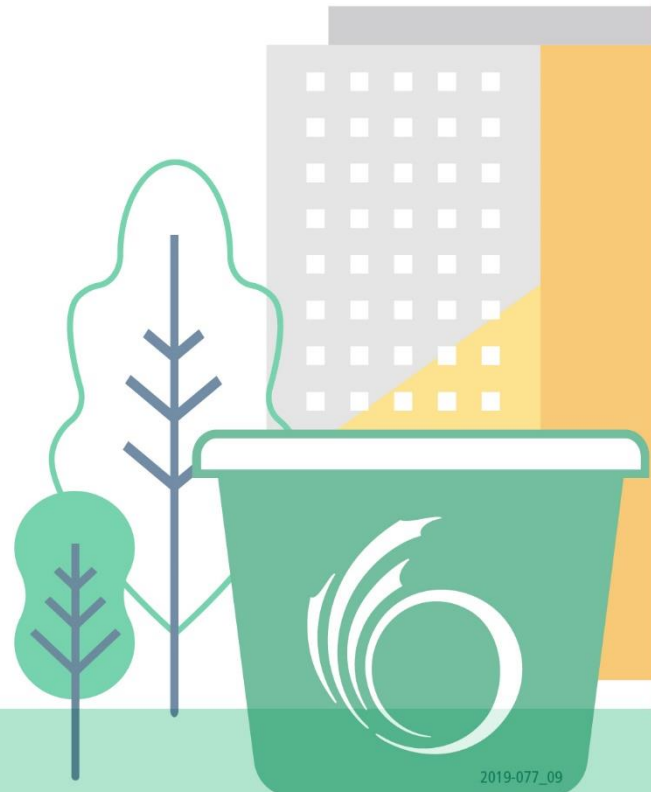


# Review of Policy and Trends

# Technical Memorandum #4

## January 2020



### Disclaimer

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This Technical Memorandum was prepared by HDR Corporation, Dillon Consulting Limited, Love Environmental Inc. and Robins Environmental.





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## 1 Executive Summary

The purpose of this Technical Memorandum is to review solid waste management policy and program trends in other jurisdictions, with a focus on successful waste diversion activities to help inform future waste management decisions for the City of Ottawa.

### 1.1 Waste Management Policy and Program Trends

Four provinces are leaders in waste minimization and diversion policies and programs in Canada – British Columbia, Québec, Nova Scotia and Prince Edward Island. These provinces have implemented extensive disposal bans on materials, such as food waste, paper products and packaging, electronic waste and some construction waste. They are also leading in diversion of food waste from disposal and Extended Producer Responsibility (EPR) / stewardship programs. Bans and EPR have been used to exert control over the amount of waste generated and disposed of by residents and businesses. British Columbia and Québec have been very active in developing single-use plastics (SUPs) strategies, with a focus on bans or levies on a wide array of SUPs and incorporating the principles of a Circular Economy as they address waste management.

Throughout Canada, a number of waste management related topics, e.g. food waste, single-use plastics (SUPs), green procurement, Circular Economy and Greenhouse Gas (GHG) reduction, have gained attention, especially in the largest urban jurisdictions – Metro Vancouver, Toronto, Montreal, and Halifax Regional Municipality. In the case of organic waste, Canadian jurisdictions have found it necessary to examine the extent to which food waste continues to be disposed in landfills, which over time creates the highly potent Greenhouse Gas – methane. In response to this concern, many municipalities in British Columbia have implemented food waste disposal bans that target residential and the industrial, commercial and institutional (IC&I) sector. In other cases, food waste diversion programs also may be driven by mandatory source separation by-law requirements that target the residential sector and/or the IC&I sector as in the case of Halifax Regional Municipality and the City of Calgary. Other municipalities are waiting for the provinces to take the lead, e.g. Ontario and Québec, while some provinces have



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already taken action, e.g. Nova Scotia and Prince Edward Island, and have imposed provincial food waste disposal bans.

Currently, there are almost 30 individual and limited SUP product bans implemented or pending in 15 Canadian jurisdictions, with British Columbia municipalities taking the lead in driving SUP bans. Most SUP bans target plastic bags, with 15 Canadian jurisdictions having implemented SUP bag bans or intending to implement bans, but jurisdictions are also banning or intending to ban plastic straws and polystyrene cups and containers.

The Circular Economy approach embraces the concepts of repair/refurbish and disassembly, design for the environment, 100 percent recycled content, etc. Greenhouse Gas reduction also factors heavily into the Circular Economy procurement principles. The cities of Toronto and Metro Vancouver are beginning to address these principles in their procurement policies and waste management approaches.

While Canadian jurisdictions have begun to address key topics such as SUPs, Circular Economy, and food waste issues, we need to look at Europe for the greatest leadership in addressing these topics as they relate to waste minimization and diversion. In 2015, the European Commission adopted a Circular Economy action plan to help move Europe towards a Circular Economy. The plan identified 54 actions that have been implemented and intended to “close the loop” on product lifecycles, including promoting eco-design, right to repair, recycled content through procurement and food waste reduction. European countries “taking charge” include Scotland, the Netherlands, Sweden and Germany. The European Union also recently enacted the Single-Use of Plastics Directive, which favours product bans, EPR schemes, design for environment requirements and collection requirements to address the challenges of SUPs.

European countries have successfully implemented other schemes to promote waste reduction and diversion, including landfill levies that help to make the costs of waste diversion programs comparable to the cost of landfill, thus creating a “level playing field” for waste diversion programs, and food waste reduction targets, bans and campaigns to reduce the amount of food waste generated and requiring management.



### 1.2 Demographic and Lifestyle Trends

Not unlike other countries, Canada is undergoing an unprecedented change in its demographics with an aging population, more women in the workforce and more people in single family households, which is having a significant impact on the need for convenient foods and lifestyles.<sup>1</sup> These trends, along with the influence of advertising, have helped to create a society governed by fast food, fast technology and fast lifestyles driven by convenience and resulting in a throw-away society, characterized by:

- Increasing access to technology that makes us dependent on needing the newest and best, resulting in the disposal of electronic goods on a regular basis.
- Increasing access to cheap and convenient food that encourages wasteful habits and increasing amounts of wasted food and packaging, especially single-use plastics.
- Increasing access to cheap goods, such as clothing – referred to as fast fashion – that are designed to wear out or break down over a short period of time, requiring replacement rather than repair.
- Technology that is designed to become obsolescent after a period of time and requiring replacement in order to have the latest and fastest.

The increase in smaller families and single person households are important trends in urban centres. This is resulting in a greater demand for convenient food and packaging, featuring customized products and freshly prepared take-home meals, as well as greater time spent eating out or ordering in.<sup>2</sup>

### 1.3 Evolving Tonne

Over the past decades, the composition of the waste stream has been changing – referred as the “Evolving Tonne” - with some common themes:

<sup>1</sup> Consumer Trend Report: Convenience. Market Analysis Report. June 2010. Government of Canada at [http://windmillwebworks.sytes.net/canadianswine/newsitems/Canada%20Consumer%20Report\\_EN.pdf](http://windmillwebworks.sytes.net/canadianswine/newsitems/Canada%20Consumer%20Report_EN.pdf)

<sup>2</sup> Consumer Trend Report: Convenience. Market Analysis Report. June 2010. Government of Canada at [http://windmillwebworks.sytes.net/canadianswine/newsitems/Canada%20Consumer%20Report\\_EN.pdf](http://windmillwebworks.sytes.net/canadianswine/newsitems/Canada%20Consumer%20Report_EN.pdf)





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- Changes in packaging as heavier packaging is replaced by lightweight packaging;
- The slow decline of the hard print newspaper and magazine industry as they move to an online format; and
- The increase of cardboard packaging as e-commerce continues to grow. The rise in e-commerce has resulted in the increased use of cardboard packaging for shipping and delivery, compared with its use in “brick and mortar” retail.
- The impacts on the Blue Box program have been significant, with programs experiencing lower recycling tonnages but higher volumes of materials, resulting in higher collection and processing costs. This problem is further exacerbated by the implementation of the China National Sword policy in February 2018, which closed the door on the import of mixed post-consumer plastics and paper to the Chinese market. Communities that have been hardest hit by the Chinese National Sword are generally characterized as having single stream, automated cart recycling programs. These programs tend to have the highest contamination and residue rates. Communities that continue to provide a two stream, fibre and container, recycling program have experienced fewer end market disruptions due to the cleaner streams and lower contamination rates.

Despite the recent negative news about struggling recycling programs and end markets, there is some room for optimism. There has been a wave of recent announcements about the construction or planned construction of new plastic and fibre processing facilities and capacity in North America that will help to establish new end markets for mixed plastics and paper packaging.

Plastics have become a mainstay in our society with its role and importance having grown consistently over the past 50 years. Despite the proliferation of plastics throughout the world, very little of it is recycled nor is it made into equal or better products/ packaging, known as “upcycling”. Currently, 9 percent of plastic packaging is recycled in Canada.<sup>3</sup> Some of plastic packaging’s biggest challenges comes in the form of single-use plastic packaging and flexible packaging. One of the most dramatic changes in packaging in the

<sup>3</sup> Economic Study of the Canadian Plastics Industry, Markets and Waste. 2019. Prepared for Environment and Climate Change Canada by Deloitte at <http://publications.gc.ca/site/eng/9.871296/publication.html>

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past several years that is contributing to the disposal dilemma has been the enormous growth in the use of flexible plastic packaging, e.g. pouches and laminated packaging, which cannot be recycled at this time. While the reduced weight of flexible packaging provides transportation benefits associated with reduced transportation costs and fewer Greenhouse Gases, compared with heavier packaging materials, it remains a problematic material to manage at its end of life with few waste diversion options available other than using it as feedstock at energy-from-waste facilities.

The pressure from governments and citizens to reduce the amount of plastic, including single-use plastics being consumed or to improve plastic packaging so that it can be recycled has forced corporations to respond by announcing initiatives and targets to reduce single-use plastics, e.g. switching to non-plastic packaging, and/or increasing recycled content in their plastic packaging. At the same time, companies are turning to bioplastic packaging, which has its own inherent issues.

**1.4 Collection Trends**

In terms of municipal collection services, some municipalities are beginning to report disruptions in curbside collection service due to the lack of reliable drivers and collection crews. The driver and collection crew shortages are placing growing pressure on municipalities with manual collection to explore automated cart collection services to try to alleviate some of the issues associated with staffing problems. New trends in collection services include increasing use of biofuels and electric vehicles.

**1.5 Impact of these Trends on the City of Ottawa**

The impact of packaging changes has already been felt by the City, with a decline in fibres and increases in the numbers and types of plastic packaging. The continuing impact of the evolving tonne will depend on how the Blue Box program transitions to a full Producer Responsibility program. There is potential for a move towards greater use of compostable packaging which could impact the City's organics program. Municipalities, including Ottawa, will need to monitor the Ontario Government's response to this

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challenge and continue to advocate for industry to assume full responsibility for the cost to manage these materials at their end-of-life.

There are a number of opportunities for the City to explore as this SWMP progresses, from changes to how materials are collected, processed and disposed to regulations, policies or strategies that encourage reduction and reuse, primarily for the residential sector. Ottawa has an opportunity to address a Circular Economy procurement strategy that goes beyond green procurement and sustainable procurement. Circular economy procurement will help Ottawa achieve closed-loop recycling, maximized recycled content, waste avoidance, reduction and reuse of goods, which will lead to further GHG reductions.

There will be profound changes in how waste is managed in the next few years, and the City will need resiliency and flexibility in their future waste management system to respond to these changes.

## 2 Introduction

The City of Ottawa is creating a 30-year Solid Waste Master Plan (SWMP) that includes consideration of the successes and failures of the past and present. It will also define a vision for the future that will ensure its long term-viability and sustainability, while ensuring flexibility to respond to an ever-changing industry over the next 30 years.

The purpose of this Technical Memorandum is to review solid waste management trends and best practices in other jurisdictions with a focus on successful waste diversion activities to help inform future waste management decisions for the City of Ottawa. This review includes:

- Recent actions in leading Canadian provincial jurisdictions and leading municipalities;
- International trends, selected European countries and programs in the United States (U.S.);
- Trends that currently, or could, impact waste generation in the future;
- Societal and demographic trends and shifts in attitudes towards waste and how it should be managed;



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- Historical and current trends in waste generation, including both packaging and products;
- Insights on how the material mix is changing and the impacts that this change may have on the City's waste management system and infrastructure;
- Emerging and sustainable end markets to reduce/divert waste items; and
- Applicable waste management industry trends.

The review concludes with a summary of the challenges, opportunities and waste management considerations these trends present for the City of Ottawa and its citizens.

## 3 Policy and Program Trends

This section focuses on policy and program trends in Canada and internationally, and provides examples of some specific Canadian provinces who have demonstrated leadership in waste management. Canada is adopting many of the policies and programs which have been in place and/or are being developed in international jurisdictions and countries around the world where they are grappling with similar issues.

### 3.1 Provincial Waste Management and Waste Reduction Strategies

The following sections provide an overview of waste management and waste reduction strategies in British Columbia, Nova Scotia, Prince Edward Island and Québec. These provinces are established leaders in Canada in innovative waste-related policies and programs. Additional information on strategies related to these provinces, and also those related to Ontario, can be found in the Legislative Review Memo.

#### 3.1.1 British Columbia

British Columbia (B.C.) has spearheaded many innovative and timely policies, programs and regulations to help divert waste. Included in the list of achievements are the 22 EPR programs in place (see Table 1), by far the broadest range of materials covered by EPR regulations in Canada, the province's work on developing a plastics strategy, featuring actions to address single-use plastics and bioplastics and its overall support of waste reduction and reuse measures.



Table 1: BC Product Stewardship Programs

| Product Category      | Product Details   | Administration  | Program Status                                 |
|-----------------------|---|---|--|
| Antifreeze and Oil    | Antifreeze, used lubricating oil, filters and containers  | BC Used Oil Management Association ( <a href="#">BCUOMA</a> )           | Ongoing since 1992 (oil) and 2011 (antifreeze) |
| Batteries             | Dry cell batteries under 5kg (rechargeable and non-rechargeable) and cell/mobile phones   | Call2Recycle Canada, Inc. ( <a href="#">Call2Recycle</a> )              | Ongoing since 2010                             |
| Batteries – Lead Acid | All lead-acid batteries   | Canadian Battery Association ( <a href="#">CBA</a> )                    | Ongoing (industry-led) since 2011              |
| Beverage Containers   | Non-Alcohol – soft drinks, juice, water and sports drinks<br>Alcohol – wine, spirits, import beers/ coolers sold in non-refillable containers | Encorp Pacific (Canada)   | Ongoing (industry-led) since 1994              |
| Beverage Containers   | Beer cans, standard brown beer bottles and certain clear refillable beer bottles  | Brewers Recycled Container Collection Council ( <a href="#">BRCCC</a> ) | Ongoing since 1997                             |



| Product Category   | Product Details  | Administration  | Program Status  |
|--------------------|--|---|---|
| Cell Phones        | Cell phones, smart phones, wireless PDAs, external aircards, pagers and accessories                              | Canadian Wireless Telecommunications Association ( <a href="#">CWTA</a> ) | Ongoing since 2009  |
| Electronics        | Portable and non-portable electronics - see <a href="#">here</a> for a full list of products accepted            | Electronic Products Recycling Association (EPRA)                          | Ongoing since 2007<br><br>(Phase 1), 2010 (Phase 2)<br><br>and 2012 (Phase 5)                         |
| Lamps and Fixtures | All residential-use lamps, fixtures and ballasts - see <a href="#">here</a> for a full list of products accepted | LightRecycle by ReGeneration  | Ongoing since 2010 (CFL, fluorescent tubes) and July 2012 (all lamps)                                 |
| Large Appliances   | Major appliances designated for residential, IC&I use  | Major Appliance Recycling Roundtable ( <a href="#">MARR</a> )             | Established in 2011 by the Assoc. of Home Appliance Manufacturers Canada and Retail Council of Canada |



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| Product Category   | Product Details  | Administration  | Program Status   |
|--|--|---|--|
| Outdoor Power Equipment (OPE)                            | Lawn tractor, and hand-held, walk behind and free-standing OPE - see <a href="#">here</a> for a full list of products accepted           | Outdoor Power Equipment Institute of Canada ( <a href="#">OPEIC</a> ) | Ongoing since July 2012  |
| Packaging and Printed Paper                              | Packaging and printed paper supplied to B.C. residents – see <a href="#">here</a> for a full list of products accepted                   | <a href="#">Recycle BC</a>  | Ongoing since May 2014   |
| Paint, Flammable Liquids, Solvents, Pesticides, Gasoline | See <a href="#">here</a> for a full list of products accepted  | <a href="#">ReGeneration</a>  | Ongoing since 1994 (paint), 1997 (flammables and pesticides) and 1998 (aerosols) |
| Pharmaceuticals  | Prescription drugs, non-prescription medicine, mineral and vitamin supplements, throat lozenges  | Health Products Stewardship Association ( <a href="#">HPSA</a> )      | Ongoing since 1997   |
| Small Appliances and Electrical Power Tools              | Portable electrical appliances and power tools designed for use in homes - see <a href="#">here</a> for a full list of products accepted | Canadian Electrical Stewardship Association ( <a href="#">CESA</a> )  | Ongoing since 2011 (small appliances) and July 2012 (electrical tools)           |



| Product Category   | Product Details   | Administration                                       | Program Status   |
|--------------------|---|--|--|
| Thermostats        | Electromechanical (mercury containing) and electronic thermostats | Thermostat Recovery Program ( <a href="#">HRAI</a> ) | Ongoing since 2009. delivered by Heating, Refrigeration and Air Conditioning Institute of Canada |
| Tires - Automobile | Tire products accepted  | Tire Stewardship BC ( <a href="#">TSBC</a> )         | Ongoing (industry-led) since 2007  |

Source: BC Product Stewardship Programs. February 2018. Recycling Council of British Columbia at [https://www.rcbc.ca/files/u6/EPRProgramSummary\\_Feb\\_2018.pdf](https://www.rcbc.ca/files/u6/EPRProgramSummary_Feb_2018.pdf)

One of the trends that date back in many jurisdictions/municipalities to at least the early 1970s, e.g. with Canada’s first “bottle bill”, is the trend towards legislation and education to encourage the reduction of municipal solid waste sent to landfill. The Province of British Columbia and the City/Region of Vancouver are noted leaders in Canada, both in supporting EPR legislation that make producers responsible for the end-of-life management/diversion of their products and packaging, and in implementing disposal bans to “stimulate” activities and markets for municipal solid waste (MSW), waste streams such as organics and construction and demolition (C&D) materials.

Throughout B.C., disposal/landfill bans and EPR legislation have been used extensively to exert control over the amount of waste generated and disposed of by its residents and businesses. EPR is an especially important tool, as it includes the specific intent to



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influence producers in the design of products and packaging to reduce the end-of-life social and environmental costs of their products. Bans have proven useful both as a means to stimulate business development to use recyclable materials as resources, and to protect the environment, especially from dangerous and hazardous waste, e.g. bio-medical waste, liquids and sludge, household hazardous wastes, etc.

B.C. has also assumed a leadership role in the development of a single-use plastic strategy. In July 2019, the B.C. Ministry of the Environment and Climate Change Strategy announced a four-part public consultation on a new B.C. Plastics Action Plan Policy Consultation Paper, to tackle the problem of single-use plastics in the environment and to dramatically reduce SUPs going to landfills and found in waterways/the ocean. Some of the key issues considered in the [B.C. Plastics Action Plan Policy Consultation Paper](#) include:

- Explicit acknowledgement of the need to consider and balance plastics/SUP items “that are not included in the federal ban” (plans) and “actions being taken by local governments that could be supported by a provincial harmonized approach”. The paper also “proposes to work with the Federal Government to develop national recycled content standards”;
- All plastic packaging generated in Canada accounts for approximately 47 percent of all plastic waste discarded; the majority of single-use plastics are used as packaging;<sup>4</sup>
- Three types of bans are considered:
  - bans (or levies) to regulate the sale/supply of certain plastic packaging into the marketplace, e.g. fees on plastic and/or paper bags;
  - bans on the use of certain plastics, e.g. ban on the use of polystyrene foam in take-out containers and cups; and
  - disposal bans at transfer stations/landfill.

<sup>4</sup> Economic Study of the Canadian Plastic Industry, Markets and Waste. 2019. Environment and Climate Change Canada at [http://publications.gc.ca/collections/collection\\_2019/eccc/En4-366-1-2019-eng.pdf](http://publications.gc.ca/collections/collection_2019/eccc/En4-366-1-2019-eng.pdf)



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- Bans on the sale of plastic bags have been introduced in 65 countries around the world.<sup>5</sup>

The consultation paper asked for residents' comments on the idea of including packaging-like products, e.g. reusable plastic containers, freezer/sandwich bags, canning jars, wrapping paper and moving boxes, as well as single-use plastics under an EPR program/the Recycling Regulation. Specific SUP products for consideration in B.C. include: plastic straws, stir sticks, cutlery and disposable foodware such as plates, bowls, cups and party supplies. This may or may not include polystyrene packaging.

The paper notes the need for national standards to “help producers of plastic products to design products with recyclability in mind, which helps to eliminate products that are hard to recycle” and that ensures “a common national standard that provides clarity and avoids a patchwork approach across provinces and territories for producers.” Drafting regulatory amendments on these matters is reportedly expected to be completed in late 2019 or early 2020.

The B.C. government also has begun to tackle bio/compostable plastics. While compostable plastics are not currently recognized under the Organic Matter Recycling Regulation (OMRR) as organic matter suitable for composting, the need to address these materials has been included as part of the government's [policy intentions paper](#) for the revision of OMRR. The amendment would allow for the addition of compostable plastic materials to Schedule 12 as organic matter suitable for composting. To be defined under Schedule 12 as an organic matter suitable for composting, compostable plastics would need to meet requirements in relevant B.C regulations. Composting facilities seeking to add compostable plastics as feedstock would be required to meet time and temperature standards which are applicable to the compostable plastics being accepted at that facility.

Recycle BC is working with producers to develop packaging that promotes reduction, reuse and better recycling, “Recycle BC works to reduce the environmental impact of

<sup>5</sup> BC Plastics Action Plan Policy Consultation Paper. July 25, 2019. British Columbia Government at [https://engage.gov.bc.ca/app/uploads/sites/121/2019/07/CleanBC\\_PlasticsActionPlan\\_ConsultationPaper.pdf](https://engage.gov.bc.ca/app/uploads/sites/121/2019/07/CleanBC_PlasticsActionPlan_ConsultationPaper.pdf)

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producers' packaging and printed paper (PPP) by managing the collection and recycling of material. This involves partnering with communities on collection and overseeing the sale of processed material to select end markets. The program also seeks to innovate by engaging with producers to advance the recycling of various materials and finding new ways to encourage source reduction, re-use and good recycling practices.”<sup>6</sup>

**3.1.2 Nova Scotia**

On the other side of the country, one of the Maritime Provinces has striven to minimize the amount of waste sent to landfill. In 2007, the Province of Nova Scotia set an ambitious target to reduce the amount of waste sent to landfill to 300 kg/person/year by 2015. This target is the lowest in Canada and comparable to rates set by jurisdictions in Europe. See Table 2 for an overview of landfill bans in Nova Scotia.

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<sup>6</sup> Packaging and Paper Product Extended Producer Responsibility Plan. June 2019. Recycle BC at <https://recyclebc.ca/wp-content/uploads/2018/07/Packaging-and-Paper-Product-Extended-Producer-Responsibility-Plan-July2018.pdf>



Table 2: Nova Scotia Material Bans from Landfill

| Materials banned between 1996-98:                     | Materials banned between 2008-09:  |
|---|--|
| Beverage containers                                   | Televisions  |
| Corrugated cardboard, Newsprint                       | Desktop, laptop / notebook computers, CPU's, keyboards, mice, cables; monitors; printers incl. with scan/fax |
| Used tires  | Computer scanners  |
| Lead-acid (automotive) batteries                      | Audio and video playback and recording systems   |
| Leaf and yard waste, organics (food waste)            | Telephones and fax machines  |
| Post-consumer paint products                          | Cell phones and other wireless devices   |
| Ethylene glycol (automotive antifreeze)               |  |
| Steel/tin and glass food containers                   |  |
| Low- and high-density polyethylene bags and packaging |  |

Every household and establishment in the province has access to a Blue Box program and food waste composting program. The province has supported community adoption of the clear bag programs, with the majority of municipalities (over two thirds) having adopted clear bags.<sup>7</sup> The evidence supporting clear bags in Nova Scotia is strong, with 81 percent of residents supporting the clear bag program who live in municipalities that already have clear bag programs and municipalities reporting significant reduction in garbage going to landfill including Cape Breton Regional Municipality (CBRM) reporting a

<sup>7</sup> Clear bags are used for garbage, see through blue bags are used for recyclables.





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16 percent decrease in garbage destined for landfill.<sup>8</sup> Halifax Regional Municipality has reported a 24 percent decrease in the amount of garbage going to landfill two years after the launch of its clear bag program<sup>9</sup> and results for thirteen Nova Scotia municipalities<sup>10</sup> showed a 41 percent decrease in garbage disposed two years after the launch of the clear bag program.<sup>11</sup>

Nova Scotia has several product stewardship/EPR programs targeting a wide range of materials, such as electronics, paints, used tires, milk packaging, used oil, newspaper, yellow pages, medical needles/syringes and expired medication. The province has a Beverage Container Deposit Refund Program which applies to all ready-made beverages. Most recently, a majority of municipalities in Nova Scotia have signaled a desire for the province to implement a full EPR program for PPP materials by summer 2020.<sup>12</sup>

For several years, the Nova Scotia government and municipalities have been strongly engaged in discussions about implementing full EPR for the Blue Box program. In 2018, the Municipal-Provincial Priorities Group, under the direction of the Regional Chairs Committee, developed a draft EPR for PPP model for Nova Scotia to facilitate conversations with municipalities and industry for their feedback. In November 2018, Nova Scotia municipalities identified EPR as a priority through a unanimous resolution at the Nova Scotia Federation of Municipalities (NSFM) [meeting](#). Municipalities are now requesting that the Nova Scotia government implement full EPR for the Blue Box program by end of summer 2020.

<sup>8</sup> Solid Waste Resource Collection & Disposal By-law S-600 – Amendments. August 21, 2014. Regional Municipality of Halifax at <https://www.halifax.ca/city-hall/legislation-by-laws/by-law-s-600>

<sup>9</sup> Clear bags keeping 24% more trash out of Halifax landfills. January 10, 2017. CBC news at <https://www.cbc.ca/news/canada/nova-scotia/clear-bags-keep-trash-out-of-landfills-1.3928331>

<sup>10</sup> Results reported from the County of Richmond, District of West Hants, District of Guysborough, Pictou County (which has six municipal units), County of Antigonish, and the Towns of Antigonish, Canso, and Mulgrave.

<sup>11</sup> The Use of Clear Bags for Garbage as a Waste Diversion Strategy: Background Research on Clear Garbage Bag Programs across North America. 2008. E & E Funded Project Number 177 at <https://www.niagararegion.ca/government/committees/pdf/Quinte%20Clear%20Bag%20Report.pdf>

<sup>12</sup> Extended Producer Responsibility For Printed Paper And Packaging (EPR For PPP) 2019. Nova Scotia Federation of Municipalities at <https://www.nsfm.ca/extended-producer-responsibility.html>



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On October 30, 2019, the Nova Scotia Minister of Environment received approval for legislation ([Bill 152](#)), the Plastic Bag Reduction Act, banning SUP retail checkout bags across the province. The ban, which is scheduled to take effect one year after the legislation is passed giving retailers and customers time to prepare. The legislation does include some exemptions, such as the bags used by dry cleaners, the bags used by garages to wrap tires and bags used for items such as fish and bulk foods.<sup>13</sup> The government will also consider regulating other SUP items, such as single-use cutlery and straws, in the future.<sup>14</sup>

#### 3.1.3 Prince Edward Island

Prince Edward Island (PEI) has taken a unique approach to managing its waste. In the 1980s, the province realized that it was managing a number of inadequately engineered and operated landfill sites dotted across the province and it needed to find a more environmentally acceptable strategy for managing its waste. In response, the provincial government established the Waste Watch program in 1994, with a goal to promote waste diversion first, then focus on waste disposal by standardizing the collection and disposal of waste throughout the province, and close all small community, inadequately regulated [landfills](#).

To ensure proper management of the program, the province created a crown corporation, the Island Waste Management Corporation (IWMC) in 1999, to administer all aspects of the program and provide Solid Waste Management Services throughout the island. In addition, all waste and diversion collection and disposal/processing services were consolidated into a single facility servicing the entire province. For example, there is only one provincial landfill, energy-from-waste facility, enclosed composting facility and material recycling facility servicing the entire province.<sup>15</sup>

<sup>13</sup> Plastic Bags Reduction Act - Bill 152. Nova Scotia Government at <https://nslegislature.ca/legislative-business/bills-statutes/bills/assembly-63-session-2/bill-152>

<sup>14</sup> N.S. passes legislation banning single-use plastic bags. October 30, 2019. CBC news at <https://www.cbc.ca/news/canada/nova-scotia/ns-passes-legislation-single-use-plastic-bag-ban-1.5340192>

<sup>15</sup> It should be noted that the entire population of PEI is only 155,000 and the area is about 5,700 km<sup>2</sup>, which is less the population and size of many southern Ontario rural municipalities/counties.



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The Waste Watch program is mandatory for all residents and businesses. PEI provides uniform collection of garbage, recyclables and organics throughout the province and the stringent legislation requires all citizens, whether residents, businesses or institutions, to participate in the three-stream program. In addition, the province has stipulated that all bagged materials must be set out in clear bags to ensure more effective monitoring. Non-participation is penalized through higher tipping fee surcharges.

The province has an ambitious EPR program across an array of waste materials including paint, electronics and cell phones, lead acid batteries, dry cell batteries, used oil, containers and filters, pharmaceuticals, PPP, and mercury containing lamps. In addition, the IWMC has placed a landfill ban on several materials including lead-acid batteries, used tires, and steel food cans. In 2009, it also introduced a ban on fluorescent light bulbs from the waste stream.

PEI is also an Atlantic and national leader on SUPs, and specifically single-use plastic bags. PEI's Plastic Bag Reduction Act came into effect July 1, 2019. PEI was the first province in Canada to pass a province-wide ban on single-use plastic checkout bags. The intent of the law is to reduce waste and environmental damage resulting from single-use plastic checkout bags and to encourage a shift to the use of reusable bags.

The Act prohibits a business from providing plastic checkout bags to customers. The alternate use of paper bags or higher quality reusable bags is encouraged, as they generally hold more, result in less waste and are more durable. The law applies to all businesses that provide checkout bags, not just grocery stores. The following key points apply to PEI businesses:

- Businesses can no longer provide plastic checkout bags to customers;
- No biodegradable or compostable checkout bags as an option;
- Paper bags are an option, with a minimum charge of \$0.15 per bag, or reusable checkout bags, with a minimum charge of \$1.00 per bag;
- No free paper or free reusable checkout bags. There is an exception for providing small recyclable paper bags (less than 600 x 600 sq. cm) at no charge;



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- Limited exemptions include bags used to protect prepared foods, loose items, food safety, medications, dry cleaning or some bulk items; and
- Businesses retain the fee, subject to HST, collected for both the paper and reusable checkout bags. The fee must be displayed on the customer receipt.

#### 3.1.4 Québec

The province of Québec is also a leader in waste diversion strategies in Canada, especially in terms of bringing a comprehensive Circular Economy overview and perspective to the issue of waste management. Three core themes are at the forefront of changes to the future of waste management in Québec:

- The lens of Circular Economy thinking and planning;
- The modernization of Québec's curbside recycling programs, including its current funding model; and
- As with virtually every other province and many municipal jurisdictions across Canada, a significant focus on existing and future plastics waste and improved plastics waste management going forward.

In March 2018, the Conseil du Patronat du Québec (CPQ) and the Québec Business Council on the Environment (CPEQ) – two prominent business associations in Québec and Éco Entreprises Québec (ÉEQ – the “Stewardship Ontario-like” organization in Québec) released a comprehensive study, [Circular Economy in Quebec: Economic Opportunities and Impacts](#), on the potential and perspectives of a Circular Economy in Québec. The study was based on an analysis of Circular Economy policies and an exhaustive review of the most recent literature on the topic. It determined the sectors with the highest Circular Economy potential, e.g. agricultural, energy, metal production and construction, as well as the economic, technological, social and policy-related barriers and levers.

The study explored five Circular Economy strategies through case studies of Québec businesses:



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- Recycling - a series of operations to process recovered recyclable materials in an effort to reintroduce them into a new production cycle;
- Reconditioning and refurbishing - strategies that involve restoring products or product components to extend the life of a product;
- Service economy - based on selling performance or service rather than products themselves: the product's performance prevails over its possession, leading to the decoupling of added value and energy and raw materials consumption;
- Industrial symbiosis - brings together businesses in a same industrial area in which one organization's waste becomes another's input or raw material; and
- Collaborative economy- relies on new ways of organizing work and exchanges according to the principle of shared access to goods.<sup>16</sup>

The study reported that a Circular Economy will reduce environmental impacts and lead to productivity, efficiency and profitability gains, as well as foster innovative research and provide strong entrepreneurial potential. It recommended that different levels of government need to create the facilitation of regulatory conditions, and taxation and financial measures to support businesses and institutions in their efforts to move towards a Circular Economy. From a waste management perspective, the study suggested that recovery and recycling drive the Circular Economy on a local scale by providing a system that aims to give new life to recyclable materials. "Recyclers are firmly established in Québec and the province must pursue efforts to stimulate innovation and create added value with recycled materials, which must be considered as true secondary resources rather than waste".

One of the first outcomes from this report has been a renewed focus on what ÉEQ calls the "modernization" of the province's existing collection, processing and materials marketing system. In October 2019, [ÉEQ reported](#) that "in the midst of the recyclable materials markets downward spiral, western countries seeking sustainable solutions are

<sup>16</sup> Circular Economy in Quebec: Economic Opportunities and Impacts. March 2018 (updated August 15, 2018). Conseil du patronat du Québec (CPQ), the Quebec Business Council on the Environment (CPEQ) and Éco Entreprises Québec (ÉEQ) at <https://www.eeq.ca/en/7834/>





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now finding themselves in a tight spot. This month, the companies that fund curbside recycling in Québec will find out that their contributions will increase significantly in order to address current challenges including the dramatic drop-in the value of materials—the impacts of which now reach tens of millions of dollars”.<sup>17</sup>

At the core of the changes to Québec’s curbside programs is the assertion that the “new system” will “make companies accountable through targets and implement means to gradually structure and manage the system”. Beyond the funding for curbside recycling they already provide, “companies must be responsible for the materials they place on the market within an EPR framework”. ÉEQ has determined four essential factors for a successful transition:

- Packaging eco-design as the norm: the manufacturing of eco-designed packaging made from recyclable recycled materials with no overpackaging;
- A comprehensive, integrated and transparent approach and constant preoccupation with quality for all stakeholders—citizens, municipalities, sorting centres, recyclers and companies—in every step of the value chain;
- The development of local and neighbouring recyclable materials markets, since sorting aims to provide materials with a new life as locally as possible and thus limits Greenhouse Gas emissions; and
- Greater roles and responsibilities for companies, beyond the funding they already provide, in the organization of the system and management of the materials by creating a partnership with the municipal sector and recognizing the expertise of Québec sorting centres.<sup>18</sup>

A shift to “full producer responsibility” in Québec essentially means that ÉEQ will no longer simply pay Québec municipalities, on behalf of producer member companies, their reported costs of recycling. There will be more direct engagement from individual producers and ÉEQ in overall system design and performance.

<sup>17</sup> EEQ Press Release, 18 October 2019, EPR at the Core of an Effective System at <https://www.eeq.ca/en/extended-producer-responsibility-at-the-core-of-an-effective-system/>

<sup>18</sup> EEQ Press Release, 18 October 2019, EPR at the Core of an Effective System at <https://www.eeq.ca/en/extended-producer-responsibility-at-the-core-of-an-effective-system/>





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A third key element of the modernization and move towards a more circular and true EPR program in Québec is a focus on plastic waste and solutions to reduce this waste.

Québec is emerging as a Canadian provincial leader with regards to new approaches, technologies and systems to address the need for dramatic improvements in plastics waste reduction and plastics recycling improvements. Successful new approaches to plastics recycling require co-ordinated work on three fronts:

- Design packaging for recyclability;
- Recycling infrastructure development; and
- Increased post-consumer resin (PCR) content in new packaging.

The previous section described some of ÉEQ's plans and efforts to “modernize” the province's recycling infrastructure. ÉEQ's approach to the first and third actions are framed within its approach to Circular Economy thinking:

“Brand owners and their EPR organizations are already investing millions in recycling and curbside recycling systems and are committed to improve recyclability and increase recycling content in their packaging. (But) their responsibilities must be broadened in order to ensure that packaging put on the market is effectively recycled within the context of the Circular Economy”.

ÉEQ has set a target of 55 percent plastics diversion by 2030 and 50 percent recycled content, where applicable. They have also launched a user-friendly web-based tool (called the [OptimEco kit](#)) as an on-line set of tools and support services to help companies with eco-design and Circular Economy project ideas.

### 3.2 Canadian Policy and Program Trends

The following sections provide an overview of policy and program trends in Canada, including those regarding organic waste, Blue Box recyclables and bulky waste material bans, single-use plastics, EPR, green procurement, Circular Economy and Greenhouse Gas reductions.



### 3.2.1 Organic Waste and Material Bans

Bans have proven useful both as a means to stimulate local business development to use previously disposed materials as resources and to protect the environment, especially from dangerous and hazardous waste, e.g. bio-medical waste, liquids and sludge, household hazardous wastes, etc. The following table summarizes organics and other materials bans (including pending bans) in Canadian jurisdictions.

*Table 3: Organic and Material Landfill Ban in Canadian Jurisdictions*

| Municipality                       | Food Waste/<br>Organics          | Blue Box<br>Recyclables | Bulky Waste                            | Other                  |
|------------------------------------|----------------------------------|-------------------------|--|------------------------|
| Prince Edward Island               | Yes                              | N/A                     | N/A                                    | N/A                    |
| Nova Scotia                        | Yes                              | Yes                     | tires, construction & demolition waste | HHW, waste electronics |
| Metro Vancouver                    | Yes                              | Yes                     | clean wood, drywall, mattresses, tires | HHW, waste electronics |
| Capital Region District, B.C.      | Yes                              | Yes                     | construction waste, scrap metal, tires | HHW, waste electronics |
| Regional District of Nanaimo, B.C. | Yes – Commercial Food Waste only | N/A                     | N/A                                    | N/A                    |
| City of Windsor, ON                | pending 2022                     | N/A                     | N/A                                    | N/A                    |



| Municipality | Food Waste/<br>Organics | Blue Box<br>Recyclables | Bulky Waste | Other |
|--------------|-------------------------|-------------------------|-------------|-------|
| Ontario      | pending 2022            | N/A                     | N/A         | N/A   |
| Québec       | pending 2020            | N/A                     | N/A         | N/A   |

N/A = Not applicable

In the effort to address climate change through Greenhouse Gas (GHG) reduction, Canadian jurisdictions have found it necessary to examine the extent to which food waste continues to be disposed in landfills, which over time creates methane, a highly potent GHG.

While the whole of the European Union is required to work towards significantly reducing the amount of biodegradable waste entering landfills, such that biodegradable municipal waste going to landfills must be reduced to 35 percent of the total amount by weight by 2020, Canada has taken a more piecemeal approach.

This situation is a result of how the Canadian Confederation works legally with its separation of powers – as opposed to the European Union (EU) and its member countries.

Currently, two provinces, some regional level governments and cities have banned organics from disposal. Examples include:

- Nova Scotia - implemented 1997 - ban of compostable organic material at disposal facilities, which applies to the residential and IC&I sectors.
- Prince Edward Island - implemented 1999 - no one is permitted to dispose of compostable material at a waste management site other than an approved composting facility. This applies to the residential and IC&I sectors.



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- Metro Vancouver, B.C. - implemented 2015 – ban of food waste from disposal facilities with permissible thresholds reduced over time, which applies to the residential and IC&I sectors.
- Regional District of Nanaimo, B.C. – implemented 2005 - ban on commercial food waste from all disposal facilities.
- Capital Regional District, B.C. – implemented 2015 - a landfill ban on kitchen scraps, e.g. food waste and soiled paper products, which applies to the residential and IC&I sectors.
- City of Calgary – implemented its food waste ban in October 2019, which applies to IC&I sectors.

Other jurisdictions have committed to future food waste bans, including:

- As discussed in Tech Memo #2 Review of Federal and Provincial Solid Waste Policies, Programs and Legislation, the Province of Ontario has formulated a framework and schedule to introduce disposal bans for food waste over a phased in period, starting 2021 (employing a phased-in approach to accommodate rural, northern communities).
- In Québec, Recyc-Québec’s goal was to ban organic waste from landfills by 2020. Nonetheless, in September 2015, the government granted a three-year extension to municipalities until December 31, 2022.

Some Canadian jurisdictions have successfully used bans to drive waste diversion in the residential as well as the IC&I sectors. Some jurisdictions have had Provincial support in implementing bans while others have used their municipal legislative authority. Setting contamination thresholds and enforcement of loads arriving at the landfill is essential to ensure that the bans drive waste diversion, as discussed below. These trailblazers include the Regional District of Nanaimo, Metro Vancouver, the Province of Nova Scotia, and the Province of Prince Edward Island.

The Regional District of Nanaimo (RDN) has taken a unique approach to waste diversion by using the “back end”, regulatory approach, featuring landfill bans, to promote participation in recycling and composting programs and to meet its waste diversion



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targets. The RDN Solid Waste Management Regulation By-law 1531 prohibits the disposal of designated recyclable materials at RDN disposal facilities. Between 1991 and 2009, disposal bans have been imposed on 11 materials including C&D and bulky waste, e.g. drywall, metal, tires, commercial organic waste, garden waste, and clean wood waste. RDN has a policy of banning materials from disposal once a stable alternative use is identified. Thresholds for banned material are enforced e.g. haulers with loads with banned materials greater than five to ten percent contamination level are subject to a 100 percent surcharge on the entire load.

Metro Vancouver has implemented several notable disposal bans including: clean wood waste, food waste and mattresses. There were several key strategies used to design and implement the food waste ban (as well as the wood waste ban). Metro Vancouver staff consulted with affected stakeholders prior to the bans being implemented and phased in enforcement of the ban. The food waste and clean wood disposal bans were introduced within a six-month educational period (between January and June, 2015). Customers disposing of food waste and clean wood above the threshold received an educational notice during this period, but starting July 1, 2015 inspectors began to issue surcharge notices to haulers. Metro Vancouver enforces the bans by putting a 50 percent surcharge on targeted materials found in the garbage stream above a specified threshold, e.g. five percent threshold on clean wood and 25 percent threshold on food waste. Table 4: Metro Vancouver Thresholds and Surcharges for Banned Materials identifies the thresholds and surcharges for banned materials. The revenue received from the surcharges goes towards funding the cost of the program and covers only about 50 percent of the cost.<sup>19</sup>

Metro Vancouver also ensures that there is adequate processing capacity and markets available for the banned materials.

Other municipalities support their landfill ban by introducing mandatory requirements into their by-laws including:

- Halifax Regional Municipality (HRM) - requires separation of recyclables (containers and fibres) and organic material from garbage at the source. The source separation

<sup>19</sup> Communications with Chris Allan, P.Eng., Director, Solid Waste Operations, Metro Vancouver. January 2, 2020.



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program for these materials is required the Solid Waste Resource Collection and Disposal By-law S-600 at all properties in HRM. Provincial regulations prohibit recyclables and organics in landfill, as only “dry landfills” are permitted in the province.

- City of Calgary – initiated its mandatory organic diversion program in November 2017 by requiring all businesses, organizations and multi-residential buildings to participate in its Green Bin program. Calgary City Council approved changes to the Waste and Recycling By-law requiring all businesses and organizations in Calgary to divert a specific list of food and yard waste materials as of November 1, 2017. It later followed the mandatory food waste separation and collection requirements by implementing a food waste landfill ban in October 2019.





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Table 4: Metro Vancouver Thresholds and Surcharges for Banned Materials

| Banned Recyclable Materials<br>(50% surcharge on Items above the threshold)   |   |
|---|---|
| 5% threshold on any combination of the following:   |   |
| <ul style="list-style-type: none"> <li>• Beverage containers</li> <li>• Other recyclable plastic, glass, metal, and composite material containers</li> <li>• Corrugated cardboard</li> <li>• Recyclable paper</li> <li>• Green waste</li> <li>• Clean Wood</li> </ul> |   |
| 25% threshold on food waste   |   |
| Banned Recyclable Materials<br>(100% surcharge on Items above the threshold)  |   |
| 20% threshold on expanded polystyrene packaging   |   |
| Banned Product Stewardship Materials<br>(\$65 surcharge on any single item)   |   |
| • Antifreeze and Containers   | • Paint and Paint Containers              |
| • Electronics and Electrical Products   | • Pesticides                              |
| • Gasoline  | • Pharmaceutical Products and Medications |
| • Lead-Acid Batteries   | • Solvents and Flammable Liquids          |
| • Lubricating Oil and Containers  | • Tires                                   |
| • Oil, Oil Filters, Oil Containers  |   |

Source: Metro Vancouver Regional District Zero Waste Committee. Friday, May 17, 2019. At [http://www.metrovancouver.org/boards/ZeroWaste/ZWA\\_2019-May-17\\_AGE.pdf](http://www.metrovancouver.org/boards/ZeroWaste/ZWA_2019-May-17_AGE.pdf)

Several communities and Canadian jurisdictions have explored textile disposal bans, including Metro Vancouver, the City of Markham and Nova Scotia. In the case of Metro Vancouver, staff are currently exploring a textile disposal ban. In Nova Scotia, in 2015, textiles were identified as a potential addition to the list of materials banned from landfill disposal; however, no action has been taken to date on this initiative by Nova Scotia



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Environment. In April 2017, the City of Markham became the first municipality in North America to implement a ban on textiles in garbage placed at the curb.

#### 3.2.2 Single-Use Plastics

According to a [report](#)<sup>20</sup> prepared by [Deloitte for Environment and Climate Change Canada](#) in 2019, Canadians recycled nine percent of plastic packaging, resulting in an estimated three million tonnes of plastic waste thrown out every year in the country.<sup>21</sup> If the status quo continues, the value of plastic waste Canadians throw in the trash is expected to climb to \$11 billion every year by 2030.<sup>22</sup> These numbers have resulted in all levels of government recognizing the need to address single-use plastic consumption and waste.

Increasingly, Canadian jurisdictions have begun to address single-use plastics (SUPs), many of which have introduced bans on designated items or are consulting the public on single-use plastic strategies. These efforts are supported by the majority of Canadians, with over 80 percent of Canadians supporting (56 percent) or somewhat supporting (25 percent) a total ban on SUPs according to a Nanos survey conducted in July 2019. Furthermore, 75 percent of those polled were willing to pay at least one percent more for more environmentally sustainable everyday items.<sup>23</sup>

Currently, there are almost 30 individual SUP product bans implemented or pending implementation in 15 Canadian jurisdictions, with B.C. municipalities taking the lead in driving SUP bans, as shown in Table 5.

<sup>20</sup> Economic Study of the Canadian Plastic Industry, Markets and Waste. 2019. Deloitte and Cheminfo Services Inc. for Environment and Climate Change Canada at

[http://publications.gc.ca/collections/collection\\_2019/ecccc/En4-366-1-2019-eng.pdf](http://publications.gc.ca/collections/collection_2019/ecccc/En4-366-1-2019-eng.pdf)

<sup>21</sup> Economic Study of the Canadian Plastics Industry, Markets and Waste. 2019. Prepared for Environment and Climate Change Canada by Deloitte at <http://publications.gc.ca/site/eng/9.871296/publication.html>

<sup>22</sup> Canada to ban harmful single-use plastics and hold companies responsible for plastic waste. June 10, 2019. Government of Canada at <https://pm.gc.ca/en/news/news-releases/2019/06/10/canada-ban-harmful-single-use-plastics-and-hold-companies-responsible>

<sup>23</sup> Most Canadians support ban on single-use plastics and are willing to pay at least 1% more for sustainable everyday items. National survey released July, 2019. Nanos survey conducted for the Globe and Mail at <https://www.nanos.co/wp-content/uploads/2019/07/2019-1464-Globe-June-Plastics-w-Tabs.pdf>



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Table 5: Summary of Single-Use Bans in Canadian Jurisdictions

| Jurisdiction                          | Straws                 | Utensils | Bags                   | Cups                        | Containers                  |
|---------------------------------------|------------------------|----------|------------------------|-----------------------------|-----------------------------|
| <b>Alberta</b>                        |                        |          |                        |                             |                             |
| Calgary                               | Consultation Phase     |          |                        |                             |                             |
| Jasper                                | -                      | -        | Ban                    | -                           | -                           |
| Municipality of Wetaskiwin            |                        |          | Ban                    |                             |                             |
| Regional Municipality of Wood Buffalo | -                      | -        | Ban                    | -                           | -                           |
| <b>British Columbia</b>               |                        |          |                        |                             |                             |
| Courtenay                             | Ban                    | -        | Ban                    | -                           | -                           |
| Cumberland                            | Ban (Jan 2020)         | -        | Ban (Jan 2020)         | -                           | -                           |
| Qualicum Beach                        | Ban                    | -        | Ban                    | -                           | -                           |
| Richmond                              | Pending Ban (Jan 2020) | -        | Pending Ban (Jan 2020) | Pending Foam Ban (Jan 2020) | Pending Foam Ban (Jan 2020) |
| Rossland                              |                        |          | Ban                    |                             |                             |
| Salmon Arm                            | -                      | -        | Ban                    | -                           | -                           |



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| Jurisdiction   | Straws   | Utensils | Bags  | Cups                | Containers          |
|----------------|--|----------|---|---------------------|---------------------|
| Sooke          |  |          | Pending Ban (Jan 2020)                        |                     |                     |
| Squamish       | Pending Ban (Jan 2020)   | -        | Pending Ban (Jan 2020)                        | -                   | -                   |
| Tofino         | Ban  | -        | Ban   | -                   | -                   |
| Ucluelet       | Ban  | -        | Ban   | -                   | -                   |
| Vancouver      | Pending Ban (April 2020)   | Pending  | Pending Ban (Jan 2020)                        | Foam Ban (Jan 2020) | Foam Ban (Jan 2020) |
| Victoria       | -  | -        | By-law deemed invalid by B.C. Court of Appeal | -                   | -                   |
| West Vancouver | Has made a request to the province to provide clear jurisdiction to municipalities to pass single-use item reduction by-laws |          |   |                     |                     |
| Manitoba       |  |          |   |                     |                     |
| Leaf Rapids    |  |          | Ban   |                     |                     |
| Snow Lake      |  |          | Ban   |                     |                     |
| The Pas        |  |          | Ban   |                     |                     |



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| Jurisdiction                     | Straws             | Utensils | Bags                                    | Cups | Containers |
|----------------------------------|--------------------|----------|---|------|------------|
| Thompson                         |                    |          | Ban                                     |      |            |
| New Brunswick                    |                    |          |   |      |            |
| Moncton/<br>Dieppe/<br>Riverview | -                  | -        | Pending<br>Ban<br>(July 2020)           | -    | -          |
| Newfoundland                     |                    |          |   |      |            |
| NFLD                             | -                  | -        | Full province<br>ban begins<br>mid 2020 | -    | -          |
| Ontario                          |                    |          |   |      |            |
| Toronto                          | Consultation Phase |          |   |      |            |
| Prince Edward Island             |                    |          |   |      |            |
| PEI                              | -                  | -        | Full province<br>ban                    | -    | -          |
| Québec                           |                    |          |   |      |            |
| Beaconsfield                     | -                  | -        | Pending<br>Ban<br>(July 2020)           | -    | -          |
| Four<br>Communities in           | -                  | -        | Ban                                     | -    | -          |

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| Jurisdiction                  | Straws | Utensils | Bags                       | Cups | Containers |
|-------------------------------|--------|----------|----------------------------|------|------------|
| the Eastern Townships         |        |          |                            |      |            |
| Huntingdon                    | -      | -        | Ban                        | -    | -          |
| Montreal and Greater Montreal | -      | -        | Ban                        | -    | -          |
| Saint Prevost                 | -      | -        | Ban                        | -    | -          |
| Saint-Anselme                 | -      | -        | Ban                        | -    | -          |
| Sainte-Anne-des-Plaines       | -      | -        | Ban                        | -    | -          |
| Sainte-Martine                | -      | -        | Ban                        | -    | -          |
| Sainte-Sophie                 | -      | -        | Pending Ban<br>(Jan 2020)  | -    | -          |
| Saint-Jean-sur-Richelieu      | -      | -        | Pending Ban<br>(June 2020) | -    | -          |
| Saint-Sauveur                 | -      | -        | Ban                        | -    | -          |
| Sherbrooke                    | -      | -        | Pending Ban                | -    | -          |





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| Jurisdiction       | Straws | Utensils | Bags                      | Cups | Containers |
|--------------------|--------|----------|---------------------------|------|------------|
|                    |        |          | (Jan 2020)                |      |            |
| Val Saint-François | -      | -        | Pending Ban<br>(Jan 2020) | -    | -          |

Source: Summary of Single-Use Item Reduction Regulations and Policies in Canada. November 2019. Metro Vancouver at <http://www.metrovancouver.org/services/solid-waste/reduction-reuse/single-use-items/Pages/default.aspx> and Shopping Bag Regulations. 2019. Retail Council of Canada at <https://www.retailcouncil.org/regulations-and-bylaws-on-shopping-bags-in-canada/>

The most active ban initiatives have focused on single-use plastic bags, with 15 Canadian jurisdictions having implemented SUP bag bans or intending to implement bans. As noted earlier, on July 1st, 2019, PEI was the first province to impose a province-wide ban on checkout bags defined as “any bag intended to be used by a customer for the purpose of transporting items purchased or received by the customer from the business providing the bag, and a bag used to package take-out food or food to be delivered, including, paper, reusable and plastic bags.”<sup>24</sup> In the case of PEI, the ban was instigated after the Island Waste Management Corporation was consistently unsuccessful in finding end markets for the material collected through its Blue Box program. Three months since the implementation of the ban, [PEI staff report](#) a significant reduction, down to two to three percent, of volume of material received.<sup>25</sup> Since that time, Newfoundland, Manitoba and, as previously noted, Nova Scotia have announced that they will follow suit with a province-wide ban on single-use bags, likely to be implemented in 2020 or 2021.

<sup>24</sup> Plastic Bag Reduction Act of Prince Edward Island. Chapter P-952 at [https://www.princeedwardisland.ca/sites/default/files/legislation/p-09-2-plastic\\_bag\\_reduction\\_act.pdf](https://www.princeedwardisland.ca/sites/default/files/legislation/p-09-2-plastic_bag_reduction_act.pdf)

<sup>25</sup> P.E.I. plastic bag recycling troubles disappear with ban. October 7, 2019. CBC at <https://www.cbc.ca/news/canada/prince-edward-island/pei-plastic-bag-ban-recycling-1.5311569>



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In July 2018, the City of Victoria, B.C. became the first municipality in B.C to enact a by-law banning retail outlets from offering or selling single-use plastic bags to customers and charging a \$0.15 fee for paper bags. In response, the plastic industry represented by the Canadian Plastic Bag Association challenged the by-law at the provincial court, resulting in the by-law being struck down in July 2019 by the B.C. Court of Appeal, noting that “municipalities wishing to exercise their regulatory authority for the protection of the natural environment are required to obtain provincial approval”. The province is now reviewing “all aspects of the decision”.<sup>26</sup> The City of Victoria has appealed the case to the Supreme Court of Canada, asking it to review the B.C.’s Court of Appeal decision. Despite the repeal of the by-law, City staff has discovered that most retail and food outlets continue to abide by the ban and paper bag fee. Having visited over 200 Victoria businesses, staff observed that 97 percent of businesses have stopped giving out single-use plastic checkout bags and according to the City’s website, “with the support of the community and the commitment of our businesses, we have kept 17 million plastic bags out of the community, village centres, parks and beaches – bags that otherwise would end up as litter or take up space in the landfill”<sup>27</sup>

In support of Victoria’s actions, on June 24, 2019, the District of West Vancouver Council adopted a notice of motion requesting the province to provide clear jurisdiction to municipalities to pass single-use item reduction by-laws. West Vancouver also presented a resolution - Confirming Municipal Jurisdiction to Regulate Single-Use Items – to the Union of British Columbia Municipalities (UBCM), which was endorsed at the UBCM Conference.<sup>28</sup> To date, no action has been taken by the B.C. government.

The City of Montreal adopted a similar ban on single-use plastic bags as the one implemented in France. After a six-month grace period, Montreal implemented the by-law

<sup>26</sup> CleanBC – Plastics Action Plan. July 25, 2019. British Columbia Government at [https://engage.gov.bc.ca/app/uploads/sites/121/2019/07/CleanBC\\_PlasticsActionPlan\\_ConsultationPaper.pdf](https://engage.gov.bc.ca/app/uploads/sites/121/2019/07/CleanBC_PlasticsActionPlan_ConsultationPaper.pdf)

<sup>27</sup> Victoria embraces reusable bags. No date of posting. Accessed March 2020. Victoria website at <https://www.victoria.ca/EN/main/residents/climate-change/waste-reduction/single-use-plastic-bags.html>

<sup>28</sup> Resolutions to be considered at the 2019 UBCM Convention Vancouver Convention Centre Vancouver, BC. September 25-27, 2019. UBCM at [https://www.richmond.ca/\\_shared/assets/Single-Use\\_Discussion\\_Guide\\_201954612.pdf](https://www.richmond.ca/_shared/assets/Single-Use_Discussion_Guide_201954612.pdf)



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in June 2018. Rather than banning all single-use plastic bags, the City of Montreal banned SUP bags less than 50 microns (0.05 millimetres) in thickness. Instead of accepting the ban, some retailers distribute plastic bags greater than the 50 micron limit, essentially defeating the purpose of the ban. Meanwhile, the Société des Alcools du Québec (equivalent to the LCBO in Ontario) stopped giving out plastic and paper bags 10 years ago.<sup>29</sup>

Other SUP product bans that are gaining traction include those on straws, foam containers and cups, with a handful of Canadian jurisdictions having implemented bans or have pending bans on these SUP items. More recently, the Cities of Richmond and Vancouver, B.C. have announced bans on most single-use plastics including: bags, straws, utensils, foam cups and foam packaging. In the case of Vancouver, the pending bans and reduction strategies announced in November 2019 include:

- A ban on plastic and compostable plastic straws, starting April 22, 2020; however, vendors must provide flexible straws, e.g. bendable plastic straws wrapped in paper, when requested by a customer with accessibility challenges. A one-year exemption is provided for plastic straws served with bubble tea;
- A ban on plastic and compostable plastic shopping bags, with fees on paper and reusable bags, starting January 1, 2021. Retailers must charge a minimum fee of \$0.15 on paper and \$1 on reusable shopping bags in order to dramatically reduce the use of single-use shopping bags. Starting January 1, 2020, the minimum fees will increase to \$0.25 for paper bags and \$2 for reusable shopping bags;
- A ban on foam cups and foam take-out containers, which started January 1, 2020, was the first of many actions taken to reduce single-use item waste in support of the City's Zero Waste 2040 goal;
- A minimum fee of \$0.25 on all disposable cups, starting January 1, 2021. This by-law will require food vendors to charge a fee of at least \$0.25 on all hot and cold drink cups; and

<sup>29</sup> Allison Hanes: Montreal 'banned' plastic bags, but we can do better. May 27, 2019. Montreal Gazette at [montrealgazette.com/opinion/columnists/allison-hanes-montreal-banned-plastic-bags-but-we-can-do-better](https://montrealgazette.com/opinion/columnists/allison-hanes-montreal-banned-plastic-bags-but-we-can-do-better)

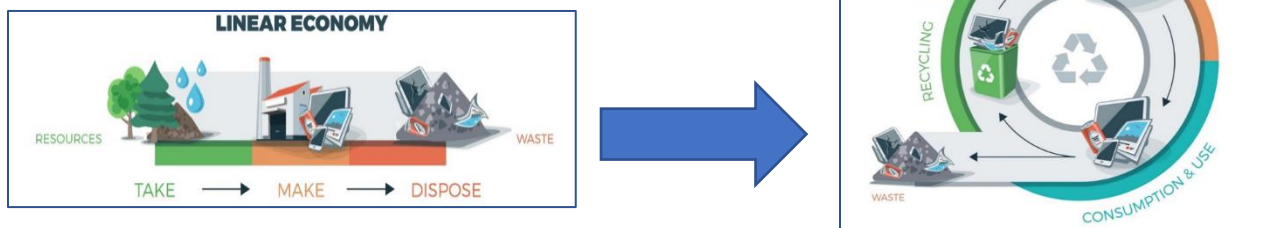


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- All single-use utensils can only be given out by request, starting January 1, 2021.<sup>30</sup>

#### 3.2.3 Circular Economy

The Circular Economy is a relatively new paradigm that replaces the conventional linear waste management approach: Make – Take – Dispose to a new way of managing waste involving a circular approach: Make – Take – Return. A Circular Economy emphasizes minimization, reuse and recycling to ensure that unwanted materials destined for disposal become feedstock for manufacturing and repurposed for reuse, thus reducing the reliance on raw materials and reducing the amount of waste requiring disposal.



The European Union (EU) explains the need for a Circular Economy as follows: “Within the current linear production and consumption economic model, only a small share of waste produced is reused, recycled or traded as secondary materials. The vast majority, including valuable and scarce materials, goes to landfill or is incinerated. In light of finite resource flows, economies will no longer be able to rely on these linear production and consumption models. A Circular Economy is an alternative to this model. It aims to keep products and materials in the value chain for a longer period and to recover raw materials after the lifetime of products for their next use.”<sup>31</sup>

<sup>30</sup> City of Vancouver Reduce Single-Use Team announcement. November 20, 2019.

<sup>31</sup> Public Procurement for a Circular Economy. 2017. European Union at [https://ec.europa.eu/environment/gpp/pdf/CP\\_European\\_Commission\\_Brochure\\_webversion\\_small.pdf](https://ec.europa.eu/environment/gpp/pdf/CP_European_Commission_Brochure_webversion_small.pdf)



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The key features of a Circular Economy for waste include:

- Preventing waste through new and innovative business models or through improved design – either for disassembly or for longevity;
- Maximizing the continuation of a product's life through enhanced reuse, repair or re-manufacture; and
- Improving end-of-life processing and resource recovery.<sup>32</sup>

Through this process, industry will be required to place emphasis on incorporating recycled content into their products and promote a closed-loop system for their packaging and products. They will also be required to manufacture products that are more durable, more easily repaired and, when they reach end-of-life, products can more easily be disassembled for recycling and repurposing.

The City of Toronto has introduced several novel approaches to promote the Circular Economy (CE). Not only has the City established a Circular Economy & Innovation Unit within the Solid Waste Management Services Division, but it has also recognized that the City's departments must work together to tackle Greenhouse Gas reduction and promote the Circular Economy. In response, the City has the Cross Divisional Circular Economy Working Group, which brings together staff from eight departments that can benefit from a collaborative and synergistic approach. The eight departments include Solid Waste Management Services (Chair), Purchasing and Materials Management Division, Economic Development and Culture, City Planning, Environment and Energy, Parks, Forestry and Recreation, Transportation Services, Facilities, and Toronto Water. The Working Group has been tasked with developing a draft Circular Economy Procurement Implementation Plan and Framework, a Monitoring, Evaluation, and Learning Framework and identifying a number of pilot projects to test the CE framework.<sup>33</sup>

In transitioning towards a Circular Economy, Metro Vancouver has focused its efforts on waste prevention and diversion. The efforts are guided by Metro Vancouver's 2011

<sup>32</sup> National Zero Waste Council at <http://www.nzwc.ca/focus/circular-economy/Pages/default.aspx>

<sup>33</sup> City of Toronto, Circular Economy Procurement Implementation Plan and Framework (CE Framework) Procurement Implementation Plan at <https://www.toronto.ca/legdocs/mmis/2018/gm/bgrd/backgroundfile-115664.pdf>





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Integrated Solid Waste and Resource Management Plan, which outlines a number of ambitious waste reduction strategies and actions and sets a 2020 target of 80 percent diversion. Rather than promoting a Circular Economy through general policies and target commitments, Metro Vancouver has focused its waste reduction efforts on four materials and activities:

- Deconstruction – Metro Vancouver will encourage reuse and recycling activities in the C&D sector, including deconstruction;
- Plastics – Metro Vancouver is developing a single-use plastics strategy;
- Food – Metro Vancouver has developed a food waste reduction strategy featuring the Love Food, Hate Waste Campaign; and
- Textiles – Metro Vancouver has developed a Regional Clothing Waste Reduction Campaign “Think Thrice”.

#### 3.2.4 Extended Producer Responsibility

EPR is an important tool to influence producers in the design of products and packaging to reduce end-of-life social and environmental costs of their packaging and products.

Currently, there are packaging and printed paper (PPP) programs in the most populated Canadian provinces including British Columbia, Saskatchewan, Manitoba, Ontario and Québec, which place the onus on stewards to pay for all, or a portion of the costs, to manage designated PPP materials at their end-of-life. In the case of British Columbia and Québec, stewards pay for all costs associated with collection, transport, processing and marketing of the designated PPP materials. In Ontario, for the time being, stewards must contribute 50 percent of the overall net costs of Ontario’s residential PPP program; however, stewards have been notified by the Minister of Environment, Conservation and Parks (MECP) to develop a plan to transition the Blue Box (PPP) program to full EPR starting January 1, 2023. In Manitoba, stewards are required to pay 80 percent of eligible costs incurred by municipalities to manage designated PPP materials through municipal residential diversion programs. In Saskatchewan stewards are responsible for 75 percent of costs.





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The other jurisdictions, Alberta, New Brunswick, Nova Scotia, Prince Edward Island, Newfoundland and Labrador and the Northern Territories, have various product stewardship-type programs, but no direct EPR programs. For some provinces, however, this is about to change.

While the Maritime Provinces have shied away from pursuing full EPR programs for PPP materials, there is a growing effort to re-assess this situation. Alberta and New Brunswick have begun studying the issue and, as noted earlier, municipalities in Nova Scotia have signaled a desire for the province to implement a full EPR program for PPP materials within nine months.<sup>34</sup>

While most Canadian provinces and territories have implemented EPR or stewardship programs to target PPP, used tires, hazardous or special waste and electronics, there remains a void in EPR programs targeting bulky, hard to manage products and materials, e.g. C&D waste, mattresses, pharmaceuticals, carpets, and furniture, which remain the responsibility of municipal and Indigenous communities to manage at their end-of-life. While these products and materials have been identified as needing EPR solutions, there has been little action on these materials to date.

In October 2009, the Canadian Council of Ministers of the Environment (CCME) released a report titled [Canada-Wide Action Plan for Extended Producer Responsibility](#)<sup>35</sup>, which proposed a two-phase EPR program targeting a wide range of packaging and products. While many of the materials listed in Phase One targeted materials that have been addressed, e.g. packaging, electronics, HHW, automotive products, through EPR programs, the materials listed in Phase Two have not been addressed, other than appliances in some jurisdictions. The materials targeted in Phase Two include

<sup>34</sup> N.S. municipalities want new recycling system within 9 months. November 12, 2019. CBC at [https://www.cbc.ca/news/canada/nova-scotia/municipalities-want-new-recycling-program-within-9-months-1.5353347?\\_vz=medium%3Dsharebar](https://www.cbc.ca/news/canada/nova-scotia/municipalities-want-new-recycling-program-within-9-months-1.5353347?_vz=medium%3Dsharebar)

<sup>35</sup> Canada-Wide Action Plan For Extended Producer Responsibility. October 2009. Canadian Council of Ministers of the Environment at [https://www.ccme.ca/files/current\\_priorities/waste/pn\\_1499\\_epr\\_cap\\_e.pdf](https://www.ccme.ca/files/current_priorities/waste/pn_1499_epr_cap_e.pdf)

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construction and demolition materials, furniture, textiles, carpet and appliances, including ozone-depleting substances (ODS).

In 2018, the Ontario Ministry of Environment and Climate Change released [The Strategy for a Waste-Free Ontario: Building the Circular Economy](#)<sup>36</sup> in response to the Waste Free Ontario Act. The Strategy not only identifies targeted materials for EPR, but it sets a timeline to address them – beginning in 2020, mattresses, carpets and furniture are cited for designation for EPR. Since then, the Strategy has been replaced by a revised plan which is silent on Phase 2 materials. More information on EPR can be found in the Legislative Review Memo.

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<sup>36</sup> Strategy for a Waste-Free Ontario: Building the Circular Economy. February 5, 2020. Government of Ontario at <https://www.ontario.ca/page/strategy-waste-free-ontario-building-circular-economy>



#### 3.2.5 Zero Waste

Zero Waste is defined as “The conservation of all resources by means of responsible production, consumption, reuse, and recovery of products, packaging, and materials without burning and with no discharges to land, water, or air that threaten the environment or human health” by the Zero Waste International Alliance and adopted by Zero Waste Canada.<sup>37</sup>



The Waste-Free Ontario Act, 2016 underlying principle is that no resources will be wasted, Ontario will generate zero-waste and there will be no GHG emissions from the waste sector. The Strategy sets targets that are hard in both senses; fixed and difficult to achieve:

- 30% diversion by 2020;
- 50% diversion by 2030; and
- 80% diversion by 2050.

The ability to achieve Zero Waste is virtually unattainable and even “environmentalists concede, however, that zero-waste is at best an aspirational goal, not an achievable

<sup>37</sup> Definition of Zero Waste. Zero Waste Canada at <https://zerowastecanada.ca/zero-waste-hierarchy/>



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target, and the strategy describes zero-waste Ontario as a visionary goal that provides the guiding principles needed to work toward the elimination of waste.”<sup>38</sup>

That said, the lofty aspiration of a Zero Waste goal has not prevented jurisdictions from declaring them as goals. Canadian jurisdictions having announced Zero Waste goals include:

- The City of Montreal recently announced a goal to be "Zero Waste" by 2030, requiring each Montreal citizen to reduce the amount of waste they produce by about 10 kilograms per year. The City is considering a wide array of policies to address over consumption of goods, such as textiles and single-use items, such as plastics. It is proposing to introduce a ban on organics and require that all large food retailers, e.g. grocery stores, and institutions, e.g. schools and hospitals, refrain from throwing out food waste but, instead, donating or transforming the food.<sup>39</sup>
- City of Vancouver has established a Zero Waste 2040 goal. With a Council motion passed in May 2016, the City developed a Zero Waste 2040 Strategy in 2018. In meeting the Zero Waste Challenge “Vancouver aspires to be a Zero Waste community by 2040, through eliminating the need for solid waste to be disposed in landfills and incinerators. In the future, residents, businesses and visitors will think differently about everything currently disposed. Zero Waste will be achieved through avoiding and reducing waste, keeping materials in circulation as long as possible, and then recycling, composting and producing renewable energy from materials that remain.”<sup>40</sup> The City has undertaken workshops to involve the public and has explored a range of Zero Waste topics including the reduction and reuse of food waste, product waste, building asset and management waste, and waste management.
- Although Metro Vancouver has not officially declared a goal of Zero Waste, instead, declaring a goal of reducing the waste generated, and aspiring to recycle 80 percent

<sup>38</sup> Board of Directors Meeting Highlights. January 19, 2017. Bluewater Recycling Association at <https://www.lambtonshores.ca/en/our-government/resources/Documents/BRA-Meeting-Highlights---Jan-19-2017.pdf>

<sup>39</sup> [http://ville.montreal.qc.ca/portal/page?\\_pageid=7137,79233635&\\_dad=portal&\\_schema=PORTAL](http://ville.montreal.qc.ca/portal/page?_pageid=7137,79233635&_dad=portal&_schema=PORTAL)

<sup>40</sup> Zero Waste 2040. 2018. City of Vancouver at <https://vancouver.ca/green-vancouver/zero-waste-vancouver.aspx>



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of the region's waste by 2020, it supports the principle of Zero Waste by establishing a Zero Waste Committee that meets regularly and has representation from each area municipality, hosting an annual Zero Waste Conference and funding the Zero Waste Challenge. Metro Vancouver's Zero Waste Challenge campaign has been in place since 2010, won a Solid Waste Association of North America (SWANA) award in 2011 and includes three distinct campaigns:

- Create Memories Not Garbage, which encourages residents to give experiences or gifts that were recyclable or reusable;
- Watch your Waste, which directs residents to the website for actions they can take to reduce waste; and
- Just Don't Trash It, which encourages residents to reuse items by either recycling, donating, giving away or re-gifting.

Outside of Canada, there are other countries that have declared Zero Waste goals including:

- Zero Waste New Zealand, which has a goal of Zero Waste to be achieved by minimizing and ultimately eliminating waste.
- Zero Waste Scotland – which claims "Resources not waste. Zero Waste is about changing the way we manage resources. It means using natural resources in the most effective way, as many times as possible, while minimizing the impact on the environment."
- Zero Waste Sweden – which is achieving Zero Waste through tax incentives, deposit-return programs, innovative diversion programs, such as Optibag, and resource recovery (EFW).

#### 3.2.6 GHG Reductions

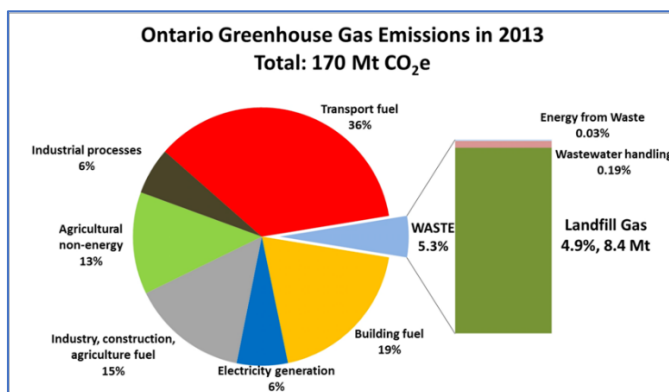
A study published by Environment Canada in 2015, produced a 2013 inventory of GHGs for the Province of Ontario. 5.3 percent of GHG emissions were attributed to the waste industry, of which 4.9 percent came from landfill gas and the remaining 0.3 percent came



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from energy-from-waste and wastewater handling.<sup>41</sup> Figure 1 presents the contribution of waste to Ontario's GHG emissions in 2013.

*Figure 1: Contribution of Waste Management Activities to Ontario GHG Emissions 2013*



Source: Greenhouse Gas Emissions and the Ontario Waste Management Industry. 2015. OWMA at <https://www.owma.org/articles/greenhouse-gas-emissions-and-the-ontario-waste-management-industry>

The source of the landfill gas comes from the decomposition of organic matter, e.g. food waste, yard waste and paper, in the anaerobic environment created at the landfill. "The decomposition of the organic component of municipal waste in landfills produces landfill gas containing about 50 percent methane (CH<sub>4</sub>) and 50 percent carbon dioxide (CO<sub>2</sub>). Methane is a potent GHG, as it has a global warming potential 21 times that of carbon dioxide. As a result, landfills are considered a significant source of GHG emissions."<sup>42</sup>

The Ontario Government has started to address the landfill gas problem through legislation requiring that large Ontario landfills (with more than 1.5 million m<sup>3</sup> of waste-in-place) and new or expanding landfills develop landfill gas capture systems and either flare or use the collected landfill gas, e.g. to generate electricity. Despite this measure,

<sup>41</sup> National Inventory Report: Greenhouse Gas Sources and Sinks in Canada, 1990-2013, Part 3. 2015 Environment Canada

<sup>42</sup> Landfill gas capture: a guideline on the regulatory and approval requirements for landfill gas. Government of Ontario website at <https://www.ontario.ca/page/landfill-gas-capture-guideline-regulatory-and-approval-requirements-landfill-gas>





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authors of the OWMA report, Greenhouse Gas Emissions and the Ontario Waste Management Industry<sup>43</sup> published in 2015, state “A comparison of the landfill gas that is currently captured in Ontario (4 Mt CO<sub>2</sub>eq) with what is believed to be the level of uncaptured landfill methane emissions (8.4 Mt CO<sub>2</sub>eq) suggests that there is a large potential for “additional” gas capture in Ontario at both regulated and unregulated sites.”

Further incentives for Ontario establishments to reduce GHGs were established when the provincial government introduced the Cap and Trade program in 2017. This program has since been cancelled by the provincial government and has been replaced by the Federal Government’s carbon tax program, which is being challenged by Ontario’s Government.

Capturing landfill gas is one solution to reduce GHGs once organic matter enters the disposal stream; but a more effective solution is to avoid sending organic matter to the landfill altogether. The Green Bin program plays an integral role in driving organic diversion and reducing the generation of methane gas. In Ontario, over 37 municipalities, representing over 70 percent of households have access to a food waste (Green Bin) diversion program, according to the 2017 Resource Productivity and Recovery Authority (RPPA) Datacall. The 2017 Datacall reported that almost 550,000 tonnes of food waste was diverted through the provincial Green Bin programs and over 1 million tonnes of organic matter was diverted through provincial Green Bin and leaf and yard waste programs. It is estimated that each tonne of food waste diverted from landfill results in a savings of 0.80 tonnes eCO<sub>2</sub> GHG emissions (compared to it being placed in a landfill).<sup>44</sup>

Canadian jurisdictions have also introduced a number of innovative programs and strategies to further reduce waste management related Greenhouse Gases.

In the City of Toronto, the first anaerobic digester (Dufferin Anaerobic Digester) in North America for residential organics was commissioned in 2002 to process 25,000 tonnes of Green Bin material annually. At the time, the City of Toronto was the largest jurisdiction in North America with a curbside Green Bin program. In 2011, construction began on a

<sup>43</sup> Greenhouse Gas Emissions and the Ontario Waste Management Industry. December 2015. (Kelleher, Seidel, Torrie). OWMA at <https://silkstart.s3.amazonaws.com/5977b0bc893aaa7f1b42c1f9.pdf>

<sup>44</sup> Determination of the Impact of Waste Management Activities on Greenhouse Gas Emissions: 2005 Update Final Report. October 2005. Prepared for Environment Canada and Natural Resources Canada



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second anaerobic digester (AD) (the Disco Solid Waste Management Facility). In 2014, once the Disco AD facility was operational, the Dufferin AD Facility was shut down for an expansion to 55,000 tonnes annually. In 2019, the City entered into a partnership with Enbridge Gas Distribution to begin installing equipment at the Dufferin AD Facility that will allow the City to turn the biogas produced into renewable natural gas (RNG) to be used to fuel the City's waste collection trucks. This project "will allow the City to reduce fuel costs for its fleet of collection trucks and significantly reduce its carbon footprint. Current estimates suggest that the Dufferin RNG facility will produce approximately 3.2 million cubic metres of RNG per year – enough to power the majority of the City's solid waste collection fleet."<sup>45</sup>

The City of Toronto is not the first jurisdiction in Canada or North America to convert residential food waste into a renewable gas to be used as a fuel substitute in its waste collection fleet. In March 2018, the City of Surrey, B.C., opened a fully integrated anaerobic digestion facility, called the Surrey Biofuel Facility, which converts food waste into RNG for use as an alternative fuel in its solid waste collection fleet. It is estimated that the closed-loop process not only demonstrates the Circular Economy, but it will reduce community-wide GHG emissions by approximately 49,000 tonnes per year, equivalent to taking over 10,000 cars off the road annually.<sup>46</sup>

The City of Montreal has set a goal to be Zero Waste by 2030 in order to help the City reduce GHG emissions in accordance with [goals set out by the United Nations Secretary General](#) in 2019.<sup>47</sup>

As of September 2019, almost 450 communities in Canada have declare a state of climate emergency. Some of the major Canadian cities having declared a state of climate

<sup>45</sup> Turning Waste into Renewable Natural Gas. City of Toronto website at <https://www.toronto.ca/services-payments/recycling-organics-garbage/solid-waste-facilities/renewable-natural-gas/>

<sup>46</sup> Renewi's Anaerobic Digestion & Compost Plant Reach 'Full Service' in Surrey, BC. June 18, 2018. Waste Management World, at <https://waste-management-world.com/a/renewi-s-anaerobic-digestion-compost-plant-reach-full-service-in-surrey-bc>

<sup>47</sup> How the City of Montreal plans to go 'zero waste'. October 18, 2019. CBC News at <https://www.cbc.ca/news/canada/montreal/montreal-zero-waste-grocery-compost-textile-recycling-1.5325319>



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emergency include the City of Ottawa (April 2019), Vancouver (January 2019), Edmonton (August 2019), Halifax (January 2019), Victoria (March 2019 and over 390 communities in Québec. Almost 20 town, cities and regions in Ontario declared a state of climate emergency in 2019.<sup>48</sup>

The City of Ottawa's decision to declare a state of emergency also resulted in allocating a one-time cost of \$250,000, which will go towards specific activities to support renewable energy and energy conservation programs and fund the analysis of its goals for reducing Greenhouse Gas emissions. At the same time, the declaration included a need to "Accord the City's Greenhouse Gas emissions targets to match the United Nation's International Panel on Climate Change report, that says global leaders have to slash 2010 Greenhouse Gas emissions by 45 per cent before 2030".<sup>49</sup>

In October 2019, Toronto's City Council unanimously voted to declare a climate emergency with the goal of accelerating its efforts to mitigate and adapt to climate change through Toronto's Climate Action Plan. The City's climate action strategy is called "TransformTO" which will reduce locally generated GHGs by targeting the highest generating GHG activities. TransformTO aims to achieve net zero GHGs by 2050 (or sooner). With 10 percent of GHG emissions in Toronto generated by waste (with food waste being the primary source), the City has set a goal of 95 percent diversion of waste from landfill by 2050.<sup>50</sup>

#### 3.2.7 Waste Disposal/ Processing and Energy Recovery

Many municipalities in Canada are exploring alternatives to traditional methods of processing and disposal of waste. Some of these technologies have been utilized in other countries for many years, and are becoming more widely utilized in North America as technology improves, public acceptance grows and the political and regulatory climates

<sup>48</sup> All the Places in Canada that have declared States of Climate Emergency. August 18, 2019. Huffington Post at [https://www.huffingtonpost.ca/entry/climate-emergency-edmonton-declare\\_ca\\_5d671036e4b022fbceb5caff](https://www.huffingtonpost.ca/entry/climate-emergency-edmonton-declare_ca_5d671036e4b022fbceb5caff)

<sup>49</sup> Ottawa City Council Declares State of Climate Emergency. April 24, 2019. CTV news at <https://ottawa.ctvnews.ca/ottawa-city-council-declares-climate-emergency-1.4393057>

<sup>50</sup> TransformTO Overview at <https://www.toronto.ca/services-payments/water-environment/environmentally-friendly-city-initiatives/transformto/transformto-climate-action-strategy/>



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change. The following sections provide a brief overview of some trends in waste processing, disposal and energy recovery. Additional information can be found in the Waste Management Technologies and Approaches Memo.

#### **Anaerobic Digestion**

Many municipalities across Canada have implemented Green Bin programs to collect household organic wastes, including food wastes (also referred as source separated organics (SSO)).

While most Canadian municipalities use aerobic composting systems to process the food waste materials, increasingly, anaerobic digestion is being seen as a viable alternative system.

Anaerobic digestion is the process of converting organic waste into biogas energy in the absence of oxygen. Biogas is primarily composed of methane (CH<sub>4</sub>) ranging from 60-70 percent depending on the feedstock. The methane needs to be “cleaned” to remove contaminants before it can be used as renewable natural gas.

Benefits of using anaerobic digestion to process source separated organics are:

- 1 tonne of SSO produces about 200-300 kWh of electricity;
- 1 tonne of SSO produces about 100-150 cubic metres of biogas; and
- Biogas is ~ 60 percent methane, depending on materials.<sup>51</sup>

Anaerobic digestion is widely used throughout Europe as a means of processing municipal organic waste. As far back as 2010, Germany and Ireland targeted municipal organic waste as a viable resource for generating renewable energy, “biomethane produced from municipal solid waste could contribute significantly to Ireland’s renewable heat or transport targets while at the same time diverting organic waste away from

<sup>51</sup> Environment Canada, Technical Document on Municipal Solid Waste Organics Processing. [https://www.ec.gc.ca/gdd-mw/3E8CF6C7-F214-4BA2-A1A3-163978EE9D6E/13-047-ID-458-PDF\\_accessible\\_ANG\\_R2-reduced%20size.pdf](https://www.ec.gc.ca/gdd-mw/3E8CF6C7-F214-4BA2-A1A3-163978EE9D6E/13-047-ID-458-PDF_accessible_ANG_R2-reduced%20size.pdf)



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landfills”.<sup>52</sup> In fact, Germany is the European leader in biogas production with a share of 50 percent of total biogas production in the EU in 2015.<sup>53</sup> The wide adoption of anaerobic digestion to process organic waste in Europe is driven by strong regulatory initiatives to reduce Greenhouse Gases and waste sent for disposal.

There are seven anaerobic digestion facilities operating in Canada that process source separated organics from municipal programs. More information on these facilities is provided in the Waste Management Technologies and Approaches Memo.

#### **Landfill Gas Recovery**

Landfill gas (LFG) provides another source of biogas capture and utilization in Ontario and Canada and an opportunity to reduce the generation of Greenhouse Gases. According to a study written for the Canadian Biogas Association:

- LFG is the third largest source of anthropogenic methane emissions in Canada;
- LFG represents 3 percent of Canada’s national GHG emissions; and
- LFG is generally the largest source of GHG over which a local community has direct control.<sup>54</sup>

In Ontario, there are 45 landfills with landfill gas capture systems, with over 53 landfill gas systems operating across Canada.<sup>55</sup>

The combined biogas collection systems operating throughout Canada, which include anaerobic digesters, landfill gas collection systems and wastewater treatment facilities are generating more than 400,000 gigajoules of renewable natural gas combined, with

<sup>52</sup> The Future of Renewable Gas in Ireland. April 2010. Bord Gais at <https://www.ifa.ie/wp-content/uploads/2013/10/Future-of-Rewable-Gas-in-Ireland-Bord-Gais-2010.pdf>

<sup>53</sup> Biogas: Developments and perspectives in Europe. December 2018. Renewable Energy. At <https://www.sciencedirect.com/science/article/pii/S096014811830301X#bbib25>

<sup>54</sup> Canadian Biogas Study. December 2013. Canadian Biogas Association at [https://biogasassociation.ca/images/uploads/documents/2014/biogas\\_study/Canadian\\_Biogas\\_Study\\_Technical\\_Document\\_Dec\\_2013.pdf](https://biogasassociation.ca/images/uploads/documents/2014/biogas_study/Canadian_Biogas_Study_Technical_Document_Dec_2013.pdf)

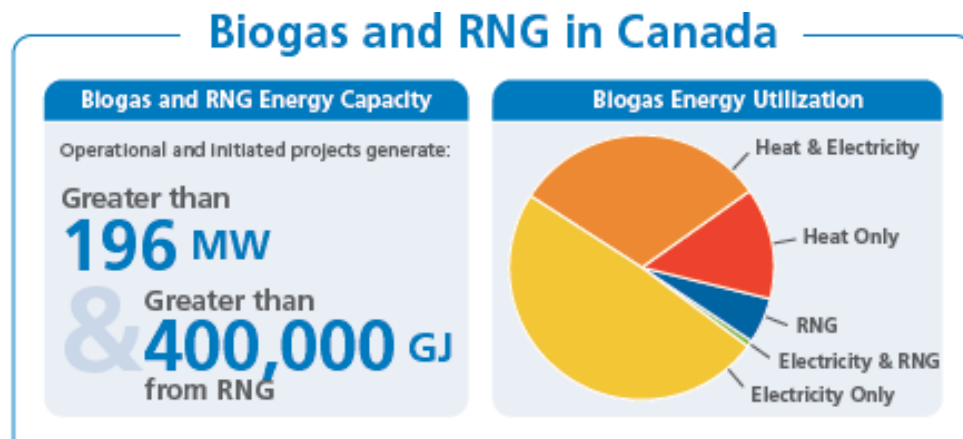
<sup>55</sup> Biogas and Renewable Natural Gas in Ontario: 2019 Market Overview and Outlook. June 2019. Canadian Biogas Association at <https://www.biogasassociation.ca/images/uploads/documents/2019/2019-Market-Overview.pdf>





the main use is the conversion to electricity. See Figure 2 for the contribution of energy activities in Canada.

Figure 2: Contribution of Energy Activities in Canada



Source: Biogas and Renewable Natural Gas in Ontario: 2019 Market Overview and Outlook. June 2019. Canadian Biogas Association at <https://www.biogasassociation.ca/images/uploads/documents/2019/2019-Market-Overview.pdf>

In Ontario alone, it is estimated that “at an efficiency rate between 60 percent and 75 percent, it is estimated that these landfills help to reduce emissions by at least 2.8 to 3.5 megatonnes tonnes of eCO<sub>2</sub> of the total 8 megatonnes generated by all landfills. They have an electricity generation capacity of roughly 65 MW.”<sup>56</sup>

## Mixed Waste Processing and Mechanical Biological Treatment

In Europe, mixed waste processing has been a popular processing technology used to extract recyclables and organic materials. These combined processing and composting facilities are referred as mechanical biological treatment (MBT) facilities. Between 2005

<sup>56</sup> Environmental Commissioner of Ontario. “Beyond the Box: Ontario’s Fresh Start on Waste Diversion and the Circular Economy,” 2017.





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and 2011, Europe experienced a 60 percent increase in MBT facilities and from 2012 to 2017, an additional 25 MBT facilities were constructed for a total of about 570 active MBT plants in Europe with a capacity of 55 million tons.<sup>57</sup>

Unlike, Europe, in the past, similar facilities in North America were called Dirty Material Recovery Facilities (MRF) or Mixed Waste Processing (MWP) facilities because they tend to lack the biological stage. Past experience with MWP facilities in Ontario have had poor success, such as the Dongara facility in York Region, which opened in 2008 and closed in 2013. The Dongara facility in York Region produced refuse derived fuel (RDF) to be used for energy recovery, which was the main economic driver for MWP at the time. Due to the lack of find viable markets for the high cost end market pellets and restrictive regulations that prohibited the pellets to be used in cement kilns as alternative fuel, Dongara was closed. The pellets were classified by Ministry of the Environment as waste and all end users were required to be designated as waste management facilities and hold waste facility Certificates of Approval in order to use the pellets. This restriction, combined with low natural gas prices, inhibited Dongara's ability to market pellets in Ontario and in June 2013, Dongara ceased operation.<sup>58</sup>

Since this time, MWP facilities in Ontario have moved away from producing refuse derived fuel and have focused on removal of recyclables, energy to waste feedstock and compostable organic materials.

The percentage of commodities that can be recovered at a MWP facility vary depending on material, type of equipment, and the level of automation. MWP can help to increase

<sup>57</sup> The Market for Biological Mechanical Waste Treatment in Europe. May 2017. EcoProg at <https://www.ecoprogram.com/publikationen/abfallwirtschaft/mba.htm>

<sup>58</sup> Residual's Management Strategy. November 2013. Smart Living: York Region's Waste Management Master Plan. At

[https://www.york.ca/wps/portal/yorkhome/yorkregion/yr/plansreportsandstrategies/integratedwastemanagementmasterplan/!ut/p/z0/jY6xDolwElafxYHRXGOMsDYMloSwYhdyai1VaaE9Rd7eorPG7b7\\_7r78IKAGYfChFZK2Bm-B92LT7Ph2I2UFy6t1kjLOKp6v4oQIRQw5iN8HwaAvwyA4iKM1JJ8E9eSa92woYpN11wCeNN3fQWs7-YmdVKFFxPobGu9kxbx15NCdPDimspl-YDhY142IET7JDg0p2wdPN6ObPucHKIWmpQPRI7VKbs4X6qxTqf6T9VRymkS9eOhaVLA!!/Xl6dykN7noC](https://www.york.ca/wps/portal/yorkhome/yorkregion/yr/plansreportsandstrategies/integratedwastemanagementmasterplan/!ut/p/z0/jY6xDolwElafxYHRXGOMsDYMloSwYhdyai1VaaE9Rd7eorPG7b7_7r78IKAGYfChFZK2Bm-B92LT7Ph2I2UFy6t1kjLOKp6v4oQIRQw5iN8HwaAvwyA4iKM1JJ8E9eSa92woYpN11wCeNN3fQWs7-YmdVKFFxPobGu9kxbx15NCdPDimspl-YDhY142IET7JDg0p2wdPN6ObPucHKIWmpQPRI7VKbs4X6qxTqf6T9VRymkS9eOhaVLA!!/Xl6dykN7noC)



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the amount of recyclables recover from the garbage stream and can be used to augment existing Blue Box recycling programs available in single-family, multi-residential and commercial municipal collection program. Communities with high participation levels in recycling programs can still have valuable recyclables in the waste stream and if combined with MWP could result in even greater diversion rates.<sup>59</sup>

In Canada, mixed waste processing has evolved to include a composting component, with one of the earliest facilities constructed in the Halifax Regional District in Nova Scotia, which opened in 1996. In the case of the Regional Municipality of Halifax, garbage from the residential and multi-residential sector is separated into a recyclables stream and an organic stream that is aerobically composted at a stabilization facility before being landfilled along with non-organic waste.

Within large urban regions in Ontario, there has been an increased interest in MBT to address low participation rates for source-separated recycling collection systems, especially in the multi-residential sector. Both the City of Toronto and the Region of Peel are currently actively engaged in pursuing MWP to maximize recovery of recyclables and compostable organics from the garbage stream, focusing on their multi-residential sector. The organic material will be anaerobically digested to extract biogas to be processed into a renewable natural gas.

#### **Energy-from-Waste**

Many jurisdictions in Europe, particularly in Northern and Western Europe, utilize Energy-from-Waste (EFW) facilities with a focus on recovering the energy to generate steam/hot water for use in district heating systems.

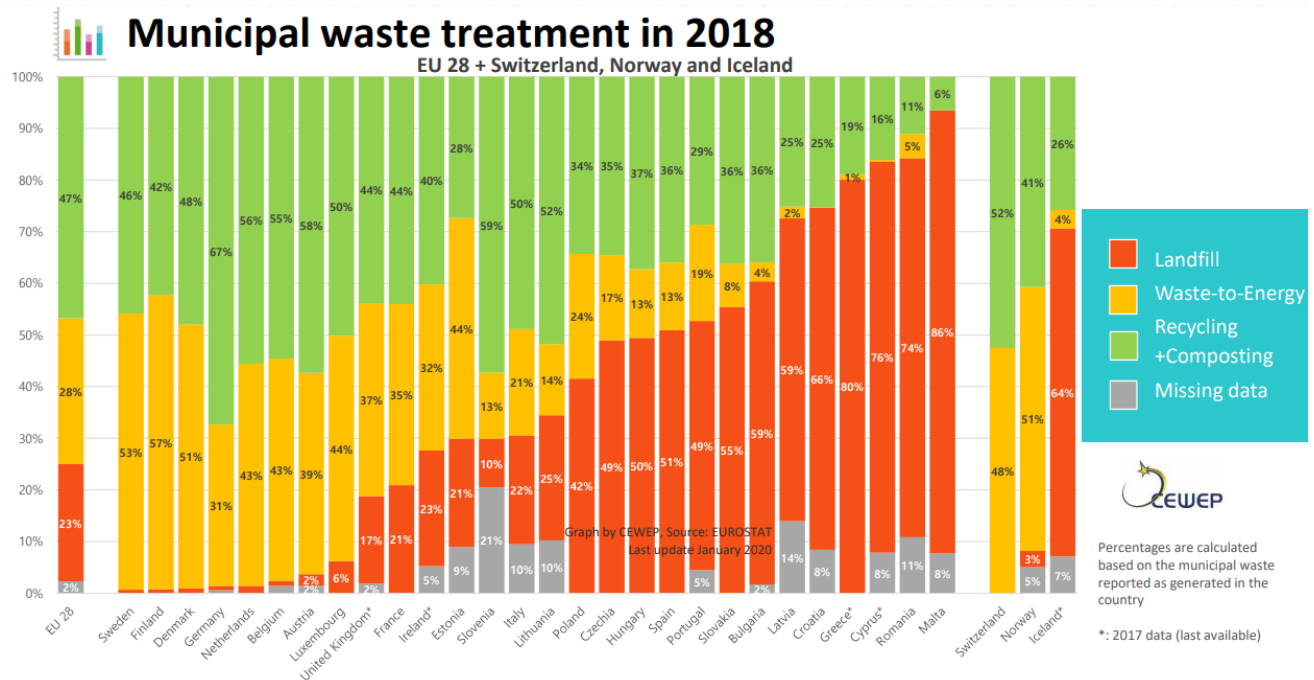
The following figure presents an overview of how municipal waste was managed in Europe in 2018. The highest use of EFW facilities is in Northern and Western Europe, with lower rates in Eastern Europe.

<sup>59</sup> Burns & McDonnell. Mixed Waste Processing Economic and Policy Study. September 2015. American Forest and Paper Association at [www.tinyurl.com/RR-AFPA](http://www.tinyurl.com/RR-AFPA)



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Figure 3: Municipal Waste Treatment in Europe (2018)



Source: Confederation of European Waste-to-Energy Plants

<https://www.cewep.eu/municipal-waste-treatment-2018/>

In Canada, some jurisdictions are using EFW facilities, primarily mass burn incineration, to manage residual waste. In Canada, there are seven operating facilities, with the most recently developed facility located in Durham Region, Ontario. The Durham-York Energy Centre has been in operation since 2016. The Alberta Biofuels Facility in Edmonton, AB is currently using a gasification/pyrolysis technology to convert non-recyclable and non-compostable MSW feedstock into methanol and ethanol. At this time, it is unclear how successful this facility is. Ottawa too, has had experience with gasification through the partnership with Plasco which was ultimately unsuccessful and resulted in the partnership being terminated in 2015 due to Plasco's inability to secure the necessary funding.



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Development of energy-from-waste facilities is a very expensive and long process. Durham and York Regions started the process in 2005 – eleven years later, the facility commenced commercial operation. This facility was the first greenfield EFW facility to be built in North America in over 20 years.

EFW is generally not a viable option for communities with significant landfill capacity, which is a more cost-effective and less contentious disposal option. The Province of Ontario does not consider material managed through EFW as diversion, only as disposal, and therefore there would be no increase to a municipality's diversion rate. In contrast, in 2019, the Province of Nova Scotia revised its solid waste regulations to all thermal treatment facilities to accept banned material such as plastic, cardboard etc. to create energy.<sup>60</sup> This will allow these materials to count towards diversion and is expected to encourage development of EFW facilities.

#### 3.2.8 Funding

At the present time, there are some funding opportunities through provincial and federal organizations to encourage innovation. Examples include:

- Green Municipal Fund (Federation of Canadian Municipalities) – provides grants for studies and pilots for waste diversion initiatives, specific waste streams (e.g. diapers) and initiatives that would reduce GHG emissions.<sup>61</sup>
- Zero Plastic Waste Initiative – supports projects that use innovative approaches to reduce plastic waste and pollution in Canada.<sup>62</sup>
- ECCC – Through Innovative Solutions Canada, Plastics Challenge –a number of grants are available to explore innovative solutions for plastic waste from various sources<sup>63</sup>

<sup>60</sup> <https://novascotia.ca/news/release/?id=20190116002>

<sup>61</sup> <https://fcm.ca/en/programs/green-municipal-fund>

<sup>62</sup> <https://www.canada.ca/en/environment-climate-change/services/environmental-funding/programs/zero-plastic-waste-initiative.html>

<sup>63</sup> <http://www.ic.gc.ca/eic/site/101.nsf/eng/home>



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- Low Carbon Economy Fund – funding is available to support projects that reduce carbon pollution and contribute to a clean economy. In 2019, funding was awarded to Enwave Energy Corp. in PEI to upgrade and expand an existing waste-to-energy system to divert more organic waste from landfill.<sup>64</sup>
- Natural Resources Canada – provides funding for energy innovation. Enerkem has been the recipient of funds from this organization.<sup>65</sup>

It would be worthwhile for the City to continue to monitor funding opportunities as the SWMP develops as the nature, type and amounts of funding change frequently.

### 3.3 International Trends

The following sections present an overview of trends, predominantly in the EU, regarding the Circular Economy, repair and the right to repair, single-use plastics, landfill taxes and food waste reduction.

#### 3.3.1 Circular Economy

Despite the strong support for the newest sustainability paradigm, i.e. the Circular Economy, a recent analysis conducted by the [World Economic Forum](https://www.weforum.org/) in 2019 estimates that the world's economy is only nine percent circular, meaning that only nine percent of materials are reused or recycled back into products/packaging. The remaining 91 percent of the economy continues to support the traditional linear economic model – make – take – waste. Figure 4 illustrates the global flow of resources, material inputs to and end of use, also referred as the global material footprint. This model continues to place enormous stress on the Earth's limited natural resources, which the world is consuming at 1.7 times faster than their replacement rate.<sup>66</sup>

<sup>64</sup> <https://www.canada.ca/en/environment-climate-change/news/2019/03/government-of-canada-supports-climate-action-by-enwave-energy-corporation.html>

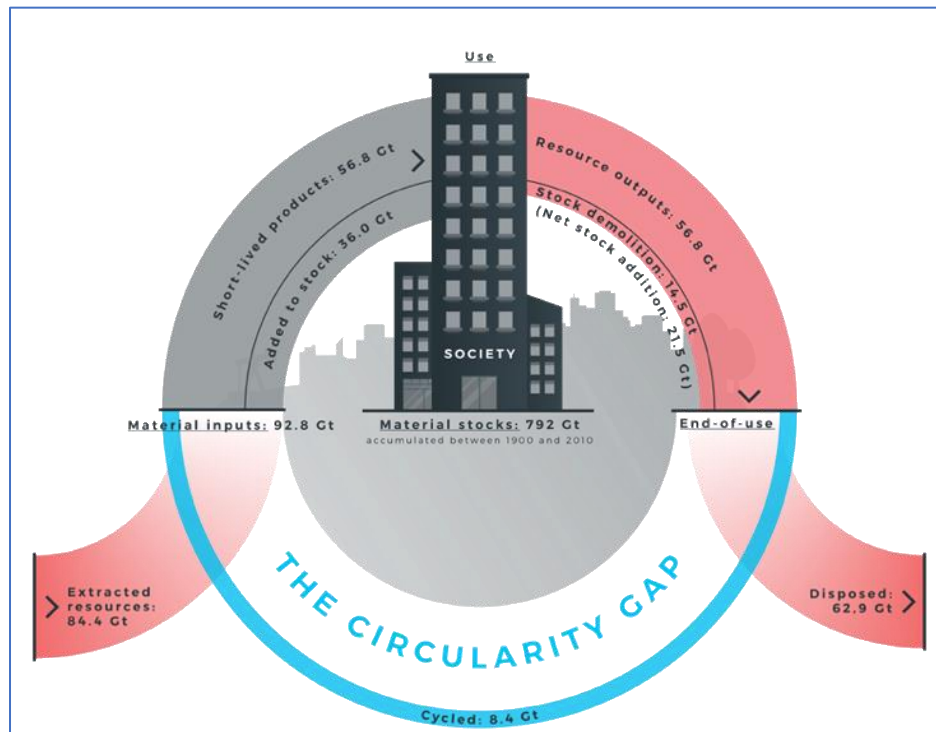
<sup>65</sup> <https://www.nrcan.gc.ca/science-data/funding-partnerships/funding-opportunities/current-investments/21146>

<sup>66</sup> The world's economy is only 9% circular. We must be bolder about saving resources. November 11, 2019 at <https://www.weforum.org/agenda/2019/11/economy-circular-recycling/>





Figure 4: Global Material Footprint



Source: *The Circularity Gap Report 2019*. January 2019. The Platform for Accelerating the Circular Economy (PACE) at <https://www.circularity-gap.world/>

Some countries have striven to reduce this “circularity gap” by mandating Circular Economy actions. Europe has assumed a leadership role in promoting the Circular Economy model and consequently has seen a modest increase of 12 percent in its economic circularity.<sup>67</sup> Some of the key policies and initiatives introduced by Europe are presented below.

<sup>67</sup> The Circularity Gap Report 2019. January 2019. The Platform for Accelerating the Circular Economy (PACE) at <https://www.circularity-gap.world/>



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In 2015, the European Commission adopted a Circular Economy action plan to help move Europe towards a Circular Economy. The plan identified 54 actions that have been implemented and intended to “close the loop” on product lifecycles. Key actions include:

- Promoting EcoDesign of products to encourage durability, recyclability, reusability and repairability;
- Promoting the “Right to Repair” for electronics and other products;
- Better enforcement of existing guarantees on tangible products and action on false green product claims;
- Development of new and revised EU green public procurement criteria integrating Circular Economy requirements;
- Strengthening waste management and diversion legislation with targets for recycling 65 percent of municipal waste by 2035 and for recycling 70 percent of packaging waste by 2030;
- Developing the EU Strategy for Plastics in a Circular Economy; and
- Reducing food waste and encouraging the generation of bio-energy from remaining food waste.<sup>68</sup>

Scotland has been at the forefront of supporting the Circular Economy in Europe by developing an ambitious Circular Economy strategy called “Making Things Last” that identifies three priority areas that best support a Circular Economy, including:

- Reducing carbon emissions in the food and drink sector and the broader bio-economy through anaerobic digestion and increased production of renewable fuels, heat, and fertilizer products;
- Encouraging remanufacturing of goods, which can require repairing and rebuilding; and

<sup>68</sup> The implementation of the Circular Economy Action Plan. 2019. Report from The Commission To The European Parliament, The Council, The European Economic And Social Committee And The Committee Of The Regions at <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1551871245356&uri=CELEX:52019SC0090>



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- Reducing construction waste generated and sent for disposal and by taking a more circular approach to the use of resources in construction and buildings.<sup>69</sup>

In support of Scotland's Circular Economy and Zero Waste strategies, the City of Glasgow has implemented Circular Glasgow, which is aimed to help the City move towards a Circular Economy by featuring a series of Circular Economy programs. One of these programs provides support, tools and expert knowledge to help local businesses of all sizes implement circular operations. For example, through the program, the food and beverage sector was highlighted as having great circular potential and a number of pilot studies were identified, including aquaponics, heat recovery and the creation of a new local beer made from left-over bread rolls.<sup>70</sup>

The Netherlands has taken a leadership role by being the first European country to set firm targets to achieve a full Circular Economy by 2050 and to reduce natural resource consumption in its economy by 50 percent by 2030. Following from this mandate, the City of Amsterdam was the first city to carry out a comprehensive scan of the City's material flow and economic benefits of becoming more circular. The City focused on an approach called, 'Learning by Doing' to demonstrate the tangible benefits of Circular Economy initiatives. Over 70 projects have been initiated, including some that focus on construction, biomass and food.<sup>71</sup>

The German government has launched the Innovative Product Cycles initiative which offers grants to projects with innovative products that feature lower environmental impact and/or are cheap to repair. The goal is to design products with Zero Waste and encourage repairs and upgrades to promote the Circular Economy. Successful applicants will receive a non-repayable grant with universities, research, and scientific institutes

<sup>69</sup> Making Things Last: a circular economy strategy for Scotland. 2016. Government of Scotland at <https://www.gov.scot/publications/making-things-last-circular-economy-strategy-scotland/>

<sup>70</sup> Municipality-led circular economy case studies. 2018. Climate-KIC Circular Cities Project at [https://c40-production-images.s3.amazonaws.com/researches/images/75\\_CE\\_case\\_studies\\_interactive.original.pdf?1554823891](https://c40-production-images.s3.amazonaws.com/researches/images/75_CE_case_studies_interactive.original.pdf?1554823891)

<sup>71</sup> Municipality-led circular economy case studies. 2018. Climate-KIC Circular Cities Project at [https://c40-production-images.s3.amazonaws.com/researches/images/75\\_CE\\_case\\_studies\\_interactive.original.pdf?1554823891](https://c40-production-images.s3.amazonaws.com/researches/images/75_CE_case_studies_interactive.original.pdf?1554823891)



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receiving up to 100 percent of eligible project-related expenses, while commercial sector applicants can receive grants up to 50 percent of eligible costs. The grant period started in 2019 and ends in 2022.<sup>72</sup>

#### 3.3.2 Repair and the Right to Repair

Our “throw-away” society is characterized by a high turnover in consumer products such as toys and consumer electronics, and the notion of “planned obsolescence”, which has resulted in the production of less-durable or non-durable consumer goods. [A study](#) conducted for the German Environment Agency (UBA), in 2016, discovered that the proportion of large household appliances which were replaced within less than five years due to a technical defect increased from 3.5 percent to 8.3 percent between 2004 and 2013. According to the study, our appetite for the newest technology is part of the problem, since consumers expect new features and innovation on electronics on a frequent basis (e.g. new television innovations every year). This innovation cycle may impair quality and reduce the amount and comprehensiveness of product testing that would normally identify product weak points.<sup>73</sup>

The problem is exacerbated by industry’s unwillingness to support outside repair of the products. “The idea of planned obsolescence is nothing new. But the use of “repair prevention” as a method of making products obsolete is growing, say right to repair proponents. Many companies that manufacture electronics—anything from laptops to refrigerators to your car’s onboard computer—now have restrictions that prevent consumers from having them fixed anywhere besides a licensed repair shop. Some companies use digital locks or copyrighted software to prevent consumers or independent repair shops from making changes. Others simply refuse to share their repair manuals.

<sup>72</sup> Germany’s 2022 Circular Economy. September 7, 2019, at [medium.com/mark-and-focus/germanys-2022-circular-economy-214b7ad8470f](https://medium.com/mark-and-focus/germanys-2022-circular-economy-214b7ad8470f)

<sup>73</sup> Lifetime of electrical appliances becoming shorter and shorter. 2016. Umweltbundesamt <https://www.umweltbundesamt.de/en/press/pressinformation/lifetime-of-electrical-appliances-becoming-shorter>



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Some add fine print clauses to their user agreements so customers (often unwittingly) promise not to fix their own products.”<sup>74</sup>

Consumer groups and governments are beginning to fight back with declarations of support and legislation promoting the “right to repair”.

With its commitment to transitioning to a Circular Economy, the EU has introduced the Ecodesign Directive to encourage durability, repairability and reuse. This Directive, introduced in October 2019, will go into effect on March 1st, 2021 and will require that:

- Manufacturers will have to ensure that electrical household appliances - such as washing machines, dishwashers and fridges - last for up to 10 years after purchase;
- Firms will be forced to ensure that appliances can be easily fixable using commonly available tools and without damage to the product. They will also have to make sure that spare parts and repair information will be available to professional repairers for a minimum number of years, 7 to 10 years depending on the appliance;
- Manufacturers must ensure that spare parts will be delivered within 15 working days; and
- If an item is faulty, consumers will have up to six months to return it, with retailers permitted the chance to repair or replace the item, before a refund may be provided.<sup>75</sup>

In the U.S., a number of consumer repair web sites have sprung up which demonstrate how to repair a wide range of goods. Organizations like the Repair Association and Fix-it have pushed for Right to Repair legislation in the U.S. and have achieved some successes including (in October 2018) recognition by the U.S. Copyright Office that consumers have the right to fix their own goods or hire someone else to fix their goods even if this requires breaking a software lock.<sup>76</sup> That said, the U.S. Copyright Office has chosen to not tamper with the Digital Millennium Copyright Act (“DMCA”) which protects

<sup>74</sup> The Fight for the “Right to Repair”. July 13, 2019. Smithsonian magazine at <https://www.smithsonianmag.com/innovation/fight-right-repair-180959764/>

<sup>75</sup> The new ecodesign measures explained. September 30, 2019. European Union at [https://ec.europa.eu/commission/presscorner/detail/en/QANDA\\_19\\_5889](https://ec.europa.eu/commission/presscorner/detail/en/QANDA_19_5889)

<sup>76</sup> the Repair Association at <https://repair.org/legislation>



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electronic manufacturers from releasing software codes and hampers the right to repair. The end result is that “users are disempowered, trained to go hat in hand to the Apple store just to change a battery (rather than doing it themselves). Independent repair shops are driven out of business and the electronic waste piles up, as users discard their devices rather than fixing them or donating them for re-use.”<sup>77</sup>

The pressure for electronic companies to allow independent repair businesses access to parts and coding has resulted in these companies beginning to comply. Apple announced in September 2019 that it would begin to work with independent repair businesses by providing the same genuine parts, tools, training, repair manuals and diagnostics as its Apple Authorized Service Providers. Apple’s Chief Operating Officer is quoted saying “To better meet our customers’ needs, we’re making it easier for independent providers across the U.S. to tap into the same resources as our Apple Authorized Service Provider network.”<sup>78</sup> In order to qualify as a qualified Apple repair business, it requires an Apple-certified technician who can perform the repairs.

On other fronts, some governments are encouraging repair of other products, such as appliances, bicycles, and clothing by supporting the repair sector.

Scotland has put its sights on the repair sector as a way to help it achieve its goal of a Zero Waste Scotland and its Circular Economy strategy of “making things last”. The goal is to make repair the first choice for businesses and the public when items break down. Scotland will achieve its goals by: exploring the potential for a repair-finding service to make it easy to find where items can be repaired; expanding repair skills in communities; and encouraging companies to offer repair services for the products they make or sell. The government has also proposed to “explore a new approach to producer responsibility, through a single framework for all product types that drives choices for reuse, repair and remanufacture.”<sup>79</sup>

<sup>77</sup> Defend your Right to Repair. The Electronic Frontier Foundation at <https://www.eff.org/issues/right-to-repair>

<sup>78</sup> Apple announces out-of-warranty iPhone repair programme. September 2, 2019. Circular at <https://www.circularonline.co.uk/news/apple-announces-out-of-warranty-iphone-repair-programme/>

<sup>79</sup> Making Things Last: a circular economy strategy for Scotland. 2016. Government of Scotland at <https://www.gov.scot/publications/making-things-last-circular-economy-strategy-scotland/>





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In 2017, the Swedish government implemented tax breaks on repairs to a variety of goods, from bicycles to washing machines, so it will no longer make sense to throw out old or broken items and buy new ones. The tax cut was presented as part of the 2017 budget, providing a 50 percent reduction in the VAT (value added tax) on repairs of bikes, clothes, home textiles, shoes and leather goods. The public would also be able to claim half the labour cost of home appliance repairs (refrigerators, washing machines and other white goods) on their income tax return.

#### 3.3.3 Single-use Plastics

Despite the proliferation of plastics throughout the world, very little of it is recycled, nor is it made into equal or better products/packaging, known as “upcycling”. In Canada, less than 10 percent of plastic packaging is recycled according to the [Government of Canada](#)<sup>80</sup> and, according to [a study](#) conducted in 2019 by the Heinrich Böll Foundation, “on a global basis another 40 percent is disposed of in landfills and 14 percent is burned in incinerators. The remaining 32 percent finds its way into the environment, including dump sites, rivers and the sea, or into the air we breathe.”<sup>81</sup>

Over the past years, international governments have begun to address the challenges associated with poor plastic recycling rates, poor plastic recycled content rates and poor plastic reuse. One of the most compelling concerns has been the release of SUPs into the waterways and oceans resulting in uncontrolled plastic pollution and countless deaths of wildlife; in fact, the Canadian Government [reports](#) “every year, one million birds and over 100,000 sea mammals worldwide are injured or die when they mistake plastic for food or become entangled”<sup>82</sup>. Some of the more innovative initiatives being introduced by countries and jurisdictions are presented below.

<sup>80</sup> Canada to ban harmful single-use plastics and hold companies responsible for plastic waste. June 10, 2019. Government of Canada at <https://pm.gc.ca/en/news/news-releases/2019/06/10/canada-ban-harmful-single-use-plastics-and-hold-companies-responsible>

<sup>81</sup> The Plastic Atlas 2019. November 2019. Heinrich Böll Foundation, Berlin, Germany, and Break Free From Plastic at <https://www.boell.de/en/plasticatlas>

<sup>82</sup> Canada to ban harmful single-use plastics and hold companies responsible for plastic waste. June 10, 2019. Government of Canada at <https://pm.gc.ca/en/news/news-releases/2019/06/10/canada-ban-harmful-single-use-plastics-and-hold-companies-responsible>





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The EU has assumed a leadership role in addressing the problem of SUP and identifying solutions. The EU has enacted a new Directive – Single-Use of Plastics Directive – aimed at reducing targeted plastic products in the environment. Enacted on June 5, 2019, the Directive gives Member States two years to transfer the Directive into their own national legislation. The Directive features four key actions, as described in a summary update provided by Reloop, a European non-profit organization promoting waste reuse and deposit-return schemes:

- **Product Bans** – As per Article 5, certain SUP items like cotton bud sticks, cutlery (forks, knives, spoons, chopsticks), plates, straws, stirrers, balloon sticks, oxo-degradable plastics and expanded polystyrene (EPS) food containers and cups will be banned in the European Union from 2021;
- **EPR Schemes** – As per Article 8, Member States will have to establish EPR schemes by 2021 for SUPs; producers of SUP products including food containers, packets and wrappers, beverage containers, cups for beverages, tobacco products with filters, wet wipes, balloons, and lightweight plastic carrier bags will be expected to cover the costs of collecting waste consisting of those SUP products and their subsequent transport and treatment, including the costs of litter cleanup and awareness raising measures;
- **Design Requirements** – Article 6 sets out product design measures for SUP beverage containers to ensure that their caps and lids remain attached to the container during its use stage to improve recyclability and ensure they do not leak into the environment. In addition, there is a 25 percent target for recycled content in PET bottles by 2025 and 30 percent in all plastic bottles by 2030; and
- **Separate Collection Target** – Article 9 stipulates that Member States will be required to collect 90 percent of single-use plastic bottles with caps and lids by 2029, with an interim target of 77 percent by 2025. Deposit-return schemes are suggested as a method to achieve this objective.”<sup>83</sup>

<sup>83</sup> Update on Europe’s New Waste Legislation: Single Use Plastics Directive. December 19, 2018. Reloop at <https://reloopplatform.eu/single-use-plastics-directive-background/>



The Netherlands was one of the first countries in the EU to ban the free distribution of plastic bags in order to tackle plastic litter. On January 1, 2016, shopkeepers were prohibited from distributing free plastic bags (which covers all types of plastic bags, including biodegradable). Although the government has recommended a fee of €0.25 per bag, the decision of what fee to charge is up to the shopkeeper.

In 2018, the Welsh government announced its commitment to becoming the world's first 'Refill Nation' and has installed over 1,000 water refilling stations across Wales. As part of its commitment, the Welsh government has developed an app - The Refill app – that shows the nearest refill stations, with the purpose to make it easier for people to use refillable bottles rather than purchase single-use water bottles.

In California, some waste companies have partnered with environmental groups to propose that new legislation (the California Recycling and Plastic Pollution Reduction Act of 2020) be placed on the November 2020 election ballot. The bill would give State regulators powers to regulate plastic and other packaging materials. The legislation would allow, for example, the State to charge plastic producers fees, e.g. one cent per package, for selling single-use plastic packaging in the State. The legislation would also require all product packaging and priority single-use products to be reusable, recyclable, or compostable by 2030, and require producers to source reduce, by weight and number, single-use plastic packaging and priority single-use plastic products to the maximum extent possible, as deemed appropriate.<sup>84</sup> Funds raised from the tax would help to fund the creation of recycling plants and new end markets for plastics.

#### 3.3.4 Landfill Taxes Used to Fund Waste Diversion

Many European countries have relied on landfill taxes as a mechanism to make the costs of waste diversion programs comparable to the cost of landfill, thus creating a "level playing field" for waste diversion. By 2017, 24 countries in the EU imposed landfill taxes, ranging in price from as little as €3 (~\$4 CAD) per tonne in Lithuania to €101 (~\$149

<sup>84</sup> Proposed California Recycling and Plastic Pollution Reduction Act of 2020." November 2019. At <https://www.oag.ca.gov/system/files/initiatives/pdfs/19-0028%20%28Recycling%20Products%20%29.pdf>



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CAD) per tonne in Flanders, Belgium. The following table presents an overview of some of the landfill levies in place in Austria, Belgium, France, Germany, Netherlands, and the United Kingdom.

*Table 6: Landfill Levies in Selected Countries*

| Issue         | Austria   | Belgium   | France  | Germany | Netherlands   | United Kingdom            |
|---------------|---|---|---|---------|---|---------------------------|
| Landfill Levy | Landfill - €87/tonne (\$128 CAD)<br><br>EFW - €8/tonne (~\$12 CAD)<br><br>MBT residues - €29.80/tonne (~\$44 CAD) | Flanders – landfill<br><br>€101/tonne (~\$149 CAD) for combustible waste<br><br>- €56/tonne (~\$83 CAD) for non-combustible waste<br><br>- no landfill tax for Brussels | Landfill - €32/tonne (~\$47 CAD) in authorized landfills and<br><br>€150/tonne (~\$220 CAD) in unauthorized landfills<br><br>EFW - €11.20/tonne (~\$16 CAD) | None    | Previously abolished in 2012 and then reintroduced in 2015 - €13.11/tonne (~\$19 CAD) | £86.10/tonne (~\$127 CAD) |

*Based on €1 = \$1.47 CAD (December 2, 2019)*

In 2012, the European Commission commissioned an article, [Landfill Levies](#), published in 2013 exploring the use of economic instruments, e.g. landfill tax, pay-as-you-throw, bans, EPR, to reduce waste disposed and achieve desired environmental outcomes. The researchers found that “in most cases (but not all) there was a correlation between high



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costs to landfill (tipping fees and landfill taxes combined) and high waste diversion rates”. The researchers noted that EU Member States with total landfill charges of lower than €40/tonne (\$59/tonne CAD) generally landfilled more than 60 percent of their waste, i.e. had waste diversion rates of 40 per cent or lower. The researchers further noted that EU Member States were much more likely to achieve 50 per cent diversion or higher where landfill charges approached €100/tonne (\$147/tonne CAD).<sup>85</sup>

The UK has a substantial landfill tax that is used to drive diversion of waste from landfill. The tax, which began in 1996 at £7 per tonne (~\$12 CAD), has been gradually increased over the years and in 2017 stood at £86.10 per tonne (~\$148 CAD). The revenue from the landfill tax, however, is not used to support municipal diversion programs.

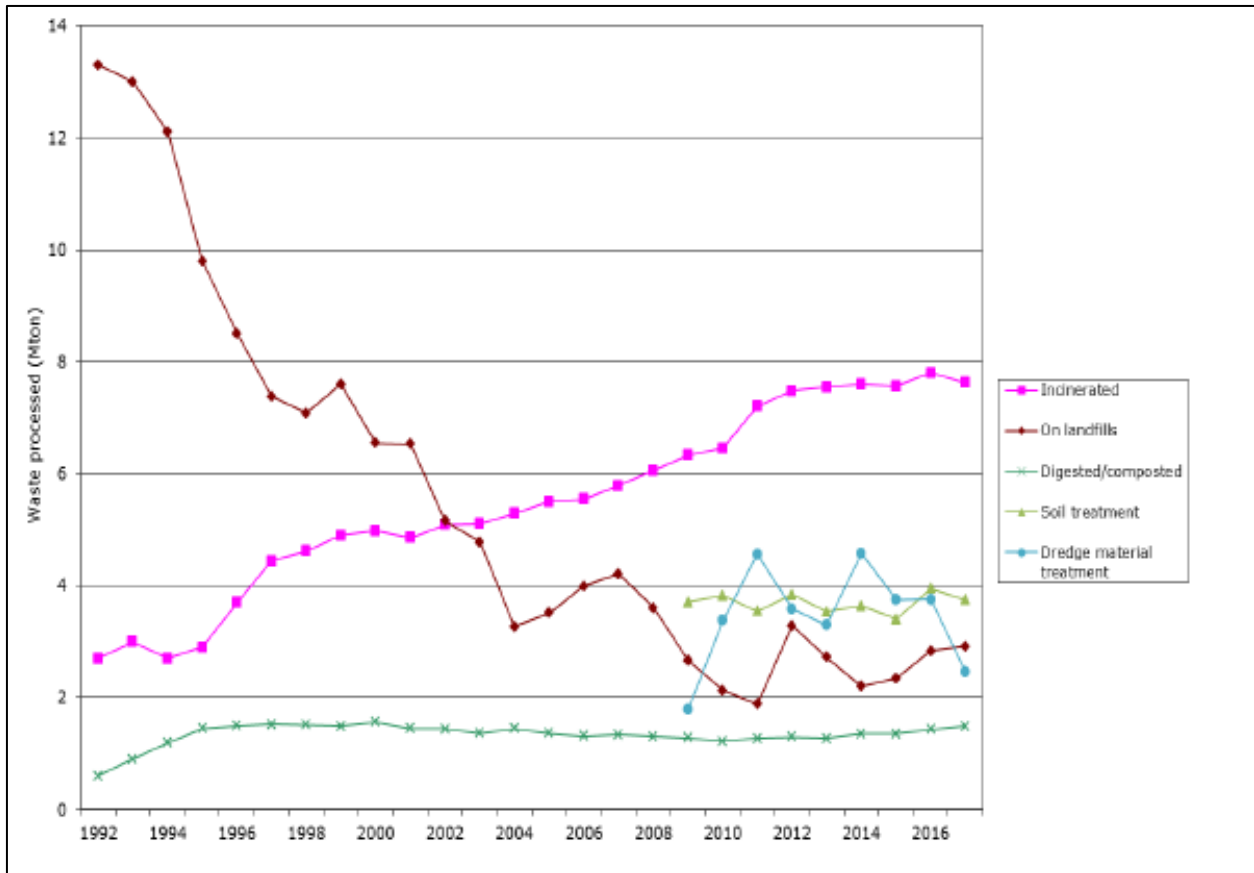
The Netherlands’ landfill taxes, introduced in 1995 at €107 per tonne (~\$157 CAD), was considered unsuccessful in steering waste away from landfills towards recycling and other diversion and was abolished in 2012. Since then, the tax was re-introduced in 2014 at a much lower rate of €13.11 per tonne (~\$19 CAD) and applied to both landfilled waste and waste going to energy-from-waste (EFW) facilities. While the newly imposed tax stopped the steady climb in waste being landfilled following its elimination in 2012 and reduced the amount of waste landfilled to near the level in 2012, prior to the removal of the tax, only an estimated 2 percent of waste was landfilled, with 17 percent waste processed at EFW facilities.<sup>86</sup> The incineration tax was first introduced in 2014 with no noticeable impact on the amount waste being incinerated – see Figure 5.

<sup>85</sup> Landfill Levies. February 2013. Solid Waste and Recycling at <https://www.solidwastemag.com/feature/landfill-levies/>

<sup>86</sup> Landfill Management in the Netherlands. 2019. Interreg Europe at <https://www.interregeurope.eu/cocoon/news/news-article/4874/in-the-picture-landfill-tax-in-the-netherlands/>



Figure 5: Waste Processed In the Netherlands



Source: Landfill Management in the Netherlands. 2019. Interreg Europe at <https://www.interregeurope.eu/cocoon/news/news-article/4874/in-the-picture-landfill-tax-in-the-netherlands/>

### 3.3.5 Food Waste Reduction

Food has become relatively cheap compared to earlier times and represents a smaller portion of household spending than ever before. Over the past 80 years, the proportion of household budgets spent on food has decreased from almost 25 percent of disposable



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income to about 10 per cent of disposable income.<sup>87</sup> Part of the reason for this increase in expenditure is that Canadians are eating out more than ever. This perception of the low cost of food in Europe and North America also attributes to food wastage, since food appears to be undervalued by consumers.

Over the past several years, the topic of wasted food has gained increasing coverage by news media and interest by European and U.S. governments. Governments have tackled food waste reduction using a variety of methods including campaigns, bans and other regulations, showcased below.

- In 2007, the Love Food Hate Waste (LFHW) campaign was launched by the UK Waste & Resources Action Programme (WRAP), which is a not-for-profit company, established in 2000 to help individuals, businesses and Local Authorities to “reduce waste and recycle more”. Over the course of the campaign, residents have been educated on how to reduce food and drink waste by cooking with left overs, buying smartly to reduce over purchasing perishable foods and making portion appropriate meals. In the first five years (2007 to 2012) of the campaign, WRAP estimated the cumulative reduction in avoidable household food waste by 21 percent.<sup>88</sup>
- The success of the campaign has resulted in the WRAP licensing the rights to use LFHW branding, promotional and web-based materials in other countries. Metro Vancouver paid a license fee to UK WRAP to use the campaign which was officially launched in May 2015, and is projected to help Metro Vancouver achieve its goal of reducing per capita waste generation by 10 percent by 2020. Since then, the National Zero Waste Council, based in B.C., purchased the LFHW license and launched a campaign in the Spring of 2018 with cities across Canada participating including: Vancouver, Toronto, Halifax, Calgary, Montreal, and Edmonton.
- In 2010, the US Environmental Protection Agency’s West Coast Region, overseeing environmental issues in the Pacific West Coast, applied for a grant from the

<sup>87</sup> Cut Waste, Grow Profit. October 2012. Value Chain Management Centre at <https://vcm-international.com/wp-content/uploads/2013/05/Cut-Waste-Grow-Profit-FINAL-DOCUMENT-Oct-3-12.pdf>

<sup>88</sup> West London Food Waste Prevention Campaign Evaluation Report. 2013. WRAP at [http://www.wrap.org.uk/sites/files/wrap/West%20London%20Food%20Waste%20Campaign%20Evaluation%20Report\\_1.pdf](http://www.wrap.org.uk/sites/files/wrap/West%20London%20Food%20Waste%20Campaign%20Evaluation%20Report_1.pdf)





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Washington office's Innovation Work Group Grant to address the impact of food consumption and food waste on climate. The Too Good to Waste (TGTW) campaign employs community-based social marketing principles and strategies to drive changes in food waste behaviour. The five behaviour modification strategies are:

- Get Smart: See How Much Food (and Money!) You are Throwing Away;
  - Smart Shopping: making lists and buying what is needed;
  - Smart Storage: keeping food fresh;
  - Smart Prep: Prep now, eat later; and
  - Smart Saving: Eat what needs eating first.
- Pilot projects with the three original partner jurisdictions (Boulder, CO; San Benito County, CA; and King County, WA) demonstrated that the community-based social marketing approach could lead to a 25 percent reduction in household food waste.<sup>89</sup>
  - In February 2016, France enacted legislation banning large grocery stores from throwing away or destroying unsold food, and requiring them to donate unsold food to charities or for animal feed. The bill prohibits large supermarkets, over 400 m<sup>3</sup>, from throwing food away or making unsold food unfit for consumption. Supermarkets must sign an agreement with food assistance organizations to redistribute their unused food or face penalties. The legislation



Indicator 12.3.1 - Global Food Loss and Waste

SDG target 12.3 has two components, Losses and Waste that should be measured by two separate indicators.

#### Sub-Indicator 12.3.1.a - Food Loss Index

The Food Loss Index (FLI) focuses on food losses that occur from production up to (and not including) the retail level. It measures the changes in percentage losses for a basket of 10 main commodities by country in comparison with a base period. The FLI will contribute to measure progress towards SDG Target 12.3.

#### Sub-Indicator 12.3.1.b - Food Waste Index

A proposal for measuring Food Waste, which comprises the retail and consumption levels is under development. UN Environment is taking the lead on this sub-indicator.

Source: FAO Sustainable Goals at <http://www.fao.org/sustainable-development-goals/indicators/12.3.1/en/>

<sup>89</sup> Sustainable Food Management presentation as part of the Wasted Food -- Innovative Lifecycle Approaches for Reducing Food Waste webinar presented by the EPA on May 13, 2013



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imposes a hierarchy with food recovered through prevention and redistribution given highest priority and sending the food waste for animal feed and energy recovery having lowest priority on the hierarchy.<sup>90</sup> While there have been criticisms of the legislation, such as it does nothing to prevent food assistance organizations from becoming dumping grounds for unwanted or unusable food from supermarkets, it has reported some success. There was a 30 percent increase in quantities of donations in 2017 from supermarkets to food assistance organizations and the percentage of supermarkets donating unsold products rose from 66 percent prior to 2016 to more than 90 percent in 2018.<sup>91</sup>

In 2018, the Netherlands launched a new initiative - United Against Food Waste – that aimed to reduce food waste in the country by half in 2030 compared to 2015 levels. The government set aside €7 million (~\$10 million CAD) to support the project via investments in innovation, research, monitoring and education. The government hopes its strategy will help it become the first European country to meet Target 12.3 of the UN’s Sustainable Development Goals – i.e. “By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses.”<sup>92</sup> The government hopes that the strategy will help to alleviate food insecurity and benefit the environment: “Less waste would also allow a significant reduction in CO2 emissions while saving money. In short, it would be good for the environment as well as the finances”.

A company based in Copenhagen, Denmark has developed an app called Too Good To Go, which links hotels, bakeries, restaurants and supermarkets to consumers so they can offer unsold products and meals cheaply. The app shows users where they can pick up the package referred to as a “magic box” or “magic bag”, depending on the country. The

<sup>90</sup> French food waste law passes unanimously. February 3, 2016. Resource at <https://resource.co/article/french-food-waste-law-passes-unanimously-10826>

<sup>91</sup> Opinion | France’s Ban on Food Waste Three Years Later. June 19, 2019. Food Tank at <http://foodtank.com/news/2019/06/opinion-frances-ban-on-food-waste-three-years-later/>

<sup>92</sup> UN Sustainable Development Goals at <http://www.fao.org/sustainable-development-goals/indicators/1231/en/>



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app is now being used in 13 European Countries including Denmark, the Netherlands, Germany and France. The company states that it has a user base of 16 million people and has salvaged over 23 million meals, and has consequently saved 57,000 tons of CO<sub>2</sub> from being released into the atmosphere.<sup>93</sup>

Gleaning has also become a growing movement to ensure that fruits and vegetables grown in fields and urban centres do not go to waste. Gleaning is a form of food recovery/rescue and refers to harvesting fruits and vegetables from the land that would otherwise rot and go to waste. The activity first started with volunteers harvesting remaining fruits and vegetables from farmers' fields and donating them to food banks. The concept has since evolved to the urban gleaning movement, which relies on volunteers to pick unwanted fruits and vegetables from urban residential gardens and donate all or part to food banks and/or share the crop with the owner of the garden and the pickers.

According to one article, [Gleaning in the 21st Century](#), published in 2019, "Since Canada's first formal fruit tree project was founded in 1998 in Victoria, British Columbia, more than 28 formal gleaning projects have emerged across the country. The first official urban fruit tree project in Ontario was the Hamilton Fruit Tree Project, founded in 2005. Other large urban centres also have formal gleaning projects including the Toronto-based group Not Far From the Tree, Hidden Harvest in Ottawa, the Appleseed Collective Revival in Guelph, and the Gleaners Guild in Waterloo Region."<sup>94</sup>

According to [Ottawa's Hidden Harvest](#) website, since 2013, the organization has harvested 22,385 kilograms of food and has donated about half to food banks. In general, the rescued food "is split four ways: at least one-quarter goes to the nearest food agency,

<sup>93</sup> Are apps tackling food waste an antidote to our throwaway culture? January 11, 2019. Deutsche Welle at <https://www.dw.com/en/are-apps-tackling-food-waste-an-antidote-to-our-throwaway-culture/a-51069061>

<sup>94</sup> Marshman and Scott, Gleaning in the 21<sup>st</sup> Century: Urban Food Recovery and Community Food Security in Ontario, Canada. January 2019. Canadian Food Studies, vol.6, pg. 100-119 at <https://canadianfoodstudies.uwaterloo.ca/index.php/cfs/article/view/264/311>



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one-quarter is shared with the homeowner, one-quarter is shared with the volunteer harvesters, and up to one-quarter goes back to Hidden Harvest Ottawa.”<sup>95</sup>

### 3.4 Waste Diversion Trends in Municipal Operations

Municipal governments have been actively addressing their internal operations to identify ways to reduce the amount of garbage going to disposal and waste-related activities causing Greenhouse Gas generation. Waste reduction efforts within municipal operations have tended to focus on specific activities including:

- The procurement of goods and services;
- Government facility operations; and
- Engaging staff.

#### 3.4.1 Green Procurement

Over the past few decades, the focus of green procurement has evolved in purpose and focus. Green procurement (also referred as environmentally preferable purchasing) places a focus on reducing the environmental impact of goods and services and tends to concentrate on environmental issues such as toxicity and recycled content of products.

Over the past decade, the term has evolved into sustainable purchasing in some jurisdictions. Sustainable procurement seeks to achieve the balance between the three pillars of sustainable development - economic, social and environmental - when procuring goods and services. Not only does procurement look at the economic aspects, but it addresses the social and environmental aspects as well by including environmental preferable purchasing, ethical purchasing and socio-economic purchasing, which is purchasing to promote economic development and supporting minority groups.

In recognizing the importance of green procurement to drive the recycling industry and infrastructure, in its report, [Canada-Wide Action on Zero Plastic Waste](#), 2019, CCME “acknowledges that member jurisdictions have all taken steps towards more sustainable

<sup>95</sup> Total Pounds Donated. July 8, 2019. Hidden Harvest Ottawa at <http://ottawa.hiddenharvest.ca/>



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practices, which may include considerations related to lifecycle management, recycled content, packaging and single-use plastics reduction, durability and repairability. Given the many forms these policies and practices take, the Government of Canada will develop guidelines that will provide the tools for jurisdictions to update their sustainable procurement practices to incorporate best practice principles for plastics management and support the transition to a more Circular Economy. This work will be completed by the end of 2021.”<sup>96</sup>

Over 20 Canadian municipalities have become members of the Canadian Collaboration for Sustainable Procurement (formerly known as the Municipal Collaboration for Sustainable Procurement) to share best practices for “operational excellence by collaborating and sharing resources to further green, sustainable and ethical purchasing”.<sup>97</sup> Municipalities have found that supporting sustainable purchasing objectives has resulted in better supplier collaboration and sustainable purchases.

More recently, a new term has appeared, Circular Economy procurement, which embraces a more robust approach focusing on the principles around the Circular Economy. Circular Economy procurement builds on the previous incarnations of green procurement practices, but takes it further by focusing on a closed-loop system featuring repair/refurbish/disassembly, design for the environment, 100 percent recycled content, etc. GHG reduction also factors heavily into the Circular Economy procurement principles.

The City of Toronto’s annual purchasing contracts amount to approximately Cdn \$2 billion in value, which is the largest municipal purchasing budget in Canada.<sup>98</sup> With this advantageous position, Toronto has developed the Circular Economy Procurement Implementation Plan and Framework (CE Framework), which will be “used to leverage the City of Toronto’s purchasing power to drive waste reduction, economic growth, and

<sup>96</sup> Canada-Wide Action on Zero Plastic Waste, 2019, the Canadian Council of Ministers of the Environment at [https://www.ccme.ca/en/current\\_priorities/waste/waste/zero-plastic-waste.html](https://www.ccme.ca/en/current_priorities/waste/waste/zero-plastic-waste.html)

<sup>97</sup> Municipal Collaboration for Sustainable Procurement website at <http://mcspgroup.com/portal/>

<sup>98</sup> Toronto Circular Economy Procurement Implementation Plan and Framework. March 2019. Ellen Macarthur Foundation at [https://www.ellenmacarthurfoundation.org/assets/downloads/Toronto\\_-\\_Case-Study\\_Mar19.pdf](https://www.ellenmacarthurfoundation.org/assets/downloads/Toronto_-_Case-Study_Mar19.pdf)





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social prosperity through a Circular Economy approach”.<sup>99</sup> The goals of the CE Framework are to increase the amount of goods and services, including City contracts, which are repairable by design, have lower lifecycle GHG emissions, are less toxic, and rely less on raw material extraction / consumption. The City also plans to require the re-examination of City contracts from a Circular Economy perspective. The City has begun a series of pilot projects to test, monitor and measure the framework, with results and final recommendations due in 2021.

Federal agencies have committed to a number of circular procurement initiatives targeting plastics, including:

- Divert 75 percent of plastic waste from federal operations by 2030;
- Eliminate avoidable single-use plastics;
- Reduce plastic waste in government purchasing and operations, meetings and events; and
- Promote the procurement of sustainable plastic products which can be repaired, recycled and contain recycled content and reduce plastic packaging associated with the products.<sup>100</sup>

In 2010, the City of Edmonton engaged all of the City’s five General Managers and nearly 100 operational staff to develop a sustainable purchasing strategy (and policy) to connect the practice of sustainable purchasing to most of the City’s key strategic plans in order to significantly increase awareness of the sustainable purchasing program. In 2015 the City held drop-in sessions and sustainable purchasing training activities for administrative

<sup>99</sup> City of Toronto, Circular Economy Procurement Implementation Plan and Framework (CE Framework) Procurement Implementation Plan at

<https://www.toronto.ca/legdocs/mmis/2018/gm/bgrd/backgroundfile-115664.pdf>

<sup>100</sup> Canadian Government website at <https://www.canada.ca/en/treasury-board-secretariat/services/innovation/greening-government/government-canada-actions-plastic-waste-federal-operations.html>





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staff, who make spot purchases and order supplies. The all-day drop-in session was attended by about 400 administrative staff.<sup>101</sup>

#### 3.4.2 Municipal Facility Operations

Increasingly, municipalities are beginning to address their internal operations to promote waste reduction and diversion.

##### Plastic Water Bottle Bans in Municipal Facilities

Many Ontario municipalities have begun to address ways to reduce the use of single-use plastics within their own operations. Over the past decade, municipal governments have started to ban the use of water bottles in Council meetings, food service operations located in government facilities and other facility operations. Canadian municipalities that have introduced water bottle bans in their own facilities include the City of Toronto, City of Markham, City of Peterborough, City of London, City of Niagara Falls, and the City of St. Catharines.

The City of Toronto's ban on bottled water in all city facilities and parks took effect in January of 2012. The ban, which affects most of Toronto's parks and park facilities, prohibits the sale and distribution of bottled water in all Toronto community centres, City facilities and parks.

In addition, as part of its Single Use Plastics strategy review, Toronto has employed its Solid Waste Management Services' Unit for Research, Innovation and a Circular Economy to work with the Purchasing and Materials Management Division and other City Divisions to reduce the use of single-use packaging items resulting from City procurements. The undertaking requires a comprehensive review of where single-use

<sup>101</sup> The Buck Starts Here - Sustainable Procurement Playbook for Cities. October 2016. Urban Sustainable Directors Network at [www.responsiblepurchasing.org%2Fpurchasing\\_guides%2Fplaybook\\_for\\_cities%2Frpn\\_usdn\\_playbook\\_for\\_cities.pdf&usg=AOvVaw3DcZsHwEbQvfkboqGxyyns](http://www.responsiblepurchasing.org%2Fpurchasing_guides%2Fplaybook_for_cities%2Frpn_usdn_playbook_for_cities.pdf&usg=AOvVaw3DcZsHwEbQvfkboqGxyyns)



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and implement an educational component to support the ban and raise awareness regarding reduction of all single use plastics”.<sup>104</sup>

The City of Markham is working to become a Zero Waste community beginning with its own facility operations. Since 2006, staff began to introduce waste reduction and diversion programs in its Civic Centre, which eventually became the first Zero Waste municipal facility in Ontario. In 2008, Markham Council adopted its Zero Waste Policy, which gave staff the authority to introduce waste reduction programs and policies in all Markham facilities. In its Civic Centre, staff implemented the following initiatives:

- Removal of waste bins from all cubicles and replaced with blue boxes only;
- Removing 500 garbage containers and replacing them with 23 central stations that twinned recycling, organics centralized bins with a small garbage can;
- Each employee received a reusable coffee mug and metal water bottle and a small bin for their desktop to contain organic waste;
- Converting the garbage receptacles in all washrooms for the collection of paper towels only that would be sent for composting; and
- Requiring the use of clear bags for garbage in centralized garbage bins.

According to staff, the Zero Waste Policy is being updated to incorporate bans for single use plastics.<sup>105</sup>

In addition, staff developed a Zero Waste Policy for food and catering services, passed by City Council in 2008, which applies to all City facilities, owned or leased. The policy sets out 14 Zero Waste requirements for all staff, foodservice suppliers, foodservice sub-

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<sup>104</sup> Elimination of Plastic Straws and Stir Sticks in City Facilities. Report to Mayor James M. Diodati and Members of Municipal Council. April 9, 2019. City of Niagara Falls at <https://niagarafalls.ca/pdf/city-hall/committees/park-in-the-city/r-c-2019-05-elimination-of-plastic-straws-and-stir-sticks-in-city-facilities.pdf>

<sup>105</sup> Communications with Claudia Marsales, Senior Manager, Waste and Environmental Management, City of Markham. January 24, 2020.



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contractors, caterers operating in a City facility or City sponsored event. Examples of the Zero Waste requirements set out in the policy include:

- “Suppliers shall recycle and/or compost all materials outlined on Appendix “A” and any other materials the Town deems capable of being recycled;
- Condiments such as tea bags, sugar, milk, cream, mustard, ketchup, jam in single serve non-recyclable packets are prohibited;
- Suppliers will provide compostable stir sticks for hot drinks and compostable straws for cold drinks; and
- Polystyrene (foam) plastic products for food or beverages is prohibited. Reusable china dinnerware and stainless steel serveware is preferred. If single use serveware, plates, and bowls are offered (paper based) they must be recyclable and/or compostable.”<sup>106</sup>

Other municipal initiatives include:

- Edmonton centralizes printing and sets default to double-sided - Employees can no longer print from individual printers but must sign using their employee cards in at centralized printers and all printers are set to default to double sided printing;
- Halifax facilities switch to clear bag program - All facilities must meet the six bag limit which allows one black bag and the others must be clear. Non-compliant bags are rejected if they contain recyclable or compostable materials; and
- San Francisco, CA operates an online virtual warehouse which facilitates the exchange of surplus supplies among city agencies. The Virtual Warehouse is an online materials exchange system for city surplus items including appliances, electronics, office furniture and office supplies. Usable, unwanted items are redistributed to other city agencies, non-profits and schools via an online database. Since 2004, the Virtual Warehouse has resulted in the reuse of over 900 tons of city-

<sup>106</sup> City of Markham Zero Waste Policy: Food and Catering Services – Policy No. 1. City of Markham at [https://ilsr.org/wp-content/uploads/2012/07/ZeroWastepolicy\\_01-Markham.pdf](https://ilsr.org/wp-content/uploads/2012/07/ZeroWastepolicy_01-Markham.pdf)



owned furniture, supplies, and equipment worth over \$6 million.<sup>107</sup>

#### Engaging Staff

In 2003, the City of San Francisco set a goal to achieve Zero Waste to landfill, “The San Francisco Commission on the Environment and the Board of Supervisors have passed resolutions adopting a goal of Zero Waste for San Francisco and the Board of Supervisors resolution authorized the Commission on the Environment to set a date to achieve Zero Waste once San Francisco met the 50 percent diversion goal”.<sup>108</sup>

In order for the City’s departments and facilities to achieve this goal, the City of San Francisco’s Environment department has dedicated staff as part of the Zero Waste Team who are primarily focused on promoting government waste reduction and management issues and ensuring city employees are properly trained on how and why to reduce, reuse, recycle and compost. In a 2016 City Government Zero Waste annual report, it was reported that Zero Waste Team members trained over 1,000 city employees.<sup>109</sup> The Zero Waste Team provides help setting up diversion programs, monitor, training staff and make Zero Waste presentations to agencies. The City provides printable signs and stickers, bins and signage that can be ordered on-line for City facilities and operations.

In addition, each San Francisco department and agency is required to have a Zero Waste coordinator. Support is provided to the 72 Zero Waste Coordinators in the form of annual workshops which are held once per year in January or February and provide an important source for Coordinators to get updates on programs, learn new skills and network. The Coordinators are required to complete an on-line Zero Waste survey annually to current

<sup>107</sup> Virtual Warehouse: Reuse City Owned Surplus Items. City of San Francisco website at <https://sfenvironment.org/virtualwarehouse>

<sup>108</sup> Resolution Setting Zero Waste Date. Resolution No. 002-03-COE - March 6, 2003. San Francisco at [https://sfenvironment.org/sites/default/files/editor-uploads/zero\\_waste/pdf/resolutionzerowastedate.pdf](https://sfenvironment.org/sites/default/files/editor-uploads/zero_waste/pdf/resolutionzerowastedate.pdf)

<sup>109</sup> Resource Conservation Ordinance – 2016 Annual Report - City Government Zero Waste Program. San Francisco Department of the Environment at [https://sfenvironment.org/sites/default/files/fliers/files/sfe\\_zw\\_cg\\_rco\\_annual\\_report.pdf](https://sfenvironment.org/sites/default/files/fliers/files/sfe_zw_cg_rco_annual_report.pdf)



information on departmental Zero Waste programs to the Zero Waste Team operating under SF Environment.

### **3.5 Societal and Demographic Trends and Their Relationship to Waste**

Attitudes and practices relating to waste management and waste generation differs greatly between generations and their lifestyle choices. This section explores some of the trends that impact waste generation, including demographics and changes in lifestyles.

While the focus of this memorandum is on what is happening demographically at large, it is noted that the City of Ottawa recently did a market research study into residents' behaviours as it relates to waste management.

#### **3.5.1 Demographic Trends**

Canada is undergoing an unprecedented change in its demographics, with an aging population, more women in the workforce, and more people choosing to remain in single family households. This changing demographic landscape is having a significant impact on the need for convenient foods and lifestyles. Some changing demographics include:

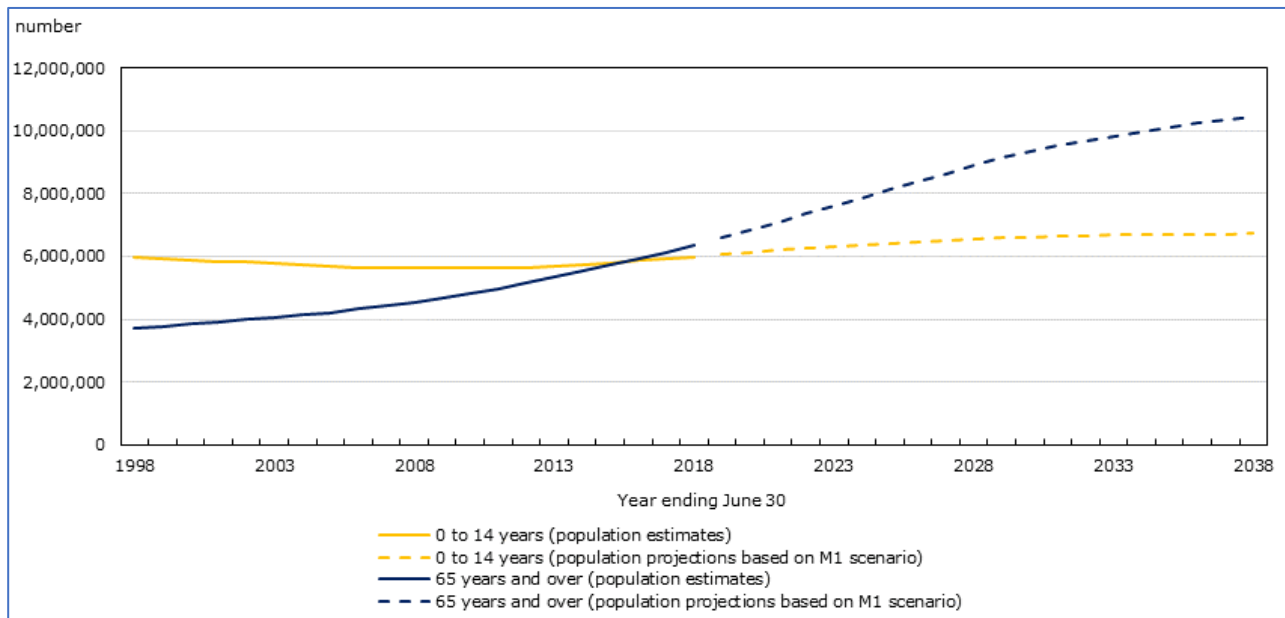
**Aging Canadians:** The Canadian population is aging. In 2017, the number of Canadians over the age of 65 outnumbered those under the age of 14. This trend is expected to continue over the next 20 years and beyond. In fact, the number of people aged 65 or older is projected to grow from a rate of 16.1 percent in 2015 to over 24 per cent by 2035, while the population under age 14 will stay stable at 15 percent to 16 percent of the population. Among those over the age of 65, almost one in two people is a baby boomer and this age group will continue to grow faster, with the last of the baby boomer generation turning 65 in 2031.<sup>110</sup> Figure 6 presents the distribution of senior and youth population.

<sup>110</sup> Annual Demographic Estimates: Canada, Provinces and Territories, 2018 Analysis: Population by age and sex. Statistics Canada at <https://www150.statcan.gc.ca/n1/pub/91-215-x/2018002/sec2-eng.htm>





Figure 6: Distribution of Senior and Youth Population to 2038



Source: Annual Demographic Estimates: Canada, Provinces and Territories, 2018 Analysis: Population by age and sex. Statistics Canada at <https://www150.statcan.gc.ca/n1/pub/91-215-x/2018002/sec2-eng.htm>

**Smaller Families and More Single Person Households:** Since the 1960s, Canada has experienced a declining birth rate. In the late 1950s, the average number of children born was 3.94 per household. The rate then began to decrease hitting a historic low of 1.49 births per woman in 2000, and recovered slightly to 1.68 in 2008. Not only are women having fewer children, but they are having them later in life.<sup>111</sup>

In addition, there are more people choosing to remain single. In 2016, Statistics Canada census revealed that the number of one-person households surpassed all other types of living situations for the first time in Canada's history. As shown in Figure 7, the

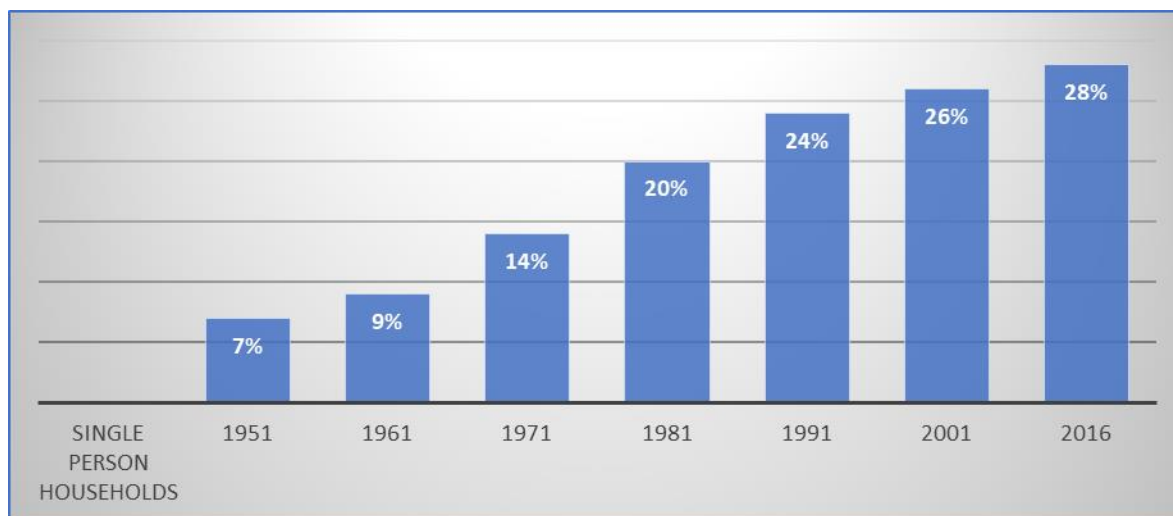
<sup>111</sup> André Léonard, Canada's Aging Population and Public Policy: 1. Statistical Overview, Publication no. 2011-63-E, Parliamentary Information and Research Service, Library of Parliament, Ottawa



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percentage of one-person households has steadily increased from 7 percent in 1950 to 28.2 percent in 2016.<sup>112</sup> Interestingly in 2016, more men aged 35 to 64 were living alone than women living alone in the same age group, whereas more senior women were living alone than senior men at almost a 2:1 ratio.<sup>113</sup> This has resulted in single person households relying on ready-made and frozen meals that serve one or two people. There is less interest in preparing meals from scratch for only one person.

*Figure 7: Percentage Change in Single Person Households (1995-2016)*



Source: *The shift to smaller households over the past century.* Statistics Canada.

<http://www.statcan.gc.ca/pub/11-630-x/11-630-x2015008-eng.htm>

**More Women in the Workforce** - Since the mid-1970s, the number of women entering the workforce has steadily increased, with almost half (47 percent) of the workforce made up

<sup>112</sup> Highlights of Statistics Canada's latest 2016 census release. August 2, 2017. CBC news at <http://www.cbc.ca/news/politics/census-family-language-highlights-1.4231841>

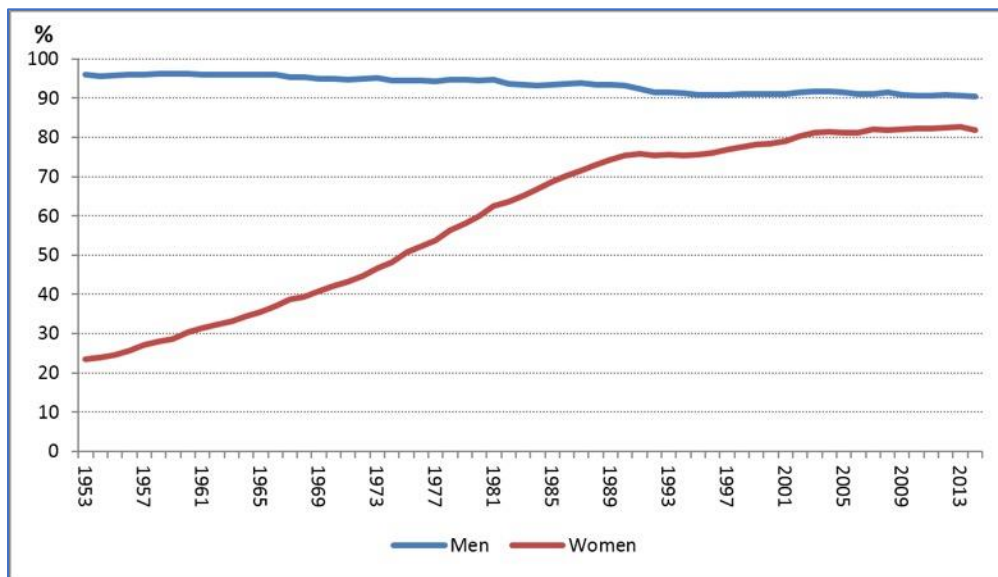
<sup>113</sup> Insights on Canadian Society: Living alone in Canada. March 2019. Statistics Canada at <https://www150.statcan.gc.ca/n1/pub/75-006-x/2019001/article/00003-eng.htm>



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of women by 2014, compared with 37 percent in 1976.<sup>114</sup> The number of women with families entering the workforce has significantly increased, with the number of dual income families almost doubling in the last 40 years, from 36 percent in 1976 to 69 percent in 2015.<sup>115</sup> As a result, the labour force participation rate of women reached 82 percent in 2014, compared with 91 percent for men - see Figure 8. This has put pressure on families to deliver fast and convenient meals.

*Figure 8: Labour force participation rates of men and women aged 25 to 54, 1953 to 2014*



Source: *The surge of women in the workforce*. 2018-05-17. Statistics Canada at <https://www150.statcan.gc.ca/n1/pub/11-630-x/11-630-x2015009-eng.htm>

### 3.5.2 Generational Trends and Relationships to Solid Waste

There are five generational groupings that are characterized by distinct ages, as follows:

<sup>114</sup> Women in the Workforce – Canada: Quick Take. May 28, 2019. Catalyst at <https://www.catalyst.org/research/women-in-the-workforce-canada/>

<sup>115</sup> The rise of the dual-earner family with children. May 30th, 2016. Statistics Canada at <http://www.statcan.gc.ca/pub/11-630-x/11-630-x2016005-eng.htm>



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- Generation Z – born 2001 and later;
- Millennials – born 1981 to 2000;
- Generation X – born 1966 to 1980;
- Baby Boomers – born 1946 to 1965; and
- Pre-Boomers – born before 1946.

Two of the demographic groups, “Millennials” and “Baby Boomers” represent over half (54 percent) of the total Canadian population, at about 27 percent each of all Canadians see Table 7: Generations in Canada.<sup>116</sup> Over time, the size of the Millennial group will increase as a result of immigration, while the Boomer generation will decline as a result of mortality.

*Table 7: Generations in Canada*

|                               | Millennials | Generation X | Baby Boomers | Pre-Boomers  |
|-------------------------------|-------------|--------------|--------------|--------------|
| <b>Born</b>                   | 1981-2000   | 1966-1980    | 1946-1965    | Before 1946  |
| <b>Aged in 2018</b>           | 18-37       | 38-52        | 53-72        | 73 and older |
| <b>Population in 2015</b>     | 9.5 million | 7.2 million  | 9.5 million  | 3.9 million  |
| <b>% Population 2015</b>      | 27%         | 20%          | 27%          | 11%          |
| <b>% of Labour Force 2015</b> | 37%         | 31%          | 30%          | 1%           |

Millennials are the most educated generation and have achieved higher household incomes than Generation Xers or Baby Boomers when they were the same age. At the

<sup>116</sup> Consumer Corner – Millennials Who Are They and what do they like when it comes to food?. November 2016. Alberta Government at <https://open.alberta.ca/publications/consumer-corner>



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same time, Millennials carry a much higher debt to income ratio (216 percent) than Generation Xers (125 percent).<sup>117</sup> Yet, despite assuming high debt ratios, Millennials are also breaking with the traditional ways society has worked in the past and are establishing their lives with little regard for traditional conventions and norms. In fact, in a recent poll, 92.1 percent of Millennials believe that “working for a responsible company is so important that it has become one of the criteria considered when applying for the right job” and more than 50 percent of respondents stated that they would be willing to make 20 percent less in salary to work for a company that makes corporate social and environmental responsibility efforts.<sup>118</sup>

Attitudes towards material consumption patterns of the younger Millennials and Generation Z groups are changing. “The younger Millennials (along with Generation Z) are incredibly environmentally conscious and they look at every brand and every product in terms of what is the impact on society, but also what is the impact on the employees and the environment.”<sup>119</sup> This is creating a dilemma for the fast fashion industry, which targets young shoppers on a budget but wanting the newest fashion. A more environmentally concerned generation may be turning away from fast fashion as demonstrated by the recent announcement of bankruptcy by the fast fashion retailer – Forever 21.<sup>120</sup>

Millennials, along with Generation Z, are more environmentally conscious and willing to buy second-hand clothing, attend swaps and say no to single-use plastics.<sup>121</sup> Those aged 18 to 24 are far more involved in trading or renting goods and trade/swap/rent an average

<sup>117</sup> Economic well-being across generations of young Canadians: Are millennials better or worse off? Statistics Canada at <https://www150.statcan.gc.ca/n1/daily-quotidien/190418/dq190418c-eng.htm>

<sup>118</sup> Why Millennials Choose CSR. August 16, 2017. Morning Future at <https://www.morningfuture.com/en/article/2017/08/16/millennials-csr-companies-responsible/60/>

<sup>119</sup> Thrifting is losing its stigma: second-hand clothes are sustainable — and cool. November 19, 2019. CBC at <https://www.cbc.ca/news/business/used-clothing-boom-ecofriendly-1.5356675>

<sup>120</sup> Forever 21 closing stores in bankruptcy filing shows limits to fast fashion, author says. September 30, 2019. PRI at <https://www.pri.org/stories/2019-09-30/forever-21-closing-stores-bankruptcy-filing-shows-limits-fast-fashion-author-says>

<sup>121</sup> Thrifting is losing its stigma: second-hand clothes are sustainable — and cool. November 19, 2019. CBC at <https://www.cbc.ca/news/business/used-clothing-boom-ecofriendly-1.5356675>



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30 goods per year, compared to 65 and over age groups who trade/swap/rent just 6 items on average per year.<sup>122</sup>

One topic that does not appear to show any generational differences is single-use plastics. A poll recently conducted by Nanos showed resounding support by all age groups for a Canadian ban on single-use plastics. The poll showed that respondents aged 18-38 (Generation Z and Millennials) were 76.3 percent supporting or somewhat supporting a SUP ban, with 82.7 percent of respondents aged 35-54 (Generation X) supporting a ban, and 83.7 percent of respondents over the age of 55 (Baby Boomers) also supporting a ban.<sup>123</sup>

In terms of food, the Generation Z group has greater interest in organic and sustainable food sources, and it is suggested that as Generation Z ages into adulthood, the food and beverage industry should expect a greater emphasis on safety, elevated demand for organic products, and heightened interest in not just a product's attributes, but how it was made and by whom. The population's concerns about clean air and mitigating climate change will mean a company's sustainability practices and positions on environmental legislation and regulations will come under greater scrutiny. That said, according to UK WRAP, people between the ages 18 – 34 (Generation Z and Millennials) waste more food than any other age group; in fact, WRAP found that those aged 18–34 generated nearly 50 percent more food waste than those aged 65 and over.

Furthermore, Millennials are snackers, averaging 4 snacks per day, and prefer individually packaged goods. They are more inclined to go out to eat, order meals in or pick up ready-to-make meals and avoid cooking. As a result, it is predicted that over time

<sup>122</sup> Changing Values in Canada's Economy: the 5th Annual Kijiji Second Hand Economy Index. 2019. Kijiji at [https://www.kijiji.ca/kijijicentral/app/uploads/2019/10/Kijiji-Index-Report-2019\\_EN\\_final\\_pages-2\\_compressed.pdf](https://www.kijiji.ca/kijijicentral/app/uploads/2019/10/Kijiji-Index-Report-2019_EN_final_pages-2_compressed.pdf)

<sup>123</sup> Most Canadians support ban on single-use plastics and are willing to pay at least 1% more for sustainable everyday items National survey released July, 2019. Nanos survey conducted for the Globe and Mail at <https://www.nanos.co/wp-content/uploads/2019/07/2019-1464-Globe-June-Plastics-w-Tabs.pdf>





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10 to 30 per cent of meals will be hand-delivered rather than cooked at home. Many of these families are two-worker families with less time to shop and cook.<sup>124</sup>

The Millennials, however, have the poorest recycling habits based on “convenience recycling” according to a survey conducted in June 2016 for Multi-Materials B.C. (MMBC). The study found that Millennials are the worst at referring to MMBC's recycling guide to determine what can be recycled and are most likely to “over-recycle” or “wishcycle” materials they simply assume are recyclable or want to be recyclable.<sup>125</sup>

The way in which the different age groups look for information varies considerably:

- Generation Z and Millennials:
  - do not tend to read or watch television, preferring to stream programs on their cell phones and computers;
  - are constantly with their cell phones, even sleeping with them;
  - prefer to text messages rather than talk on the phone; and
  - have a shorter attention span when it comes to reading information and search for information on-line.
- Generation X:
  - are comfortable with computers and the internet;
  - rely on the internet to find information; and
  - do not rely on traditional media, e.g. print media, for information, but still watch shows on a television.
- Boomers:

<sup>124</sup> How Demographics and Technology Explain the Evolving Tonne. Dec/Jan 2017. Solid Waste and Recycling Magazine

<sup>125</sup> Vancouver millennials not great recyclers, study finds: Many millennials engage in 'convenience recycling,' Multi-Materials B.C. study finds. September 16, 2016. CBC at <https://www.cbc.ca/news/canada/british-columbia/vancouver-recycling-mmhc-1.3780022>



- rely on traditional sources of media to get information, e.g. newspapers, television, radio, magazines; and
- not as comfortable with computers and the internet as the other age groups.

## 4 Consumer Trends and Their Impacts on Waste

Related to demographics, changes in attitudes and lifestyles are having a significant impact on the types and quantities of waste generated. The following sections explore some of the recent consumer trends and resulting changes in waste quantities and composition.

### 4.1 Demand for Convenience

As lifestyles grow busier and demographics change, there is an increased demand for convenience, which has caused changes in how people access and consume goods. The following sections provide an overview of how our lifestyles, including choice of food, have changed.

#### 4.1.1 Lifestyles and Convenience

In the 21<sup>st</sup> century, Canadian society is governed by fast food, fast technology and fast lifestyles driven by convenience, resulting in a throw-away society, characterized by:

- Increasing access to technology that makes us dependent on needing the newest and best, resulting in the disposal of electronic goods on a regular basis;
- Increasing access to cheap and convenient food that encourages wasteful habits and increasing amounts of wasted food and packaging, especially single-use plastics; and
- Increasing access to cheap goods, such as clothing – referred to as fast fashion – that are designed to wear-out or break-down over a short period of time, requiring replacement rather than repair.

Our throw-away society is characterized by a high turnover in consumer products such as toys and consumer electronics, and the notion of “planned obsolescence”, which has



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resulted in the production of less-durable or non-durable consumer goods. Market demand, market competition, low cost and trend factors result in high household turnover of many items, most of which have no real potential for repair or reuse, e.g., plastic toys, mobile phones. The household waste stream reflects society's increasing consumption of goods that are designed to wear-out or break-down over a short period of time, requiring replacement rather than repair.

Many products are over-packaged to protect the goods from harm or theft. These packaging materials e.g. bubble wrap, polystyrene pellets and wraps, plastic bubble packaging, multi-layer packaging, are tossed into the garbage as soon as the package is opened, further contributing to the throw-away society.

One of the most conspicuous examples is clothing, which has been coined "fast fashion". Fast fashion is defined as "inexpensive clothing produced rapidly by mass-market retailers in response to the latest trends" by the Oxford Dictionary. A recent study conducted in Metro Vancouver reported "Clothing is one of the fastest growing waste streams due to rapidly changing fashion trend cycles and low prices, leading to increased clothing consumption and disposal. Approximately 20,000 tonnes of clothing waste is disposed annually in Metro Vancouver, despite local options to swap, sell or donate unwanted clothing. Metro Vancouver residents throw out an average of 8 kg of clothing per person per year, equivalent to the weight of 44 t-shirts per person per year."<sup>126</sup> While Canadian households donate about 15 percent of textiles to charities, the remainder ends up in landfills.<sup>127</sup>

According to the U.S. EPA, over the past 20 years the amount of clothing that the average American tosses out each year has doubled from 7 million to 14 million tons, or an astounding 80 pounds (36 kg) per person.

<sup>126</sup> Metro Vancouver Regional District. Zero Waste Committee Regular Meeting Friday, February 8, 2019 at [http://www.metrovancouver.org/boards/ZeroWaste/ZWA\\_2019-Feb-8\\_AGE.pdf](http://www.metrovancouver.org/boards/ZeroWaste/ZWA_2019-Feb-8_AGE.pdf)

<sup>127</sup> Sabine Weber, Combating Textile Waste, August 2016. Corporate Knights at <http://www.corporateknights.com/channels/waste/combating-textile-waste-14709816/>



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The Ontario Textile Diversion Collaborative states that Canadians buy 400 percent more clothing today than 20 years ago, and yet, we keep our clothes for half as long.<sup>128</sup> And while some Canadian sources, e.g. Recycling Council of Ontario, cite similar disposal statistics of estimated 81 pounds (37 kg) of textiles discarded by Canadians every year, other studies suggest otherwise. For example, a report prepared by the Resource Productivity and Recovery Authority (RPRA) suggests “Studies indicate that every Canadian consumer produces 66 to 88 pounds (30 to 39 kg) of textile waste per year.”<sup>129</sup>

The EPA estimates that diverting “fast fashion” items from disposal would be the environmental equivalent of taking 7.3 million cars and their carbon dioxide emissions off the road.<sup>130</sup>

Along with an increase in the amount of textiles in the residential waste stream over the years, there has been a similar increase of other “fast goods” such as toys, electronics, furniture – all part of our throw-away society. As consumer spending has increased, so too has the generation of municipal solid waste (MSW). According to the U.S. EPA, “Over the years, the change in the amount of MSW generated has typically imitated trends in how much money American households spend on goods and services. Personal Consumer Expenditures (PCE) measures U.S. household spending on goods and services such as food, clothing, vehicles, and recreation services”.<sup>131</sup> Since 1960, as household spending on consumer goods and services has increased, the MSW generation rate has also increased, although as the EPA points out, not at the same rate, as shown in Figure 9.

<sup>128</sup> Responsibly Reuse and Recycle your Clothing. September 14<sup>th</sup>, 2019. Ontario Textile Diversion Collaborative at <https://fashiontakesaction.com/responsibly-reuse-recycle-your-clothes/>

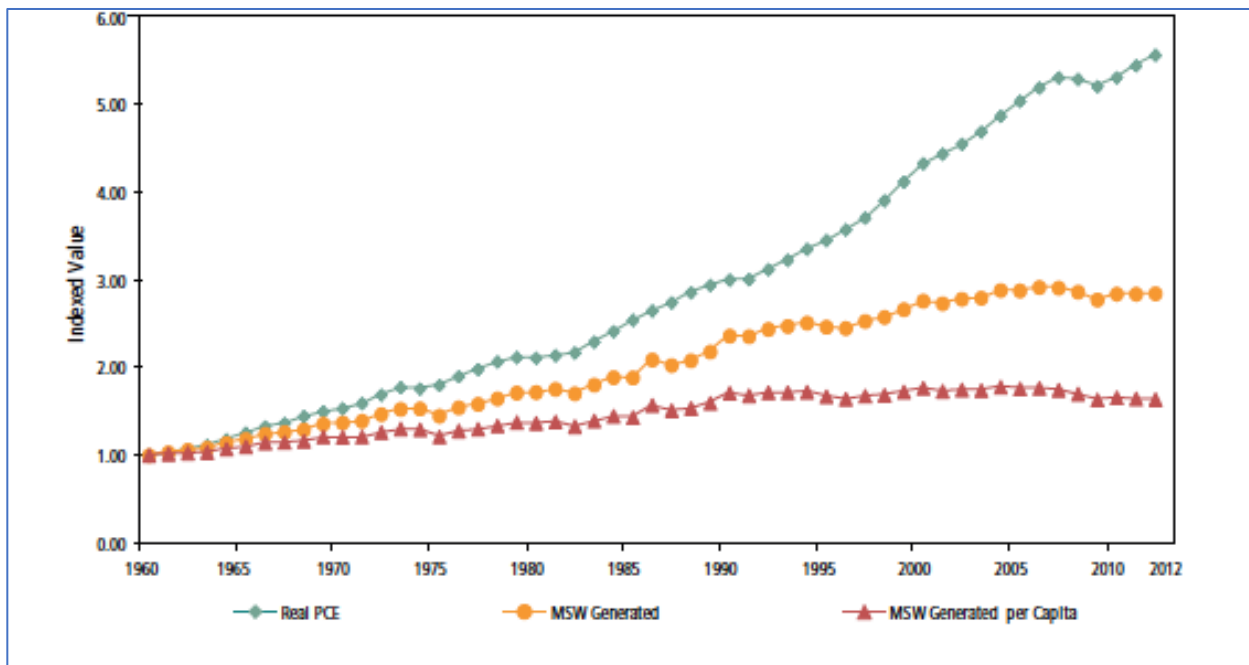
<sup>129</sup> City of Markham Textile Recycling Program. No Date. RPRA at <https://rpri.ca/wp-content/uploads/IPAC-Awards-Backgrounder-Markham.pdf>

<sup>130</sup> Fast Fashion Is Creating an Environmental Crisis. September 9, 2016. Newsweek. At [Newsweek.com/2016/09/09/old-clothes-fashion-waste-crisis-494824.html](https://www.newsweek.com/2016/09/09/old-clothes-fashion-waste-crisis-494824.html)

<sup>131</sup> Source of data: Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2012. U.S.EPA



Figure 9: Indexed MSW Generated and Real Personal Consumer Expenditures (PCE) over Time (1960-2012) in the U.S.



Source of data: *Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2012*. U.S.EPA

The demand for convenience is also shaping our lifestyles as fewer people cook at home, and more people rely on eating out, heating up ready-to-go meals at home or ordering in. New mobile apps allow people the convenience of ordering meals that are delivered directly to their door. The growth of this industry is staggering, with mobile ordering projected to be a \$38 billion industry by 2020 in North America.<sup>132</sup> This trend is resulting in new condo buildings being constructed without units having fully equipped kitchens – no

<sup>132</sup> Latest in Real Estate. June 2019. TO Blog at [blogto.com/real-estate-toronto/2019/06/toronto-newest-condo-buildings-doesnt-have-ovens/](http://blogto.com/real-estate-toronto/2019/06/toronto-newest-condo-buildings-doesnt-have-ovens/)



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oven, just a microwave, as in the case of a new 150-unit condo constructed in Toronto that is providing only convection microwaves instead of ovens.

#### 4.1.2 Demand for Convenient Food

Over the past decade, there has been an increase in the amount of food waste generated, especially wasted food, and the associated food packaging from single serving packaging and ready-to-go meals. The demand has, in part, been attributed to an increase in one-person households and dual working households, which demand easier to prepare and pre-prepared meals.<sup>133</sup>

The growth of smaller families and single person households are important trends in urban centres. This is resulting in a greater demand for convenience food and packaging, featuring customized products and fresh prepared take-home meals.

The growth of single person households and increased demands on family time is resulting in “make-it-for-me” food experiences featuring customized products and fresh prepared ready-to-go meals. People want to spend less time on food preparation and want the convenience of easy-to-prepare meals.

Older people also want convenient meals that are easy-to-prepare, take-home foods and delivered meals. Food packaging needs to be easy to read, easy to open and available in single or double serving sizes.

According to a study of Canada’s food service industry, Home Meal Replacement (HMR) has been gaining market share and “has been one of the better performing restaurant segments of the Canadian foodservice industry over the past five years” showing an annual 1 percent increase in customer traffic, translating to an 8 percent increase in sales. Grocery stores are meeting increased HMR demand by offering take-home meals, and as a result, have gained 50 percent of the HMR traffic.<sup>134</sup>

<sup>133</sup> Consumer Trend Report: Convenience. Market Analysis Report. June 2010. Government of Canada at [http://windmillwebworks.sytes.net/canadianswine/newsitems/Canada%20Consumer%20Report\\_EN.pdf](http://windmillwebworks.sytes.net/canadianswine/newsitems/Canada%20Consumer%20Report_EN.pdf)

<sup>134</sup> GE Capital. (2015). 2015 Canadian Chain Restaurant Industry Review. GE Capital.





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As a result, there has been a growing demand for new types of food packaging characterized by:

- Shrink wrapped products;
- Pre-prepared salads, vegetables and fruits in plastic film and polystyrene packaging;
- More plastic containers for ready-made meals;
- Re-sealable plastics packages; and
- Single serve and smaller portion packaging, typically in plastic pouches and laminate packaging.

There are also generational and gender differences in the way in which food is consumed. A recent cross-Canada study, conducted in 2017 by a group of professors at Dalhousie University, reports that:

- Women, people with less income, and high school graduates are more likely to skip meals;
- People in Ontario are more likely to get take-out or eat at a restaurant for breakfast compared to other Canadians;
- Generation X are weekend cooks, more so than other generations;
- Generation Z want to cook more, but are eating at restaurants more often; and
- The majority of respondents (41 percent) buy their dinner (ready-to-eat) or go out to a restaurant one to two times weekly.<sup>135</sup>

When asked about the availability of time to prepare meals during the week, 54 percent of Generation Z responded with a lack of time, compared to 34 percent of Millennials, 20 percent of Generation X and 12 percent of Baby Boomers. In the case of Millennials, less

<sup>135</sup> Disintegration of food habits: A look at the socioeconomics of food, the blurring lines between traditional meals and out-of-household food consumption. May 2017. Dr. Sylvain Charlebois, Faculty of Management, Dr. Simon Somogyi, Faculty of Agriculture and Dr. Sara Kirk, Faculty of Health Professions, University of Dalhousie at <https://www.dal.ca/content/dam/dalhousie/pdf/management/News/News%20&%20Events/MealManagementPreliminaryResultsMay18English.pdf>



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time is available to prepare meals or eat at home due to work/life; therefore, convenience is a big factor in food purchases, which is reflected in higher purchases of frozen meals and other easy-to-prepare products. Millennials are also spending more of their food budget, with 44 percent of their food budget spent on dining out.<sup>136</sup> Food that is not eaten is typically wasted at the restaurant or fast food establishment or it may be taken home and left in the fridge and forgotten. According to a U.S. report, restaurant diners leave 17 percent of their meals uneaten and leave, on average, 55 percent of edible leftovers on their plate.<sup>137</sup>

[One report](#) determined that advertising has been found to play an important role in increasing the demand for fast foods, such that a 1 percent increase in fast food advertising was found to increase demand 0.25 percent.<sup>138</sup>

The need for convenience has resulted in growing demand for on-line food shopping in Canada, but at a slower rate than other countries. “Despite having greater access to the internet, Canadians are relatively slow to adopt on-line purchasing, especially in food and beverage categories. The main reason for this situation is attributed to lack of a well-developed e-commerce landscape in Canada.” Still, Canadians have begun to purchase liquor, wine, food/groceries on-line and this is expected to continue to grow by over 50 percent for liquor, 44 percent for wine and 37 percent for food/groceries. The top retailers that sell groceries on-line include Amazon, Walmart, Costco Wholesale, Well.ca and Longo Brothers Fruit Market.<sup>139</sup>

In addition, more Canadians are eating out. In a 2016 [General Social Survey](#) conducted by Statistics Canada, most survey respondents (93 percent) indicated that they eat out at least once a week with 54 percent eating out more than once a week and 39 percent

<sup>136</sup> Consumer Corner – Millennials Who Are They and what do they like when it comes to food?. November 2016. Alberta Government at <https://open.alberta.ca/publications/consumer-corner>

<sup>137</sup> Wasted: How America Is Losing Up To 40 Percent Of Its Food From Farm To Fork To Landfill. 2017. Natural Resources Defense Council

<sup>138</sup> U.S. Households' Demand for Convenience Foods. July 2016. United States Department of Agriculture at <https://www.ers.usda.gov/publications/pub-details/?pubid=80653>

<sup>139</sup> Consumer Corner - E-Commerce Trends Online Consumer. February 2019. Alberta Government at <https://open.alberta.ca/publications/consumer-corner>



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eating out once a week. When asked the main reason for eating out, 40 percent responded that they “eat out for convenience, no time to cook, do not like or know how to cook”.<sup>140</sup>

### 4.2 Increasing Reliance on Plastics

Plastic is ubiquitous in our society and throughout the world. The transition to, and emphasis on, plastic packaging is most notable when Coca-Cola replaced its glass bottle with a plastic bottle in 1978, over 40 years ago. Since then, more and more packaging has transitioned to plastic.

According to the report, European Strategy for Plastics in a Circular Economy, “Over the past 50 years, the role and importance of plastics in our economy has consistently grown. Global production of plastics has increased twentyfold since the 1960s, reaching 322 million tonnes in 2015. It is expected to double again over the next 20 years.”<sup>141</sup> Under this scenario, 20 percent of the world’s fossil fuel will be used to manufacture plastics. Another source claims that “Between 1950 and 2017, some 9.2 billion tonnes of plastic were produced. That is more than a tonne per person alive on Earth today.”<sup>142</sup> Furthermore, the same report states that 56 percent of the plastics ever produced have been produced since the year 2000.

Today, one of the biggest threats comes from single-use plastic packaging that is used once and then discarded. It is estimated that:

- Every year, Canadians throw away over three million tonnes of plastic waste, of which about nine to twelve percent is recycled.
- Roughly one-third of the plastics used in Canada are for single-use or short-lived products and packaging.

<sup>140</sup> Eating Out, How Often and Why, January 10, 2019. Statistics Canada at <https://www150.statcan.gc.ca/n1/en/catalogue/11-627-M2019003>

<sup>141</sup> A European Strategy for Plastics in a Circular Economy. January 16, 2016 at <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1516265440535&uri=COM:2018:28:FIN>

<sup>142</sup> The Plastic Atlas 2019. November 2019. Heinrich Böll Foundation, Berlin, Germany, and Break Free From Plastic at <https://www.boell.de/en/plasticatlas>



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- Up to 15 billion plastic bags are used every year and close to 57 million straws are used daily.<sup>143</sup>

In the summer of 2019, the City of Victoria, B.C. conducted a waste audit of public space garbage and found that 30 percent comprised of single-use items and packaging. The audit identified that 13,000 single-use cups and more than 12,000 takeout containers and straws were collected in the bins each day.<sup>144</sup>

As these and other plastics begin to break-down, they form microplastics which can travel in the air, on land and in waterways undetected until they become unintentionally part of our food chain by entering animal and human digestive systems. In an interview with the lead author of a [study](#), conducted at the University of Victoria, B.C., that looks at the amount microplastic particles in commonly consumed foods in relation to their recommended daily intake, “At just under five millimetres in diameter, or smaller than the size of a sesame seed, microplastics are tiny pieces of plastic that come from the degradation of larger plastic products or the shedding of particles from water bottles, plastic packaging and synthetic clothes. Our research suggests microplastics will continue to be found in the majority—if not all— items intended for human consumption.”<sup>145</sup>

### 4.3 On-line Shopping

Canadians are considered one of the most technologically connected populations in the world, with almost 90 percent of Canadians having access to the internet in 2016.

In the past, Canada lagged behind the United States and other countries in making purchases on-line, but that is changing with the value of all on-line purchases in 2016 of CAD \$24 billion, with a growth rate of 27.4 per cent since 2012. In 2017, the average total

<sup>143</sup> June 10, 2019 ECCC press release at <https://pm.gc.ca/en/news/news-releases/2019/06/10/canada-ban-harmful-single-use-plastics-and-hold-companies-responsible>

<sup>144</sup> Victoria city staff recommends further limiting of single-use plastics. November 6, 2019. [vancouverisland.ctvnews.ca/victoria-city-staff-recommends-further-limiting-of-single-use-plastics-1.4673460](https://vancouverisland.ctvnews.ca/victoria-city-staff-recommends-further-limiting-of-single-use-plastics-1.4673460)

<sup>145</sup> Humans unknowingly consume a lot of microplastics. June 5, 2019. University of Victoria. At <https://www.uvic.ca/news/topics/2019+microplastics-consumption-kierancox+media-release>



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on-line purchase value was about CAD \$600 per internet user.<sup>146</sup> By the end of 2019, it is projected that Canadians will spend about \$40 billion on on-line shopping, accounting for 9.5 percent of all retail transactions. This represents almost a doubling in on-line sales since 2015.<sup>147</sup>

A KPMG study reports that on average, North Americans purchased 19 on-line items in 2017, with Generation Xers completing more on-line purchases than Millennials or Baby Boomers. “Interestingly, despite the common belief that the upswing in on-line shopping is largely driven by the younger and more ‘tech-savvy’ Millennials, Generation X consumers in fact made 20 percent more purchases last year than their younger counterparts. Stage of life and income levels are certainly primary factors driving both on-line and offline shopping, and Generation X consumers, many of which are more established in their careers and building homes and families, are likely buying more consumer goods.”<sup>148</sup>

The KPMG report also identified the top six on-line purchases made by Canadians in 2017: books and music, electronics/computers/laptops, women’s apparel and accessories, men’s apparel, household goods and toys/games/video games.

In Canada, the main drivers behind on-line purchases are:

- Greater variety and selection of goods and services across different retailers;
- Convenience;
- Time saving and the ability to shop anywhere and anytime;
- Ability to see and compare prices on a wide selection of goods and services across different retailers; and

<sup>146</sup> Consumer Corner - E-Commerce Trends Online Consumer. February 2019. Alberta Government at <https://open.alberta.ca/publications/consumer-corner>

<sup>147</sup> 10 Amazing Stats About Online Shopping. 2019. At <https://www.theupsstore.ca/10-amazing-stats-about-on-line-shopping/>

<sup>148</sup> The Truth about On-line Consumers. 2017. KPMG at <https://assets.kpmg/content/dam/kpmg/xx/pdf/2017/01/the-truth-about-on-line-consumers.pdf>





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- Stable and flexible delivery and shipping options. <sup>149</sup>

Compared with other countries, such as China, Canadian consumers prefer using their laptops/desktops over mobile phones and tablets when shopping on-line; consequently, Canadians are seen to be at an early stage of mobile shopping.

As E-commerce or on-line shopping continues to gain an increasing share of the retail market, this has resulted in an increase in cardboard packaging waste.

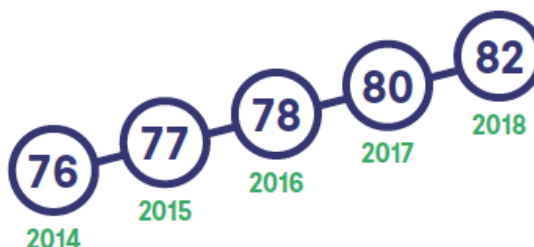
### 4.4 Awareness of/Use of Second-Hand Economy

A 2019 report prepared by Kijiji defines “Second-hand practices or “reuse” as a relatively broad concept that involves extending the lifespan of products by providing them to other individuals for reuse. This can take on a number of different forms: donations, second-hand purchases, exchanges, free sharing, paid sharing, rentals or lending.”<sup>150</sup>

The Kijiji 5th annual report, published in 2019, surveyed almost 6,000 individuals about their second-hand practices and what motivates them to engage in the second-hand economy. According to the Kijiji report, the second-hand economy is thriving and has been growing steadily over the past five years. While financial reasons still motivate people the most to engage in the second-hand economy, there has been an observed increase in other motivation factors such as altruism and environment. Clothing

#### Intensity Index continues to rise

The second-hand economy Intensity Index is the average number of items each Canadian has acquired or disposed of in the second-hand economy during the year. It has risen steadily each year:



Changing Values in Canada's Economy: the 5<sup>th</sup> Annual Kijiji Second Hand Economy Index. 2019.  
Kijiji

<sup>149</sup> Consumer Corner - E-Commerce Trends Online Consumer. February 2019. Alberta Government at <https://open.alberta.ca/publications/consumer-corner>

<sup>150</sup> Changing Values in Canada's Economy: the 5<sup>th</sup> Annual Kijiji Second Hand Economy Index. 2019. Kijiji at [https://www.kijiji.ca/kijijicentral/app/uploads/2019/10/Kijiji-Index-Report-2019\\_EN\\_final\\_pages-2\\_compressed.pdf](https://www.kijiji.ca/kijijicentral/app/uploads/2019/10/Kijiji-Index-Report-2019_EN_final_pages-2_compressed.pdf)





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and accessories, e.g. shoes, scarves, jewelry, were the greatest items traded, representing 30 percent of all traded items. Other interesting points from the report include:

- 82 percent of Canadians participated in second-hand activities at least once in 2018;
- Canadians under the age of 45 participate most in the second-hand economy;
- Women participate more than men in the second-hand economy;
- Over 35 percent of users participating in the second-hand economy have annual incomes of \$80,000 or more; and
- The value of second-hand items that exchanged hands in Canada in 2018 was an estimated \$27.3 billion<sup>151</sup>.

Apart from the second-hand retail stores, there is a thriving second-hand “free” economy characterized by swap exchanges and reuse/repair events. Swap events are free events in which individuals can provide gently used items (clothing, textiles, footwear, accessories) to “swap” for other items. Municipalities may or may not be involved in organizing and/or supporting the event.

In 2017, Toronto established Community Reduce & Reuse Programs. The City provides workshop spaces to encourage repair and reuse of clothing, textiles and bikes. The textile repair workshops help reduce the amount of textiles discarded each year; in fact, approximately two tonnes of textiles have been diverted since the start of the program. Attendees learn how to repair and alter clothing and bikes, in the case of the bike repair workshops. Both workshops provide the attendees with access to the necessary tools, equipment and supplies needed for repair.<sup>152</sup>

Edmonton’s Reuse Centre accepts various items from Edmonton residents free of charge and makes them available to organizations and individuals for reuse. It accepts over 250 items that fall under the following categories: arts & crafts supplies, needle craft supplies, office and school supplies, home décor and media supplies. Organizations and

<sup>151</sup> Changing Values in Canada’s Economy: the 5th Annual Kijiji Second Hand Economy Index. 2019. Kijiji at [https://www.kijiji.ca/kijijicentral/app/uploads/2019/10/Kijiji-Index-Report-2019\\_EN\\_final\\_pages-2\\_compressed.pdf](https://www.kijiji.ca/kijijicentral/app/uploads/2019/10/Kijiji-Index-Report-2019_EN_final_pages-2_compressed.pdf)

<sup>152</sup> Toronto’s Community Reduce & Reuse Programs at <https://www.toronto.ca/services-payments/recycling-organics-garbage/long-term-waste-strategy/waste-reduction/community-reduce-reuse-programs/>



individuals can purchase items at the Reuse Centre for a small fee of \$5 per purchase or \$50 annual membership (non-profit organizations only and limit of 25 trips) and may take as many items as they require. The Reuse Centre is operated mostly by volunteers and diverts on average 20 tonnes of materials per month.<sup>153</sup>

## 5 Trends in Waste Generation

The following sections provide an overview of how a “tonne of goods” has evolved over time, and the challenges and opportunities in marketing some of the materials that are part of the new “tonne of goods”.

### 5.1 The Evolving Tonne

The composition of the waste stream has been changing over the past few decades with some common themes:

- Changes in packaging, as heavier packaging is replaced by lightweight packaging;
- The slow decline of the hard print newspaper and magazine industry as they move to an on-line format; and
- The increase of cardboard packaging as e-commerce continues to grow relative to the retail market share.

Over the past decade, the packaging industry has shifted its packaging from traditional heavier materials, such as glass and steel, to light-weight materials such as multi-layered and plastic packaging. At this time, many of the newer lightweight packaging materials such as flexible plastic pouches and other multi-layer packaging cannot be recycled.

In addition, industry has worked to reduce the weight of packaging (i.e. lightweighting), making it thinner and smaller; for example, the current weight of plastic water bottles has decreased by 50 percent over the past 14 years. Whereas one tonne of PET bottles

<sup>153</sup> City of Edmonton at [http:// https://www.edmonton.ca/programs\\_services/garbage\\_waste/reuse-centre.aspx](http://https://www.edmonton.ca/programs_services/garbage_waste/reuse-centre.aspx)



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contained about 35,000 individual units ten years ago, today one tonne of PET bottles contains about 70,000 units, i.e. double the number of PET bottles.<sup>154</sup>

The 2015 WDO Datacall submissions showed that the amount of Blue Box plastic packaging marketed throughout the province doubled over a period of five years. This observation was attributed to an increase in the variety of plastics accepted in municipal Blue Box programs, but also the increase in plastic packaging in general, which is commonly referred to as the “Evolving Tonne”.<sup>155</sup>

A study conducted in 2015 by Clarissa Morawski, Maria Kelleher and Samantha Millette compared the changes in tonnage of Blue Box materials per household in 13 Canadian and two U.S. communities over a three-year period from 2010 to 2013. The findings showed that each surveyed community had experienced a drop in the weight of its Blue Box program year over year. In fact, “nearly 90 percent of those programs surveyed have recorded recyclable weight declines since 2008 on a per household basis, and in some communities the reductions are quite dramatic.”<sup>156</sup>

The reduction in tonnage and material composition from 2004 to 2017 collected through Ontario’s Blue Box program is visually displayed in Stewardship Ontario’s 2018 Annual Report – see Figure 10 and Figure 11.

<sup>154</sup> The Evolving Ton Explained. May 2015. Resource Recycling at <https://www.cmconsultinginc.com/wp-content/uploads/2015/04/EvolvingTonMayRRFinal.pdf>

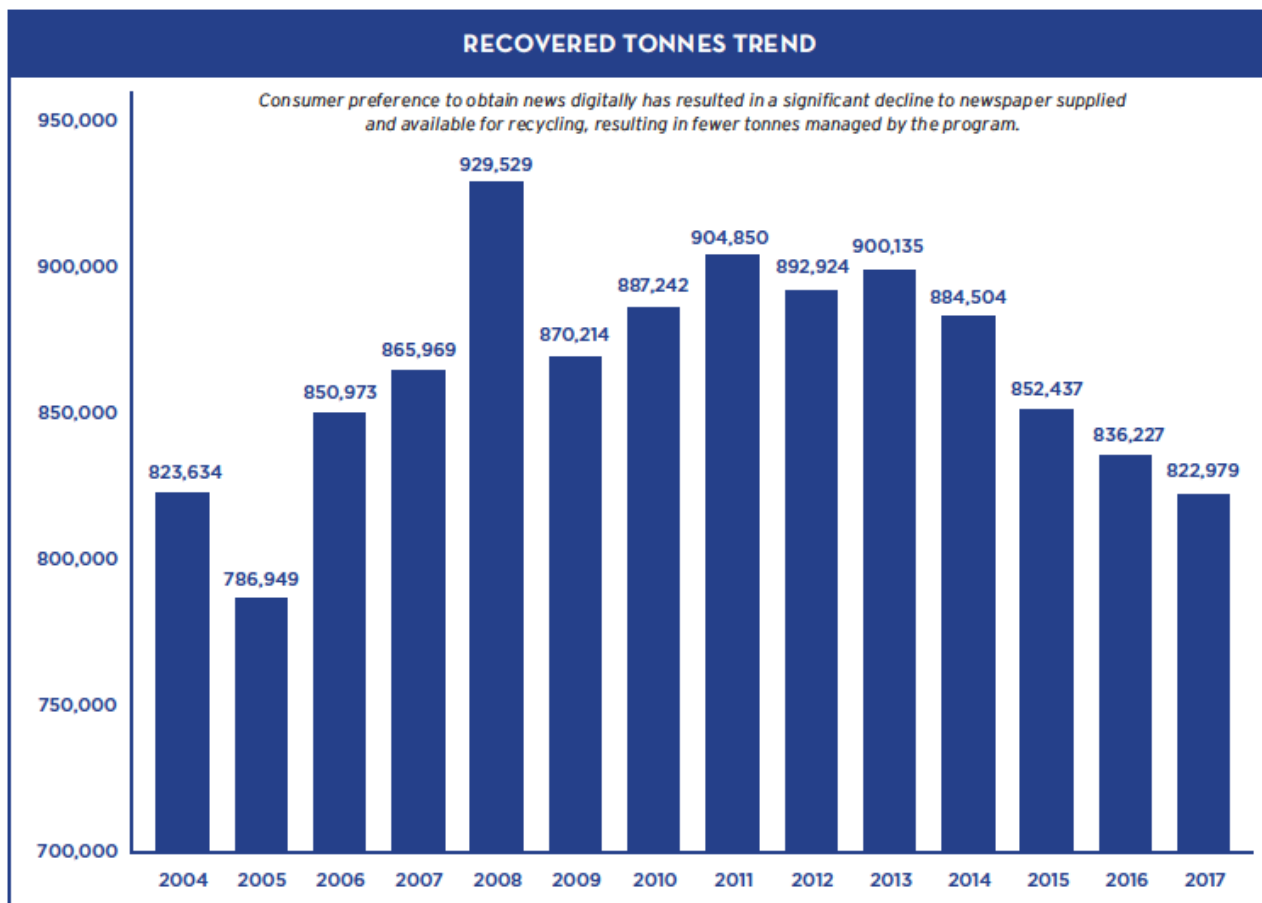
<sup>155</sup> WDO Datacall - December 17, 2015 – Recycling tonnages on the decline while participation increases at <http://208.93.239.103/partners/municipalities/municipal-datacall/>

<sup>156</sup> The Evolving Ton Explained. May 2015. Resource Recycling at <https://www.cmconsultinginc.com/wp-content/uploads/2015/04/EvolvingTonMayRRFinal.pdf>



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Figure 10: Ontario Blue Box Recovered Tonnes 2004 to 2017



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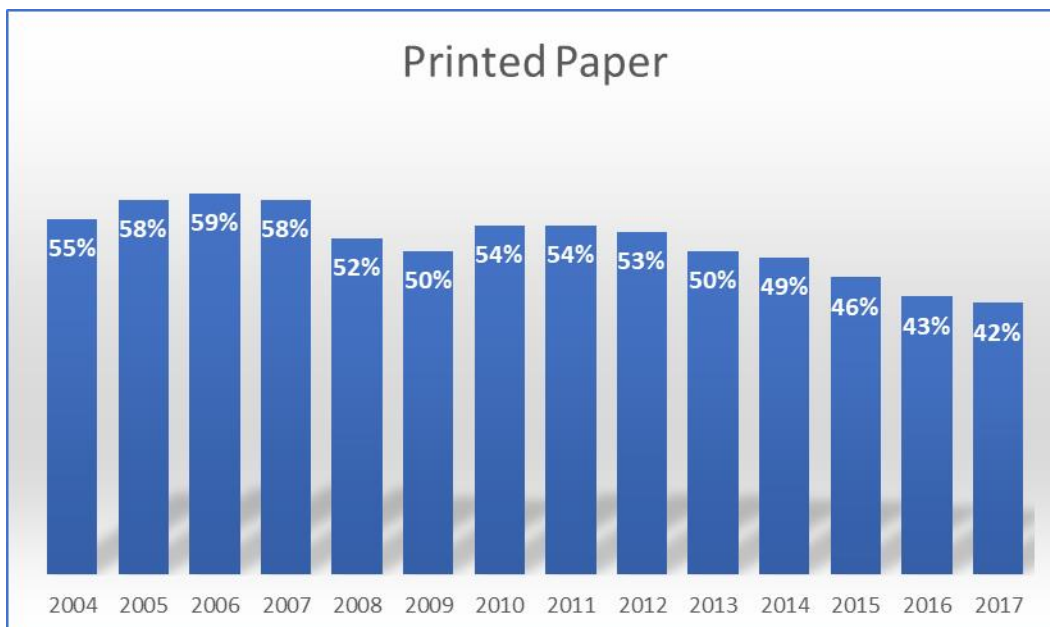
### 5.1.1 Changes in Printed Paper and Packaging

The fibre stream has shown significant fluctuations over the past decade resulting from two key factors: the decline in print media and the increase in cardboard packaging from e-commerce.

The print industry is in decline as people shift to electronic media. This has resulted in a decline in heavy fibres such as newspapers and magazines and the virtual elimination of print directories.

Figure 12 shows the sharp decline in percentage share of printed paper, e.g. newspapers, in the Blue Box stream from representing over half, by weight, of the Blue Box program in the 2004/2005 to about 40 percent, by weight, in 2017.

*Figure 12: Printed Paper Percent Share in Ontario Recycling Stream 2004-2017*



Source: 2108 Stewardship Ontario Annual Report. 2018. Stewardship Ontario at <https://stewardshipontario.ca/wp-content/uploads/2019/06/SO2018.pdf>

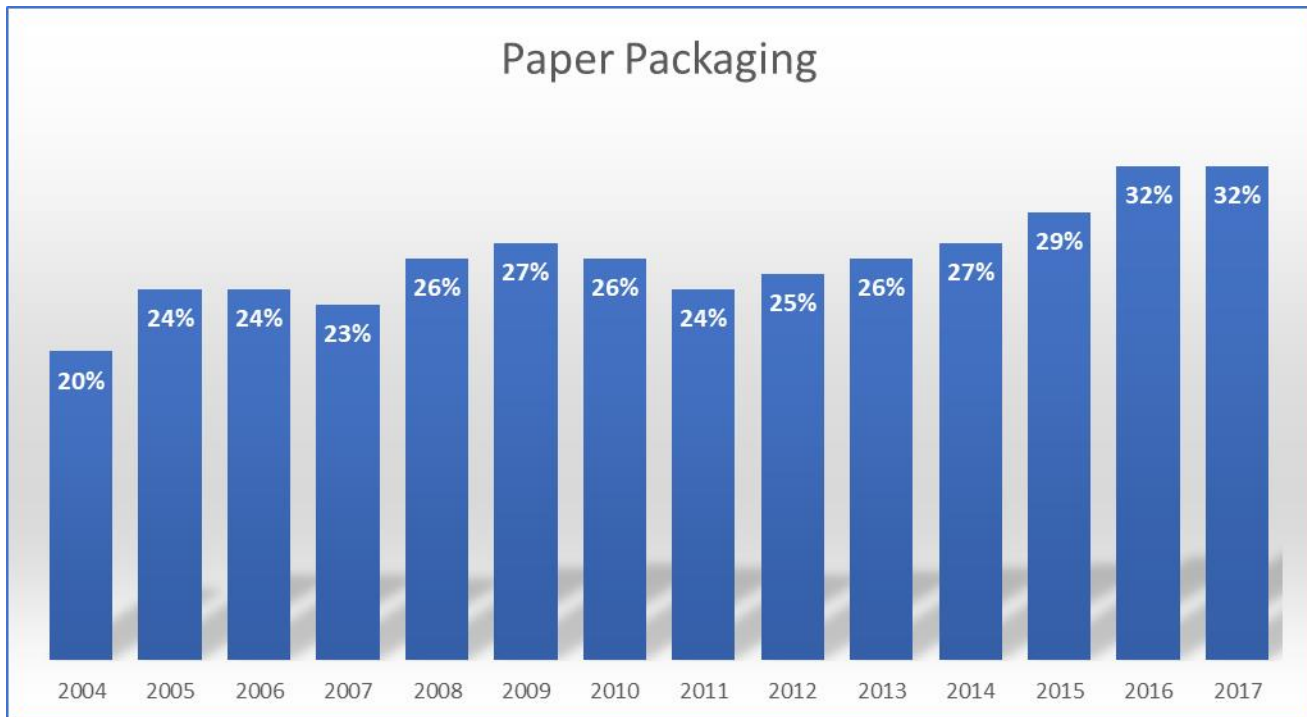




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Due to the significant increase in e-commerce over the years, there has been an increase in paper packaging (consistently predominantly of cardboard). Unlike newspaper, the cardboard portion of the Blue Box has increased steadily from 2004 to 2017, from 20 percent by weight of the Blue Box stream in 2004 to almost 32 percent by weight 2017, as shown in Figure 13.

*Figure 13: Paper Packaging Percent Share in Ontario Recycling Stream 2004-2017*



Source: 2108 Stewardship Ontario Annual Report. 2018. Stewardship Ontario at <https://stewardshipontario.ca/wp-content/uploads/2019/06/SO2018.pdf>.

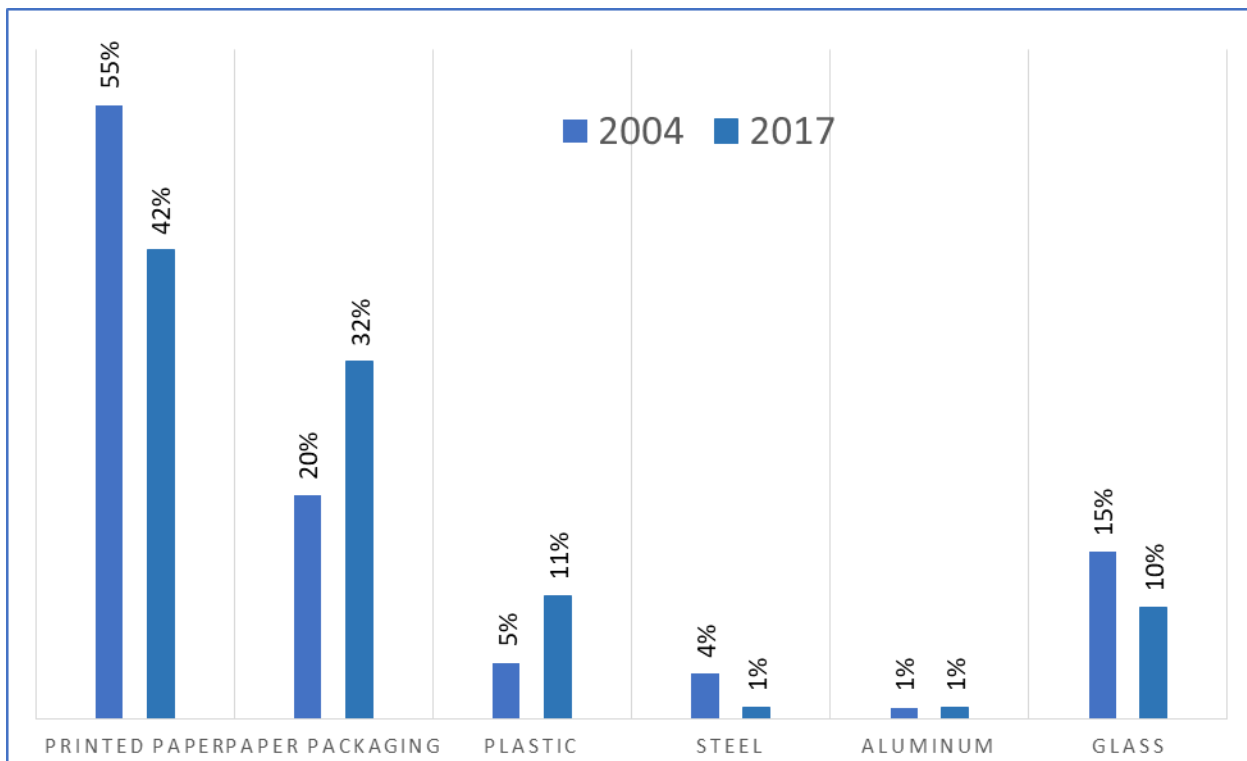
The increase of plastics and lightweight packaging material in the Blue Box program, coupled with the decline of heavier packaging is not only creating a major shift from a tonnage based system to a volume based system, but is also resulting in a greater number of materials that are expensive to recycle, such as plastics, and fewer materials

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Figure 14: The Evolving Tonne of Blue Box Materials – a Comparison from 2004 to 2017 (by weight)



Source: 2108 Stewardship Ontario Annual Report. 2018. Stewardship Ontario at <https://stewardshipontario.ca/wp-content/uploads/2019/06/SO2018.pdf>.

According to a report prepared for the Continuous Improvement Fund in 2014, “Diversion versus Net Cost Analysis for The Ontario Blue Box System”, the projected change to the Blue Box composition over the next decade includes a 40 percent decrease in newspapers by weight, with a 25 percent to 45 percent increase in cardboard, aseptic packaging, gable tops and paper laminates. The study also projected a 20 percent reduction in steel cans and 40 percent reduction in glass, with a 35 percent increase in



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PET and 20 percent increase in plastic laminates by weight.<sup>158</sup> Unless municipalities add new materials to the Blue Box program, the overall weight of materials is estimated to decrease by 7.38 percent (2008 to 2026).<sup>159</sup>

The challenge, as discussed in the section below, is how municipalities can adjust to these changes without losing money and relying on public funds to prop up these instabilities in the recycling system.

### 5.2 Processing Challenges and Changes

Three specific impacts of the evolving Blue Box program on industry's processing operations and bottom line include:

- Much lower collected material density, e.g. 1 cubic metre of recyclables that used to weigh 107 kg now weighs 57 kg, which means that MRFs are processing more and lighter material at the same processing fee;
- Greater shipping costs, since it is estimated to take 140 trucks to deliver Blue Box materials to MRFs that used to only need 100 trucks;
- Increases in residue rates at the MRFs, e.g. one MRF that used to get 20,000 rejects an hour now gets 120,000 rejects per hour<sup>160</sup>.

Much of the packaging associated with ready-made and pre-prepared foods cannot be recycled. Even packaging that should be recycled, such as plastic trays used for ready-to-eat meals, often cannot be recycled due to the simple fact that they are black in colour and cannot be read by most optical sorters against the black conveyor belt.

The processing challenges resulting from the "Evolving Tonne" have been exacerbated by new restrictions imposed by China on the import of recyclable materials for further processing and end market use into the country. In February 2018, China (which had

<sup>158</sup> Diversion Vs Net Cost Analysis for the Ontario Blue Box System. CIF Project #722. August 29, 2014. Prepared by Kelleher Environmental for CIF

<sup>159</sup> Based on a linear trend analysis from 2008 to 2014 with estimated growth 2015 to 2026

<sup>160</sup> Board of Directors Meeting Highlights. January 19, 2017. Bluewater Recycling Association at <https://www.lambtonshores.ca/en/our-government/resources/Documents/BRA-Meeting-Highlights---Jan-19-2017.pdf>



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become the “home” of over 50 percent of some of the most commonly recycled materials around the globe – e.g. paper and plastics) put in place a ban on 24 types of waste materials. The policy bans various plastic, paper and solid waste, including plastics such as PET, PE, PVC and PS. It also set a much tougher standard on the limit of contamination in scrap plastic, paper and metals allowed in shipments into China. In 2018, this increased from 90-95 percent purity to 99.5 percent - a level that very few curbside recycling operators anywhere in the world are able to achieve.

Prior to this new law, China was processing 55 percent of the world’s scrap paper and – as noted above – was the leading destination for other recyclable materials from around the world. For example, the amount of scrap plastic imported into China fell from 3.5 million metric tonnes in 2017 to just 21,300 metric tonnes in the first four months of 2019.<sup>161</sup>

Some speculate that the Chinese National Sword policy will lead to new approaches to recycling and the development of new processing capacity in North America, especially for plastics.<sup>162</sup> For example, in 2019 a number of U.S. companies announced the opening of new processing facilities for recycled plastics. According to one source “the planned projects represent nearly \$400 million in investment across the country. Together, these projects will have the capacity to consume more than 700 million pounds of scrap plastics, including HDPE, LDPE, PP and more. These facilities are being built all over the U.S.”<sup>163</sup> Some of the new projects include:

- PreZero Polymers announced the opening of two U.S. processing plants in 2020 with a mixed rigid recycling facility in South Carolina and a film recycling plant in southern California.

<sup>161</sup> “Should the Chinese National Sword Inspire Global Recycling Innovation?”. Tomra Group Newsletter, May 29, 2019 at <https://recycling.tomra.com/blog/chinese-national-sword-inspire-global-recycling-innovation>

<sup>162</sup> The Power to see the road ahead: 5 trends in Waste Management. 2018. Bank of America /Merrill Lynch at <https://www.bofaml.com/en-us/content/waste-recycling-management-trends.html>

<sup>163</sup> Experts express optimism for paper and plastic markets. July 9, 2019. Resource Recycling at <https://resource-recycling.com/recycling/2019/07/09/experts-express-optimism-for-paper-and-plastic-markets/>



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- Green Impact Plastics, based in Mexico, has developed a system to process post-consumer PET thermoforms and will open a \$7 million plant in late 2020 in the Los Angeles area.
- The Texas-based Avangard Innovative will open three processing sites in 2020 to recover and pelletize plastic film. The new processing facilities will be constructed in Houston, Nevada and Mexico.

New projects have been announced for fibre processing as well, with over \$2.5 billion in announced new and expanded recycled fibre processing capacity in the United States, especially for containerboard and paper bags. Some of the announced projects include:

- McKinley Paper Company will reopen a Port Angeles, Washington paper mill that has been idle for about a year and a half to start producing containerboard.
- Cascades, based in Québec, has announced its acquisition of an idle White Birch newsprint mill in Virginia and will convert the facility from its original purpose to produce newspaper to produce recycled lightweight linerboard and medium, used in containerboard manufacturing.
- ND Paper, the U.S. subsidiary of Nine Dragons, has purchased two U.S. virgin fibre mills and will convert them to recycled pulp production using mixed paper and OCC as the feedstock to produce containerboard.

### 5.3 End Market Challenges and Impact of Bans

With the introduction of the China National Sword, the export of U.S. plastic waste shifted to other Asian countries, including Vietnam, Malaysia and Thailand. When those countries started to ban the imports, they began to show up in Cambodia, Laos, Ghana, Ethiopia, Kenya and Senegal, which had never received these wastes before. More recently, Argentina has changed its definition of waste, which could allow it to accept millions of tonnes of plastic waste imported from the U.S.

In response to the migratory movement of plastic wastes to developing countries, Norway has proposed an amendment to the Basel convention, placing a restriction on developed countries exporting low-quality plastic waste to developing countries without first obtaining





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their explicit consent and ensuring the waste can be appropriately handled. More than 180 countries are party to the Basel convention, which governs the international waste trade.<sup>164</sup> The ruling was passed in May 2019 and under it, “The U.S. and other countries (including Canada) now will not be able to send the plastic waste to developing countries that are part of the Basel convention and are not part of the Organization for Economic Cooperation and Development”<sup>165</sup> The rule will take a year to come into force.

One of the most immediate impacts of the China National Sword in many programs in Ontario (and elsewhere in Canada, the U.S. and Europe) was the imposition of restrictions of materials to be collected at the curb or at drop-off sites. Certain materials that are difficult to process (and are of little value) in the commodity market began to be dropped from residential recycling programs. While local circumstances are different, some of the more common materials being removed include:

- Cartons, including Tetra Paks, milk cartons and other drinking boxes;
- Aluminum foil, pie plates and lasagna trays;
- Aerosol containers;
- Paint Cans;
- Beverage cups, including disposable coffee and cold drink cups; and
- Small items such as individual yogurt and apple sauce containers.

It should be noted that these materials have not been dropped from collection in the Recycle BC program as producers in that province are required to now achieve material specific collection and recycling targets for all obligated and collected packaging and paper products.

Furthermore, recycled plastic end markets are competing with cheap natural gas, which is replacing recycled plastic as feedstock in manufacturing plastic bottles. According to the 2019 [Deloitte report](#), “domestically recycled “secondary” plastics output accounted for

<sup>164</sup> Argentina could become 'sacrificial country' for plastic waste, say activists. November 1, 2019. The Guardian at <https://www.theguardian.com/environment/2019/nov/01/argentina-plastic-waste-dumping-ground-import>

<sup>165</sup> Nearly all Countries agree to stem the flow of plastic waste to poorer countries. May 11, 2019. The UK Guardian at <https://www.theguardian.com/environment/2019/may/10/nearly-all-the-worlds-countries-sign-plastic-waste-deal-except-us>



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approximately CA\$350 million in sales in Canada in 2016. In comparison with the sales of its primary resin competitor, it is 30 times smaller.” Secondary plastics producers enjoy lower upfront investment than their virgin competitors do; however, during periods of low oil prices which bring downward prices for virgin resins, secondary resins producers are more exposed than their virgin counterparts as their cost structure is more labour intensive. This is one reason why many secondary plastics producers ceased operations in 2016 in North America, as oil prices were low.”<sup>166</sup>

Over the past decade, the U.S. plastic marketplace has been flooded with cheap natural gas produced from huge fracking facilities located throughout the country. According to several sources, cheap natural gas is driving plastic production made from raw resources, rather than using recycled plastic resin. One of the largest plastic producers in Europe, Ineos Limited, is investing billions of dollars to import fracked gas from the U.S. as a feedstock in the production of plastic packaging.<sup>167</sup>

Communities that have been hardest hit by the Chinese National Sword are generally characterized as single stream, automated cart recycling programs. These programs tend to have the highest contamination and residue rates, up to 25 percent and over, as in the case of the City of Toronto’s residential curbside recycling program. Those communities that continue to provide a two stream, (fibre and container), recycling program have experienced fewer end market disruptions, due to the cleaner streams and lower contamination rates, as in the case of Ottawa which reports a 3 percent contamination rate.

With poor end markets, many communities in the United States are struggling to keep recycling programs afloat. Price hikes in processing have resulted in some smaller communities cancelling their Blue Box recycling programs, e.g. the City of Surprise, Arizona, or switching from weekly to bi-weekly collection, e.g. the Cities of Phoenix and Tucson, Arizona. Other communities are looking at price hikes and/or reducing program

<sup>166</sup> Economic Study of the Canadian Plastics Industry, Markets and Waste. 2019. Prepared for Environment and Climate Change Canada by Deloitte at <http://publications.gc.ca/site/eng/9.871296/publication.html>

<sup>167</sup> The Plastic Atlas 2019. November 2019. Heinrich Böll Foundation, Berlin, Germany, and Break Free From Plastic at <https://www.boell.de/en/plasticatlas>



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services. For example, officials in the City of Phoenix are examining whether to hike the monthly solid waste rates or to reduce waste diversion program services. Recently, their solid waste management department presented four options at varying costs:

- Maintain current service and increase the monthly waste management fee paid by residents;
- Suspend the City's curbside Green Bin program for yard waste and close the composting facility;
- Switch to biweekly recycling collection; and/or
- Suspend both the curbside recycling and yard waste Green Bin programs.<sup>168</sup>

#### 5.4 Emerging and Sustainable End Markets to Divert Waste

In order for Canada to achieve “Zero Waste” for plastics, it is argued that measures to support the creation of a viable domestic secondary end-market would require product-based quotas or requirements for secondary material content to “create a guaranteed stable domestic demand for secondary materials and subsequently increasing investment in plastics recycling/diversion. This could be thought of as the “first domino” that must be toppled to create cascading impacts on secondary plastics infrastructure investment and use. Certain products (bottles, certain packaging) that do not have difficult performance requirements (flame retardant, food-safe) could use secondary plastics of sufficient purity without significant issue.” Other measures could include implementing a tax or fee on virgin resins to make secondary plastic more economically feasible to manufacturers. However, this could lead to higher consumer prices to the volatility of oil prices and investments in virgin plastic production.<sup>169</sup>

Recognizing this need to invest in the plastic infrastructure, in its 2019 report, [Canada-Wide Action on Zero Plastic Waste](#), 2019, the CCME, indicated, “that industry often needs support to build momentum and achieve a significant economic transition, CCME

<sup>168</sup> Phoenix weighs service cuts, rate hikes, facility closures to sustain recycling. November 13, 2019. Waste Dive at <https://www.wastedive.com/news/phoenix-rate-hike-cut-composting-recycling/567139/>

<sup>169</sup> Economic Study of the Canadian Plastics Industry, Markets and Waste. 2019. Prepared for Environment and Climate Change Canada by Deloitte at <http://publications.gc.ca/site/eng/9.871296/publication.html>



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member jurisdictions will promote the use of incentives. This could include targeted investments for infrastructure and innovation in the areas of plastic design, production and recovery, and/or for transitioning current operations to Circular Economy practices. The Government of Canada will assess infrastructure needs for improved plastic life-cycle management and will work with jurisdictions, industry and funding organizations to identify how they can support access to capital funding. This will be completed by the end of 2020.”<sup>170</sup>

In June 2018, B.C. launched a pilot program to collect stand-up pouches and other flexible plastic packaging, e.g. chip bags, at Recycle BC depots and London Drug stores so they can determine how to best recycle these packages. Beginning January 2019, all Recycle BC depots began collecting the other flexible plastic packaging. Currently, the flexible plastic packaging collected at depots is used as a feedstock for research and development at Merlin Plastics in Delta, B.C., which is running tests to find a viable, stable commercial recycling process for these types of packaging. A portion of the material will be recycled and the remaining material will be recovered and produced into engineered fuel. This includes turning the flexible plastic into energy pellets to be burned as a replacement for coal or diesel at the province's industrial sites, like cement kilns.<sup>171</sup>

Despite Recycle BC's effort to introduce flexible plastic packaging into its Packaging and Paper Product program, it has experienced some setbacks in adding in new materials into its revised five year plan. During its most recent set of Phase two consultations in 2018, Recycle BC requested feedback on its [Revised Packaging and Paper Product Extended Producer Responsibility Plan](#) and summarized in the [Consultation report](#). During the consultations, earlier versions of the plan proposed to broaden the list of materials to include either packaging-like product (e.g. aluminum pie plates, and plastic film sandwich bags sold as product) or single-use plastic items. Some Stewards argued “that the definition of “packaging” as provided in the Environmental Management Act (EMA) does not legally designate either packaging-like product or single-use plastic

<sup>170</sup> Canada-Wide Action on Zero Plastic Waste, 2019, the Canadian Council of Ministers of the Environment at [https://www.ccme.ca/en/current\\_priorities/waste/waste/zero-plastic-waste.html](https://www.ccme.ca/en/current_priorities/waste/waste/zero-plastic-waste.html)

<sup>171</sup> Other Flexible Plastic Packaging at RecycleBC website at <https://recyclebc.ca/flexiblepackaging/#1526666192734-651eec09-04c1>



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items. Other members of the steward community argue that the definition of the packaging in the EMA does not obligate single-use plastic items. Their view is that if the B.C. MOECCS intends to amend the Recycling Regulation to designate packaging-like products and single-use plastic items or provide clarification guidance on a broadened scope, then the MOECCS and by extension, Recycle BC, has a duty to consult prior to including the broadened scope in the program plan.”<sup>172</sup> In response, all references to packaging-like products and single-use plastics new materials were dropped from the Revised Plan.

In the Spring of 2019, ÉEQ, the Québec government and the government of France hosted a global “Plastics Solutions Forum” to:

- Promote new plastics recycling approaches based on technologies and processes developed through polymer research;
- Contribute to speeding up innovative plastic packaging recycling; and
- Establish relations and projects between start-ups and investors.

Three world leading, Québec based technologies and companies were profiled in the forum:

1. Loop - a company repolymerizing PET;
2. Pyrowave - converting polystyrene (PS) waste into recycled styrene monomer; and
3. Polystyvert - another new PS recycling technology.

From a producer/brand owner perspective, one of the most recent and innovative plastics market development initiatives is a project by the Washington-based Association of Plastics Recyclers (APR) called the “Recycling Demand Champion” program. The

<sup>172</sup> Consultation Report on Revised Packaging and Paper Product Extended Producer Responsibility Plan. October 2018. Recycle BC at [https://recyclebc.ca/wp-content/uploads/2018/02/18-02-26\\_Recycle-BC-Consultation-Report\\_Final.pdf](https://recyclebc.ca/wp-content/uploads/2018/02/18-02-26_Recycle-BC-Consultation-Report_Final.pdf)





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Canadian company Merlin Plastics, headquartered in B.C., which also has joint venture operations in Oregon and California, is a founding member of this program.

APR's Recycling Demand Champions commit to purchase new volume post-consumer resin (PCR) through "work in progress" (i.e. pilot) durable goods, or other common applications for PCR, and thereby play a prominent role in expanding the market for mixed residential plastics by driving investment, increasing supply of recycled resins and producing more high quality PCR. Everyday purchase items that often include PCR are: trash bags, mop buckets, trash cans, totes, recycling signs and safety signs. "Work in progress" applications include pallets, crates, specialty totes and large liquid containers.

Ten companies launched the Recycling Demand Champions program in late 2017 and announced in October 2018 that they had increased their new post-consumer resin usage by 6.8 million pounds of LDPE, PET, PP and HDPE.<sup>173</sup> The founding companies include Coca-Cola, Keurig, Dr. Pepper, Target, Proctor and Gamble and, as mentioned above, the Canadian company Merlin Plastics. The most common applications for PCR reported in 2017 were for garbage cans, trash bags, bag liners, packaging, pallets, park benches and picnic tables. Eight new companies have joined in 2019, including Unilever.

Members of the Recycling Demand Champions program state that "consistent and reliable demand for recycled plastic is critical for recycling to become mature, vibrant and sustainable. A strong demand-pull for recycled plastics is needed to ensure building a more robust recycling supply chain". Two specific objectives for the program are to help prevent ocean plastics by stimulating strong North American markets and to boost a Circular Economy for plastic packaging.

The City of Toronto has implemented a policy for introducing new materials into its waste diversion programs, specifically the Blue Box and Green Bin programs. The policy, referred to as the Adapt Policy ensures "a transparent process that brand owners and packaging manufacturers can refer to when designing new product packaging. It also includes the City's expectations regarding full cost recovery measures for testing the

<sup>173</sup> Recycling Demand Champions at <https://plasticsrecycling.org/recycling-demand-champions>





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behaviour of new materials in its processing facilities and any financial impacts to its integrated waste management system as a result of new material addition”.<sup>174</sup> This approach helps Toronto better tackle new and emerging packaging materials such as compostable and biodegradable packaging, that are introduced into the market without being tested for their compatibility with municipal end-use processing facilities and end market demands. Toronto is the first municipality in North America to introduce this policy.

There are a number of jurisdictions that require designated packaging to have recycled content to help drive the recycling commodity markets. For examples, under Single-Use Carryout Bag Ban (SB 270), in place since November 2016, the State of California stores may sell only reusable grocery bags, recycled paper bags, or compostable bags to customers and must charge a minimum 10-cent charge for each type of bag. The bags must meet State specification under the law, including that all paper bags contain 40 percent recycled fibre and reusable retail shopping bags include 20 percent recycled content by 2020 and 40 percent thereafter.<sup>175</sup> Also, in September 2019, [AB-792 Recycling: plastic containers: minimum recycled content and labeling](#), was passed requiring plastic beverage containers sold in California to contain 10 percent recycled content by 2021 and 50 percent by 2030.<sup>176</sup> In addition, the European Union (EU) Single-Use Plastics (SUP) Directive requires 25 percent post-consumer recycled content for PET bottles by 2025 and 30 percent recycled content for all plastic bottles by 2030.<sup>177</sup>

The City of Phoenix has implemented a program called “Reimagine Phoenix” to help divert waste from landfill through innovation. They have established a resource innovation

<sup>174</sup> Addition of New Materials to the City's Waste Diversion Programs (Adapt Policy). May 17, 2018. Toronto Public Works and Infrastructure Committee at <https://www.toronto.ca/legdocs/mmis/2018/pw/bgrd/backgroundfile-115692.pdf>

<sup>175</sup> SB 270: Report to the Legislature: Implementation Update and Policy Considerations for Management of Reusable Grocery Bags in California. February 25, 2019. CalRecycle at <https://www2.calrecycle.ca.gov/Publications/Details/1647>

<sup>176</sup> AB-792 Recycling: plastic containers: minimum recycled content and labeling. September 20, 2019. California State at [https://leginfo.ca.gov/faces/billNavClient.xhtml?bill\\_id=201920200AB792](https://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=201920200AB792)

<sup>177</sup> Circular Economy: Commission welcomes Council final adoption of new rules on single-use plastics to reduce marine plastic litter. May 19, 2019. European Union. [https://ec.europa.eu/commission/presscorner/detail/en/IP\\_19\\_2631](https://ec.europa.eu/commission/presscorner/detail/en/IP_19_2631)



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campus located at one of their transfer stations to incent entrepreneurs, partnerships and collaboration. In 2014, the City received funding to establish an incubator as part of the Resource Innovation and Solutions Network, in partnership with a local university. To-date the initiative has generated over 70 jobs, launched 22 products and has resulted in a number of patent filings, pilots, and RFPs. Recently, in 2019, Renewlogy was awarded an RFP to process six million pounds of plastics #3 to #7 annually from the City of Phoenix by converting these plastics into fuel.<sup>178</sup>

The NextGen Consortium, founded by McDonald's and Starbucks, and managed by Closed-Loop Partners, launched the NextGen Cup Challenge in October 2018. It is an open innovation initiative seeking to identify and commercialize existing and future solutions for the single-use, hot and cold fibre cup system. Students, suppliers, entrepreneurs, designers and businesses were invited to submit their innovative ideas. The 12 winners of the Challenge were announced in February 2019.

From the 12 winners, six have been chosen to receive acceleration funding of up to \$1 million. The NextGen Circular Business Accelerator provides the six winners access to their network of experts, business and technical resources and testing opportunities to confirm that their products can be successful once broadly implemented. The six short-listed cups will be trialed during 2019 in Starbucks stores located in Vancouver, New York, San Francisco, Seattle and London. The categories included are innovative cup liners, new materials for cups and reusable cup service models.<sup>179</sup>

## 6 Industrial, Commercial and Institutional (IC&I) Trends

The following sections provide an overview of policies regarding IC&I waste management and how corporations are responding with their own solutions for managing waste more responsibly.

<sup>178</sup> Renewlogy Projects at <https://renewlogy.com/projects/#norebro-custom-5e12727bee4af1>

<sup>179</sup> NextGen Consortium at <https://www.nextgenconsortium.com/>



### 6.1 Making IC&I Establishments More Responsible for Waste Diversion

There is a growing awareness among the Ontario public that within Ontario, the IC&I sector has not actively engaged in waste reduction, reuse and recycling within its sectors. In Ontario, the IC&I sector including construction and demolition, divert just over 13 percent of their wastes.<sup>180</sup>

Part of the problem has been the lack of enforceable regulations with Ontario's current 3Rs regulations, under the *Environmental Protection Act*, which set recycling objectives for designated IC&I establishments that have never been actively enforced. In 1994, the Ontario Government introduced a set of regulations that targeted designated IC&I establishments to develop waste diversion plans and implement recycling programs, as follows:

- *Ontario Regulations 102/94* (Waste Audits and Waste Reduction Work Plans), *103/94* (Industrial, Commercial and Institutional Source Separation Programs) and *104/94* (Packaging Audits and Packaging Reduction Work Plans) made under the *Environmental Protection Act*, commonly known as Ontario's 3Rs Regulations, govern the IC&I sectors. Businesses view the three regulations as the policy framework for waste generator responsibility.
- *Ontario Regulations 102/94* and *103/94* require large IC&I establishments, e.g., hospitals, restaurants, and offices, to identify the amount and types of waste they generate, develop waste reduction work plans, separate certain wastes at source and make reasonable effort to ensure that separated wastes are sent for reuse or recycling.
- *Ontario Regulation 104/94* requires manufacturers, packagers and importers to audit their packaging practices and develop packaging reduction plans.

These regulations targeted only the largest of IC&I establishments and relied on establishments to "do the right thing" and monitor themselves. The Ontario Government

<sup>180</sup> Strategy for a Waste-Free Ontario: Building the Circular Economy. February 2017. Ontario Ministry of Environment and Climate Change at <https://www.ontario.ca/page/strategy-waste-free-ontario-building-circular-economy>



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made little attempt to monitor and enforce the regulations, resulting in limited success. “Now more than 20 years old, the 3Rs Regulations no longer adequately drive waste diversion. Their requirements are limited to large establishments and only select waste materials and require only “reasonable efforts” to send source-separated wastes for recycling or reuse.”<sup>181</sup>

The *Waste Free Ontario Act* enables the province to enact measures that will require IC&I establishments to engage in waste diversion activities and to report on their progress. One key step that may be taken through RPRA’s comparatively new registry is better reporting and measurement of current IC&I generation and diversion. Work needs to be done (by the province, producers and service providers) to dramatically improve IC&I waste diversion across Ontario. In addition to better data, other important IC&I diversion issues include:

- The breadth and variety of materials to be covered by regulations;
- Scope of the regulated sectors;
- Size thresholds for facilities and dwellings; and
- IC&I promotion and education roles and responsibilities.

In Ontario, the *Waste Free Ontario Act* enables the province to address food and organic waste. The province’s plan to consider banning food and organic waste is a core element of the 2018 Food and Organic Waste Framework. Within the two components of the Framework Food and Organic Waste Action Plan are two (2) key goals that will impact IC&I food waste generating establishments:

- To implement Food Waste Disposal Bans beginning in 2021 by employing a phased-in approach to accommodate rural, northern communities; and
- To establish Food and Organic Waste Reduction Targets for IC&I Facilities – 50-70 percent waste reduction and resource recovery of food/organic waste by 2025.

<sup>181</sup> Strategy for a Waste-Free Ontario: Building the Circular Economy. February 2017. Ontario Ministry of Environment and Climate Change at <https://www.ontario.ca/page/strategy-waste-free-ontario-building-circular-economy>







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companies which have made similar commitments including Carlsberg, Corona, and Guinness.

- TerraCycle Inc. has launched the “Loop” initiative, a collaboration with almost 50 brand names to sell food and cleaning products in packaging that can be returned and refilled. The program has been piloted in parts of France and the United States in 2019 before being rolled out to other regions. The Loop will begin a pilot in Toronto in early 2020, in partnership with Loblaws.
- KFC Canada will start testing the use of bamboo buckets starting in 2020 as packaging for poutine, with the intent to expand to other foods over time.
- Sobeys Canada has announced that it will remove plastic bags from all its grocery stores in Canada by the end of January 2020.

In other parts of the world, another leader is Tesco, the UK’s biggest supermarket chain that has pledged to remove one billion pieces of plastic packaging from products in its UK stores by the end of 2020. Tesco will start by removing black plastic trays from ready meals, secondary lids on products such as cream, yogurt and cereals, and spoons, forks and straws from snack pots and drinks cartons. It has also identified plans to remove 200 million pieces of plastic used to pack clothing and greetings cards. In order to remove problematic plastics, the company has identified that it will replace plastic straws on drink cartons with paper ones and to replace plastic trays on own-label ready meals with recycled board. The retailer is also switching to paper bags from plastic bags to contain loose fruit, vegetables and bakery items.<sup>183</sup>

In addition, small and medium sized, usually independent, retailers are stepping up to introduce innovative, packaging free and Zero Waste shopping experiences. For example, the City of Ottawa has the waste-free grocery stores, Nu Grocery. Other cities have Bare Market and the Unboxed Market in Toronto, Méga Vrac and LOCO in Montreal, Nada in Vancouver and the Tare Shop in Halifax.<sup>184</sup> The demand for these Zero

<sup>183</sup> Tesco moves to cut out plastic from range of own-brand products. November 1, 2019. The Guardian at <https://www.theguardian.com/business/2019/nov/01/tesco-moves-to-cut-out-plastic-from-range-of-own-brand-products>

<sup>184</sup> A beginner's guide to zero-waste grocery stores. March 13, 2019. CBC at <https://www.cbc.ca/life/food/a-beginner-s-guide-to-zero-waste-grocery-stores-1.5054986>





Waste shopping experiences has resulted in several of the companies expanding the number of retail locations, as in the case of Nu Grocery, LOCO and Bare Market.

### 6.3 Waste Diversion in the Multi-Residential Sector

The Province of Ontario defines multi-residential housing as a form of IC&I. Under *Ontario Regulation 103/94*, multi-unit residential buildings are defined as:

#### Multi-Unit Residential Buildings

**10.** (1) The owner of a building that contains six or more dwelling units shall implement a source separation program for the waste generated at the building.<sup>185</sup>

As with IC&I establishments, e.g. hospitals, restaurants, and offices, listed under *Ontario Regulation 103/94*, designated multi-residential buildings must separate certain wastes at source, e.g. glass bottles and jars, newsprint, aluminum and steel cans, and PET bottles and “The categories of waste that are collected or accepted by the Blue Box waste management system, if any, of the municipality where the building is located”. Buildings are expected to make reasonable efforts to ensure that separated wastes are sent for reuse or recycling. Unlike other designated IC&I establishments, multi-residential buildings are not required to identify the amount and types of waste they generate, and develop waste reduction work plans.

Under *Ontario Regulation 103/94*, municipalities do not have a legal obligation to manage waste, recyclables or organics generated from multi-residential buildings, even though they are residential buildings. Enforcement of the source separation requirements in multi-residential buildings, in fact, lies with the province, which historically have been limited. Further, these regulations have not been updated to include organics diversion through Green Bin programs leaving a significant amount of waste not diverted.

<sup>185</sup> O. Reg. 103/94: Industrial, Commercial and Institutional Source Separation Programs. 1994. Ontario Government at <https://www.ontario.ca/laws/regulation/940103>



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While the regulation requires that recycling programs be provided in multi-residential buildings of six units or more, the onus is placed on the building owner, not the municipality to provide the service. Provision of waste collection and diversion services to multi-residential buildings by a municipality is a choice, not a requirement. Over the past decade, municipalities have realized the benefits of providing waste diversion services to the multi-residential sector to achieve control over the management of divertible materials.

The way municipalities are promoting waste diversion in the multi-residential sector has evolved over the years. Municipalities are finding more opportunity to direct waste diversion activities in new multi-residential buildings than older buildings by addressing the waste diversion infrastructure needs during the planning and design stages of development.

Leading edge municipalities, for example Halton Region, City of Markham and City of Toronto, have begun to require that buildings under construction establish three-stream collection methods in their buildings ensuring that waste diversion services are as convenient and effective as garbage services. The Waste Management Development Standards address the infrastructure and programming needed for successful three-stream diversion. Under this requirement, builders can choose to implement a three-stream collection system using any one of the following methods:

- Tri-sorter technology;
- Three chute systems;
- Three-stream sort systems on each floor; or,
- Other approaches that ensure that access to recycling and source separated organics diversion remains as convenient as residual waste disposal.

This mandatory approach tackles one of the key challenges associated with promoting waste diversion in multi-residential buildings – convenience. Residents will be more inclined to participate in recycling and organics diversion, if the method of diversion remains as convenient as the means of garbage disposal.



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Unfortunately, this approach does little to solve the convenience problem for existing multi-residential buildings with single chute systems or systems that do not make waste diversion as convenient as garbage disposal. The multi-residential sector presents a unique set of challenges for municipal staff involved in implementing waste diversion programs in these multi-residential buildings, not only from a logistical perspective but, more importantly, from a motivational perspective.

Some best practice measures adopted by municipalities to promote waste diversion include:

- Hiring dedicated multi-residential staff - Increasingly, municipalities are hiring dedicated staff to manage the multi-residential file rather than taking a piece meal approach by sharing the file among non-dedicated staff members. This enables staff to focus on programs and policies directly involving multi-residential waste diversion. It also provides a consistent contact for stakeholders who need information. Some municipalities with dedicated multi-residential recycling coordinators include the Region of Peel, Region of Waterloo, Halton Region and the City of Toronto.
- Education, outreach and feedback for tenants and property management - Informing and engaging tenants and property management about the benefits of waste diversion help to ensure a successful program. Overcoming some of the challenges mentioned earlier requires a greater commitment to providing regular reminders to tenants about the program. Some examples include establishment of 3R ambassador programs as in the case of Toronto, or hiring students to go door-to-door to provide recycling kits and talk with tenants about the benefits of its recycling program and answer questions as in the case of Hamilton.
- Metro Vancouver has established an on-line multi-family recycling kit and dedicated webpage for property managers. After carrying out community-based social marketing pilots in multi-family homes in order to develop best practices in reducing waste and improving recycling practices, Metro Vancouver developed its Multi-Family Recycling Tool Kit for property managers featuring promotion and education, green team, resident survey kits and resources.



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- **Mandatory requirements** - In order to establish a level playing field for multi-residential building owners and property managers, municipalities have begun to introduce mandatory requirements in the form of specific by-laws and ordinances requiring buildings to provide waste diversion services to residents along with regular education and promotional efforts. Not only does this measure provide an impetus for property management to provide waste diversion programs but it gives the community powers to take action if the requirements are not met. Examples of communities implementing mandatory waste diversion by-laws include the Cities of Markham, Toronto, Halifax, San Francisco, Seattle, and Portland.

These and other multi-residential best practices are further explored in the Comparative Scan of Municipal Strategies, Practices and Initiatives Memo.

## 6.4 Waste Management Industry Trends

The following sections provide an overview of how municipalities are collecting waste (private vs public forces), and issues associated with staffing and collection.

### 6.4.1 Collection Services

Over recent decades, municipalities have begun to eliminate in-house waste collection services, preferring to contract out garbage collection activities to private waste management companies, usually to the lowest bidder.

In response, several municipalities have introduced a number of measures to improve working conditions for contracted collection crews. For example, the City of Winnipeg added requirements to its 2016 collection RFP to require better worker health and safety training and equipment, and restricted the amount of subcontracting permitted. Other municipalities have introduced fair living wage policies, including the City of Vancouver, the largest city in Canada to do so. Vancouver's Living Wage Policy guarantees a minimum wage of \$20.91 and benefits to all workers contracted by City agencies, if the contracted estimated annual value is greater than \$250,000.<sup>186</sup> Similar living wage

<sup>186</sup> City of Vancouver's Living Wage webpage at <https://vancouver.ca/doing-business/living-wage.aspx>



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policies have been adopted by other municipalities in British Columbia, e.g. New Westminster, Port Coquitlam, Burnaby, Pitt Meadows.

In the case of Ottawa, which currently has an in-house collection that services two out of the City's five curbside collection zones, it has proven that it can be competitive with private sector contractors during the tendering process.

#### 6.4.2 Alternative Fleet Technologies

Other trends are seeing that municipalities are looking at including alternative fuels for fleet vehicles and greater automation for collection. Increasingly, municipalities are replacing traditional collection vehicles that operate on diesel fuel with collection vehicles operating on biofuels (e.g. compressed natural gas). The most commonly used alternative fuels include bio-diesel and, compressed natural gas (CNG).

Biodiesel is an alternative fuel made from food-based oil, such as vegetable oil, grease or fats. The most common feedstocks for biodiesel production in North America include canola oil, soy oil, rendered animal fat and used cooking oil. The oil can be blended with diesel at any level, for example a 5 percent blend is known as B5 or used entirely on its own, known as B100. Not only is biodiesel classified as a renewable energy source but according to Natural Resources Canada, compared to diesel, biodiesel has the potential to reduce GHG emissions by over 80 percent on a lifecycle basis.<sup>187</sup> The biggest challenge with biodiesel is its operational challenges in cold weather if the blend is higher than B5. This factor has limited its use in winter with one report recommending the use of B5 in the winter, and up to B20 in the summer for heavy duty vehicles such as collection vehicles.<sup>188</sup> While biodiesel has GHG benefits over regular diesel, it has not been able to realize its full potential as an alternative fuel in a cold climate such as Canada.

<sup>187</sup> Biodiesel. Natural Canada website at <https://www.nrcan.gc.ca/energy/efficiency/energy-efficiency-transportation-and-alternative-fuels/alternative-fuels/biofuels/biodiesel/3509>

<sup>188</sup> Evaluation of the Impact of Using Biodiesel and Renewable Diesel to Reduce Greenhouse Gas Emissions in City of Toronto's Fleet Vehicles. January 22, 2019. Toronto Department of Fleet Services at <https://www.toronto.ca/legdocs/mmis/2019/ie/bgrd/backgroundfile-130965.pdf>





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A promising alternative biofuel that is beginning to replace diesel and biodiesel is CNG. Biogas generated from waste management facilities (e.g., anaerobic digestion, landfills, sewage treatment facilities), is then cleaned and purified into a RNG, then compressed to produce CNG which can be directly used as a fuel for CNG vehicles. Natural gas fuel can reduce GHG emissions from heavy-duty trucks, e.g. collection vehicles, by up to 30 percent compared to diesel on a lifecycle basis.<sup>189</sup>

Throughout Canada, several municipalities have transitioned to garbage, recycling and organic collection vehicles powered by CNG gas including Central Okanagan, Kelowna, Coquitlam and Surrey, B.C.; Winnipeg, MB; and Ottawa, ON.<sup>190</sup>

In 2012, the City of Ottawa became Waste Management Inc.'s first Canadian city to use CNG collection vehicles. The Municipal Affairs Manager for Waste Management Canada claims "Introducing CNG trucks is an important part of our long-term sustainability strategy to reduce emissions by 15 percent and increase fuel efficiency by 15 percent."<sup>191</sup>

Two cities - Surrey, B.C. and Toronto, ON – have established closed-loop systems whereby food waste collected through the Green Bin program is converted to methane then RNG using anaerobic digestion technology for use as an alternative fuel in collection vehicles.

In March 2018, the City of Surrey, B.C., opened a fully integrated anaerobic digestion facility, called the Surrey Biofuel Facility, which converts food waste into RNG. The facility will produce RNG for vehicles and for injection into the FortisBC NG pipeline network, and in turn converted to CNG for use as an alternative fuel in its solid waste collection fleet.

<sup>189</sup> Natural Gas Use in the Transportation Sector. December 2010. NRCan at <https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/oeo/pdf/transportation/alternative-fuels/resources/pdf/roadmap.pdf>

<sup>190</sup> Natural Gas Use: in Medium and Heavy Duty Transportation Sector. June 2019. NRCan at <https://www.nrcan.gc.ca/resource-library/natural-gas-use-medium-and-heavy-duty-vehicle-transportation-sector-roadmap-20-june-2019/22111>

<sup>191</sup> Natural Gas Use: in Medium and Heavy Duty Transportation Sector. June 2019. NRCan at <https://www.nrcan.gc.ca/resource-library/natural-gas-use-medium-and-heavy-duty-vehicle-transportation-sector-roadmap-20-june-2019/22111>





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This approach has enabled the City of Surrey to achieve a closed loop system with food waste being converted into an alternative fuel in its collection vehicles.

In the case of the City of Toronto, as of January 2019, 120 (48 percent) of the City's waste collection diesel trucks have been being replaced by CNG trucks.<sup>192</sup> The City's Solid Waste Management Services, in partnership with Enbridge Gas Distribution Inc., installed new equipment at the Dufferin Solid Waste Management Facility in 2018. The new equipment, known as a Bio-methane Upgrading System, turns raw biogas—produced from processing Green Bin organics—into RNG. The intent is for the RNG to feed into the Enbridge gas line and, in turn, be converted into CNG to power Toronto's CNG vehicles.

Electric collection vehicles have become a reality for some jurisdictions in the United States for example, Chicago is considered the first city in the United States to test a single all-electric garbage truck in 2014 (albeit not without issues). The City of Sacramento, CA announced in January 2019 that it would introduce electric garbage trucks into its fleet and in May 2019, the City of Seattle's, contractor, Recology introduced its first fully electric garbage truck. In 2020, New York City will test its first all-electric garbage truck. No city in Canada has announced the purchase or piloting of electric garbage trucks and there are no known case studies of electric garbage trucks being tested in colder climates, similar to that of Ottawa in the winter months.

These and other technological innovations are further discussed in the Waste Management Technologies and Approaches Memo.

#### 6.4.3 Staffing Challenges

The waste management industry is a labour intensive industry, especially when it comes to the collection side of the business. Manual collection is very strenuous, and the nature of the work is dangerous, leading to low employee retention.

<sup>192</sup> The Pathways to Sustainability of Toronto's Fleets.2019. Toronto Fleets at <https://www.toronto.ca/wp-content/uploads/2019/11/9188-SustainableCoTFleets.pdf>



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A survey conducted in 2016 in the United States, that asked why collection crews were leaving their jobs, found that the primary reason (50 percent) for drivers leaving was for better paying jobs. The second reason (41 percent) was to spend more time at home with 34 percent responding for the need of better benefits, and 21 percent leaving due to health issues. In response, the Executive Director of the Solid Waste Association of North America (SWANA) has acknowledged that, “Companies and local governments need to provide appropriate compensation to attract qualified applicants. Further, making sure that drivers feel appreciated and addressing safety concerns can help employers retain drivers.”<sup>193</sup>

Increasingly, municipalities are struggling to ensure that residents receive consistent curbside collection service, as contracted waste collection companies fail to meet collection schedules due to mechanic, driver and collection crew shortages. In the case of Simcoe County, these labour shortages resulted in the County cancelling its annual curbside collection of waste electronics. According to Simcoe County’s Director of Solid Waste, “the going local rate of roughly \$21 per hour for a collector does not compare to the hourly rates being offered by construction companies for the same skills, which is translating to a roughly 80 per cent staff turnover rate.”<sup>194</sup> Some companies have resorted to providing financial bonuses in order to keep crews working. Waste management companies are also competing with trucking and delivery companies for drivers.

The driver and collection crew shortages are placing growing pressure on municipalities with manual collection to explore automated cart collection services in an effort to alleviate the staffing problems. The industry is exploring non-traditional/alternative ways to address staffing issues, including attracting/sourcing workers from overseas.

#### 6.4.4 Pressure to Implement Automated Collection

<sup>193</sup> Driver Shortage Poses a Challenge to the Waste Industry. May 16, 2016. Waste 360 at <https://www.waste360.com/haulers/driver-shortage-poses-challenge-waste-industry>

<sup>194</sup> Waste collection delays continue; ‘There’s no silver bullet,’ says official. September 10, 2019. Barrie Today at <https://www.barrietoday.com/local-news/waste-collection-delays-continue-theres-no-silver-bullet-says-official-1685720>



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Automated cart collection has become a mainstay in many residential collection services, especially in Western Canada. In Ontario, it is estimated that about 30 municipalities have implemented automated cart programs to collect garbage, recycling and organics/food waste, where available. Examples of municipalities with automated cart programs include the City of Toronto, Guelph, Sault Ste. Marie, Timmins, and Temiskaming Shores, the Region of Peel, Southgate Township and Bluewater Recycling (servicing 22 towns and townships). These communities have implemented automated cart collection services for a variety of reasons, but the main reasons include:

- Carts result in cleaner neighbourhoods, as the lids on the cart protect the material from the wind and carts are more resistant to tipping than traditional garbage cans;
- The large carts can hold up to six times the capacity of the Blue Box and can better accommodate changes in Blue Box material composition, which has been shifting from high-density materials, such as glass and steel to lighter, bulkier recyclables, such as plastics;
- The automated cart system provides health and safety benefits to collection crews as they eliminate manual lifting and repetitive strain injuries; and
- Municipalities report a reduction in worker injuries and Workplace Safety and Insurance Board claims. These benefits can result in reduced overall contract costs.

Despite the benefits of automated cart collection, there are also drawbacks in the form of the high up-front capital/investment costs to select, procure and distribute the carts and convert to automated collection vehicles. Operational challenges that may be experienced in rural and/or urban areas, include:

- Homeowners must be educated on where to place carts at the edge of the road and how to place them in snow banks, ice and windy conditions so that they do not topple over or block the road and may find moving them down long driveways more inconvenient;
- High-density neighbourhoods with street parking provide obstacles for automated collection vehicles trying to access the carts;
- Bulky items, e.g., furniture, mattresses, carpets, cannot be accommodated by the cart system and require a separate collection; and



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- Householders may take advantage of the additional capacity of the cart by using them as an alternative place for unwanted items, resulting in higher contamination.

Municipalities like Simcoe County, which have a manual curbside collection program, have begun to examine transitioning to an automated curbside collection service that would enable collection companies to hire non-traditional collection crews and expand the pool of recruits to include women and older workers. Automated cart collection also reduces health and safety issues associated with manual collection.

Other municipalities, such as Niagara Region, have also grappled with transitioning to an automated cart program and, recently, decided that the high implementation costs and contamination challenges outstripped the benefits. Research conducted by Niagara Region staff highlighted some of the negative aspects of automated cart collection, including:

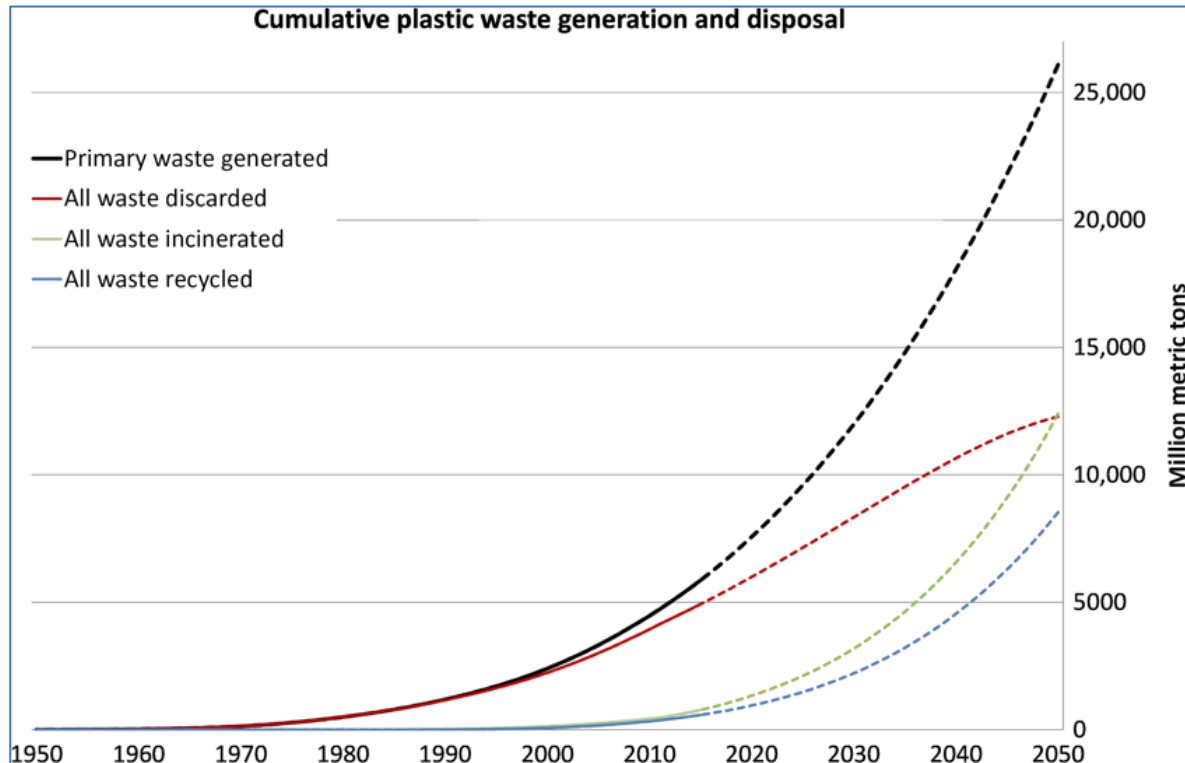
- The 2016 Provincial average contamination rate for a multi-stream, i.e. two or more streams, recycling program was 8.9 percent, compared with an average of 14.1 percent for a single stream program (Niagara's contamination rate averaged 4.8 percent);
- Peel staff reported a one-time initial cost to implement three-stream cart collection of \$35 million, based on 325,000 single family homes, and on-going annual maintenance and replacement costs between \$1 and \$3 million; and
- According to Calvin Lakhani, a postdoctoral Fellow in the Faculty of Environmental Studies at York University, the automated cart program may be exacerbating the Blue Box end market challenges since "the contamination rate more than doubled if not tripled after switching to a cart-based collection system. As a result, revenue from post-recyclable materials – the same revenue expected to offset the cost of these programs – has fallen."<sup>195</sup>

<sup>195</sup> Report to Niagara Region's Public Works Committee: Base and Enhanced Services for Next Collection Contract. March 19, 2019. Niagara Region at <https://www.niagararegion.ca/government/council/committees/pw/default.aspx>





Figure 15: Global Cumulative Plastic Waste Generation and Disposal (in million metric tons)



Source: *Production, use, and fate of all plastics ever made*. 2017. By Roland Geyer, 1\* Jenna R. Jambeck, 2 Kara Lavender Law. *Science Advances*.at <https://advances.sciencemag.org/content/3/7/e1700782>

A recently released CCME document highlights the use of plastics in Canada and its recycling rates. According to the CCME report, plastic packaging is achieving a 23 percent diversion rate and 15 percent recycling rate. Diversion rate is defined as “the share of plastic diverted from direct disposal and sent to a sorting facility, divided by the amount of plastic waste available for collection” and recycling rates is defined as “the share of plastic that is ultimately reprocessed, whether through chemical or mechanical





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recycling, from diverted waste, divided by the amount of plastic waste available for collection”.<sup>197</sup> The remainder is landfilled, leaked into the environment or incinerated.

Figure 16, from a 2019 report recently published by Deloitte, [Economic Study of the Canadian Plastics Industry, Markets and Waste](#)<sup>198</sup>, shows the flow of plastic resin in Canada, through use in durable and non-durable products (non-durable is defined as in use for less than one year and then ending up as waste) to final end-of-life management. According to the study, packaging represents 47 percent of the total plastic waste generated in Canada, followed by automotive at nine percent, textiles at seven percent and electrical and electronic equipment at seven percent. Despite the proliferation of plastics in our society, most end up being disposed rather than recycled, with 86 percent (2,795 thousand tonnes) of end-of-life plastic being landfilled, one percent (29 thousand tonnes) end up as leaks in the environment, four percent (137 thousand tonnes) being incinerated and only nine percent (305 thousand tonnes) being recycled.<sup>199</sup>

<sup>197</sup> CCME Discussion paper: Guidance to facilitate consistent extended producer responsibility policies for plastics. November 2019. CCME at

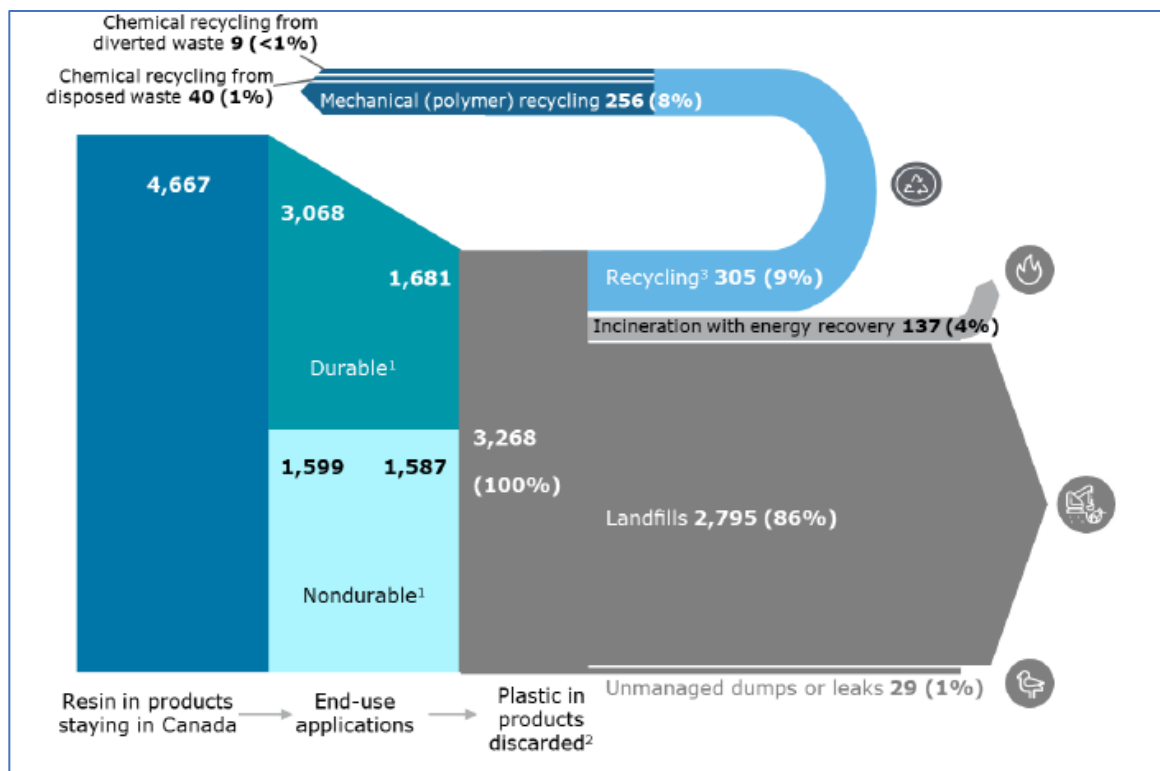
<https://www.ccme.ca/files/CCME%20EPR%20discussion%20paper%20EN%201.0%20secured.pdf>

<sup>198</sup> <http://publications.gc.ca/site/eng/9.871296/publication.html>

<sup>199</sup> Economic Study of the Canadian Plastics Industry, Markets and Waste. 2019. Prepared for Environment and Climate Change Canada by Deloitte LLP at <http://publications.gc.ca/site/eng/9.871296/publication.html>



Figure 16: Canadian Plastic Resin Flows (in thousands of tonnes per annum, 2016)



Source: *Economic Study of the Canadian Plastics Industry, Markets and Waste*. 2019. Prepared for Environment and Climate Change Canada by Deloitte LLP at <http://publications.gc.ca/site/eng/9.871296/publication.html>

One of the most dramatic changes in packaging in the past several years that is contributing to the disposal dilemma has been the enormous growth in the use of flexible plastic packaging, called plastic laminates, such as stand up pouches, resealable film packaging, juice pouches and tube pouches – none of which can be recycled at this time.

The demand for stand-up pouches is growing faster than other flexible packaging. Stand-up pouches are convenient to use, providing zip locks for easy opening and closing, but at the same time provide high visibility as a stand-up package. Global industry growth was estimated at over 11 percent per year from 2012 to 2016 and U.S. demand for



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flexible packaging is projected to increase 3.0 percent annually to \$18.8 billion in 2017, with growth being led by product introductions in packaged meat and poultry, snack foods, ready-to-eat produce, and specialty beverages.<sup>200</sup>

Some industry sources expect the weight/volume of pouches, also referred to as multi-layer laminates, to soon equal and eventually exceed residential plastic film generation. Current pouch consumption in the U.S. is estimated to be 51 stand-up pouches per capita per year.<sup>201</sup>

As the number and type of plastic packaging and single-use plastics increases, processors (MRFs) see that their “jobs are becoming harder, as major consumer brands flood the market with more and different types of single-use plastics and other disposable packaging, insisting that these items should be included in our recycling programs. At the same time, the industry does little to nothing to actually make their products recyclable, use recycled content, or invest in recovery infrastructure.”<sup>202</sup> The only effort to manage stand-up pouches and other flexible packaging to date has been the collection program introduced in British Columbia which sends the material to Metro Vancouver’s energy-from-waste facility since there are no recycling options available at the present time. EPR in British Columbia has not resolved the non-recyclability problem associated with flexible plastics, such as stand up pouches. Other opportunities, include niche recycling programs which target a small fraction of the flexible packaging generated in Canada. For example, TerraCycle has teamed up with companies, such as Europe’s Best Frozen Fruit, to offer recycling programs for the partnering company’s plastic pouches.

The situation is not much different in Europe in which the majority of pouches generated in Europe are sent to EFWs or landfilled. There are some exceptions in which companies

<sup>200</sup> Converted Flexible Packaging. November 2013. Industry Market Research

<sup>201</sup> Report: Stand-up pouches expected to continue growth trend. July 21, 2015. Plastic News at <https://www.plasticsnews.com/article/20150721/NEWS/150729972/report-stand-up-pouches-expected-to-continue-growth-trend>

<sup>202</sup> Keep on recycling, America. But companies must do their part too - The new Association of Mission-Based Recyclers – including Eco-Cycle, the Ecology Center, Eureka Recycling and Recycle Ann Arbor – calls on packaging companies to start working collaboratively. November 13, 2019. Waste Dive at <https://www.wastedive.com/news/keep-on-recycling-america-but-companies-must-do-their-part-too/567214/>



offer niche pouch recycling programs to consumers. The consumers of the targeted brands can return the pouches to the producers to be recycled; for example, the producers of Purr & Miaow cat food, available in pouches, offer consumers pre-paid recycling bags that allow the consumer to send Purr & Miaow empty pouches to a company, Enval, which has a patented microwave pyrolysis process to reclaim the aluminum and convert the plastic to oil and gas.<sup>203</sup>

## 7.2 Increasing Recycled Content of Goods and Packaging

One of the fundamental principles of a Circular Economy features reincorporating recycled materials back into the manufactured goods and packaging to reduce the need for raw resources. In order for society to achieve a Circular Economy, it must ensure that packaging and goods are recyclable, and contain a maximum amount of recycled content, without compromising the product's structural integrity.

As major purchasers, governments can help drive the need to increase recycled content in goods and packaging through their procurement activities. Governments can also impose taxes/fines and set recycled content standards through regulations. Some examples of governments using this authority include:

- In May 2019, the EU passed the Directive on Single-use Plastic Products which will require that manufacturers of plastic beverage bottles gradually increase the recycled content in the bottles from 25 percent by 2025 and 30 percent by 2030.<sup>204</sup> In addition, the EU's Circular Economy Directive explores imposing variable fees based around the amount of recycled content in packaging.
- In October 2019, the UK government proposed a tax on food and drink service companies that do not use plastic packaging containing at least 30 percent recycled

<sup>203</sup> Recycling and Recovery of Flexible Plastics at <https://www.flexpack-europe.org/en/sustainability/recycling-recovery.html> and Enval aims to 'purrfect' aluminium pouch recycling. March 27, 2019 at <https://recyclinginternational.com/non-ferrous-metals/packaging-recycling/19065/>

<sup>204</sup> Council adopts ban on single-use plastics. May 21, 2019. European Council at [https://www.consilium.europa.eu/en/press/press-releases/2019/05/21/council-adopts-ban-on-single-use-plastics/?utm\\_source=dsms-auto&utm\\_medium=email&utm\\_campaign=Council+adopts+ban+on+single-use+plastics#](https://www.consilium.europa.eu/en/press/press-releases/2019/05/21/council-adopts-ban-on-single-use-plastics/?utm_source=dsms-auto&utm_medium=email&utm_campaign=Council+adopts+ban+on+single-use+plastics#)



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plastic in their products. The tax will be applied to the production and import of plastic packaging and will be introduced by April 2022.<sup>205</sup>

- The Netherlands, France and the UK have established Plastics Pacts to tackle plastic waste. In the case of the Netherlands, all producers of single-use plastic products will need to incorporate “as much recycled plastic as they can” with a minimum recycled content requirement set at minimum 35 percent.<sup>206</sup>
- The California Recycling and Plastic Pollution Reduction Act of 2020, would give State regulators the power to maximize, where deemed appropriate, the use of recycled content in the production of products and packaging.

Corporations have also begun to respond to the demand for recycled content with the following initiatives:

- Coca-Cola has announced that it will increase the recycled content of its plastic Coke bottles such that 50 percent of its new plastic bottles will come from recycled bottles. Currently, Coca-Cola recycles 9 percent of its bottles back into new bottles.<sup>207</sup>
- In 2017, Unilever committed to not only ensuring that 100 percent of its plastic packaging will be fully reusable, recyclable or compostable by 2025, but it has committed to increase the recycled plastic content in its packaging to at least 25 percent by 2025. Going one step further, in October 2019 it announced two additional goals, one of which is to reduce the amount of virgin plastic used in plastic packaging by 50 percent by 2025.<sup>208</sup>

<sup>205</sup> Resource and Waste and Plastic Packaging Tax Consultations. DEFRA UK website at <https://consult.defra.gov.uk/environmental-quality/resource-and-waste-and-plastic-packaging-tax-consu-1/>

<sup>206</sup> Will the Plastic Pact deliver on its promises? February 27, 2019. Recycling International at [https://recyclinginternational.com/plastics/plasticpact/?utm\\_source=nieuwsbrief&utm\\_medium=email&utm\\_campaign=02/28/2019&goal=0\\_978429473f-d80df2c019-222328849](https://recyclinginternational.com/plastics/plasticpact/?utm_source=nieuwsbrief&utm_medium=email&utm_campaign=02/28/2019&goal=0_978429473f-d80df2c019-222328849)

<sup>207</sup> American Beverage Association launches ‘Every Bottle Back’ campaign. November 6, 2019. Plastics Today at <https://www.plasticstoday.com/recycling/american-beverage-association-launches-every-bottle-back-campaign/26131354461820>

<sup>208</sup> Rethinking plastic packaging – towards a circular economy. Unilever at <https://www.unilever.com/sustainable-living/reducing-environmental-impact/waste-and-packaging/rethinking-plastic-packaging/>





- Walmart has announced that it will target all private packaging brands to have at least 20 percent post-consumer recycled content by 2025.<sup>209</sup>

### 7.3 Bio-Plastics Packaging

As more communities begin to reduce or eliminate single-use plastic items, including but not limited to, take-away containers, straws, cutlery and to-go cups, there is more pressure to find alternative items, such as bioplastic products.

“Bioplastics” come in two main types: bio-based and biodegradable/compostable. Bio-based plastics are manufactured from natural polymers, such as corn/maize starch and sugarcane. Biodegradable plastics, on the other hand, are designed to be broken down naturally by microorganisms under specific conditions. Often, the biodegradable plastic is also bio-based, but not always biodegradable. According to one report, less than 40 percent of bio-based plastics are biodegradable.<sup>210</sup>

Over the years, there have been numerous concerns raised about bioplastics, especially from a municipal perspective. Some main concerns include:

- Bioplastic feedstock, e.g. maize/corn and sugarcane, directly compete with food needed to feed populations in developing countries where many of these crops are grown. The crops tend to be monocultures that require large amounts of pesticides, fertilizers and other resources to maintain growth. One study estimated that the production of one tonne of bio-compostable bags (PLA) requires the input of 2.39 tonnes of maize, 0.37 hectares of land and 2,921 m<sup>3</sup> of water<sup>211</sup>;
- There is a general lack of understanding about what it means for a packaging to be a bioplastic. Residents are more likely to confuse the word with recyclable rather than compostable and place the bioplastic packaging material in the Blue Box recycling

<sup>209</sup> <https://corporate.walmart.com/newsroom/2019/02/26/walmart-announces-new-plastic-packaging-waste-reduction-commitments>

<sup>210</sup> The Plastic Atlas 2019. November 2019. Heinrich Böll Foundation, Berlin, Germany, and Break Free From Plastic at <https://www.boell.de/en/plasticatlas>

<sup>211</sup> The Plastic Atlas 2019. November 2019. Heinrich Böll Foundation, Berlin, Germany, and Break Free From Plastic at <https://www.boell.de/en/plasticatlas>





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program. Unfortunately, these plastics are not compatible with other plastic resins and cannot be recycled; and

- While bio-compostable packaging may break-down over a shorter period of time compared with petroleum-based plastic, it does not necessarily break-down during a typical composting period. According to the test criteria for the biodegradable label, the plastic has to be 90 percent degraded after 12 weeks at 60 degrees Celsius.<sup>212</sup> The concern is that not all composting facilities can meet the requirements to ensure that the bio-compostable packaging is fully degraded.

In a study by Dillon Consulting, discussions with numerous commercial composting processors in B.C. and Washington showed a significant variability across facilities in terms of processing temperature and timelines. In fact, of ten facilities interviewed, not one had both a processing time longer than 180 days and a processing temperature of at least 56°C (although one facility exceeded the processing time and almost met the processing temp of 56°C (at 55°C)). Most interviewees indicated that paper and pulp products composted well during their field tests, however, they could not provide definitive answers regarding the compostability of compostable plastics.<sup>213</sup>

It appears that claims of compostability in commercial facilities may not be entirely true. In fact, many compostable plastics do not even make it into the processing phase of operations, as facilities have difficulty distinguishing between compostable plastics and petroleum-based plastics and often reject any load containing visible plastics, even if they are suspected or known to be compostable plastic. Of facilities that tolerate a certain amount of compostable plastics, post-process screening typically removed those items and they were disposed of as residuals in order to meet Organic Matter Recycling Regulation (OMRR) (or other) foreign matter content limits.

The majority of facility operators interviewed for the City of Vancouver Single-use Item (SUI) Reduction Strategy were of the opinion that banning plastic SUIs such as plastic straws and allowing compostable plastic alternatives to be used instead, would

<sup>212</sup> The Plastic Atlas 2019. November 2019. Heinrich Böll Foundation, Berlin, Germany, and Break Free From Plastic at <https://www.boell.de/en/plasticatlas>

<sup>213</sup> Communications with Geoff Love. November 15, 2019



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inadvertently increase contamination in the organics feedstock, ultimately increasing the amount of residuals sent to landfill. Interviewees explained that due to a lack of public awareness in differentiating between non-compostable and compostable plastic straws (for example), this kind of regulation could lead consumers to think that all SUIs are compostable and discard non-compostable plastic items into the compost stream. This contamination is particularly undesirable if the non-compostable items are recyclable and could have been recovered through recycling instead.

The municipality of Richmond, B.C. identified the problem in a recent statement. “Whereas businesses are beginning to switch to compostable single-use items for to-go meals and beverages, yet this material is not designed to biodegrade if littered, and is not guaranteed to biodegrade in industrial compost facilities because standards and certifications are not aligned with existing infrastructure that is designed to compost food scraps and yard waste. And whereas local governments are facing increasing pressure to collect and manage this material, yet it is beyond local government's ability to control compostable packaging design or finance the specialized collection and processing infrastructure required for compostable packaging”.<sup>214</sup>

In order for biodegradable plastics to become an effective alternative to plastic packaging, it must be used appropriately and properly incorporated into the waste management system. The government of the Netherlands has articulated the challenge with the need to focus “on clarifying the potential uses of biodegradable plastics that may be composted or fermented in their end-of-life phase. Such uses may be found in the food value chain and the medical sector. Biodegradable plastics are used increasingly and specifically in cases involving high risks to the environment. Clarity for consumers, municipalities, and the waste and recycling sector as to how to deal with the various types of plastics is essential.”<sup>215</sup>

<sup>214</sup> Resolutions to be considered at the 2019 UBCM Convention Vancouver Convention Centre Vancouver, BC. September 25-27, 2019. UBCM at [https://www.richmond.ca/\\_shared/assets/Single-Use\\_Discussion\\_Guide\\_201954612.pdf](https://www.richmond.ca/_shared/assets/Single-Use_Discussion_Guide_201954612.pdf)

<sup>215</sup> A Circular Economy in the Netherlands by 2050. 2016. Netherlands Government at <https://www.government.nl/documents/policy-notes/2016/09/14/a-circular-economy-in-the-netherlands-by-2050>





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One municipality in B.C. has introduced a resolution at the Union of British Columbia Municipalities (UBCM) requesting that “whereas the costs (both known and unaccounted for) associated with these disposable “products of convenience”, should be borne by the manufacturers, the distributors and the retailers who are creating the products and then handing them out to consumers, would create an environment of responsibility and awareness by assigning an environmental handling fee to these products which is dispersed to local government responsible for financing solid waste and recycling. Therefore, be it resolved that UBCM request the Province of British Columbia to engage with retailers, manufacturers and industry to implement an environmental fee for all single-use plastic products and packaged goods, (including compostable and biodegradable) entering the British Columbia market place to incentivize reduction, to help subsidize regional solid waste management programs.”<sup>218</sup>

## 8 The Potential Influence of These Trends on Waste Management in the City of Ottawa

The impact of the above issues will present challenges and opportunities for the City of Ottawa. These are discussed in the following sections.

### 8.1 Challenges

Trends in packaging fluctuate, and understanding the lifestyle trends that will have an impact on consumer purchasing decisions in the future are important. These and other factors impact the amount of waste that is produced over time, and are likely to affect the tonnages of packaging and printed paper material available for recycling in Ottawa’s Blue Box program. Many of the new packaging designs cannot be effectively recycled in current municipal recycling programs or require additional resources to accommodate the recycling process.

<sup>218</sup> Resolutions to be Considered at the 2019 UBCM Convention Vancouver Convention Centre Vancouver, BC. September 25-27, 2019. UBCM at [https://www.richmond.ca/\\_shared/assets/Single-Use-Discussion-Guide-201954612.pdf](https://www.richmond.ca/_shared/assets/Single-Use-Discussion-Guide-201954612.pdf)

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The extent to which this remains a problem in the future should be mostly resolved if Ontario transitions to full EPR for the Blue Box program, as planned by the Province. If and when Ontario transitions, municipalities will no longer be responsible for managing paper products and packaging designated to the Blue Box program.

What remains unresolved is whether industry will also be responsible for the full management of compostable packaging materials that enter the Green Bin program, be it compostable paper packaging, e.g. boxboard packaging, and bio-plastics e.g. compostable bags. Municipalities, including Ottawa, will need to monitor the Ontario Government's response to this challenge and continue to advocate for industry to assume full responsibility for the cost to manage these materials at their end-of-life.

The “Evolving Tonne” associated with the Blue Box program has placed many municipalities in precarious situations resulting in declining tonnages but increasing volumes of light-weight materials, especially plastic packaging. Municipalities that have traditionally used percent diversion rates to measure the success of recycling programs, e.g. the Blue Box program, are seeing diversion rates stagnate due to the light-weighting of materials and the switch from heavier packaging, e.g. glass and steel, to lighter packaging, e.g. plastics. This is forcing municipalities to re-examine how they measure waste diversion and convey progress to politicians and the public.

The fastest growing plastic packaging is the flexible plastic packaging, characterized by stand-up pouches, and resealable film packaging, which generally cannot be recycled and end up in the landfill. Unfortunately, these and other forms of non-recyclable plastic items, e.g. single-use plastics, end up in Blue Box systems due to a lack of understanding of what can be recycled and/or “wishcycling”. Consequently, municipalities are dealing with higher contamination rates and unwanted items at the MRF, resulting in higher processing costs and lower grade end market materials.

Our throw-away society, which is characterized by high turnover consumer products such as toys, clothing and consumer electronics coupled with the notion of “planned obsolescence”, will continue to generate greater volumes of garbage since many of the goods are designed to wear-out or break-down over a short period of time, requiring





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replacement rather than repair. The movement to promote goods that are designed to be repaired and have the “right to repair” has a long way to go before it makes a noticeable dent in the amount of waste being landfilled.

Some municipalities are facing driver and collection crew shortages that are placing growing pressure on municipalities with manual collection to explore automated cart collection services to alleviate the staffing problems. While automated cart collection programs benefit from fewer health and safety issues due to the elimination of manual lifting and repetitive strain injuries and provide larger carts that enable municipalities to expand the number of Blue Box materials, these programs also require municipalities to switch to a single stream Blue Box program which generally leads to higher contamination rates. Ottawa may need to address automated cart programs in the future, should its public work force and private collection contractors begin to experience staffing shortages that impact the provision of residential collection services; however, the City should wait to see how the Blue Box transition roles out and impacts the various collection services offered to residents.

As Ontario moves toward a regime of Individual Producer Responsibility (IPR), again as described in the Legislative Review Memo, over the next 3 to 5 years, it will be interesting to see whether two stream programs (even with increased innovations and investments in optical scanning technologies) can meet higher quality requirements needed by obligated producers to achieve their individual material specific recovery targets.

## 8.2 Opportunities

The City of Ottawa can use a variety of policies to foster greater waste reduction and diversion within its boundaries, such as bans and levies to reduce the amount of single-use plastics used in government facilities and businesses, procurement strategies to increase recycled content in products and packaging, to promote repair and reuse of goods, and incentives to encourage the establishment of repair businesses and activities.





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Municipalities have demonstrated an increased emphasis on the first two Rs - Reduction and Reuse - by embracing programs that encourage waste minimization and reuse, such as:

- Organizing swap and repair events, to promote the second-hand economy;
- Launching reuse programs targeting art supplies, household goods, bikes, etc.;
- Textile diversion and reuse programs; and
- Food waste reduction campaigns, such as the Love Food, Hate Waste campaigns implemented by Vancouver, Toronto, Halifax, Calgary, Montreal, and Edmonton.

The City of Ottawa can continue to embrace these reduction and reuse activities and adopt some of the leading best practices from other municipalities.

The Ontario Government has responded to demands to address IC&I waste generation by committing to explore material bans and establishing diversion targets directed at IC&I wastes. With the growing demand for the IC&I sector to take significant steps to address its waste stream and, more specifically, to implement waste reduction and diversion programs, there is an opportunity for the City of Ottawa to help small and medium sized IC&I waste generators through the provision of support through educational, auditing and technical support programs.

Opportunities to tie waste reduction, reuse and recycling to Greenhouse Gas (GHG) reduction are abundant and are being explored in Western Canada and here in Ontario. For example, food waste reduction activities and composting programs result in significant GHG reduction by eliminating the generation of methane gas. Ottawa has provided a Green Bin organics program to single family residents since 2010 and has expanded the program to multi-residential residents and other generators. The success of the program should enable staff to pursue new opportunities such as expanding the program to local businesses, institutions and food chains and over time, implement a food waste ban at Ottawa's Trail landfill. City staff will need to evaluate the capacity of its contracted composting facility and determine the need for further capacity. The lack of regional food waste composting capacity may offer opportunities for Ottawa to consider

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investing in anaerobic digestion and convert the methane to alternative fuel (CNG) for its waste collection fleet.

There is an unprecedented level of focus on single-use plastics at all levels of government, business and non-governmental organizations in Canada and around the world. The wealth of information available should enable Ottawa to learn from other jurisdictions in developing its own SUP strategy. Some of the questions that Ottawa will need to address in developing a strategy include - what can the City, residents and businesses of Ottawa most effectively do at the local level? What level of stakeholder consultation is required to ensure support for the strategy?

Ottawa has an opportunity to address a Circular Economy procurement strategy that goes beyond green procurement and sustainable procurement. Circular economy procurement will help Ottawa achieve closed-loop recycling, maximized recycled content, waste avoidance, reduction and reuse of goods, which will lead to further GHG reductions. In order to develop a Circular Economy procurement strategy, City staff will need to assess opportunities to build on initiatives and activities of the Municipal Collaboration of Sustainable Procurement and to work collaboratively with other City departments to gain insight and build consensus supporting a Circular Economy procurement strategy. The City will also need to train and engage procurement staff in the roll-out of the strategy.

Communities considered leaders in waste reduction and diversion have taken the time to research, consult and develop supporting strategies to guide future actions, such as the City of Vancouver's Zero Waste Strategy and Single-use Plastic Reduction Strategy and the City of Toronto's Long Term Waste Management Strategy and Circular Economy Procurement Strategy. As part of the Solid Waste Master Plan development, the City of Ottawa can learn from these leaders and take the opportunity to develop specific strategies to provide direction and authority to promote the principles of a Circular Economy, featuring waste reduction, reuse and diversion that extends well beyond Blue Box recycling and organics diversion and provides additional benefits of GHG reduction from the various waste minimization measures.



### 8.3 Future Waste Management Considerations

The principles of the Circular Economy are playing an increasingly important role in guiding government policies and actions, especially when it comes to the two key features: EPR and waste minimization/diversion.

In the case of EPR, generally speaking, the MSW stream can be seen to be comprised of materials that are readily “stewardable”, e.g. CCME’s the list of Phase 1 EPR materials – packaging and printed paper, waste electronics, Municipal Hazardous or Special Waste - and Phase 2 EPR materials – carpets, mattresses, furniture, C&D waste, and materials that are non-stewardable, e.g. yard waste and fruit and vegetable produce, as argued by farmers. While the Phase 1 list of EPR materials has been implemented in Ontario, timelines for the Phase 2 list are uncertain. That said, the *Waste Free Ontario Act* lays the framework for expanding EPR commitments. While the Strategy for a Waste-Free Ontario: Building the Circular Economy not only targets appliances, CRD (construction, renovation and demolition waste), carpets and mattresses for future EPR programs, and establishes timelines for their development, these Phase 2 materials are ignored under the new Made-in Ontario Environment Plan, which includes only a cursory statement acknowledging the need to consider more EPR programs. The extent to which municipalities can influence the Ontario provincial government to keep moving forward and target the Phase 2 stewardable goods remains to be seen.

Municipal governments, however, have access to a variety of policies to foster greater waste reduction and diversion within its boundaries. Material bans and landfill pricing, Circular Economy procurement, levies and incentives are all potential measures to be considered to help reduce the quantity of material being sent to landfill, pertaining to mostly the residential sector.

Investment in an automated cart collection system for garbage, recycling and food waste would not make sense for the City of Ottawa to consider at this time, until the Blue Box program in Ontario fully transitions to full EPR and the implications on the City’s collection system are better understood.