

**Textile Waste & The 3R's:
Textile waste strategy recommendations for the City of Toronto**

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Abstract

The outsourcing of manufacturing to low-wage countries in concert with the rise of fast fashion business models has resulted in an abundance of low-cost and low-quality textile products. This has led to increased consumption and shortened product lifecycles, the consequence of which is increased textile waste. This waste stream generates environmental, economic, and social consequences in countries of both production and consumption. As such, it is necessary for municipalities, like the City of Toronto, to adopt a comprehensive textile recycling strategy to divert these materials from landfills. The 3R Waste Hierarchy provides a framework on which to model such a strategy. Strategies based on the 3R components of Reduce, Reuse, and Recycle help to minimize the amount of waste disposed while conserving natural resources and extracting the maximum value out of already produced products. The first component, Reduce, focuses on changing consumption habits to prevent the creation of waste, and in the context of textile waste aim to move consumers away from the purchase of fast fashion products. The fast fashion retail model is premised on introducing new products to stores as quickly as possible. In this model, clothing quickly becomes outdated or falls apart, leading to disposal. The second component, Reuse, focuses on using an item again and prolonging its life. Textiles can be sold or donated to second-hand retailers to be used by a new owner. Thrift stores comprise the largest portion of the second-hand market. They accept donations of used clothing, which are then sold in their retail stores or to for-profit recyclers to generate revenue. Lack of information is a major barrier to the success of reuse strategies. Consumers generally do not understand what can be donated, choosing instead to throw away items they thought donation centres would not accept. The final component, Recycle, involves recovering the valuable raw materials from a product and utilizing these as inputs into a new product. Mechanical and chemical textile recycling processes are used to break down textiles and produce new fibres. Depending on the process, the resulting fibres are either of lower or same quality as the original fibres, and can be utilized for a variety of applications. For each 3R component, strategies to address textile waste are identified and evaluated according to their potential efficiency, effectiveness, and feasibility. Textile handling and collection strategies are also analyzed using the same criteria. Accordingly, to address its textile waste, the City of Toronto is recommended to introduce voluntary reduction strategies, such as textile collection boxes and green procurement, and education campaigns. Over time the City should move towards full compliance using by-laws mandating building diversion levels and landfill bans. By implementing such a strategy, the City of Toronto can address the impact of its textile waste, and serve as a model for other Canadian municipalities looking to do the same.

Foreword

My MES Major Paper relates to numerous aspects of my MES Plan of Study (“POS”). My major paper, *Textile Waste & The 3R’s: Textile waste strategy recommendations for the City of Toronto*, examines the issue of textile waste and outlines an appropriate strategy the City of Toronto can adopt to address this waste stream. My POS is focused on business strategies for recycling and waste management, concentrating on waste management practices, the life-cycle of products, and waste reduction implementation strategies.

Specifically, my major paper relates to the following learning objectives. In Component 1, which focuses on waste management practices and considers how industry can operate in open- and closed-loop systems, my paper addresses learning objectives 2 and 3. In Component 2, which looks at the life-cycle of products, my paper addresses learning objective 2. Finally, in Component 3, which considers how to successfully implement waste management strategies, my paper addresses learning objectives 2 and 3.

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Chapter One Overview

The textile industry is a massive global manufacturing industry, valued at \$842 billion USD¹, and producing an ever-increasing amount of new clothing, shoes, bedding, towels, uniforms, and other products to satisfy consumer demand. The rise of fast fashion, a business model focused on bringing new products to market as quickly as possible², and rapidly changing consumer preferences, has encouraged increased consumption among consumers. At the same time, clothing's use period has become shorter. Fast fashion garments typically are worn only ten times before they begin falling apart³, and much of the time, consumers discard items after only a couple wears⁴.

As a result of increased consumption, shortened lifecycles, and a shift to synthetic fibres, which do not decompose post-disposal, textile waste has emerged as a prominent issue. This waste stream generates environmental, economic, and social consequences in the countries both of production and of consumption. This paper examines the implications of textile waste, how it should be handled, and how this issue relates to the City of Toronto ("The City") and other Canadian municipalities.

The Textile Industry

The global textile and apparel industry accounts for 2% of the world's Gross Domestic Product ("GDP") and employs upwards of 57 million people worldwide⁵. While 25 years ago, developed countries in Europe and North America dominated textile and apparel production and supply, globalization and the search for lower production costs have resulted in a market shift towards Asia, primarily China⁶. In Canada, domestic production of finished manufactured textiles decreased by 29% between 1992 and 2015⁷. Over this same period, textiles imports increased by 75%⁸. Accordingly, domestic market share of clothes made in Canada dropped to 4.8% in 2015⁹, down from 40% in 2004¹⁰.

In 2005, the phase out of the Multi-Fibre Arrangement was completed, dismantling previous barriers to yarn, fabric, and clothing trade¹¹. The Multi-Fibre Arrangement, introduced in 1974, imposed quotas on developing countries that exported textiles and apparel to developed

¹ Sheng Lu, "Market Size of the Global Textile Apparel Industry: 2015 to 2020," *Fash455 Global Apparel & Textile Trade and Sourcing*, accessed from <https://shenglufashion.wordpress.com/2017/06/06/market-size-of-the-global-textile-and-apparel-industry-2015-to-2020/>

² Elizabeth Cline, *Overdressed: The Shockingly High Cost of Cheap Fashion* (New York: Penguin, 2012), 96.

³ Cynthia Goudeau, "Ready to Tear? A Study on Fashion and Consumer Disposal Behavior" (PhD diss., Oklahoma State University, 2014).

⁴ Maybelle Morgan, "Throwaway Fashion: Women have adopted a 'wear it once culture,' binning clothes after only a few wears," *Mail Online*, June 2015, accessed from <http://www.dailymail.co.uk/femail/article-3116962/Throwaway-fashion-Women-adopted-wear-culture-binning-clothes-wears-aren-t-pictured-outfit-twice-social-media.html>

⁵ "Global fashion industry statistics – International apparel," *FashionUnited*, accessed from <https://fashionunited.com/global-fashion-industry-statistics>

⁶ Robert Antoshak, "Forces of Change: The Global Textile Industry in Transition," *From the Field to The Shelf*, September 2009, accessed from <http://rantoshak.blogspot.ca/2009/03/forces-of-change-global-textile.html>

⁷ Statistics Canada, "Table 304-0014 –Manufacturers' sales, inventories, orders and inventory to sales ratios, by North American Industry Classification System (NAICS), Canada, monthly (dollars unless otherwise noted)," *CANSIM*, accessed from <http://www5.statcan.gc.ca/cansim/a26?lang=eng&id=3040014>

⁸ "Statistics Database," *World Trade Organization*.

⁹ "Apparel Industry Profile," *Government of Canada*, January 2017, accessed from https://www.ic.gc.ca/eic/site/026.nsf/eng/h_00070.html

¹⁰ Sandro Contenta, "Made in Canada: How globalization has hit the Canadian apparel industry," *The Star*, May 2013, accessed from https://www.thestar.com/news/insight/2013/05/27/made_in_canada_how_globalization_has_hit_the_canadian_apparel_industry.html

¹¹ Diana Wyman, "Stretching or Shrinking? The Textile & Clothing Industries in Canada," *Statistics Canada*, November 2009, accessed from <http://www.statcan.gc.ca/pub/11-621-m/11-621-m2005022-eng.htm>

countries, in an attempt to protect textile industries in developed nations¹². Following the break-up of the arrangement producers in developed countries shifted more of their production to developing countries characterized by low wages¹³, such as China, India, and Bangladesh. As labour constitutes 20-40% of the cost of garment production¹⁴, offshoring production presented producers from developed countries with opportunities to lower production costs in this labour-intensive industry. As a result, China has dominated the global textile and apparel export market for over a decade, with countries like Bangladesh, Vietnam, and India capturing an increasing portion of these expanding export markets¹⁵. Table 1 provides a comparison of textile sector wages among apparel exporting and importing countries.

Table 1: Comparison of Hourly Labour Cost in Textile Industry¹⁶

Country	Hourly Labour Cost (in US\$/Hour)
Bangladesh	\$0.62
Vietnam	\$0.74
Indonesia	\$0.95
India	\$1.12
China	\$2.65
United States	\$17.71
Germany	\$30.03
France	\$31.61

Source: "Hourly Labor Cost Textile Industry -2014," *Werner International*, January 2015.

The textile and apparel industries are expected to continue to grow into the future. The global textile market, valued at \$842.7 billion USD in 2016, is predicted to reach approximately \$1,004.6 billion USD by 2021, with an average annual growth rate of 3.6%. Additionally, the global apparel retail industry's value is forecasted to grow 5.7% annually between 2015 and 2020, increasing from \$1,254.1 billion USD in 2015 to approximately \$1,652.7 USD by 2020¹⁷. Rising population, disposable income, and urbanization, especially in emerging economies like China, India, and Mexico, all drive world demand for textile and apparel products¹⁸. Furthermore, consumption focused business models, like the fast fashion model, encourage increased expenditure on low-cost, low-quality clothing, which further stimulates demand as well as a high turnover of product. Along with escalating production and consumption, there has been a corresponding increase in the environmental and social harms associated with the textile industry.

¹² *Supra* at note 6.

¹³ *Supra* at note 11.

¹⁴ Cline, *Overdressed*, 42.

¹⁵ *Supra* at note 8.

¹⁶ "Hourly Labor Cost Textile Industry -2014," *Werner International*, January 2015, accessed from <http://www.werner-newtwist.com/en/news1-vol-011/index.htm>

¹⁷ *Supra* at note 1.

¹⁸ "Textiles Market Analysis by Raw Material (Cotton, Chemical, Wool, Silk), By Product (Natural-Fibres, Polyester, Nylon), By Application (Household, Technical Fashion & Clothing), By Region (North America, Europe, Asia Pacific, And Segment Forecasts, 2014-2025 –Industry Overview," *Grand View Research*, January 2017, accessed from <http://www.grandviewresearch.com/industry-analysis/textile-market>

Issues with Textile Waste

Textile waste is created at both the pre-consumer and post-consumer stages. Pre-consumer waste includes the by-products of the textile industry, whereas post-consumer waste includes any clothing or household textiles that are no longer wanted or needed¹⁹. While most textile waste can be recycled in some way, a large portion ends up discarded in landfills. In the United States the volume of post-consumer textile waste increased by 40% between 1999 and 2009; however, the textile waste diversion rate only increased by 2% over the same period. This means growing amounts of textile waste end up in landfills²⁰. Disposal of textile waste via landfills raises a myriad of environmental, economic, and social issues which occur at both the production level and the post-consumption level. These are discussed in more detail below.

Disposing of textiles via landfills creates further demand for raw materials and more production to create new products to replace those which were thrown away. This leads to the continuation of unsustainable production practices in the textile industry, which are outlined in Table 2.

Table 2: Overview of Textile Production Processes & Associated Issues²¹

Step	Associated Issues	Prominent Examples
<p><u>Fibre Production:</u> The cultivation or production of fibres. Includes plant-based, animal-based, and synthetic fibres.</p>	<p><u>Plant-Based Fibres:</u> Cotton, the most widely used natural fibre, is highly water and pesticide dependent, and requires considerable amounts of land to be diverted from other potential land or crop use.</p> <p><u>Animal-Based Fibres:</u> These fibres, such as wool, camel hair, and cashmere, require large parcels of land to be used for animal grazing, leading to increased soil salinity and loss of biodiversity²². Animal agriculture also consumes large amounts of water and utilizes pesticides and insecticides to prevent disease and stimulate higher yields, which can pollute waterways²³. Animal-based fibres also raise issues around animal rights, with many allegations of animal abuse in the industry.</p> <p><u>Synthetic Fibres:</u> These man-made fibres are energy intensive and produced using petroleum, a non-renewable resource.</p> <p>Additionally, the production of plant, animal, and synthetic fibres all require energy use, which result in greenhouse gas (“GHG”) production.</p>	<p><u>1. Conditions in the Aral Sea</u> Because of large-scale water withdrawal for irrigation of cotton producing land, the water levels of the Aral Sea are less than 10% of what they were 50 years ago. This has led to collapse of surrounding communities and fisheries, extinction of native fish species, and surface salination of former lake area²⁴.</p> <p><u>2. Pesticide Use</u> Cotton is extremely chemically dependent, resulting in 25 to 77 million cases of acute and chronic pesticide poisoning in agricultural workers and children each year²⁵.</p>

¹⁹ Rahul Gadkari and M.C. Burji, “Textiles Waste Recycling,” *Textile Value Chain*, accessed from <http://www.textilevaluechain.com/index.php/article/technical/item/273-textiles-waste-recycling>

²⁰ “The Facts about Textile Waste (Infographic),” *Harmony*, August 2014, accessed from <https://harmony1.com/textile-waste-infographic/>

²¹ Nicole Thompson, “Textile Waste: An overview of the issue of textile waste and current recycling processes,” August 2016.

²² “Wool, Fur, and Leather: Hazardous to the Environment,” *PETA*, accessed from <http://www.peta.org/issues/animals-used-for-clothing/animals-used-clothing-factsheets/wool-fur-leather-hazardous-environment/>

²³ “The Textile Process,” *Chemsec Textile Guide*, accessed from <http://textileguide.chemsec.org/find/get-familiar-with-your-textile-production-processes/>

²⁴ Jens Soth, Christian Grasser, and Romina Salerno, “The Impact of Cotton on Fresh Water Resources and Ecosystems,” *WWF International*, May 1999, accessed from http://d2ouvy59p0dg6k.cloudfront.net/downloads/impact_long.pdf

²⁵ “The Deadly Chemicals in Cotton,” *Environmental Justice Foundation & Pesticide Action Network UK*, 2007, accessed from http://ejfoundation.org/sites/default/files/public/the_deadly_chemicals_in_cotton.pdf

<p><u>Yarn & Fabric Production:</u> Once fibres are harvested or produced they are spun into yarn. The yarn is then used to create fabric, through weaving, knitting, or non-woven processes.</p>	<p>During these processes, numerous chemicals are added to fibres and yarn to increase strength and reduce friction. These chemicals can be potentially hazardous²⁶.</p> <p>GHG emissions are also produced during both stages</p>	<p><u>1. Nonylphenol Ethoxylates (“NPEO”)</u> NEPO is commonly used in spinning oils and sizing chemicals. NEPO degrades into Nonylphenol (“NP”), which can accumulate in body tissue and is toxic to aquatic life. Additionally, high exposure to NP can impact human fertility and fetal health²⁷.</p>
<p><u>Textile Treatment:</u> This step includes pre-treatment, which prepares fabric for dyes and further treatments, dyeing and printing, and treatment of fabric.</p>	<p>During this stage, fabrics are treated with a variety of potentially hazardous chemicals and dyestuffs to achieve different colours, prints, and finishes²⁸. These processes produce wastewater, which is then released into local waterways, leading to water degradation. Chemicals found in discharged wastewater are highly toxic to aquatic life and bio-accumulate in fish.</p> <p>Given the nature of waterways, the environmental risk posed by wastewater is not confined to the immediate area, as wastewater discharged into rivers may eventually flow into the sea, and then continue to spread around the globe.</p> <p>GHG emissions are also produced during these stages of production.</p>	<p><u>1. The Citarum River</u> Indonesia’s Citarum River is considered the world’s dirtiest river. Numerous textile manufacturing plants are situated along the river and discharge their wastewater into it. Tests on water discharged from nearby textile manufacturing plants along the river have found the presence of nonylphenol, an endocrine disruptor that is highly toxic and persistent²⁹.</p> <p><u>2. China</u> Approximately 2.5 trillion litres of wastewater from textile manufacturers are discharged into Chinese rivers annually³⁰. Compounds found via testing are known to be highly toxic, persistent, and in some cases, carcinogenic in animals and humans³¹. Industrial wastewater is also responsible for pollution of large quantities of foodstuffs and aquatic products³².</p>
<p><u>Garment Construction:</u> This stage transforms finished fabric into a final garment, through processes such as cutting and sewing.</p>	<p>As garment construction is a labour-intensive process, much of this work has been offshored to low-wage countries, raising human rights issues. In the textile industries in countries like Bangladesh, Vietnam, and Indonesia wages before tax and including overtime provide workers with less than one-third of the income required for a living wage³³.</p>	<p><u>1. Rana Plaza</u> In 2013, an eight-story building in Bangladesh containing five clothing factories collapsed, killing 1,100 workers and injuring 2,500 people. The morning of the collapse, many workers</p>

²⁶ *Supra* at note 23.

²⁷ “10 Toxic Chemicals to Avoid in Your Products,” *Source Intelligence*, July 2015, accessed from <http://source.ethicalfashionforum.com/article/10-toxic-chemicals-to-avoid-in-your-products>

²⁸ “Textiles Come with a Toxic Footprint,” *Chemsec Textile Guide*, accessed from <http://textileguide.chemsec.org/find/textiles-come-with-a-toxic-footprint/>

²⁹ “Toxic Threads: Polluting Paradise,” *Greenpeace International*, April 2013, accessed from <http://www.greenpeace.org/international/en/publications/Campaign-reports/Toxics-reports/Polluting-Paradise/>

³⁰ Lydia Heida, “Can Waterless Dyeing Processes Clean Up the Clothing Industry,” *Environment 360*, June 2014, accessed from http://e360.yale.edu/feature/can_waterless_dyeing_processes_clean_up_clothing_industry_pollution/2775/

³¹ “Toxic Threads: Putting Pollution on Parade,” *Greenpeace International*, November 2012, accessed from <http://www.greenpeace.org/international/Global/international/publications/toxics/Water%202012/ToxicThreads02.pdf>

³² “Cleaning up the Fashion Industry,” *Institute of Public & Environmental Affairs*, April 2012, accessed from <http://114.215.104.68:89/Upload/Report-Textiles-One-EN.pdf>

³³ *Supra* at note 16.

	<p>Workers endure ‘sweatshop-like’ conditions, with long hours and compulsory overtime in unsafe and hazardous working conditions. Workers have limited protections available to them, and are threatened with non-renewal of their contracts if they engage in union activities, turn down overtime, or raise complaints.</p> <p>This stage of production also produces textile waste, as approximately 15% of fabric intended for garment construction ends up on the cutting room floor and is discarded³⁴.</p> <p>GHG emissions are also produced during these stages of production.</p>	<p>had refused to enter the building due to concerns about the structural integrity of the building. However, owners and managers forced workers in with threats of physical violence and withholding of pay³⁵.</p>
<p>Transport: This includes transport of materials through all stages of production and transport of finished product to end market.</p>	<p>As evidenced above, the production processes of textiles and garments involve numerous steps, and each of these steps does not necessarily occur in the same area, or even the same country. As such, transport does not only occur at the end of the production process to take products to their final markets for retail, but also throughout the entire production process.</p> <p>Each movement within the textile supply chain results in GHG emissions.</p>	<p>1. Import Transportation Costs Over two pounds of carbon dioxide (“CO₂”) equivalent emissions are generated when transporting a single t-shirt from Xinjiang, China to Los Angeles³⁶. Considering 98% of clothing bought in the United States is imported³⁷, transportation generates a significant amount of GHGs.</p>

Sources:

“10 Toxic Chemicals to Avoid in Your Products,” *Source Intelligence*, July 2015.
Benjamin Marias, “Textile Recycling at a Glance” (presented at Performance Days, Munich, May 2014).
“Cleaning up the Fashion Industry,” *Institute of Public & Environmental Affairs*, April 2012.
“Factory Collapse in Bangladesh,” *Institute for Global Labour and Human Rights*.
“Impact of Fashion,” *Reformation*.
Jens Soth, Christian Grasser, and Romina Salerno, “The Impact of Cotton on Fresh Water Resources and Ecosystems,” *WWF International*, May 1999.
Lydia Heida, “Can Waterless Dyeing Processes Clean Up the Clothing Industry,” *Environment 360*, June 2014.
Nicole Thompson, “Textile Waste: An overview of the issue of textile waste and current recycling processes,” August 2016.
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“The Textile Process,” *Chemsec Textile Guide*.
“Toxic Threads: Polluting Paradise,” *Greenpeace International*, April 2013.
“Toxic Threads: Putting Pollution on Parade,” *Greenpeace International*, November 2012.
“Wool, Fur, and Leather: Hazardous to the Environment,” *PETA*.

Another concern related to the disposal of textile waste is the physical presence of such waste in landfills. Despite high recyclability, it is estimated that textile waste comprises five to ten percent of materials in Canadian landfills³⁸, and as noted above, the volume of textile waste is rising rapidly, increasing by nearly 40% between 1999 and 2009³⁹. Each Toronto households is estimated to throw away 18 kilograms of textiles each year⁴⁰. In addition to the negative and

³⁴ Benjamin Marias, “Textile Recycling at a Glance” (presented at Performance Days, Munich, May 2014), accessed from <https://www.performancedays.com/fair/presentations/details/textile-recycling-at-a-glance.html>

³⁵ “Factory Collapse in Bangladesh,” *Institute for Global Labour and Human Rights*, accessed from <http://www.globallabourrights.org/campaigns/factory-collapse-in-bangladesh>

³⁶ “Impact of Fashion,” *Reformation*, accessed from <https://www.thereformation.com/whoware#impactOfFashion>

³⁷ *Ibid.*

³⁸ Sabine Weber, “How Consumers Manage Textile Waste” (Master’s Thesis, University of Waterloo, 2015), accessed from https://uwspace.uwaterloo.ca/bitstream/handle/10012/9604/Weber_Sabine.pdf?sequence=1

³⁹ *Supra* at note 20.

⁴⁰ “Waste Management Guide Calendar –Apartment Buildings & Condominiums,” *City of Toronto*, 2017.

social consequences discussed previously, improper disposal also fails to capture the potential reuse and recycling value that remains in these materials. The impacts of these discarded textiles differ depending on their makeup. Specifically, there is a distinction between natural and synthetic fibres.

Natural fibres biodegrade over time; however, issues arise when these materials decompose in anaerobic conditions, like those found in landfills⁴¹. Decomposition in these environments produces both landfill gasses and acid leachate. Landfill gasses are comprised of GHGs, including CO₂ and methane, as well as hydrogen and various sulfides⁴². Furthermore, as textiles decompose, the various chemicals, dyes, and other compounds they have been treated with seep into the soil, creating acid leachate⁴³. In both these cases, gasses and leachate can continue to be produced long after the items have been discarded and the landfills are closed⁴⁴. Consequently, landfills require ongoing management, even after they have been closed. The City of Toronto continues to care for 160 closed landfill sites⁴⁵, costing the City considerable money and resources. Additionally, it is difficult to contain these gasses and leachate in the immediate area of the landfill. Thus, the surrounding air quality may become compromised and groundwater contaminated⁴⁶.

Synthetic fibres, on the other hand, do not decompose. This means when synthetic fibres are discarded, they permanently occupy space within the landfill. This raises a significant issue when landfill capacity limitations are considered. Currently, the Toronto owned Green Lane Landfill, purchased in 2007, has an estimated remaining site life of 10.52 years, if current diversion rates remain constant⁴⁷. Once the landfill reaches capacity, the City will be required to find a new landfill location, which raises socio-economic issues of siting and imposes high costs on the municipality. Residents tend to resist development of new landfills in their neighbourhoods, citing odour, unattractiveness, perceived health impacts, and depression of property values of surrounding residential areas⁴⁸. Consequently, waste facilities tend to be disproportionately located in minority and low-income areas, where communities lack both access to information about the health and economic risks associated with landfills, and the resources to protest and block development⁴⁹.

Establishing comprehensive textile recycling programs can aid in diverting textile waste from landfills. This, in turn, helps mitigate the environmental, social, and economic concerns arising during the pre-production and post-consumption stages.

⁴¹ *Supra* at note 21.

⁴² "Landfill Gas Basics" in Landfill Gas Primer: An Overview for Environmental Health Professionals, *Agency for Toxic Substances & Disease Registry*, November 2001, accessed from <http://www.atsdr.cdc.gov/hac/landfill/html/ch2.html>

⁴³ Mattias Wallander, "Why Textile Waste Should Be Banned from Landfills," *Triple Pundit*, January 2012, accessed from <http://www.triplepundit.com/2012/01/textile-waste-be-banned-landfills/#>

⁴⁴ *Supra* at note 21.

⁴⁵ "Attachment 1 –Final Long Term Waste Management Strategy," *City of Toronto*, 2016, accessed from <http://www.toronto.ca/legdocs/mmis/2016/pw/bgrd/backgroundfile-94038.pdf>

⁴⁶ *Supra* at note 21.

⁴⁷ WSP Canada Inc., "2015 Annual Progress Report, Green Lane Landfill: January 2015 –December 2015," *City of Toronto*, March 2016, accessed from http://www1.toronto.ca/City%20of%20Toronto/Solid%20Waste%20Management%20Services/1%20Overview/Green%20Lane%20Landfill/Documents/2015%20Green%20Lane%20LF%20Annual%20Progress%20Report_FULL%20May.pdf

⁴⁸ *Supra* at note 21.

⁴⁹ *Supra* at note 21.

The 3R Waste Hierarchy

A strategy for addressing and combatting the increasing problems of textile waste is to develop programs that incorporate the 3R Waste Hierarchy. The 3R strategy helps minimize the amount of waste being disposed of while conserving natural resources and extracting the maximum value out of already produced products⁵⁰. The components of the 3R strategy -Reduce, Reuse and Recycle - are ordered according to priority.⁵¹ The hierarchy can be utilized as a management tool to guide allocation of resources and policy formation.

“Reduce” challenges our current consumption driven culture, encouraging us to be mindful in our consumption through buying less, and in turn throwing away less⁵². Since some level of consumption is always necessary, “Reuse” involves using an item again and again in its original state. The item can either be repeatedly used for the same purpose, or it can be repurposed for something new, for example, worn out clothing can be reused as cleaning rags. Likewise, the product can be reused by the initial owner or by someone who has purchased it second-hand. The last step of the hierarchy is to “Recycle”. This involves recovering raw materials either through physical or chemical processes, and turning these inputs into new products⁵³. Some scholars propose a 4R strategy, which includes “Repair” as one of the components⁵⁴, but for the purpose of this paper “Repair” strategies will be discussed in relation to the “Reduce” stage.

The 3R Waste Hierarchy grew in popularity during the late 20th and early 21st centuries as increasing concern about global environmental issues and the depletion of natural resources facilitated a shift in waste management policies⁵⁵. Historically, waste management policies were focused on environmentally conscious waste treatment to avoid pollution at the local level. However, the emergence of large scale issues, like climate change, has resulted in more integrated policies motivated by sustainability and curbing waste generation⁵⁶. The 3R strategy is integrated in the United Nation’s Sustainable Development Goals. For example, the target of Goal 12 is to ensure sustainable consumption and production patterns by aiming to substantially reduce waste generation through prevention, reduction, recycling, and reuse by 2030⁵⁷. Numerous countries and cities around the world, including Canada⁵⁸ and the City of Toronto⁵⁹, also incorporate and encourage 3R principles as part of their waste management strategies.

⁵⁰ “Reduce Reuse Recycle: Waste Hierarchy,” *All-Recycling-Facts*, accessed from <http://www.all-recycling-facts.com/reduce-reuse-recycle.html>

⁵¹ Rinkesh, “The ‘Reduce, Reuse, Recycle’ Waste Hierarchy,” *Conserve Energy Future*, accessed from <http://www.conserve-energy-future.com/reduce-reuse-recycle.php>

⁵² *Ibid.*

⁵³ Parnuwat Usapein and Oraathai Chavalparit, “Evaluating the performance of 3R options to reduce landfill wastes and using the 3R indicator (3RI): case study of polyethylene factories in Thailand,” *Journal of Material Cycles & Waste Management* 17, no. 2 (December 2014): 304, doi: 10.1007/s10163-014-0336-9.

⁵⁴ Ishfaq Muhammad, “German Textile Recycling Benchmarking: Case I:CO” (Bachelor’s Thesis, HAMK University of Applied Sciences, 2013), accessed from <http://www.theseus.fi/bitstream/handle/10024/63989/Muhammad+Ishfaq+German+Textile+Recycling+Technology+last+modified+-+Copy.pdf?jsessionid=BEB953B4FA666DA61E86BAEF0002EE30?sequence=1>

⁵⁵ Shin-ichi Sakai, et al., “International Comparative Study of 3R and Waste Management Policy Developments,” *Journal of Material Cycles & Waste Management* 13, no. 2 (May 2011): 87, doi: 10.1007/s10163-011-0009-x.

⁵⁶ *Ibid.*

⁵⁷ “Goal 12 Targets” in Goal 12: Ensure Sustainable Consumption and Production Patterns, *United Nations*, accessed from <http://www.un.org/sustainabledevelopment/sustainable-consumption-production/>

⁵⁸ “Reduce, Reuse, Recycle,” *Environment and Climate Change Canada*, modified July 2014, accessed from <https://www.ec.gc.ca/gdd-mw/default.asp?lang=En&n=D3A22BDD-1>

⁵⁹ “Service Level Review: Public Works & Infrastructure Committee Presentation,” *City of Toronto*, June 2015, accessed from <http://www.toronto.ca/legdocs/mmis/2015/ex/bgrd/backgroundfile-86054.pdf>

A 3R strategy generates both economic and environmental benefits. As waste management is one of the costliest public services, reducing the volume of waste by either preventing its generation or diverting it to recycling facilities can substantially decrease these costs⁶⁰. Additionally, through reuse and recycling, the maximal amount of value can be extracted from a product. In turn, these strategies conserve precious resources and limit the amount of unnecessary production, thereby limiting harmful by-products. As well, since waste management and GHG emissions are strongly correlated⁶¹, 3R strategies can aid in GHG reduction, which is already a major goal for many cities. Reducing waste while promoting recycling reduces GHG emissions through reduction in energy utilization and waste incineration, and prevents methane gas generation in landfills⁶².

The 3R principles can be extended to address textile waste and serve as a basis for textile recycling programs. As the 3R strategy is well-known and intuitive, a textile recycling program based on this concept will be easy for individuals to understand and use. Figure 1 illustrates the 3R Waste Hierarchy and options to address textile waste using “Reduce, Reuse, and Recycle” strategies. These specific strategies are discussed in greater detail in Chapters 3, 4, and 5.

Figure 1: 3R Waste Hierarchy & Textiles



Given the size of the global textile industry, which is continuing to grow with the support of constant consumer demand, steps need to be taken to address the growth of textile waste. The disposal of textile waste produces local environmental and economic problems through landfilling and enables the continuation of harmful production processes. By adopting a comprehensive textile waste strategy that incorporates the 3R principles, cities can address local waste related issues while reaping economic gains. This also encourages residents to break the cycle of consumption and disposal that accepts environmentally and socially destructive

⁶⁰ Mushtaq Ahmed Memon, “Integrated Solid Waste Management Based on the 3R Approach,” *Journal of Material Cycles & Waste Management* 12, no. 1 (December 2009): 31, doi: 10.1007/s10163-009-0274-0.

⁶¹ *Supra* at note 51.

⁶² *Ibid.*

practices in producing countries. The City of Toronto's experience with waste management and the challenges and opportunities with regards to textile waste are discussed in detail in the next chapter.

Chapter Two

Toronto & Textile Waste

Toronto, the capital of Ontario, is one of Canada's largest and most diverse cities, and manages one of North America's largest municipal solid waste ("MSW") management operations⁶³. Currently solid waste management services ("SWMS") in Toronto collect waste and recycling curbside and accept materials at transfer stations, drop-off depots, and at Community Environment Days. This accumulated 483,000 tonnes of blue bin recycling and green bin organics and 524,000 tonnes of garbage in 2014⁶⁴. Overall, the City handles waste coming from residential sources, including single family residences and residences above commercial units, as well as approximately two-thirds of the City's multi-residential units. Additionally, the City is also responsible for waste coming from small commercial establishments, government divisions, charities, institutions, religions institutions, elementary and secondary schools, and it accepts private industrial, commercial, and institutional waste at transfer stations and landfills. All other waste is managed by the private sector, who do not need to adhere to the City's collection and diversion by-laws⁶⁵. The overall cost for the City to deliver its MSW services is around \$378 million a year⁶⁶. This system is primarily funded through user and tipping fees, which accounts for 74% of funds generated⁶⁷. The City also receives funds as part of Extended Producer Responsibility ("EPR") systems, like the Blue Bin program which is partially funded by paper and packaging industry stewards⁶⁸. Under an EPR program, producers are responsible for their products over the entirety of their lifecycle, including the disposal stage. Legislated EPR programs are mandatory for producers and have been used to manage a variety of materials, including electronic equipment, batteries, ozone-depleting substances, and used tires⁶⁹.

When it comes to textiles, Toronto currently advises residents to donate their unwanted textiles to non-profit organizations or bring them to City sponsored Community Environment Days. If neither of those options is possible, residents are then instructed to throw textiles in the garbage. The City discourages residents from placing textiles in recycling bins as the material can become caught in sorting machines, which can damage equipment and cause injuries⁷⁰. The City previously piloted a curb-side textile recycling pickup program in Etobicoke in the mid 1990s's; however, the program was dropped due to high operating costs and problems with textiles becoming wet and devaluing the loads^{71,72}.

⁶³ *Supra* at note 45.

⁶⁴ *Ibid.*

⁶⁵ *Ibid.*

⁶⁶ "Solid Waste Management 2017 Operating Budget," *City of Toronto*, 2017, accessed from <http://www1.toronto.ca/City%20Of%20Toronto/Strategic%20Communications/City%20Budget/2017/Analyst%20Notes/Operating/Final%202017%20Solid%20Waste%20BC%20Operating%20Budget%20Notes.pdf>

⁶⁷ *Ibid.*

⁶⁸ Joyce Chan, "The History of Recycling in Ontario," *Halton Recycles*, November 2012, accessed from <https://haltonrecycles.wordpress.com/2012/11/16/the-history-of-recycling-in-ontario/>

⁶⁹ "Frequently Asked Questions about Extended Producer Responsibility," *Environment and Climate Change Canada*, accessed from <https://www.ec.gc.ca/gdd-mw/default.asp?lang=en&n=246D12C9-1>

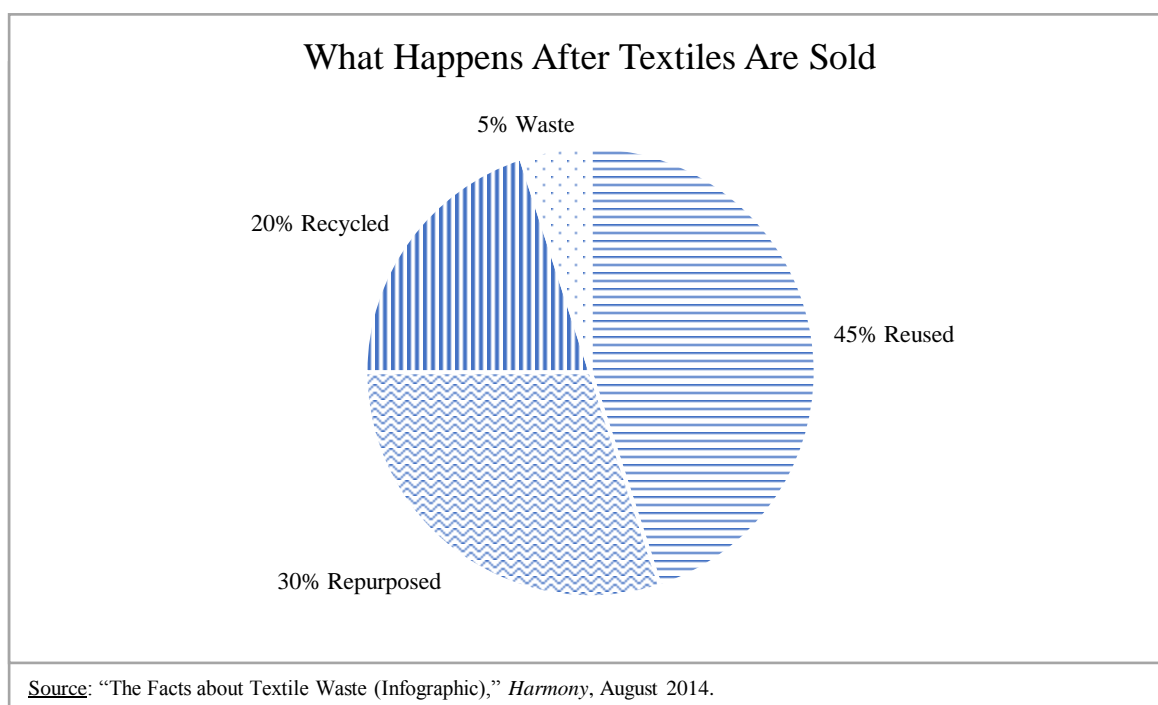
⁷⁰ "Bad Things Happen When the Wrong Items and Recycling Get Together," *City of Toronto*, accessed from <http://www1.toronto.ca/wps/portal/contentonly?vgnextoid=5627e8660d035510VgnVCM10000071d60f89RCRD>

⁷¹ "Appendix 1: Final List of Options," *City of Toronto*, accessed from <http://www.toronto.ca/legdocs/mmis/2015/pw/bgrd/backgroundfile-83453.pdf>

⁷² Since the attempt in Etobicoke, successful curb-side pick-up programs have been implemented in various communities in the United States as well as Colchester, Nova Scotia.

Textiles and clothing items are also collected through Toronto charities. Commonly this is done through drop off at collection boxes or charity locations; however, some charities, like Diabetes Canada and the Ontario Federation for Cerebral Palsy, will pick up donations from resident's homes. These organizations generate their revenue by selling collected items to charity-affiliated for-profit thrift stores like Value Village. Textiles and clothing items donated to charities are sorted and pieces with high resale potential, about 20% of the items, are sold in the charities' shops⁷³. Due to space and labour constraints, not all items received can be kept by the organizations, and the remaining 80% is sold to second-hand textile recyclers⁷⁴. In both these cases, revenue is generated for the organization, which is used to fund their charitable activities. Figure 2 outlines what happens to the textiles once they have been sold to second-hand recyclers.

Figure 2: What Happens After Textiles Are Sold⁷⁵



The majority of the textiles, 45%, are classified as wearable and exported as second-hand clothing to developing and low-income countries. The rest of the textiles are classified as unwearable; 30% of these are re-purposed as industrial rags and cloths, 20% are broken down into fibre using either mechanical or chemical recycling methods, and the final 5% is unusable and ends up as waste⁷⁶.

Several issues arise with Toronto's current textile waste strategy. While the City provides locations where residents can drop off textiles and clothing for donation, there are only a limited

⁷³ "Consumers," *Council for Textile Recycling*, accessed from <http://www.wearonaterecycle.org/action/consumers.html>

⁷⁴ *Ibid.*

⁷⁵ *Supra* at note 21.

⁷⁶ *Ibid.*

number of places on this list⁷⁷. Given that research has shown that 64% of people do not want to drive more than five miles to drop off reusable clothing⁷⁸, the apparent lack of locations for donation, and the distance to reach a location, may result in people opting to trash their textiles as the City also suggests. Clothing drop boxes, which appear mainly in parking lots, offer alternative locations to take textiles, yet the City does not advertise this as an option or provide a list of drop box locations, despite providing permits for 594 such boxes⁷⁹. As controversy has arisen around these drop boxes, with numerous illegitimate boxes operated by for-profit clothing exporters popping up around the City⁸⁰, the City's failure to mention these boxes as a donation option may lead residents to doubt their authenticity. Figure 3 shows a photo of a legal, permitted collection box (left) and an illegal box (right).

Figure 3: Legal vs. Illegal Textile Collection Box⁸¹



The City's website also advises residents to donate items "in good condition⁸²"; however, as most textiles are recyclable in some way, even items in poorer condition should still be donated. The City's message further adds to the confusion around textile recycling, with consumers feeling they should only donate items that are valuable and intact, resulting in a 15% textile diversion rate, with the rest being landfilled⁸³. Furthermore, the City's current strategy only targets residential textiles, while overlooking textile waste generated by institutional sources such as hospitals, schools, and government buildings, which can all produce considerable amounts of waste, particularly in facilities where uniforms are required. Finally, the City does

⁷⁷ "ReUseIt," *City of Toronto*, accessed from

<http://www1.toronto.ca/wps/portal/contentonly?vnextoid=c46d433112b02410VgnVCM10000071d60f89RCRD>

⁷⁸ Eric Lyday, "How Many Pounds of Textiles are Trashed Every Year?" *Daily Infographic*, February 2014, accessed from

<http://www.dailyinfographic.com/how-many-pounds-of-textiles-are-trashed-every-year>

⁷⁹ "Clothing Drop-Box Locations," *City of Toronto*, November 2016, accessed from

<http://www1.toronto.ca/wps/portal/contentonly?vnextoid=6b48c17be9337510VgnVCM10000071d60f89RCRD>

⁸⁰ Jack Lakey, "The Fixer: Clothing Donation Boxes Not So Charitable," *The Star*, September 2011, accessed from

https://www.thestar.com/yourtoronto/the_fixer/2011/09/05/the_fixer_clothing_donation_boxes_not_so_charitable.html

⁸¹ Nicole Thompson, *Textile Collection Boxes*, 2017.

⁸² *Supra* at note 70.

⁸³ Sabine Weber, "Combating Textile Waste," *Corporate Knights*, August 2016, accessed from

<http://www.corporateknights.com/channels/waste/combating-textile-waste-14709816/>

not address carpet waste, which accounts for 4% of landfill waste in Canada⁸⁴. Again, the City of Toronto advises residents to put unwanted carpets in the garbage, despite these materials being recyclable. Innovative companies, like Interface, can convert reclaimed carpets into new carpet tiles and divert materials from landfills⁸⁵.

Both the City of Toronto and the province of Ontario have recognized the implications of textiles in the waste stream and have committed to addressing this issue in their long-term waste strategies, specifically Toronto's Waste Strategy and Ontario's *Bill 151, Waste-Free Ontario Act*. Toronto's Waste Strategy aims to achieve a 70% residential waste diversion rate between 2016 and 2066 by emphasizing 3R activities, including better promotion and facilitation of the reduction and reuse of textiles⁸⁶. According to the City, strategies such as developing a textile diversion awareness campaign, providing support for reuse events, and establishing mobile and permanent drop-off centers, have the potential to divert up to 15,000 tonnes of textile waste from landfills over a ten-year period⁸⁷. At the provincial level, *Bill 151, Waste-Free Ontario Act* plans to move the province towards a circular economy, primarily through the transition to a full Extended Producer Responsibility framework⁸⁸. Textiles and clothing have been identified as materials that may fall under this system, where the producers or first importers are financially responsible for dealing with waste, in the future⁸⁹.

Various cities and countries worldwide have recognized the issues associated with textile waste and have begun acting to manage this waste stream. These programs provide models that Toronto can emulate when implementing its own textile waste management strategy. Table 3 provides an overview of textile waste strategies implemented nationally and internationally and where they fall in the 3R Waste Hierarchy.

Table 3: Current Textile Waste Strategies Worldwide

Location	Description	3R Waste Hierarchy
United Kingdom ⁹⁰	Love Your Clothes Campaign – awareness campaign that promotes better consumer habits and provides options for unwanted clothes	Reduce, Reuse, Recycle
San Francisco, CA ⁹¹	Collection bins through partnership with Goodwill	Reuse, Recycle
Markham, ON ⁹²	Collection bins through partnership with The Salvation Army	Reuse, Recycle

⁸⁴ "Where Do You Go to Recycle Your Old Carpet?" *Green Coast Recycling*, accessed from <https://www.greencostrubbish.com/where-do-you-go-to-lay-your-old-carpet-to-rest/>

⁸⁵ "Interface is Closing the Carpet Recycling Loop," *Interface*, accessed from http://www.interface.com/CA/en-CA/about/modular-carpet-tile/ReEntry-20-en_CA

⁸⁶ *Supra* at note 45.

⁸⁷ *Ibid.*

⁸⁸ *Ibid.*

⁸⁹ "Strategy for a Waste-Free Ontario: Building the Circular Economy," *Province of Ontario*, December 2016, accessed from http://www.downloads.ene.gov.on.ca/envision/env_reg/er/documents/2016/012-9356.pdf

⁹⁰ "About," *Love Your Clothes*, accessed from <http://loveyourclothes.org.uk/about>

⁹¹ Adele Peters, "San Francisco Mixes Design and Technology in Its New Plan to Recycle All Textiles," *Co.Exist*, February 2014, accessed from <https://www.fastcoexist.com/3024992/san-francisco-mixes-design-and-technology-in-its-new-plan-to-recycle-all-textiles>

⁹² *Supra* at note 83.

New York City, NY ⁹³	Collection bins through partnership with Housing Works, curbside collection partnership with Goodwill, collection bins at farmers markets	Reuse, Recycle
Colchester, N.S. ⁹⁴	Curbside pick-up of textiles	Recycle
France ⁹⁵	EPR system set up for clothing, linen, and footwear	Recycle
Weymouth, MA ⁹⁶	Clothing collection through public schools	Recycle
<p><u>Sources:</u> “About,” <i>Love Your Clothes</i>. Adele Peters, “San Francisco Mixes Design and Technology in Its New Plan to Recycle All Textiles,” <i>Co.Exist</i>, February 2014. Jessica Schreiber, “Re-FashioNYC” (presented at Tip of the Iceberg: Textile Diversion Strategies and Extended Producer Responsibility Symposium, Markham, Ontario May 4, 2016). “Market Players,” <i>ECO-TLC</i>. “Recycling in Colchester,” <i>Municipality of Colchester</i>. Sabine Weber, “Combating Textile Waste,” <i>Corporate Knights</i>, August 2016. “Weymouth Public Schools Textile Recycling Program,” <i>Massachusetts Department of Environmental Protection</i>, August 2013.</p>		

The strategies listed in Table 3, as well as the textile waste strategies currently proposed by the City of Toronto, are discussed in further detail in the following chapters. Through the implementation of a comprehensive textile waste strategy that incorporates all three aspects of the 3R Waste Hierarchy, Toronto can address and decrease the amount of textile waste the City produces each year. Furthermore, following the examples set by other cities and countries, and learning from their successes and failures, will increase the likelihood of program success in the City and help alleviate implementation issues.

⁹³ Jessica Schreiber, “Re-FashioNYC” (presented at Tip of the Iceberg: Textile Diversion Strategies and Extended Producer Responsibility Symposium, Markham, Ontario May 4, 2016).

⁹⁴ “Recycling in Colchester,” *Municipality of Colchester*, accessed from <http://www.colchester.ca/recycling-in-colchester>

⁹⁵ “Market Players,” *ECO-TLC*, accessed from <http://www.ecotlc.fr/page-297-information-in-english.html>

⁹⁶ “Weymouth Public Schools Textile Recycling Program,” *Massachusetts Department of Environmental Protection*, August 2013, accessed from <http://www.mass.gov/eea/docs/dep/recycle/reduce/cs-weymouth.pdf>

Chapter Three **Reduce**

The first principle in the 3R Waste Hierarchy is Reduce. This component focuses on changing our consumption habits to prevent the creation of waste. By encouraging consumers to be mindful of their purchases, and to question whether all purchases are needed, this strategy avoids the accumulation of unnecessary and unused items that would eventually go into the waste stream. However, a significant obstacle to reducing textile waste is the widespread adoption of the fast fashion business model by apparel retailers and consumers.

The Fast Fashion Model

The fast fashion model is a retail strategy premised on supplying trendy products to retail stores as quickly as possible. Moving away from traditional fashion retail methods, which are characterized by seasonal fashion trends, fast fashion retailers constantly put out new inventory throughout the year⁹⁷. In addition to the ever-incoming selection of new merchandise, fast fashion is known for low prices, continually changing assortment, fashionable styles, and lower quality.

Unlike for technology, where innovation results in improvements to products, innovation in the fashion results in arbitrary changes in style,⁹⁸ creating a new ‘must-have’ trend. This issue is exacerbated by social media. Social media has aided fast fashion since new styles are put on display, which drives consumers to emulate trends. Fast fashion retailers provide consumers with an inexpensive way to be fashionable, and because retailers are on top of new and emerging trends by offering continually incoming product, consumers can use these retailers to keep up with changing trends.

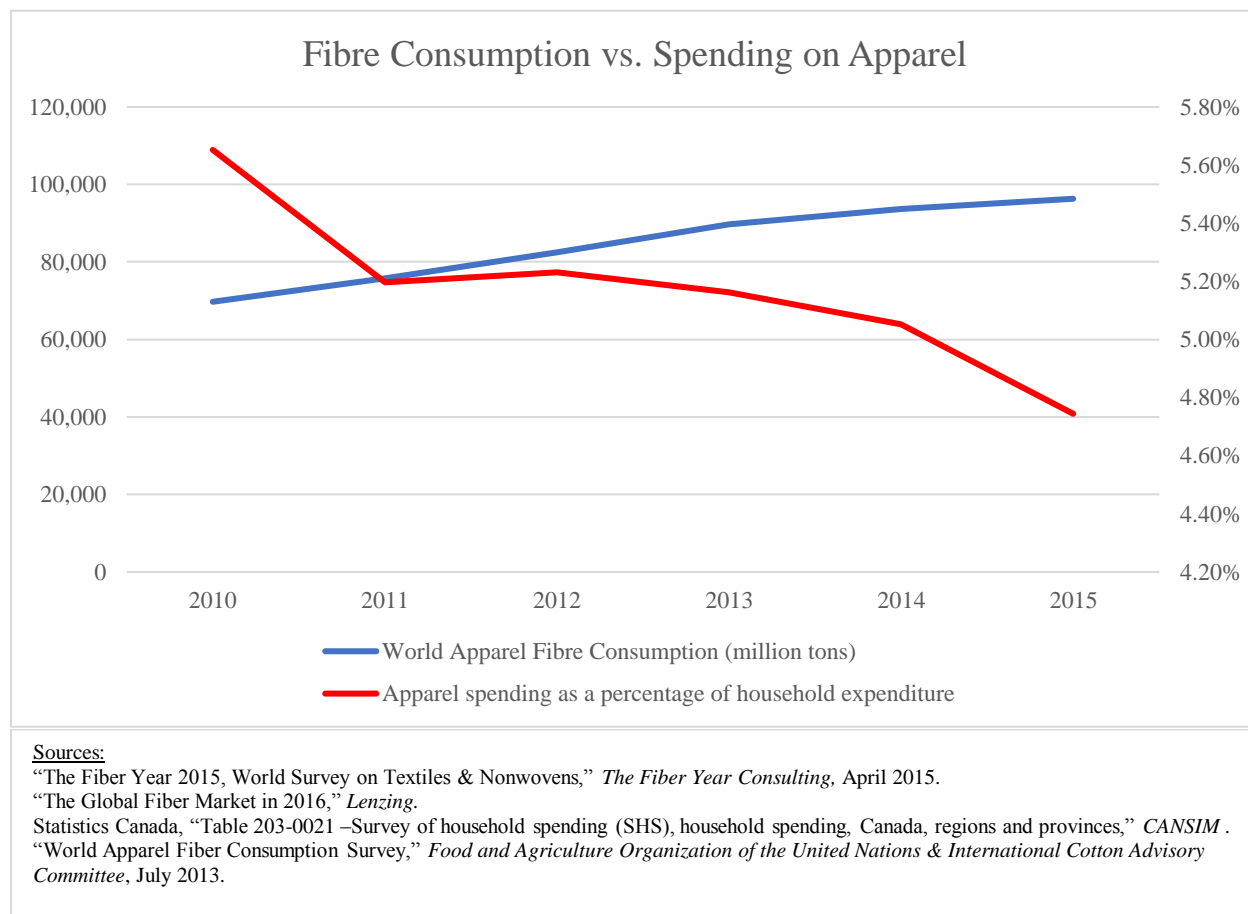
As a result, consumers are buying more apparel at lower prices. As Figure 4 illustrates, the global demand for fibre has been increasing steadily; however, the percentage of household expenditure on apparel items in relation to total consumption spending has been decreasing. This suggests that while households are spending less overall on clothing, they are buying more clothing items than before. This is a direct consequence of fast fashion models. This is a global trend, with more than 80 billion clothing items purchased worldwide every year, an increase of 400% from twenty years ago⁹⁹.

⁹⁷ Cline, *Overdressed*, 96.

⁹⁸ Cline, *Overdressed*, 111.

⁹⁹ Steve Hargreaves, “Your Clothes are Killing Us,” *CNN*, May 2015, accessed from <http://money.cnn.com/2015/05/22/news/economy/true-cost-clothing/>

Figure 4: Global Fibre Consumption vs. Canadian Household Spending on Apparel^{100 101}



The consequence of increased clothing consumption is that many pieces of clothing will either quickly go out of style, be discarded, or fall apart, resulting in more textile waste.

The Emergence of Fast Fashion

Traditionally, fashion retailers followed six month cycles, producing a fall/winter collection and a spring/summer collection. Consumers in the early 1980’s generally were less aware of changing trends. As such, retailers could forecast several seasons in advance¹⁰⁴.

¹⁰⁰ “World Apparel Fiber Consumption Survey,” *Food and Agriculture Organization of the United Nations & International Cotton Advisory Committee*, July 2013, accessed from https://www.icac.org/cotton_info/publications/statistics/world-apparel-survey/FAO-ICAC-Survey-2013-Update-and-2011-Text.pdf

¹⁰¹ “The Fiber Year 2015, World Survey on Textiles & Nonwovens,” *The Fiber Year Consulting*, April 2015, accessed from <https://www.textilemedia.com/assets/Uploads/TFY15-sample-pages.pdf>

¹⁰² “The Global Fiber Market in 2016,” *Lenzing*, accessed from <http://www.lenzing.com/en/investors/equity-story/global-fiber-market.html>

¹⁰³ Statistics Canada, “Table 203-0021 –Survey of household spending (SHS), household spending, Canada, regions and provinces,” *CANSIM*, accessed from <http://www5.statcan.gc.ca/cansim/a26?lang=eng&id=2030021>

¹⁰⁴ *Supra* at note 3.

However, due to socio-cultural changes and social media¹⁰⁵, consumers have become more knowledgeable about current fashion trends, more style-orientated¹⁰⁶, and have begun to demand current, on-trend items. This demand became more pronounced in the 2000's with increasing access to the internet. Access to the internet enabled consumers to watch fashion shows, read apparel blogs, and see images of street-style and celebrities, exposing them to the fashion industry from which many were previously excluded¹⁰⁷.

At the same time, outsourcing, as a result of globalization, resulted in long supply chains, with different manufacturing steps occurring in different countries. This led to long lead times, the time between placing an order and receiving it, and required apparel collections to be decided upon more than a year before items would arrive in stores¹⁰⁸. Despite efforts to predict what would be popular once styles arrived in stores, traditional fashion retailers are often inaccurate, meaning pre-season forecast errors can be as high as 50%¹⁰⁹. As a result, products sit on shelves longer and are subject to constant sales and markdowns to sell unwanted stock¹¹⁰.

To overcome these obstacles, the fast fashion business model focuses on quick response strategies, which shorten the time between production and distribution. Fast fashion retailers institute flexible supply chains, establishing both long-standing and short-term supplier relationships¹¹¹. To ensure this model works, fast fashion companies rely on a constant exchange of information between retail locations, factories, and corporate headquarters about what is currently selling in stores and what trends are emerging¹¹². As a result, forecast accuracy can be as high as 95%, with a 95% sell-through rate¹¹³. Utilizing these quick response techniques, fast fashion retailers have new products in their stores in a matter of weeks. Zara, considered the first fast fashion retailer, can design, produce, and deliver new garments to stores within a two-week time frame. For Forever 21, this process takes six weeks, and for H&M, this process takes eight weeks¹¹⁴.

Figure 5: Fast Fashion Retailers¹¹⁵



¹⁰⁵ Veronica Gabrielli, Ilaria Baghi, and Vanni Codeluppi, "Consumption Practices of Fast Fashion Products: a consumer-based approach," *Journal of Fashion Marketing and Management* 17, no. 2 (2013), doi: 10.1108/JFMM-10-2011-0076.

¹⁰⁶ *Supra* at note 3.

¹⁰⁷ *Supra* at note 3.

¹⁰⁸ Cline, *Overdressed*, 97.

¹⁰⁹ Margaret Bruce and Lucy Daly, "Buyer Behaviour for Fast Fashion," *Journal of Fashion Marketing and Management* 10, no. 3 (2006), doi: 10.1108/13612020610679303.

¹¹⁰ *Ibid.*

¹¹¹ *Ibid.*

¹¹² Cline, *Overdressed*, 98.

¹¹³ *Supra* at note 109.

¹¹⁴ Cline, *Overdressed*, 98-99.

¹¹⁵ Faith Bowman, "Quantity Over Quality –the decline of standards in fast fashion," *Fashion Edits*, 2014, accessed from <http://www.fashionedits.com/blog/quantity-quality-decline-standards-fast-fashion/>

The fast fashion model is profitable, despite low clothing prices. Fast fashion models profit because they encourage a high volume of purchasing from consumers. Short product lifecycles and limited availability are used to achieve this continued consumption. Product lifecycles are the time from introduction of the product in retail locations until its decline, either due to the product selling out or the style falling out of fashion¹¹⁶. Product lifecycles have become increasingly shorter with the emergence of fast fashion, with the product lifecycle of fast fashion apparel products being understood as one month or less¹¹⁷. Additionally, retailers produce relatively small batches of each style, which ensures there is always something new in stores and encourages consumers to frequently revisit stores¹¹⁸. This also limits overstock and the need for sales. For example, Zara's unsold inventory accounts for less than 10% of their stock, whereas the industry average is 17-20%¹¹⁹. Combined, short product lifecycles and limited availability create a sense of product scarcity, which encourages consumers to purchase products immediately and shop more frequently¹²⁰. As a result, despite low unit prices, the average garment price is around \$15¹²¹, and fast fashion retailers have been outperforming traditional apparel companies with average profit margins of approximately 16%, compared to 7% with traditional apparel models¹²².

Figure 6: Prices at H&M and Forever 21¹²³



¹¹⁶ Liz Barnes and Gaynor Lea-Greenwood, "Fast Fashion in the Retail Store Environment," *International Journal of Retail & Distribution Management* 38, no. 10 (2010), doi: 10.1108/09590551011076533.

¹¹⁷ Sasikarn Chatvijit Cook and Jennifer Yurchisin, "Fast Fashion Environments: consumer's heaven or retailer's nightmare?" *International Journal of Retail & Distribution Management* 45, no. 2 (2017), doi: 10.1108/IJRD-03-2016-0027.

¹¹⁸ Cline, *Overdressed*, 99.

¹¹⁹ *Ibid.*

¹²⁰ *Supra* at note 117.

¹²¹ *Supra* at note 3.

¹²² *Supra* at note 3.

¹²³ Nicole Thompson, *Prices at Fast Fashion Retailers*, 2017.

Given the cheap prices of fast fashion apparel, consumers do not necessarily feel a sense of risk when it comes to purchasing products. The perceived scarcity of fast fashion items, due to limited supply and availability, encourages impulse buying¹²⁴. Because the price is low, if consumers make an impulse purchase they may not end up using, the impact of that decision to consumers is also low. As a result, it is reported that only about 20% of clothing in the average person's closet is worn on a regular basis¹²⁵. There are numerous reasons for why consumers may overlook items in their wardrobe. Social media can influence the way consumers view their clothes. It can lead to feelings of boredom towards clothing and create pressure to continually wear something new, as not to be pictured in the same outfit twice¹²⁶. Furthermore, minor faults, such as improper fit, may not seem important when engaging in impulse buying, but prevent consumers from wearing the item later. Finally, return restrictions by retailers, such as short return timeframes or final sale of marked down items, may discourage consumers from returning their impulse buys¹²⁷.

The low price of fast fashion items also persuades consumers to accept a lower level of quality. Consumers believe fast fashion garments should cost about half the price of conventional apparel products, and both acknowledge and accept this means the product quality will be lower¹²⁸. This trade-off is justifiable for consumers as they commonly purchase fast fashion items for a one-time event or to follow a trend, which will quickly fall out of fashion. Therefore, most fast fashion items are only worn once or twice before being discarded, and as noted most fast fashion garments can only withstand ten wears before beginning to fall apart¹²⁹.

The result of this is increased turnover: low-quality fast fashion products break down faster and are thrown out faster. Then, due to the low price, they are replaced by something new, creating a vicious cycle leading to increased waste. Fast fashion items are discarded at approximately twice the frequency of non-fast fashion apparel¹³⁰. Furthermore, consumers equate the low-quality of fast fashion items with disposability, making them more likely to discard of items via landfills¹³¹.

Opportunities for Reduce

One way for Toronto to implement Reduce strategies for textile waste is to introduce education and awareness campaigns. The focus of such campaigns should be to educate consumers about sustainable purchasing and use decisions. Individuals who recognize the impact of environmental degradation are more likely to adjust their purchasing and consumption behaviours¹³². By illustrating the negative impacts of textile waste, both in the pre- and post-consumption phases, awareness campaigns can cultivate environmental concern and encourage

¹²⁴ *Supra* at note 117.

¹²⁵ Ray Smith, "A Closet Filled with Regrets," *The Wall Street Journal*, April 2013, accessed from <https://www.wsj.com/articles/SB10001424127887324240804578415002232186418>

¹²⁶ Maybelle Morgan, "Throwaway Fashion: Women have adopted a 'wear it once culture,' binning clothes after only a few wears," *Mail Online*, June 2015, accessed from <http://www.dailymail.co.uk/femail/article-3116962/Throwaway-fashion-Women-adopted-wear-culture-binning-clothes-wears-aren-t-pictured-outfit-twice-social-media.html>

¹²⁷ *Supra* at note 125.

¹²⁸ *Supra* at note 105.

¹²⁹ Hyun-Mee Joung, "Fast-Fashion Consumers' Post-Purchase Behaviours," *International Journal of Retail & Distribution Management* 42, no. 8 (2014), doi: 10.1108/IJRDM-03-2013-0055.

¹³⁰ *Supra* at note 3.

¹³¹ *Supra* at note 129.

¹³² Ida Ferrara & Paul Missios, "A Cross-Country Study of Household Waste Prevention and Recycling: assessing the effectiveness of policy instruments," *Land Economics* 88, no. 4 (2012), doi: 10.3368/le.88.4.710.

individuals to wear garments longer, purchase less, and move away from fast fashion consumption.

Educational campaigns should connect the consumer with products by educating consumers about product quality and environmental and social impacts of the product. Creating a connection between garments and consumers helps remove the connotation that these items are disposable¹³³. Encouraging people to wear clothing they already own reduces resource demand: an additional nine months of wear reduces waste, carbon, and water footprints by 20 to 30%¹³⁴.

Another strategy is educating consumers about the manufacturing process of textiles, so they understand their garments are more than just a piece of clothing, but rather, a cumulation of finite resources and labour. Honest-By is an example of how retailers can be involved in educating consumers before purchase, by requiring suppliers to share information about their production processes. This information is shared on the clothing labels, resulting in 100% transparency¹³⁵. Reformation is another retailer employing a similar strategy. The carbon dioxide, water, and waste savings of each product compared to the industry average is calculated and shared with consumers¹³⁶.

These standards help consumers understand what has gone into their products and where production takes place, giving them the information to make informed purchasing decisions¹³⁷. The City of Toronto could encourage local designers to engage in similar behaviours by providing incentives for retailers who adopt such strategies, through funding or access to resources. The City of Toronto can also highlight the work of already established groups such as Fashion Revolution, which encourages consumers to ask brand retailers “who made my clothes?” to illustrate supply chain conditions¹³⁸.

Labour violations and exploitation in the garment industry has been an issue among consumers and in the media. Raising awareness about issues within the textile manufacturing sector may encourage consumers to research where and how retailers produce before buying a product, slowing their pace of consumption and moving them away from fast fashion retailers. Additionally, by aligning with a social movement, citizens have the opportunity to become involved with changing the fashion industry. When an individual becomes actively involved in such a movement, the assumption is that their consumption behaviours will change to match their social beliefs.

The second component of textile waste awareness campaigns should address textile quality. Higher quality clothing will last longer, thus reducing the amount of textile waste produced. As society shifted from making their own clothing at home to purchasing from retailers, understanding of garment construction faded¹³⁹. Now, many people are unsure of how

¹³³ Cline, *Overdressed*, 221.

¹³⁴ Lucy Ravenhall, “Fast Fashion & the Destruction of Developing Countries,” *Eco Outfitters*, January 2016, accessed from <http://www.ecooutfitters.co.uk/blog/fast-fashion-the-destruction-of-developing-countries/>

¹³⁵ “About,” *Honest by*, accessed from <http://www.honestby.com/en/page/16/about.html>

¹³⁶ “Sustainable Practices,” *Reformation*, accessed from <https://www.thereformation.com/whoweare#sustainablePractices>

¹³⁷ *Supra* at note 135.

¹³⁸ “About,” *Fashion Revolution*, accessed from <http://fashionrevolution.org/>

¹³⁹ Cline, *Overdressed*, 87.

to check for quality and durability when purchasing clothing¹⁴⁰, and have become increasingly uninterested in the makeup of their clothing¹⁴¹. Awareness campaigns could provide information to help consumers gauge clothing quality, including how to evaluate seams, linings, and fabric content, as well as how to understand wash and care instructions, which will prolong the life of the garment if followed properly¹⁴². To stress the importance of quality and garment longevity, awareness campaigns could employ side-by-side visuals. Side-by-side visuals could contrast higher quality garment with a similar fast fashion item, showing the condition of each garment after multiple wears.

The City of Toronto could model an educational campaign after the U.K.'s successful *Love Your Clothes Campaign*. The campaign, which was launched in 2014 by the U.K charity WRAP, was developed in concert with industry, non-profit, and governmental actors. The campaign is aimed at changing the way consumers buy, use, and dispose of their clothing by educating consumers about the entire lifecycle of garments¹⁴³. The campaign was short-listed for the Chartered Institution for Wastes Management's 'most effective communications campaign' in 2016¹⁴⁴. It uses infographics, instructional videos, community engagement, and provides event information to encourage consumers to change their purchasing habits, provide better care for clothing they already own, and dispose of unwanted clothing properly¹⁴⁵. The campaign also utilizes social media to promote its mission, which would also be an important method of communication in a campaign launched by the City of Toronto.

In Canada, over 62% of citizens over the age 13 engage on various social media networks, including Facebook, Twitter, and Instagram¹⁴⁶, with the City of Toronto being one of the top three connected cities¹⁴⁷. Furthermore, social media usage is increasing among millennials¹⁴⁸, the group primarily targeted by fast fashion retailers, making an awareness campaign integrated with social media an opportune way to reach this demographic.

In addition to awareness campaigns, The City of Toronto can also promote and provide support for repair and swap events. Once again, as society shifted from making clothing to purchasing clothing, people failed to retain sewing and repair skills¹⁴⁹. Now, few people have the skills to repair to garments, choosing instead to discard items¹⁵⁰. The City of Toronto currently supports the Toronto Repairathon, a free public event where people can bring one to two clothing items to be repaired by volunteers, while also running workshops to teach basic mending skills¹⁵¹. The City of Toronto should continue to support this program, aiming to increase the

¹⁴⁰ Edward Langley, Stefan Durkacz, and Simona Tanase, "Clothing Longevity and Measuring Active Use," *Waste and Resources Action Programme*, August 2013, accessed from http://www.wrap.org.uk/sites/files/wrap/priv_download/Clothing%20longevity%20SUMMARY%20REPORT.pdf

¹⁴¹ Cline, *Overdressed*, 85.

¹⁴² "Sustainable Clothing: a practical guide to enhancing clothing durability and performance," *Waste and Resources Action Programme*, accessed from <http://www.wrap.org.uk/sites/files/wrap/WRAP%20Sustainable%20Clothing%20Guide.pdf#page-25>

¹⁴³ *Supra* at note 90.

¹⁴⁴ "Sustainability and Resource Awards," *CIWM*, November 2016, accessed from <http://www.ciwm-journal.co.uk/downloads/CIWM-Awards-2016-Winners.pdf>

¹⁴⁵ David Crichton, "Love Your Clothes Shortlisted for Prestigious CIWM Award," *IE Brand*, October 2016, accessed from <https://www.iebrand.co.uk/blog/love-your-clothes-shortlisted-prestigious-ciwm-award>

¹⁴⁶ Ali Salman, "2017: Canadians love social media but Canadian businesses hate to embrace it," *Rapid Boost*, November 2016, accessed from <http://rapidboostmarketing.com/canadians-love-social-media-but-canadian-businesses-hate-to-embrace-it/>

¹⁴⁷ *Ibid.*

¹⁴⁸ "2016 Canadian Social Media Monitor: key trends in Canada's social media landscape," *Insights West*, May 2016, accessed from http://www.insightswest.com/wp-content/uploads/2016/05/Rep_InsightsWest_CDNSocialMediaMonitor_2016.pdf

¹⁴⁹ *Supra* at note 139.

¹⁵⁰ *Supra* at note 142.

¹⁵¹ *Toronto Repairathon*, accessed from <http://repairathon.com/>

number of events held each year from the 6 held in 2016¹⁵². Additional ways the City could further encourage reclamation of repair and sewing skills could be to provide easy-to-follow tutorials on how to do common repairs, such as darning a hole or mending a seam. These tutorials could be made available through the City's website. The City of Toronto could also run promotions offering subsidized sewing classes at community centres, and providing complimentary basic repair kits at Repairathon events.

The City can also facilitate swap events, where individuals get together and exchange their unwanted clothing items. Events can be done on a neighbourhood level, in apartment complexes, or in student housing. City facilitated events provide structure to swaps that ensures they do not contribute to litter or illegal dumping of items and provides the City an opportunity to track waste diversion¹⁵³. Additionally, the City can provide guidelines and tips for how to host a swap for people who wish to organize a more informal event, such as within a group of friends. Finally, the City can promote swap events held around the City by other organizations, such as Nathalie-Roze & Co's Uber-SWAP¹⁵⁴.

Employing educational and awareness campaigns while simultaneously supporting repair and swap opportunities enables the City of Toronto to influence consumer purchasing and use behaviours, in turn decreasing textile waste. Educational campaigns teach consumers how their clothing is made and what happens to it when they are finished with it. When consumers understand that a t-shirt is more than just a piece of fabric, but a collection of resources and human labour, which has an lasting impact once disposed, they will be more conscious of what they purchase and how they use those items. Once they have this knowledge, the City of Toronto can further encourage sustainable use behaviours by providing opportunities for individuals to repair and swap their clothes, extending the life of those items and limiting waste generation.

¹⁵² *Ibid.*

¹⁵³ *Supra* at note 45.

¹⁵⁴ "Spring Uber-SWAP: a used & vintage women's clothing exchange," *Facebook*, accessed April 11th, 2017 from <https://www.facebook.com/events/1524634344214897/>

Chapter Four

Reuse

The second R in the 3R Waste Hierarchy is Reuse. Reuse focuses on using an item again, prolonging its life. The item can be used again in its original state, commonly by a new owner who purchases the item second-hand, or can be repurposed for something new, for example, through upcycling. Reusing textiles extends their useful life and thereby reduces water, carbon, resource, and waste footprints. In practice, the most common example of Reuse in Canada is through the second-hand market.

The Second-Hand Market

The second-hand economy is comprised of retailers selling used merchandise, including used clothing and textiles. This market contributes approximately \$36 billion to Canada's GDP¹⁵⁵. Individuals can participate in the second-hand market either as consumers, by purchasing used items, or suppliers, by donating or selling their unwanted goods. The majority of citizens have participated in the market, with eight in ten North Americans reporting to have purchased used goods at some point in their lives¹⁵⁶. Economic, ethical, and hedonic motivations all play a role in participation in the second-hand market¹⁵⁷. For textiles specifically, the second-hand market can be broken down into three main types of retailers: vintage, consignment, and thrift stores.

Vintage Retailers

Vintage retailers are for-profit retailers concentrating on clothing from a specific era, with items typically being twenty years or older¹⁵⁸. Higher quality garments often have a high value, with focus being placed on unique, stylish, and historic pieces¹⁵⁹. Retailers actively search for products, sourcing from rag houses, thrift stores, estate sales¹⁶⁰, antique fairs, and auctions. With styles from past decades re-emerging as current trends, vintage shops offer consumers a way to access these fashions in a more authentic way than retail chains. While fast fashion retailers offer similar vintage styles, these pieces lack the history and uniqueness of second-hand pieces, and also have an environmental and social footprint¹⁶¹. Furthermore, vintage retailers can provide a shopping experience large fast fashion brands are unable to replicate. Feelings of nostalgia, the thrill of treasure hunting, and opportunity for social interaction are all hedonic motivations for consumers shopping at vintage retailers¹⁶². There are numerous vintage shops throughout Toronto, with a large concentration in Kensington Market.

¹⁵⁵ Alexandra Posadzki, "The Rise of the Second-Hand Economy," *Profit Guide*, March 2016, accessed from <http://www.profitguide.com/industry-focus/retail/the-rise-of-the-second-hand-economy-100504>

¹⁵⁶ "The State of Reuse Report: give a sh!rt about your clothing footprint," *Value Village*, 2017, accessed from https://www.savers.com/sites/default/files/reuse_report_2017_vv.pdf

¹⁵⁷ Jinhee Han, "Understanding Second-Hand Retailing: a resource based perspective of best practices leading to business success" (Master's Thesis, Iowa State University, 2013), accessed from <http://lib.dr.iastate.edu/cgi/viewcontent.cgi?article=4643&context=etd>

¹⁵⁸ *Ibid.*

¹⁵⁹ *Ibid.*

¹⁶⁰ Sofia Luu, "Finding the Right Piece," *The Varsity*, March 2013, accessed from <http://thevarsity.ca/2013/03/25/finding-the-right-piece/>

¹⁶¹ *Ibid.*

¹⁶² *Supra* at note 157.

Consignment Retailers

Consignment retailers also operate on a for-profit basis and act as a mediator between sellers and consumers¹⁶³. Sellers can bring unwanted items into consignment stores, which will sell the goods for the individuals and take a percentage of the profit. These percentages range from 25% to 40% of the retail price. Additionally, instead of cash, consignment stores may offer store credit, offering as high as 50%¹⁶⁴. This reduces costs for both parties, since individuals avoid advertising, location, and display costs¹⁶⁵, and store owners avoid the time and effort costs vintage shops incur by not needing to actively search out inventory.

Economic and ethical motivations are important incentives for both suppliers and consumers of consignment retailers. For individuals selling items to the shops is a way for them to make money off their unwanted items and recover some of the price they originally paid. Additionally, selling their items to the consignment shop ensures that they stay out of the landfill and extends their useful life. For customers of consignment shops, they can purchase relatively new, branded items at inexpensive prices. Clothing in consignment shops is typically one to two years old, in generally good condition, and seasonal¹⁶⁶. As well, by purchasing used, customers avoid the environmental costs associated with new products. There are multiple consignment shops in Toronto, catering to different needs, including sporting apparel, children's clothing, and designer goods.

Thrift Stores

Thrift stores comprise a large portion of the second-hand market. Thrift stores accept donations from individuals, which are then sold in their stores, where the profits go towards supporting charitable initiatives. Donations are collected several ways: through donation centres, drop-off clothing bins, or by being picked up directly from the residents' homes¹⁶⁷.

Unlike vintage and consignment stores, which focus on fashionability, thrift stores are not particular in what they accept. Even items in poor condition are accepted and contribute to thrift stores' revenue streams¹⁶⁸.

Thrift stores can be divided into non-profit and charity affiliated for-profit operating systems. Some thrift stores are operated by national charities, like The Salvation Army, on a non-profit basis¹⁶⁹. For The Salvation Army, thrift store sales account for 22% of their total revenue¹⁷⁰, which is then used to support a variety of community initiatives. On the other hand, charity affiliated for-profit thrift stores purchase items from charitable organizations, which they then sell for a profit¹⁷¹. For example, Value Village buys second-hand clothing in bulk from

¹⁶³ *Supra* at note 157.

¹⁶⁴ Grace Carroll, "Flipping Your Wardrobe: a guide to Toronto's best consignment shops," *Post City Toronto*, October 2011, accessed from <http://www.postcity.com/Eat-Shop-Do/Shop/October-2011/Flipping-your-wardrobe-a-guide-to-Torontos-best-consignment-shops/>

¹⁶⁵ *Supra* at note 157.

¹⁶⁶ *Supra* at note 157.

¹⁶⁷ *Supra* at note 157.

¹⁶⁸ *Supra* at note 83.

¹⁶⁹ *Supra* at note 157.

¹⁷⁰ "Annual Report: 2015-2016 Canada and Bermuda," *The Salvation Army*, accessed from http://www.salvationarmy.ca/annualreview_1516/sa_annual-report_2015-2016_web.pdf

¹⁷¹ *Supra* at note 157.

charities like the Canadian Diabetes Association. Over the past ten years Value Village has purchased over one billion dollars' worth of clothing from such organizations¹⁷².

Thrift stores divert large quantities of textiles from landfills. In 2016, The Salvation Army diverted 31.2 million kilograms of used clothing and household items in Canada and Bermuda¹⁷³. In the same year, Value Village collected a further 343 million pieces of clothing through their Canadian, American, and Australian operations¹⁷⁴.

In addition to the environmental benefits of waste diversion and extending product life, these operations offer social benefits as well. Profits are used to achieve organizations' charitable goals. For large charities, like The Salvation Army, funds are directed towards many large national and international causes. Conversely, many smaller, independent thrift stores use profits and donations to assist at the community level by supporting women's shelters and providing clothing for new Canadians and lower-income workers¹⁷⁵. Furthermore, because of the low prices of thrift store items (the average price of an item at Value Village is \$4.50¹⁷⁶), low-income individuals can shop for basic clothing necessities.

With the decline in clothing prices, charities have begun to see an influx of barely used clothing donations, and have passed the point where they can sell everything they receive¹⁷⁷. Only around 20% of clothing donations received are sold in charity thrift stores¹⁷⁸; the remaining 80% is baled and sold to private sector recyclers, which provides thrift stores with additional revenue¹⁷⁹. As shown in Chapter 2, Figure 2, 45% of these textiles are classified as wearable and are further reused¹⁸⁰. Commonly, this clothing is exported as second-hand clothing to developing countries. Clothing is separated into numerous categories, weighed, labeled, and then baled¹⁸¹. Baled textiles are packed into 40-foot shipping containers, which contain around 300 55 kilogram bales¹⁸². Wholesalers in developing nations purchase containers and sell the bales to smaller traders¹⁸³, who then sell the clothes in local markets in Africa, Asia, Central and South America, and Eastern Europe.¹⁸⁴ In 2016 Canada exported over \$166 million in used clothing, with a large amount of exports going to Kenya, Ghana, India, Tanzania, and Tunisia¹⁸⁵. The clothing that is deemed to be unwearable is sold to shoddy industries¹⁸⁶, which remanufactures

¹⁷² Adria Vasil, "Where Do My Clothing Donations Really End Up?" *Now Toronto*, September 2011, accessed from <https://nowtoronto.com/lifestyle/ecoholic/where-do-my-clothing-donations-really-end-up/>

¹⁷³ *Supra* at note 170.

¹⁷⁴ *Supra* at note 156.

¹⁷⁵ *Supra* at note 172.

¹⁷⁶ "2015 Community Impact Report," *Value Village*, accessed from https://www.savers.com/sites/default/files/communityimpactreport_vv_july072016.pdf

¹⁷⁷ Cline, *Overdressed*, 128.

¹⁷⁸ "Consumers," *Council for Textile Recycling*, accessed from <http://www.wearonaterecycle.org/action/consumers.html>

¹⁷⁹ "The Life Cycle of Secondhand Clothing," *Council for Textile Recycling*, accessed from <http://www.wearonaterecycle.org/about/clothing-life-cycle.html>

¹⁸⁰ *Supra* at note 21.

¹⁸¹ Andrew Richard Brooks, "Riches from Rags or Persistent Poverty? Inequality in the transnational second-hand clothing trade in Mozambique" (PhD diss., University of London, 2012).

¹⁸² *Ibid.*

¹⁸³ *Ibid.*

¹⁸⁴ Jackie Northam, "The Global Afterlife of Your Donated Clothes," *NPR: Parallels*, May 2013, accessed from <http://www.npr.org/sections/parallels/2013/05/21/185596830/the-global-afterlife-of-your-donated-clothes>

¹⁸⁵ Statistics Canada, "Canadian International Merchandise Trade Database," *CANSIM*, accessed from [http://www5.statcan.gc.ca/cimt-cicm/topNCountries-pays?lang=eng&getSectionId\(=0&dataTransformation=0&refYr=2017&refMonth=3&freq=12&countryId=0&getU saState\(=0&provId=1&retrieve=Retrieve&save=null&country=null&tradeType=1&topNDefault=10&monthStr=null&chapterId=63&arrayId=0§ionLabel=XI%20-%20Textiles%20and%20Textile%20Articles&scaleValue=6&scaleQuantity=0&commodityId=630900](http://www5.statcan.gc.ca/cimt-cicm/topNCountries-pays?lang=eng&getSectionId(=0&dataTransformation=0&refYr=2017&refMonth=3&freq=12&countryId=0&getU saState(=0&provId=1&retrieve=Retrieve&save=null&country=null&tradeType=1&topNDefault=10&monthStr=null&chapterId=63&arrayId=0§ionLabel=XI%20-%20Textiles%20and%20Textile%20Articles&scaleValue=6&scaleQuantity=0&commodityId=630900)

¹⁸⁶ *Supra* at note 134.

rags and shreds of soft worsted fabrics into fibre¹⁸⁷. From here, 30% of the materials are repurposed into rags for wiping and polishing in commercial, residential, and industrial settings¹⁸⁸. A further 20% is sold to fibre buyers, who use mechanical and chemical recycling processes to break materials down into fibre components¹⁸⁹. These fibres are then reused in other products such as padding, insulation, or new pieces of clothing¹⁹⁰. The remaining 5% is unusable and ends up as waste¹⁹¹.

Barriers to Reuse

Lack of Information & Convenience

Given the large percentage of reusable and recyclable clothing that is disposed of in landfills each year, there appears to be a lack of understanding about the donation and reuse process. A general misconception is that only items in relatively good condition can be donated¹⁹². Therefore, torn, stained, and lower quality items, like fast fashion clothing, are often thrown away^{193 194}. A Value Village survey of North American consumers found that 62% of respondents threw away items because they did not think a donation centre would accept them¹⁹⁵. However, even if items cannot be resold through charity thrift shops, they still provide a valuable revenue stream, as these items can be sold to for-profit recyclers.

Convenience is another obstacle to promoting reuse, both in encouraging donations and the consumption of used clothing. As discussed in relation to vintage shopping, some individuals enjoy the thrill of ‘treasure hunting’ for used pieces of clothing. However, for others, purchasing used is not as convenient as buying new. These consumers often feel they do not have the time to search through large batches of items to find something they want. Similarly, the time commitment required for donating clothing and accessibility of donation locations deter people¹⁹⁶, with non-donors finding it easier to simply throw away items. When donating, 30 minutes appears to be the upper limit on how long people are willing to travel¹⁹⁷, with 64% of people unwilling to drive farther than five miles to drop off donations¹⁹⁸.

Export of Used Clothing

Exporting used clothing can be beneficial for low-income nations by providing inexpensive clothing options and jobs in the used clothing supply chain. However, this process also undermines the local clothing industries. The second-hand market in sub-Saharan African

¹⁸⁷ Mohini Gupta, “So, What Do You Do with Shoddy Yarn?” *Fibre 2 Fashion*, accessed from <http://www.fibre2fashion.com/industry-article/7791/so-what-do-you-do-with-shoddy-yarn>

¹⁸⁸ *Supra* at note 176.

¹⁸⁹ Cline, *Overdressed*, 130-131.

¹⁹⁰ *Ibid.*

¹⁹¹ *Supra* at note 134.

¹⁹² *Supra* at note 83.

¹⁹³ Sabine Weber, “The Ecological Footprint of Textiles & How Consumers Manage Their Unwanted Garments” (presented at Tip of the Iceberg: Textile Diversion Strategies and Extended Producer Responsibility Symposium, Markham, Ontario, May 4, 2016).

¹⁹⁴ Harvard Gould, “Textiles are the Next Frontier in Recycling for Cities Looking to Cut Waste,” *CBC News*, May 2016, accessed from <http://www.cbc.ca/news/technology/textile-recycling-1.3569138>

¹⁹⁵ *Supra* at note 156.

¹⁹⁶ *Supra* at note 38.

¹⁹⁷ *Supra* at note 156.

¹⁹⁸ *Supra* at note 78.

nations is dominated by used clothing, comprising over half of the clothing sector by volume¹⁹⁹. The saturation of the market with cheap, used clothing, on average 38% cheaper than new clothing²⁰⁰, is a significant barrier to the advancement of local clothing manufacturing. Low cost second-hand clothing undercuts new local goods, as they must be retailed at higher prices to cover costs of production. Since affordability is a key consideration in consumer purchasing decisions, local textiles are unable to compete with cheap second-hand goods²⁰¹.

Used clothing is not the sole obstacle for local clothing industries, as cheap Asian imports, high capital costs, lack of access to credit, and inefficient infrastructure are also barriers to production²⁰². However, trade liberalization, which opened African marketplaces to second-hand clothing imports, coincided with the contracting of local industries. A negative correlation has been found between second-hand clothing imports and African clothing production, with a 1% increase in imports corresponding to a 0.26% decrease in production²⁰³. Such trends are evident in Ghana, where employment in the textile and clothing sector fell by 80% between 1975 and 2000, as well as in Nigeria, which supported a workforce of 200,000 people, and now the industry is almost non-existent²⁰⁴.

Some countries have implemented or have proposed bans on imported second-hand clothing in order to protect domestic clothing industries. However, porous borders and corruption enable the illegal import of used clothing into markets that are officially closed²⁰⁵.

The creation of new jobs in the used clothing supply chain is often used as a counterargument against the detrimental impact to local economies; however, these jobs are not necessarily preferable. Jobs in the second-hand clothing market are informal, and as such do not provide the same social and legal protections as the formal sector²⁰⁶. Additionally, second-hand clothing trade can be volatile and is influenced by local socio-political circumstances and transport costs, which can lead to rapid shifts in export destinations²⁰⁷. This can hurt the retailers who depend on second-hand clothing for their livelihoods.

The second-hand clothing trade is also characterized by power imbalances and information asymmetries. Second-hand traders in developing nations are disadvantaged as they lack power in their exchange relationships with exporters. This power imbalance exists throughout the supply chain. Exporters make profit off the volume of used clothing exported, and so, they have an incentive to include not only desirable items in bales, but also low-quality waste items, and items that are in low demand. The used clothing importers are required to accept mixed packaging lists and end up with undesirable items²⁰⁸. For example, African importers are obligated to accept packing lists that include suits and heavy coats, which are unpopular and unsuitable for the climate.

¹⁹⁹ Sally Baden and Catherine Barber, "The Impacts of the Second-Hand Clothing Trade on Developing Countries," *Oxfam*, September 2005, accessed from <http://policy-practice.oxfam.org.uk/publications/the-impact-of-the-second-hand-clothing-trade-on-developing-countries-112464>

²⁰⁰ *Supra* at note 181.

²⁰¹ *Supra* at note 199.

²⁰² *Supra* at note 199.

²⁰³ Natalie Hoang, "Clothes Minded: An Analysis of the Effects of Donating Secondhand Clothing to Sub-Saharan Africa" (Scripps Senior Thesis, 2015), accessed from http://scholarship.claremont.edu/scripps_theses/671

²⁰⁴ *Supra* at note 181.

²⁰⁵ *Supra* at note 181.

²⁰⁶ *Supra* at note 199.

²⁰⁷ *Supra* at note 181.

²⁰⁸ *Supra* at note 181.

There is a further discrepancy in power between the used clothing wholesalers and market retailers. Retailers are required to pay upfront for bales, are unable to examine bales prior to purchase, and cannot return bales if unhappy with contents. The purchase of bales is likened to a lottery, as the bales contain a mixture of fashionable, high quality clothing as well as low-quality, worn-out, damaged, and even unsellable items. The presence of low-quality items in bales is increasing, partially due to the increase of fast fashion items which are lower quality to begin with. It is estimated that up to a quarter of clothing in bales are unsellable²⁰⁹. Low-quality items must either be sold at a lower price or end up being thrown out. The inherent risk associated with the purchase of bales makes retailers vulnerable, as bales with predominately low-quality items result in operating losses. This risk makes capital accumulation and upward mobility difficult for retailers²¹⁰, further challenging the assertion that job creation in the second-hand clothing supply chain can counteract the negative impacts of these imports.

Since retailers are unable to sell low-quality items and rags, these pieces are simply thrown away. This raises a concern that a situation similar to what has occurred with the export of electronic waste may arise. Much like second-hand clothing, e-waste is shipped to developing countries in Asia and Africa in shipping containers labeled as second-hand goods²¹¹. Much of what is classified as second-hand goods is in reality the developed nation's garbage and cannot be reused in importing countries. This e-waste is then processed in informal recycling centres to extract valuable components with the remaining items dumped in landfills. Both informal recycling and landfilling generate environmental and health issues, including: discharge of acids into waterways, release of toxic fumes into the atmosphere, contamination of groundwater, and neurological, digestive, and bone problems in those living or working near e-waste sites²¹².

Since it is unlikely developing nations have the same infrastructure as Canada and other developed countries to deal with textile waste, this waste is more often landfilled. This makes these areas vulnerable to the environmental consequences of landfills outlined in Chapter 1, including creation of landfill gas and acid leachate. The export of e-waste and textile waste to developing countries illustrates a larger social issue where Western countries use African and Asian countries as a dumping ground for unwanted items instead of dealing with the consequences of their consumption.

Opportunities for Reuse

The City of Toronto should focus on two components for their Reuse strategy: information campaigns and collaboration. When implementing their textile recycling program, The City of Markham found that people were open to recycling their textiles, but needed more information about the process²¹³. This indicates that there is a public willingness to participate in a textile recycling strategy, but the current level of knowledge is too low. To address this, the City should expand upon the awareness campaign discussed in the Chapter 3 to include information on reuse. This includes educating the public about reuse from both a consumption

²⁰⁹ *Supra* at note 199.

²¹⁰ *Supra* at note 181.

²¹¹ Nicole Thompson, "Illegal E-Waste Export: A review of the issue," April 2016.

²¹² *Ibid.*

²¹³ Claudia Marsales, "Markham Textile Diversion Strategy: what we learned and where we are going" (presented at Tip of the Iceberg: Textile Diversion Strategies and Extended Producer Responsibility Symposium, Markham, Ontario, May 4, 2016).

and disposal perspective. The City should educate consumers about the benefits of buying used and donating or selling unwanted clothing, highlighting how these actions extend product lifecycles, reduce environmental impacts, and support local communities.

On the consumption side, the City should try to make buying used clothing fashionable, by featuring local vintage and consignment shops on their website and social media. The focus should be on these second-hand retailers as they are more fashion orientated than thrift stores. Additionally, the website and social media accounts could present profiles of used clothing shoppers and feature their second-hand outfits, favourite shopping locations, and shopping tips.

On the disposal side, the City should educate people about what types of textiles can be donated. Additionally, the City should educate citizens about what happens to clothes once they are donated. As most people tend to believe donated items are reused within their own community, they may be uncomfortable with the idea of donations becoming commodities²¹⁴. Educating the public that when items are sold on the second-hand market the items still generate revenue for the initial charities, may help alleviate these anxieties and encourage donations. Additionally, the City should consider redesigning the ReUseIt section of its website, which displays donation locations for various goods on a map²¹⁵. This should be expanded to include consignment locations as well as legal parking lot clothing donation boxes. Furthermore, the option of search by location type (thrift store, consignment shop, and donation boxes) should be given to make it easy for users. Since inconvenience is a significant barrier to clothing donation, including these alternative donation locations will help illustrate that donation is more easily accessible than residents may have believed.

The second component of the City's Reuse strategy should be collaboration. This includes collaboration between non-profits and collaboration with vintage and consignment shops.

Collaboration with existing non-profits like The Salvation Army ensures that municipal efforts to combat textile waste does not detract from non-profits, which depend on clothing donations to fund their charitable missions. Such a collaboration would be mutually beneficial, as non-profit collaborators could expect to benefit from an increase in textiles collected. The City would also benefit because they would not need to spend capital on sorting and storage infrastructure, as the existing non-profit infrastructure would be utilized.

San Francisco, New York City, and Markham all provide examples of how such collaboration can be successfully carried out. San Francisco partnered with Goodwill as part of their textile recycling program. San Francisco uses electronic collection bins, which are placed in apartment buildings and managed by Goodwill²¹⁶.

New York City ("NYC") employs a similar scheme, partnering with numerous organizations to facilitate textile recycling. NYC works with Housing Works, a charity serving the homeless and people affected by HIV/AIDS, to place and maintain non-electronic collection boxes in apartment buildings. Working with Wearable Collections, a for-profit entity that raises

²¹⁴ *Supra* at note 181.

²¹⁵ *Supra* at note 77.

²¹⁶ *Supra* at note 91.

money for charities²¹⁷, NYC established textile collection at numerous weekly farmer's markets²¹⁸. Finally, NYC organized a curbside collection event with the participation of Goodwill. Utilizing clean sanitation trucks, bags specifically designated for textiles were picked up from approximately 250,000 homes, which were then brought to a Goodwill warehouse²¹⁹.

Closer to the City of Toronto, the City of Markham has launched an aggressive textile recycling campaign. Markham employs collection boxes which feature its logo and are managed by The Salvation Army²²⁰. The boxes are located around the city, in supervised locations, such as fire stations and have sensors to indicate when the bins are full²²¹. The City of Markham received funding from the Federation of Canadian Municipalities to launch the program, with implementation estimated to cost \$90,000 over 2016 and 2017²²². Additionally, the operating costs of the program, including operation of smart sensors and lifecycle costs of bins, is expected to be \$6,000 a year, with collection operating costs incurred by The Salvation Army²²³. Furthermore, these costs are expected to be offset by the reduction in collection fees²²⁴, as Markham expects they will save \$86,000 in 2017 in curbside collection rates²²⁵. To fully support the program, Markham has also introduced a ban of textile items in garbage; Markham uses clear garbage bags and will not collect bags with visible textiles²²⁶.

The City of Toronto can draw upon these examples in implementing its own textile recycling program. Collaborating with non-profits ensures that these organizations continue to receive revenue generating donations. Utilizing donations as a means of collection also ensures revenue generated is redirected back into supporting communities. Additionally, as the City of Markham has illustrated, such programs can be implemented without excessive cost to the municipality.

The City of Toronto should also consider collaborating with vintage and consignment retailers. Some retailers offer interactive experiences to engage customers and educate them on second-hand clothing. Examples include hosting fashion shows and holding upcycling contests²²⁷. The City could partner with retailers to help facilitate these events, which would help bring used and vintage dressing into the mainstream, and illustrate the fashionability of such items. Additionally, supporting such events and directing attention toward these retailers may increase their revenues, and help boost the local economy.

Promoting reuse through education campaigns and engaging events allows the City to effectively convey the benefits of both donating and purchasing used clothing. Additionally, by leveraging non-profit infrastructure, the City can establish convenient collection systems. The City can draw on the experiences of other municipalities as a guideline for implementation. Such

²¹⁷ "Learn About Our Company," *Wearable Collections*, accessed from <http://wearablecollections.com/about/>

²¹⁸ *Supra* at note 71.

²¹⁹ *Supra* at note 93.

²²⁰ *Supra* at note 194.

²²¹ *Supra* at note 83.

²²² Claudia Marsales, "Report to General Committee: textile recycling smart bin program," *Markham*, March 2016, accessed from <http://www2.markham.ca/markham/ccbs/indexfile/Agendas/2016/General/gc160418/Textile%20Recycling%20Smart%20Bin%20Program.pdf>

²²³ *Ibid.*

²²⁴ *Ibid.*

²²⁵ Amanda Persico, "Markham's Textile Recycling Program to Save Taxpayers \$86,000," *York Region*, January 2017, accessed from <https://www.yorkregion.com/community-story/7012848-markham-s-textile-recycling-program-to-save-taxpayers-86-000/>

²²⁶ "Markham Recycles Textiles," *The City of Markham*, accessed from <http://www.markham.ca/wps/wcm/connect/markhampublic/7c7b22f9-2df0-4265-a110-94f4ddaa2fcb/TextileRecyclingPDF-WEB.pdf?MOD=AJPERES&CACHEID=7c7b22f9-2df0-4265-a110-94f4ddaa2fcb>

²²⁷ *Supra* at note 157.

a strategy will lower the cost of implementation for the City, as they will not need to duplicate efforts in designing collection boxes or bags or researching how to effectively deliver the program.

Chapter Five **Recycle**

The third and final R in the 3R Waste Hierarchy is Recycle. Recycling involves recovering the valuable raw materials from a product, using either mechanical or chemical recovery processes, and utilizing these as inputs into new products. This process keeps unnecessary waste out of landfills and conserves virgin materials. Widespread adoption of textile recycling can help to move the apparel industry away from a traditional linear economy, in which products are produced, consumed, and disposed of, to a circular economy. In a circular economy, products are produced and consumed, but resources from discarded products are recovered and reused in the production process. A circular economy reduces the impacts associated with a linear system by extracting the maximum value from materials²²⁸ and ensuring cultivation of new resources is not required. The recycling process includes two stages: the collection and handling of textiles, and; the processing of textiles²²⁹.

Collection & Handling of Textiles

The first stage in the recycling processes is collection and handling of textile waste. Waste is created at both the pre- and post-consumer stages. Pre-consumer waste is created during the production process. This includes waste produced during fibre and yarn production and unused scrap fabric from cut-and-sew operations. Conversely, post-consumer waste consists of items disposed by the public following consumption²³⁰. Collecting pre-consumer waste requires the coordination of industry players, while recovery of post-consumer waste entails public cooperation and buy-in²³¹.

The collection and handling strategies described below will focus solely on post-consumer waste. As mentioned in Chapter 1, most textile production in Canada is outsourced. As such, the City of Toronto will have little influence over the global textile industry. Strategies targeting pre-consumer waste should be carried out by a larger governing body, such as the provincial or federal government. However, since municipalities are responsible for waste management, the City of Toronto can influence, and therefore should target, post-consumer waste.

There are different ways for the City to manage the collection and handling of textile waste. Three strategies widely utilized in other municipalities and countries are curbside pickup, collection boxes, and extended producer responsibility schemes. These strategies are outlined below. A discussion of the potential draw-backs of each system and their applicability for the City of Toronto is included in Chapter 6.

²²⁸ Karen Leonas, "The Use of Recycled Fibres in Fashion and Home Products," *Textiles and Clothing Sustainability*, (2017): 55-77, DOI: 10.1007/978-981-10-2146-6_2.

²²⁹ *Ibid.*

²³⁰ *Ibid.*

²³¹ *Ibid.*

Curbside Pickup

Curbside pickup involves collecting textiles along with the pickup of other recyclable goods, such as paper and plastic, and waste. This process can be implemented by the municipality, as is done in Colchester, Nova Scotia. In Colchester, the city picks up household textiles along with other recyclable materials. Textiles are placed in the already existing fibre recycling bags with paper products²³², which are then manually sorted at recycling facilities²³³. Three weeks after Colchester implemented their curbside pickup service, over 680 kg of textiles had been diverted from the landfill²³⁴.

Municipalities can also contract out curbside pickup services to third parties, such as textile recycling companies. Queen Creek, Arizona uses a textile recycling company to pick up curbside textile recycling²³⁵. This arrangement generates revenue Queen Creek, and local charitable organizations. Queen Creek receives 10 cents for each pound collected, and 10 cents for each tonne collected is given to charity²³⁶.

Textiles are more difficult to manage via curbside collection because they can become contaminated or ruined when mixed with other items. Because of this, specialized equipment is often required for pickup. This can include providing residents with bags specifically for textiles, to ensure they stay dry, or using modified recycling trucks with separate compartments for textile materials²³⁷.

A considerable advantage of a curbside pickup strategy is the low cost to residents, in terms of time and effort. Since residents are already familiar with the curbside pickup process, which is used for paper and plastic items, adding textiles to the collection schedule does not require any major behaviour change for individuals. Increasing the ease of textile recycling for individuals should increase participation and, in turn, increase the volume of textiles collected and diverted from landfills.

Collection Boxes

The use of charity collection boxes to gather textiles was discussed in Chapter 4. For-profit entities and municipalities can also be responsible for the operation of textile collection boxes. I:Collect (“I:CO”), a closed-loop textile recycler, is an example of such a for-profit organization. I:CO provides logistics services to more than 60 brands around the world, including H&M, American Eagle Outfitters, Levi Strauss & Co, Puma, and Forever 21²³⁸. The company provides retailers with customizable collection bins²³⁹ where consumers can drop off unwanted clothing in exchange for in-store vouchers²⁴⁰. I:CO then organizes the transportation of

²³² *Supra* at note 94.

²³³ Cassie Williams, “Colchester County Now Recycling Styrofoam and Textiles,” *CBC News*, May 2016, accessed from <http://www.cbc.ca/news/canada/nova-scotia/colchester-county-textile-recycling-1.3591381>

²³⁴ *Ibid.*

²³⁵ Mattias Wallander, “Textile Recycling: (Don’t) Curb Your Enthusiasm,” *Huffpost*, December 2012, accessed from http://www.huffingtonpost.com/mattias-wallander/textile-recycling-curb-enthusiasm_b_2051106.html

²³⁶ *Ibid.*

²³⁷ *Ibid.*

²³⁸ Gina-Marie Cheeseman, “American Eagle Outfitters Expands Clothing Recycling Program,” *Triple Pundit*, June 2014, accessed from <http://www.triplepundit.com/2014/06/american-eagle-outfitters-expands-clothing-recycling-program/>

²³⁹ “Building Textile Circularity,” *I:CO*, accessed from <http://www.ico-spirit.com/en/company/>

²⁴⁰ *Supra* at note 238.

items to sorting and recycling plants²⁴¹. Since 2009, the company has collected over 70,000 tonnes of used textiles²⁴².

I:CO's role as a logistics provider helps consolidate textile recycling efforts at the retailer level. This service enables retailers, who may not have the capital, time, or knowledge to participate in the textile recycling system, to be part of the circular apparel economy. However, a criticism of this system is the use of in-store vouchers as customer incentives. While this encourages consumer involvement, it also promotes the continuation of the purchase-disposal cycle and does not address the underlying issue of overconsumption.

Municipalities can also partner with for-profit textile recyclers to implement collection box programs. For example, this was done in Weymouth, Massachusetts. Weymouth initiated a campaign focused on collecting "the good, the bad, and the ugly" textiles by placing collection boxes in public schools²⁴³. Logistical services were provided by the for-profit recycler Bay State Textiles, who supplied and serviced the containers²⁴⁴. Schools were provided with a start-up incentive and paid \$100 per tonne of textiles. Not only did the municipality divert 78.8 tonnes of textiles during the two years the program was in operation, but the program also helped raise revenue for school programs²⁴⁵. Additionally, engaging schools in the recycling process provided students and school facilitators with more knowledge about issues of textile waste and the solutions. This knowledge is then brought home with the students and shared within their households and the wider community.

Given that households are not the only source of textile waste, with institutions, such as schools and hospitals, also generating waste²⁴⁶, establishing collection campaigns in these locations, in conjunction with other collection efforts, would allow the City of Toronto to address multiple sources of waste generation.

Extended Producer Responsibility

Extended Producer Responsibility ("EPR") systems put the onus of responsibility on producers for the entirety of their product's lifecycle. Several EPR programs already exist in Canada, covering packaging and printed materials, beverage containers, and electronic waste, among others²⁴⁷. Currently, there are no EPR programs that address textile waste in Canada; however, the Canadian Council of Ministers have recommended this category be incorporated into the existing EPR framework²⁴⁸.

²⁴¹ Rick LeBlanc, "I:CO Provides Fashion Recycling Options," *The Balance*, March 2017, accessed from <https://www.thebalance.com/i-co-provides-fashion-recycling-options-2877813>

²⁴² "Creating the Future," *I:CO*, accessed from <http://www.ico-spirit.com/en/homepage/mission/>

²⁴³ *Supra* at note 71.

²⁴⁴ *Supra* at note 96.

²⁴⁵ *Ibid.*

²⁴⁶ *Supra* at note 83.

²⁴⁷ "Inventory of Programs," *Environment and Climate Change Canada*, accessed from <https://www.ec.gc.ca/gdd-mw/default.asp?lang=En&n=9FB94989-1&xsl=genericsearchrenderer%2Cresult&searchoffset=1&searchdisplaycount=75&databasematch=WSGlobal&filtername=searchname&formtype=gdd-mw®ion=D1CF2A68-3DCC-472F-B6C1-780DD2616131&product=&submit=Search#resulttop>

²⁴⁸ "Progress Report on the Canada-Wide Action Plan for Extended Producer Responsibility," *Canadian Council of Ministers of the Environment*, 2014, accessed from <http://www.ccme.ca/files/Resources/waste/extended/CAP-EPR%20Progress%20Report.pdf>

France provides an example of an operational textile EPR system. The French TLC EPR program targets clothing, household linens, and footwear²⁴⁹. Companies who market products in France are responsible for providing or managing the recycling at the point of disposal²⁵⁰. Companies have the option to establish their own recycling program, which is approved by French authorities, or they can contribute to ECO TLC, the industry steward²⁵¹. Over 94% of the industry has chosen to contribute to ECO TLC, who manages the textile recycling program on their behalf²⁵². Each company pays a set fee to ECO TLC based on the quantity of items sold²⁵³. In 2015, ECO TLC received €16.3 million in contributions²⁵⁴, which ECO TLC used to operate the program, provide educational materials, and fund selective R&D²⁵⁵. Financial incentives are also in place to encourage innovation and investment into recycled textiles. Companies using textiles with recycled content of 15% or more pay less in contributions per item²⁵⁶. ECO TLC's recycling program primarily uses collection bins to gather textiles, with additional collection through non-profit organizations, in-store drop offs, and door to door collection²⁵⁷. Textiles are then sent to an eligible sorting facility²⁵⁸. The program collected 195,000 tonnes of textiles in 2015, an increase of 11% over the previous year²⁵⁹. As EPR systems are already commonplace in Canada, a program targeting textiles could draw on the experience of the ECO TLC model to fit into the existing Canadian EPR framework.

Processing of Textiles

The second stage of textile recycling is the processing of collected textiles. Depending on how the textiles are processed, they will either contribute to an open-loop system or a closed-loop system. In an open-loop system, the material cannot be recycled indefinitely, either because of degradation of the raw material during the recycling process or inclusion of the raw material in non-recyclable products. An open-loop system will postpone waste generation, but ultimately does not prevent it. On the other hand, in a closed-loop system, the material can be recycled continually without degradation of the raw material²⁶⁰. Of the two methods used for textile recycling, mechanical recycling represents an open-loop system, whereas, chemical recycling is part of a closed-loop system.

In the mechanical recycling process, textiles are broken down through cutting, shredding, and carding processes²⁶¹. The fibres produced through this process are weaker and shorter than virgin fibres²⁶². To increase quality these fibres are blended with virgin fibres²⁶³, resulting in a

²⁴⁹ *Supra* at note 71.

²⁵⁰ "2015 At A Glance," *Eco TLC*, accessed from http://www.ecotlc.fr/ressources/Documents_site/Essential_2015_GB_BD.pdf

²⁵¹ *Ibid.*

²⁵² *Ibid.*

²⁵³ Maarten Dubois, Diana de Graaf, and Joachim Thieren, "Exploration of the Role of Extended Producer Responsibility for the Circular Economy in the Netherlands," *EY*, June 2016, accessed from [http://www.ey.com/Publication/vwLUAssets/ey-exploration-role-extended-producer-responsibility-for-circular-economy-netherlands/\\$FILE/ey-exploration-role-extended-producer-responsibility-for-circular-economy-netherlands.pdf](http://www.ey.com/Publication/vwLUAssets/ey-exploration-role-extended-producer-responsibility-for-circular-economy-netherlands/$FILE/ey-exploration-role-extended-producer-responsibility-for-circular-economy-netherlands.pdf).

²⁵⁴ *Supra* at note 250.

²⁵⁵ "About Eco TLC," *Eco TLC*, accessed from <http://www.ecotlc.fr/page-41-a-propos-d-eco-tlc.html>.

²⁵⁶ *Supra* at note 253.

²⁵⁷ *Supra* at note 250.

²⁵⁸ Lauriane Tiard, "The French EPR," *Mistra Future Fashion*, May 2013, accessed from <http://mistrafuturefashion.com/wp-content/uploads/2013/05/Laurianne-Tiard-29-May-2013.pdf>

²⁵⁹ *Supra* at note 250.

²⁶⁰ *Supra* at note 228.

²⁶¹ Bojana Voncina, "Recycling of Textile Materials," 2000, accessed from http://www.2bfuntex.eu/sites/default/files/materials/Recycling%20of%20textile%20materials_Bojana%20Voncina.pdf

²⁶² *Supra* at note 38.

²⁶³ Hannah Gould, "Waste is So Last Season: recycling clothes in the fashion industry," *The Guardian*, February 2015, accessed from <https://www.theguardian.com/sustainable-business/sustainable-fashion-blog/2015/feb/26/waste-recycling-textiles-fashion-industry>

20% reprocessed and 80% virgin mix²⁶⁴. Mechanically recycled fibres are used in various applications, including upholstery, insulation materials, carpet underlays, disposable diapers, napkins, wiping, and fillings, among others²⁶⁵.

In the chemical recycling process fibre molecules are broken down and re-polymerized²⁶⁶ and then re-spun into new fibres²⁶⁷. Unlike mechanical recycling, there is no loss of quality since the resulting fibres are the same length and quality as virgin fibres²⁶⁸. As such, the outputs of the chemical recycling process can easily be reintroduced into the production chain²⁶⁹.

Currently this process is most commonly used for synthetic textiles, particularly polyester. Teijin, a Japanese company, has developed a fibre-to-fibre polyester recycling process, and through their ECO CIRCLE program, works with over 150 partner companies²⁷⁰, including Patagonia²⁷¹. Teijin's process, which formulates new, raw polyester materials by breaking down discarded polyester fabric into monomers, results in an energy saving of 76% and a 71% CO₂ emissions reduction compared with polyester produced from virgin materials²⁷². Additionally, this process does not require the use of petroleum in the production process.

Chemical recycling techniques exist for natural fibres as well, however these technologies are not yet widespread²⁷³. Re:newcell and Evrnu are two companies at the forefront of this process. Re:newcell recycles cotton and other cellulosic textiles into a dissolving pulp, which can be introduced into the textile production chain²⁷⁴. Similarly, Evrnu's technology also creates a pulp by shredding and breaking post-consumer cotton waste down at the molecular level²⁷⁵. The resulting pulp can then be used to create high quality fibres²⁷⁶. This process uses 98% less water than traditional cotton fibre and reduces CO₂ by 90% compared to polyester production²⁷⁷.

Barriers to Recycling

Loss of Quality

Mechanical recycling of textiles is currently the most common and scalable option for textile recycling²⁷⁸. However, since this process operates in an open-loop system, it is not as sustainable as chemical recycling. The fibres resulting from the mechanical recycling process are lower quality and cannot be continually recycled. This necessitates blending of reprocessed

²⁶⁴ "Sustainable Fashion," *Mistra Future Fashion*, accessed from <http://mistrafuturefashion.com/sustainable-fashion/>

²⁶⁵ Bahareh Zamani, "Carbon Footprint and Energy Use of Textile Recycling Techniques: Case study Sweden" (Master of Science Thesis, Chalmers University of Technology, 2011), accessed from <http://publications.lib.chalmers.se/records/fulltext/146872.pdf>

²⁶⁶ *Ibid.*

²⁶⁷ *Supra* at note 21.

²⁶⁸ *Ibid.*

²⁶⁹ *Supra* at note 261.

²⁷⁰ "Closed-Loop Recycling System: ECO CIRCLE," *Teijin*, accessed from <https://www.teijin.com/solutions/ecocircle/>

²⁷¹ Lisa Hayes, "Synthetic Textile Innovations: Polyester Fiber-to-Fiber Recycling for the Advancement of Sustainability," *AATCC Review: the magazine of the textile dyeing, printing, and finishing industry*, 11, no. 10 (2011).

²⁷² *Ibid.*

²⁷³ *Supra* at note 21.

²⁷⁴ "The Business Concept," *Re:newcell*, accessed from <http://renewcell.se/about/business-concept/>

²⁷⁵ Kasey Lum, "Evrnu Recycles Old Cotton Garments into New Fibres," *Ecouterre*, April 2016, accessed from <http://www.ecouterre.com/evrnu-transforms-garment-waste-into-useable-bio-based-fibers/>

²⁷⁶ *Ibid.*

²⁷⁷ "Technology," *Evrnu*, accessed from <http://www.evrnu.com/technology/>

²⁷⁸ *Supra* at note 21.

fibres with virgin materials to achieve acceptable quality. As a result, there is still demand for virgin resources and the continuation of harmful environmental and social practices associated with their cultivation and extraction. Although chemical textile recycling would be preferable, as it can achieve a circular system, it is more expensive than mechanical recycling²⁷⁹.

Blended Materials & Sorting Requirements

The prominence of blended fibres poses another barrier to textile recycling. Blended fibres, like poly-cotton, are popular as they allow manufacturers to combine the benefits of different fibre types in one fabric. However, different processing systems are used in the breakdown of natural and synthetic fibres, and different performance specifications are required for each type of fibre. This adds an additional level of complexity to the recycling process²⁸⁰. Worn Again is working to advance potential technologies to separate blended fibres via chemical recycling; however, this is not yet commercially viable²⁸¹.

Since different fibre classes need to be recycled using different systems, the sorting of textiles is a crucial step in the recycling process. Incorrect sorting can result in textiles being used for low-grade applications when they could have been recovered for higher-grade uses²⁸². Textile sorting is a labour-intensive process as it is generally done by hand²⁸³. This could be a disincentive to establishing textile recycling in Canada, due to higher wages when compared with other countries. Automatic sorting technology, which uses near infrared spectroscopy to sort fibres based on composition and colour²⁸⁴, is a more efficient option for handling large amounts of textiles²⁸⁵. However, like the blended fibre case, this technology is not yet commercially viable²⁸⁶.

Investment & Demand

As highlighted above, there are numerous emerging technologies which streamline the textile recycling process. However, these technologies are not yet commercially viable. A major obstacle for textile recycling is the need for investment and demand to bring these technologies into the mainstream. Increasing investment into textile recycling technologies can help to increase efficiency in the recycling process and results in higher quality outputs. Additionally, stimulating demand ensures a stable market for the resulting products. As a result, the textile recycling industry can work to achieve economies of scale, reducing their overall production costs. However, the abundance of cheap fabric available to the apparel and textile market poses a barrier to the widespread acceptance of recycled textile materials²⁸⁷. Furthermore, current production costs, uncertain supply chains, and lower quality fibres from mechanical techniques are additional challenges facing textile recyclers²⁸⁸. These obstacles are all disincentives for

²⁷⁹ Claire Guignier, "Textile Recycling: an overview on technologies and tendencies applications," *CTT Group*, April 2013, accessed from http://www.textilescience.ca/downloads/april12_2013/Recycling_Claire_Guignier_apr12_2013.pdf

²⁸⁰ *Supra* at note 228.

²⁸¹ *Supra* at note 263.

²⁸² Rick LeBlanc, "Technologies for Automated Sorting of Textiles for Recycling," *The Balance*, October 2016, accessed from <https://www.thebalance.com/automated-sorting-for-textiles-recycling-2878011>

²⁸³ *Supra* at note 264.

²⁸⁴ *Supra* at note 282.

²⁸⁵ *Supra* at note 264.

²⁸⁶ *Supra* at note 282.

²⁸⁷ *Supra* at note 265.

²⁸⁸ *Supra* at note 228.

investment in the industry. Moreover, while some large retailers like Patagonia and H&M have introduced recycled fibres into their product lines²⁸⁹, more demand by manufacturers is needed to ensure a stable end market.

Opportunities for Recycling

In its strategy for textile recycling, the City of Toronto should aim to develop a comprehensive collection and handling system. The system should include further logistical considerations and support investment and demand for recycled products and technologies.

First, the City of Toronto should decide on the most appropriate way for the municipality to carry out textile collection. Curbside pickup, collection boxes, or EPR schemes represent potential options for collection. To ensure public participation, whichever system is chosen should be characterized by ease of access for residents and relative cost effectiveness for the City. These options and their suitability for use in the City of Toronto are discussed in detail in Chapter 6. Additionally, as collection is only one aspect of the textile recycling process, the City must consider how textile waste will be managed when implementing a textile recycling system. The City could be solely responsible for managing collected waste and ensuring that it is reused and recycled. Alternatively, the City could partner with a third-party, such as a charity or textile recycler, to take on this role. Again, the benefits and drawbacks of the various partners is discussed further in the following chapter.

Second, the City should support initiatives that increase investment into, and demand for, recycled textiles. To do this, the City should focus on education for consumers and producers and employ green procurement strategies.

In line with the awareness campaigns discussed in previous chapters, the City should educate consumers about the benefits of products containing recycled material. For example, the City could highlight how these products help reduce the need for raw materials, save energy, and reduce CO₂ emissions. Additionally, the City can showcase retailers who use recycled textile materials on their website. The City can provide the same information to local Toronto producers, to encourage them to adjust their production to include recycled fibres and textiles. The City can also provide producers with information on how to find and connect with recycled textile suppliers. Furthermore, the City could offer incentives to local producers who use recycled material in their products, such as subsidizing a portion of the material cost, or promoting retailers on the City website and social media channels. Targeting consumers and retailers in such a way will help stimulate demand for products containing recycled textile materials.

Finally, the City should adopt green procurement practices. Green procurement involves the selection of products that minimize environmental impact²⁹⁰. In the textile industry, green procurement would focus on the purchase of textiles, such as uniforms, that contain recycled materials. Adopting such a strategy would legitimize the City's other textile waste initiatives, since the City would be implementing the behaviours it is promoting. This could also serve as a

²⁸⁹ *Supra* at note 21.

²⁹⁰ "Green Procurement," *International Institute for Sustainable Development*, accessed from https://www.iisd.org/business/tools/bt_green_pro.aspx

signal for other municipalities and organizations. The City can encourage adoption and help facilitate green procurement in other organizations. For example, the City could encourage green procurement amongst institutions that require uniforms, like private schools and hospitals, or require large amounts of other textiles, like hotels and bedding. Again, this will help increase demand in the textile recycling industry and drive investment.

Chapter Six Recommendations

As discussed in the previous chapters, the issue of textile waste is an important one, with social, environmental, and economic implications both locally and on a broader scale. As such, it is important that the City of Toronto take action in addressing this issue. The previous chapters have outlined numerous strategies for addressing textile waste drawing from all three stages of the 3R Waste Hierarchy. In choosing an appropriate strategy or combination of strategies and carrying out implementation, the City of Toronto should look to achieve three broad goals: increasing awareness about textile waste and the issues it creates; reducing textile waste in landfills; and encouraging sustainable consumption and the use of recycled fibres. The strategies discussed are analyzed here according to different criteria to determine their ability to meet these goals and the City's best course of action moving forward.

Three criteria are used to evaluate each strategy recommendation: efficiency, effectiveness, and feasibility. Efficiency is the ratio of inputs to outputs. Specifically, efficiency is determined by the outcomes of an action in relation to the resources required²⁹¹. An efficient strategy is one that achieves the desired goal of textile waste diversion, at the lowest cost. Effectiveness is the extent to which a policy or strategy achieves the desired goal²⁹². An effective textile waste strategy is one that can meet the diversion goals set by the City. Finally, feasibility involves numerous aspects, including whether policies can obtain political and social support, whether the required technology and infrastructure is in place, and whether such strategies are administratively possible²⁹³.

Table 4 ranks each strategy as either high, medium, or low in terms of the potential efficiency, effectiveness, and feasibility. Additional details as to why such a rating assigned are also listed; bearing in mind that it is difficult to determine the overall impacts of a policy until after implementation.

Table 4: Comparison of Textile Waste Strategies

<u>Criteria</u>	Education Campaigns (Chapters 3, 4, 5) <ul style="list-style-type: none"> • Education on issues of textile waste. • Education on benefits of 3R textile strategies. 	Retailer Support (Chapter 3, 4, 5) <ul style="list-style-type: none"> • Subsidies for retailers. • Promotion of retailers through City website. 	Event Support (Chapters 3, 4) <ul style="list-style-type: none"> • Hosting Repairathon events, vintage fashion shows, and swaps. 	Green Procurement (Chapter 5) <ul style="list-style-type: none"> • Green procurement at municipal level. • Facilitation of voluntary green procurement for institutions and businesses.
<u>Efficiency Rating</u>	High <ul style="list-style-type: none"> • Costs to the City would include staff and materials. 	Low <ul style="list-style-type: none"> • Subsidies require an outlay of municipal money and are 	High <ul style="list-style-type: none"> • The City would take on a facilitative role. 	Medium <ul style="list-style-type: none"> • Depending on prices, this may require an increase in government

²⁹¹ Christine Rossell, "Using Multiple Criteria to Evaluate Public Policy: The case of school desegregation," *American Politics Quarterly* 21, no. 2 (April 1993), doi: 10.1177/1532673X9302100201.

²⁹² *Ibid.*

²⁹³ "Selected Criteria for Evaluating Public Policy Proposals," accessed from http://people.uncw.edu/imperialm/UNCW/PLS_505/PLS_505_Figures_Eval_Criteria.pdf

	<ul style="list-style-type: none"> If the focus is placed on utilizing the website and social media for delivery, costs will be lower as there is less need for physical resources. 	<p>dependent on both retailer and consumer buy-in. If consumers do not buy products from retailers, the strategy will not be successful in achieving its goals.</p> <ul style="list-style-type: none"> Instead, promotion of retailers would be more efficient, as costs to government would be lower and could be combined with the education campaign. Promotion of retailers would increase knowledge about local businesses, which could lead to a boost for the local economy. 	<ul style="list-style-type: none"> Promotion and staff will be the only major costs incurred by the City. Any physical items required, such as tables, chairs, and sewing machines, may already be available at venues, or can be reused if purchased. Promoting vintage and repair also could stimulate the local economy. 	<p>spending on textile items.</p> <ul style="list-style-type: none"> Subsidies may be necessary to facilitate green procurement for institutions and business. However, this is more efficient than subsidies for retailers, as the ones receiving the subsidy are also the end consumers. In the long term, the prices of recycled fabric could be expected to drop due to increased demand and awareness.
<u>Effectiveness Rating</u>	<p>Medium-High</p> <ul style="list-style-type: none"> To be successful, the information provided by the City needs to lead to behaviour changes. This requires public and retailer buy-in. Education campaigns have the potential to influence a range of behaviours, including production, consumption, and disposal behaviours. Surveys have found people are interested in textile disposal, but lack information on the issue²⁹⁴. 	<p>Low</p> <ul style="list-style-type: none"> Same issues as discussed in relation to efficiency. A subsidy's success is dependent on both retailer and consumer participation. Because of the prominence of large chain retailers, it could be difficult to change individual buying behaviours. 	<p>Medium-High</p> <ul style="list-style-type: none"> Events like swaps and Repairathons can divert significant amounts of textile waste. However, success is dependent on public participation. These events also provide an opportunity to educate individuals about the impacts of textile waste, and the importance of sustainable consumption. 	<p>High</p> <ul style="list-style-type: none"> Green Procurement encourages the use of recycled fabrics and stimulates the market. The more institutions and private businesses that participate, the more effective the strategy will be. The City needs to ensure participants are aware of how to properly dispose of old textiles to ensure this does not lead to more textile waste.
<u>Feasibility Rating</u>	<p>High</p> <ul style="list-style-type: none"> The City of Toronto has experience with information campaigns, and have introduced similar campaigns in the past^{295 296}. Successful textile waste awareness campaigns have been introduced 	<p>Medium</p> <ul style="list-style-type: none"> Subsidies are already widely used and do not carry the same negative connotations as taxes. Additional staff would be required to research and identify appropriate retailers for subsidies. 	<p>High</p> <ul style="list-style-type: none"> The City has supported successful events like these in the past. The City would need to identify vintage retailers who would be appropriate to partner with. 	<p>Low-Medium</p> <ul style="list-style-type: none"> The City has successfully employed Green Procurement strategies in other areas^{298 299}. The City would need to determine textile needs and connect with appropriate suppliers.

²⁹⁴ *Supra* at note 213.

²⁹⁵ *Supra* at note 40.

²⁹⁶ *Supra* at note 70.

²⁹⁸ "Green Fleet," *City of Toronto*, accessed from

<http://www1.toronto.ca/wps/portal/contentonly?vgnextoid=a47107ceb6f8e310VgnVCM10000071d60f89RCRD>

²⁹⁹ "Renewable Energy," *City of Toronto*, accessed from

<http://www1.toronto.ca/wps/portal/contentonly?vgnextoid=935ec5a69b568410VgnVCM10000071d60f89RCRD>

	<p>elsewhere, like the U.K., and provide examples of what information should be included in the City's campaign.</p> <ul style="list-style-type: none"> • The City would need to reassign or hire additional staff to manage the website and social media accounts. • Using online sources as the primary method of delivery could raise issues of accessibility, as low-income residents may not have easy access to the internet. • The provincial government is responsible for school curriculum²⁹⁷. Therefore, provincial support is needed for the City to extend education campaigns to schools. 	<ul style="list-style-type: none"> • Subsidies may not be socially acceptable in this case as there is an opportunity cost associated with providing this money. • The City may face resistance if residents believe money should be put towards other social issues. • Promotion of retailers raises the same points as discussed in relation to the feasibility of education campaigns. 	<ul style="list-style-type: none"> • The City would need to identify appropriate locations where events would reach the maximum number of individuals. 	<ul style="list-style-type: none"> • Due to the voluntary nature, participation among institutions and the private sector may be low. • This may cause for-profit retailers, like hotels and restaurants, to move out of the City if it is perceived as an added cost to business.
<u>Additional Notes</u>	<p>How to measure the strategy's success:</p> <ul style="list-style-type: none"> • By comparing diversion rates before and after introduction of education campaign. • The number of hits to website and interaction on social media. 	<p>How to measure the strategy's success:</p> <ul style="list-style-type: none"> • Increased business for retailers receiving subsidies and being promoted on website. • Wider use of recycled textiles overall. • Drop in prices of recycled fabric in the long term. 	<p>How to measure the strategy's success:</p> <ul style="list-style-type: none"> • The volume of items diverted through swaps. • Number of items repaired at Repairathon events. • The number of events hosted each year, indicating if demand for events is increasing. • Increased business for vintage retailer partners. <p>Surveys should be employed at swap and Repairathon events to determine what individuals would have done with unwanted or broken items otherwise.</p>	<p>How to measure the strategy's success:</p> <ul style="list-style-type: none"> • Percentage of the City's textile needs that are fulfilled using recycled fabric. • The number of institutions and private businesses participating in green procurement. • Drop in prices of recycled fabric in the long term.
<p><u>Sources:</u> "Bad Things Happen When the Wrong Items and Recycling Get Together," <i>City of Toronto</i>. Claudia Marsales, "Markham Textile Diversion Strategy: what we learned and where we are going," presented at Tip of the Iceberg: Textile Diversion Strategies and Extended Producer Responsibility Symposium, May 4, 2016. "Green Fleet," <i>City of Toronto</i>. "Renewable Energy," <i>City of Toronto</i>.</p>				

²⁹⁷ "Who's Responsible for Your Child's Education?" *Ontario Ministry of Education*, accessed from <http://www.edu.gov.on.ca/eng/document/brochure/whosresp.html>

“Waste Management Guide Calendar –Apartment Buildings & Condominiums,” *City of Toronto*, 2017.
 “Who’s Responsible for Your Child’s Education?” *Ontario Ministry of Education*.

In addition to textile waste policies, the City of Toronto needs to determine the most appropriate way to collect and handle textile waste. Table 5 provides a ranking of collection and handling strategies based on their potential efficiency, effectiveness, and feasibility.

Table 5: Comparison of Textile Collection & Handling Strategies

Criteria	Curbside Pickup (Chapter 5)	Collection Boxes (Chapters 4, 5)	EPR (Chapter 5)
<u>Efficiency Rating</u>	<p>Low</p> <ul style="list-style-type: none"> • Implementation would require capital and infrastructure investment. • The City would need to modify existing collection trucks or acquire new ones. • Or the City would need to supply residents with supply bags and boxes. 	<p>High</p> <ul style="list-style-type: none"> • It is not necessary for the City to spend money on designing boxes as these products already exist. • The City will be responsible for the maintenance and operation costs of bins. • Depending on who manages the collected waste, the City may not be responsible for collection and processing costs. • There is evidence that curbside collection costs will fall due to the diminishing volume of textiles in waste³⁰⁰. 	<p>High</p> <ul style="list-style-type: none"> • The government would be responsible for the costs of designing and implementing policy. However, producers would bear the operation costs.
<u>Effectiveness Rating</u>	<p>High</p> <ul style="list-style-type: none"> • Curbside pickup provides individuals with an easy way to recycle textiles. Since convenience is a determiner of disposal behaviour³⁰¹, this would likely increase the amount collected. • There is a risk of material contamination early on. 	<p>Medium</p> <ul style="list-style-type: none"> • There is evidence from other cities that collection boxes are effective in textile waste collection. • Success requires resident participation. • Collection boxes provide an opportunity to increase collection from multi-resident dwellings. Multi-resident housing represents almost 50% of structural dwelling type in the City of Toronto³⁰². • Depending on their location, collection boxes could also make drop off easier for single unit residents. 	<p>Medium</p> <ul style="list-style-type: none"> • Other EPR programs have been effective in reducing waste, such as electronic waste³⁰³. • Success is still dependent on public buy-in. If individuals do not change their behaviours, diversion will remain low.

³⁰⁰ *Supra* at note 225.

³⁰¹ *Supra* at note 38.

³⁰² “Census Profile, 2016 Census, Toronto, C [Census subdivision], Ontario and Canada [Country],” *Statistics Canada*, Catalogue no. 98-316-X2016001, May 2017, accessed from <http://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?Lang=E&Geo1=CSD&Geo2=PR&Code2=01&Data=Count&SearchType=Begins&SearchPR=01&TABID=1&B1=All&Code1=3520005&SearchText=toronto>

³⁰³ “2015 Annual Report,” *Ontario Electronic Stewardship*, accessed from <http://ontarioelectronicstewardship.ca/wp-content/themes/Avada-Child-Theme/annualreport/2015/?page=2>

<u>Feasibility Rating</u>	Medium <ul style="list-style-type: none"> • The City can use existing recycling collection routes. • Residents are already familiar with the curbside pickup process; therefore, inclusion of textiles does not require additional learning or effort on their part. • The City would be required to update recycling centres as they currently cannot process textiles³⁰⁴. • The City may require additional staff to facilitate the pickup and processing of materials. 	High <ul style="list-style-type: none"> • The City would be need to determine the number of collection boxes to install, and where they would be most effective. • The City may need to hire additional staff to service boxes. 	Low <ul style="list-style-type: none"> • EPR programs are administratively difficult and not feasible for the City of Toronto to implement in isolation. • Successful implementation of an EPR program would require provincial and/or federal support. • If done in isolation, retailers may move out of the City if they see the policy as an added cost to business. • An EPR program should be socially acceptable given that costs are not passed onto consumers.
Sources: “2015 Annual Report,” <i>Ontario Electronic Stewardship</i> . Amanda Persico, “Markham’s Textile Recycling Program to Save Taxpayers \$86,000,” <i>York Region</i> , January 2017. “Bad Things Happen When the Wrong Items and Recycling Get Together,” <i>City of Toronto</i> . “Census Profile, 2016 Census, Toronto, C [Census subdivision], Ontario and Canada [Country],” <i>Statistics Canada</i> , Catalogue no. 98-316-X2016001, May 2017. Sabine Weber, “How Consumers Manage Textile Waste,” (Master’s Thesis, University of Waterloo, 2015).			

Finally, the City of Toronto must also decide who will be responsible for handling textile waste. Table 6 outlines the advantages and disadvantages of each option.

Table 6: Comparison of Service Providers

<u>Provider</u>	<u>Advantages</u>	<u>Disadvantages</u>
Municipality	<ul style="list-style-type: none"> • The sale of collected textiles can generate revenue for the municipality. • The municipality has control over what happens to collected textiles. They can choose to sell to a textile recycler whose mission and practices are aligned with the City’s. 	<ul style="list-style-type: none"> • The City would be required to invest in additional infrastructure and capital required to manage textile waste. • The City would be responsible for the collection and processing costs.
Charities	<ul style="list-style-type: none"> • This would increase the volume of textiles going to the partnered charity, which increases their total revenue. • Any additional revenue generated can be channeled back into community. • Using a charity’s name may add legitimacy to the program and encourage people to participate. • The City would not incur collection and processing costs, as these actions would be carried out by the charity. • Charities already have infrastructure in place to deal with textile waste. 	<ul style="list-style-type: none"> • The City has little to no control over what the charity does with collected waste. • Partnering with one specific charity may reduce donations to other charities that depend on donations as a source of revenue. • As mentioned in Chapter 4, people may be resistant to donate if they believe items will not be used in the local community.
For-Profit Recycler	<ul style="list-style-type: none"> • Using a local recycler could result in a boost to the local economy. • This presents an opportunity for profit sharing between the textile recycler and the municipality. 	<ul style="list-style-type: none"> • This may reduce the level of donations to charities, which depend on them for a source of revenue.

³⁰⁴ *Supra* at note 70.

	<ul style="list-style-type: none"> • The City would not incur collection and processing costs, as these actions would be carried out by the recycler. • Recyclers already have infrastructure in place to deal with textile waste. • This could reduce transportation costs and CO₂ emissions, as the recycler would receive waste directly instead of from a charity. 	<ul style="list-style-type: none"> • The City has little to no control over what the recycler does with collected waste. • This may result in an increase of waste exports to developing countries. • As mentioned in Chapter 4, people may be resistant to idea of their unwanted items being used as commodities instead of as donations.
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Additional Considerations

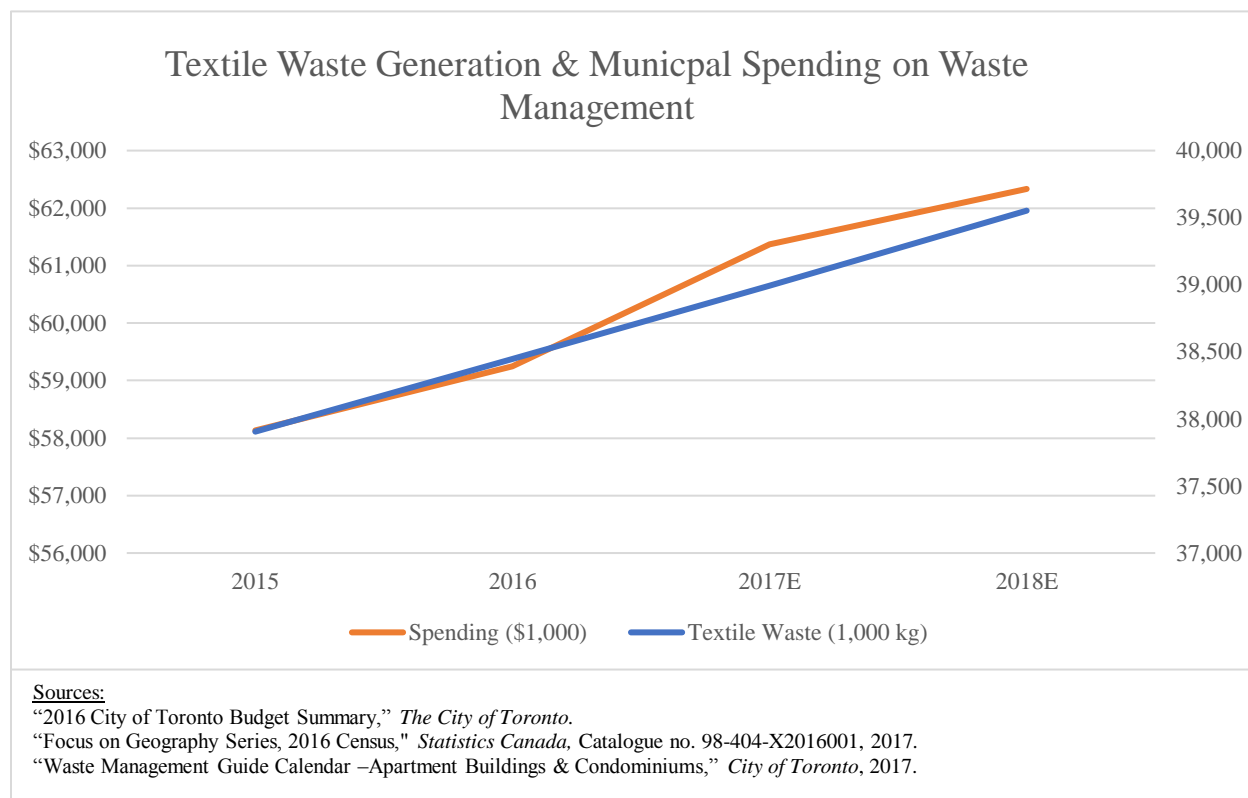
Aside from deciding on which strategies to pursue and who will carry them out, there are additional economic and policy considerations the City should keep in mind while devising its overall textile waste approach.

Economic Considerations

In addition to the financial and economic factors discussed in relation to specific strategies, the City must consider broader economic implications as well. First, Reduce strategies will be more cost-efficient than Recycling strategies. Targeting waste reduction can reduce system costs and save the City money due to lower collection, processing, and disposal costs³⁰⁵. This idea is reinforced by the structure of the 3R Waste Hierarchy, with Reduce being the highest priority and most preferable option in the hierarchy.

Second, the City needs to consider the impacts on municipal spending. Figure 7 outlines the City of Toronto's budget, and expected budget, for municipal waste services, including collection, transfer, processing, and transport costs. Note, in this case waste management refers only to the management of garbage, and does not include recyclable or compostable materials. An estimation of yearly textile waste generated by Toronto households is also shown in Figure 7.

³⁰⁵ *Supra* at note 71.

Figure 7: Textile Waste Generation & Municipal Spending on Waste Management^{306 307 308}

As shown in the above figure, the City’s expenditure on waste management has increased since 2015, and is expected to continue to increase into the future. Textile waste generated by Toronto households is expected to increase over the same period. Furthermore, local governments in Ontario spent an average of \$12 per person on the operation of disposal facilities in 2014, compared to \$8 per person on operation of recycling facilities^{309 310}. Encouraging a reduction in textile waste can help reduce the financial burden of managing waste services and disposal facilities. Any savings in these areas can be diverted towards recycling operations.

A reduction in textile waste in landfills will correspond to an increase in textile materials for reuse and recycling. As a result, the City will also need to consider the long-term impacts of increased textile materials. An increase in the amount of textile materials collected will put a strain on the already existing recycling infrastructure, such as sorting and mechanical recycling facilities. To manage an influx of collected materials, the City should plan for future investments to upgrade or replace infrastructure. Lower expenditures on waste management and disposal facilities could help offset the costs of future infrastructure requirements.

³⁰⁶ “2016 City of Toronto Budget Summary,” *The City of Toronto*, accessed from <http://www1.toronto.ca/City%20of%20Toronto/Strategic%20Communications/City%20Budget/2016/PDFs/GFOA%202016%20City%20of%20Toronto.pdf>

³⁰⁷ “Focus on Geography Series, 2016 Census,” *Statistics Canada*, Catalogue no. 98-404-X2016001, 2017, accessed from <http://www12.statcan.gc.ca/census-recensement/2016/as-sa/fogs-spg/Facts-CMA-Eng.cfm?TOPIC=1&LANG=Eng&GK=CMA&GC=535>

³⁰⁸ *Supra* at note 40.

³⁰⁹ Statistics Canada, “Table 153-0045 –Local Government Characteristics of the Waste Management Industry, Canada, Provinces and Territories, every 2 years (dollars unless otherwise noted),” *CANSIM*, accessed from <http://www5.statcan.gc.ca/cansim/a26?lang=eng&id=1530045&p2=33>

³¹⁰ Statistics Canada, “Table 051-0001 –Population by Year, by Province and Territory (Number),” *CANSIM*, accessed from <http://www.statcan.gc.ca/tables-tableaux/sum-som/101/cst01/demo02a-eng.htm>

Finally, the City should consider the impacts on job availability. Diverting textiles from landfills to textile recyclers could create jobs in the textile reclamation industry. On a per-tonne basis, the textile recycling industry can employ 85 times more workers than landfills and incinerators³¹¹. Therefore, new job creation could make up for the job losses resulting from less landfill waste.

Policy Considerations

There are additional policy implications the City must consider when choosing and implementing a textile waste strategy. Depending on which option, or options, the City chooses to pursue, additional policies may be needed to ensure the program's success.

The City should implement additional regulations that support and encourage the use of the new collection system to ensure it is effective. For example, the City of Markham has banned textiles from disposal, and curbside collection will not pick-up bags that contain clothes and household textiles.³¹² This strategy helps support their textile collection box system. Additionally, landfill bans have been used in conjunction with EPR programs, such as with electronic waste, to prohibit disposal via landfills and ensure items are recycled properly³¹³. Another option is for the City of Toronto to implement by-laws which support waste division goals. By-laws could target multi-residential buildings and institutions by mandating diversion requirements³¹⁴. The purpose of these regulations is to change residents' disposal behaviours to ensure unwanted textiles are diverted from landfills and are directed to the proper collection program.

Additionally, second-hand clothing exports may increase as the volume of textiles collected by charities or third-party recyclers increases. To ensure waste products are not exported, as discussed in Chapter 5, enhanced regulation regarding second-hand clothing exports may be necessary. The City should require full transparency from any charities or third-party recyclers they partner with for textile collection and handling. This can be accomplished by requiring collaborators to provide detailed information on how textiles are handled in their facilities and to whom textiles and waste are sold. Furthermore, the City can require any secondary recyclers to whom textiles are sold to be subject to audit practices and obtain approval to do business with City partners.

In Canada, waste management is regulated at the provincial level. However, municipalities are responsible for delivering waste and recycling services³¹⁵. While municipalities have some regulatory power via by-laws, such as bans and limits on garbage generation. Collaboration with other municipalities, and provincial and federal government may be necessary for the realization and success of select policies. In some cases, such as with EPR programs or export regulation, the City of Toronto may not have the administrative capacity or authority to implement such policies on its own. Furthermore, if policies that target businesses

³¹¹ *Supra* at note 21.

³¹² *Supra* at note 226.

³¹³ Nicole Thompson, "Evaluating B.C.'s E-Waste Strategy: How electronic EPR programs rate on equity and performance outcomes," December 2016.

³¹⁴ *Supra* at note 71.

³¹⁵ "How Waste is Regulated," *Recycling Council of Ontario*, accessed from https://www.rco.on.ca/how_waste_is_regulated

are implemented in isolation, retailers may relocate to other areas which do not have such heavy restrictions. By collaborating with other levels of government and municipalities, a comprehensive textile strategy could be implemented across the province. This would both help to keep a level playing field, as businesses would pay the same costs wherever they operated in the province, and enable the implementation of more complex strategies, such as an EPR program.

Finally, the City needs to consider how it will implement and enforce its textile waste strategy. The City can approach this in several ways. On the one hand, the government can take an approach that favours voluntary participation. In this case, individuals and businesses are encouraged to participate in textile waste strategies, but are under no obligation to do so. Instead, the government relies on moral suasion to change behaviours³¹⁶. For example, this could involve putting collection bins and information about textile waste in apartment buildings. Residents would then voluntarily put what they wanted in the bins. Voluntary approaches are generally considered politically friendly due to their flexibility. However, these types of policies are subject to free-rider problems, in which individuals may choose not to participate but still benefit from the actions of others. Furthermore, without accountability and public participation these strategies generally do not achieve the desired targets³¹⁷.

Alternatively, the City could adopt a stricter stance, such as a command-and-control strategy. Command-and-control strategies include setting a target for diversion, which is achieved by using regulations everyone must adhere to. This strategy would involve installing collection bins, and then mandating a level of diversion the building must achieve. These types of strategies tend to be successful in achieving targets; however, they can be politically unpopular, can be inefficient, and provide little incentive for individuals or businesses to go beyond the minimum threshold of compliance³¹⁸.

Rather than using a single approach, the City could consider a combination of the voluntary and command-and-control tactics. In this case, the City would introduce these strategies in a gradual manner, starting first with voluntary programs and moving onward to stricter regulation and enforcement. To do this, the City should set clear and publically available textile diversion targets and timelines to achieve those targets. If residents and businesses know what the set targets and timelines are, they can begin adapting their behaviour in the voluntary phase in preparation for future regulation. Additionally, diversion targets should increase over time to encourage innovation.

Overall Recommendations

There are numerous tools and strategies the City of Toronto could use in its textile waste strategy. Outlined below is a recommendation of the strategies, approach, and timeline the City of Toronto can adopt to address its textile waste.

³¹⁶ Don Drummond, Beata Caranci, and David Tulk, "Market-Based Solutions to Protect the Environment," *TD Economics*, March 2007, accessed from <https://www.td.com/document/PDF/economics/special/td-economics-special-bc0307-env.pdf>

³¹⁷ *Ibid.*

³¹⁸ *Ibid.*

When implementing the textile waste strategy, the City should adopt a phased in approach, like that described in “Policy Considerations”. The City should begin by focusing on voluntary reduction strategies and education campaigns, and over time move towards full compliance using by-laws and bans. As mentioned above, taking this approach gives residents and businesses time to learn about the issue and adjust their behaviours, making the eventual transition towards compliance based policies smoother.

The City should utilize collection boxes, operated in collaboration with a selected charity, to collect and handle textile waste. Collection boxes have proven successful with other municipalities, notably in the nearby City of Markham, which also provides an opportunity for information and best practice sharing. Collection boxes should be placed in public spaces, residential buildings, institutions, and retail spaces to make drop off as convenient as possible for individuals. Furthermore, collection boxes can be worked into an EPR framework, as evidenced by the French TLC EPR program³¹⁹, if this system is later adopted by the province. Collaborating with a charity, such as The Salvation Army, to manage the collection boxes would save the City money and ensure that municipal efforts do not detract from charity textile collection, an important source of their revenue. This also provides legitimacy and familiarity with the program for residents, since charity collection boxes already exist in the City.

Initially, the City should focus on Reduce strategies, such as education campaigns and event support. Reduce strategies are cost-effective, and by attempting to prevent waste generation, the City can reduce or avoid long-run infrastructure and waste management costs. Additionally, education based campaigns provide residents and businesses with an information base and ensures they understand the negative impacts of this waste stream. This also ensures they understand the reason behind the implementation of stricter by-laws in the future, which in theory should make acceptance of regulation more likely.

During this time, the City should also begin introducing voluntary initiatives for retailers, residential buildings, and institutions. For example, the City could install collection boxes and introduce green procurement strategies. The City should also clearly state when voluntary initiatives will become mandatory. This provides an incentive to participate in the voluntary phase, and allows participants time to adjust their behaviours and determine what will be the most cost-effective way for them to meet requirements.

Eventually, the City should implement several by-laws relating to textile waste, based on previously voluntary initiatives. First, by-laws should require textile collection boxes in residential buildings, textile retailer spaces, and institutions, such as hospital and schools. The City has flexibility in determining thresholds for requirement. For example, only residential buildings with over a certain number of units, or retailers that transact a set dollar amount of business a year, will be required to have a collection box. This prevents small and low-volume businesses and buildings, in which diversion would also likely be small, from incurring costs of compliance that may be too high for them to continue to operate.

Following the implementation of textile waste by-laws, the City should pass a by-law which requires a minimum level of textile diversion for buildings. Such a by-law would prohibit

³¹⁹ *Supra* at note 250.

buildings from disposing textile waste via garbage and require this material be diverted for reuse or recycling. Waste received at transfer stations would be monitored, with loads containing textile waste above a set threshold receiving verbal warnings or monetary fines. The acceptable threshold level can decrease, and the fine level can increase, over time. This by-law should be supported by a landfill ban on textiles.

Finally, the City should eventually implement a procurement by-law for municipal departments, making the previous voluntary green procurement initiative mandatory for this group. Once again, beginning with a voluntary program gives departments time and flexibility to identify their textile needs, find the most appropriate suppliers, and resolve any budget issues before the program becomes mandatory.

Table 7 provides an example of how the City of Toronto could implement the strategy described above over a ten-year period. Table 7 also suggests textile diversion targets the City should pursue, with the baseline being a 15% diversion rate³²⁰.

Table 7: Ten-Year Textile Strategy Timeline

Phase	Timeline	Strategies	Diversion Target
Phase 1	Years 1-3	<ul style="list-style-type: none"> • Education campaign. • Event support. • Installation of collection boxes in public spaces • Voluntary installation of collection boxes in private spaces (retailers, residential buildings, and institutions). 	25%
Phase 2	Years 3-6	<ul style="list-style-type: none"> • Continuation of education campaigns and event support. • By-laws requiring textile collection boxes in residential buildings and in retailer spaces. • Voluntary green procurement for municipal departments, retailers, and institutions. 	40%
Phase 3	Years 6-10	<ul style="list-style-type: none"> • Continuation of education campaigns and event support. • Landfill ban on textile materials. • Procurement by-law for municipal departments • By-laws mandating building diversion levels. 	55%

The City should ensure that it is monitoring and tracking key indicators of the program's success, such as diversion rate and tonnes of textiles collected. This information should then be made publicly available. This provides government transparency and accountability as well as political rationales for the program. Additionally, throughout this process, the City of Toronto should pressure the Ontario provincial government to implement a provincial strategy targeting textile waste. The provincial government is better equipped to carry out more complex programs, such as EPR. Moving past the initial ten years, a more comprehensive program like EPR will further increase the likelihood of achieving more ambitious diversion targets.

³²⁰ *Supra* at note 83.

As textile production, consumption, and disposal continue to increase worldwide, action must be taken to mitigate the numerous issues this waste stream creates. The 3R Waste Hierarchy provides a template for designing solutions. Combined, Reduce, Reuse, and Recycle strategies can address these environmental and social issues by promoting sustainable consumption, discouraging waste generation, prolonging product life, and preserving resources. Furthermore, a textile waste strategy can provide the City with many benefits, including stimulating local businesses, creating jobs, and reducing waste management costs. The textile waste strategy recommended in this paper can be adopted and adapted to serve other municipalities with similar waste diversion goals as the City of Toronto. By implementing a comprehensive textile waste strategy, the City of Toronto can address its impact in this area, and serve as a model for other Canadian municipalities looking to do the same.

Appendix A

Figure 4: Global Fibre Consumption vs. Canadian Household Spending on Apparel

World Apparel Fibre Consumption (million tons)

Year	Fibre Consumption
2010	69,728
2011	75,864
2012	82,540
2013	89,800
2014	93,700
2015	96,314
2016	99,000

Fibre consumption was estimated for the years 2011, 2012, and 2015 as data was unavailable for these years.

- 2011 and 2012 figures were calculated based on the assumption of an 8.8% increase over the previous years. Assumption is based on a steady state rate of change between 2010 and 2013.
- 2015 consumption numbers were calculated based on the assumption of a 2.9% increase over the previous year. Assumption is based on a steady state rate of change between 2014 and 2016.

Apparel Spending as a Percentage of Household Spending

Year	Household Consumption Spending	Household Clothing & Footwear Spending	Apparel Spending as Percentage of Consumption Spending
2010	\$54,013	\$3,053	5.65%
2011	\$55,227	\$2,870	5.20%
2012	\$56,330	\$2,946	5.23%
2013	\$58,576	\$3,024	5.16%
2014	\$59,057	\$2,983	5.05%
2015	\$60,516	\$2,871	4.74%

Household consumption spending refers to food, shelter, household operations, household furniture and equipment, clothing, transportation, health care, personal care, recreation, reading materials, education, tobacco, alcohol, games of chance, and miscellaneous expenses incurred by households during the reference year.

Appendix B

Figure 7: Textile Waste Generation & Municipal Spending on Waste Management

The City of Toronto Spending on Waste Management

Year	2015	2016	2017	2018
Waste Collection & Transfer (\$000s)	\$29,138.6	\$28,419.3	\$30,470.7	\$31,386.3
Processing & Transport (\$000s)	\$28,994.7	\$30,824.2	\$30,895	\$30,946.6
Total Spending (\$000s)	\$58,133.3	\$59,243.5	\$61,365.7	\$62,332.9

The City of Toronto Textile Waste Generation

Year	2011	2015	2016	2017	2018
Occupied Households	1,989,705	2,105,833	2,135,910	2,166,415	2,197,356
Total Waste Generated (000 kg)	N/A	37,905	38,446	38,995	39,552

The number of occupied households was estimated for the years 2015, 2017, and 2018 as data was unavailable for these years.

- Figures were calculated based on the assumption of a 1.43% increase over the previous years. Assumption is based on a steady state rate of change between 2011 and 2016.

Total textile waste generated was estimated using the assumption that each Toronto household produces 18 kg of textile waste each year.

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