



TransformTO: Climate Action for a Healthy, Equitable & Prosperous Toronto

Implementation Update 2017 and 2018

City of Toronto
Environment and Energy Division





We acknowledge that this report was developed on the traditional territory of many nations including the Mississaugas of the Credit, the Anishnabeg, the Chippewa, the Haudenosaunee and the Wendat peoples, and is now home to many diverse First Nations, Inuit and Métis peoples. We also acknowledge that Toronto is covered by Treaty 13, signed with the Mississaugas of the Credit, and the Williams Treaties signed with multiple Anishinabek Nations.

Toronto is also part of the 'Dish With One Spoon Territory'. The Dish With One Spoon is a wampum treaty between multiple Anishinabek and Haudenosaunee Nations that bound them to share the territory and protect the land covering much of the Great Lakes area. Subsequent Indigenous Nations, peoples, settlers and newcomers have been invited into this treaty in the spirit of peace, friendship and respect.

The City of Toronto respectfully acknowledges the traditional land stewardship and knowledge of the land that Toronto's Indigenous persons hold, and offer respect and appreciation to, Community, Knowledge Keepers, Elders, and the Ancestors. We strive to further understand and share this knowledge about the unique and symbiotic relationships many Indigenous Nations have had over the millennia, and continue to have with this territory we collectively now call home.

Contents

Key Initiatives Advancing TransformTO	iv
Overview	1
Progress towards a low-carbon Toronto	3
Long Term Goals	6
TransformTO Alignment with International Climate Agreements	10
Guiding Principles: Equity, Health, Resilience, Economic Prosperity	10
Indigenous Engagement & Knowledge	12
Consumption-Based Emissions	12
How to read this report	13
Legend for Icons Used in Tables	13
Buildings	15
GHG Inventory and Key Drivers Analysis	16
Implementation Status of Short-Term Strategies	17
Project Profiles	19
Benefits	21
Energy	23
GHG Inventory and Key Drivers Analysis	24
Implementation Status of Short-Term Strategies	25
Project Profiles	26
Benefits	27
Transportation	29
GHG Inventory and Key Drivers Analysis	30
Implementation Status of Short-Term Strategies	32
Project Profiles	33
Benefits	35
Waste	37
GHG Inventory and Key Drivers Analysis	38
Progress towards waste goals	38
Project Profiles	39
Benefits	40
Outreach and Engagement	43
Implementation Status of Short-Term Strategies	45
Project Profiles	45
Finance and Governance	47
Implementation Status of Short-Term Strategies	49
Project Profiles	50
Leading by Example	53
Conclusion	63
Stay Involved	64

Key Initiatives Advancing TransformTO



300 million
Green bond issued



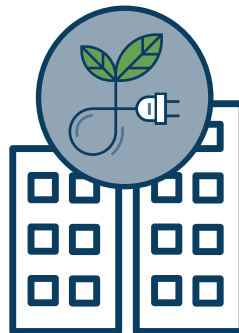
**Neighbourhood
Climate Action**
Community Grants
launched



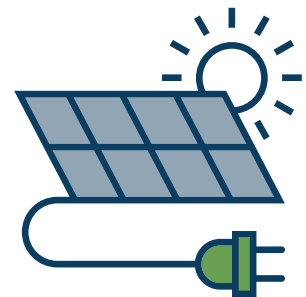
**Mount Dennis back-up
power battery project
installed by Metrolinx,**
eliminates need for
natural gas generator



**Toronto Green Standard
Version 3** in effect to drive
near-zero emissions
development



**Energy retrofits
of 21 Toronto Community
Housing buildings**



**100 Solar PV
installations on
City-owned properties**
generating **12 megawatts**
of electricity per year



Community reduce and reuse programs
in neighbourhood improvement areas



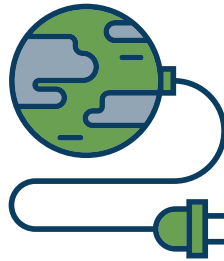
King Street transit pilot
made **permanent**



First net-zero
City-owned building:
Mount Dennis childcare centre



Electric mobility strategy:
Phase 1 completed



Joint development agreement with Enwave for **low carbon thermal energy networks**



Expanded sustainable energy plan financing
scope to support the energy retrofit loan program



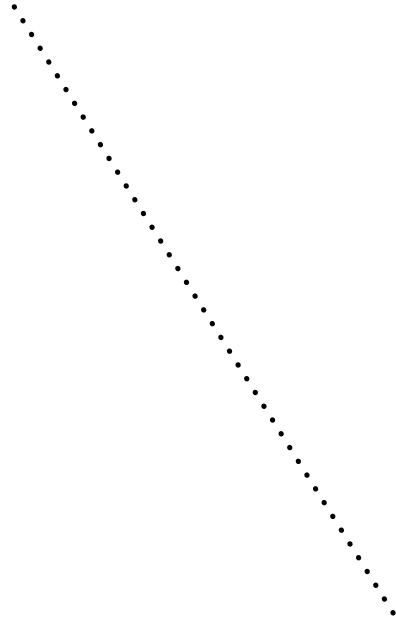
Bike-Share Toronto
expanded by over **350%** in three years



100% increase in **Home Energy Loan Program (HELP)** applications



Over **\$10 million** in **financing** provided through **High-Rise Retrofit Improvement Support Program**



Overview





Overview

In 2007, Toronto City Council unanimously adopted Toronto's first climate action strategy and set the target of reducing greenhouse gas emissions by 80 per cent against 1990 levels by the year 2050. City Council also adopted the short-term target of reducing greenhouse gas emissions by 30 per cent by the year 2020.

A lot has happened since 2007 and the year 2020 is around the corner. A report issued by the United Nations Intergovernmental Panel on Climate Change in October 2018, stressed the need to immediately dramatically reduce global CO₂ emissions to limit global warming to 1.5 degrees and avoid catastrophic impacts. Climate change is the defining global challenge of our time and Torontonians agree. A City of Toronto commissioned survey of residents, from November 2018, found that 91 per cent of residents believe climate change threatens our health and well-being and everyone needs to take steps to reduce their greenhouse gas emissions.

While Toronto can celebrate the fact that our community-wide greenhouse gas emissions are more than 40 per cent below 1990 levels, the challenge of getting to a low-carbon future is only growing. In 2015, Toronto City Council recognizing an increased urgency for climate action, launched ***TransformTO: Climate Action for a Healthy, Equitable and Prosperous Toronto***.

After two years of active resident engagement, detailed analysis and scenario modeling, City Council in July 2017 unanimously adopted the first

set of TransformTO 2017-2020 short-term strategies and a set of transformational goals identifying how Toronto will change as we collectively work towards the goal of becoming a low-carbon city. The TransformTO vision for a low-carbon future is one that not only reduces our emissions, but one that achieves multiple community-wide priorities including poverty reduction, good quality jobs, healthy communities, and increased resilience to extreme weather.

City Council in February 2018 fully funded implementation of the TransformTO 2017-2020 short-term strategies. These strategies accelerated existing actions and decisions, establish new programs and policies and collaborate with residents and businesses. While there have been changes in the external context of climate action since City Council's approval, with the cancellation of programs such as Ontario's GreenON funding for building retrofits, TransformTO implementation continues to move forward demonstrating municipal leadership.

Implementation of TransformTO combined with related strategic directions has resulted in:

- Strategies for permitting and design of near-zero emissions development;
- Programs to support deep energy and emission reduction retrofits of existing buildings;
- Actions leading to low-carbon transportation choices;

- Innovative collaborations with the private sector for the development of Low Carbon Thermal Energy Networks; and
- Strategies to reduce residential waste.

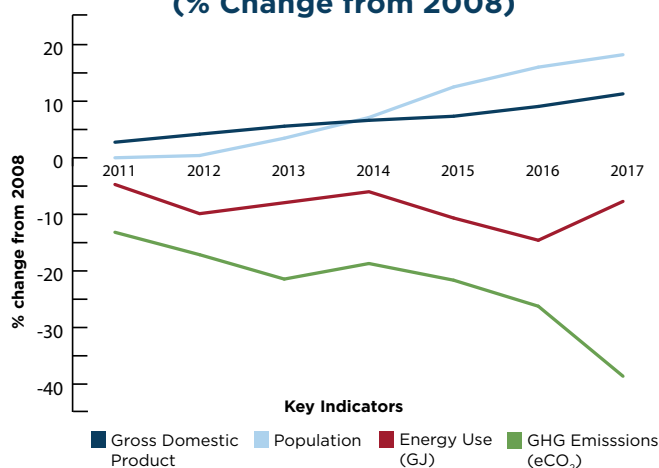
Cities are at the forefront of the efforts to address climate change and Toronto is a recognized global leader. Toronto is on the path to a low-carbon, healthy, equitable and prosperous city. This report celebrates the achievements and steps taken over the last two years towards that goal.

PROGRESS TOWARDS A LOW-CARBON TORONTO

In 2017, total community-wide greenhouse gas (GHG) emissions were 15.1 mega tonnes (MT) of equivalent carbon dioxide (eCO₂) which is 44 per cent lower than the estimated levels for 1990. This reduction reflects the cumulative impact of efforts by all orders of government including the City of Toronto, and the significant response of community and private sector actors.

Toronto GHG emissions reductions have happened in the context of both population and economic growth, making the per capita reductions additionally significant. Since 2008, Toronto's population has grown by 11% and Gross Domestic Product (GDP) by 18%, while energy use has decreased by 8% and overall GHG emissions have decreased as illustrated in Figure 1.

Figure 1: Energy, GHG Emissions & Economic Indicators (% Change from 2008)



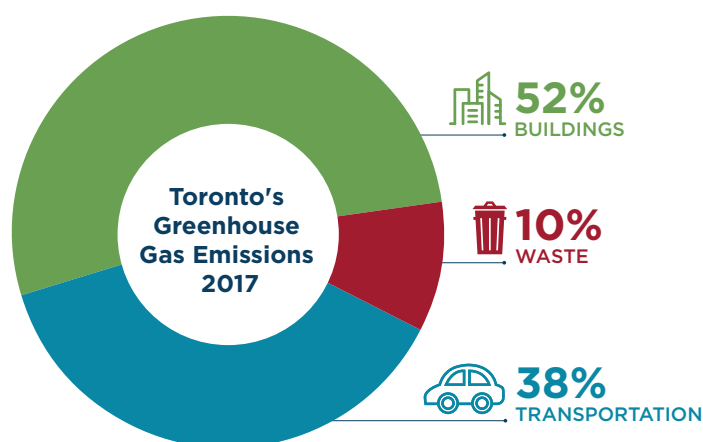
[Click to see an enlargement of Figure 1](#)

Emissions are calculated and reported as per guidance in the Global Protocol for Community-Scale Greenhouse Gas Emissions Inventory (GPC). The GPC provides a global standard for accounting and reporting community-wide GHG emissions to support climate action planning. The GPC is also the method which is employed to achieve compliance with Toronto's participation in the Global Covenant of Mayors for Climate and Energy.

Toronto's community-wide GHG inventory consists of all direct and some indirect GHG emissions from three major sectors – buildings, transportation, and waste (figure 2).

- Building emissions are calculated from the emissions associated with the consumption of natural gas and electricity.
- Transportation emissions include those from on-road passenger vehicles, heavy trucks, and buses, as well as from commuter rail and a small portion of marine navigation. Aviation and freight rail are not accounted for in this inventory as reliable data for these emissions sources is currently not available.
- Waste emissions predominately originate in landfills with a small portion coming from the treatment of wastewater.

Figure 2: Toronto's Greenhouse Gas Emissions (2017)

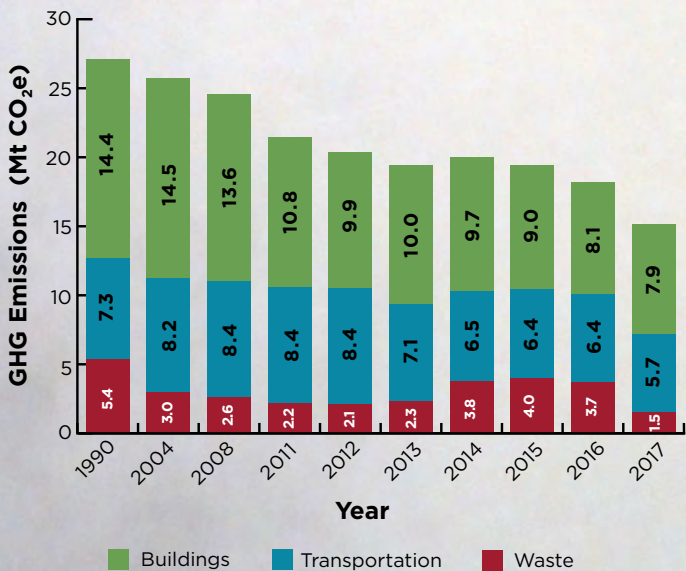


[Click to see an enlargement of Figure 2](#)



Figure 3 shows the community-wide annual GHG emissions by sectors from 1990 to 2017.

Figure 3: GHG Emissions by Sector (1990 - 2017)

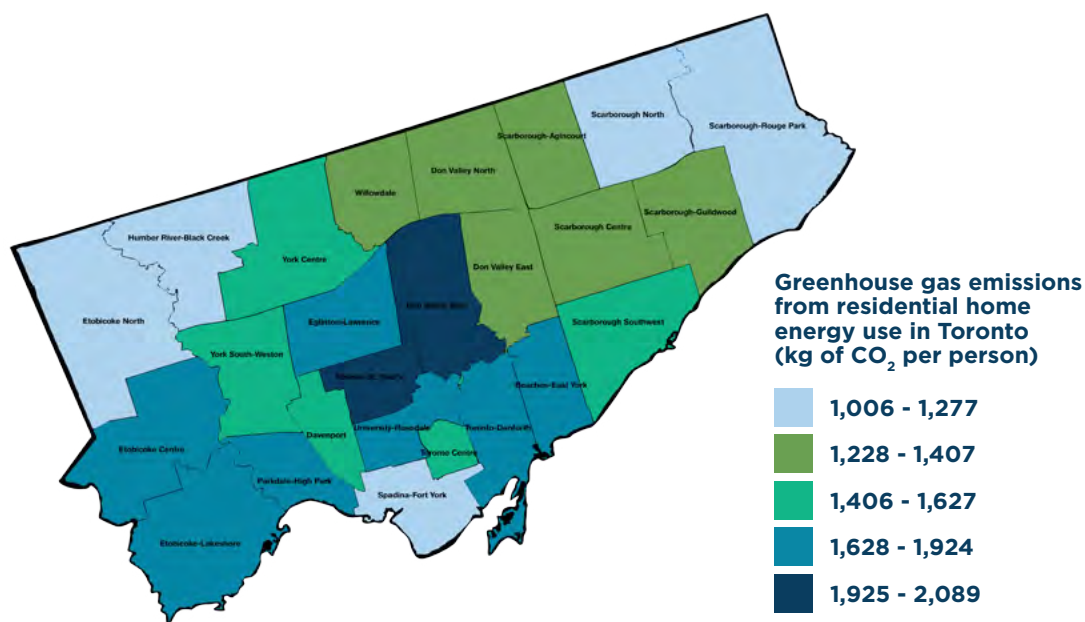


Emissions are not uniform across the city. The analysis that informed the TransformTO Strategy development included geospatial data. By modelling where in Toronto transportation and building emissions come from we see patterns and potential opportunities for action. In some areas residents are generating more emissions per capita than others, driven both by individual choices such as home energy efficiency or mode of travel, but also structural factors including access to public transit or renting versus owning a home.

Figure 4 shows modelled per capita emissions from residential buildings across Toronto. Per capita emissions levels are informed by multiple factors including housing size and density, energy efficiency of homes and buildings, and individual choices about home temperature and energy use.

[Click to see an enlargement of Figure 3](#)

Figure 4: Per Capita Emissions (modelled) from Residential Homes by Ward (2016)

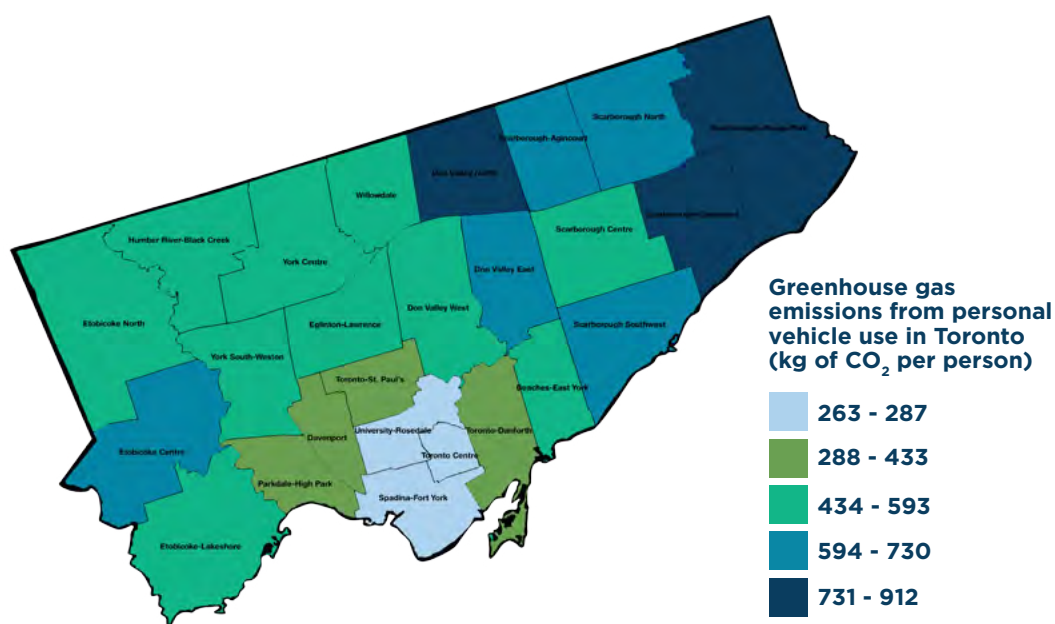


[Click to see an enlargement of Figure 4.](#)

The transportation sector generates about one-third of the overall GHG emissions in Toronto. Personal vehicle use, including travel in personal cars as well as SUVs, vans and light trucks, accounts for approximately 29 per cent of overall GHG emissions. Figure 5 shows modelled per capita transportation emissions from personal vehicles.

Per capita GHG emission levels from personal vehicles are informed by multiple factors including access to public transit and active transportation infrastructure, community density and layout, the proximity of destinations, and individual choices about mobility.

Figure 5: Per Capita Emissions (modelled) from Personal Vehicles, by Ward (2017)



[Click to see an enlargement of Figure 5.](#)

LONG TERM GOALS

Toronto's GHG reduction targets, based on 1990 levels:

↓ 30% by 2020


↓ 65% 2030


↓ 80% by 2050


How we'll get there:


100% 
of new buildings are near
zero GHG emissions by 2030

100% 
of existing buildings are
retrofitted by 2050

75% 
of energy comes from renewable
or low-carbon sources by 2050

30% 
of total floor space uses
low-carbon thermal energy
by 2050

100% 
of transportation uses low
or zero carbon energy by 2050

75% 
of trips under 5km are
walked or biked by 2050

95% 
of waste is diverted
in all sectors by 2050

The low-carbon Toronto in 2050 is one where all buildings are energy efficient, all transportation is low-carbon, and the energy we use comes primarily from low-carbon sources. These goals, unanimously adopted by City Council in 2017, guide the actions we collectively need to take to achieve a low-carbon future.

The indicators presented here use a 2016 baseline and will be used to measure the impact towards achieving the long-term community wide low-carbon goals to 2050.

TransformTO Goal		Indicator	Measure	Baseline (2016)	Indicator ¹ (year)	
Buildings	1	100% of new buildings are designed and built to be near-zero GHG emissions by 2030	Decreased average GHG intensity of new buildings	Average GHG Intensity (kilograms per square metre) of new building development applications ²	23 kgCO ₂ /m ²	19 kg CO ₂ /m ²
			Increased number of lower emission development applications	Number of applications pursuing Toronto Green Standard near-zero pathway (tier 4) ³	N/A	1
	2	100% of existing buildings are retrofitted to the highest emission reduction technically feasible, on average achieving a 40% energy performance improvement, while limiting affordability impacts to residents, by 2050	Decreased tonnes of CO ₂ e from buildings sector	Total tonnes of CO ₂ e from all buildings	8,150,000 tonnes of CO ₂ e	7,900,000 tonnes of CO ₂ e (2017)
			Decreased energy use in privately-owned buildings	Weather normalized average energy use intensity for office buildings over 250,000 square feet ⁴	93 kBtu/ft (2017)	N/A

- 1 The latest available data is used wherever possible. The City of Toronto uses an internationally recognized methodology to calculate greenhouse gas emissions, which means emission data is two years delayed.
- 2 Greenhouse gas intensity (GHGI) is a measure of the carbon performance of a given building design. It is expressed in kg/m² /year and represents the modelled annual energy use of a building converted to GHG emissions using an emissions factor for the specific energy sources to be used in the building divided by the floor area of the building. In this way, the GHGI is a proxy for the modelled carbon performance of a particular building design. Design factors which reduce operational greenhouse gas intensity in a building include use of passive design elements, zoning or on-demand systems, choosing high performance active mechanical heating, cooling, or ventilation systems, and favouring the use of lower emission energy sources such as waste heat recovery, electricity, and renewables. This calculation represents an average of the modelled GHGI for all development proposals received under the Toronto Green Standard in a calendar year. Actual building performance will vary from the modelled performance in the development application. The Toronto Green Standard Version 3 includes a target of 20 kgCO₂/m².
- 3 This includes building applications that are submitted and reviewed that meet the Toronto Green Standard. The Toronto Green Standard's implementation is designed to include updates to the standard that includes higher performance standards in each version. Four tiers of increasing performance were developed to reflect the need to update building performance targets every four years to reach the zero emissions target by 2030. Every four years, a new version of the Toronto Green Standard will come into effect, raising the required minimum performance standards until near-zero emissions designs become mandatory starting in 2030. On May 1 2018, the Toronto Green Standard Version 3 came into effect.
- 4 Site Energy Use Intensity (EUI) expresses a building's energy use as a function of its size, and is calculated by dividing the total energy consumed by the building in one year by the total gross floor area of the building. A lower EUI indicates a more efficient building. In 2018, the Province of Ontario's Energy & Water Reporting and Benchmarking (EWRB) regulation only required privately owned buildings within the City of Toronto which are over 250,000 square feet in size to self-report this metric. More information will become available over the coming years as the regulation expands to include more building types and sizes. The City of Toronto will further analyze and report on this data as it becomes available.

TransformTO Goal		Indicator	Measure	Baseline (2016)	Indicator ¹ (year)
Energy	3	75% of community-wide energy use is derived from renewable or low-carbon sources by 2050	Increased percentage of energy derived from renewable or low-carbon sources	Percentage of community-wide energy derived from renewable or low-carbon ⁵	25% Low-carbon 17% Renewable 25% Low-carbon 17% Renewable (2017)
	4	30% of total floor space community-wide – residential and commercial – will be connected to low-carbon thermal energy by 2050	Increased percentage of floor space connected to low-carbon thermal energy	Percentage of community-wide floor space energy derived from renewable or low-carbon ⁶	2% 2% (2018)
			Increased total square metres of floor space connected to low-carbon thermal energy	Total square metres of floor space connected to low-carbon thermal energy ⁶	4-6 million square metres 4-6 million square metres (2018)

- 5 This per cent is determined by calculating the portion of all energy sources (including mobile fuels) that are low-carbon or renewable. For this calculation, renewable energy is understood as energy that is from a non-fossil fuel and is renewable while low-carbon energy is understood as non-fossil fuel sourced energy, including nuclear.
- 6 This measure includes both networked and building-scale systems. Toronto has a number of existing and growing thermal energy networks (district energy) systems, as well as new and existing building-scale thermal energy system. This measure is based on voluntary information provided by network system owner and operators as well as stakeholder surveys and reports. The accuracy of the measure is expected to increase through continued coordination and partnership with stakeholders.

TransformTO Goal		Indicator	Measure	Baseline (2016)	Indicator ¹ (year)	
Transportation	5	100% of transportation options - including public transit and personal vehicles - use low or zero-carbon energy sources	Decreased tonnes of CO ₂ e from transportation sector	Total tonnes of CO ₂ e from transportation sector	6,400,000 tonnes of CO ₂ e	5,700,000 tonnes of CO ₂ e (2017)
			Increased number of low or zero-carbon personal vehicles	Number of electric private vehicles in Toronto ⁷	1,600	6,200 (2018)
			Increased number of low or zero-carbon public transit vehicles	Number of low or zero-carbon transit vehicles ⁸	0	0 (2018)
	6	Active transportation accounts for 75% of trips under 5 km community-wide by 2050	Increased percentage of active transportation used for trips under 5km	Percentage of commuting trips under 5km by walk or cycle ⁹	37%	37% (2016)
Waste	7	95% of waste is diverted in all sectors – residential, institutional, commercial and industrial - by 2050	Decreased GHG emissions from waste	Total tonnes of CO ₂ e from waste ¹⁰	3,700,000 tonnes of CO ₂ e	1,500,000 tonnes of CO ₂ e (2017)
			Increase in residential waste diversion	Percentage of residential waste diversion ¹¹	52%	53% (2017)

7 This is the number of active electric vehicle registrations in the city of Toronto. This includes both plug-in hybrid electric vehicles and battery electric vehicles.

8 The first all-electric TTC bus began operation on June 3rd 2019. It is the first of 60 electric buses the TTC will have by the first quarter of 2020..

9 Data from the Transportation Tomorrow Survey 2016 and measures all trips from home to work and trips from home to school that are less than 5km by walking or cycling. The survey is updated every five years.

10 Compared to 2016, this is a reduction of half of the emissions reported. This is due largely to changes in methodology where the contribution of privately collected and managed waste has been adjusted to better reflect the contribution of waste from the private sector.

11 This diversion rate represents the amount of diverted tonnes achieved by both single-family homes and multi-residential buildings (categorized as having nine or more units). This breaks down into a 66 per cent diversion rate for residents living in single-family homes and 28 per cent for residents living in multi-residential buildings. This diversion rate does not include waste collected at institutional, commercial and industrial facilities as diversion information is not available for private collected waste.

TRANSFORMTO ALIGNMENT WITH INTERNATIONAL CLIMATE AGREEMENTS

The Environment and Energy Division partnered with C40 Cities to evaluate if TransformTO aligns with the Paris Agreement and the International Panel on Climate Change (IPCC) science-based targets to limit planetary warming to 1.5 degrees Celsius.

C40 evaluated Toronto's plans against the C40 Climate Action Planning (CAP) Framework. The C40 Cities CAP Framework sets out the essential components of climate action planning to deliver low-carbon resilient development consistent with the objectives of the Paris Agreement.

The CAP framework has been peer reviewed by key external organisations dedicated to climate change, adaptation and achieving the objectives of the Paris Agreement.

From January through April 2019, C40 Cities reviewed Toronto's climate action plans for both mitigation (TransformTO) and adaptation (Toronto Resilience Strategy) against requirements in three categories: commitment and collaboration; challenges and opportunities; and acceleration and implementation.

Toronto's plans were found to meet the requirements to align with the Paris Agreement, however the absence of an emissions neutral

goal by 2050 diverges from the accepted level of necessary ambition. To fully align with the Paris Agreement, Toronto was advised to adopt a GHG emissions neutrality goal for 2050 similar to other leading international cities including Oslo, Melbourne, and Paris.

The additional advice from this review, including recommended new or accelerated action, will inform the development of the next TransformTO Implementation Plan.

GUIDING PRINCIPLES: EQUITY, HEALTH, RESILIENCE, ECONOMIC PROSPERITY

TransformTO is grounded in the idea that reducing GHG emissions is not only necessary to avoid the worst effects of climate change, but that climate actions can also achieve multiple community-wide objectives. C40 Cities has launched the Inclusive Climate Action program focussed on "ensuring that efforts to address climate change help create sustainable cities for all." Toronto is actively engaged with this network to ensure our programs and policies address the disproportionate impacts of our changing climate on equity-seeking groups. Using the following TransformTO guiding principles when designing and delivering climate actions will ensure that the transition to a low-carbon Toronto occurs in a way that maximizes public benefit and minimizes harms.



TransformTO Guiding Principles



Advance social equity



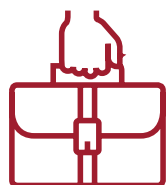
Protect low-income residents



Improve affordability particularly for vulnerable population



Enhance and strengthen the local economy



Maintain and create good quality local jobs



Improve public health



Contribute to poverty reduction



Create resilient communities and infrastructure

In an effort to ensure climate action delivers on broad potential benefits, the Environment and Energy Division (EED) has initiated two parallel tracks of activity:

- building internal capacity to analyze the equity impacts of program and policy design and delivery, and
- evaluating which benefit opportunities are the most significant for climate action in Toronto.

Equity Impact Analysis Capacity Building

The EED Equity Action Team is leading a program for equity analysis capacity building for all EED staff. One cohort of staff have completed the Urban Sustainability Directors Network Equity and Sustainability training program, and a second cohort is currently participating through lunch and learns. In partnership with the People, Equity, Diversity and Human Rights Division, EED staff are supporting the development of the City of Toronto Equity Lens training course, and participated in the pilot training course. EED staff are advancing the TransformTO guiding principles by applying equity lens analysis early in program and policy design and specific instances are highlighted throughout this report.

Benefit Assessment

To better understand where the greatest

opportunities for benefits exist, three research studies have been completed by external consultants on the benefit opportunities of climate action in Toronto. Each report presents analysis of relationships between climate action and benefit.

Benefits of Actions to Reduce Greenhouse Gas Emissions in Toronto: Health and Health Equity identifies that “climate change has been described as the ‘biggest global health challenge of the 21st century’” and that there are “strong connections between GHG-reduction actions and health benefits across diverse cities.”

Benefits of Actions to Reduce Greenhouse Gas Emissions in Toronto: Prosperity and socio-economic equity supports Toronto’s ability to “understand and communicate the significant economic and socio-economic equity benefits that can potentially be obtained from climate action.”

Benefits of Actions to Reduce Greenhouse Gas Emissions in Toronto: Climate Resilience report “proved beneficial in identifying mitigation/resilience benefit linkages and exploring the variables involved in the relationship”.

These reports are available on the TransformTO website at www.Toronto.ca/TransformTO and specific findings are highlighted throughout the benefits sections of this report.

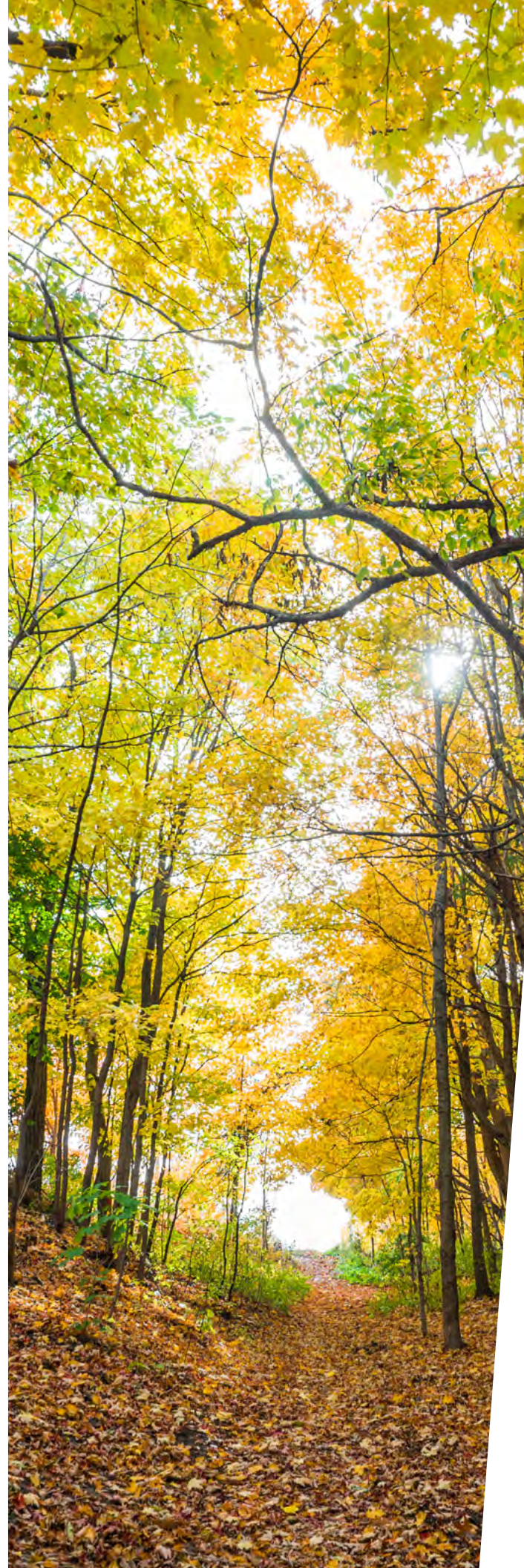
INDIGENOUS ENGAGEMENT & KNOWLEDGE

With funding from the Urban Sustainability Directors Network, EED initiated a process to include Indigenous communities and Indigenous Knowledge (IK) into the ongoing development and implementation of TransformTO. In partnership with the not-for-profit organization Indigenous Climate Action, EED and the Resilience Office collaborated on a one-day workshop to discuss the next steps in supporting, promoting, and connecting with urban Indigenous climate action. The report from the workshop is available on the TransformTO website: [Toronto.ca/TransformTO](https://toronto.ca/TransformTO). It emphasizes the centrality of relationship building over time, and the essential nature of land-based programs for urban Indigenous communities. It calls on the City of Toronto to adopt full cost accounting methods and consider environmental impacts from a lifecycle approach.

These insights will guide the ongoing work of TransformTO and be built upon in the next TransformTO implementation plan as the first preliminary steps in responding to Toronto City Council's direction (2017. PE19.4) to "undertake appropriate consultation with the Aboriginal community on the TransformTO plan and implementation, including any local traditional knowledge relevant to climate change".

CONSUMPTION-BASED EMISSIONS

Consumption-based emissions are an emerging area of research and actions. Cities like Toronto consume more than we produce, meaning we indirectly cause emissions elsewhere by purchasing goods and services from producer areas of the world. City Council directed that EED investigate consumption-based emissions in Toronto. A partnership with C40 resulted in a preliminary analysis of consumption-based emissions in Toronto suggesting there are significant opportunities to address consumption-based emissions associated with the construction industry and food. The next TransformTO Implementation Plan will present actions to advance sustainable consumption.





HOW TO READ THIS REPORT





This report is divided into seven chapters. The first four chapters include a detailed breakdown per emission sector – Buildings, Energy, Transportation and Waste – and provide a comprehensive overview of our progress by highlighting:





- Toronto’s 2017 GHG Inventory;
- A key drivers analysis of major sector trends;
- An update on TransformTO short-term strategies;
- Project Profiles demonstrating success in public engagement, resource mobilization and describing project equity, health, prosperity, resilience benefits; and an
- Overview of benefits of climate action by sector.

The next two chapters - Outreach and Engagement and Finance, Governance and Partnerships are known as the ‘enabler’ chapters since without the efforts made in these areas, we would not be able to achieve the progress made thus far.

The last chapter of this report speaks to the City of Toronto Leading by Example, which is a summary of progress made by the City of Toronto to incorporate sustainable practices, improve energy efficiency and reduce GHG emissions in our own facilities and operations.

LEGEND FOR ICONS USED IN TABLES

Icon	Progress Stage
	Initiated
	Planning
	In Progress
	Completed

Icon	Meaning
	Equity
	Health
	Jobs
	Resilience

Buildings



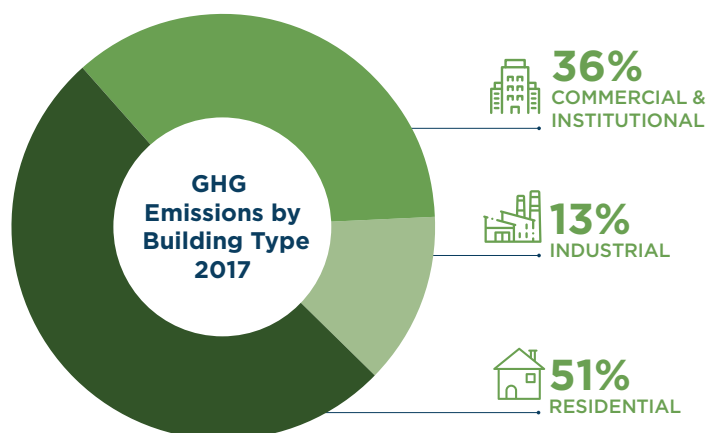
Buildings

GHG INVENTORY AND KEY DRIVERS ANALYSIS

Building emissions are approximately 7.9 MT of the City's total inventory in 2017, making up the largest share of emissions at 52 per cent.

Figure 6 shows the buildings sector broken down into residential, commercial/institutional and industrial.

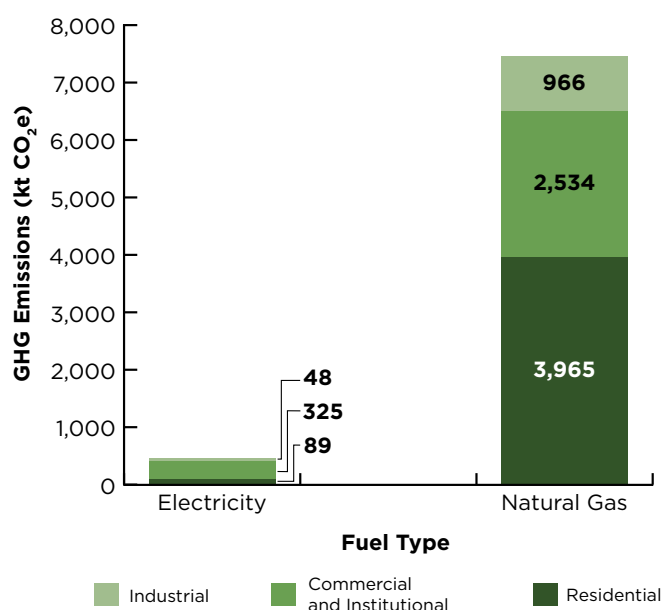
Figure 6: GHG Emissions by Building Type (2017)



[Click to see an enlargement of Figure 6.](#)

Figure 7 shows the three main building types in Toronto and the portion of their emissions by fuel source – by both electricity and natural gas.

Figure 7: GHG Emissions from Buildings, by fuel and building type (2017)










[Click to see an enlargement of Figure 7.](#)







Residential buildings contribute the majority of emissions in this sector followed by commercial/institutional. In both of these sectors, GHG emissions from natural gas are much more significant than those from electricity. For example, residential natural gas emissions make up approximately 50 per cent of overall buildings emissions in Toronto¹². Emissions from electricity have decreased in residential, commercial/institutional, and industrial buildings with the most change in reductions coming from the residential. This is driven both by increased energy efficiency and by the low-carbon electrical grid in Ontario.



¹² Emissions factor for natural gas has not changed from 2016 to 2017

IMPLEMENTATION STATUS – TRANSFORMTO 2017-2020 SHORT-TERM STRATEGIES: EMISSIONS FROM BUILDINGS

In 2016, City Council approved a series of short-term strategies (2017-2020) to initiate the transformation in Toronto's urban systems that put Toronto on the needed long-term trajectory towards a low-carbon future. Progress towards achieving these building related short-term strategies is summarized below:

#	Action	Description	Progress Snapshot	Benefits	Status
1.1	Enhancing the Better Buildings Partnership	Enable, support and catalyze retrofits of commercial and institutional building.	<ul style="list-style-type: none"> Conducted extensive stakeholder engagement with over 20 industry experts including architects, property owners and managers, construction leaders, engineers and environmental non-profit organizations to inform program design for deep retrofits. Benchmarked 50 buildings across the academic and health care sectors to identify efficient and cost effective ways to better understand building performance and provide participants with the tools to navigate funding and incentives to achieve short-term and long-term strategies. 	 Jobs  Resilience	
1.4	Improving energy efficiency of social housing	Retrofit social housing building stock	<ul style="list-style-type: none"> 21 buildings at Toronto Community Housing undergoing extensive energy upgrades 103 energy savings measures such as energy efficient boilers, and building automation has led to approximately 1,820 tonnes of annual CO₂e reduction and annual utility cost savings of \$805,000. \$1.3 billion co-investment fund to provide Toronto Community Housing with funds over 10 years for capital repairs, including energy efficiency, under the National Housing Strategy 	 Jobs  Resilience  Equity	

#	Action	Description	Progress Snapshot	Benefits	Status
1.5	Continued support for residential property owners	Retrofit single-family residential buildings – Home Energy Loan Program & Retrofit multi-residential buildings - HI-RIS	<ul style="list-style-type: none"> • Applications to HELP doubled between 2017 and 2018 and 64 projects were completed in the last 2 years. • On average participants are saving more than 30% on energy, reducing emissions by 3 tonnes/year and realizing savings up to \$560/year in utility costs. • For 2017 and 2018, the Hi-RIS program generated 3,085 CO₂e tonnes of GHG savings. 	 Jobs	
2.1	Leading-edge new construction standard	To undertake the necessary research to support integration into the Toronto Green Standard of more progressive energy-efficiency requirements.	<ul style="list-style-type: none"> • Toronto Green Standard (TGS) version 3 was approved by City Council in December 2017, setting out a path to achieve near-zero emissions by 2030 for new development. • Toronto Green Standard version 3 has avoided over 10 tCO₂ emissions compared with the Ontario Building Code since it came into effect May 1, 2018. • Under Version 3, more than 10 applicants are pursuing Tier 2, and one has submitted an application for Tier 4, a full 11 years before this becomes a mandatory requirement. • Over 200+ presentations and outreach events for Toronto Green Standard delivered. 	 Resilience	
5.2	Use building energy disclosure as an engagement tool	Use energy performance benchmarks to drive energy savings among building owners most in need of support, and further motivate industry leaders in energy-efficiency.	<ul style="list-style-type: none"> • 82% energy reporting compliance rate for buildings in Toronto during first year, higher than any other municipality and the overall provincial compliance rate of 55%. • Energy & Water Reporting and Benchmarking learnings and challenges presented and shared with other municipalities across Ontario through the Clean Air Partnership platform. 	 Resilience	

#	Action	Description	Progress Snapshot	Benefits	Status
5.4	Collaborate with utilities on local programming	Enable local utilities - Toronto Hydro and Enbridge Gas - to best support Toronto's long-term low-carbon future.	<ul style="list-style-type: none"> Currently engaged in a benchmarking activity with Enbridge Gas and uncovered GHG reduction opportunities within the Long Term Care and Education Sectors Established monthly managerial meetings to engage and support conservation activities as well as exchange best practices in collaboration with Toronto Hydro 	 Resilience	

PROJECT PROFILES

Home Energy Loan Program Expansion

The Home Energy Loan Program (HELP) offers Toronto homeowners competitive interest rates on loans of up to \$75,000 to cover the cost of home energy improvements and retrofits. Eligible home improvements include energy efficient furnaces and air conditioners, windows, doors, insulation, renewable energy technology and more.

Since 2017, the Home Energy Loan Program has seen more than a 100 per cent increase in applications with over 347 applications being submitted in 2017 and 2018. The average value of the projects also increased from \$18,000 to \$28,000. On average, HELP participants are seeing energy savings of \$560 per year. In 2018, homes that used HELP reduced their total average annual GHG emissions from 9.7 tonnes to 6.8 tonnes.

Since the start of the pilot in 2014, 172 projects have been completed. In 2017 and 2018, a total of 64 projects were completed and more than 49 projects are confirmed to finished in 2019.

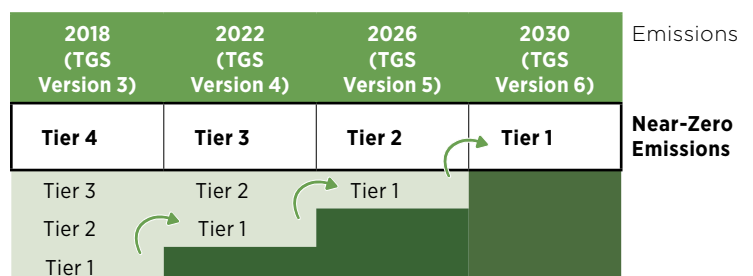
Staff have secured \$328,000 in funding from Natural Resources Canada to support residential energy-efficiency initiatives and are actively participating in a Federation of Canadian Municipalities project to better understand energy poverty issues, both of which are a direct complement to residential programming efforts.

Toronto Green Standard: Towards Near-Zero Emissions New Development

The Toronto Green Standard (TGS) is a set of environmental performance measures that facilitates sustainable new development in Toronto. The standard has been responsible for developing capacity amongst developers and demonstrating that the industry can build higher performance buildings by consistently raising the bar for performance over time.

In December 2017, City Council approved the TGS Version 3 that came into effect May 1, 2018. TGS Version 3 includes a four-tiered framework for implementation of advanced performance targets that are successively required to achieve near-zero emissions for all new buildings by 2030. This update is intended to deliver TransformTO's long-term building goal which aims for 100 per cent of new buildings to be designed and built to be near-zero GHG emissions by 2030.

Figure 8: A Pathway to Zero Emissions Buildings



The TGS sets out a stepped pathway to near-zero emissions buildings, as seen in figure 8. In any given year, a developer can opt to pursue the higher tiers (i.e. Tier 2 or higher), but every four years, they will be required to “step-up” to a higher level of performance. By 2030, the Tier 1 requirement for new buildings will be a near-zero emissions design.

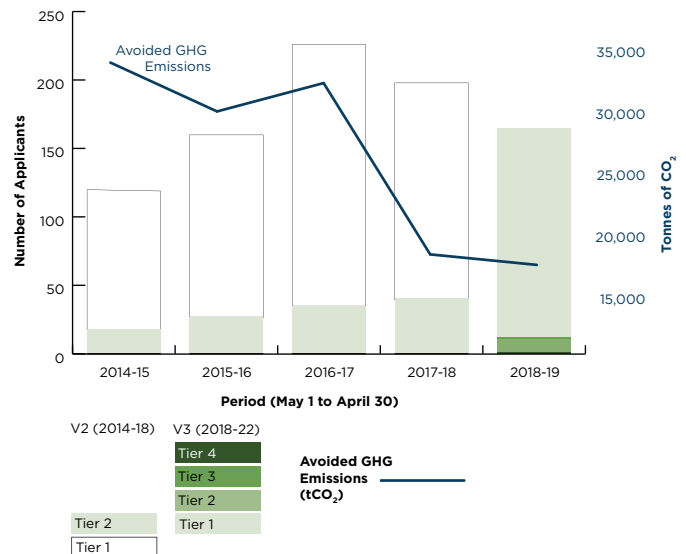
The revised and updated TGS reflects consultation with a number of stakeholders that provided input and feedback on the new standard. Version 3 of TGS is particularly noteworthy for its adoption of absolute targets for total energy use, thermal energy demand, and GHG emissions based on building types for all Tiers.

Analysis of the past five years of development applications, which includes TGS Version 2 (May 2014 – April 2018) and the first full year of TGS Version 3 (May 2018 – April 2019), indicates the success of the stepped pathway is appropriate. Based on Figure 9 below:

- The number of Tier 2 applications increased year over year under TGS Version 2, indicating that over time the development industry becomes more comfortable with higher levels of performance.
- Avoided GHG emissions compared to the Ontario Building Code (OBC) were consistent from 2014 through 2016, and then decreased in 2017 when new OBC energy performance requirements came into effect. This demonstrates not only the TGS’s ability to deliver emissions reductions in Toronto, but also its ability to influence provincial regulation.
- Despite fewer Tier 2 applications so far under TGS V3, the avoided emissions are on par with the previous year due to the higher requirements. This is in part due to the fact that under Version 3 all applicants are required to meet performance levels that are equivalent to Tier 2 of Version 2. In other words, developers are thus far demonstrating their ability to step-up.

- Under Version 3, more than 10 applicants are pursuing Tier 2, and one has submitted an application for Tier 4, a full 11 years before this becomes a mandatory requirement.

Figure 9: Toronto Green Standard: Annual development applications and estimated avoided GHG emissions (2014/15 - 2018/19)



[Click to see an enlargement of Figure 9.](#)

Changing Lanes: Building Laneway Suites in Toronto

In June 2018 City Council adopted Official Plan and Zoning By-law amendments to permit laneway suites in the Toronto and East York areas of the City. Laneway suites are separate rental housing units located in the backyard of existing houses, next to a public laneway. The new permissions for laneway suites allow them to be constructed as-of-right, subject to some criteria, adding new rental stock to the city’s established neighbourhoods.

Laneway suites are a part of complete low-carbon communities. They provide a new option for people to rent in neighbourhoods that are already well served by parks, community facilities, schools, transit, and other amenities, as well as near commercial and employment areas, helping limit the need for automobile trips thereby reducing GHG emissions. Laneway suites can also help make public laneways and communities more green, liveable, and safe.

The City estimates that between 100 and 300 laneway suites will be constructed annually. Since

the By-law to allow laneway suites was enacted in August 2018, the City has received over 100 preliminary review applications for laneway suites and has issued several building permits. The City is currently consulting on expanding permission for laneway suites from Toronto & East York to the rest of the city.

Emissions Reduction Policy Strategy for Existing Buildings

In early 2019, the Environment and Energy Division began the process of developing a comprehensive policy strategy to drive near-zero emission performance and environmental sustainability in Toronto’s existing buildings. The strategy will enable GHG emission reductions by providing the market with clear and predictable performance expectations into the future.

Currently, the Environment and Energy Division is retaining external expertise to support the development of the strategy, which will investigate two main components; a framework for emissions and energy performance standards for existing buildings, and a suite of policy and regulatory mechanisms that will support the existing building sector in realizing those performance standards. The strategy will also consider job creation and economic development opportunities, along with ways building retrofits can support indoor environmental healthy and the ability of residents to shelter in place.

Taking Leadership: In Pursuit of Carbon Neutral: The Arthur Meighen Building

The Arthur Meighen Building, located at St. Clair and Yonge Street and owned by the Government of Canada is currently being renovated to be carbon neutral. When complete it will include solar panels, a geothermal heating and cooling system and will serve as the main Government of Canada building for the Ontario region. The major renovation of this 10-storey building with an area of 41,085 m² built in the 1950s, is undergoing a major renovation as a flagship model

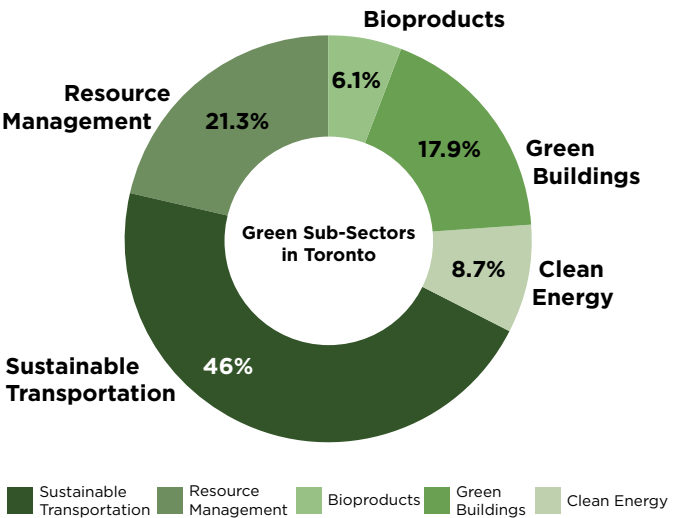
that demonstrates the federal government’s commitment to reduce its carbon footprint. When complete it is estimated that the building’s GHG emissions will be reduced by 88 per cent, compared to the current building’s performance.

BENEFITS

One area where Toronto can see a benefit in the buildings sector is through workforce development and economic growth associated with green building construction and energy efficiency retrofits. In fact, an Ontario study found that for every \$1 million invested in energy efficiency programs, we can expect 17-21 job-years and \$2.4-3 million in net GDP growth¹³. The construction of high-performing buildings is an opportunity to increase good quality jobs and ensure that equity-seeking groups facing barriers to employment are part of the transition to a green workforce.

Toronto’s green sector is strong and growing rapidly by protecting the environment while creating jobs and local wealth. Toronto’s green sector employs more than 29,000 people (see figure 10).

Figure 10: Breakdown of Toronto’s Green Sub-Sector Employment



[Click to see an enlargement of Figure 10.](#)

13 City of Toronto, [Benefits of actions to reduce greenhouse gas emissions in Toronto Prosperity and socio-economic equity](#), 2019.

A 2017 Mowat Centre report on Decent Work in the Green Economy found that a number of equity-seeking groups - including racialized populations, Indigenous peoples, women, newcomers, and workers with disabilities - continue to face inequities in Ontario and experience barriers to accessing decent work¹⁴. This presents an opportunity to ensure that people facing barriers to employment are considered in program development.

High performance buildings are also able to protect inhabitants during periods of extreme weather. Toronto has experienced a number of extreme weather events when buildings have lost heating or cooling for significant periods, leading residents to live in uncomfortable and even dangerous conditions, which can impact health. Energy modelling conducted in the development of the Toronto Green Standard has shown a correlation between the achievement of higher levels of building energy performance and improved thermal resilience¹⁵. For example, buildings designed with thicker building envelopes or other highly efficient building strategies help to maintain liveable indoor temperatures with less energy and for longer periods of time during power outages.

Benefits of achieving the TransformTO new and existing building goals include:

- Increased quality of life for building residents
- Energy cost savings
- Increased energy security and grid resilience
- Increased local employment
- Improved indoor and outdoor air quality
- Improved access to low-carbon and active transportation options
- Increased resilience and thermal comfort in extreme weather events
- Avoided weather damage costs
- Increased property value

¹⁴ Mowat Centre, [Decent Work in the Green Economy](#), 2017.

¹⁵ City of Toronto, [Zero Emissions Buildings Framework](#), 2017.



Energy



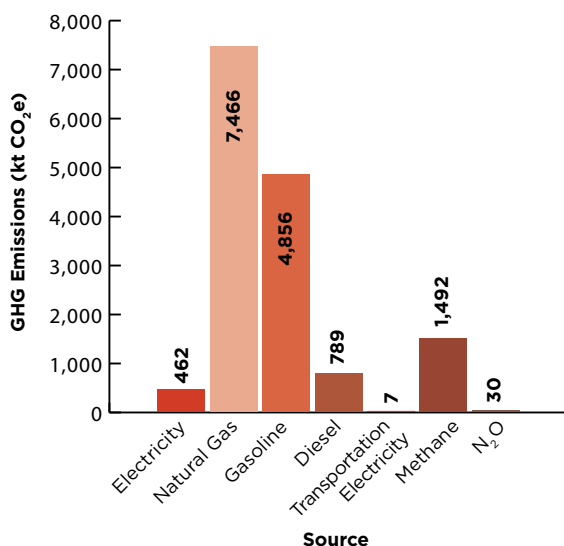
Energy

GHG INVENTORY AND KEY DRIVERS ANALYSIS

Reducing energy consumption is a priority in reducing GHG emissions. By using less energy, be it through high-efficiency appliances, walking, cycling or using public transit rather than driving, or avoiding wasting food that would end up in the green bin, conserving energy is the best way to reduce GHG emissions. For the energy needs that remain, using low-emission energy sources is the necessary next step. TransformTO sets the goal that 75 per cent of all energy used in Toronto will come from low or zero-carbon sources by 2050.

Figure 11 shows the relative contribution to emission in Toronto from each fuel source.

Figure 11: GHG Emissions by Source (2017)



Natural gas consumption remains the largest source of GHG emissions in Toronto, followed by transportation fuels, primarily gasoline fuel used for personal and light-duty vehicles.

While electricity is currently low-carbon in Ontario, there are times when peak demand requires the use of natural gas to generate electricity and this results in the GHG emissions associated with electricity generation.

Ontario's Electricity Grid in 2017

The Ontario government phased out the use of coal to generate electricity at the end of 2014, drastically reducing the carbon content in electricity generation province-wide. In 2017, to cover baseload electricity use in Ontario, the provincial electricity grid was fed by 60 per cent nuclear, 26 per cent is hydro, about 10 per cent renewable (2.2 per cent solar, 7.2 per cent wind, 0.4 per cent biomass) and 4 per cent gas. In 2017, the Ontario electricity emissions factor is at 20 g/kWh, down from 40g/kWh in 2016. During periods where the use of electricity is beyond baseload, natural gas plants are used to meet increased demand. This usually happens during peak use times of the day, thereby increasing the emissions of carbon for electricity generated during those times. These are referred to as 'marginal emissions' because they are produced on the margins.








[Click to see an enlargement of Figure 11.](#)

The Ontario emissions factor is currently low, however within the next 10 years, that emissions factor will

rise as nuclear generation capacity is phased out, if renewable generation does not grow to fill the gap.

IMPLEMENTATION STATUS – TRANSFORMTO 2017-2020 SHORT-TERM STRATEGIES: EMISSIONS FROM ENERGY SUPPLY

In 2016, City Council approved a series of short-term strategies (2017-2020) to initiate the transformation in Toronto's urban systems that put Toronto on the needed long-term trajectory towards a low-carbon future. Progress towards achieving these energy related short-term strategies is summarized below:

#	Action	Description	Progress Snapshot	Benefits	Status
2.2	Community Energy Planning	To maximize the potential for low-carbon development through the preparation and implementation of community energy plans for all new major developments and revitalization areas	<ul style="list-style-type: none"> Since 2016, completed four Community Energy Plans – Port Lands Net-Zero Energy Plan; Downtown (TOcore) Infrastructure Plan; Mount Dennis neighbourhood Net-Zero Energy Plan; Consumers Road Business Park. 87 Energy Strategy Reports reviewed in 2017 and 2018 for Rezoning Development Applications. 	 Resilience	
2.3	Low-carbon/ Renewable Thermal Energy Networks (District Energy)	To reduce emissions from district energy systems including health care and institutional campuses	<ul style="list-style-type: none"> Innovative joint development partnership for low-carbon thermal networks established with Enwave in April 2018 after a competitive procurement process. Etobicoke Civic Centre Precinct Net Zero Community is currently the most significant project in development with potential for others to imitate. 	 Resilience	
2.4	Renewable Energy Strategy	To create a renewable energy strategy to advance emerging clean technologies such as solar PV, wind, biogas, geo exchange and energy storage through a comprehensive long-term strategy developed with industry and community stakeholders	<ul style="list-style-type: none"> Identified as a 2019-2020 priority activity that will be supported by the Environment and Energy Division and other City Divisions, as well as external consultants. This activity will include engagement with key stakeholders such as energy developers, utilities, various associations, and the public. 	 Resilience  Jobs	

PROJECT PROFILES

Partnership with Enwave to Deliver Low-Carbon Thermal Energy Networks

In April 2018, the City of Toronto and Enwave Energy Corporation, a private energy company, signed a Joint Development Agreement to deliver Low-Carbon Thermal Energy Networks (LCTEN), also known as district energy systems. LCTEN use energy from renewable sources, such as heat recovery, geo-exchange and solar thermal, to heat and cool multiple buildings in an area.

The partnership with Enwave will enable the City to accelerate and scale-up LCTEN delivery. Enwave brings extensive technical and business experience, and the ability to secure investment, while the City can provide access to low-carbon energy sources and other funding.

In addition to delivering cost-effective GHG emission reductions and potential revenue opportunities for the City, this partnership will promote and maximize benefits for the community at large through local economic development and improved resilience.

Port Lands Net Zero Energy Plan

Toronto's Port Lands is 320+ hectares of post-industrial waterfront land located east of the downtown core. Its scale and location, combined with the ongoing investment in infrastructure, presents a truly unique opportunity to develop Toronto's largest Net Zero Community.

A Net Zero Community maximizes the use of local, low-carbon energy sources, approaching zero emissions over time. The approach is to first significantly reduce energy use in buildings through passive design and energy efficiency, followed by renewable energy supply at both the building and district-scale.

At the direction of City Council in 2014, staff prepared the Port Lands Net Zero Energy Plan, which was approved in 2017. Key guidelines include buildings designed to meet the highest levels of the Toronto Green Standard, and thermal energy networks connected to renewable energy sources.

Achieving net zero in large, growing areas such as the Port Lands is a key part of achieving the goals TransformTO. In addition to reductions in energy use and emissions, a Net Zero Community will provide benefits like increased socio-economic diversity as well as promoting a healthy, resilient and sustainable neighbourhood.

Growing district energy systems: Enwave's expansion to The Well

Allied Properties REIT, RioCan REIT and Enwave have joined forces to extend Enwave's existing Deep Lake Water Cooling and hot water distribution networks by building a new energy storage facility housed at The Well. The Well is a mixed-use residential, commercial and retail development located in Toronto's downtown west. This joint undertaking will enable westward expansion of Enwave's system, providing both The Well and surrounding communities with access to sustainable cooling and heating solutions. The installation will serve The Well community, and buildings in neighbouring areas, providing the first low-carbon, resilient cooling and heating option for the downtown west community. This collaboration is the first one of its kind in Canada and the long-term business agreement will deliver value far into the future.

This project will provide long-term benefits for the City of Toronto and support the focus on resilience and carbon emission reduction. By decentralizing energy supply and reducing the load on the electricity grid, particularly during periods of peak demand, it enables a more reliable and flexible source of energy.

The Well features 1.1 million square feet (~330,000m²) of office space, 500,000 square feet (~150,000m²) of retail and food service space, and 1,800 residential units. Construction on The Well began in 2017.



BENEFITS

Although Ontario's current electrical system is largely low-carbon, a significant number of homes and buildings are still heated with natural gas. The consumption of natural gas is associated with air pollutants such as NO₂, PM_{2.5} and O₃ which contribute to poor air quality and raise the risks of chronic diseases associated with poor air quality¹⁶. Switching to low-carbon and renewable energy systems benefits the physical health of residents by reducing these air pollutants associated with natural gas combustion.

As renewable energy and district energy systems are further developed, there will also be increased opportunities for local employment for developers, manufacturers, engineering consultants, construction, and related service providers. For example, a 2017 study found that each megawatt of residential solar deployed in Ontario would bring GDP growth of \$900,000 and create 20.9 job-years¹⁷. The development of decentralized renewable energy systems can also ensure that local residents and businesses have control over their own systems, contributing to price stability and predictability over the long-term. Where possible, the installation of renewable energy systems also provides a revenue opportunity for building owners, as excess energy is fed back into the grid.

A decentralized, diverse, and renewable energy system combined with energy storage also provides a reliable backup power source. This ensures that buildings are able to function in the event of electricity outages, including those caused by extreme weather events. Toronto is installing renewable energy systems combined with onsite energy storage in a number of its own buildings, including an EMS station and community centre. There is great opportunity for additional installations community-wide to provide backup power facilities in the event of power disruptions.

Benefits of achieving the TransformTO energy goals include:

- Improved air quality
- Increased local employment
- Economic growth and revenue opportunities from local energy generation
- Increased energy price stability
- Energy security & reliability
- Improved climate resilience and energy reliability in extreme weather

16 City of Toronto, [Benefits of Actions to Reduce Greenhouse Gas Emissions in Toronto: Health and Health Equity](#), 2019.

17 City of Toronto, [Benefits of Actions to Reduce Greenhouse Gas Emissions in Toronto: Prosperity and Socio-Economic Equity](#), 2017.

Transportation





Transportation

GHG INVENTORY AND KEY DRIVERS ANALYSIS

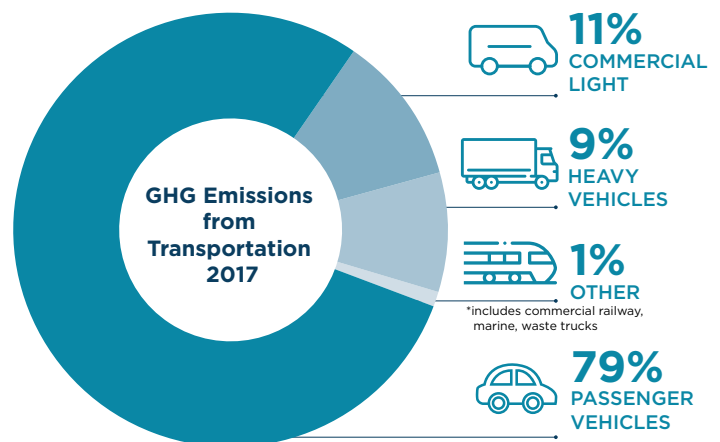
Transportation's GHG emissions in 2017 were approximately 5.7 MT, accounting for 38 per cent of community-wide emissions.

A significant change in the methodology for calculating transportation GHG emissions was applied in 2017. Toronto's Environment and Energy Division partnered with Transportation Services Division, the University of Toronto and The Atmospheric Fund to use the Transportation Services Division vehicle count data to develop a predictive spatial-temporal model for traffic in Toronto. The result is a more accurate street by street depiction of vehicle movements, volumes and speeds in the city which are then used as an input into a second model which calculates GHG emissions. The adoption of this model by the Transportation Services Division marks a significant change in how Toronto tracks vehicle movements in the city and will be used to inform transportation planning over the coming years.

Additionally, an improvement in quantifying the impact of GHG emissions from commercial vehicles was integrated into this model using recent research from the University of Toronto. Three main

categories of commercial vehicles have been more accurately captured, namely commercial vans and pick-up trucks (gasoline), commercial light trucks (diesel) and commercial heavy trucks (diesel).

Figure 12: GHG Emissions from Transportation (2017)



[Click to see an enlargement of Figure 12.](#)

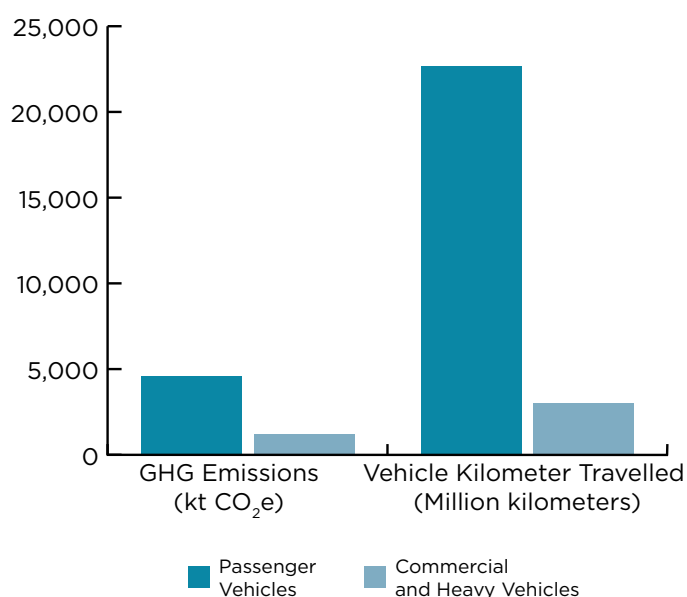
The results of the model show that the amount of vehicle kilometres travelled (VKT) has gone up significantly from the last measure in 2008, increasing by almost 3.7 billion kilometres travelled in 2016. However, overall emissions from vehicular traffic has gone down by 640,000 tonnes of eCO₂ which is a reflection of improvements in vehicle fuel efficiency, including the gradual uptake of electric vehicles in Toronto¹⁸.

¹⁸ Starting in 2004, the Canadian government and US federal EPA began harmonizing vehicle technical standards in order to ensure that vehicles and engines entering the Canadian market met more stringent exhaust emission standards (see On-Road Vehicle and Engine Emission Regulations). Successive reviews of the technical harmonization have led to improvements in emissions of cars and light duty trucks with the most recent revisions applied to the 2017 to 2025 model years.



80 per cent of all GHG emissions from transportation continue to originate from passenger vehicles including car, SUV, vans, and light trucks. Commercial vehicles account for about 20 per cent of all transportation related GHG emissions, even though they only make up about 12 per cent of all the vehicle kilometres travelled in the city.

Figure 13: Transportation GHG Emissions and Corresponding Total Vehicle Kilometer Travelled













[Click to see an enlargement of Figure 13.](#)



IMPLEMENTATION STATUS - TRANSFORMTO 2017-2020 SHORT-TERM STRATEGIES: EMISSIONS FROM TRANSPORTATION

In 2016, City Council approved a series of short-term strategies (2017-2020) to initiate the transformation in Toronto's urban systems that put Toronto on the needed long-term trajectory towards a low-carbon future. Progress towards achieving these transportation related short-term strategies is summarized below:

#	Action	Description	Progress Snapshot	Benefits	Status
3.2	Support safe cycling and walking	Invest in infrastructure and programs to support safe cycling and walking	<ul style="list-style-type: none"> • From 2016 to 2018, over 100 km of existing cycling routes received upgrades and enhancements to improve safety, and approximately 60 km of new cycling infrastructure was installed: <ul style="list-style-type: none"> • 15 lane km of cycle tracks • 18 lane km of bike lanes • 13 lane km of shared lane pavement markings • 12 centreline km of multi-use trails. • Bicycle Parking Strategy under development employing a user-centric approach to remove barriers to cycling and provide convenient and secure, bicycle parking. • Development of the Vision Zero Road Safety Plan, adopted by City Council, a comprehensive five year (2017-2021) action plan focussed on reducing traffic-related fatalities and serious injuries on Toronto's streets. 	 Health	
3.3	Enhanced transit service	Enhance transit network infrastructure and service levels	<ul style="list-style-type: none"> • Since 2015, TTC regular service has increased by approximately 10%. The City has invested in major strategic initiatives to improve the quality of TTC transit services to: <ul style="list-style-type: none"> • Reduce crowding on buses, streetcars and subways; • Reduce travel times by expanding and enhancing the express bus network; and • Increase the availability of transit by operating most routes seven days, expanding the overnight network, and extending subway service to Vaughan Metropolitan Centre. • Between 2015 and 2018, in total, \$90.3 million has been invested in transit resulting in service improvements on all subway lines, all streetcar routes and approximately 150 of 180 bus routes. 	 Resilience  Jobs	

#	Action	Description	Progress Snapshot	Benefits	Status
3.4	Develop a low-carbon freight strategy	Develop a community-wide low-carbon freight strategy, and related interdivisional policies, regarding urban goods movement/urban freight in alignment with Metrolinx's Regional Transportation Plan	<ul style="list-style-type: none"> Transportation Services is developing a Freight and Goods Movement Strategy which will be presented to Council in 2020. 	 Health	
3.5	Enable electric vehicles (EVs)	Catalyze EV infrastructure and support electric vehicle sales.	<ul style="list-style-type: none"> Ontario EV sales surpassed 8 per cent of new passenger vehicle sales in 2018. Completed the Electric Mobility Assessment Phase in 2018 which included two events with over 75 stakeholders from various City Divisions, non-profit, academic, advocacy groups, and community organizations promoting EVs and EV drivers, property developers and the automobile industry. Transportation Services, in collaboration with Toronto Hydro, will be introducing on-street EV charging stations at nine locations as a pilot in 2019. 	 Health  Resilience	

PROJECT PROFILES

King Street Transit Pilot

The 504 King streetcar is the busiest surface transit corridor in the entire city and now moves more than 84,000 riders on an average weekday, supporting TransformTO's goals of low-carbon transportation for all. The pilot, which became operational in November 2017, transformed King Street between Bathurst Street and Jarvis Street into a Transit Priority Corridor, restricting through movements at most intersections for private vehicles and

providing priority to streetcars. Streetcars now travel faster and more predictably during all periods of the day and approximately 30,000 minutes of travel time are saved by King streetcar customers daily. With more predictable travel times, more people are taking King streetcars than ever, with daily weekday ridership growing by 16 percent from 72,000 to 84,000 boardings per day. Prior to the pilot, overall customer satisfaction with King streetcar service was low on key measures such

as travel time, comfort, and wait time. Through the pilot period, customer satisfaction on all these measures have significantly improved. Beyond improved transit service, there has been an increase in the number of people cycling along King Street, likely because reduced motor vehicle volumes made it more comfortable to cycle, while total pedestrian volumes have remained stable. Due to the success of the pilot, the King Street Transit Pilot was made permanent by Toronto City Council in April 2019.

Kids ride free on TTC and GO

Children under the age of 12 can ride for free on the TTC and GO Transit, catalyzing low-carbon trips and building low-carbon behaviours. Children riding the TTC has more than doubled since children's rides were made free, from 11 million streetcar, bus and subway rides to over 28 million. TransformTO identifies low or zero emissions transportation as a critical goal for 2050, along with active transportation for 75 per cent of trips under 5km. Streetcars and subways are already electrically powered making them low-carbon transportation options. As the TTC phases in hybrid and fully electric buses in the coming years those trips will also become even lower carbon. Using transit also supports walking and cycling as it requires some walking to bus or subway stops and can involve multi-modal trips including cycling to transit stops.

Licensing of Vehicles-For-Hire

Running 24 hours a day, seven days a week, the impact of taxicabs on local air quality and climate change is significant. Toronto is the first municipality in Canada to regulate both taxicabs' GHG emissions and air quality impacts moving us towards the TransformTO goal of 100 per cent low-carbon transportation options that at the same time, improve local air quality.

Taxicabs contribute approximately 99,000 tonnes of GHG emissions in Toronto per year. City Council directed all Toronto taxicabs to be 'green taxis' so that 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.

In addition to moving Toronto towards our low-carbon mobility goal, the bylaw delivers significant public health benefits of reducing traffic related air pollution, the largest source of poor air quality in the city. More than 3,500 vehicles now meet the City's green taxi standard, up from 450 in 2014. Notably, 25 per cent of green taxis are hybrid electric or alternatively fuelled, which means they offer even greater improvements in fuel consumption and GHG emissions reductions.

Electric Mobility

Switching passenger, freight and transit vehicles from gasoline and diesel to electric and other low-carbon fuels is a central part of the TransformTO goal that all vehicles are powered with low-carbon energy by 2050. The transition to electric and other low-carbon fuels will also significantly reduce local air pollutants that affect the health of Toronto residents. In order to support the transition to electric vehicles, the City has undertaken extensive research and key stakeholder consultation to inform the development of an electric mobility strategy. The existing Electric Vehicle Working Group met four times throughout the year to inform and guide the research phase. Two consultation events also occurred involving stakeholders from various City Divisions, non-profit, academic, advocacy groups, community organizations promoting EVs and EV drivers, property developers and the automotive industry. The Electric Mobility Assessment Phase of the strategy development was completed in 2018, and the Electric Mobility Strategy will be presented in 2019.

Bike Share Toronto Expansion

The Bike Share Toronto network has expanded the number of bikes and stations by over 350 per cent in the past three years, supporting active mobility. With a total of 360 stations, 3,750 bikes, and 6,300 docking points, bike sharing acts as an extension of Toronto's public transit system and as a first/last kilometre solution by supporting short one-way trips. All three levels of government have invested in the expansion of the Bike Share Toronto infrastructure. The Government of Canada committed \$4 million through its Public Transit

Infrastructure Fund for Bike Share expansion in Toronto, which was matched with another \$4 million from the City of Toronto. Additionally, Metrolinx invested \$4.9 million to connect users to Union, Exhibition, Bloor and Main GO stations. Bike Share Toronto stations are located throughout downtown Toronto, Etobicoke, North York and Scarborough, with continued plans to expand and extend service to a greater number of Toronto's residents and visitors. Bike Share Toronto, managed by the Toronto Parking Authority, now has more than 15,000 active members and provided almost 2 million trips in 2018, supporting TransformTO's goal that 75 per cent of trips under 5km are walked or biked by 2050.

BENEFITS

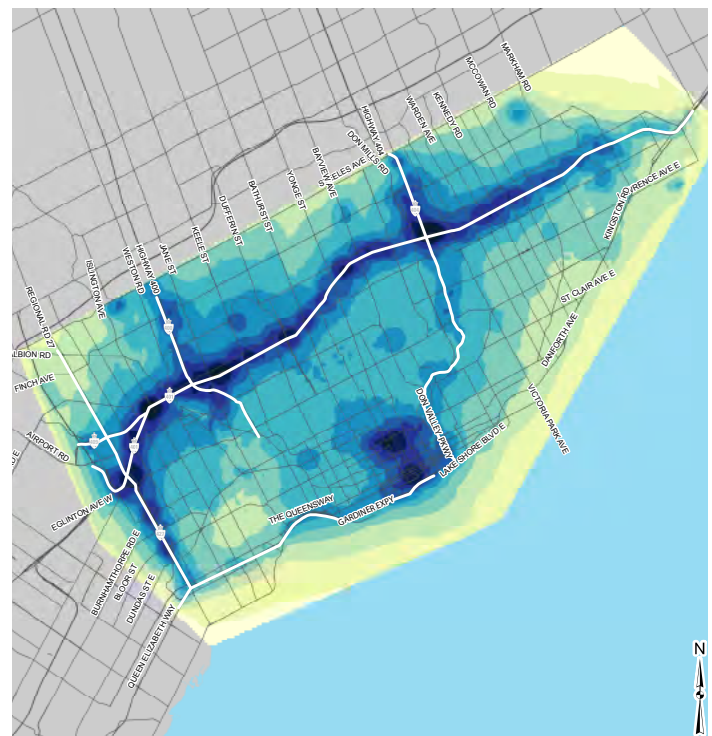
Research from Toronto Public Health and the Environment and Energy Division has found that traffic related air pollution is the largest major local contributor to air pollution in Toronto¹⁹. Achieving our low-carbon goals hinges on transforming transportation both in how we move and what fuels our movement. Achieving our transportation goals will have the greatest positive effect on people in areas that are poorly served by transit and/or lack safe active transportation infrastructure. Currently, the vast majority of transportation is fuelled by gasoline and diesel, fossil fuels that contribute to GHG emissions and emit air pollutants.

The combination of an improvement in air quality from fewer cars on the road, potential reductions in environmental noise, an increased number of people walking and biking, investments in the public transportation network, and a switch to low-carbon vehicles offers many health benefits. Poor air quality is known to increase the risks of chronic diseases. In 2014, Toronto Public Health estimated that, each year, about 280 deaths and 1,100 hospitalizations arise from exposure to traffic

related air pollution emitted within Toronto²⁰.

In Toronto, air quality is markedly worse in areas near major highways and arterial roads²¹. Figure 14 illustrates the spatial patterns of pollution concentrations across Toronto for coarse dust particles PM_{10} . The influence of transportation emissions is clear along Highway 401 and other major highways, including the additional traffic on ramps and at highway crossings and interchanges, as well as the congested downtown area.

Figure 14: Traffic Related Air Pollution – Modelled Annual Average PM_{10} Concentrations (based on 2012 data)



[Click to see an enlargement of Figure 14.](#)

Active transportation, whether it's walking to the neighbourhood store, biking to school, or walking to the nearest transit stop, is a clean, green, and healthy way to get around Toronto. In fact, some studies have found that the greatest health benefit from public transit is increased physical exercise from commuters travelling the first and last mile of transit trips using active transportation²².

19 City of Toronto, [Avoiding the TRAP: Traffic-Related Air Pollution in Toronto and Options for Reducing Exposure](#), 2017.

20 City of Toronto, [Reducing Health Risks from Traffic-Related Air Pollution \(TRAP\) in Toronto](#), 2017.

21 City of Toronto, [Avoiding the TRAP: Traffic-Related Air Pollution in Toronto and Options for Reducing Exposure](#), 2017.

22 City of Toronto, [Benefits of Actions to Reduce Greenhouse Gas Emissions in Toronto: Health and Health Equity](#), 2019.

Physical activity from active transportation has important health benefits, including significantly reducing the risk of all-cause mortality, cardiovascular disease, obesity, type II diabetes, and certain types of cancer. Physical activity also has a demonstrated positive effect on a range of mental illnesses. Increasing the use of active transportation can also generate significant social, environmental, economic and transportation system benefits. For example, a recent study in Vancouver found that for residents living within 500 metres of a newly installed active transportation corridor, moderate physical activity increased by 16.1 per cent, time spent sitting decreased by 8.0 per cent, and days of poor health decreased by 9.8 per cent after the improvements were made. They also found that the overall increase in active transportation reduced annual CO₂ emissions by 13 tonnes²³.

The benefits of achieving the TransformTO transportation goals can include:

- Improved air quality & health, especially for those near major roadways
- Improved physical & mental health from active transportation
- Improved road safety with increased public transit use
- Reduced impacts of traffic noise
- Reduced travel time and congestion
- Cost savings for users



23 Frank, L. D. & Ngo, V. D. Study of Travel, Health, and Activity Patterns Before and After the Redesign of the Comox Helmcken Greenway Corridor, Final Report (Phase 2), 2016.

Waste





Waste

GHG INVENTORY AND KEY DRIVERS ANALYSIS

Waste emissions in 2017 were approximately 1.5 MT accounting for about 10 per cent of all community-wide emissions.

Almost all (1.46 MT) of emissions from the waste sector are landfill emissions, with the remaining being a small portion from wastewater treatment processes. The key to reducing methane emissions from landfill are the landfill gas capture and processing systems in place, and waste reduction.

Toronto uses a first order decay model to determine the emissions from methane in any given year – from both historical waste and current waste going to landfill²⁴.

For the 2017 GHG emissions inventory, staff took a closer look at how emissions are currently being calculated from the collection and management of solid waste in the city and determined that Toronto has been over reporting waste emissions from the private sector over the past few years. This is due in part to the lack of available data regarding private sector waste both in terms of quantity and composition.

Staff adjusted the quantity of waste by using a currently estimated ratio of publicly-managed versus privately-managed waste in Ontario which is about a 40:60 ratio²⁵. By applying this ratio to the characteristics of a currently open landfill used by the City, an emission of private waste was proportioned assuming similar waste composition and transport methods/distance. This is a rough estimate and it is acknowledged that this estimate may change. Further, in addition to changes made to correct emissions attributed to privately managed waste, expert advice from the C40 network was sought and concluded that Toronto may wish to also adjust its methodology from a first order decay method to a methane commitment method in future calculations.

PROGRESS TOWARDS WASTE GOALS

Long Term Waste Management Strategy

The City's Long Term Waste Management Strategy (Waste Strategy) was created after two years of extensive research, comprehensive technical evaluation, and widespread public consultation and stakeholder engagement activities. The Waste Strategy, developed and led by the Solid Waste Management Services Division, was approved by

24 For example, New York employed a waste commitment method where all methane emissions from future decomposition of landfilled solid waste is allocated to the year of disposal.

25 Ontario Ministry of Environment, Conservation and Parks, [Reducing Litter and Waste in our Communities: Discussion Paper](#), 2019.

City Council in July 2016 and outlines the way waste will be managed in Toronto over the next 30-50 years.

The Waste Strategy places a priority on diverting waste from landfill through the implementation of reduction, reuse, and waste diversion (i.e. recycling and composting) policies and programs. This long-term goal of maximizing diversion from landfill is also a goal of TransformTO.

Toronto is acting on Waste Strategy recommendations through the implementation of various new programs that support waste reduction, reuse and the transition towards a circular economy and zero waste future. The first Waste Strategy Annual Report will be available online at toronto.ca/wastestrategy in summer 2019, highlight and will work undertaken from 2016 to the end of 2018.

PROJECT PROFILES

Community Reduce & Reuse Programs

Toronto has taken a community-focussed approach to fostering a culture of waste reduction, reuse, sharing, and repairing by initiating five new Community Reduce & Reuse Programs. These programs were developed through a partnership between Solid Waste Management Services and Social Development, Finance & Administration. These programs help build sustainable communities by promoting a culture of repairing and sharing, while reducing the amount of waste going to landfill. This is achieved by:

- educating residents
- providing opportunities for waste reduction, sharing, repairing and reuse
- offering skills training to create job and economic opportunities
- fostering community culture by creating spaces for local residents to gather.

These programs' success lies in engaging community partners, such as local

agencies and non-profit organizations, to deliver the programs. Multi-residential buildings and community hubs were specifically targeted because they provide the greatest opportunity for diversion and education. The program sites are based primarily within Neighbourhood Improvement Areas, which includes parts of Toronto where the City and partners invest in people, services, programs and facilities to strengthen social, economic and physical conditions.

The five programs are unique and diverse in nature and address a different waste item. Collectively, these programs take a collaborative approach to neighbourhood-level action and support the TransformTO goal of diverting waste from landfill.

Urban Harvest aims to reduce food waste by collecting and redistributing surplus backyard fruits and vegetables to local food banks.

Sewing Repair Hubs focuses on reducing the amount of textile waste by providing workshop spaces to educate and encourage the repair and reuse of clothing and textiles.

Bicycle Repair Hubs offers workshop spaces and training in bicycle assembly, repair, maintenance and safety to promote a cycling culture and reduction in scrap metal waste.

Community Composting equips resident groups with the tools, skills and knowledge to maintain a community garden, turn yard waste into compost, and learn about food waste reduction and the benefits of composting.

Sharing and Reuse Spaces (implementation in 2019) will promote a culture of reusing, sharing, repairing and repurposing items to prolong their lifecycle, resulting in less waste. Residents will be encouraged to share items with others in their community and be mindful of choosing activities and products that support reuse.

Working Towards a Circular Economy

As part of the Waste Strategy, Toronto is working towards an aspirational goal of zero waste and a Circular Economy. A Circular Economy aims to reduce waste and maximize resources by moving

away from the linear take-make-and-dispose approach to an innovative system focusing on product longevity, renewability, reuse and repair.

To drive circular economy innovation and growth, and as recommended by the Waste Strategy, the City created a Unit for Research, Innovation & a Circular Economy within the Solid Waste Management Services Division. The Unit is involved in research and planning as well as incorporating circular economy principles into new programs, policies, procurement and processes. The overarching goal of the Unit is to make Toronto the first municipality in Ontario with a circular economy.

The City is a member of the National Zero Waste Council Circular Economy Working Group, as well as the global Circular Economy 100 network, created by the Ellen MacArthur Foundation. Key initiatives undertaken by the unit include establishing a Cross-Divisional Circular Economy Working Group and a Circular Economy Working Group, a Circular Economy Procurement Framework, and a new policy for Addition of Materials to Waste Diversion Programs. For more information, please consult the Long Term Waste Management Strategy's Annual Report.

Waste Reduction Community Grants

The City launched the Waste Reduction Community Grants a three-year pilot program, to fund and support innovative community-based efforts to reduce residential waste and increase participation in existing waste diversion programs. The program focusses on increasing public engagement and education, mobilizing neighbourhood-level action, and encouraging applicants to work collaboratively with community partners to deliver projects. Investment in actions that address multi-residential buildings, multi-lingual communities, equity-seeking groups and the city's Neighbourhood Improvement Areas is a priority.

In 2018, over 80 Expressions of Interest were received and 7 projects were approved for a total funding amount of \$116,000. Projects which received funding were selected based on their

demonstrated ideas that focussed on reducing or eliminating barriers, increasing equity and access, promoting project sustainability, and serve as a best practice that could be implemented in other neighbourhoods, all while reducing waste destined for landfill.

BENEFITS

Emissions from waste contributes about 10 per cent of Toronto's overall GHG emissions. The largest portion of these emissions are from landfills. Waste reduction and diversion strategies can help build community relationships, build the local economy, save money, and reduce emissions.

The City of Toronto's Long Term Waste Management Strategy includes goals and programs to reduce waste and increased diversion. These programs operate throughout the city, including a number of programs and campaigns to reduce waste and ensure waste diversion in Neighbourhood Improvement Areas (see figure 10). These programs help build sustainable communities by offering opportunities for sharing and repairing, creating job and economic opportunities, and creating community spaces to gather.

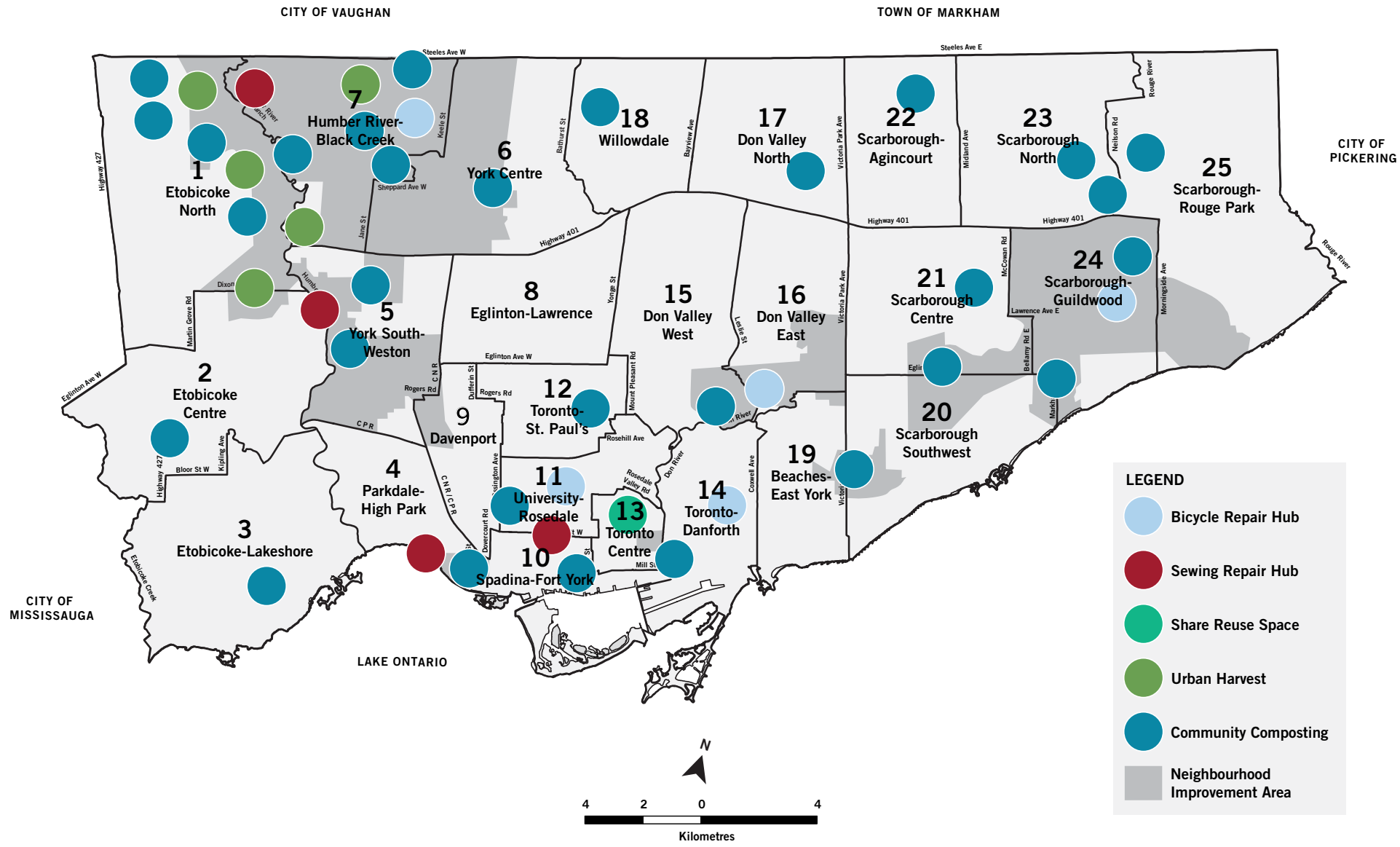
Waste reduction and diversion also supports a local economy and creates green jobs in recycling and waste processing²⁶. Reducing and reusing materials instead of buying new ones can also create jobs in rental, sharing, and repair businesses as money is spent locally instead of buying imported goods.

The benefits of achieving the TransformTO waste goal include:

- Increased community cooperation, community knowledge and participation
- Local jobs and economic development
- Decreased food waste
- Extended seven landfill lifespan by diverting waste (using less landfill space)

26 Ontario Ministry of the Environment, '[The Economic Benefits of Recycling in Ontario](#)' 2009.

Figure 15: City of Toronto Waste Programs and Neighbourhood Improvement Areas



Outreach and Engagement





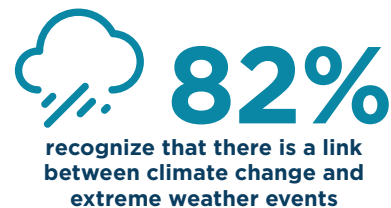
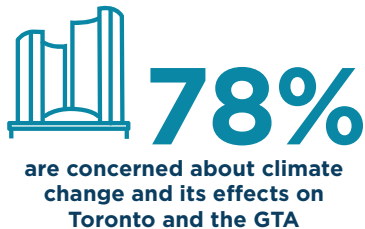
Outreach and Engagement

Extensive cross-divisional and cross-sectoral TransformTO outreach and engagement efforts were made in 2017 and 2018.

This included leveraging the full force of the Live Green Toronto program, supplemented by efforts to use mass-media to raise awareness of TransformTO and its goals. The Live Green Toronto outreach program, which participated in over 400 events in 2017 and 2018, expanded its mandate and incorporated TransformTO messaging into all aspects of its existing and new programming.

The Live Green Toronto Volunteer Program, comprised of over 1,500 volunteers who speak 110 languages, added 200 volunteers in the last two years alone and delivered hands-on training about TransformTO.

In 2018, the City of Toronto commissioned a survey to capture residents' perceptions on climate change and to better understand their willingness to take action in the community.



However...




48%
don't know what they can do to address climate change

The most desired motivators for climate action were found to be incentives for home energy efficiency and for infrastructure and support for sustainable transportation methods (cycling,

public transit, electric vehicles). The most common barriers preventing climate action are convenience, expense, and lack of interest.

IMPLEMENTATION STATUS – TRANSFORMTO 2017-2020 SHORT-TERM STRATEGIES: OUTREACH AND ENGAGEMENT

In 2016, City Council approved a series of short-term strategies (2017-2020) to initiate the transformation in Toronto's urban systems that put Toronto on the needed long-term trajectory towards a low-carbon future. Progress towards achieving the outreach and engagement related short-term strategy is summarized below:

#	Action	Description	Progress Snapshot	Benefits	Status
5.3	Leverage Live Green Toronto	Cultivate neighbourhood-based low-carbon projects and challenge residents and businesses to undertake deep energy retrofits.	<ul style="list-style-type: none"> Partnered with over 30 different community organizations, non-for-profits, foundations and resident groups on new projects that support climate action engagement. Partnered with the City's Social Development, Finance and Administration Division to pilot Neighbourhood Climate Action grants in 2019, offering up to \$7,500 for projects in Neighbourhood Improvement Areas that reduce GHG emissions and address one or more health, prosperity, equity, resilience benefits of TransformTO. 	 Equity	

PROJECT PROFILES

Climate Action Engagement Workshop

In January 2019, over 80 community partners were brought together in a collaborative workshop to discuss new and innovative approaches to climate action in the city. This event engaged community leaders from diverse backgrounds to ensure their voices were heard and that barriers to climate action participation were reduced. The purpose of this meeting was to host participants from various sectors to collectively discuss, brainstorm and apply creative problem-solving to Toronto's climate challenges. Participants recommended a list of key actions and project ideas that can help to engage and encourage Torontonians in neighbourhood-level climate action. Efforts are

already underway to support these projects and the partnerships that formed as a result of the workshop. To date, the City has partnered with over 30 different community organizations, non-for-profits, foundations and resident groups on various new projects that support climate action engagement. The outcomes of this workshop are available on the in the *Summary Report: Toronto Climate Action Community Engagement Workshop* at www.toronto.ca/livegreen.

Corus Media Marketing Campaign

The City kicked-off a monthly series with existing Live Green Toronto media partner Corus, with a daily reach of 910,000 people in Toronto across its television, radio and digital platforms. The



partnership focussed on Global TV segments supported by content on globalnews.ca. The objective was to promote TransformTO to the mass audience. This marketing campaign focussed on advancing education and awareness about various TransformTO long-term goals. Each television segment averages 2.5 minutes of journalistic content, featuring City subject-matter experts, and an article or infographic is posted to globalnews.ca supported by digital advertising and social media amplification. This feature has already been a success in delivering information and ensuring Torontonians have the tips, tools, and resources to take climate action.

Take Steps to #TransformTO Walking Challenge

In May 2019, the City of Toronto organized a city-wide ward versus ward challenge encouraging residents to walk more and keep track of their progress using the free Carrot rewards app. There was an educational component on climate action and benefits to health and the environment provided through the Carrot app. The challenge engaged the over 70,000 Carrot app users across Toronto. This new, innovative and fun digital campaign to engage residents, who may not typically be involved in environmental or climate action activities, reduced the barriers to entry and increased access. The winning neighbourhood was treated to the grand prize of a street party hosted by Live Green Toronto and double Carrot reward points.

Sector-specific Engagement Efforts

As part of TransformTO implementation, the City consulted with sectoral stakeholders, convened

working groups, reached out to audiences with diverse backgrounds, and made extra efforts to connect to those facing challenges and barriers. In each of the sectors – buildings, energy, transportation and waste – direct efforts were made to bring the community perspective into the design and delivery of climate action.

In the buildings sector, the Home Energy Loan Program went through a successful marketing campaign targeting single-family residential homes along with focussed outreach activities to increase program intake and participation. Similarly, the Deep Retrofit Challenge, currently under development, conducted extensive stakeholder engagement in the industry to learn, understand and implement key findings about undertaking more extensive and impactful retrofits. This involved consultations with local utilities, other jurisdictions across the world, and the creation of an advisory committee of local industry experts to inform the detailed program design. There was also substantive energy efficiency outreach via the Toronto Greenest Neighbourhoods project where the city engaged multiple community agencies and groups to help residents learn about incentives and rebates available to make their homes more energy efficient. The Smart Commute Program made strides in the transportation outreach sector to achieve higher participation rates in the Smart Commute Month annual survey. Lastly, waste outreach focussed on ramping up the City's 3R Ambassadors program where tenants in multi-residential buildings can equip their buildings with the tools and resources to achieve higher waste diversion rates.

Finance and Governance



Finance, Governance and Partnerships

In order to fund trend-setting climate actions for Toronto, we are leveraging investment and funding from all levels of government, private investors, and other non-conventional sources. This process has involved establishing and expanding innovative financing mechanisms and encouraging relationships with strategic partners to deliver projects.








The City of Toronto employs various financial mechanisms to incentivize and advance climate action work, and has a position dedicated to developing innovative financing mechanisms. For example, the City updated the Sustainable Energy Plan recoverable debt financing mechanism to support increased eligibility for the Energy

Retrofit Loan Program. The Home Energy Loan Program (HELP) and City's High-Rise Retrofit Improvement Support Program (Hi-RIS) provide loans for residential energy retrofits by using local improvement charges, which allows a homeowner or building owner to easily payback the loan through monthly installments on their property tax bill. Through these programs, homeowners or building owners have access to low fixed interest rates, and terms of up to 15 years, making it possible to pay for energy improvements over time. Allowing for these innovative financing mechanisms to fund climate actions will provide more opportunities for residents and industry to take on projects to achieve our emission reductions.



IMPLEMENTATION STATUS – TRANSFORMTO 2017-2020 SHORT-TERM STRATEGIES: FINANCING AND GOVERNANCE ACTIONS

In 2016, City Council approved a series of short-term strategies (2017-2020) to initiate the transformation in Toronto's urban systems that put Toronto on the needed long-term trajectory towards a low-carbon future. Progress towards achieving these outreach and engagement related short-term strategies is summarized below:

#	Action	Description	Progress Snapshot	Benefits	Status
1.2	Innovative funding mechanisms	Advance Toronto's case for securing its fair share of provincial and federal low-carbon funding to channel new money into TransformTO strategies supporting the development and implementation of energy retrofit projects in the commercial, MURB and residential sectors.	<ul style="list-style-type: none"> Issued Toronto's first-ever Green Bond (Debenture) valued at \$300 million to attract investment needed to deliver on low-carbon goals. Issue was over-subscribed by 36 domestic and global investors. The lowest interest rate since amalgamation was achieved, resulting in \$600,000 of borrowing cost savings. Supported federal transit funding applications with technical assistance related to federal Climate Lens requirements. 	 Resilience	
1.3	Dedicated funding for community-based climate action	Expand direct funding of neighbourhood-based climate action, including the not-for-profit sector	<ul style="list-style-type: none"> In July 2018, City Council endorsed updates to the Sustainable Energy Plan Financing (SEPF) mechanism to expand eligibility to include private and publically owned buildings increasing the reach for community based climate action beyond the not-for-profit sector. In 2017 and 2018 the SEPF program approved \$49.5 million in loans. 	 Resilience  Health  Jobs	
3.1	Explore road pricing	Investigate feasibility and authority for road pricing in Toronto	<ul style="list-style-type: none"> Decisions from the Province have rendered this strategy infeasible at the present time. Executive Committee Preliminary findings on cost and revenue from tolling were presented to the Executive Committee in December 2016 as part of the committee's consideration of 'The City of Toronto's Immediate and Longer-term Revenue Strategy Direction'. 	 Resilience	N/A

PROJECT PROFILES

Toronto issued its first \$300 million Green Debenture

In 2018, Toronto issued its inaugural green bond (debenture) of \$300 million to finance low-carbon transit related investments. Toronto is one of the first municipalities in Canada to issue a bond to raise the necessary capital required to deliver projects that support climate action. This offering was over-subscribed – attracting investment from over 30 investors. Additionally, the City achieved its lowest interest rate since amalgamation, resulting in \$600,000 in borrowing cost savings.

Green bonds are Toronto's primary means of engaging with and raising funds from the capital markets. The funds raised through this first bond issuance will focus exclusively on TTC transit projects to support their expansion and delivery. However, future offerings will support a broad range of initiatives that mitigate and help us adapt to the effects of a changing climate, including, but not limited to: renewable energy, energy efficiency, green buildings, water and waste water management, pollution prevention and control, and the circular economy.

Sustainable Energy Plan Financing Funding Energy Retrofits

The Energy Retrofit Loan program funded by the Sustainable Energy Plan Financing (SEPF) mechanism offers eligible publically and privately owned buildings located in Toronto an interest rate equivalent to the City's estimated cost of borrowing to undertake energy retrofits. The program supports energy conservation, renewable energy, and GHG reduction projects. Since 2013, the City has disbursed a total of \$67 million in energy retrofit loans.

Financing has been provided to entities including the YMCA which borrowed \$12 million to install low-carbon resilient energy systems comprised of roof-top and wall-mounted solar energy generation and battery energy storage systems, electric vehicle

charging stations, and high efficiency combined heat and power systems. Annual CO₂ emissions reductions are expected to be approximately 2,600 tonnes per year.

In 2015, TCHC received \$28 million in Provincial grants and leveraged over \$35 million in City financing to expand the project scope and undertake more comprehensive energy retrofits in 9 buildings. These retrofits included lighting retrofits, heating and domestic hot water system upgrades, window replacements, exterior walls overcladding, installation of occupancy sensors and the implementation of water conservation measures. These energy retrofit projects will save approximately \$1.9 million and 5,300,000 kWh and 3,500 tonnes of CO₂ emissions per year.

Accessing Intergovernmental Funding Programs

Led by the Environment and Energy Division, a coordinated cross-corporate effort was made to leverage funds for over 50 GHG mitigation proposals seeking external funding. Funding has been accessed from various sources such as the Government of Canada, Natural Resources Canada, the Province of Ontario, the Federation of Canadian Municipalities, the Independent Electricity System Operator and C40 Cities. Funding secured by the city ranges from \$50,000 - \$135 million in support of new and enhanced capital projects, demonstrations, research and technical studies. This funding will be applied to:

- supporting the battery electric bus program at TTC
- providing cycling infrastructure
- spurring social housing energy retrofits
- expanding the Home Energy Loan Program
- delivering Toronto's Greenest Neighbourhood to advance neighbourhood-based home energy efficiency
- corporate buildings energy retrofits
- supporting engineering design for net-zero communities in Toronto

- working on the Waterfront Neighbourhood Centre & the deep energy retrofit including the lake-based geothermal system.

Strategic Partnerships made to Advance Climate Action Work

To achieve the low-carbon future envisioned in TransformTO, it is necessary to collaborate and combine the efforts between the City of Toronto and the community at large. This work can only advance at the pace required to meet the TransformTO targets by forming strategic partnerships with the academic, industrial and non-profit sectors working towards the same goals. Partnerships were made to advance work in various sectors – buildings, energy, transportation and waste via different agreement models to work on a variety of different projects. Some examples of the projects collaborated upon via these partnerships include: developing an interactive web portal, a joint-agreement to advance low carbon thermal networks, revising our GHG accounting methodology, participating in international benchmarking and delivering mass media marketing.

Leading
by Example





Leading by Example

The City of Toronto is taking a lead on reducing GHG emissions from its own operations. In addition to a series of community-wide emission reduction goals, TransformTO set a series of corporate leadership goals to reduce the environmental impacts and costs associated with City operations in buildings, energy, vehicles, and waste management. Toronto is already a leader in green operations and has many sustainable operating practices but has committed to accelerating these actions to ensure that all City workplaces, vehicles, practices, and buildings contribute to reducing GHGs and ensuring that the impacts of climate change are mitigated. These ambitious goals were adopted with an accelerated timeline to demonstrate a commitment to ‘walking the talk’ and clearly signal to other organizations that Toronto is a leader in climate change action.

TransformTO:

City of Toronto Leadership Goals

- 100% of new City-owned buildings will be built to be near-zero GHG emissions by 2026
- 100% of existing City-owned buildings will be retrofitted to be 40% more energy efficient, on average, by 2040
- 24 megawatts of renewable energy capacity will be installed on City-owned facilities and lands by 2020
- 45% of City-owned vehicles will be low-carbon by 2030
- 100% of City-owned facilities will achieve zero waste status by 2030
- 1.5 million gigajoules of energy will be generated from biogas by 2030
- Earn ‘Canada’s Top 100 Green Employers’ designation by 2020

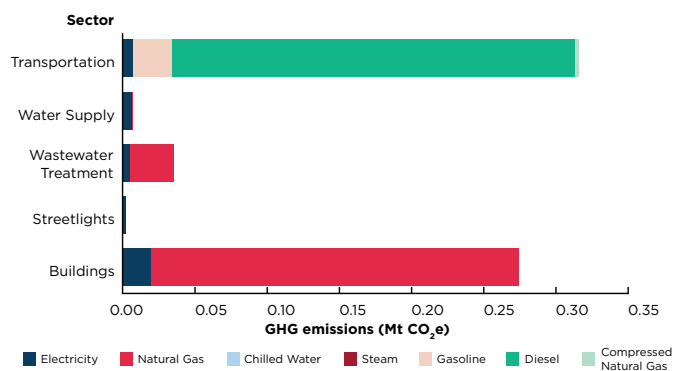


Sector	TransformTO Goal	Indicator	Baseline	Status (2018)
Buildings	100% of new City-owned buildings are designed and built to be near-zero GHG emissions by 2026	Average GHG Intensity (kilograms per square metre) of new buildings	28 kgCO ₂ /m ² (2017)	15 kgCO ₂ /m ²
		Number of new near-zero City buildings	0 (2016)	1
	Retrofit all City-owned buildings, including social housing, to the highest emission reduction technically feasible, on average achieving a 40% energy saving over 2017 building energy performance by 2040	GHGs from City buildings	320,000 tonnes of CO ₂ e (2016)	274,000 tonnes of CO ₂ e (2017)
		Average Energy Consumption (ekWh/m ²)	3.25 ekWh/m ² (2017)	3.25 ekWh/m ²
Energy	Install 24 Megawatts capacity of renewable energy capacity on City-owned facilities and lands by 2020	Total megawatts capacity	4.7 MW (2016)	12 MW
	Generate and utilize 1.5 million energy from biogas by 2030	Total gigajoules of energy generated	0.6 million Giga-joules (2016)	0.6 million Giga-joules
Transportation	Update the City's Green Fleet Plan to ensure transition of 45% of City-owned fleet to low-carbon vehicles by 2030	% of fleet vehicles that are low-carbon	24% (2018)	24%
Waste	Achieve zero waste status at all City-owned facilities by 2030	% of waste diverted at City offices and civic centres	86% (2016)	87%
People & Engagement	Earn a designation as one of Canada's Top 100 Employers - Greenest Employers by 2020.	Designation earned	Not achieved (2016)	Not achieved

CITY OF TORONTO CORPORATE GHG EMISSIONS

In 2017, the City of Toronto's corporate GHG emissions were 1.9 MtCO₂e. This represents just over 6 per cent of all community-wide emissions for Toronto.

Figure 16: City of Toronto Corporate GHG Emissions by Sector and Source (2017)



[Click to see an enlargement of Figure 16.](#)

The City of Toronto corporate GHG emissions shown in Figure 16 are broken down by sector including: transportation, water supply, wastewater treatment, streetlights, and buildings. Transportation and City-owned buildings are the largest sources of emissions, with diesel from TTC buses and natural gas from buildings contributing 13 per cent and 14 per cent of the City's corporate GHG emissions, respectively.

The analysis in this report includes GHG emissions from operations and facilities of the City. GHG emissions from solid waste are not included in this report as City of Toronto corporate waste is processed alongside community-wide waste in City-operated facilities and are not accounted separately.

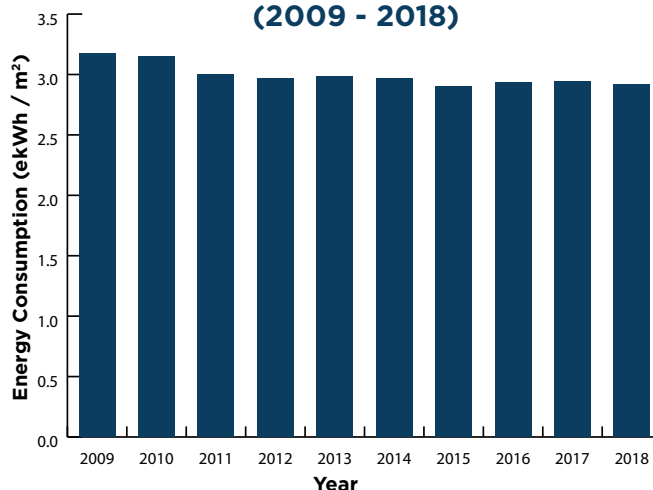
BUILDINGS

The City of Toronto owns and operates thousands of buildings and facilities including office buildings, community centres, daycare centres, parks, and parking lots. These buildings and facilities use

significant energy every year to provide services to residents, businesses, commuters, visitors, and City of Toronto staff.

In order to track and report on City of Toronto building energy use, the City produces an Energy Conservation & Demand Management Plan that profiles over 600 of the City of Toronto's corporate buildings based on energy use and operation type. The plan provides an overview of both past and proposed measures undertaken in City-owned buildings to reduce energy consumption. Figure 17 shows energy consumption of City-owned office buildings over time.

Figure 17: City of Toronto Corporate Energy Consumption of Office Buildings (2009 - 2018)




[Click to see an enlargement of Figure 17.](#)

As of 2017, all new City Agency, Corporation and Division-owned buildings and major additions are required to meet a higher performance measure as set out in the by the Toronto Green Standard Version 3. This Standard includes performance measures higher than those required by private developers, ensuring City building projects reduce energy use and greenhouse gas emissions from new buildings while making them more resilient to power disruptions, and encourage the use of renewable and district energy.

City building projects are also directed to aim to achieve a net-zero energy and emissions target for all new buildings and additions greater than 100 metres gross floor area, where technically practical and financially feasible.

Progress towards short-term Leading by Example Building actions

#	Action and Description	2017/2018 Progress Snapshot	Progress
4.1	Expand energy retrofits at City facilities Scale-up energy efficiency retrofits of the City-owned real estate portfolio to achieve energy savings of up to 50%, including low-carbon fuel switching (i.e. geothermal).	<ul style="list-style-type: none"> • 50 LED lighting conversion projects completed, saving 244 tonnes of CO₂e <ul style="list-style-type: none"> • 5,650,000 kWh saved • \$920,000 annual energy cost savings • 12 building automation system projects carried out <ul style="list-style-type: none"> • 1,360,000 kWh saved • \$180,000 annual energy cost savings 	

Buildings Project Profiles

Mount Dennis Early Learning and Child Care Centre – The City’s First Near Zero-Emission Building

Construction is underway on a new childcare centre in the Mount Dennis neighbourhood that, once completed, will be the City of Toronto’s first net-zero building. The building uses a high-performance design standard that ensures energy efficiency throughout the project lifecycle. It includes a geothermal heating and cooling system, rooftop solar panels, and energy storage batteries. These features will ensure that energy used in the building is generated on-site, meaning virtually no energy costs are associated with the building operations. The building design will also improve the building’s resilience, capturing stormwater runoff and ensuring on-site backup energy is available during power outages. Solar PV, combined with energy storage systems, can also be used to provide zero-emission backup power to buildings. As the first City of Toronto’s net-zero project, it will demonstrate the ability to build a low-carbon future and lead the way for future net-zero projects.

Deep Energy Retrofit and Resilience Upgrades at Waterfront Neighbourhood Centre

The Waterfront Neighbourhood Centre at Queen’s Quay and Bathurst Street is currently undergoing a deep retrofit to reduce energy consumption and improve resilience. The project includes replacement of lighting with energy efficient LED lights, and updating the building automation system to optimize the performance of the building’s heating, ventilation, air conditioning, refrigeration.



The project will also install a state-of-the-art geothermal heating and cooling system that uses water from Lake Ontario to heat and cool the building. The building will also be outfitted with an innovative combined solar and storage system that generates power through rooftop solar panels and stores the energy in batteries. This will ensure the centre’s supply and security of energy is reliable during power outages, giving the community a reliable and safe place in times of extreme weather.

ENERGY

Reducing energy in City operations involves a number of innovative solutions including the installation of renewable energy, expanding low carbon thermal networks to City facilities, and using biogas captured from waste and wastewater.

Renewable energy delivers economic and environmental benefits, and improves energy security during extreme weather or peak demand days. Recognising the economic, climate change, and resilience benefits of renewables, the City has mandated the installation of renewable energy systems on all City buildings, where feasible, by 2020. Toronto has been installing renewable energy for many years and over the past 20 years, more than 100 renewable energy systems have been installed on City buildings and properties. In recognition of its leadership and achievements, the City of Toronto received the “Solar Developer of the Year” Award in 2017 from the Canadian Solar Industry Association.

Progress towards short-term Leading by Example Energy actions

#	Action and Description	2017/2018 Progress Snapshot	Progress
4.2	Scale-up renewable energy installations Scale-up renewable energy installation at City-owned facilities by doubling capacity by 2020 (up to 24MW).	<ul style="list-style-type: none"> Completed installation of the 100th solar PV system in 2018, saving 21,942 tonnes of CO₂e Installations will generate 11,000,000 kWh annually and \$2.5 M in annual revenues City of Toronto received the “Solar Developer of the Year” Award in 2017 from the Canadian Solar Industry Association 	
4.3	Utilize landfill gas and biogas Implement biogas upgrading infrastructure at the Dufferin Organics Processing Facility, and to consider other sites managed by Solid Waste Management and Toronto Water	<ul style="list-style-type: none"> Solid Waste Management Services has partnered with Enbridge Gas Inc. to construct its first biogas upgrading facility and injection station at the Dufferin Solid Waste Management site. Construction is underway, and will be operating by January 2020, producing and estimated 3.2M cubic meters of Renewable Natural Gas. Toronto Water continues to generate and use biogas for operations at two of four of the treatment plants 	

Energy Project Profiles

Improving energy resilience at Toronto EMS station

The City has recently completed its first solar PV and energy storage project, reducing energy costs and enhancing the resiliency of a paramedic services facility near Danforth and Woodbine. This installation includes a 10 kWdc solar PV system that generates power by using solar cells to convert energy from the sun, coupled with two 13.5 kWhr Tesla Powerwalls that store energy for later use when needed. The system is connected to the grid through the Net Metering Program, while providing peak shaving, meaning that the EMS station can use energy generated onsite during peak demand hours instead of buying electricity from the grid.

The system is expected to provide indefinite emergency back-up power to critical loads during a grid outage. This project demonstrates that renewable energy and storage can be a solution for other facilities to ensure reduce energy costs and improve resiliency of critical City facilities.

Etobicoke Civic Centre Precinct Low-Carbon Thermal Energy Network

The City of Toronto and Enwave are working

together to deliver a Low-Carbon Thermal Energy Network (LCTEN) as part of the development of the Etobicoke Civic Centre Precinct, Toronto's first Net Zero Community. The 5.6 hectare site is being master planned for 280,000 square metres of mixed-use development in six blocks that will be unlocked through reconfiguration of the Six Points Interchange (Bloor St, Dundas St, and Kipling Ave). The City's new Etobicoke Civic Centre will anchor the development.

The LCTEN concept envisions a central plant in the below-grade parking garage of the Civic Centre, from which hot and cold water will be distributed to surrounding buildings through a network of underground pipes. The primary energy source will be a geo-exchange borefield below the central plant, with potential for additional borefields below the other buildings and proposed park.

Combined with an energy-efficient design, the LCTEN will help the Civic Centre achieve Tier 3 of the Toronto Green Standard. As the LCTEN is expanded to serve new development over time, and additional renewable energy sources are added, the Precinct is expected to approach zero emissions. In addition to reducing emissions, the LCTEN

will provide benefits such as local employment opportunities and improved resilience.

Renewable Natural Gas

In an effort to reduce GHG emissions and optimize the beneficial use of a wastestream, namely biogas, Solid Waste Management Services is taking a creative partnership approach with Enbridge Gas Inc. to produce renewable natural gas (RNG) from the biogas produced at the Dufferin Solid Waste Management Services facility. RNG is considered a carbon negative source of energy and is produced by cleaning or purifying the biogas by removing mainly carbon dioxide and other contaminants. The resulting gas is 90 percent methane which can be conditioned and injected directly into natural gas distribution grid and can be potentially used to heat buildings or fuel vehicles. The RNG facility is scheduled to be fully operational by January 2020.

The City has been processing 75,000 tonnes per year of organics at its Disco Road Organics Processing Facility since 2014, and is set to commission its second facility, the Dufferin Organics Processing Facility in the fall of 2019. Dufferin Organics Processing Facility will have a processing capacity of 55,000 tonnes per year and will produce approximately 3.2 million cubic meter of RNG.

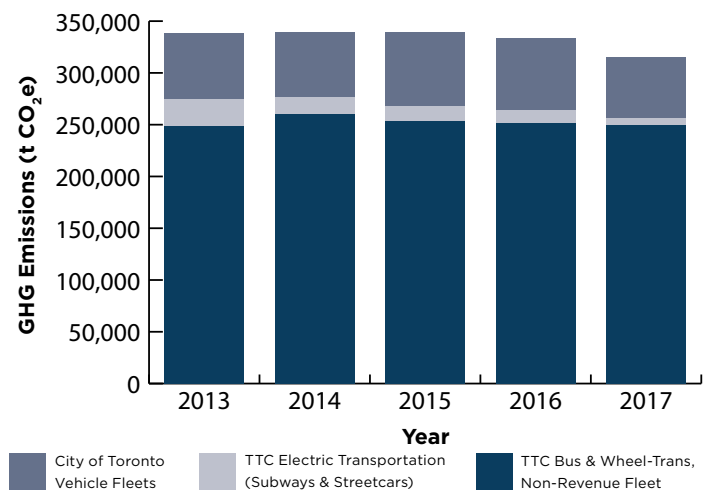
A portion of the biogas from landfill, the City's anaerobic digestion facilities and wastewater treatment plants is currently flared (burned). This is common industry practice for managing biogas to reduce GHG emissions, by converting methane to carbon dioxide. While this practice does not take advantage of the biogas' renewable energy potential, the City continues to pursue opportunities to enhance the generation and utilization of biogas and RNG.

TRANSPORTATION

The City of Toronto operates a large vehicle fleet with thousands of vehicles. GHG emissions associated with the City's corporate transportation in 2017 was 315,000 tonnes. Figure 18 presents the

City's corporate GHG emissions from transportation over time. In all years, the largest contributor to the total emissions were diesel vehicles, representing almost 90 per cent of all corporate transportation emissions in 2017. Although total corporate transportation GHG emissions have decreased slightly over time, these emissions are expected to decrease significantly as the TTC transitions from diesel buses to electric buses over the next few years.



Figure 18: City of Toronto Corporate Transportation GHG Emissions by Operation (2013 - 2017)



[Click to see an enlargement of Figure 18.](#)

City of Toronto Corporate GHG emissions from transportation includes emissions from vehicles associated with City operations including TTC subways, TTC buses & Wheel-Trans, Fire, Police, EMS, waste trucks to landfill, as well as vehicles used for general City operations such as park and street maintenance.

The City is taking a number of actions to reduce the emissions both from vehicles used in our operations, and the ways in which City staff commute and get around. With over 30,000 employees, the City of Toronto is a large employer with an opportunity to encourage employees to commute and travel sustainably, reducing transportation related emissions.

#	Action and Description	2017/2018 Progress Snapshot	Progress
4.4	Improve fleet fuel efficiency Accelerate the City's Green Fleet Plan to ensure effective and efficient utilization of available green technologies and management practices	<ul style="list-style-type: none"> • The Green Fleet Plan continues to evolve and implement available green technologies and practices with higher potential for emissions reductions that are sustainable, and operationally and economically viable. • An updated Green Fleet strategy will be presented in Fall 2019. • Solid Waste Management Services using CNG fleet. 	
4.5	Promote Smart Commute for Toronto Public Service Expand the implementation of the City of Toronto's Smart Commute Program to promote sustainable commuting options for the Toronto Public Service.	<ul style="list-style-type: none"> • Initiated the Workplace EV Charging Program which includes installation of charging station in two locations. Two dual level 2 EV charging stations in Metro Hall and another two in City Hall for City staff. • Carpool Parking – 11 carpool spots at Metro Hall and 9 at City Hall for City staff set to open in Q2 2019. • Installation of additional bicycle parking at Metro Hall and North York Civic Centre. Funding has been allocated to Smart Commute to improve bike parking facilities at 13 City buildings for both public visitors and staff. • Smart Commute Champions Network established with 57 internal champions at 27 work locations promoting Sustainable Commuting options for staff. 	

Transportation Project Profiles

Green Fleet Plan

Recognizing the benefits that come from greater cooperation, and the need to be more strategic, the five major City of Toronto fleets have come together to create the City of Toronto Green Fleet Plan that articulates the collective vision of the City Fleets. The five fleets working together under this Plan are those managed by the City's Fleet Services Division, Toronto Paramedic Services, Toronto Fire Services, Toronto Police Services and Toronto Transit Commission.

The Green Fleet Plan focuses on emissions from the operation of almost 10,000 on-road and off-road vehicles and equipment owned and operated by the City of Toronto. The Green Fleet Plan ensures that vehicles, equipment, fuels, and practices consume less fuel, emit less GHG and air pollution, are sustainable, and economically and operationally viable. As of 2018, 24 per cent of City on-road vehicles are green, including fully electric and plug-In hybrid electric vehicles.

Building on the success of the current plan and emissions reductions already realized, City Fleets will present an updated Plan in the fall of 2019 that will ensure that strategies and actions to reduce emissions from City-owned vehicles and equipment meet the City's emission reductions targets, remain sustainable, and economically and operationally viable.

Green Bus Technology Plan (TTC)

The Toronto Transit Commission (TTC) has committed to have 50 per cent zero emissions vehicles by 2028-2032 and 100 per cent zero emissions by 2040, making the TTC a leader in achieving TransformTO's overall goal of 100 per cent low or no-carbon transportation options by 2050. The TTC will have 60 fully electric buses generating near-zero GHG emissions delivered by the end of 2019, and over 250 hybrid electric buses with 38 per cent fewer lifecycle emissions than convention diesel buses will be on the road. The TTC is investing in proven technologies such as hybrid electric buses at scale, while exploring the more innovative technology of fully electric buses

through a pilot that will compare three different e-bus manufacturers by operating them on the same routes and evaluating performance. Regardless of technologies, bus travel is more climate friendly than car travel and supports TransformTO with a passenger kilometer on a bus emitting less than 1/10th the GHG emissions of a car.

City Staff encouraged to commute sustainably

City staff were surveyed about their commuting in 2016. Here are a few key takeaways from the survey of City staff:

- Staff who walk or cycle to work are the most satisfied with their commute
- 72% of staff say that their commute directly affects their job satisfaction
- Staff who drive alone to work are the least satisfied with their commute
- 83% of staff who drive alone to work are willing to consider an alternate commute mode



City staff who want to help others commute in more sustainable ways are invited to join the Smart Commute Champions Network that was established in 2018. The goal of the network is to encourage staff to explore their

commuting options and make the switch to a better, more sustainable commute - such as walking, cycling, taking public transit and carpooling. There are currently more than 55 internal champions at 27 different work locations promoting Sustainable Commuting options for staff.

WASTE

City buildings and facilities continue to reduce and divert waste. TransformTO set the goal that all City buildings will be zero waste by 2030. The City is already well underway to ensuring that its

largest buildings are diverting almost all waste. In 2016, eight City-owned office buildings over 10,000 square metres diverted 90 per cent, or 1,297 metric tonnes, of waste from landfill, reducing GHG emissions.

Waste Project Profiles

Going Paperless

An increasing number of City workplaces are moving to reduce their reliance on printed material and moving to electronic resources. The City Clerk's office will be going paperless in 2019 and eliminating printed agendas for City officials for meetings of City Council and its committees. This switch will save paper and reduce printing costs. As more City workplaces go paperless, the City is ensuring that surplus material is being properly diverted or donated. This included donating 1,500 binders to two school boards in 2018. As more workplaces go paperless, surplus binders continue to be diverted to the school boards.

City Staff pledge to go plastic-free

In the summer of 2018, over 200 City staff took up the challenge to give up their single-use disposable plastic habit as part of Plastic Free July. They pledged to give up disposable plastics such as coffee pods, takeout food containers, shrink wrapped food and products, water & beverage containers, Styrofoam, straws and shopping bags. Staff found the pledge made them stop and think about the amount of plastic they had been thoughtlessly using, both at work and at home.

Circular Procurement

The City is investigating how to ensure that City policies, plans, and procedures embed the concept of the circular economy at all project phases. Adopting the principles of circular economy will reduce the environmental impacts and embodied emissions from products, materials and buildings across the City through procurement, construction, operations, and planning.



PEOPLE & ENGAGEMENT

Achieving these ambitious Leading by Example goals will require whole-of-government transformation in the way the City operates and in how services are delivered. TransformTO is dedicated to ensuring City of Toronto staff are aware of these goals and engaged to make greener choices both at work and at home.

Engagement Project Profile

Live Green Teams

Live Green Teams are employee-led teams dedicated to promoting green practices in their workplace. Staff are guided by the zero waste and emission reduction goals of TransformTO and meet regularly to host events, workshops, and brainstorm opportunities to further promote greening their workplace. There are currently Live Green Teams active in 10 City workplaces.

Live Green Teams are supported by Live Green @ Work, a City of Toronto initiative that supports workplaces in establishing Green Teams and provides opportunities and resources on greening workplaces.

CONCLUSION

Over 90 per cent of Torontonians are concerned about the climate crisis and believe that action is required by everyone to reduce GHG emissions. Toronto City Council, by funding the 2017-20 TransformTO short-term strategies has put in place resources to support residents and businesses in taking action. We can celebrate that Toronto's community-wide GHG emissions are 44% below 1990 levels but we are still 15 megatonnes away from being a carbon neutral city.

Incremental changes in the energy performance of buildings, how we move about our city, the sources for our energy supply and waste reduction actions will not result in a low carbon future. Expanded action is necessary and implementation of TransformTO is supporting the community in taking the necessary accelerated collective action.

Toronto's efforts to address climate change, based on analysis by the C40 Cities, is compliant with international climate agreements and the directions of the Intergovernmental Panel on Climate Change. The C40 Cities do recommend though that to better reflect Toronto's commitment that we consider adopting a net zero emission goal for the year 2050.

The "TransformTO: Climate Action for a Healthy, Equitable & Prosperous Toronto Implementation Update 2017 and 2018" establishes a set of

indicators and measures that will be used for tracking Toronto's community-wide progress against the TransformTO goals. In addition, it provides a detailed summary of the steps taken in so far to implement the TransformTO Short-Term Strategies and provides a profile of the exciting and innovative policies, programs and initiatives that have been established as a result.

Taking action on climate change can and should also result in changes that support Toronto's goals associated with resilience, equity, health and prosperity. This status report highlights the research and steps being taken to ensure understanding and documentation of the benefits of climate action and that appropriate steps are taken to realize those benefits.

In 2019 and 2020, we will continue to implement the 2017-2020 TransformTO Short-Term Strategies, and we will publish a second status update on implementation in 2021. Development of the next short-term implementation plan to 2023 is informed by the outcomes of this status report, and a staff report recommending new, revised and accelerated action is already underway. That staff report will also present an action plan for implementing the climate resilience/adaptation directions outlined in Toronto's Resilient City Strategy released on June 4th, 2019.



Stay Involved

Stay informed about what the City of Toronto and its partners are doing to reduce greenhouse gas emissions in the city. Subscribe for e-updates at [Toronto.ca/transformto](https://toronto.ca/transformto)



Contact Information

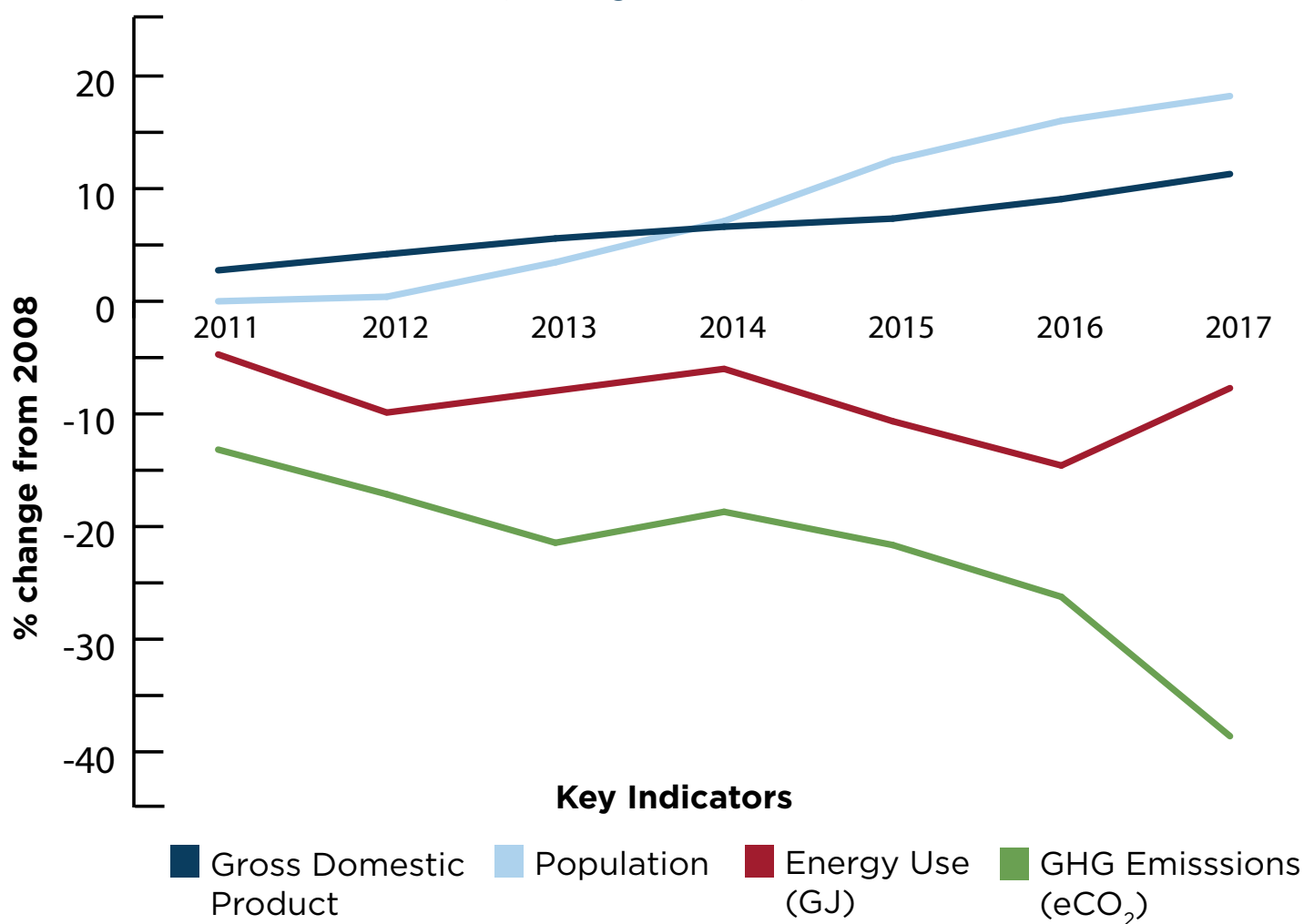
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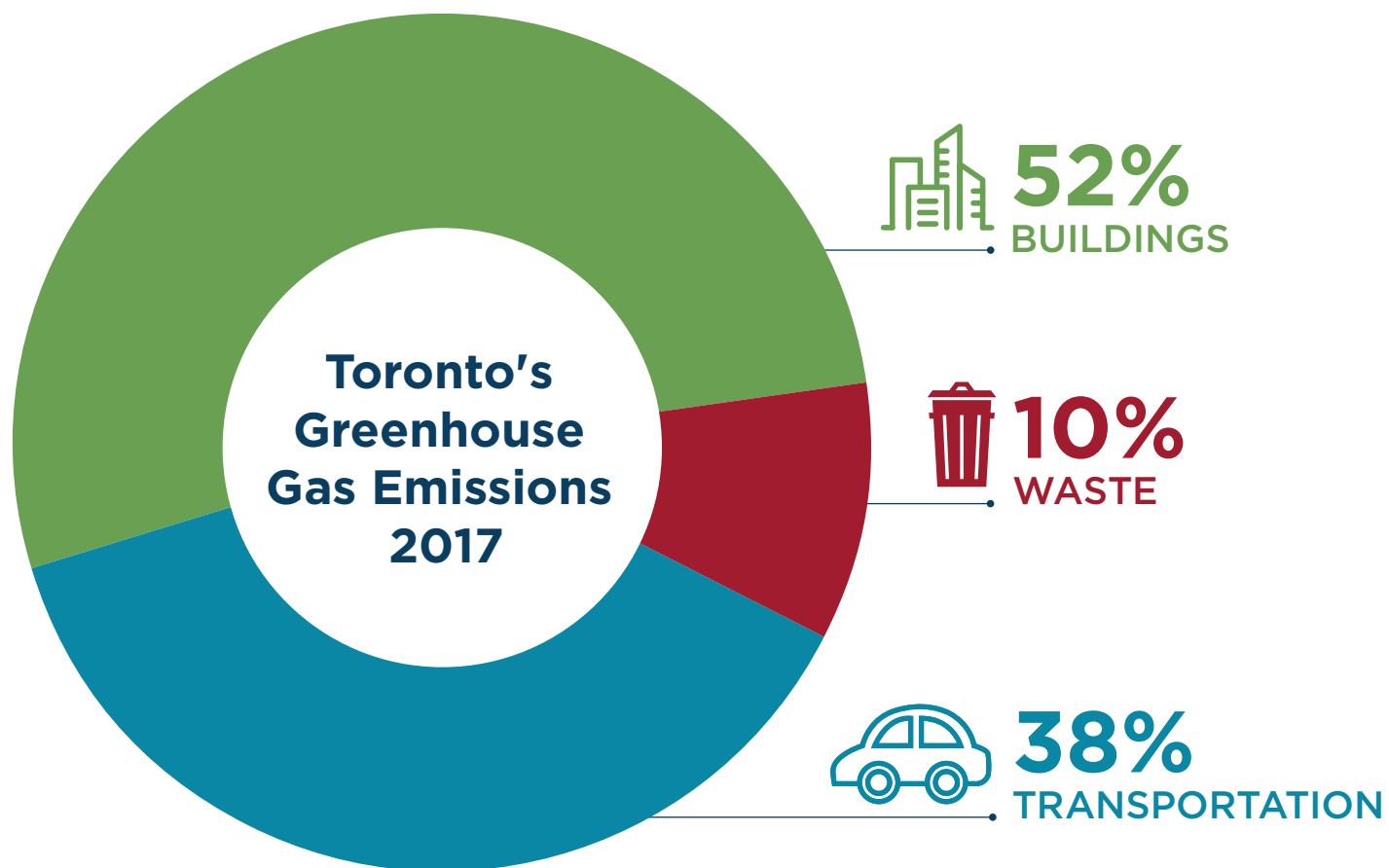
Enlarged Charts & Graphs

Figure 1: Energy, GHG Emissions & Economic Indicators
(% Change from 2008)



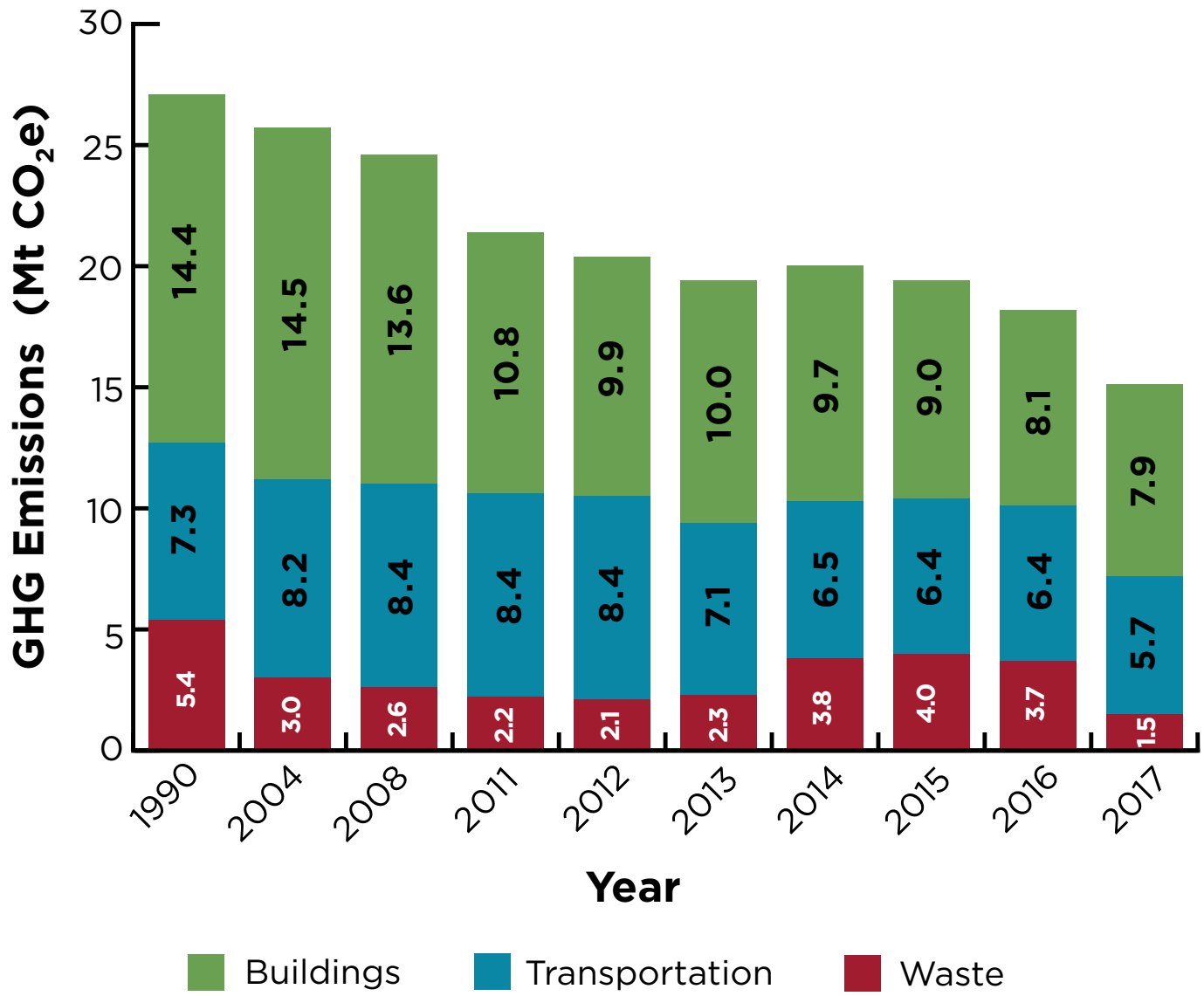
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**Figure 2: Toronto's Greenhouse Gas Emissions
(2017)**



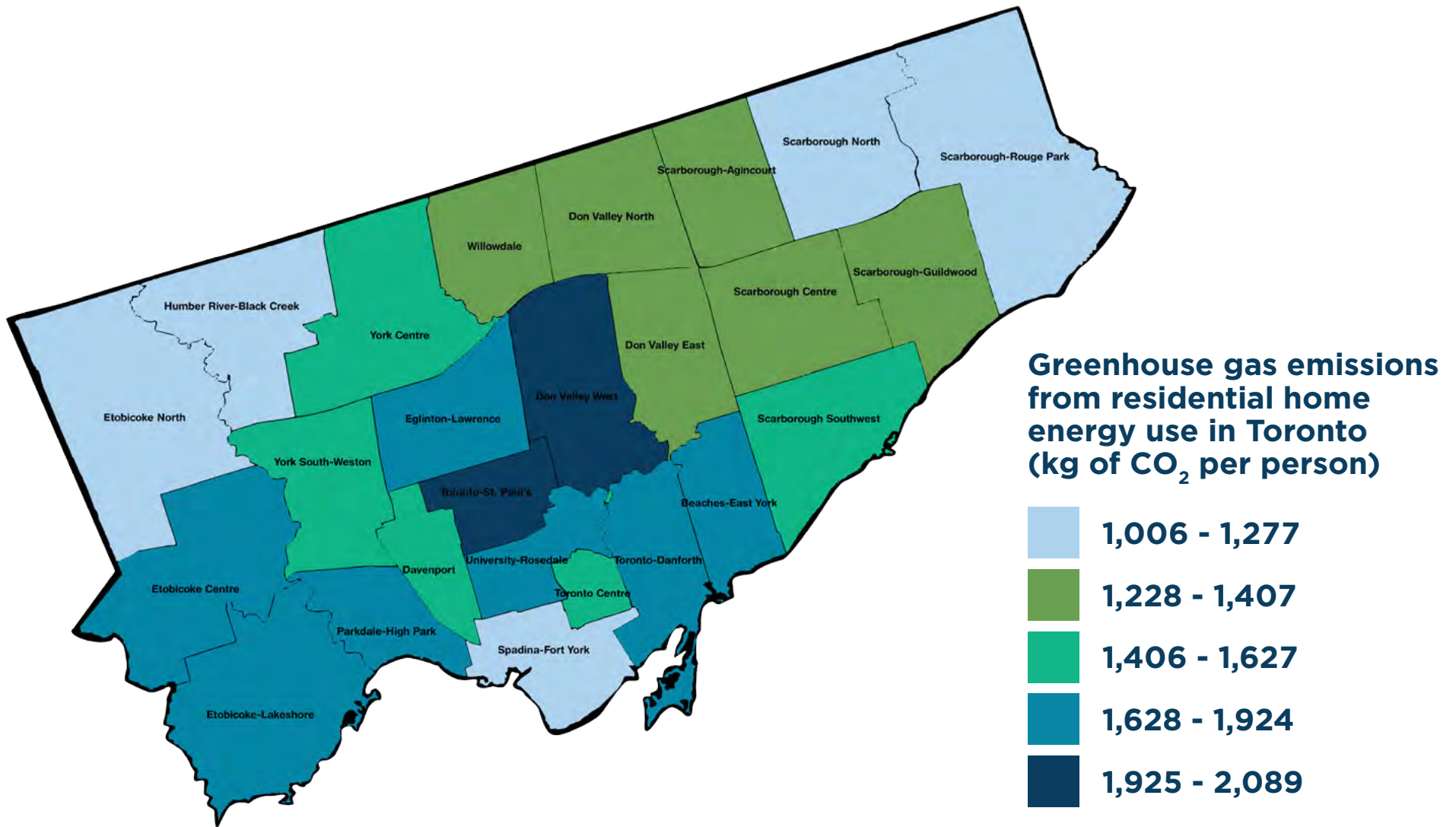
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Figure 3: GHG Emissions by Sector (1990 - 2017)



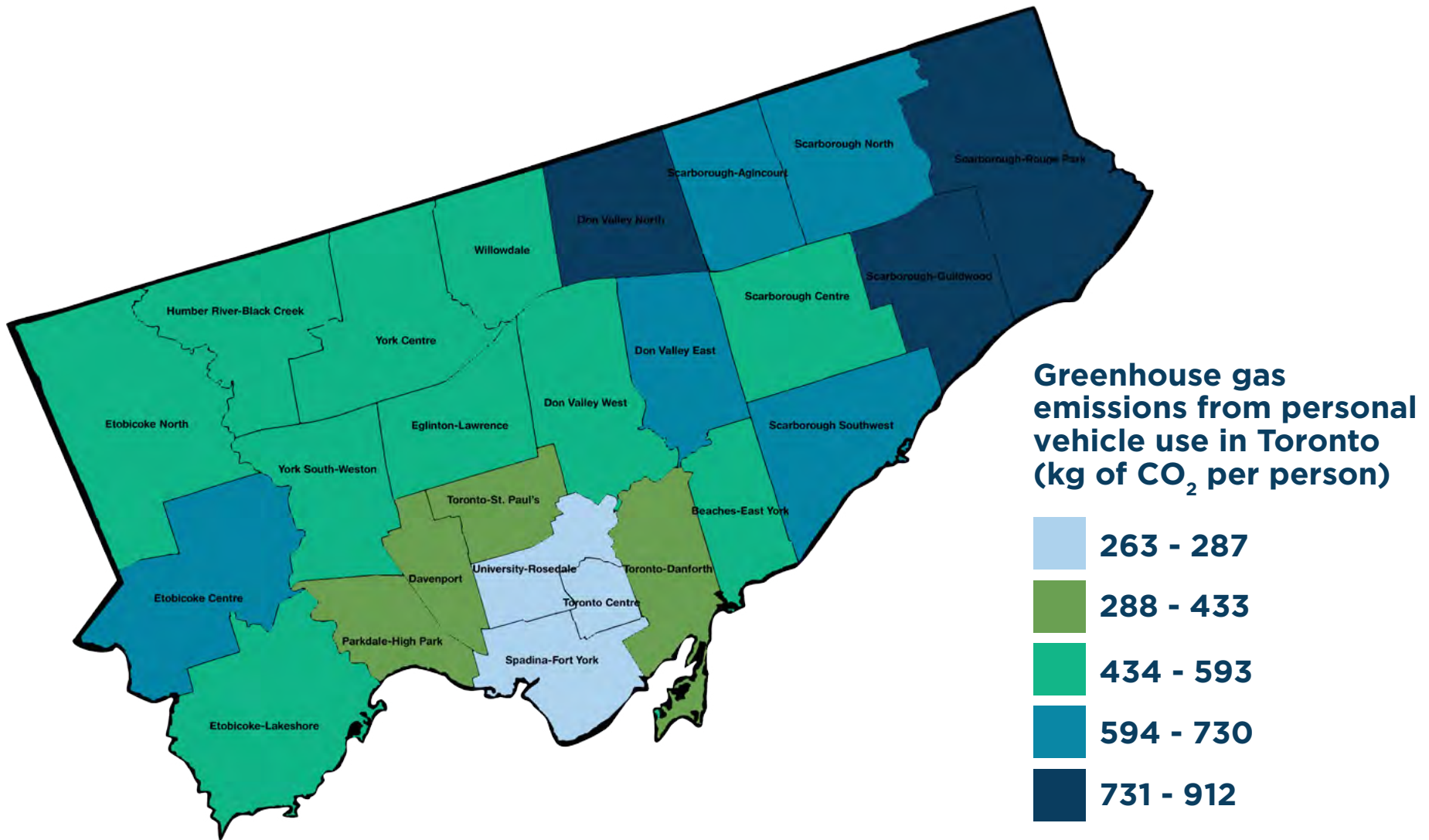
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**Figure 4: Per Capita Emissions (modelled) from Residential Homes by Ward
(2016)**



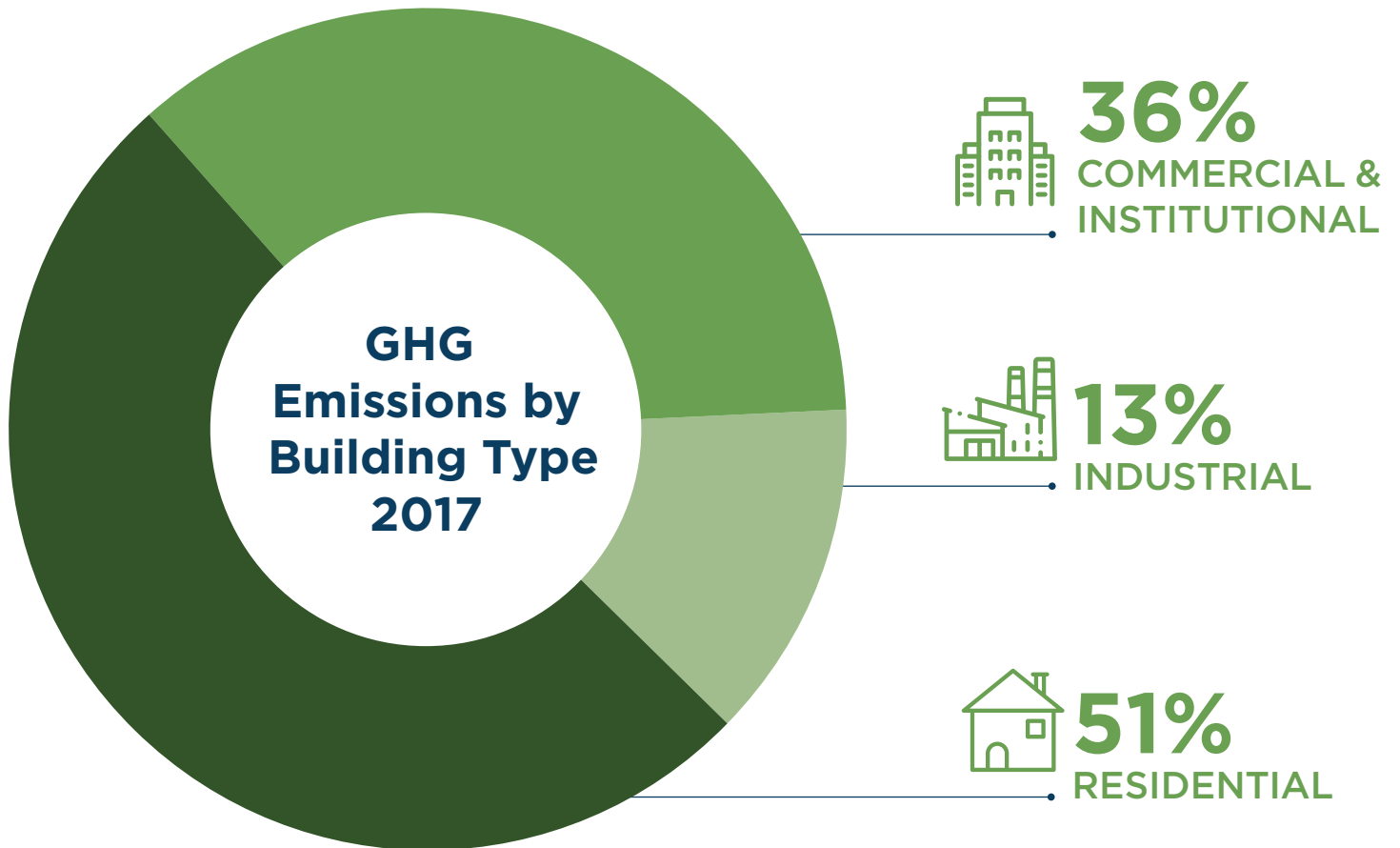
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**Figure 5: Per Capita Emissions (modelled) from Personal Vehicles, by Ward
(2017)**



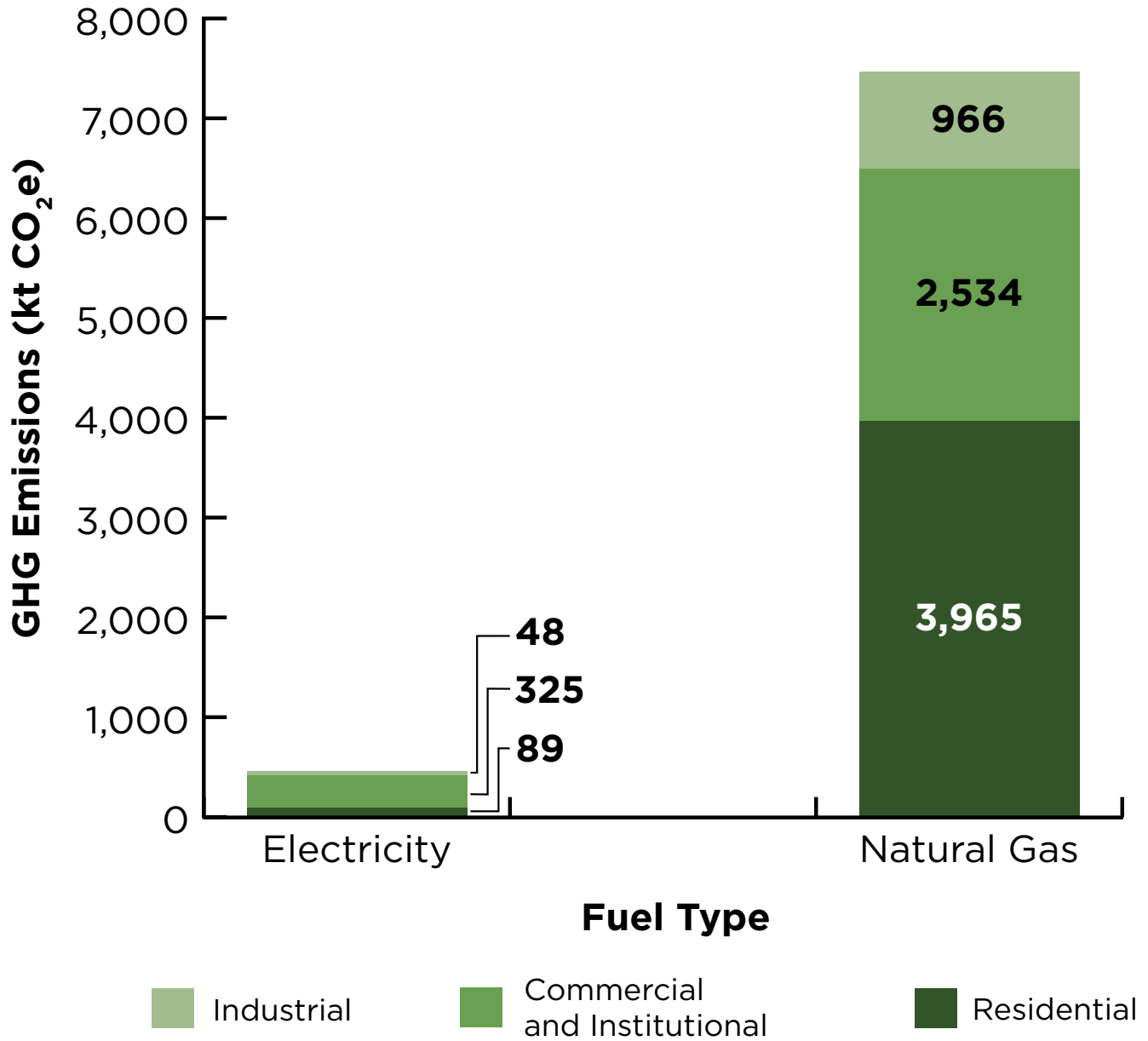
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**Figure 6: GHG Emissions by Building Type
(2017)**



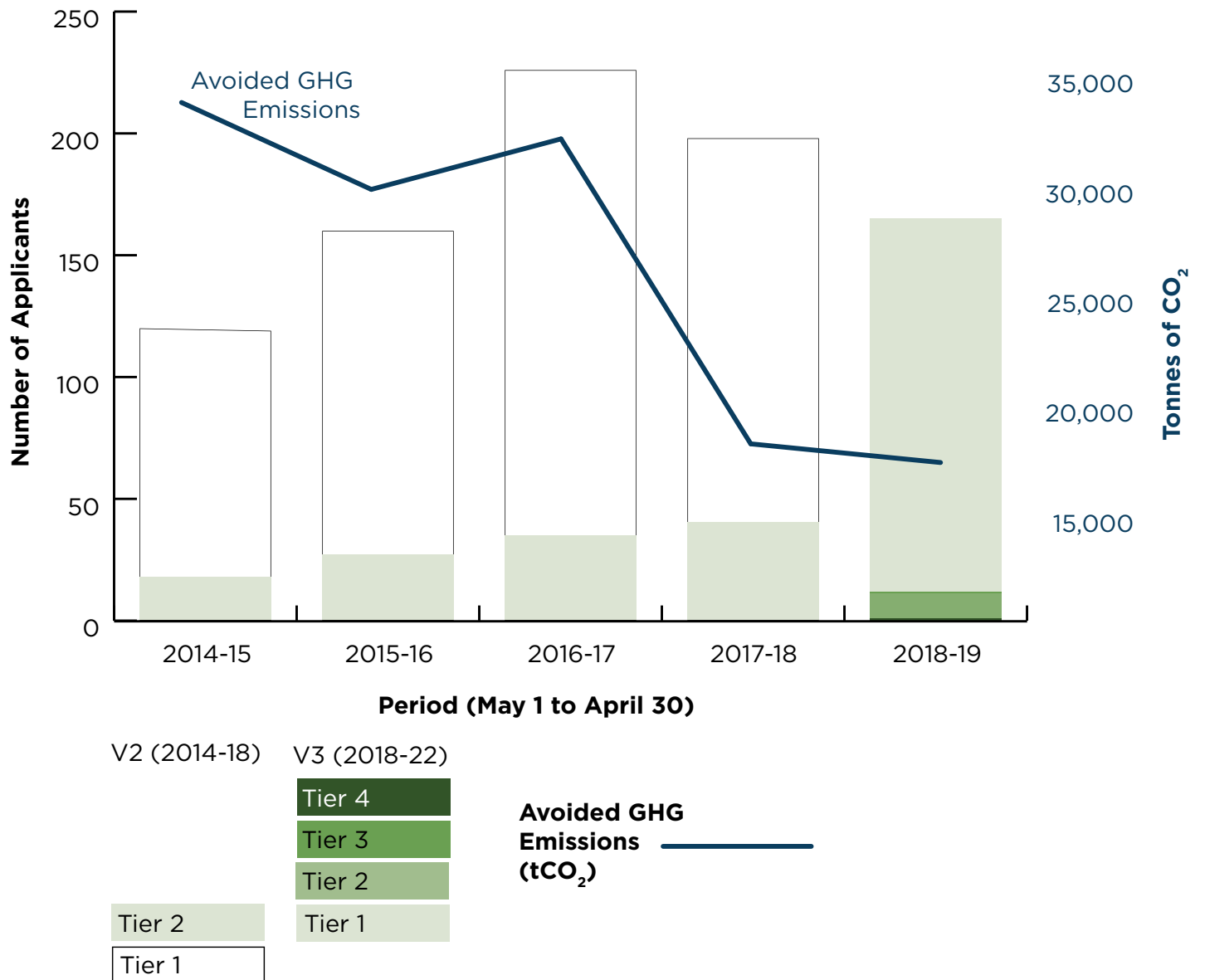
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**Figure 7: GHG Emissions from Buildings, by fuel and building type
(2017)**



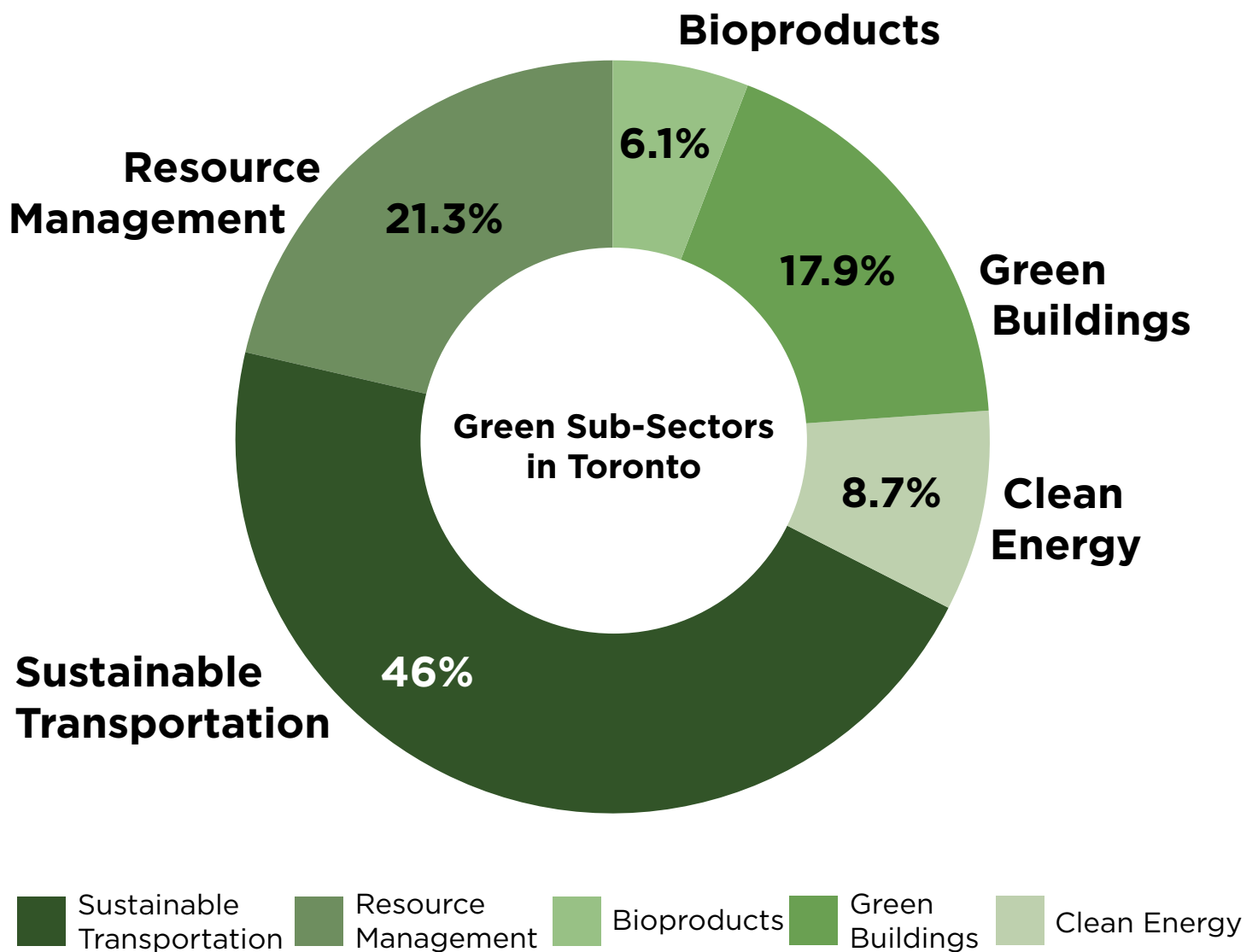
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Figure 9: Toronto Green Standard: Annual development applications and estimated avoided GHG emissions (2014/15 - 2018/19)



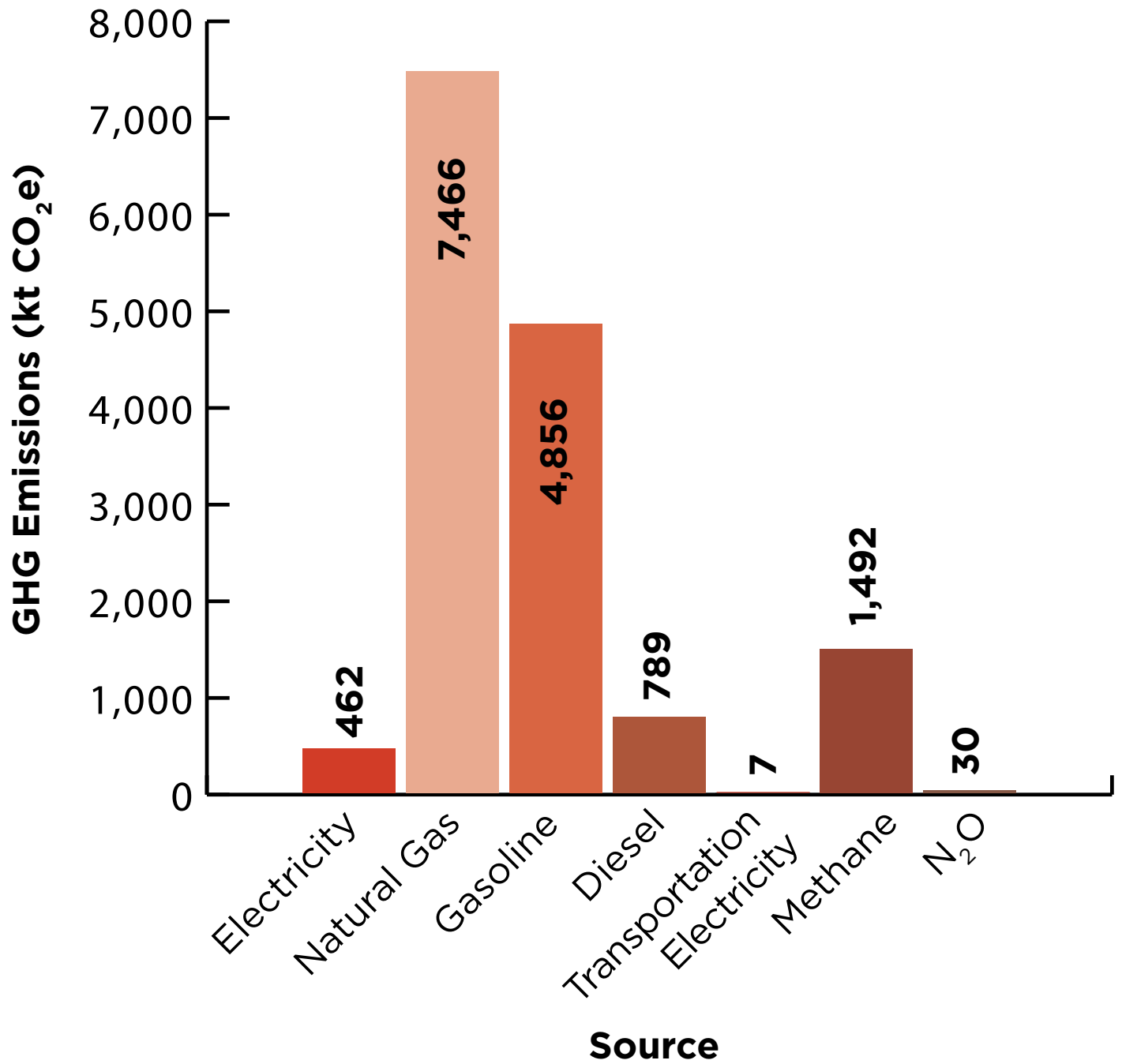
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Figure 10: Breakdown of Toronto's Green Sub-Sector Employment



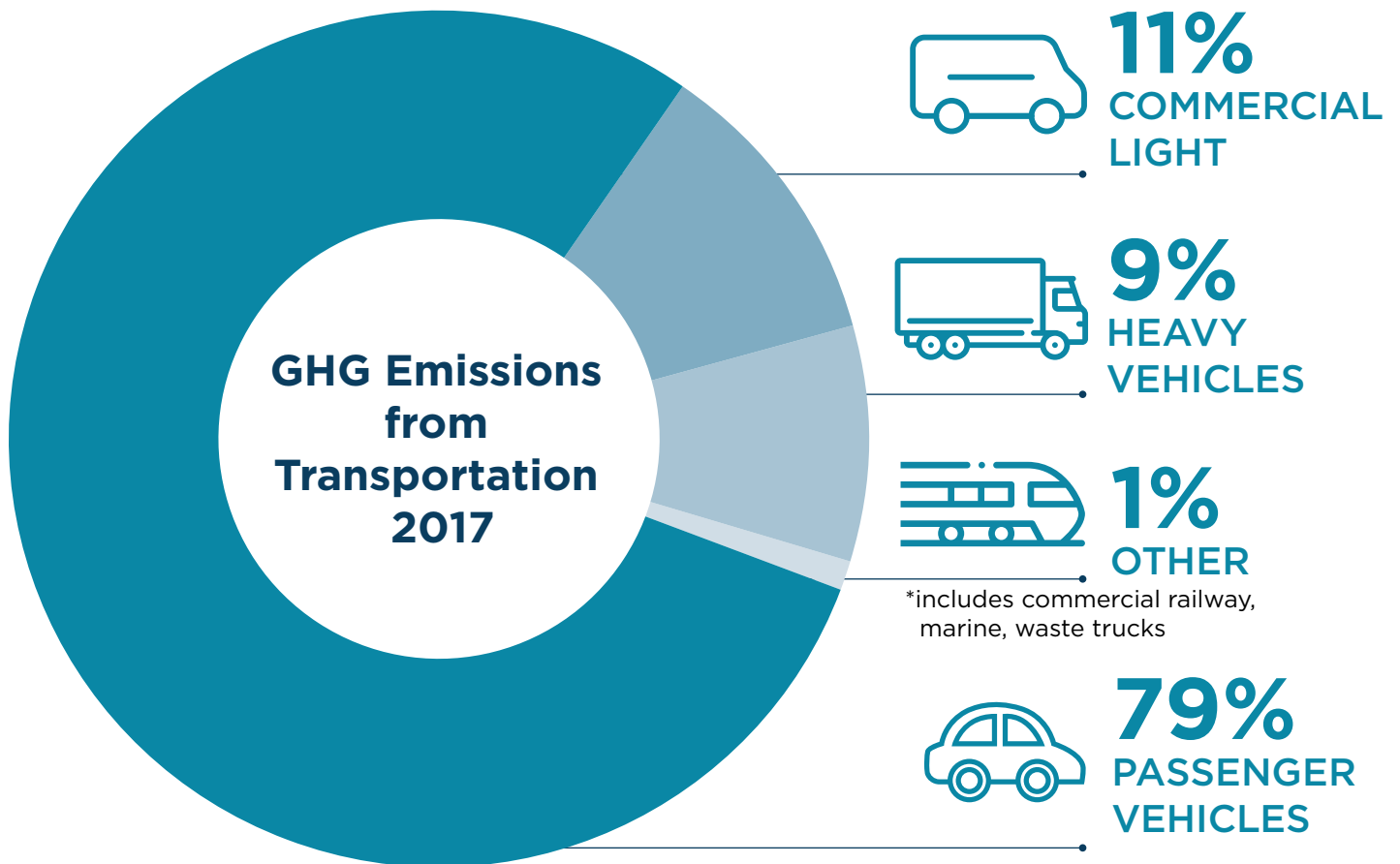
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**Figure 11: GHG Emissions by Source
(2017)**



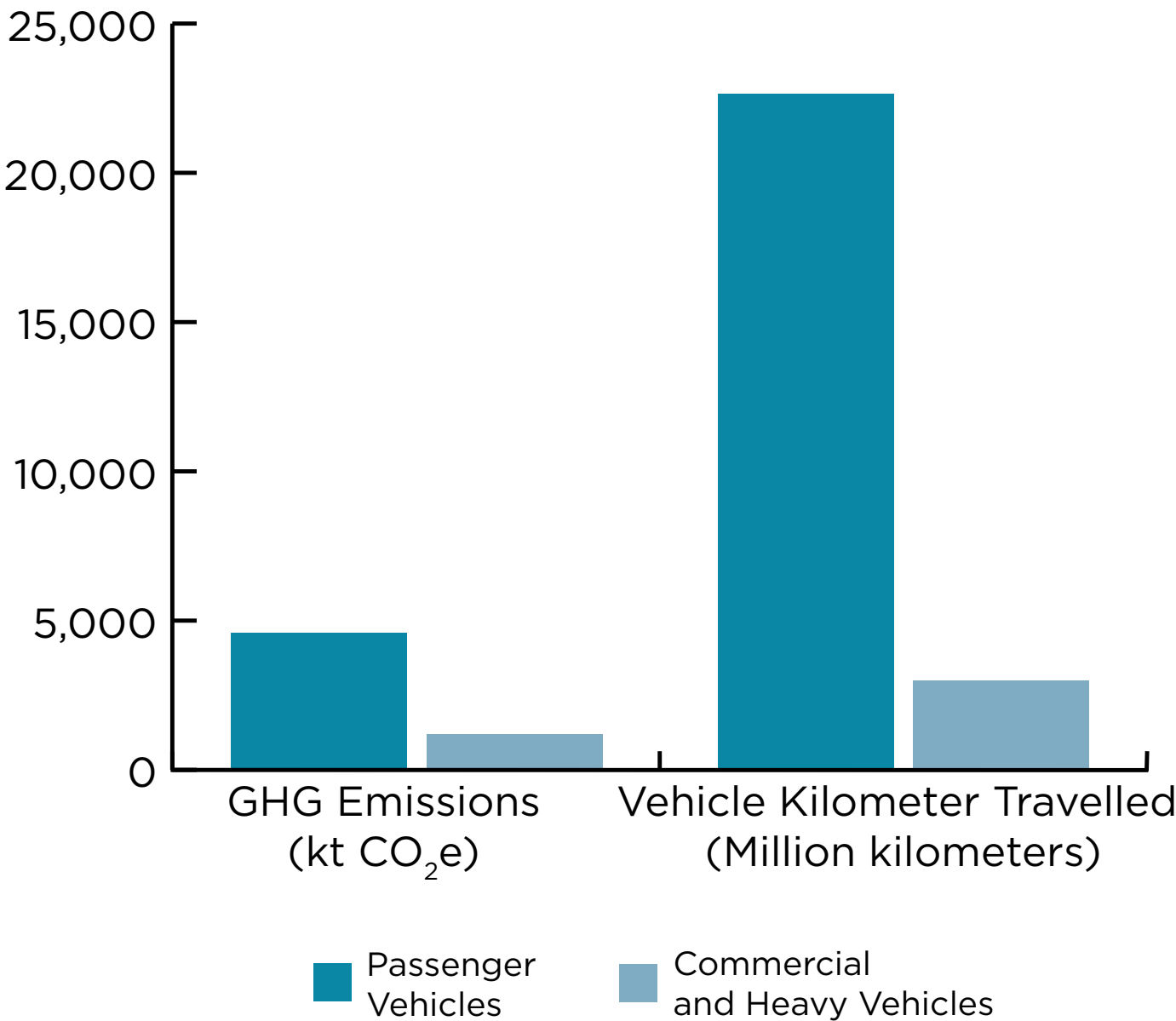
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**Figure 12: GHG Emissions from Transportation
(2017)**



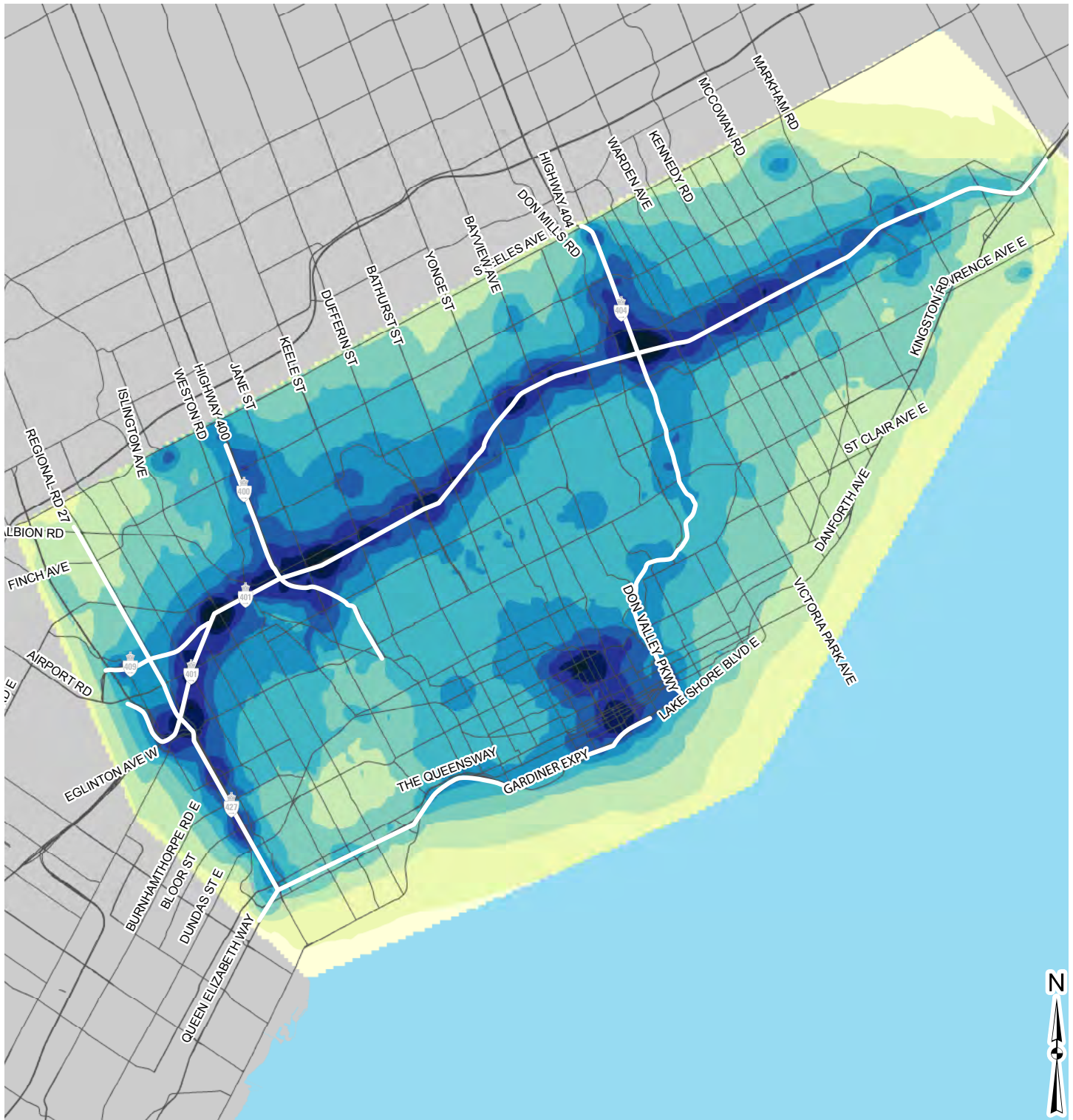
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Figure 13: Transportation GHG Emissions and Corresponding Total Vehicle Kilometer Travelled



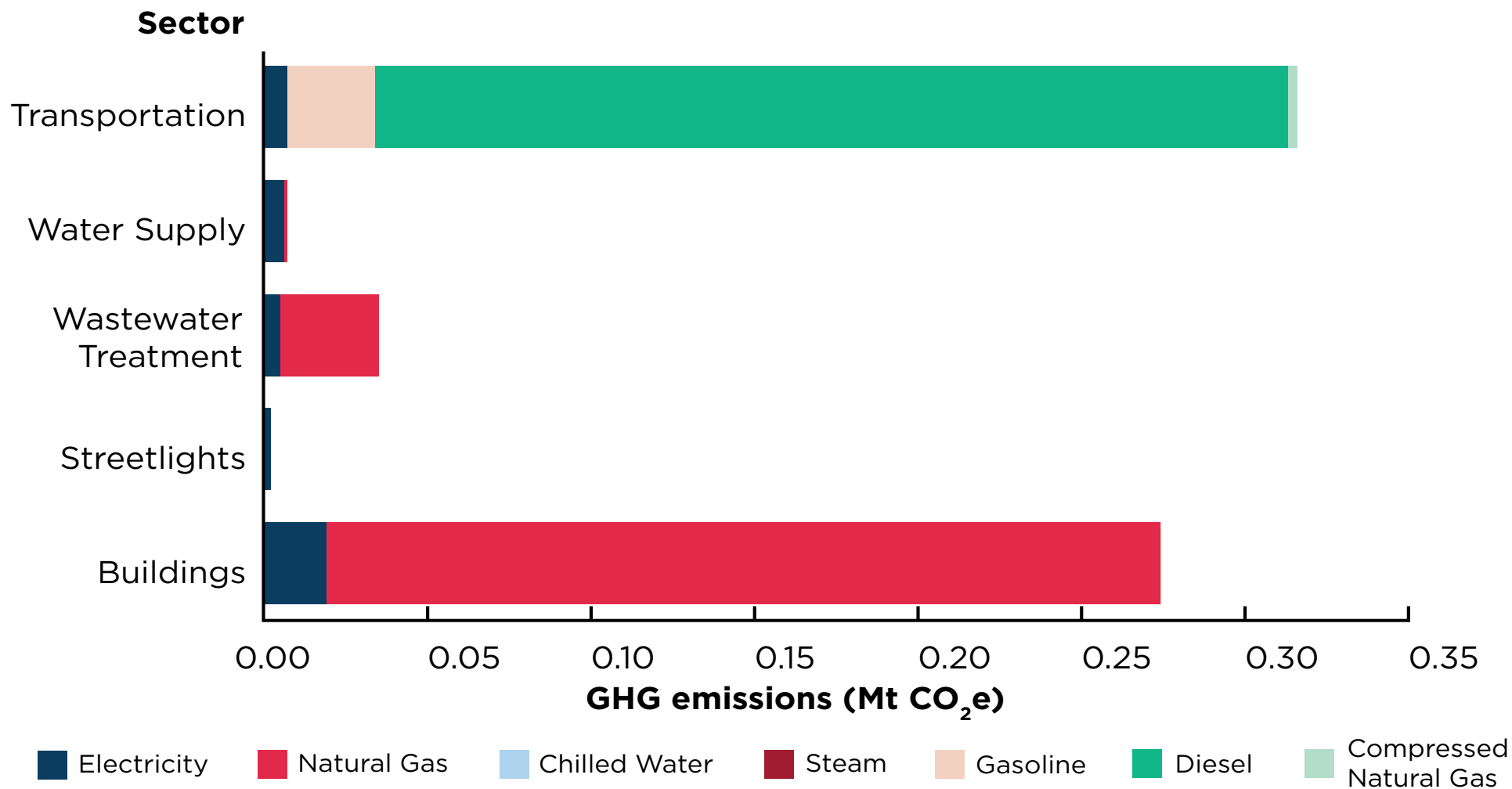
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**Figure 14: Traffic Related Air Pollution – Modelled Annual Average PM₁₀ Concentrations
(based on 2012 data)**



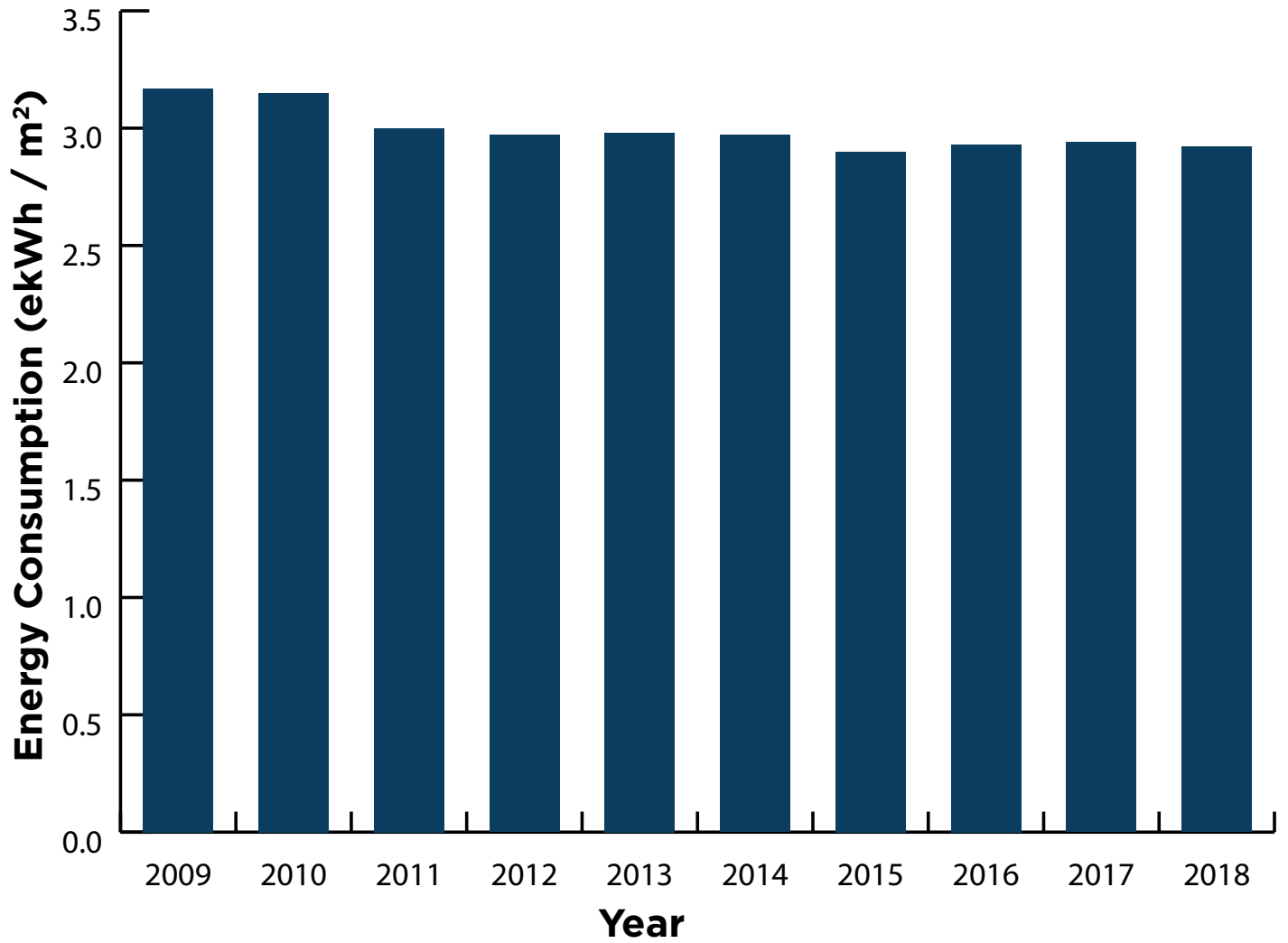
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Figure 16: City of Toronto Corporate GHG Emissions by Sector and Source (2017)



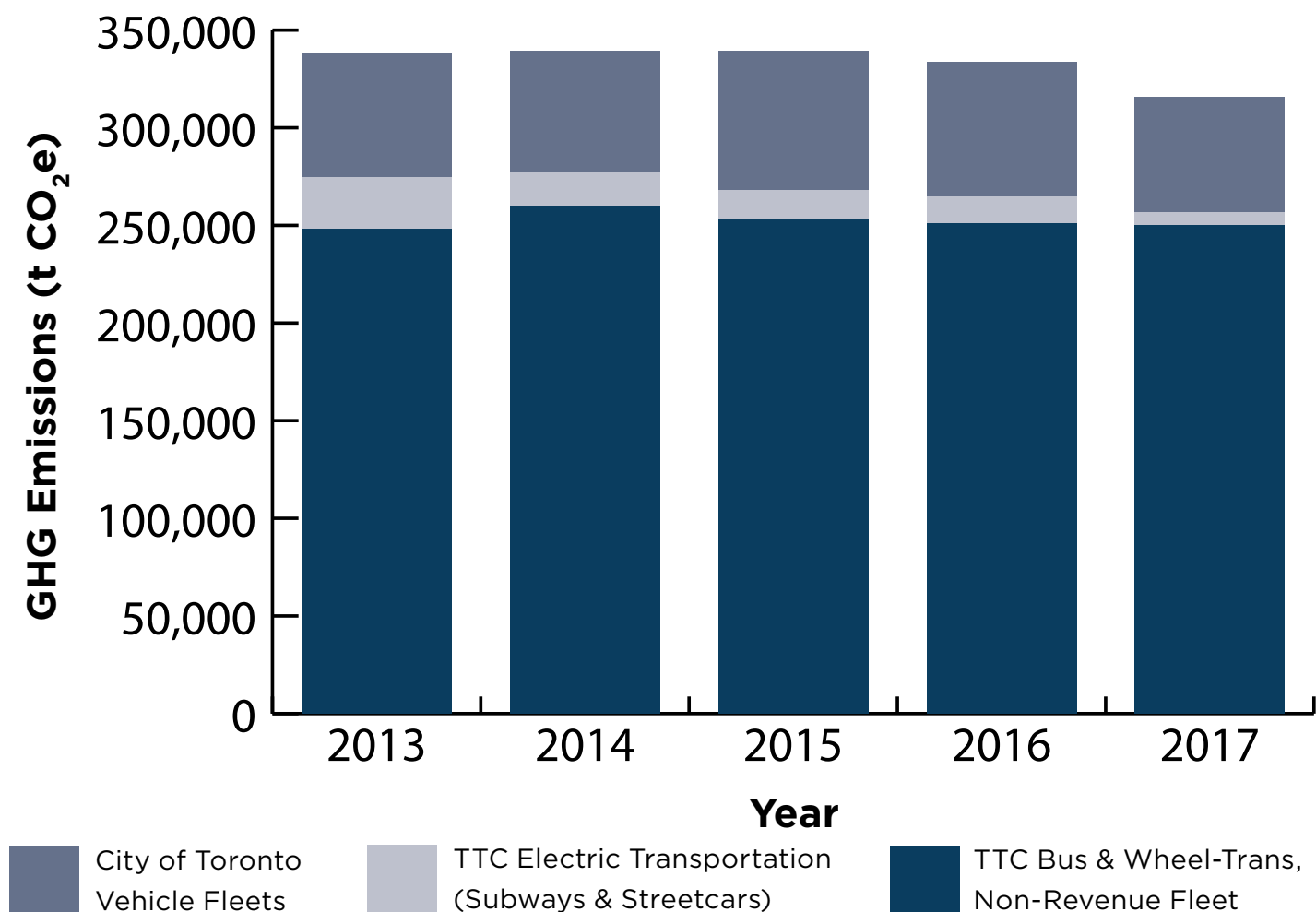
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**Figure 17: City of Toronto Corporate Energy Consumption of Office Buildings
(2009 - 2018)**



[Click to return to page 56 of the report.](#)

**Figure 18: City of Toronto Corporate Transportation GHG Emissions by Operation
(2013 - 2017)**



[Click to return to page 59 of the report.](#)