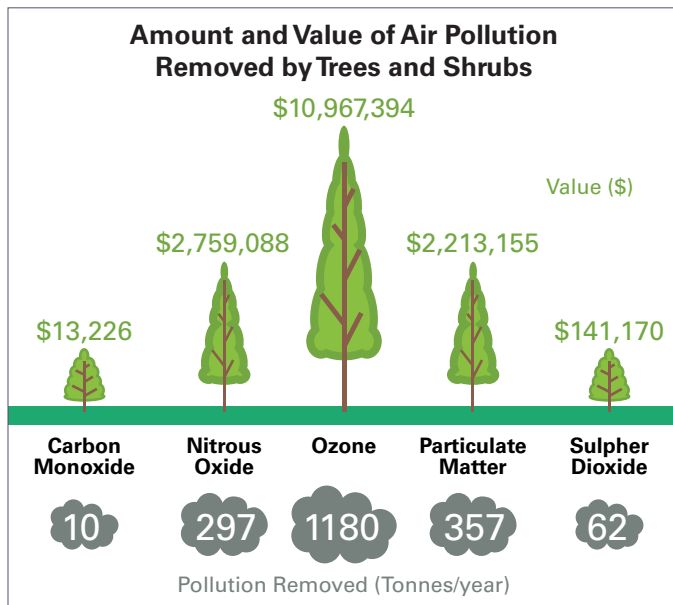
*Toronto's urban forest is comprised of 10.2 million trees that provide the equivalent of over \$28.2 million in ecological services each year.*

A small but significant contributor to the overall urban forest is the 600,000 trees found along city streets. Street tree health has improved from 49% in 2011 to 64% in 2016 despite difficult growing conditions. This improvement is the result of a proactive maintenance program and the removal of trees in poor condition.

With 60% of existing trees, and the most future tree planting potential located on private property, City Council approved the development of a tree planting strategy in 2016. The strategy, to be released in 2018, will focus on tree planting and stewardship efforts to increase tree planting on private property. The City is also developing the *Parkland Strategy*, a long-term plan to address current and future parkland needs of an evolving Toronto.

Interest in urban agriculture, environmental stewardship and urban food production has increased in recent years. Recognizing their many economic and social development benefits, the City supports the expansion of community gardens and programs. Documents such as the *Community Garden Action Plan* (1999), *GrowTO: An Urban Agriculture Action Plan* (2012), and *Cultivating Food Connections: Toward a Healthy and Sustainable Food System* (2010) promote local food production and security, and provide growers with greater access to land. By year-end 2016, Toronto had 73 community gardens and 5,500 garden volunteers tending 219,000 square feet of space, with 131,000 square feet producing up to 788,400 pounds of food annually.

More than ever the natural environment is recognized for its important role in ecological health and sustainable city building. Low impact development techniques that mimic the natural environment are increasingly integrated to achieve concurrent benefits in our urban environment, such as better stormwater management, health benefits, and reduced urban heat, energy consumption and greenhouse gas emissions.



Sources:  
 City of Toronto (2012). [Assessing Urban Forest Effects and Values: Toronto's Urban Forest](#).  
 City of Toronto (2013). [Every Tree Counts: A Portrait of Toronto's Urban Forest](#).



Riverdale Park



High Park

**Objective:** Sustaining, restoring and enhancing the health and integrity of the natural ecosystem, supporting biodiversity in the city, and targeting ecological improvements.

Goal	Measure	Progress
1. Expand tree canopy cover to 40%	Canopy cover percentage	26.6-28% (2009) <sup>21</sup> Next canopy assessment will be in 2018
2. Plant 57,000 to 114,000 trees on public land annually <sup>22</sup>	Annual tree planting	113,510 trees planted on public land (2016) <sup>23</sup>
3. Achieve tree health of over 70% in excellent or good condition <sup>24</sup>	Street tree condition rating	64% in excellent or good condition (2016) <sup>25</sup>
4. Establish one community garden in each ward by the end of 2001 <sup>26</sup>	Community garden in each ward	73 gardens in 32 wards (2016) <sup>27</sup>

<sup>21</sup> City of Toronto (2013). [Every Tree Counts: A Portrait of Toronto's Urban Forest.](#)



Rouge National Urban Park

## WHY NATURE MATTERS TO HEALTH

an evidence review by Toronto Public Health

**Increased green space:**

- Promotes healthier births
- Reduces all-cause mortality
- Decreases stress
- Promotes healthier weights
- Improves cognitive function
- Enhances community ties

**Children and low-income groups benefit the most**

Green space that is poorly maintained or perceived as unsafe increases stress and negatively impacts health and wellbeing

**Features that promote health benefits:**

- Diversity of plants; large trees and grass
- Perceived cleanliness and safety
- Water features
- Proximity to residents and density of green space
- Play structures and community gardens

**TORONTO** toronto.ca/trees Call **311**

## Achievements

### Tree Planting and Maintenance

Trees provide a multitude of environmental, social and economic benefits and play a key role in creating healthy environments. Toronto has 10.2 million trees that provide the equivalent of more than \$28.2 million dollars in ecological services per year and has a combined structural value of \$7.1 billion, equivalent to \$700 per tree<sup>28</sup>.

To ensure its sustainability and to preserve ecological functions, the City has set a goal of achieving 40% tree canopy cover. With more than half of Toronto's land privately owned and 60% of existing trees located on private lands, partnering with stakeholders and private land owners is essential to maintaining and growing the urban forest.

In 2016, City Council adopted two reports *Growing Toronto's Tree Canopy and Strategy to Expand the City's Tree Canopy on Private Lands* as part of the development of a tree planting strategy to encourage tree planting and stewardship on private property. The strategy, ready in 2018, will focus on promotion, education, training and tree planting support programs for residential homeowners as well as industrial, commercial and institutional landowners.

<sup>22</sup> City of Toronto (2013). <https://www.toronto.ca/data/parks/pdf/trees/sustaining-expanding-urban-forest-management-plan.pdf>.

<sup>23</sup> City of Toronto (2017). Special Request.

<sup>24</sup> City of Toronto (2013). <https://www.toronto.ca/data/parks/pdf/trees/sustaining-expanding-urban-forest-management-plan.pdf>.

<sup>25</sup> City of Toronto (2017). Special Request (TMMS Existing Condition report Feb 6, 2018). (street tree condition rating)

<sup>26</sup> City of Toronto (1999). [Community Garden Action Plan](#).

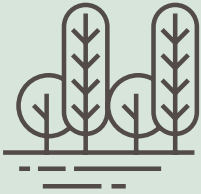
<sup>27</sup> City of Toronto (2017). Special Request.

<sup>28</sup> Valuation of ecological services includes an estimate for air pollution removal, energy savings, avoided carbon related to energy conserved and carbon sequestered. The total value of ecological services would be much higher if the value of stormwater management, climate resilience, biodiversity, pollination and habitat protection, human health benefits, personal enjoyment and other difficult to monetize factors were included.



# Toronto Urban Forest Benefits

**10.2**  
million trees



Structural value of  
**\$7.1** million,  
\$700/tree



Ecological services  
of **\$28.2**  
million each year

(air pollution removal, reduced energy consumption, and avoided carbon from energy conserved and carbon sequestered)



**1.1** million tonnes  
of carbon stored, equivalent  
to annual carbon emissions of  
733,000 automobiles

**46,700**

tonnes of carbon  
sequestered per year,  
valued at **\$1.1 million/year**



**1,905**

tonnes of air pollutants  
intercepted annually, valued  
at **\$16.9 million/year**

**Enhance biodiversity**  
(plants and animal species)



**Stormwater  
Management**



**Support  
pollinators**



**41,2000**

Mwh reduction in energy  
needed to heat/cool  
residential buildings, valued  
at **\$10.2million/year**



**Enhance resilience**  
(climate change  
adaptation / mitigation,  
reduce flash flooding)



**Protect and create  
pollinator habitat  
protection/food sources**



**Human health benefits**  
(improved air quality, shade,  
perceived cleanliness and  
safety, increased property  
value, decreased stress)



Through the Urban Garden Initiative approximately 2,600 children help to plant and harvest vegetables.

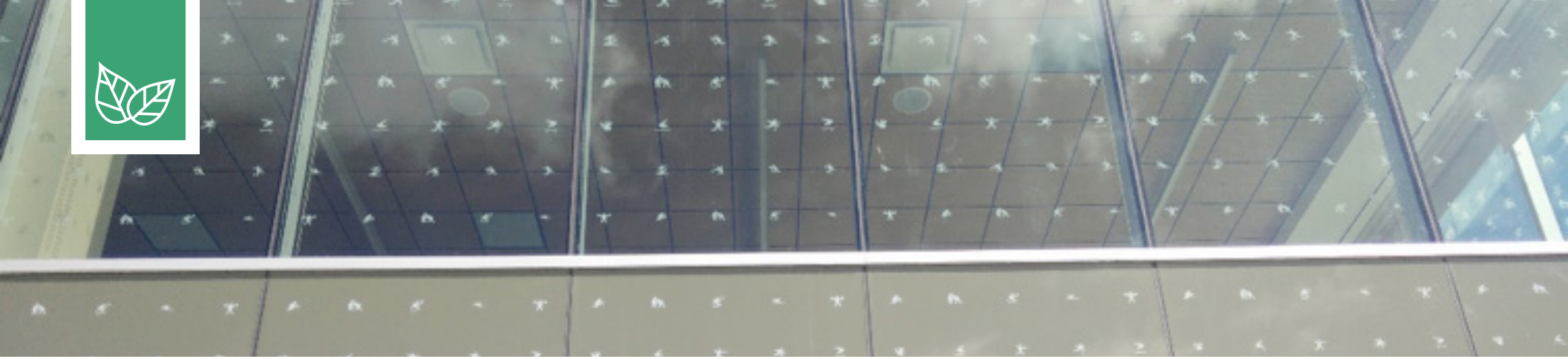
### **Tree Planting in Celebration of National Tree Day**

The City of Toronto celebrated National Tree Day on September 21, 2016 with members of the community and representatives from Tree Canada, Earth Day Canada, Amarak Corporation and Telus. Over 50 volunteers planted more than 75 trees and shrubs at Eglinton Flats. National Tree Day, which occurs during National Forest Week in September, recognizes the impact trees have on community health and well-being. When mature, the trees can intercept as much as 702,700 litres of stormwater and produce enough oxygen for over 150 people per year.

### **Vegetable Gardens at Child Care Centres**

In 2016, children at all 52 child care centres operated by the City planted, grew, harvested and cooked their own vegetables in an endeavour to reduce the carbon footprint associated with food procurement and to support local growers and distributors. This provided an opportunity to teach children about nutrition and health.

Under the Urban Garden Initiative, which began in partnership with Holland Marsh Growers Association in 2016, approximately 2,660 children enrolled at all Toronto Early Learning Child Care Centres and Toronto Home Child Care providers, planted 3,120 seeds of carrots, green beans, lettuce, beets, onions, and tomatoes. The children helped to tend the crops, harvest the vegetables, and prepare healthy meals.



The City's *Bird-Friendly Best Practices for Glass* help to reduce bird collisions and mortality. Photo Source: Karen Jiang

## Bird-Friendly Developments

Many of North America's migratory bird species are in decline. Habitat loss, pesticide use and climate change are all contributing factors. In urban cities, collisions with buildings are an additional concern. Birds fly into buildings after being attracted by the reflection of the sky or trees in windows. In the evenings, birds collide with buildings because they are attracted by the lights inside.

An estimated one million birds die each year in Toronto from collisions with buildings. To address this issue, the City published the [Bird-Friendly Development Guidelines](#) in 2007, a set of design strategies for new and existing buildings, and dedicated a section of the Toronto Green Standard to deterring bird collisions and mortality in new developments.

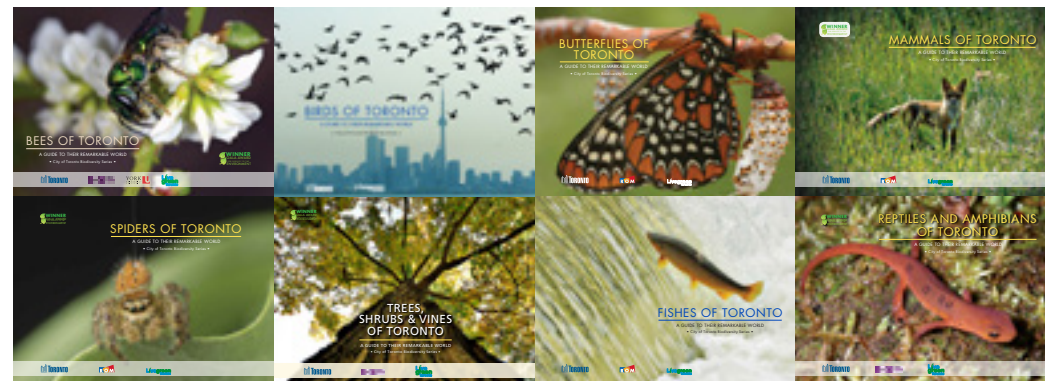
Released in 2016, the [Bird-Friendly Best Practices for Glass](#) updates the 2007 Guidelines and provides key recommendations for architects, developers and building managers to reduce light pollution and improve glass treatments.

## Biodiversity Booklet Series

The Biodiversity Booklets feature the non-human residents of Toronto in a series of visually engaging books. The booklets help raise awareness of Toronto's diverse species, reconnect people with the natural world, and cultivate a sense of stewardship in residents. Created in partnership with professional organizations, more than 100 subject-matter expert volunteers dedicated their time, passion and expertise to develop the books, which provide an inventory of local species and tell the tale of the current state of biodiversity in the city. They also help to inform and enhance policy development to mitigate biodiversity loss.

In 2016, three additional books were published: *Mushrooms of Toronto*, *Bees of Toronto*, and *Trees, Shrubs & Vines of Toronto*, which increased the number of books in the series to nine. As of 2016, 120,000 copies of the books have been distributed to the City's 100 library branches. The booklets are also used by the Toronto District School Board in their science and technology curriculum and Eco-Schools program.

Link: <https://www.toronto.ca/explore-enjoy/parks-gardens-beaches/ravines-natural-parklands/biodiversity-in-the-city-2>



The Biodiversity Booklet Series was created in partnership with expert organizations, including the Biodiversity Institute of Ontario, Ontario Nature, Royal Ontario Museum, Toronto and Region Conservation Authority, Toronto Field Naturalists, Toronto Wildlife Centre and York University.



Photo: The Gatineau-Hydro Corridor Revitalization  
Source: TRCA

### The Gatineau-Hydro Corridor Revitalization.

Native plants are vital to creating a natural, sustainable landscape because they provide food and shelter for native insects and wildlife. The Gatineau Hydro Corridor Revitalization aims to transform over 500 acres of underutilized and barren land into a native wildflower and pollinator meadow complete with a multi-use trail system and urban agriculture opportunities. The goal is to create a continuous naturalized corridor from Downtown Toronto, across the Lower Don River Trail, to Rouge National Urban Park. The project is being developed by Toronto Region and Conservation Authority (TRCA) in partnership with the City of Toronto and with philanthropic partner The W. Garfield Weston Foundation. Thanks to the support of local residents, school groups and conservation experts, there are now hundreds of thousands of wildflowers and shrubs in almost 80 acres of naturalized meadow, fostering native wildflowers such as black-eyed susans, colombines, blanket flowers and native grasses.



A mural at Bloor Street West and Howland Avenue was unveiled in June 2016 to celebrate National Pollinator Week, and the City's affiliation with Bee City Canada. The Green Sweat Bee – one of Toronto's native pollinators – is featured in the mural.

### Recipe for Community

Led by the Toronto Foundation and the City of Toronto, the Recipe for Community program creates partnerships and engages with public and private sector groups and local residents to invest in the community. It brings together four crucial community ingredients – community engagement and capacity building, food, community gathering, and beautification of shared neighbourhood spaces – to create new opportunities and foster a sense of belonging and pride in the neighbourhood. At the heart of the program is a priority to ensure local residents are involved in both the planning and delivery of project activities. Recipe for Community has worked in Alexandra Park, St. James Town and Weston-Mount Dennis, and in 2015 and 2016, Scarborough Village and Rexdale neighbourhoods were the focus. Activities include gardening workshops, vegetable planting days, food nutrition training, resident leadership events and employment and skill-building programs. In 2016, over 1,350 community members were engaged, and 245 community members received training and certification in areas such as food nutrition, food handling, small business management, and emergency first aid/CPR. Five new community gardens were created, and six existing areas were revitalized as community green spaces.

Link: <https://www.toronto.ca/business-economy/partnerships-sponsorships-donations/partner-2/community-programs/recipe-for-community/>



### Children's Eco Programs Expansion

Since 2001, Children's Eco Programs have provided hands-on opportunities for children and youth to discover the wonders of Toronto's parks and gardens and learn about the importance of ecological, physical and community wellbeing. Offerings include curriculum-based school programs, seasonal Eco Camps, food and nutrition courses, gardening sessions, and hikes along trails and Discovery Walks. In response to Torontonians' growing demand and the City's goal of increasing the use, enjoyment and public stewardship of parks and ravines, the program has expanded its offerings and locations.

As of 2016, Children's Eco Programs were hosted at 25 Community Recreation Centres and had supported 20 vegetable gardens across the city. Over 115 Parks, Forestry and Recreation staff were trained to teach children about nature and gardening, and over 160 community volunteers were engaged annually through the gardening program.

In 2016, the Franklin Children's Garden, on Toronto Island Park, welcomed close to 40,000 visitors from June to September. Thanks to the Franklin the Turtle Mascot, in partnership with the Toronto Public Library's Storytime Program, over 600 children received Discovery Backpacks and materials for self-guided nature tours around Franklin's Pollinator Station, including a booklet, magnifier, and binoculars.

Since 2001, Children's Eco Programs have provided hands-on opportunities for children and youth to discover the wonders of Toronto's parks and gardens. Offerings include curriculum-based school programs, spring/ summer/ winter break Eco Camps, food and nutrition courses, gardening sessions, and hikes along trails and Discovery Walks.

Link: <https://www.toronto.ca/explore-enjoy/recreation/nature-and-eco-programs/>





### Developing a Ravine Strategy

Toronto's ravines provide many important ecological services and recreation opportunities. They play a key role in flood control and stormwater management, provide passage for wildlife, and account for 87% of Toronto's Environmentally Significant Areas. Ravines are also a fragile resource. With population growth, new development, and climate change putting increased pressure on ravines, a plan to guide their future use, management, enhancement and protection is critical. Since early 2015, the City of Toronto and the Toronto and Region Conservation, in consultation with the public and a wide range of stakeholders, have been working to develop the Toronto Ravine Strategy, the first ever comprehensive strategy focused solely on Toronto's ravines. The Draft Strategy, published in June 2016, sets out a vision and a set of principles to guide policies, investments and stewardship of ravines. It also contains 21 high-level recommendations for future decision-making related to ravines. The final strategy will also include a plan for establishing and monitoring ecosystem health indicators and public school education opportunities.

Link: <https://www.toronto.ca/city-government/accountability-operations-customer-service/long-term-vision-plans-and-strategies/parks-forestry-recreation/ravine-strategy>





## Sustainable Transportation



Transportation choices greatly influence human and environmental health. In Toronto, road vehicles are responsible for approximately one-third of GHG emissions<sup>29</sup> and 80% of locally-generated air pollutants and emissions<sup>30</sup>, and contribute to half of air quality-related hospitalizations and premature deaths each year in the city<sup>31</sup>. Toronto's Official Plan includes mandates to reduce auto dependency, improve air quality, and provide an integrated, accessible multi-modal transportation system for all users.

Toronto coordinates growth around the existing transportation network to make sustainable, low-carbon transportation options – such as public transit, cycling, and walking – readily available. Between 2012 and 2016, 81% of new residential developments were proposed in areas targeted for growth by the City's Official Plan<sup>32</sup>, concentrating jobs, housing and services in areas with readily available sustainable transportation options.

The City's TransformTO initiative, Secondary Plans, and Toronto Green Standard all support sustainable transportation options. Respectively, they identify modal split targets, and require new developments to provide infrastructure for electric vehicles, pedestrians, and cyclists. In addition, the *Toronto Pedestrian Charter* (2002), *Toronto Walking Strategy* (2009), *Toronto Bike Plan* (2001), *Active City* (2014) and *Ten Year Cycling Network Plan* (2016) identify principles and recommendations to improve active commuting, such as walking and cycling, improve health, and reduce auto use, particularly single-occupant vehicles.

<sup>29</sup> City of Toronto (2017). Toronto 2014 Global Protocol for Community-Scale Greenhouse Gas Emissions Inventory.

<sup>30</sup> City of Toronto (2014). [Toronto 2012 Greenhouse Gas and Air Quality Pollutant Emissions Inventory](#).

<sup>31</sup> Toronto Public Health (2014). [Path to Healthier Air: Toronto Air Pollution Burden of Illness Update](#).

<sup>32</sup> City of Toronto. [2016 How Does the City Grow?](#)



*Between 2012 and 2016, 81% of new residential developments were proposed in areas targeted for growth by the City's Official Plan, concentrating jobs, housing and services in areas with readily available sustainable transportation options.*

As of 2011, nearly half of the trips to work made by Torontonians were predominantly by sustainable modes on a regular basis – 46% overall<sup>33</sup>. Over the course of a 24-hour period, in 2011, sustainable transportation accounted for 34% of all trips, 44% of trips to work, and 80% of trips to school in 2011<sup>34</sup>. Between 2001 and 2011, active commuting increased for trips to work, but decreased for trips to school. Creating and maintaining a culture of healthy, physically active, low-carbon lifestyles is important, particularly for our youth.

Growth and sustainability of Toronto is tied to the city's transportation network, the viability of which is crucial to supporting the travel needs of an increasing number of residents and workers, and reducing any negative impacts of commuting. Investments in key transportation infrastructure and programs, including federal and provincial support for public transit, are pivotal. Moving forward, the City will continue to focus on providing a well-connected multi-modal system that supports a low-carbon, healthy future.

<sup>33</sup> Statistics Canada (2001, 2011). Census of Population 2001, and National Household Survey 2011. Data from Census and National Household Survey provides information about modes of transportation taken to work for all household members aged 15 and over. The breakdown of sustainable transportation modes taken by respondents include Public Transit, Walking, and Bicycling. Trips tabulated account for city of Toronto residents only. This information reflects the data available at time of publication of this report.

<sup>34</sup> Transportation Tomorrow Survey (2001, 2006, 2011). Transportation Tomorrow Survey data provides information about modes of transportation taken for all-purpose trips, trips to work, and trips to school for household members aged 11 and over. The type of sustainable transportation modes taken by respondents include the following categories: Active Commuting, Public Transit, and School Bus. Trips tabulated account for city of Toronto residents only. This information reflects the data available at time of publication of this report.



## Objective: A multi-modal transportation system that meets the needs of all users.

Goal	Measure*	Progress
1. Double bicycle trips as percentage of all trips by 2011 (2001 baseline) <sup>35</sup>	Percentage change in bicycle trips to work	69% increase from 2001 to 2011 <sup>36</sup>
2. Expand the bikeway network with an additional 525 centreline kilometres by 2025, consisting of: <ul style="list-style-type: none"> <li>• 280 centreline km of bike lanes or cycle tracks on fast, busy streets;</li> <li>• 55 centreline km of sidewalk-level boulevard trails (multi-use trails) on fast busy streets;</li> <li>• 190 centreline km of cycling routes along quiet streets<sup>37</sup></li> </ul>	Lane kilometres	As of the end of 2016, the network included: <ul style="list-style-type: none"> <li>• 26 lane km of cycle tracks</li> <li>• 211 lane km of bike lanes</li> <li>• 9 lane km of yellow “contra-flow” bicycle lanes</li> <li>• 300 lane km of sharrows and signed routes</li> </ul>
3. Expand the existing multi-use trails by 77 centreline km by 2021 from 2012 (for a total of 363 centreline km):	Centreline kilometres	273 centreline km of multi-use trails as of the end of 2016 <sup>39</sup>

\*Note: Lane km (measuring both travel directions) are used for on-street infrastructure to account for routes with different infrastructure on either side of the road or one-way streets. Centreline km (measuring the length of the road in one direction) is used for multi-use trails since they are typically two-way.

<sup>35</sup> City of Toronto (2001). [Toronto Bike Plan: Shifting Gears](#).

<sup>36</sup> Statistics Canada (2001, 2011). Census of Population 2001 and National Household Survey 2011.

<sup>37</sup> City of Toronto (2016). [10 Year Cycling Network Plan](#)

<sup>38</sup> City of Toronto (2012). [Bikeway Trails Implementation Plan](#)

<sup>39</sup> City of Toronto (2016). [10 Year Cycling Network Plan](#).



## Mode of Travel to Work (Toronto Census Metropolitan Area)

Year	Total Number of Trips	Total Sustainable Transportation	Public Transit	Carpooling	Total Active Transportation	Walking	Cycling
2016	2,747,050	42.5%	24.3%	11.6%	6.7%	5.2%	1.4%
2011	2,582,780	39.9%	23.3%	10.8%	5.8%	4.6%	1.2%
2006	2,433,060	43%	22.2%	15.0%	5.8%	4.8%	1.0%



## Cycling Network Totals, 2016

# Status of the Cycling Network

(December 2016)

On-Street Cycling infrastructure	(Lane kilometers)
Cycle Tracks	26
White bicycle lanes	211
Yellow 'contra-flow' bicycle lanes	9
Sharrows and Signed Routes	300
<b>On-Street Total</b>	<b>546</b>

Note: the City of Toronto has an additional 18.5 km of sharrows on arterial roads. Arterial Sharrows are not considered to be a Cycling Network facility type.

Multi-use Trails	(centerline kilometers)
Off road Trails, including Rail Trails, Hydro Corridor Trails, Boulevard Trails and Major parks Trails	300*

\* Trails which are classified as part of the Cycling Network are typically two-ways, with a centerline. Lane km would be approximately 600.



Photo: Cyclists enjoying the Richmond Cycle Track



### Bike Network Expansion

In June 2016, Toronto City Council approved the 10 Year Cycling Network Plan (2016-2025), a comprehensive strategy for infrastructure investments to increase bicycle use and safety. In addition to expanding the network by 525 centreline kilometres to new parts of the city, the plan builds on the existing network of cycling routes by connecting gaps and improving route quality.

A significant amount of cycling impact analysis and stakeholder consultation was undertaken to develop the plan: approximately 10,500 individuals shared their priorities on network planning, over 90,000 trips were recorded by network users through the Toronto Cycling App which helped the City better understand cycling trips and current demand, and more than 7,000 respondents provided feedback on the draft network map. Safety and connectivity were identified by stakeholders as the two highest network design priorities. In response, a component of the Plan focuses on intersection safety improvements and the expansion of wayfinding solutions.

As of year-end 2016, 546 lane km of on-street and 300 centreline kilometres of multi-use have been installed and preliminary findings show ridership on new cycling network routes, such as Sherbourne Street, Richmond Street and Adelaide Street, have increased substantially.

Ridership on new cycling network routes has increased substantially. Daily bicycle volume counts on the Sherbourne Street bicycle lanes increased from 1,200 in 2012 to 3,500 in 2014. Preliminary evaluation of the Richmond-Adelaide Cycle Track Pilot shows that ridership tripled. From 2014 to 2015 alone, the daily eight-hour westbound volume on Richmond Street increased from 500 to 1,300 and the daily eight-hour eastbound volume on Adelaide Street increased from 550 to 1,575 cyclists<sup>40</sup>.

<sup>40</sup> City of Toronto (2016). [10 Year Cycling Network Plan](#).



Bike infrastructure and parking connects Torontonians with jobs, schools, attractions, and neighbourhoods. Toronto recognizes bicycle parking as a key component of mobility and continues to invest in bicycle parking infrastructure through the installation of bicycle locking rings, bike corrals, bike lockers and bike stations (pictured from left to right above).

### Bicycle Parking

Bike parking is an important part of a city's cycling infrastructure. Available, convenient, and safe bicycle parking encourages and enables sustainable commuting, active lifestyles, and low-carbon transportation.

With over 17,500 bike rings on public sidewalks and boulevards – equivalent to 35,000 bicycle parking spots – Toronto is a recognized North American leader in bike ring parking infrastructure. The City provides bicycle parking facilities at destinations regularly frequented by cyclists. Bicycle parking options range from short-term parking needs, such as locking rings, to long-term recurring needs, such as bicycle lockers and stations, and seasonal needs to address peak cycling times, such as bike corrals.

Toronto continues to invest in bicycle parking as demand increases and more people choose to cycle. In 2016, 600 new bicycle locking rings, three new bike corral locations, and three new bicycle locker locations were installed, totalling approximately 1,250 new bicycle parking spaces. In addition, over 500 existing locking rings were serviced or replaced. Toronto's Bicycle Parking Strategy was initiated in 2016 to address the need to increase the supply of bicycle parking and work with partners to target current and future investments.

The City encourages the public to suggest new locations for bike locking rings on public land and works with property owners to develop and expand bicycling parking on private lands, such as near office towers, shopping malls and residential towers.

Link: <https://www.toronto.ca/services-payments/streets-parking-transportation/cycling-in-toronto/bicycle-parking/>







### Toronto Transit Commission Ridership

The Toronto Transit Commission (TTC) is Canada's largest, and North America's third largest, transit system. Serving 1.7 million customer journeys every workday, the TTC provides a sustainable transportation option, which reduces the production of greenhouse gas emissions, air pollution, and congestion on our roadways.

TTC ridership has increased each year and set an all-time record of 538.1 million rides in 2016. In support of the 2015 Pan Am/ Parapan Am Games, hosted in Toronto, the TTC extended service by increasing bus, streetcar and subway frequency, organizing temporary express bus routes to key venues, and offering complementary all-day TTC access for those with an event ticket. The TTC provided approximately 4 million free rides during the Games.

The TTC continues to improve service, reduce journey times and support the growing transportation demand across the city, and work with the City on traffic control signals, parking restrictions on major streets during rush hours, and re-routing to reduce delays. The projects improve travel times and help reduce dependence on the automobile. Current and ongoing projects also include station renovations, the creation of second entrance/exits, and accessibility improvements in subway stations.

### Toronto Transit Commission Sustainability

The *Toronto Transit Commission's 2013-2017 Five-Year Corporate Plan* sets out the organization's priorities and commitments to support the goal of maximizing mobility in Toronto while minimizing the impact on the environment. The TTC is currently developing an updated Environment Management Plan that will detail the TTC's management of a range of environmental aspects including waste, waste water, air emissions, sustainability, contaminated lands, and fuel and chemical management. Initiatives to reduce vehicle emissions include annual emission testing, retirement of inefficient engines, and the application of new emission control technologies for the bus fleet to capture and reduce particulate matter (PM), nitrogen oxides (NO<sub>x</sub>), carbon monoxide and other air pollutants. The TTC supports also commuters who wish to cycle as part of their journey' As of 2010, all buses feature bike racks, and in 2016 the TTC installed 29 self-serve bike repair stops at nine subway stations and improved bicycle parking at six stations. The TTC is also studying the resilience of TTC subway infrastructure to climate change and flooding with the goal of identifying mitigation opportunities and measures.

### Community Bicycle Hubs

The Community Bicycle Hubs program supports economic development and community engagement through the promotion of sustainable transportation in the city's Neighbourhood Improvement Areas and revitalization sites. The program offers free-of-charge bike repair training for youth in lower income neighbourhoods and free cycling clinics for residents. The skills-training creates social and financial opportunities for participants, establishes local youth-run social enterprises, and promotes active transportation and recreation. The training and services are offered in accessible spaces, such as residential apartments, social housing buildings, public facilities, and outdoor community green spaces. The program is supported by 31 private, public and non-for-profit organisations that contribute financial and in-kind support. Six neighbourhood sites operate as Community Bicycle Hubs, 48 youth received training as bike mechanics, 75 bike clinic days were hosted, and over 1,100 bicycles were serviced.



### Multi-Use Trails

Multi-use trails are off-road routes that exist along city boulevards, in ravines, parkland, rail and hydro corridors. They form a network of active transportation options across the city and are a significant recreational asset shared by diverse users. In 2012, City Council adopted the [Bikeway Trails Implementation Plan](#) which calls for 77 kilometres of new trails to be built within a 10-year time frame and identifies priorities to upgrade existing trails for improved safety and connectivity. The [Multi-Use Trail Design Guidelines](#) were published by the City of Toronto in 2015 to ensure the development and ongoing maintenance of multi-use trails are high quality, accessible, and socially and environmentally friendly. The Guidelines support Toronto's vision of a safe and comfortable city-wide bike network that encourages people of all ages to choose active transportation for mobility and enjoyment.

Link: <https://www.toronto.ca/explore-enjoy/recreation/walking-hiking/trails/>





### Bike Share Expansion

Bike Share Toronto, the city's bike sharing program, provides an active transportation option that complements Toronto's multimodal transportation system, broadens the public transit network, and supports personal mobility year-round. Recognizing the growing demand for cycling and multimodal travel choices, in 2015 the Toronto Parking Authority committed to expanding Bike Share Toronto over five years. The Bike Share Toronto system (formerly BIXI Toronto) was launched in May 2011 with 1,000 bikes, 80 docking stations and 1,500 docks.

In partnership with Metrolinx, an additional 120 new stations and 1,000 new bikes were added in 2016 and by year-end, the system boasted 2,000 bicycles, 200 stations and 3,500 docks across the city. Bike Share continues to grow, with new stations planned in high-demand areas and near public transit stations to ensure a connected and convenient system.

In August 2017, another 70 stations and 750 bikes will be added to the system with funding from the Government of Canada's Public Transit Infrastructure Fund.

### Pedestrian Projects

Toronto's [\*Walking Strategy\*](#), adopted in 2009, committed to building a physical and cultural environment that supports pedestrian safety, accessibility and enjoyment. Sidewalks are a key component of a city-wide network of well-connected and secure walking routes. Through the Essential Links program, additional sidewalks are added each year when roads are reconstructed or resurfaced. In 2016, 4.9 kilometres of new sidewalk were installed under the program. Toronto improves streets and walkways with tools like visible pedestrian crossings, countdown timers, curb ramps, audible crossing signals and tactile walking surface indicators at all new intersections. The City also works to identify intersections that may pose risks to pedestrians and implements safety and comfort enhancements, such as advanced green lights for pedestrians and extended crossing times to support people of all ages and mobilities. New projects in 2016 included a pilot on York Street to extend the pedestrian zone near Union Station, Canada's busiest multi-modal transportation hub, and evaluating new pedestrian strategies and techniques, such as wayfinding and map design.





## Complete Streets Guidelines

Toronto streets, which comprise more than 25% of the city's total land area, accommodate over 5 million trips per day. Streets are vital transportation networks, moving people and goods safely and efficiently, and they are important public spaces where people meet, socialize, shop, and create community.

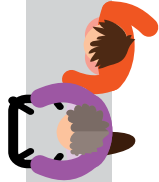
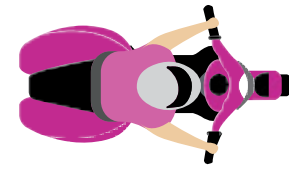
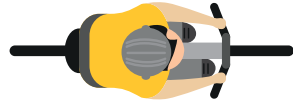
Recognizing the critical role that streets play in our social wellbeing, health, mobility, environment and economy, Toronto's new [Complete Streets Guidelines](#) will be released in early 2017.

The Guidelines, a first for Toronto, will provide a coordinated vision, set of goals, and street design guidance for designers, decision-makers and communities.

The Guidelines will incorporate ideas and experiences from thousands of Torontonians and stakeholders and outline a holistic approach to street design that prioritizes safety and encourage creative solutions to make streets work for everyone.



Designed to be safe and attractive for people, placemaking, and prosperity, Complete Streets are designed to improve safety and accessibility, provide transportation choices and connected networks, promote healthy and active lifestyles, enhance social equity, support economic vitality, improve environmental sustainability and create vibrant and attractive public spaces.



# VISIONZERO



**PEDESTRIANS DON'T HAVE STEEL-REINFORCED FRAMES.**  
**PLEASE DRIVE CAREFULLY.**  
City of Toronto

Road safety is a top priority, and all road users have the responsibility to be more aware. While Toronto has one of the lowest fatality rates in North America, 20-40 pedestrians or cyclists are injured or killed each year. Educational campaigns of the *Vision Zero Road Safety Plan* target actions individuals can take to reduce the risk of collisions, whether as drivers, cyclists or pedestrians. Historically we have seen an increase of 60-80% in the average number of monthly collisions with vulnerable road users in the fall, when daylight hours are reduced.

## Vision Zero: Toronto's Road Safety Plan

Approved by Toronto City Council in 2016, the *Vision Zero Road Safety Plan*, contains a series of measures and strategies aimed at improving safety for all road users and eliminating deaths and serious injuries on our streets. Among the key issues addressed in the plan are safety for older adults, school children, pedestrians and cyclists. The plan uses collision data, feedback from Torontonians, and City Council direction to identify where improvements are most needed. One key focus area is aggressive driving and distraction, which was identified as the top road safety concern by the 1,253 Torontonians who participated in the development of *Vision Zero*.

Aggressive driving and distracted driving represent the most common factors in collisions resulting in serious injuries and death. The plan proposes a mix of engineering, educational, enforcement, and technological measures to improve road safety in Toronto, such as reduced speed limits, improved pavement markings, awareness campaigns, increased police presence and adjustments to signal timing.



# EVERYTHING MUST GO SOMEWHERE



## Reduce Solid Waste



Source: City of Toronto (2016). <https://www.toronto.ca/wp-content/uploads/2017/10/8ed4-Toronto-Waste-Strategy-Exec-Summary-FINAL-AODA.pdf>

Photo: As part of Scotiabank Nuit Blanche 2015, the City sponsored and commissioned an art installation called *There is No Away... Everything Must Go Somewhere*. The piece is composed of 131 bales of recyclable materials collected from the City's Blue Bin recycling program to raise awareness about the amount of waste we generate and the importance of developing a strategy to reduce and manage it. Video shorts were also shown depicting Toronto's waste management facilities and operations. Waste does not simply disappear – There is No Away... *Everything Must Go Somewhere*. Staff spoke to over 400 people throughout the Nuit Blanche night and thousands of people visited the installation over the week it was on display. The installation won a bronze educational program award from the Solid Waste Association of North America in 2016.

## Award

### 2016 Solid Waste Association of North America – Bronze, Educational Program Excellence Award

The City's 2016 art installation at Nuit Blanche – called *There Is No Away... Everything Must Go Somewhere* – made the point that materials do not simply disappear. The installation was recognized for excellence in educational programming.

With innovative programs and services tailored to the needs of diverse customers, the City primarily manages waste from single family homes and apartment and condominium buildings. The City also services some non-residential customers, including small businesses, schools, charities, and religious organizations.

Toronto's goal to divert 70% by 2026 and aspirational Zero Waste goal, are outlined in the *Long Term Waste Management Strategy*, adopted by City Council in 2016. Waste reduction provides economic, environmental and social benefits, including reduced costs to manage waste, and reduced energy use and greenhouse gas emissions <sup>41</sup>.

Toronto's residential waste diversion rate was 52% in 2016, nearly double the 2001 rate of 27%. However, our landfill capacity will run out by 2029 if our diversion rate remains unchanged. Adding to this pressure is the fact that Toronto's population continues to grow.

Through the *Long Term Waste Management Strategy*, priority is placed on the first 2Rs (reduce, reuse) and opportunities to enhance waste diversion programs and services are being explored, particularly for multi-residential buildings and the industrial, commercial and institutional (ICI) sectors. These sectors typically have lower diversion rates compared to single family homes.

The *Long Term Waste Management Strategy* recognizes the challenges facing the City, as multi-residential buildings make up approximately 55 per cent of the dwelling units in Toronto. This number is forecasted to increase over time as the population grows. The *Long Term Waste Management Strategy* also identifies the need for increased waste diversion in the multi-residential sector to support the City's diversion targets and reduce the amount of material currently sent to landfill.

<sup>41</sup> City of Toronto (2017). Toronto 2014 Global Protocol for Community-Scale Greenhouse Gas Emissions Inventory.



**Objective:** Provide innovative waste management services, promote waste reduction and diversion, and maintain a clean city.



Goal	Measure	Progress
1. Divert residential waste: • 70% by 2026 <sup>42</sup>	Overall diversion rate	52% (2016) <sup>43</sup>
	Single family diversion rate	65% (2016)
	Multi-residential diversion rate	28% (2016)

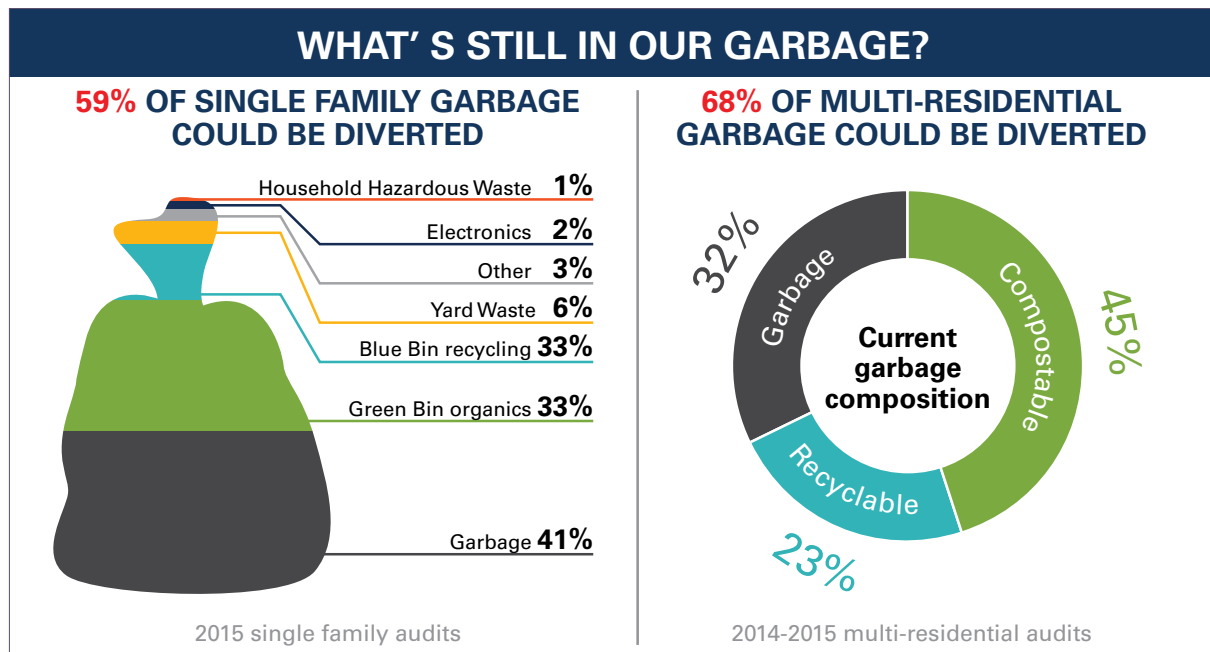
<sup>42</sup> City of Toronto (2016). [Long Term Waste Management Strategy](#).

<sup>43</sup> City of Toronto. [Residential Waste Diversion 2016 Rates](#).

Prioritizing reduction and reuse of products, and increasing diversion by recycling and composting will help to extend the life of Green Lane Landfill. This will also drive long-term sustainable waste reduction practices across the city and support Toronto’s aspirational circular economy and zero waste future, which is aligned with the provincial *Waste-Free Ontario Act, 2016*.



Toronto has made progress in improving waste diversion. Since 2001 an increase of 66% has been achieved. Source: SWMS



Source: City of Toronto (2016). <https://www.toronto.ca/wp-content/uploads/2017/10/8ed4-Toronto-Waste-Strategy-Exec-Summary-FINAL-AODA.pdf>

Recent waste audits indicate Torontonians can significantly improve waste diversion. A substantial amount of materials found in the garbage stream actually belong – and could have been diverted – to the Green Bin organics and Blue Bin recycling program. Waste diversion in multi-unit residential buildings is typically lower than in single family homes. With 55% of Torontonians currently living in multi-residential buildings and the number expected to increase, improved waste diversion in multi-unit residential buildings is an important part of the City's *Long Term Waste Management Strategy* and future.





Launched in June 2016, The Mayor's Towering Challenge was designed to motivate building property managers, superintendents, owners, boards, 3Rs Ambassadors and residents to improve waste diversion in apartments, condominiums and co-operatives. Improving diversion in multi-unit residential buildings is a key component of Toronto's Long Term Waste Management Strategy.

About half of Toronto residents live in apartments, condominiums and co-operatives, but only divert about 27% of waste, compared to 65% diversion in single-family homes. In total, 143 buildings (over 22,000 units) across 35 Wards registered to participate in the Mayor's Towering Challenge.

Link: <https://www.toronto.ca/services-payments/recycling-organics-garbage/apartments-condos-co-ops/mayors-towering-waste-challenge/>

## Achievements

### Long Term Waste Management Strategy

Each Torontonian generates about 15 pounds of Blue Bin recyclables, Green Bin organic waste, and garbage per week, which is not sustainable, especially as our population continues to grow and landfill space is limited. Our landfill will reach capacity by 2029<sup>44</sup>, if we do not change the way we manage our waste.

Following two years of technical evaluation and community engagement, a *Long Term Waste Management Strategy* was approved by City Council in July 2016. The *Long Term Waste Management Strategy* will guide Toronto's waste management for the next 30-50 years and help us reach the goal of diverting 70% of waste by 2026.

The Long Term Waste Management Strategy puts a priority on reducing waste, maximizing its value through recovery, and minimizing the amount sent to the landfill. Key opportunities include: increasing public awareness of sustainable practices, increasing diversion in multi-residential buildings and the ICI sector, and addressing food waste and textile diversion. Up to 34,000 tonnes of food waste can potentially be reduced and 15,000 tonnes of textile diverted by 2026. New metrics and performance indicators to better measure program success will be implemented, such as a per household waste generation rate.

The *Long Term Waste Management Strategy* is anticipated to divert an additional 200,000 tonnes of materials by 2026 and help Toronto work towards a circular economy and zero waste future. Public input helped to shape the *Long Term Waste Management Strategy* – over 4,200 residents attended more than 40 events and meetings across the city, 3,400 survey responses were received, and 16,000 web visits and 283 Tweets were logged.

Link: <https://www.toronto.ca/services-payments/recycling-organics-garbage/long-term-waste-strategy/>

<sup>44</sup> Source: <https://www1.toronto.ca/City%20Of%20Toronto/Solid%20Waste%20Management%20Services/Long%20Term%20Waste%20Strategy/Pdf/Station%202%20web.pdf>

It's now even  
**easier**



to buy a City of Toronto

**GARBAGE TAG**



### Clean Toronto Together

Each spring, Toronto's annual clean up brings together thousands of residents, students, businesses, organizations and community groups to remove litter from public spaces, helping to keep our city clean, green and beautiful. In 2016, Clean Toronto Together drew record-high participation.

In total, over 192,700 Torontonians participated in more than 1,060 registered cleanup events, including 328 community cleanups with 10,182 residents and 543 school cleanups. Approximately 4,061 bags of litter and 344 bags of recycling were collected. This equates to 37 tonnes of garbage and 3 tonnes of recycling diverted from the public space.

Link: <https://www.toronto.ca/explore-enjoy/festivals-events/more-city-produced-events/clean-toronto-together/>

### Community Environment Days

For over 25 years, Community Environment Days, hosted by local councillors, have helped residents do their part to create a cleaner, greener and more livable city. Held annually between April and October in each of Toronto's 44 wards, Community Environment Days allow residents to correctly and safely dispose of household items that do not belong in the City's Blue, Green, and garbage bins, such as household hazardous waste (HHW), home healthcare waste, and electronic waste. Residents can also pick up free compost and donate non-perishable food items, reusable household goods, art supplies, books and clothing in good condition.

Since 1991, more than 600,000 people have attended over 1,000 events and diverted over 13,000 tonnes of waste from the landfill, including 8,000 tonnes of HHW, 3,000 tonnes of electronics and 1,000 tonnes of reusable items. In addition, nearly 25,300 tonnes of compost have been picked up, and nearly 90,700 backyard composters have been sold, which led to the diversion of an estimated 9,000 tonnes of organic waste.

In 2016 alone, more than 26,000 people attended Community Environment Days, donating a total of 123 kilograms of food, 57,000 kg of reusable household goods and 7,800 kg of arts and craft supplies, and diverting 125,000 kg of electronics, and 320,000 kg of HHW. In 2016, approximately 570 tonnes of compost, made in part with materials collected through the Green Bin Organics Program and Yard Waste, was given to event attendees.

Link: <https://www.toronto.ca/services-payments/recycling-organics-garbage/community-environment-days/>



# NOT WANTED IN YOUR BLUE BIN

Know the culprits! Organic waste, containers with food or residue, textiles, electronics and coffee cups don't belong in recycling. Not sure where to place an item? Check the Waste Wizard at <https://www.toronto.ca/services-payments/recycling-organics-garbage/waste-wizard/>.



## Recycle Right

In 2015, Torontonians placed approximately 44,000 tonnes of garbage and food waste in recycling Blue Bins. Contamination, which is the disposal of items in the wrong bin, is problematic. Items that don't belong in the Blue Bin, for example, can damage equipment, cause workplace injuries at recycling facilities, increase processing costs, and ruin perfectly good recyclables. Reducing contamination by even 5% could save almost \$2 million annually. To raise awareness and reduce contamination in the Blue Bin in particular, the City launched a public education campaign called Recycle Right in 2016. The highly visual multi-platform public education campaign included ads, videos, social media and a dedicated web page. Within six months, the campaign generated over 800,000 YouTube views, 1,180,000 Facebook video views, 227,000 Instagram video views, and over 600,000 visits to the Recycle Right webpage.

Link: <https://www.toronto.ca/services-payments/recycling-organics-garbage/houses/what-goes-in-my-blue-bin/>



Toronto's Long Term Waste Management Strategy follows a 5Rs waste hierarchy which places an emphasis on reduction, reuse, recycling and recovery before disposal. Toronto is working towards a zero waste and circular economy future, which focuses on preventing waste and maximizing resource recovery. Strategies to achieve that include increased diversion in multi-residential apartments and condos, support for exchange networks, and enhanced enforcement.



Clean Water

Photo: Scarborough Bluffs

*Toronto is home to some of the best beaches and drinkable water in the world.*

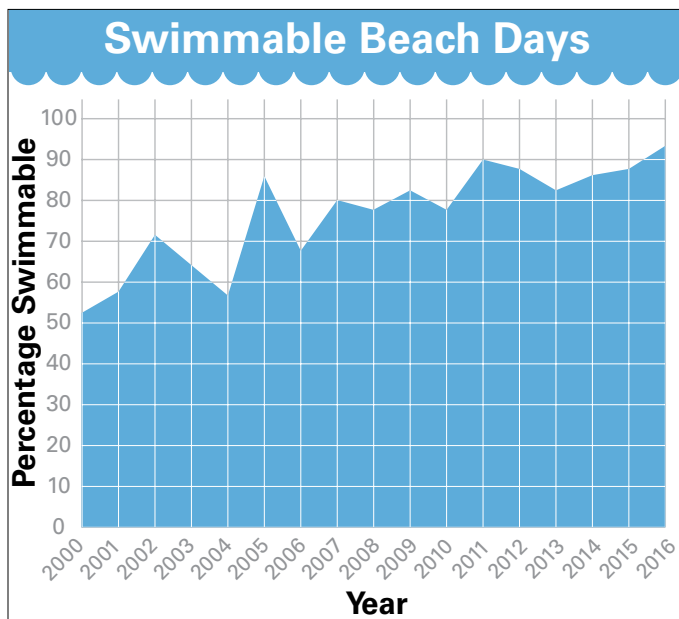
*In 2016, Toronto's Blue Flag-certified beaches were safe for swimming 93% of the season – the highest percentage ever recorded in Toronto.*

<sup>45</sup> Swimmable beach day data, provided by Toronto Public Health through the SwimSafe beaches water quality program, is verified by the Foundation for Environmental Education (FEE) under the internationally recognized Blue Flag Program. Blue flags are awarded to communities committed to maintaining high standards for water quality. The City's 11 supervised beaches are tested for E. coli bacteria levels on a daily basis from June 1 to Labour Day to determine water quality and safety conditions for public swimming. Notices are issued for each beach based on testing results, in accordance to the Ontario Recreational Water Protocol. When E. coli levels are high, Toronto Public Health posts warning signs against swimming. In 2016, Toronto had an average of 93% swimmable beach days, the highest percentage ever since Toronto joined the program in 2000. In 2000, beaches were marked as safe for swimming only 51% of the season. Beach and lake water quality and quantity, can be impacted by climate change and severe weather events, for example, there tends to be higher E. coli levels after heavy rain events.

Toronto's waterways play a vital role in supporting in the city's economy, the natural environment, and providing exceptional opportunities for cultural and recreational activities. In 2003, Toronto City Council adopted the *Wet Weather Flow Master Plan* (WWFMP) - a comprehensive long-term plan with the goal of reducing and ultimately eliminating the adverse impacts of wet weather flow, which is the runoff generated by rain or snowmelt, to protect our environment and improve the health of watershed ecosystems in Toronto. Key water quality objectives of the WWFMP include reducing improving water quality at the City's swimming beaches, Lake Ontario waterfront and in the City's watercourses.

Toronto applies a hierarchy of stormwater management solutions that begins with managing rainfall where it falls (i.e. source controls), followed by conveyance controls along the City's streets, and finally larger end-of-pipe infrastructure solutions. As of 2016, the City has made significant progress in implementing the WWFMP through projects, programs, and other initiatives to improve water quality in the urban watercourses, the City's beaches and the Lake Ontario shoreline, enhance resilience of infrastructure against extreme weather and flooding risks, and restore and protect watercourses and infrastructure from future erosion. Education and partnerships with communities and businesses has been and continues to be instrumental in managing stormwater, preventing pollution, and restoring the health of streams and aquatic habitats.

Toronto is home to some of the best beaches in the world, thanks in part to the *Toronto Beaches Plan* (2009), which helps to ensure safe, swimmable beaches and recreational shorelines. In 2016, Toronto's Blue Flag-certified beaches<sup>45</sup> were safe for swimming 93% of the season, the highest percentage ever recorded in Toronto.



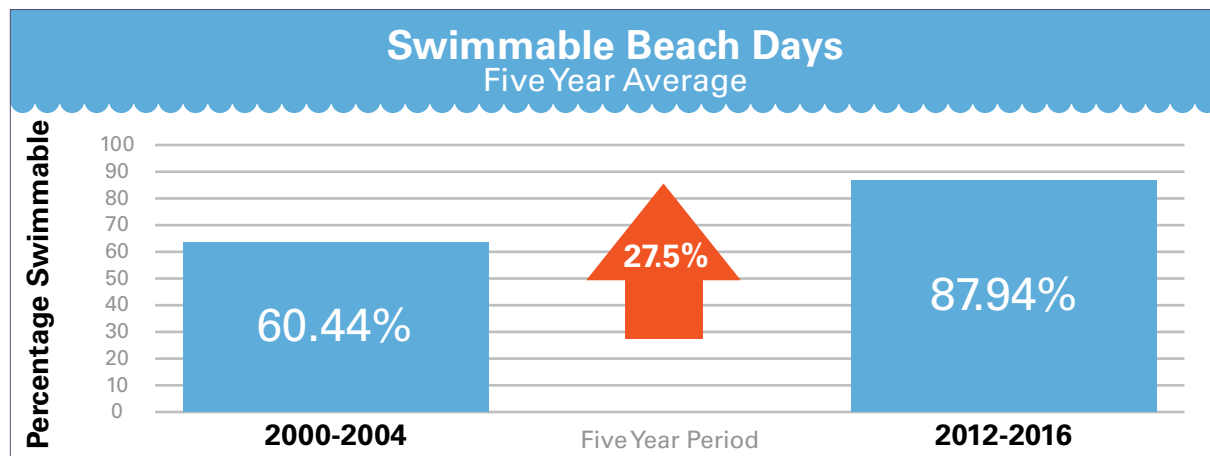
Beach water quality has significantly improved over the years. In 2000, Toronto beaches were deemed safe for swimming 51% of the swimming season. By 2016, 93% were safe for swimming – the highest percentage ever recorded in Toronto through the Blue Flag Beach Program.

<sup>46</sup> City of Toronto (2003). [Wet Weather Flow Master Plan](#).

<sup>47</sup> Swimmable beach day data, provided by Toronto Public Health through the SwimSafe beaches water quality program, is verified by the Foundation for Environmental Education under the internationally recognized Blue Flag Program. The City of Toronto's 11 supervised beaches are tested daily for E. coli bacteria levels from June 1 to Labour Day of every year to determine water quality and safety conditions for public swimming. Notices are issued for each beach based on testing results, in accordance to the Ministry of Environment and Climate Change's standard for beach water quality in Ontario. The swimmable beach day data represents the number of days a beach is posted as safe for swimming out of the total number of days during the SwimSafe program season, and is calculated as five-year averages.

**Objective:** Reduce and ultimately eliminate the adverse effects of wet weather flow on the built and natural environment, and achieve a measurable improvement in the health of watershed ecosystems.

Goal	Measure	Progress
1. Improve water quality in rivers and lakes for body-contact recreation <sup>46</sup>	Increase in percentage of swimmable beach days	51% (2004) to 93% (2016) <sup>47</sup>





## Achievements

### Green Streets Technical Guidelines and Demonstration Projects

Stormwater runoff is a major contributor to degraded water quality and can contribute to flooding in urban areas, particularly during extreme weather events. Green infrastructure in the public right-of-way (i.e. Green Streets) mimics the natural water cycle and manages precipitation where it falls, which reduces stormwater runoff, enhances water quality and reduces flood risks, improves air and water quality, creates habitat for local species, and enhances public spaces to provide aesthetic and health benefits.

In 2016, the City developed Green Infrastructure Technical Guidelines, to be released in 2017, to provide guidance, standards and selection tools for the planning, design, integration and maintenance of a range of green infrastructure options appropriate for the city's street types and conditions. The City has also been implementing green infrastructure demonstration projects that provide learning opportunities for future projects. As of 2016, completed demonstration projects included bioretention infrastructure along Keele Street, South Station Street, and the Coxwell-Fairford Parkette, sustainable sidewalks along the Queensway, and 'greening' of a surface parking lot on St. Clair Avenue.

Link: <https://www.toronto.ca/services-payments/streets-parking-transportation/enhancing-our-streets-and-public-realms/green-streets/>



Photos: The South Station bioretention cell (Weston Road/ Lawrence Avenue W.) transformed 205m<sup>2</sup> of hard concrete to permeable green space in 2016. The area can effectively receive and treat stormwater runoff from the adjacent roadway. Annually, up to 380,000 litres of stormwater runoff will pass through the bioretention area. The bioretention unit will filter pollutants, absorb water for tree and plant growth and slow down stormwater runoff. Design features include seating for 45 people, 10 bicycle parking spaces, 16 shade trees and 720 pollinator plants. The greenery helps reduce local ambient temperature up to 7°C.



Photo: The Emery Creek stormwater ponds and wetland project will improve water quality while adding greenery and recreation space for the community. The wetland provides habitat and removes solids, and the finishing pond (right) provides final treatment before discharge to the Humber River.

### **Emery Creek Stormwater Management Ponds**

Emery Creek, located in the Humber River watershed, has historically had some of the worst water quality conditions in Toronto. In 2016, the City began the construction of the Emery Creek stormwater management ponds project, which is expected to be completed in 2018. The project consists of three connected ponds covering an area of almost three hectares that will intercept and treat stormwater flows from the Emery Creek catchment area to improve water quality and help control stream erosion.

The project will also add nearly 6,000 shrubs and trees around the ponds and wetland, create a lookout point with seating and educational signage, and construct a new one-kilometre multi-use trail. Once complete, the ponds are expected to significantly improve water quality in the Humber River, support a healthier habitat for aquatic and terrestrial wildlife in the watershed, and aesthetically improve the community space.

Link: <https://www.toronto.ca/community-people/get-involved/public-consultations/infrastructure-projects/emerycreek/>



### Mandatory Downspout Disconnection

In 2008, Toronto City Council approved amendments to the City's Sewers Bylaw making it mandatory for property owners to disconnect their downspouts from the City's sewer system. Downspout disconnection reduces stormwater loadings to the City's sewer system, which minimizes sewer overloading, the risk of flooding, property damage, and release of pollutants and untreated sewage into local waterways that can occur during heavy rainfalls.

Mandatory Downspout Disconnection is one of the City's most important source control measures. It was implemented in three phases starting in November 2011 with the final phase implemented city-wide in December 2016. A field study undertaken in summer 2016 identified a high rate of disconnection (79 per cent) across the City. Toronto Water continues to implement a multi-year enhanced education, communication, and outreach strategy to further increase the rate of disconnection in future years.

Link: <https://www.toronto.ca/services-payments/water-environment/managing-rain-melted-snow/basement-flooding/mandatory-downspout-disconnection/>

### Green Roof Bylaw

Toronto is the first city in North America to have a bylaw requiring and governing the construction of green roofs on new developments. The Green Roof Bylaw came into effect in 2010 and requires vegetative roofs on new residential, commercial and institutional buildings greater than 2,000m<sup>2</sup>. Green roofs have many benefits: they improve air quality, mitigate stormwater runoff, enhance water quality, lessen the effects of urban heat, and reduce energy consumption for heating and cooling. Green roofs also offer the opportunity to create habitat for wildlife. Since 2010, 400 new green roofs have been built, or are in progress, covering an area of 346,000 m<sup>2</sup> (3,724,300 ft<sup>2</sup>), which is the equivalent of 43 Canadian football fields. Toronto has approximately 600 green roofs and was recognized for installing the most green roof area in 2016 out of all North American cities<sup>48</sup>.

Link: <https://www.toronto.ca/city-government/planning-development/official-plan-guidelines/green-roofs/green-roof-bylaw/>



The *Design Guidelines for Biodiverse Green Roofs* identify, describe and illustrate the best practices and plants for creating habitat and promoting biodiversity on green roofs in Toronto. Toronto is the first city in North America to release such guidelines that encourage biodiverse green roof design.

<sup>48</sup> Green Roofs for Healthy Cities (2017). 2016 Annual Green Roof Market Survey: Top Ten Metropolitan Regions Recorded Installed Green Roofs.





### **Eco-Roof Incentive Program**

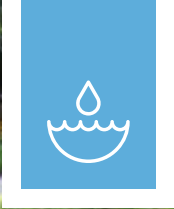
The Eco-Roof Incentive Program supports the installation of green roof and cool roofs on Toronto's residential, commercial, industrial and institutional buildings. Eco-roofs help to make the city more resilient to climate change and flooding by retaining stormwater; reducing urban heat, energy consumption, and greenhouse gas emissions; improving air and water quality; enhancing green space and biodiversity; and providing habitat for pollinators.

The program is funded by cash-in-lieu funds that developers pay instead of installing a green roof which would be required by the City's Green Roof Bylaw.

Since 2009, more than 260 projects have been funded, totalling over 570,000 square metres of eco-roof space, equivalent in size to 70 Canadian Football League fields. Each year, these eco-roofs reduce energy consumption by almost 1000 mega-watt hours, and cumulatively avoid over 210 tonnes of greenhouse gas emissions. Green roofs have cumulatively diverted 60 million litres of stormwater – equal to 24 Olympic-sized swimming pools – from the City's sewer system.

In 2016, 68 new projects were completed, totalling over 150,000 square metres of retrofitted space. Each year, they will reduce energy consumption by 271,000 kWh, avoid over 11 tonnes of GHG emissions, and divert over 10 million litres of stormwater.

Link: <https://www.toronto.ca/services-payments/water-environment/environmental-grants-incentives-2/green-your-roof/>



# Eco-Roof Incentive Program



**>270**  
green and cool  
roofs funded



**557,000**  
square metres  
= equivalent to 70  
Canadian football fields

## Annual benefits:



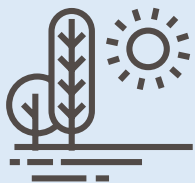
Reduce energy  
consumption by  
**1,167 mega-watt  
hours**



Avoid **218**  
tonnes of GHG  
emissions



Divert  
**10.6** million litres  
of stormwater (more than 4  
Olympic-sized swimming pools)



Improve air and  
water quality



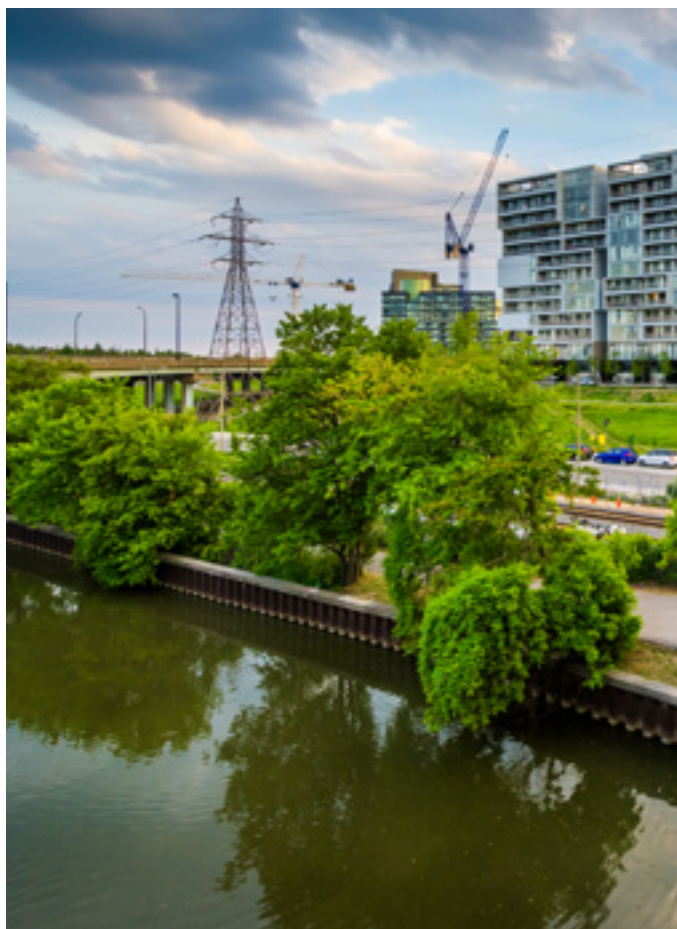
Enhance green  
space and  
biodiversity



Provide  
habitat for  
pollinators



Mitigate urban  
heat island  
effect



### **Don River and Central Waterfront Project**

In 1987, the International Joint Commission (IJC) identified the City of Toronto's waterfront as one of 43 polluted Areas of Concern in the Great Lakes Basin, largely due to poor water quality in the Don River and the Inner Harbour. A major source of pollution is stormwater runoff, and combined sewer overflows (CSOs) that contain a mixture of stormwater and untreated sewage, which are discharged from outfalls into Toronto's waterways after heavy rains or snowmelts.

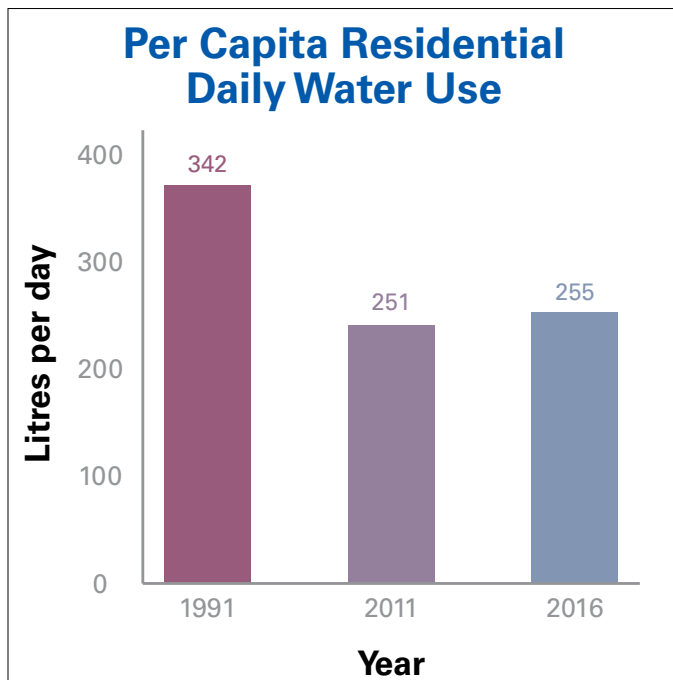
In 2006, Toronto City Council approved the start of the Don River and Central Waterfront Project to improve water quality in the Don River and Inner Harbour. After years of study, the preliminary design for the project was completed in 2015 and the first stage of construction is planned to begin in 2018. The project includes three integrated tunnels, vertical storage shafts, off-line storage tanks and a new wet weather flow high-rate treatment facility to capture and treat stormwater discharges and combined sewer overflows to the Lower Don River, Taylor-Massey Creek and Toronto's Inner Harbour. The project also includes upgrades to the Don Sanitary Trunk Sewer system to help service future growth and will improve operations by providing redundancy for the Coxwell Sanitary Trunk Sewer.

Once fully implemented over the next 25 years, the project will virtually eliminate CSO discharges and reduce polluted stormwater discharges into the Don River and Central Waterfront, and reduce harmful bacteria and algae growth nutrients, such as phosphorus and nitrogen, entering our waterways. In addition to improving river and lake water quality for human health and recreational reasons, aquatic habitats, fisheries and wildlife will benefit.

Link: <https://www.toronto.ca/services-payments/water-environment/managing-rain-melted-snow/what-the-city-is-doing-stormwater-management-projects/lower-don-river-taylor-massey-creek-and-inner-harbour-program/>



# WATER GOES DIGITAL



### Toronto Water Meter Program

The average three-person household uses approximately 765 litres of water per day. To help better track water consumption and detect water loss more quickly, the City implemented the Water Meter program.

Beginning in 2010, new automated meters were installed in homes and businesses at no charge to customers. By the end of 2016, 473,417 water meters had been installed or retrofitted with a transmitter, representing 99.5% of all water accounts in Toronto.

The Water Meter Program is generating \$5 million in annual operating savings and \$28 million in revenue recoveries annually.

In February 2016, the City launched an online tool, MyWaterToronto, to help people conveniently view their water use information anytime. The tool has received about 45,000 visits and generated favourable feedback in its first year.

Together, the automated meters and online tool will lead to improved water conservation and water efficiencies, monetary savings, and help to build public awareness of our precious water resources.

Link: <https://www.toronto.ca/services-payments/water-environment/how-to-use-less-water/mywatertoronto/>



In addition to energy and basement flooding prevention retrofits, many residents in the Black Creek SNAP have installed multiple barrels to harvest the rain for their vegetable gardens.



Through the Harvest the Rain Program, SNAP offers free of charge home consultations to help residents green their homes and make them more resilient.



The San Romanoway Revival Project transformed underutilized land around privately owned low income towers, into a vibrant sustainable space with Toronto's largest allotment garden and orchard, supported with rainwater harvesting, pollinator gardens and hundreds of native trees.

### **Black Creek Sustainable Neighbourhood Retrofit Action Plan (SNAP) : Leveraging Green Infrastructure for Improved Resiliency**

Toronto and Region Conservation Authority's Black Creek SNAP (Sustainable Neighbourhood Retrofit Action Plan) is delivered in partnership with the City of Toronto, local organizations, and community members.

SNAP uses a holistic approach to revitalizing older urban neighbourhoods through the implementation of a broad range of climate change related urban renewal initiatives. It does this through one simple, but profound, change – focusing on neighbourhoods. SNAP takes into account municipal needs and community interests before designing and implementing programs.

The Black Creek SNAP neighbourhood plan incorporates actions for basement flooding reduction, improved health of the Black Creek, reduction of energy and water consumption, local food production and enhancement of the urban forest. Being a Local Improvement Area, resilience is a strong focus.

Since 2013, 255 households received free home consultations and on-going support on greening their homes and making them more resilient. Over 30% of participants completed energy retrofits and 41% took measures to prevent basement flooding. Over 370 rain barrels have been installed, 91 trees have been planted at private homes, and 465 kg of waste has been diverted through residents' donation of surplus produce to local food programs.

Link:

Toronto And Region Conservation Authority's Black Creek SNAP Projects and Action Plan  
<https://trca.ca/conservation/sustainable-neighbourhoods/snap-neighbourhood-projects/black-creek-snap/>

Sources:

Toronto And Region Conservation Authority's Black Creek SNAP: Harvest the Rain program  
<https://trca.ca/conservation/sustainable-neighbourhoods/snap-neighbourhood-projects/black-creek-snap/projects-harvest-rain/>

Sustainable Neighbourhood Retrofit Action Plan (SNAP) Projects November, 2013  
<https://trca.ca/wp-content/uploads/2016/10/SNAP-Overview-Nov-2013-1.pdf>



## Greening City Operations

### GREENING CITY OPERATIONS



Photo: Toronto Police 32 Division.

#### Corporate Energy Efficiency Improvements

The City of Toronto is always working to maximize the energy efficiency of its own operations. Four City buildings were presented the Race to Reduce Award for exceeding the goal of reducing energy use by 10% between 2011-2014. The Toronto Archives building achieved the highest reduction at 59% reduced energy use, followed by City Hall at 21%, Metro Hall at 15% and 277 Victoria Street at 19% reduction. One method to achieve efficiencies is through energy efficiency retrofits which reduce energy consumption, operating costs, and GHG emissions, while improving energy security and resilience. Energy retrofits in City corporate buildings continue to build on savings of more than \$4 million per year and annual CO<sub>2</sub> emissions reductions of more than 15,000 tonnes. In 2016, 14 LED lighting retrofit projects were completed, generating annual savings of approximately \$900,000. Water fixture retrofits at Metro Hall and City Hall were also completed and will contribute to a 25% reduction in water consumption and savings of \$30,000 per year.

Building Automation Systems (BAS) which control heating, ventilation and air conditioning (HVAC), refrigeration, and lighting systems are another way to improve building performance. BAS have been installed in various long-term care facilities, recreational centres, the Toronto Archives, North York Civic Centre, Scarborough Civic Centre, and Toronto Police 32 Division. BAS provide a projected 10% electricity and natural gas savings and prolong the life of heating, ventilation, and air conditioning (HVAC) equipment. In 2016, the City completed BAS projects at 799 Islington Avenue, Toronto Police Service 43 Division, EMS Headquarters, and floors 16-20 and 22 of Metro Hall. BAS retrofits have allowed for better control of the heating and cooling systems and enhanced occupant comfort.



Photo: Solar PVs are installed at the City's King Street Yard (King Street W. near Dufferin Street).

### **Corporate Energy Conservation and Demand Management Plan**

The City's Energy Conservation and Demand Management (ECDM) Plan (2014-2019) profiles over 500 City-owned buildings and identifies opportunities to save an estimated \$17 million in utility costs through infrastructure upgrades and energy performance improvements.

The Plan is based on energy use and operation type, and helps to identify buildings with the highest energy savings potential.

The ECDM Plan is one of the ways Toronto is a leading North American city in terms of energy efficiency and climate change mitigation.

### **Renewable Energy**

Recognizing the economic, energy security and environmental benefits that renewable energy systems offer, the City is working to install renewable energy systems on all existing City buildings, where feasible. The City is engaged in a joint venture with Toronto Hydro-Electric System Limited to develop, construct and operate solar photovoltaic systems under the Feed-In Tariff (FIT) program administered by the Independent Electricity System Operator (IESO). All FIT projects have a 20-year contract at a guaranteed rate per project. Projects are located in various City buildings, including EMS Stations, Fire Halls, Community Centres, Libraries, City Arenas and Yard, office buildings and more.

The revenue generated from all solar PV projects in 2016 was approximately \$1,095,000. These projects include:

- 10 projects operating since 2013/14 under the FIT 1 program, which generated a combined 1,501.6 MWh.
- 9 projects operating under the FIT 3 program, which generated a combined 1,930.4 MWh.
- 19 smaller projects under the MicroFIT program.

In 2016, construction started on an additional round of Feed-in-Tariff projects, including over 35 FIT 4 projects, and 17 MicroFIT projects. Completion is expected in 2017 and 2018.



### Deep-Lake Water Cooling in City Facilities

With support from the City of Toronto, in 2004 Enwave Energy Corporation developed a deep-lake water cooling system that uses cold water from Lake Ontario to provide air conditioning to high-rise buildings in Toronto.

Buildings that are connected to the system – including City Hall, Metro Hall, and Old City Hall – reduce electricity use by 90%, and significantly reduce emissions.

Toronto Union Station which was connected to the system in 2013 will continue to expand the system into additional areas of the station, including new construction.







### **Green Fleet Plan**

The City's Consolidated Green Fleet Plan 2014-2018, which recognizes the health and environmental benefits that come from reduced vehicle and equipment impacts, focuses on reducing emissions from almost 10,000 on-road and off-road vehicles and equipment owned and operated by the City of Toronto. It includes measures such as annual emission testing, retirement of inefficient engines, application of diesel particulate filters, and promoting low-emission transportation for City business activities.

Initiatives undertaken in 2016 are expected to reduce 5,648 cumulative tonnes of greenhouse gas emissions. These initiatives include the adoption of anti-idling systems on 48 ambulances, 428 police patrol vehicles, and nine fire trucks, and the replacement of an additional 37 diesel waste-collection trucks with compressed natural gas trucks.

### **Loans for Energy Retrofits in City and Community Buildings**

Through the Sustainable Energy Plan Financing (SEPF) program, the City funds energy retrofit projects for City facilities and community-based organizations, including not-for-profits. The program, which began in 2013, continues to advance the City's goals of reducing GHG emissions, reducing energy consumption, increasing energy security, and contributing to improved service quality and resilience. By the end of 2016, the program has supported seven retrofit projects and three additional projects are underway.

In total the SEPF program has provided over \$11 million in financing to community-based organizations and approximately \$1 million to City agencies and corporations. These retrofits yield an estimated \$1.7 million in annual utility cost savings, \$17,000 equivalent mega-watt hours per year in energy savings, 1,000 kilowatt per year reduction in energy consumption, 500 tonnes of GHG avoided annually, and 534 person-years of direct and indirect jobs.

In 2016 alone, approximately \$5.5 million in loans was distributed. These projects will provide \$750,000 in annual cost savings, 7,300 equivalent mega-watt hours per year in energy savings, and 420 kilowatts per year in reduced demand savings.

### **Reducing Peak Energy Demand**

The City participates in the Independent Electricity System Operators Demand Response Program, which reduces electricity consumption during periods of peak demand. In addition to creating economic benefits, the program reduces GHG emissions, optimizes assets, and contributes to energy security and resilience.

Since 2012, the City has enrolled 21 corporate sites, providing a total 5.67 MW of power. In addition to saving on utility bills, the City has earned over \$1.75 million in new revenue to invest in more resilient systems that also provide clean backup power.

# KEY TERMS

## **Carbon dioxide equivalent:**

A standard practice by which greenhouse gases are calculated in terms of their global warming potential of carbon dioxide.

## **Cooling degree days:**

Cooling degree days are used to estimate energy use and air conditioning requirements of buildings. Cooling degree days are calculated by taking difference between the mean temperature of the day (where it is above 18°C) and 18°C. As temperatures increase, the number of cooling degree days and electricity use is expected to increase.

## **Diversion rate:**

The percentage of residential waste that is diverted from disposal through various reuse and recycling, and composting programs. In Toronto these programs include Blue Bin recycling, Green Bin organics, leaf/yard waste and Christmas trees, backyard composting, Community Environment Days, household hazardous waste depots, grass cycling, large appliance/scrap metal and electronic waste collection/drop-off.

## **Electricity demand:**

A measure of the rate at which a building, appliance, or area uses energy. The more quickly energy is used, the more demand is generated. A less energy efficiency appliance creates a larger demand than an efficiency one. Electrical demand is often measured in kilowatts (kW).

## **Energy consumption:**

How much energy a given building, appliance or geographic area uses to power its operation. Electrical energy consumption is often measured in kilowatt-hours (kWh). In Toronto, where most of our thermal energy comes from the combustion of natural gas, we often measure thermal energy in volumes (m<sup>3</sup>) of natural gas.

## **Energy demand:**

A measure of the rate at which a building, appliance, or area uses energy. A less energy efficient building creates a larger demand than an efficient one. Electrical demand is often measured in kilowatts (kW).

### **Environmentally Significant Areas (ESA):**

Areas of land or water within the natural heritage system that are particularly sensitive and require additional protection to preserve their environmentally significant qualities. Each Environmentally Significant Area is comprised of one or more of the following:

- habitats for vulnerable, rare, threatened or endangered plants or animals,
- rare, high quality or unusual landforms created by geomorphological processes within the city or the Greater Toronto Area
- large, diverse and relatively undisturbed spaces which many plants and animals need to survive and reproduce,
- important ecological functions that contribute to the health of ecosystems beyond their boundaries, such as serving as a stopover location for migratory wildlife.

### **Greenhouse gas:**

Greenhouse gases are gaseous constituents in the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths, causing the greenhouse effect. Greenhouse gas emissions contribute to global warming and climate change.

### **Green infrastructure:**

Green infrastructure refers to natural and human-made elements that provide ecological and hydrological functions. They also make streets more pleasant, comfortable and sustainable. Examples of green infrastructure may include natural heritage features and systems, park lands, stormwater management systems, street trees, urban forests, natural channels, permeable surfaces, green roofs, and active and sustainable transportation infrastructure.

### **Low impact development (LID):**

LID is a stormwater management strategy that seeks to mitigate the impacts of runoff and stormwater pollution by managing runoff as close to its source as possible. LID comprises a set of site design strategies that minimize runoff and mimic natural or predevelopment hydrology through the process of infiltration, evapotranspiration, harvesting, filtration and detention of stormwater. These practices can effectively remove nutrients, pathogens and metals from runoff, and reduce the volume and intensity of stormwater flows.

### **Natural gas consumption:**

Natural gas consumption is a measure of how much natural gas a given building, appliance or geographic area, for example, uses to power its operation. In Toronto, most of our thermal energy comes from the consumption of natural gas, which is often measured in cubic metres (m<sup>3</sup>).

### **Nitrogen oxides (NO<sub>x</sub>):**

Nitrogen and oxygen in air at high temperatures can combine to form nitrogen oxides (NO<sub>x</sub>), which includes nitric oxide (NO) and nitrogen dioxide (NO<sub>2</sub>). Fuel combustion at high temperatures and industrial processes produce NO<sub>x</sub>.

### **Net zero:**

SA net zero building is a building with net zero energy consumption. The building produces enough renewable energy to meet its own annual energy consumption requirements, which reduces the use of non-renewable energy. These buildings consequently contribute less overall greenhouse gas to the atmosphere than similar non-net zero buildings. The definition also applies to campuses, portfolios, and communities.

### Ozone (O<sub>3</sub>):

Ozone is a colourless, odourless gas at ambient concentrations and a major component of smog. Approximately 35% of the VOCs emitted in Ontario in 2012 came from the transportation sector. O<sub>3</sub> irritates the respiratory tract and eyes, and exposure to high levels results in chest tightness, coughing and wheezing. People with respiratory and heart problems are at a higher risk. Ozone has been linked to increased hospital admissions and premature death. Ozone causes agricultural crop loss each year in Ontario and noticeable leaf damage in many crops, garden plants and trees.

### Particulate matter (PM):

Particulate matter is the general term used for a mixture of solid particles and liquid droplets in the air. It includes aerosols, smoke, fumes, dust, ash and pollen. Particulate matter is characterized by size, mainly because of the health effects associated with particles of different diameters. Of special concern are particulate matter less than 10 microns (µm) (PM<sub>10</sub>) and particulate matter less than 2.5 microns (µm) (PM<sub>2.5</sub>). PM<sub>2.5</sub> is also known as fine particulate matter or respirable particles because their small size allows them to penetrate further into the respiratory system than larger particles, which causes health effects. The composition of particulate matter varies with place, season and weather conditions. Exposure to fine particulate matter has been associated with hospital admissions and several serious health effects, including premature death. PM has been linked to aggravated cardiac and respiratory diseases such as asthma, bronchitis and emphysema and to various forms of heart disease. People with asthma, cardiovascular or lung disease, as well as children and elderly people, are considered to be the most sensitive to the effects of fine particulate matter.

### Peak load:

The maximum rate at which energy can be drawn from the grid by a specific area, appliance or building, measured in kilowatts (kW). If the electricity grid experiences a peak load that exceeds its capacity, brownouts or energy instability can occur.

### Smog:

Smog, a combination of smoke and fog, describes what happens when smoke is released into a natural fog. Photochemical smog, however, occurs when air pollutants, including hydrocarbons, nitrogen oxides, and other pollutants, as are released from industry, vehicles and buildings into air in the presence of sunlight; sunlight causes chemical changes that create photochemical smog – typically with high levels of ozone.

### Smog advisory:

Smog advisories are issued to the public when there is a strong likelihood that widespread, elevated and persistent smog levels are expected.

### Volatile organic compounds (VOCs):

Volatile organic compounds are carbon-containing gases and vapors such as gasoline fumes and solvents, excluding carbon dioxide, carbon monoxide, methane, and chlorofluorocarbons. Although there are many thousands of organic compounds in the natural and polluted troposphere that meet the definition of a VOCs, most measurement programs concentrate on the 50 to 150 most abundant hydrocarbons. Many individual VOCs are known or suspected of having direct toxic effects on humans, ranging from carcinogenesis to neurotoxicity. A number of individual VOCs, such as benzene, dichloromethane, have been assessed to be toxic under the Canadian Environmental Protection Act, 1999 (CEPA 1999). The more reactive VOCs combine with nitrogen oxides (NO<sub>x</sub>) in photochemical reactions in the atmosphere to form ground-level ozone, a major component of smog. VOCs are also a precursor pollutant to the secondary formation of fine particulate matter (PM<sub>2.5</sub>). Both ozone and PM<sub>2.5</sub> are known to have harmful effects on human health and the environment.

# Toronto's Environmental Progress Report



Toronto's goal is to reduce emissions by **80%** by 2050

Toronto's first overall environmental progress report measures our success in creating a cleaner, greener, more sustainable city. It also shows how far we've come and how far we have yet to go to reduce our greenhouse gas emissions (GHG) by 80% by 2050.  
\*Reflects 2014 data

