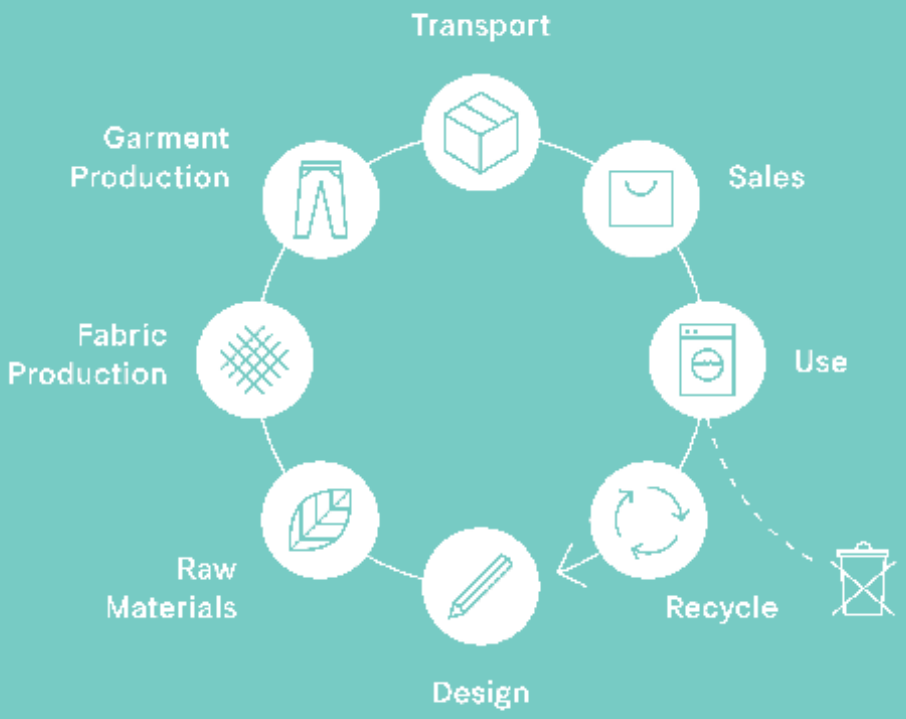
Towards the Circular Economy:

Identifying local and regional government policies for developing a circular economy in the fashion and textiles sector in Vancouver, Canada



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VANCOUVER
ECONOMIC COMMISSION

EXECUTIVE SUMMARY

"What local and regional policies should be implemented to catalyze a circular economy in the fashion and textile industry in Vancouver, Canada?"

Government policy and regulations provide the enabling framework for the circular economy to flourish. However, there is no standardized approach to creating a circular economy; instead, policies must be appropriate for the local context.

Seven influential Vancouver businesses were engaged in May and June of 2015 to help define the context, barriers, and local policy needs for stimulating the shift to a circular economy in Vancouver's fashion and textiles sector.

Overall, the context for creating a circular economy in the fashion and textile sector in Vancouver is positive—businesses are already striving to reduce waste and are interested in moving towards circularity.

That said, the drivers to move toward circular economy business models are not strong enough for businesses to pursue this change on their own. Businesses in Vancouver believe that government can play a vital role in providing the policy levers and incentives for change that will encourage the shift to a circular economy.

The local and regional governments can catalyze the shift to a circular economy in Vancouver's fashion and textiles sector through:

1. Implementing an Extended Producer Responsibility (EPR) standard for textiles
2. Implementing a waste ban for textiles
3. Encouraging research and development for textile recycling
4. Manage or facilitate textile collection programs
5. Providing and encouraging the uptake of recycling infrastructure
6. Building education and awareness about textile waste
7. Implementing pilot take-back programs
8. Educating fashion designers about the full lifecycle impacts of clothing
9. Providing financial incentives and green credits for local businesses that reduce waste and are sustainable
10. Enabling local manufacturing and encourage regional material loops

* Businesses identified EPR as the most important and effective policy to develop a circular economy in the long-term.

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INTRODUCTION

Over the past decade, generating a circular economy has become a priority for both businesses and cities wishing to move towards sustainability. A circular economy offers an alternative model to our take-make-waste model of consumption by keeping materials in circulation (and out of the landfill). While businesses primarily have been the focus of circular economy initiatives, cities have been identified as the ideal location for creating closed, regional material loops.[1]

In the city of Vancouver, Canada, local governments and a number of fashion and textile businesses recognise the opportunities that come from moving toward a circular economy. For one, the circular economy offers a solution to the growing problem of textile waste, which currently amounts to over 30,000 tonnes added to Metro Vancouver landfills each year.[2] In addition, the circular economy offers an opportunity to generate economic growth, increase the number of local green jobs, and contribute to the City's goal to be the greenest city in the world by 2020.[3]

For local fashion and textile businesses, the circular economy provides an opportunity to create new profit streams, increase their resilience to volatile input costs, and support their efforts to become completely sustainable and socially responsible[4].

That said, a number of barriers will need to be overcome in order for the circular economy in the fashion and textile sector to become a reality. Government policy will play a critical role in addressing these barriers and creating opportunities to guide the shift to circularity[5]. Indeed, there are many promising examples of the types of policies that regional and local governments can, or have, implemented around the globe to spur the shift to a circular economy. Although there is no standardized approach to creating a circular economy, there are many creative solutions being explored.

This paper outlines the role Vancouver's local and regional governments can play to help catalyze a circular economy in the fashion and textile sector in Vancouver. While policy alone won't drive the development of the circular economy, this paper outlines the context for creating a circular economy in Vancouver, identifying the barriers that will need to be addressed and the key action areas in which government can play a role.

1 Ellen MacArthur Foundation, 2013
2 Metro Vancouver Solid Waste Dept., 2014
3 Ellen MacArthur Foundation, 2015; Lee et al, 2013
4 Ellen MacArthur Foundation, 2013
5 Ellen MacArthur Foundation, 2015

THE GLOBAL TEXTILE INDUSTRY

Our linear model of consumption of textiles cannot be sustained.

The limits of our take-make-waste model of consumption are extremely apparent when examining the textile industry. As the global population and the middle class continue to grow, so too does the demand for textiles, which has steadily increased since the 1970s.[1] Likewise, global fibre production also continues to set new records. In fact, global production of cotton and polyester, the two main fibres in the textile industry, is expected to grow by 40% in the next 5 years.[2]

Much of the increase in textile consumption has been attributed to industry changes which have emerged since textile and clothing production has moved to developing countries, mainly in Asia, where they can be produced cheaply and quickly, driving down costs and ultimately increasing consumption.[3] While this is true for many soft goods, including footwear, clothing and carpets; nowhere is this more apparent than with the emergence of the 'fast fashion' industry, where cheap clothing brands are designed to sell new styles every two weeks according to regularly changing trends.[4]

While cheap clothing can make fashion more accessible across the globe, many consumers tend to purchase more than they need and have developed a throwaway attitude as a result.[5] In fact, a number of studies have confirmed that most consumers throw textiles away, even if the consumer is interested in protecting the environment.[6]

Textile waste is now estimated to be the fastest growing waste stream in many countries.[7]

In the UK, Netherlands, and Nordic countries, 61% of textile waste is landfilled or incinerated after only one use; only 39% is re-used or recycled.[8] In the US, textiles have one of the poorest recycling rates of reusable materials. Americans only donate 15% of their clothing for recycling or reuse[9] and often textiles that are re-used or repurposed only remain useful for one additional lifecycle.[10]

The impact of this waste goes beyond the landfills as textile production also creates a significant amount of waste. Cotton farming is characterized by intensive agriculture, which uses large amounts of irrigation and pesticides.[11] During production, energy waste and toxic water pollution are issues.[12] And at end of life, synthetic fibres do not decompose; while materials that do decompose produce methane gas.[13]

Moreover, textile production relies on finite resources that will only become scarcer as demand continues to increase: cotton and other natural fibres require significant agriculture landmass and polyester requires finite supplies of oil.[14] As population growth and climate change put pressure on these scare resources, sustainability will become a strategic business imperative for textiles businesses.

1 Elkstrom and Salomonson, 2014; Hvass, 2014; Kalmykova et al. 2015
2 Circle Economy (a), 2015
3 Niinimaki and Hassi, 2011
4 Cataldi et al, 2012; Niinmaki and Hassi, 2011
5 Cataldi et al, 2012
6 Birwistle and Moore, 2007; Joung, 2014
7 Niinimaki and Hassi, 2011
8 Circle Economy (a), 2015
9 Cline, 2014
10 Circle Economy (a), 2015
11 Niinimaki and Hassi, 2011
12 Ashby et al, 2012; Cataldi et al, 2012; Elkstrom and Salomonson, 2014
13 Morgan and Birtwistle, 2009
14 Circle Economy (a), 2015; Christiansen et al, 2013

A circular economy for textiles.

The circular economy offers a sustainable alternative to the linear model of consumption characterized by the textile industry. The circular economy model operates within planetary boundaries where resource loops are closed, waste-free and resilient by design.[15] Economic activities are geared towards keeping materials infinitely in circulation through waste avoidance, material efficiency and resource recovery.[16]

The circular economy goes beyond recycling to focus on waste prevention and reduction first, by reusing, repairing, reselling or redistributing materials. If that is not possible, materials are recycled and recovered from the waste stream and used as inputs, substituting the demand for virgin resources. Finally, waste prevention may be achieved by designing, producing and consuming products in a manner that prevents waste in the first place, so that people and systems downstream don't have to manage it.[17] In addition, all energy in a circular economy is derived from renewable and sustainable resources.[18]

A circular textiles industry, therefore, would see textile products, fabrics and fibres continually cycled through connected loops within and across industries.[19] Products would be designed with cyclability and quality in mind, which may require the use of different materials (for example, sustainable and recyclable fabrics such as hemp and bamboo) and designing out waste in the first place (by using fabrics that are of high quality, are more resistant to wear, and can be repaired).

Businesses should also encourage the collection of old textiles so that materials can be recycled or repurposed (referred to as cascaded use) and encourage collaborative consumption and direct reuse (such as purchasing second-hand or leasing clothes and textile products).[20]

This new vision also involves a new type of consumer, one that appreciates 'slow fashion', cares about how their products are made, and intends to keep their products for longer.[21]

Businesses that move towards circularity can improve environmental performance, create new profit streams and boost innovation. A circular economy can also shield businesses from the increasing price volatility of scarce textile resources, ultimately increasing competitive advantage and business resilience.[22]

Businesses may also choose to go circular because they aspire to be more responsible and are interested in improving their sustainable brand and customer loyalty.[23] Others may be filling a niche for consumers that have moved away from disposable fashion as they become aware of ethical and environmental issues.[24]

Appendix 1 provides a number of examples of fashion and textile businesses that are implementing circular models in their business practices today – demonstrating that it is possible to implement circular practices that are profitable. It is important to note that these examples, while promising, are still relatively rare in the textile industry. Indeed, a recent survey shows that only three out of ten fashion businesses are focusing on managing their environmental footprint even though seven out of ten businesses risk short-term profits and medium-term survival by ignoring effective resource management.[25]

15 Circle Economy (b), 2015
16 Ellen MacArthur Foundation, 2013
17 Ellen MacArthur Foundation, 2013
18 Circle Economy (b), 2015
19 Circle Economy (c), 2015
20 Circle Economy (c), 2015; Ellen MacArthur Foundation, 2013
21 Cataldi et al, 2012; Niinimaki & Hassi, 2011
22 Ellen MacArthur Foundation, 2013
23 Elkstrom and Salomonson 2014, Ellen MacArthur Foundation, 2013
24 Ashby et al, 2012; Christiansen et al, 2013
25 by Christiansen et al (2013)

POLICY AS A DRIVER FOR THE CIRCULAR ECONOMY

Waste and the city

Undeniably, urban centers are dealing with increasing greenhouse gas (GHG) emissions, a reduction in natural capital, strained resources, and increasing waste levels.[1] However, as centres of economic power, knowledge and innovation, cities have proven that they have greater independence and agility to take action on environmental issues than larger more complex jurisdictions.[2] To deal with prevalent and growing quantities of waste, many cities, including Vancouver, have chosen to focus on moving towards 'zero waste'.

Cities currently generate over 70% of all waste produced globally, an average of 1.3 billion tonnes of solid waste per year— a number that is expected to increase to 2.2 billion tonnes by 2025.[3]

Zero waste is desirable because it decreases municipal reliance on landfills and reduces the cost and impacts associated with waste collection. Both zero waste goals and a circular economy are believed to spur local collection, sorting systems, and re-manufacturing & recycling activities, which increases the number of local green jobs.[4]

Given the amount of waste generated in urban areas, the Ellen MacArthur Foundation purports that cities are the ideal location for recovering materials and developing closed, regional loops. Costs associated with asset-sharing, as well as collecting and treating end-of-use materials, are reduced where there is higher drop-off and pick-up density.[5]

1 Siemens, 2012; Zaman and Lehmann, 2011
2 C40 Cities, 2015; Siemens, 2012
3 Zaman and Lehmann, 2011; 2013
4 Fujita & Hill, 2007; Lee et al, 2013; Zaman and Lehmann, 2011
5 Ellen MacArthur Foundation, 2015

Local and regional waste policies

Local governments can have a powerful effect on waste management by introducing waste bans, levies and regulations. Some cities such as Los Angeles, San Francisco and Stockholm have set aggressive diversion targets and implemented waste bans on products such as plastic bags and demolition and construction waste.[6] Many cities have also invested in curbside recycling programs, green waste composting, and material recovery facilities.[7] The city of San Francisco has even implemented a textile collection initiative in partnership with a private company and local non-profit organization.[8]

Through these types of regulations and initiatives, cities such as LA and San Francisco have already diverted 70% of materials from their landfills.[9] In North-West Europe, recycling fees have resulted in recycling percentages in the range of 70-90%.[10]

Extended Producer Responsibility (EPR) standards, which require producers to take responsibility for their products at end-of-life, can also be implemented to encourage waste diversion. EPR programs shift waste management plans onto the producer and are characterised by the participation of companies (either physically or financially) in product take-back, reselling and recycling activities.

EPR programs shift waste management costs away from local governments and onto the producers which frees local governments from the financial and operational burdens of managing product waste.[11] Many jurisdictions across North America and Europe have EPR programs in place for glass, paper, packaging,

6 Murphy and Pincetl, 2013; Zaman and Lehmann, 2013
7 Fujita and Hill, 2007; Murphy and Pincetl, 2013
8 San Francisco Environment, 2015
9 Murphy and Pincetl, 2013; Zaman and Lehman, 2013
10 IMSA Amsterdam, 2013
11 Recycling Council of British Columbia, 2009

batteries, and metals.[12] In Tokyo, thanks to an extensive EPR program, 98% of all metals are recovered from the waste stream.[13]

In order for waste regulations and EPR programs to be effective for textiles, collection for recycling and reuse must be optimised. Curbside recycling and product take-back programs for reuse require extensive handling of products; therefore, economies of scale need to be sufficient to make closing the loop viable.[14] In addition, there are limitations to textile recycling: sufficient capacity is required to sort textiles depending on the fibres used (as textile waste is not homogeneous) and not all materials can be recycled, particularly in the case of some fabric blends.[15] As a result, local capacity and technological innovation for waste recovery are vital to make product take-back programs work.[16]

Government policy needs to look at more than just managing waste and its impacts: policies that solely concentrate on improving resource recovery through waste diversion and recycling, while important, amount to nothing if waste generation levels continue to increase.

Although San Francisco and LA have high waste diversion rates, the overall quantity of waste is still on the rise.[17] In the Netherlands, where 80% of some materials are recycled, there is no incentive to obtain a high quality of recycled material, so although low-quality recycled materials might be used in secondary applications, they still end up as waste eventually.[18]

In order for the circular economy to flourish, the most important objective for governments must be to address the causes of waste production in the first place. Simply setting high diversion targets alone is not enough—regulations and waste bans must be accompanied by policies and programs that aim to discourage the creation of waste by both businesses and consumers to begin with, while encouraging closed-loop cycles for high quality materials.

While waste management and resource optimisation programs are a high priority for many governments, it seems that creating a circular economy is not as critical.[19] Indeed, examples of enabling policies and programs to develop the circular economy that go further than waste management are far less prevalent. These policies can include providing support and incentives for circular businesses, building local capacity and networks, and providing education and outreach to encourage the efficient use of resources.

There are a few promising examples of governments intervening to encourage more sustainable consumption patterns. The government of Tokyo, for example, advises businesses on the use biodegradable and recyclable materials and runs advertisements that encourage Tokyoites to buy waste-free products.[20] The Seoul government has encouraged the development of a sharing economy hub to facilitate sharing of cars, idle public spaces, and children's clothing.[21] And in Vienna, the local government was instrumental in creating a repair platform to put the repair services sector in touch

12 Elstrom and Salomonson, 2014; Murphy and Pincetl, 2013; Zaman and Lehmann, 2013
13 IMSA Amsterdam, 2013
14 Ashby et al, 2012; Hvass 2014
15 Ashby et al, 2012; Circle Economy (a), 2015; Elkstrom and Salomonson 2014
16 Zaman and Lehmann, 2011
17 Murphy and Pincetl, 2013; Zaman and Lehmann, 2013
18 IMSA Amsterdam, 2013
19 De Groene Zaak, 2015
20 Fujita and Hill, 2007
21 De Groene Zaak, 2015

with customers. This initiative alone has prevented over 600 tonnes of waste per year and supported a high quality repair services sector in Vienna.[22]

Governments can also provide critical support for innovative business models. This can include starting programs for research, enabling demonstration programs, and providing economic incentives for pilots and start-ups (for example through preferential lease and business tax rates).[23] Governments can also lead by example and proactively procure materials from local circular and green businesses.[24]

Institutional rules and regulations can sometimes become barriers to developing circular systems. For example, a more radical solution to encouraging the circular economy proposes shifting taxes away from labour to raw materials, which can decrease the demand for resources and encourage more labour-intensive (and circular) business models.[25] However, such a tax shift can only be realised if international or regional institutions encourage long-term reform and are in agreement.[26]

Developing appropriate policy

Although it is clear that policy can play a role in developing the circular economy, the nature of policies and their impacts differ significantly due to the local context. There is no "one-size-fits-all approach" to the types of policies that are most appropriate for developing the circular economy.[27] The tools, methodology and strategies implemented by each city need to be affordable, politically manageable and effective given existing technology and infrastructure.

22 De Groene Zaak, 2015
23 De Groene Zaak, 2015; Lee at al, 2013; Recycling Council of BC, 2009
24 De Groene Zaak, 2015; Lee et al, 2013; Wijkman and Skanberg, 2015
25 De Groene Zaak, 2015; Wijkman and Skanberg, 2015
26 De Groene Zaak, 2015
27 Van Beers et al, 2009; Jiao and Boons, 2014

The role of the consumer

Ultimately, any effort by business and government to change must align with consumer attitudes and habits. Consumers are responsible for use, care and disposal of textiles, and their demands and requirements will also influence the design process.[28] In order for a circular economy to flourish, consumers need to be made aware of the need for textile recycling and reuse as well as the environmental consequences of textile production and waste.[29]

Consumers may be more willing to modify their clothing disposal behaviour if they were made more aware of the social and environmental consequences of textile consumption.[30]

Increasing consumer knowledge has been shown to have a lasting effect on recycling habits.[31]

To date, the price of ethical and sustainable clothing tends to be higher and the availability limited. As a result, sustainable clothing is not yet seen as a viable alternative to cheap throw-away fashion, and it still makes up a small fraction of the total market.[32] This suggests that ethical and sustainable fashion brands must, for the time being at least, be comparable in style and price to other fashion brands.[33] Closed loop fashion will need to be price competitive, and sustainable fashion companies will need to communicate their value proposition more effectively in order to succeed.[34]

28 Ashby et al, 2012
29 Birtwistle and Moore, 2007; Hvass 2014; Zaman and Lehmann, 2011
30 Birtwistle and Moore (2007); Morgan and Birtwistle (2009)
31 Iyer and Kashyap (2007)
32 Sudbury and Boltner, 2011
33 Joergens 2006; Shen et al, 2012; Sudbury and Boltner, 2011
34 Joergens, 2006; Sudbury and Boltner, 2011

RESEARCH CONTEXT + METHODOLOGY

Context for this research

The Vancouver Economic Commission (VEC) plays a key role in supporting Vancouver's "Greenest City" mandate, including advancing a new vision for the city's industrial core—one where businesses reduce energy and water, contribute to local supply chains and find new channels for waste.[1]

Previous research undertaken by the VEC identified that government policy can play a critical role in encouraging the development of the circular economy in Vancouver. However, no specific policy recommendations for the fashion and textiles sector have been developed.

Programs and policies related to waste generation in Vancouver can be developed by the City of Vancouver, the Metro Vancouver region or by the Province of British Columbia in Canada. While policies could also be generated on a national and international level, these are not the focus of this research.

The City of Vancouver

The City of Vancouver is located on the coast of the province of British Columbia, Canada. With a population of just over 600,000 people and a land area of 114 square kilometers, the city is one of the densest in North America. Vancouver is consistently ranked as one of the most livable cities in the world and also as one of the greenest, or most sustainable cities.[2] The city's council has a stated mission to see Vancouver become the greenest city in the world by 2020 and 100% renewable energy powered by 2050.[3]

As part of this Greenest City goal, Vancouver has a zero waste sub-goal and a 2020 target to reduce the amount of waste going to landfill by 50% from 2008 levels.[4] To reach this target, the city has already mandated demolition companies to deconstruct (rather than demolish) homes built prior to 1940 and has expanded the range of recyclable materials accepted by Vancouver's curbside recycling programme (however the programme does not accept textiles). The City has also identified the "development of education and enforcement strategies for all sectors with a focus on waste prevention and material reuse initiatives" as a key priority for the next five years.[5]

Metro Vancouver

The region of Metro Vancouver consists of the City of Vancouver and 20 other municipalities, altogether housing over 2.4 million people. The region partners with the cities on matters related to waste as overall disposal and management of landfills is undertaken at the regional level. Metro Vancouver has implemented landfill bans on clean wood, mattresses, and organic waste and is also working with the cities on a "Zero Waste Challenge" which aims to advocate for increased reduce and reuse initiatives, promote best practices for businesses, and strengthen the market for recyclable materials.[6]

While textile waste is not yet a focus for the region, it has been recognised as a concern and is being closely monitored.[7]

The Province of British Columbia

British Columbia (BC) is Canada's third most populous province, with a population of 4.5 million people. The Province's Ministry of Environment has signalled it plans to develop Extended Producer Responsibility standards for textile waste in the future; adding to existing EPR programs for beverage containers, electronics,

1 Vancouver Economic Commission, 2015
2 Siemens, 2012
3 City of Vancouver (a), 2015
4 City of Vancouver (b), 2015
5 City of Vancouver (b), 2015
6 Metro Vancouver, 2015
7 Metro Vancouver, personal communication, April 7, 2015

small appliances and paper and packaging.[8] This plan is part of a broader strategy initiated by the Government of Canada to shift waste management costs to producers while also harmonising legislation across the provinces to make it easier for companies working across provincial jurisdictions.[9] It is not yet clear what the EPR policy for textiles will look like, or when it will be implemented (as the date of implementation has been recently pushed back from 2017 to an unspecified date).

Research question & approach

What local and regional policies should be implemented to catalyze a circular economy in the fashion and textile industry in Vancouver, Canada?

In order to answer this question, this research project aims to:

1. Explore the context for a circular economy in Vancouver
2. Ascertain the barriers and opportunities to create a circular economy for textiles in Vancouver
3. Identify and prioritize policies that could encourage a circular economy in Vancouver

Research methodology & design

According to the Ellen MacArthur Foundation, it is critical to involve businesses early in circular economy policy development. The Foundation reports that businesses are the most appropriate stakeholder to identify relevant circular economic opportunities and barriers for their sector, a critical step in policy development. This approach is also supported by local policy makers in Vancouver who have suggested that businesses should put forward specific and realistic policy recommendations they would like to see government implement.

In view of this, business interviews and focus groups were combined with case study analysis to complete this research. Questions for business participants were developed to identify:

1. Current business practices and drivers to reduce waste and become more circular
2. Current opportunities and barriers to develop a circular economy for textiles
3. Policy options to address these barriers

Research Sample

Multiple businesses should be engaged when assessing opportunities, barriers and policy options, and participants for action-oriented research should be selected based on "their involvement in a matter which is of genuine concern to them." As such, seven Vancouver-based businesses were interviewed in May 2015 as core business representatives for this research.

Respondents were selected to be representative of fashion and textile businesses located in the city. Given the predominance of athletic apparel companies and small businesses in Vancouver, three respondents were medium-sized athletic apparel companies with global manufacturing operations and markets and two respondents were local designers with small, local manufacturing operations and markets. In addition, two respondents were selected given their focus in dealing with unwanted textiles: a textile solution provider that was responsible for transferring unwanted textile materials into secondary markets through recyclers, and a mattress recycler.

8 Metro Vancouver, personal communication, April 7, 2015

9 Environment Canada, 2015

RESEARCH FINDINGS: DRIVERS + BARRIERS TO CIRCULAR ECONOMY IN VANCOUVER

All of the businesses interviewed are already taking strides to reduce waste throughout their supply chains.

Recycling or upcycling excess material

All businesses that were interviewed are recycling or upcycling some amount of textiles. Since none of the fashion businesses interviewed had implemented a product take-back program, the percentage of textiles that were recycled or used in other applications represented a small percentage of the overall textiles used and produced by the companies. In the case of the mattress recycler and recycling solution provider, recycling and reusing unwanted textiles represented their principal business activity.

Four respondents reused or recycled scrap materials that were left over after the assembly process.

Of these, one respondent used scrap material to make prototypes while two other respondents worked with partners to reuse scrap material into other products. Three respondents donated or sold excess fabric to other designers.

Two of the seven respondents identified upcycling or recycling items that were returned or did not sell. For one respondent, items that did not sell were brought back and adapted for sale again, for example by "removing sleeves or turn[ing] pants into shorts, or shorts into skorts". Items that were returned but unwearable (because of damage, or a recall) were transferred to a solution provider for recycling. Another respondent collected items that "are not in a state to be repaired to a professional standard, [and] in those cases a certain number of them are repaired and donated to youth outdoor programs and other organisations".

The core business activity of the mattress recycler and textile recycling solution provider is to manage or recycle materials. The solution provider works with their partners in the United States to "mechanically reclaim materials into secondary products – [textiles become] things like insulation for cars, insulation for homes and material for sporting good [such as] punching bags". While this respondent acknowledged that the textile materials lose their value in this process, they commented that "if you look at how long the materials are actually used, [they are used] for a very long period [in the secondary application], a much longer period of time than what a sweater would be [used for]. Most people consider it downcycling, but we consider it reuse".

The mattress recycler processed and recycled 90% of each mattress that came through their doors - metal, toppers, cotton, wood, foam, plastic and coconut husks are all recycled for reuse in other applications. For example, foam becomes carpet underlay, cotton becomes insulation, wood becomes wood pulp, and steel is recycled back into steel.

Designing for reduced waste & encouraging more sustainable consumption

Three of seven respondents are reducing waste at the fabric processing level, by sourcing sustainable fabrics for their clothing. Two of these respondents use certified fabrics, such as Bluesign or GOTS (Global Organic Textile Standard) certified fabrics which must meet vigorous manufacturing and production standards, as well as more sustainable dyes. These same respondents also selected natural fabrics such as organic cotton, hemp, and silk over synthetic materials such as polyester. One athletic apparel company also used organic cotton and was actively trying to source recycled material for some of their clothing.

Four of seven respondents were focused on creating high-qualtiy, long-lasting, timeless clothes that aren't as subject to the fashion trends of the day.

One small business took this a step further by "doing talks to get people thinking about what's in their closet - [asking] do they need that much, [and encouraging them to] buy better quality pieces that will last longer." One company responded that they were committed to "making products that are made to last and have a certain ethos around them, [even if] they have a higher price point".

For one athletic apparel company, whose products come with a lifetime warranty, the focus is on "trying to keep the product in use for as long as we can". This same company had recently undertaken research related to their brand and found that "two values that we scored highest on [among customers] were durability and quality". As a result, this company also provides repair services to their customers in order to "keep products in a high utility phase" for as long as possible.

One small business, which also created its own digitally-printed materials, was setting themselves up to operate within an "on-demand model, [in which] clothing is only created when it's ordered or needed." This was seen as a practical solution to avoid unwanted inventory that doesn't sell.

Exploring product take-back

Four of seven companies were interested in exploring options around product take-back, and had taken steps to test or research the viability of product take-back processes.

One athletic apparel company had collaborated with other companies to look at technology solutions to recycling blends, while another had implemented a pilot product take-back programme for athletic base layers (the program had limited success and has since ended).

One small business "asked people to bring in any clothes, and then we donate them to [a drop-in centre], and they get a discount in the store – and it did really well". This business also found that these programs help to "start the conversation with people, to get them to start thinking about where they are putting their [used and unwanted] clothes, and who in the community is in need."

Drivers for businesses to move towards circularity

Respondents identified several drivers to further reduce waste and move towards circularity. These include drivers to reduce their impact on the environment, increase their reputation with customers, capitalize on business opportunities, and become resilient to future regulatory and market pressures.

Five of seven businesses identified reducing their impact on the environment as a significant driver to reduce waste. "We know our major impact is in product and so [greening our product] is the way to eliminate a lot of our footprint by [eliminating] virgin raw materials from the process". Four businesses also mentioned consumer expectations as a driver to become more circular. One respondent said they were looking at how to reduce waste partly because "there are clear expectations in our industry of environmental stewardship...from both users and employees", while another respondent identified that "textile waste is a big issue – it's growing, and it's a hot topic". The textile solution provider commented that social pressures are growing for companies to "be more responsible for what they're

producing and how they're producing it", although they admitted that consumer pressure depends somewhat "on the brand, their mission statement, and their [consumer] market base".

Five businesses spoke about the need to move towards circularity in anticipation of future pressures, including regulatory pressures in the markets where they operate.

Two respondents mentioned that future pressures may come from increasingly volatile and expensive commodity markets. Further to this, one other respondent commented that "[commodity prices and the scarcity of resources] is something people talk about. I haven't seen it in actuality yet...but we might down the road".

Three businesses felt that moving towards a circular economy would positively affect their bottom line. Both the mattress recycler and textile solution provider have found that by providing recycling solutions, they were filling a need in the market while also delivering environmental benefits. The mattress recycler was able to respond to a market need that arose from a recently implemented landfill ban for mattresses in Metro Vancouver. In his words, "the genesis was the environmental perspective and seeing an opportunity in business – they were both working cohesively". One small business also believed that their on-demand model would not only reduce their environmental impact, but also improve efficiency, and ultimately affect their bottom line.

Barriers and opportunities

All respondents identified several barriers that will need to be addressed in order to develop a circular economy for the fashion and textile industry in Vancouver. These include barriers related to recycling technology and recycled materials, product take-back infrastructure and processes, and consumer behaviour and education. In addition, a number of concerns related to local manufacturing were raised by those businesses that have manufacturing operations in the city.

Recycling technology and recycled materials

By far the most common barrier and concern that was mentioned by businesses were the limitations related to current textile recycling technology and recycled textile material.

Four businesses identified the inability to recycle the majority of the textile materials they use as a major inhibitor to moving towards closed loop.

While the technology exists to recycle pure materials (for example, to recycle cotton back into cotton), this isn't the case for blended materials (such as nylon-polyester blends) which are primarily used by the respondents. For example, one apparel company mentioned that "we use so many blended materials [but] the technology doesn't exist to take back materials and turn them back into product." As a result, approximately 95% of this company's products can't be closed loop with the current recycling technology that exists.

Compounding this problem, recyclers are slow to keep up with changes in the textile materials used by the fashion industry. As one respondent identified, "recycling is always reactive to what's happening upstream. The textile industry can adapt and change really quickly and the impact on the downstream recyclers is [significant]. Machinery is a really high investment. [Recyclers] are not going to change and tweak their [machinery] as quickly as the apparel industry is going to

tweak and change the latest textiles that they're using."

At the same time, many businesses were not willing to compromise on quality to use materials that could be recycled—style, fit, and function all take priority over recyclability. One respondent commented that although "[consumers] might view [closed loop apparel] as a value add, they'll still want to buy a garment based on their own considerations—does it fit, is it the right colour, do I like it, is the price ok? Most of the things we're all wearing are all blended. The solution has to be something that works in a consumer market place where you have blended materials."

Three businesses also expressed concerns around the development of end markets for recycled materials. Since most respondents admitted that they weren't willing to compromise on the materials they use for fashion, alternative markets may need to be found for recycled textile materials. The mattress recycler commented that "the only way a system is practical and usable is if there is a market for it". For example, even though it's possible to recycle felt, this materials gets landfilled because there is no second use market for it.

Product take-back infrastructure and processes

In addition to the challenges related to technology and recycled materials, five respondents commented on challenges that exist related to existing product take-back processes and infrastructure. Because infrastructure and take-back programs aren't widely available for textiles in Vancouver, many respondents commented that it wasn't financially feasible to pursue a program on their own.

Another respondent commented that "even if you were to [use] materials that were pure, [sorting them] would be so time and resource intensive it wouldn't be worth the final result". Similarly, the mattress recycler identified shipping costs as being so prohibitive that in some cases, products aren't worth recycling because it costs too much to ship them: "right now, we ship to Washington and Alberta – if we had to send it to the middle of the U.S. – it wouldn't work".

Five respondents commented that the only way for product take-back programs to be viable is by "developing processes that will work on a mass scale", where many businesses and consumers are participating in product take-back on a city-wide scale.

However, respondents did not agree on what product-take back processes should be pursued in Vancouver. As one respondent commented: "how do you manage the process of bringing [materials] back—is it at a retail level, is it at a collection site, is it through manufacturers of the materials themselves, is it through government?" Moreover, once materials are collected, the infrastructure to deal with them needs to be in place. As one respondent commented: "there aren't many textile material shredding facilities here in Metro Vancouver, or even BC."

One respondent commented that product take-back processes should be transparent, so that all users are aware of where used textiles end up: "one of the reasons we haven't [partnered with some of the private take-back providers that exist] is [because] it's hard to trace what happens to the apparel—definitely giving it a second life and keeping it out of the landfill is a great goal…but then you hear that sometimes the clothing gets shipped to Africa and you wonder if you're exporting the problem". These concerns were echoed in the focus group.

Consumer behaviour and education

Interestingly, while consumers were seen by some businesses as a driver towards circularity, they were also seen as a critical barrier to making a circular economy.

Four respondents commented that consumers will need to be educated to actively partake in recycling and reuse programs. In order to do this, product take back will need to be easy and convenient for the consumer. One respondent commented that "people need things to be easy and available", while another commented that changing consumer habits "is a massive system change, but if the opportunity is there, there's a reason and it's beneficial, they'll do it".

Two respondents commented that consumers will also need to change their consumption habits: "even very progressive [people] are still shopping at fast fashion. They care about all these big issues but there seems to be a blind spot. It's getting better, but it's still there." Likewise, another respondent felt that their company needed to "better tell the story of 'this stuff is really well built—it's going to keep working'". This company believed that creating "a compelling consumer narrative and changing the dialogue around garments to focus on quality construction and build and design rather than newness" could help contribute to changing consumer habits.

Challenges for local manufacturers

All of the businesses that have local manufacturing operations in Vancouver commented on the challenges that exist for local manufacturers.

Concerns related to local manufacturing were raised about the lack of skilled workers, industrial space, and support for manufacturing more generally. Indeed, one respondent commented: "As a local manufacturer, there are no incentives [to stay here]. The garment industry is totally ignored. If there were more incentives to stay here for manufacturing, imagine all the jobs that would [be] here."

Local manufacturing can help reduce waste and create a circular economy in two ways: manufacturing for a local market can lead to less waste associated with transporting clothing; and more local manufacturers can help with the development of closed, regional material loops.

Three businesses identified challenges related to finding local skilled workers as a significant challenge to manufacturing in Vancouver. As one respondent identified: "We love manufacturing locally and wish we could do more. In the past it's been difficult to find skilled sewers, so now we've set up a training facility to train people starting from scratch."

In addition, one respondent commented that industrial space was hard to find, and increasingly at risk of re-zoning. This respondent commented:

"It's incredibly hard to find to space where you could begin a small manufacturing business. More and more [professional offices] are moving into buildings that are zoned for industrial warehouse use."

In addition, increasing demand from other industries has increased rental rates. As this respondent commented, "landlords can set the lease rate at whatever they want, and it's killed off a lot of businesses".

All respondents believed that government can, and should, play a fundamental role in encouraging a circular economy for textiles. While governments still need to rely on business and consumer action, it could take some level of action towards addressing most of the barriers that have been identified. Ten government priorities were identified along with the most applicable jurisdiction to implement them (i.e., the City of Vancouver, Metro Vancouver, and/or the Province of BC).

Regulations & waste bans

1. Implement an Extended Producer Responsibility standard for textiles (Province of BC)

Extended Producer Responsibility (EPR), where businesses are required to play a financial role in product take-back, was identified by five respondents as a key policy that would help catalyze a circular economy in the textile sector (the small businesses were the only ones not to site EPR initially). Not only was EPR seen as an effective tool to divert waste from the landfill, but three respondents also saw it as a funding source for research and development for recycling technology.

As one respondent identified, a textile EPR regulation in BC should not only cover the cost of the program, but "a certain percentage should go into research and development". Another respondent further elaborated on how the program could work: "The way I can see EPR working in BC is every single garment has a tax on it, and that tax is determined by the weight, material type, and whether it's a mix of materials or not…all of that money gets taken and [initially] all of it is used on research and development to identify all the different recycling opportunities out there and the gaps in the market; then doing research and development and capacity building [to address gaps]".

For one respondent, EPR could also "provide an incentive and opportunity for consolidation for supply of material" which would help future recycling technology development. This respondent elaborated: "there's no point developing a technology if there's no supply of material. Right now [materials are] so dispersed that there's no way to develop technology because we don't have our hands on enough of the right materials."

However, one respondent recognized that EPR, while it may be beneficial, wasn't necessarily a perfect solution. A similar EPR regulation for packaging "wasn't nuanced enough to really capture when things were well designed to avoid driving waste rates so if you were relying on the [regulation] alone you didn't have a very good incentive to redesign your packaging." This is an important lesson for the development of an EPR policy in BC—it should somehow account for, and incentivize, well-made and longer lasting apparel pieces.

2. Implement a waste ban for textiles (City of Vancouver, Metro Vancouver)

Three respondents believe that a textile waste ban would help catalyze the circular economy. This would include both "bans on material going into landfill and waste-to-energy bans: materials that are recyclable should not be burned." Waste bans were seen as an effective way to divert waste, consolidate textile collection, and drive demand for textile recycling.

The mattress ban in Vancouver is seen as a perfect example of how effective waste bans can be. As the mattress recycler identified: "If it wasn't for Metro Vancouver putting the ban through, we would have been relying on marketing and networking and for companies to pay more for a service that they would have otherwise paid less for, because they could go to landfill for a third of the price."

Provide processes, infrastructure and research and development for recycling

3. Encourage research and development for textile recycling (Metro Vancouver, Province of BC)

Five businesses saw the need for government to play a role in encouraging research and development for textile recycling. While funding for research and development could be linked to an EPR program, it was also generally seen as an area that could benefit from overall government support. One respondent commented: "there's research that needs to be done on how you get a commercially viable solution to get to closed loop. I'm not sure one company alone is going to come up with that solution, especially when the market place isn't there for it, so that's where see a role for government—they could fund research projects at universities to do pre-competitive research around what technology is going to be required."

While the federal government has a tax incentive program for research called the Scientific Research and Experimental Development (SRED) Tax Incentive, many small businesses, including two respondents, were not eligible for funding. Expanding this program or creating similar programs for the textile industry would therefore help.

4. Manage or facilitate textile collection programs (City of Vancouver, Metro Vancouver, Province of BC)

Three respondents believed that government could play a role in managing or facilitating a textile collection program for households, either through a curbside recycling program or recycling drop-off centres. Local collection would help with consolidation of materials from consumers and would also address barriers for businesses wanting to recycle textiles but unable to cover the cost of these programs. As one respondent identified: "we're trying to find other avenues to put the textiles but where do we send it? We've looked at sending it to San Francisco but it ends up being far too costly for us to justify. If there was something locally, a local collection the same as our cardboard collection, that isn't too costly, we would use it."

5. Provide and encourage the development of recycling infrastructure (City of Vancouver, Province of BC)

Three businesses believe that government could help provide incentives to encourage the development of recycling facilities, such as textile mulching facilities. Two respondents believed the infrastructure should be built in BC, which is a critical component to creating closed, regional loops.

Financial tools such as tax incentives and loans were seen as effective incentives to encourage the development of local recycling infrastructure. As an example, recyclers currently don't pay tax on the importation of machines. The extension of this program, and others like it, was encouraged.

Educating the public and private sector on textile waste

6. Build education and awareness about textile waste and collection (City of Vancouver, Metro Vancouver, Province of BC)

Four respondents commented that governments could play a key role in educating consumers about the problem

of textile waste, as well as providing information for consumers and businesses on how to dispose of their textile waste for recycling or reuse.

One respondent identified that government could "educate the public around why [we need to recycle]; not dissimilar to when we started introducing the blue bins [for plastic, paper metal recycling]". Strategies for education that were suggested include having events and campaigns, as well as using digital and social media tools such as "an app to let people know where textile recycling and collection bins are located".

7. Implement a pilot take-back programme (City of Vancouver, Metro Vancouver)

Four respondents believed that local government could help implement a pilot take-back program to demonstrate the viability of a closed loop system. The pilot could help identify the costs to run take-back programs and gauge consumer participation rates and interest. Two respondents commented that the pilot would need to be run in a transparent manner to ensure used clothing ends up in appropriate places.

One respondent suggested that these programs could pay for themselves if they are run properly: "There is true value in clothing. At least 50% if not more is going to be resalable, you just have to find the right avenues and be [transparent]. The portion of the clothing that is resalable more than funds the program….the City could capture some of that."

8. Educate fashion designers about the full lifecycle impacts of clothing (City of Vancouver)

Two respondents believed that government could collaborate with local colleges and universities to educate apparel design students on the full lifecycle impacts of the products they design. One respondent commented that "new up and coming apparel designers [need to] understand the implications of how they design things affects them later in life".

Support local, sustainable businesses

9. Provide financial incentives and green credits for local businesses that reduce waste and are sustainable (City of Vancouver)

Two respondents believe that governments could provide incentives for businesses that reduce waste and are sustainable. These could include tax incentives or grants as other soft tools such as promoting green companies through public relations projects such as awarding "Vancouver's top green companies".

In addition, incentives could also be implemented to encourage businesses that were directly involved in keeping materials in circulation. For example, one respondent commented: "Is there some way from a policy perspective to favour the existence of second hand retail?… some way to nudge retailers to find space to resell things."

10. Enable local manufacturing and encourage local regional loops (City of Vancouver)

Three respondents commented that the government should incentivize and encourage local manufacturers to set-up and continue to have their operations in the city. This could include providing "loans and funding programs and to support manufacturing companies" as well as providing local worker training programs and protecting industrial lease

space. Government could also facilitate the creation of local loops through eco-industrial network development programs, so that scrap waste from local manufacturing is used by other users.

Policy priorities

Of the ten policies identified in the interviews, three policies were identified by the focus group as priorities for the short and long-term.

In the long-term, EPR was seen as a vital policy that would have a high impact on the overall system and aid with the implementation of other government-led programs and policies, such as research and development, awareness building, and textile collection.

In the short-term, the group identified running pilot take-back programs and supporting local manufacturing as useful first steps. However, the group did agree that ultimately, while local and regional movement towards a closed loop system should be applauded, change would need to be made on a global scale in order for a true circular economy to flourish.

Overall, respondents believed that governments could play a vital role in providing levers, incentives and support for change. EPR in particular, was seen as the best lever to incite change in the industry. One respondent commented: "As much as it isn't a perfect system, there is merit to EPR because it's finally that financial lever that allows all these programs to happen—it spurs consolidation, collection and awareness building." Most importantly, EPR was seen as a key driver and funding source for much-needed research and development to address the problem of technology, which was identified as "the golden nugget that no one's cracked yet."

Because EPR is not on the horizon in the short term, the group identified implementing pilot projects as an important initiative the City of Vancouver could focus on in the short term. Pilot programs were seen as an effective way to gather early evidence of viability and build awareness of the interest in, and need for, a closed loop system. In addition, successful pilot programs were also seen as a way to encourage buy-in and gain traction among policy makers and businesses alike.

Most importantly, while the focus group identified that even though "avoiding landfill, recycling and repurposing is a trend that is building and will catch on more and more", the need to build momentum amongst global industry players was seen as critical for success. True solutions for a textile closed loop system would need to be international in scope, and would require the active participation of large international fashion companies.

One respondent commented that "if some of the huge companies, the top ten, got together and created a system, they could [implement closed loop] on their own. They can do it now, [without policy]." In addition, the group identified the need to have an international body to help organize industry players, create a unified message, and put pressure on governments globally: "somebody does have to own this…maybe the Sustainable Apparel Coalition. They lobby government and really have an active voice. It has to live somewhere like that to get any traction."

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SUMMARY OF KEY FINDINGS

Although the businesses that participated in the research are not yet working within a closed loop and circular system, they have demonstrated movement towards, and interest in, the development of a circular economy in Vancouver. Indeed, these businesses are already striving to reduce, reuse and recycle textile waste. Moreover, the range of practices identified speaks to the strength of the multi-faceted circular economy model, which offers diverse businesses a variety of avenues to strive towards closed loop.

The businesses identified a number of drivers and benefits of moving towards circularity. While these drivers were different for each respondent, they included anticipated or real pressures from consumers, regulators and commodity markets, as well as business imperatives to do the right thing and capitalize on business opportunities. It is clear that for the businesses interviewed, these drivers to find solutions and move towards circularity are not strong enough for them to do it on their own.

Indeed, solutions for recycling and reusing consumer textile waste do exist now; however, they are seen by the respondents as being unaccountable, expensive, time-consuming, and in some cases, ineffective. A number of systemic barriers will need to be addressed in order for a circular economy to flourish: recycling technology will need to be improved, markets for recycled products will need to be found, product take-back processes and infrastructure needs to be developed and consumers will need to be educated.

Government can play a vital role in providing the levers and incentives for change, addressing some of the barriers identified.

The governments of the City of Vancouver, Metro Vancouver, and Province of BC can implement regulations, such as EPR and waste bans; facilitate product-take back processes; invest in infrastructure and research and development; educate the public and designers; and enable local manufacturing and closed-loop systems.

It is important to note that very few of the policies identified will be successful if implemented on their own. Rather, to be effective, many of the policies identified would need to be implemented together with one or more policies. For example, textile collection programs would need to be complimented with efforts to educate consumers, and EPR would be complimented by textile collection, research and development, and building recycling infrastructure.

A provincial EPR program was identified by the respondents as the most important and effective policy lever to drive change in the industry. Interestingly, most respondents believed revenues from EPR should be used to fund the implementation of complimentary policies and programs, such as research and development and textile collection. This is a significant finding: EPR is the only solution identified that also provides a source of funding for government to provide necessary programs and solutions — a critical component for the viability of government policy.

Further Considerations

Many of the priorities identified in this research were focused on material recovery as opposed to waste prevention (an important emphasis in a circular economy). While any movement to keep materials in circulation is desirable, policies should also be constructed to discourage the creation of waste as well. Further research into how businesses that promote alternative methods of consumption (such as lease models and the sharing economy) needs to be completed.

As further validation for government action, research could also be done to assess the economic and environmental impact of a circular economy for fashion and textiles in Vancouver.

APPENDIX 1 - Circular Business Models in the Fashion and Textiles Sector

Business	***Model***	***Example***
Patagonia	Design out waste	Clothing is designed and made to last, parts can be replaced as they wear out.
	Repair	Patagonia offers repairs for free.
	Reuse	A third-party trading post allows customers to sell or donate clothing.
	Recycle	Patagonia has implemented a product take-back programme to recycled used Patagonia products.
Filippa K	Reuse	Filippa K collaborates with second-hand stores to sell pre-owned Filippa K clothes.
	Alternative consumption	'Lease the look' program allows customers to lease select pieces.
Marks & Spencer/ H&M	Reuse & recycle	Used clothing can be returned to the store and donated for reselling and recycling – customers receive a discount voucher.
ASOS	Reuse	The ASOS marketplace allows anyone to sell fashion to anyone else.
MUD Jeans	Alternative consumption	Consumers lease jeans and return them when they are finished with them.
	Reuse & recycle	Returned jeans are upcycled and turned into vintage pieces, or if they are beyond repair, they are recycled and turned into new jeans.
Interface carpets	Design out waste	Carpet tiles allow sections of carpet to be replaced as needed; products are designed to be easily recycled and contain a high amount of recycled material.

Ellen MacArthur Foundation, 2013; Filippa K, 2015; Interface, 2015; MUD Jeans, 2015; Niinimaki and Hassi, 2011

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