CARBON

WHY DOES CARBON MATTER?

Carbon dioxide is one of the primary greenhouse gases emitted to the atmosphere by human activities. Burning oil, gas, coal, and other fossil fuels in our power plants, factories, homes, and vehicles releases greenhouse gases. In turn, these greenhouse gases trap heat in the atmosphere and oceans contributing to global warming and climate change. There is broad consensus among scientists and decision makers that climate change is the most serious environmental threat facing our planet, its ecological systems, and our way of life.

CARBON

Our emissions are changing our climate

WHY IS THIS IMPORTANT?

Greenhouse gases (GHGs) are released to the atmosphere by human activities. GHGs trap heat in the atmosphere and oceans and are causing the climate to change.

In Ontario, we produce almost **2X** the world average GHG emissions per person.

WHAT'S HAPPENING?

Transportation fuel use and natural gas consumption by homes and businesses for heat are the two largest sources of GHG emissions in the GTA.

ONTARIO
is the first jurisdiction in North America to eliminate coal-generated electricity

Burning coal to produce electricity produces large amounts of carbon. Coal made up **25%** of Ontario's electricity generation in 2003 and was reduced to **zero** in 2014.

Climate change is the most serious global environmental threat to human progress and quality of life.

WHAT CAN WE DO?

- Create efficient, integrated transit
- Improve electric vehicle infrastructure

Carbon (GTA)

PROGRESS

Global greenhouse gas (GHG) emissions have reached the highest levels ever measured. Most scientists agree that GHGs from human activities are the most significant driver of climate change. Although we're working hard to reduce our GHG emissions, there is still a great deal of work to be done. Municipal leaders need to monitor emerging federal and provincial government climate change policies to ensure that our region is prepared to take action on GHG reduction and is positioned competitively in the coming low-carbon economy.

THE CURRENT SITUATION

From 2000 to 2010, global emissions of GHGs grew at a faster rate than they did over the previous three decades, reaching the highest levels in human history.[1] In Ontario, we produced 12.8 tonnes of GHG per capita in 2012[2], which is 1.7 times higher than the world average of 7.5 tonnes of GHG[3] and many times higher than the levels we will need to achieve worldwide to prevent the damaging impacts of climate change. In the The Living City® Report Card 2011, analysis showed that transportation fuel use and natural gas consumption by homes and businesses (mainly for heat) were the two largest sources of carbon emissions in the GTA, followed by electricity generation as the third largest.

While Toronto's experience is not representative of the entire GTA, recent analysis shows that there are two recent developments that have had, or are having, a significant impact on local GHG emissions. First, Ontario's phase-out of coal-fired electricity generation over the last several years has drastically reduced the GHG emissions associated with our use of electricity. Second, federal fuel efficiency standards, provincial support for electric vehicle infrastructure, and support for a regional mass transit system will assist in the transition to a low-carbon transportation system. In the City of Toronto, these policies are expected to drive GHG emissions downward, helping the city meet and potentially exceed its 30% reduction target by 2020.

WHAT NEEDS TO BE DONE

Municipal leaders need to keep in tune with emerging policy frameworks and, in turn, determine how their cities can influence, adopt, expedite and build upon these policies in the local context. They must also learn how to leverage local experience and expertise on the regional, provincial, and federal scale for maximum impact.

For example, emerging policy in Ontario to require large building owners to report their annual energy consumption was first proposed in Toronto (following New York's lead). This initiative should be applauded and implemented quickly by all municipalities across the GTA once it is formalized. The data generated by this policy will increase the awareness of – and dialogue on – energy use, help building managers understand opportunities for energy savings, and improve the market value of high-performing buildings (serving as an incentive for improving energy efficiency). Cities can make direct use of the data to guide the design of new energy efficiency policies and programs, and to focus resources on those buildings in greatest need of improvement. Cities should also lead by example, investing aggressively in energy efficiency retrofits of municipal buildings.

A well designed, affordable and seamlessly integrated mass transit system across the region is another important component of a low-carbon strategy. However, the regional transportation system must be designed in tandem with a broad suite of policies that encourage people to choose transit over single occupancy vehicle use. Our land use planning policies and decisions will have a significant impact on our future transportation choices.

Land use planning in the GTA is at the centre of our carbon profile. The Province's *Proposed Growth Plan for the Greater Golden Horseshoe, 2016*, will create new responsibilities and authorities for municipalities to integrate climate change mitigation into official plans and other policy frameworks. For example, locating housing and job centres in closer proximity would reduce transportation needs and facilitate use of mass transit. Denser neighbourhoods would also reduce building energy use, while more walkable neighbourhoods would increase levels of active transportation, which provides such co-benefits as improving public health and promoting a sense of place.

Identifying both the conflicts and synergies with other community benefits will be a critical component to long-term GHG reduction planning. Reaching the municipal carbon reduction targets considered necessary to avoid the most dangerous repercussions of climate change – i.e., achieving an 80% reduction by 2050 – will require major changes to the way residents of the GTA travel, work and play. But these changes also represent an opportunity to pursue some of our other health, economic and equity goals as well. For example, transportation emissions are a major source of air pollution in Toronto, resulting in poor health outcomes; therefore, reducing carbon emissions also offers public health benefits. Instances of inactivity-related diseases – and the related public health care costs – are sharply rising as we spend more time commuting long distances by car. More active and public transit options have proven to increase overall public health and reduce health costs in other jurisdictions. Finally, an intensive campaign to retrofit existing buildings is a key strategy that would address the number one source of GHG emissions in cities, while also generating substantial local employment.

Cities face both opportunities and constraints in minimizing the GHG emissions related to waste management. On one hand, cities oversee waste disposal and recycling services and are well positioned to increase the effectiveness of diversion programs (through innovative program design and education efforts). On the other hand, cities have limited tools at their disposal for encouraging waste prevention and shifting society toward the circular economy.[4] In light of this, cities should focus both on local waste diversion strategies and on provincial and federal policies that promote waste reduction, such as the *Strategy for a Waste-Free Ontario*. Cities can also play a critical role by using the biogas captured at landfills, sewage treatment plants and organics processing facilities to displace some of the fossil fuels used in the electricity generation, heating and/or transportation sectors.

Ultimately, our region will need to replace the fossil fuels used in transportation and space-heating with alternatives, such as low-carbon grid electricity and air/ground source heat pumps. This probably means re-thinking our electricity grid system, allowing it to handle new loads while taking advantage of new, de-centralized low-carbon energy sources – creating, at the same time, a power distribution system that is

more resilient to climate change and other shocks. As we transform our cities to a new low-carbon status and protect them from the impacts of climate change, we need to invite the input, expertise and innovation inherent in our diverse community members; the solutions we build together will be more likely to succeed. Similarly, greater understanding of our regional carbon profile will help us work together to identify and realize the multi-faceted opportunities of a low-carbon GTA.

WHAT WE ARE DOING

- In 2014, the Province of Ontario was the first jurisdiction in North America to fully eliminate coal as a source of electricity generation. Coal went from 25% of Ontario's supply mix in 2003 to zero in 2014, resulting in large-scale carbon reduction.

- The Environmental Commissioner of Ontario released *Facing Climate Change*, a GHG progress report for 2016. The report reviewed the science of climate change, its impacts, and why Ontario must dramatically reduce its GHG emissions.

- The Corporation of the Regional Municipality of York reduced its GHG emissions in 2015 by 994 tonnes, a 1.1% decrease over the same period in 2014. Key initiatives in 2015 for reducing emissions included transit route optimization and solar panel installation.

- The Ontario Climate Consortium is leading a multi-year research initiative – the Community Energy Knowledge Action Partnership (CEKAP) – that will explore opportunities to scale-up the implementation of low-carbon energy policies at the local and regional scale. CEKAP is a unique collaborative effort involving five academic institutions, eight municipalities, the provincial government and a range of civil society organizations.

- Several municipalities have developed sustainability guidelines for new development, including Toronto, Pickering, Oakville and Markham. In addition, the cities of Brampton, Richmond Hill and Vaughan worked collaboratively to develop the Sustainability Assessment Tool to measure the environmental sustainability performance of new development applications.

- The Ontario Ministry of Transportation funded the installation of 32 electric vehicle charging stations at four locations at Toronto Pearson International Airport. The Level 2 and Level 3 DC Fast Charging stations were procured by TRCA in partnership with the Greater Toronto Airport Authority and will be operational and open to the public in spring 2017.

- Region of Peel with its partner municipalities (Brampton, Mississauga and Caledon) developed a comprehensive and collaborative *Climate Change Strategy*. Region of Peel is a frontrunner in developing a climate change strategy on a regional basis.

- The Home Energy Loan Program in the City of Toronto is promoting the use of local improvement charges for energy efficiency retrofits, while the complementary High-rise Retrofit Improvement Support (Hi-RIS) program is doing the same for multi-unit residential buildings.

TARGETS

Long-term target: Reduce emissions to 80% below 1990 levels by 2050 (11 Mt CO_{2e}).

by Mary Pickering, *Vice President Programs and Partnerships at The Atmospheric Fund (TAF)* - full bio on page 96


AIR QUALITY

WHY DOES AIR QUALITY MATTER?

Air pollution is responsible for significant health impacts. Research has linked air pollution to a number of health concerns, including respiratory illness, cardiovascular disease, cancer, endocrine system and neurological effects, diabetes and allergies. Even at low levels, air pollution can cause significant detrimental health impacts due to long-term systemic exposure. These health impacts have a strong bearing on our quality of life and place an unnecessary strain on the health care system.

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WHAT CAN WE DO?

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- Improve electric vehicle infrastructure

Air Quality (GTA)

PROGRESS ↗*

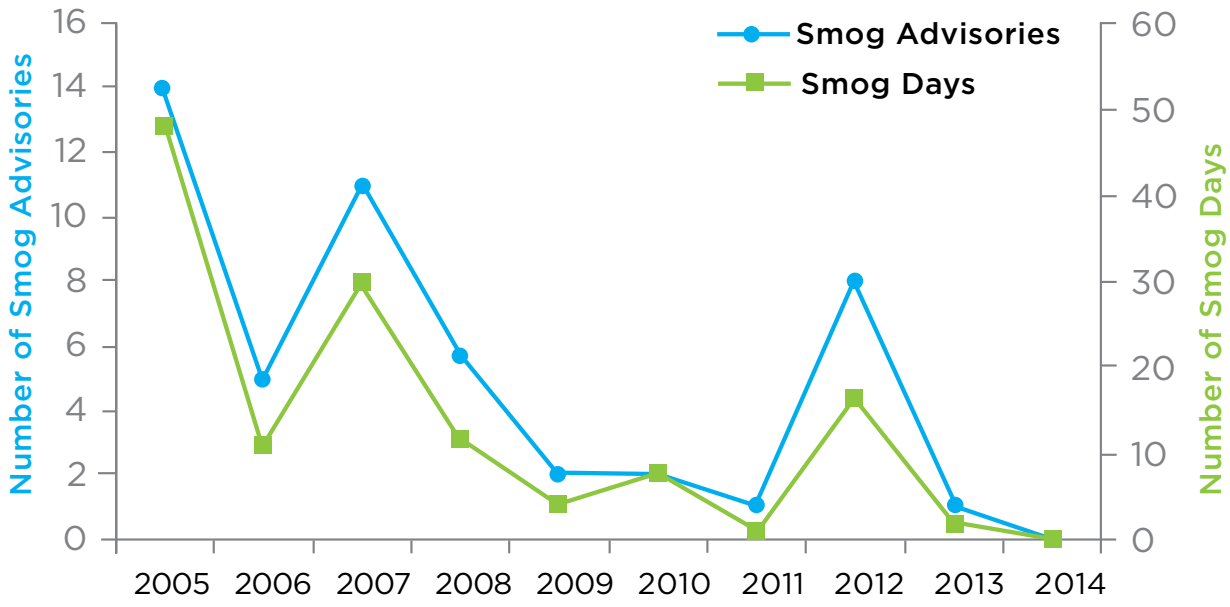
Over the past decade, ambient concentrations of most common air pollutants have declined across Ontario. However, variations in air quality *within* a community can be as great as the variation *between* communities. Since this variation is rarely measured, there may be "hot spots" of poor air quality even though air quality is getting better overall. We do know that when we drive our vehicles and use energy in our offices and homes, we are burning fossil fuels (such as gasoline, natural gas, oil) and sending pollution into the air. This contributes to smog and poor air quality, which is directly linked to impacts on our health. In order to improve air quality in the GTA, we need all levels of governments to continue to encourage the development of clean industry, energy and transportation. We also need more comprehensive and detailed local area monitoring within urban neighbourhoods to better understand how air quality is affecting people at the local level.

THE CURRENT SITUATION

Air pollution is made up of a variety of substances, each with different sources, patterns of distribution, chemical reactions and health impacts. A number of our most common air pollutants (also known as criteria air pollutants) collectively represent a serious threat to the health of our communities. They include ground-level ozone (O_3), fine particulate matter ($PM_{2.5}$), sulphur dioxide (SO_2), nitrogen dioxide (NO_2) and carbon monoxide (CO). While everyone is adversely affected by exposure to air pollution, children, the elderly and those with pre-existing health conditions (such as heart disease, asthma and other respiratory illnesses) are particularly vulnerable. The Canadian Medical Association estimates that the morbidity and mortality associated with poor air quality over the period 2008 through 2031 will cost in excess of $117 billion (in current dollars).[5]

Air pollution must be monitored over space and time in order to evaluate the quality of the air we breathe, to compare it to targets we have set based on health evidence, and to gauge historical improvements. Understanding the severity of the issue is imperative in creating appropriate indicators, alerts and prevention strategies for vulnerable populations, and in determining the necessity and effectiveness of mitigation measures. Monitoring can also inform land use and transportation policies, development applications, and the siting of sensitive facilities, such as child or senior care facilities.

In Ontario, ambient concentrations of most common air pollutants have declined over the past decade. Between 2005 and 2014, $PM_{2.5}$ concentrations decreased by 31%, NO_2 by 42%, SO_2 by 49% and CO by 40%.[6] These decreases are due primarily to improvements in vehicular performance, industrial downturns, and the impact of provincial air quality initiatives such as the phase out of coal-fired power and federal vehicle emission standards. Over the same time frame, ozone concentrations increased by 3% on average, although summer concentrations decreased by 8%.[7] As a result, the number of smog alerts and smog days reported each year have dropped.



Trend based on three MOECC sites in Toronto, Halton-Peel, and York-Durham.[8]

These improvements have occurred over large areas and over long time frames, and it should be noted that the figures are based on annual averages. Local concentrations of these pollutants can still exceed ambient air quality criteria over shorter time frames.

'Traditional' monitoring networks – comprising an assortment of meticulously calibrated and maintained stationary, movable and mobile measuring instruments – have collectively informed our understanding of pollution trends and health effects in Ontario. Generally owned and operated by provincial and federal government agencies, these networks are used for decision making by governments and for research purposes by academic and non-government communities. Because they are government owned, the data generated is generally publicly accessible; however, the delay in releasing this data can be lengthy, taking over a year in some cases. Moreover, network coverage is geographically sparse, and the equipment is expensive to acquire, install, operate and maintain. For these reasons, the data generated may not reflect the spatial gradient of pollution in our local communities.

Recent studies have demonstrated that variations in air quality within a community can be as great as the variation between communities, suggesting that land use, urban design and proximity to roads can impact local exposures.[9] Traditional monitors are too large and expensive to reveal local variations in air pollution. However, recent technological advances in monitoring technology, coupled with the rapid growth of social entrepreneurship and active academic research communities mean we are at an exciting juncture in pollution monitoring. This has resulted in the creation of 'next generation' monitors, including small research monitoring networks, portable monitors and wearable monitors.[10] While many next generation monitoring technologies are in their infancy, new products are making it to market at a rapid rate, allowing for cheaper, more extensive local monitoring of air pollution. There has also been a proliferation of smartphone-based apps to assist in disseminating health messaging in our communities. As these technologies become more widely tested and available, they may offer community organizations greater opportunity to conduct their own monitoring and to gather evidence in support of local health and environmental concerns.

WHAT NEEDS TO BE DONE

- Improve local air quality monitoring.
- Invest in and encourage the use of clean energy technologies, such as solar, wind, geothermal, and bioenergy.
- Improve cycling and other active transport infrastructure to reduce reliance on private vehicles.
- Improve public transportation, particularly on a regional scale.
- When planning new communities, design streets to make more space for pedestrians, cyclists, and transit. Older communities need to consider redesigning streets and infrastructure to better accommodate pedestrians and cyclists.
- Foster greater collaboration between academia, NGOs, public and private sectors to advance monitoring.
- Build greater public and political awareness of the health implications of poor air quality.

WHAT WE ARE DOING

- CivicAction's Race to Reduce is a program aimed at reducing total energy use in participating office buildings across the Toronto region. Reducing energy use ensures less fossil fuel is burned and results in a reduction in air pollution.
- Clean Air Partnership's 20/20 The Way to Clean Air program is designed to help homeowners reduce their energy consumption by 20% at home and on the road, improving local air quality and lessening the impact of smog and climate change on the environment and health.
- Toronto Environmental Alliance's INHALE Project uses mobile air particulate monitoring equipment attached to backpacks, bike handlebars, and baby stroller handles, allowing volunteers to walk, run, or ride through their neighbourhoods collecting real-time air pollution data.
- The Southern Ontario Centre for Atmospheric Aerosol Research (SOCAAR) at the University of Toronto is an interdisciplinary centre for the study of air quality, with a focus on how aerosols impact human health and the environment. SOCAAR brings together medical personnel, atmospheric chemists, and environmental engineers, to promote collaborative research through access to state-of-the-art facilities and partnerships with government and industry.
- The innovative Scarborough Cycles project is extending the bike culture beyond the downtown core out into the suburbs. Bike 'hubs' were established in two communities to offer access to bicycles, tools, and repair clinics, while providing civic engagement opportunities for residents. The initiative was funded by the Metcalf Foundation Cycle City program and the Toronto Centre for Active Transportation, in partnership with CultureLink Settlement and Community Services, the Toronto Cycling Think & Do Tank, and Cycle Toronto.

TARGETS

Long-term target: Sulphur dioxide (SO_2) emissions of 7,000 tonnes; volatile organic compounds (VOCs) emissions of 11,700 tonnes; particulate matter ($PM_{2.5}$) emissions of 1,700 tonnes; and, nitrogen oxides (NO_x) emissions of 22,000 tonnes.

by Kevin Behan, *Deputy Director with Clean Air Partnership*
- full bio on page 96


WASTE

WHY DOES WASTE MATTER?

Almost everything we do creates waste. Waste is often stored in landfills that produce carbon emissions, take up valuable land, and represent a wasted use of valuable materials that could have been reused, recycled, or resold. As our population continues to grow, we will continue to create waste. Our current consumption levels are unsustainable and will impact the kind of world we will leave for future generations.

WASTE MANAGEMENT

Reduce, reuse, repair, recycle, recover

WHY IS THIS IMPORTANT?

It is responsible and sustainable to reduce, reuse and recycle rather than bury waste in landfills. Diverting waste from landfills means we are using more of that material for other uses and consuming fewer resources and energy.

WHAT'S HAPPENING?

Residential waste diversion has not improved significantly over the last 5 years. The diversion rate for MuRBs is about 1/4 compared to 2/3 in single family dwellings.

GTA residential waste diversion:

MULTI-UNIT RESIDENTAL BUILDING (MuRB)
such as apartment buildings and condos

SINGLE FAMILY HOMES

More than two-thirds of what people put in their garbage bags could be diverted from landfill.

TEXTILES SUCH AS CLOTHING ARE
95% RECYCLABLE
and make up **10%** of our garbage.

WHAT CAN WE DO?

- Improve waste reduction options in MuRBs
- Improve textile recycling options across the GTA

Waste (GTA)

PROGRESS

Although there have been small gains in some municipalities, waste management for the GTA as a whole has not improved over the past five years. Effective waste management minimizes the amount of waste going to landfills and maximizes the use we get from materials, preserving our environment and making our region more sustainable. We need to focus our attention on making waste diversion a priority, particularly in multi-unit residential buildings (MuRBs). This includes making waste diversion easier for residents and building tenants by increasing opportunities for recycling, reduction, and reuse of materials.

THE CURRENT SITUATION

One of the most widely used measures of the success of a municipal waste management program is the percentage of waste generated by its residents that is diverted from disposal in a landfill or from incineration. Since the last The Living City® Report Card in 2011, the percentage of residential waste being diverted from disposal in the GTA has remained fairly steady at about 52%.[11] The impressive growth in waste diversion between 2006 (39%) and 2009 (50%) seems to have stalled and the region is considerably below the long-term target of 75% diversion established in The Living City® Report Card 2011.

Low diversion rates mean that too much waste that is divertible is ending up in the garbage stream. For example, the most recent waste audits from the Region of Peel show that about two-thirds of the waste that is set out as garbage could be diverted – and that both single family and MuRBs have similar percentages of divertible material in their garbage streams.[12] The findings are comparable in other jurisdictions such as the City of Toronto, although MuRBs there have more divertible materials in the garbage stream.[13]

MuRBs continue to experience difficulty in achieving high diversion rates. In Toronto, for example, the diversion rate for MuRBs in 2014 was 26% compared to 66% in single family dwellings.[14] This is an improvement for MuRBs since 2009 when it was only 16%. Much of that increase is due to the growing number of MuRBs that are adopting organics diversion programs but, at the same time, virtually all of the diversion challenges for MuRBs noted in The Living City® Report Card 2011 remain.

On the positive side, the total amount of waste generated per person annually in the GTA has declined by almost 5% from 362 kg/capita in 2009 to 345 kg/capita in 2014. Much of this decline is likely due to the increasing prevalence of lightweight materials in the waste stream, such as plastics, that are replacing heavier materials used in packaging and products. This change in waste generation may also reflect successful efforts by residents to reduce and reuse.

Since the last The Living City® Report Card, a major policy development has been the Province of Ontario's proposed *Waste-Free Ontario Act* and the creation of a draft plan for moving forward on waste diversion and reduction known as the '*Strategy for a Waste Free Ontario: Building the Circular Economy*'.[15] Together, these two initiatives address many of the opportunities for action recommended in The Living City® Report Card 2011. The *Waste-Free Ontario Act* imposes full extended producer responsibility (EPR) on producers of certain products and materials. This means that producers will have to pay the full costs of recovery of their end-of-life products. Not only will this transfer financial responsibility away from municipalities and taxpayers, but the hope is that the new system will encourage producers to make their products and packaging more easily recyclable, reusable or durable. Products and materials covered by EPR in Ontario currently are Blue Box materials, used tires, some household hazardous wastes, and waste electrical and electronic equipment (WEEE), such as old computers and televisions. Unlike other EPR programs in Ontario, which are full EPR already, producers currently split Blue Box costs with municipalities and they will now have to pay all of the program's costs. New products suggested for possible inclusion in EPR include fluorescent bulbs and tubes, carpets, bulky items (e.g. furniture), and WEEE not already designated under EPR (e.g. household appliances).

Two other proposals of note in the *Strategy for a Waste Free Ontario* are landfill bans for certain products and the development of an organics action plan. The first proposed set of landfill bans are for WEEE and compact fluorescent light bulbs. The organics action plan will address waste reduction and diversion across the entire pre-consumer and post-consumer organic waste supply chain, meaning that both the food sector and residents will be involved. All of these measures will have potentially profound impacts on residential waste diversion and reduction in the GTA. Although ambitious and wide-ranging, the most disappointing aspect of the *Strategy for a Waste Free Ontario* is that it is vague about the options for reducing industrial, commercial, and institutional (ICI) waste, except for food waste in the ICI sector, as noted above.

WHAT NEEDS BE DONE

Reduce the quantity of divertible materials in the waste stream. Recycling needs to be simplified. For example, the same types of packaging should be recyclable in each of the GTA municipalities, both at home and in the workplace. Municipalities should disallow the sale of packaging that combines recyclable and non-recyclable materials, such as most types of take-out coffee cups and lids. Although some municipalities have recently started to divert textiles, textiles in the municipal residual waste stream remain an issue. Textiles represent up to 10% of the material destined for landfill.[16] Another strategy to reduce the quantity of divertible materials is increased education about what can and cannot be diverted.

Focus on increasing diversion rates in MuRBs. We are seeing the emergence of best practice MuRBs that are closing in on or even exceeding average diversion rates in single family households. For example, between 2014 and 2016, residents of a 282 unit condominium in Toronto decreased the volume of garbage that they set out by 86% and increased the volume of recycling by 48%.[17] The building offers its residents a wide range of diversion opportunities in addition to Blue Bin and Green Bin diversion, including battery recycling, used clothing collections, cooking oil recovery, pharmaceuticals recovery, household hazardous waste recycling, WEEE recycling, a sharing-shelf for reuse of household items, and space for exchanging used books and furniture.

Reuse and reduce. Most of the waste diversion efforts to date in the GTA deal with recycling and organic waste. Reuse and reduction have been neglected parts of the waste management hierarchy but some municipalities are developing innovative programs to increase both.

Measure and monitor ICI waste. Better measurement of ICI waste flows and diversion, as well as updating existing ICI diversion regulations and enforcing them are all necessary to significantly reduce waste.

WHAT WE ARE DOING

- In 2016, the City of Markham launched an innovative and aggressive textile recycling program. Markham has installed municipally managed textile donation containers at city facilities, fire stations, and community centres. Gently used items will be sold for rewear or reuse by The Salvation Army and the remaining textiles will be recycled.

- The City of Toronto recently launched the Mayor's Towering Challenge, which offers resources, support and online recognition to help participating MuRBs increase diversion.[18] The City of Toronto has also recently approved an updated *Long Term Waste Management Strategy*.

- Region of Peel adopted the *Waste Reduction and Resource Recovery Strategy* in 2014. The strategy is built on the 4Rs (Reduce, Reuse, Recycle and Recover) and has established a diversion target of 75% by 2034, the highest proposed diversion rate for the GTA.

- York Region has a Reuse, Repair, Repurpose Strategy. Since 2007, York Region has partnered with Goodwill and Habitat for Humanity to operate several reuse transfer facilities. York Region also has waste diversion strategies dedicated to MuRBs, organics, and ICI waste.[19]

- Partners in Project Green works with GTA businesses to reduce their waste through programs such as Material Exchange, which facilitates online exchanges of materials between organizations, and service providers to divert resources from landfill and drive towards a circular economy. Since conception in 2012, Material Exchange has resulted in 146 exchanges and 9,237 tonnes diverted from landfill.

- City of Mississauga and City of Vaughan participated in Partners in Project Green's inaugural Recycling Collection Drive in 2016 collecting and recycling electronic and textile waste at municipal buildings across the GTA. Overall, 16 municipal and commercial organizations, representing 30 locations across the GTA participated in the event during Waste Reduction Week in Canada.

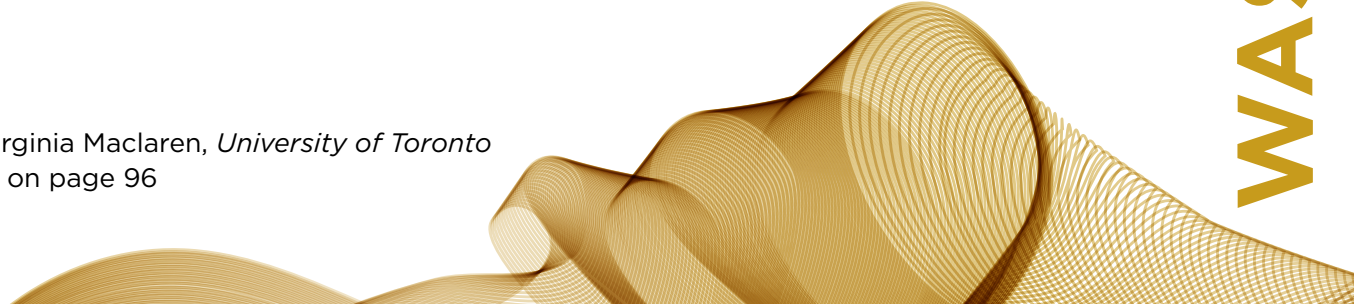
- Durham Region broke the Guinness World Record for most batteries collected in a twenty-four hour period, collecting 5,102 kg of material. This has turned into a continuing program and now Durham also provides used battery curbside collection services to all residents making it easier to recycle.

- The Tree and Wood Recovery Centre, in partnership with TRCA, was launched in 2016. Located in the City of Mississauga, the Centre helps to divert and repurpose ash wood affected by emerald ash boarer into lumber, live-edge, and other innovative wood products. Over 4,500 tonnes of wood waste was repurposed in its first year of operations.

TARGETS

Long-term target: Residential and ICI waste diversion rates greater than 80%.

WASTE



by Dr. Virginia Maclaren, *University of Toronto*
- full bio on page 96