

A person is seen from behind, sorting through a large pile of clothing in what appears to be a recycling facility. The clothing is piled high and includes various items like shirts, pants, and jackets. The person is wearing a dark jacket and a backpack. The scene is dimly lit, with a yellow vertical bar on the left side of the image.

# Looking in the mirror.

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A review of circularity in the clothing and textiles industry in Aotearoa.

BY BERNADETTE CASEY AND BRIAN JOHNSTON

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# Executive Summary

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When we started the research for this report in April 2020 Aotearoa was in Stage 4 lockdown in response to the global COVID-19 pandemic. The clothing industry was in free fall, with long established supply-chains ground to a stand-still. Brands were left scrambling to secure alternative production, and priorities were upended in response to the closure of retail stores. For many the pandemic has also triggered reflection on the non-financial impacts of the industry's underlying business model and future direction.

In recent years the clothing industry, and to a lesser extent the wider textile industry has come under considerable public criticism for conspicuous overproduction and environmentally wasteful practices, such as disposal of off-spec and unwanted

products. The industry's linear production system is delivering more and more textile to market, while at the same time this textile is increasingly difficult to reuse, repair, repurpose and recycle. Alternative routes for unwanted textiles such as the rag trade, and shipping to less affluent nations for resale are becoming less viable. The volume of unsuitable textiles being donated to charities is increasing rapidly, increasing sorting and disposal costs, and hampering their ability to generate income for their causes. In addition, the rising trend for countries to restrict imports of textile waste effectively puts the responsibility back on the source country. Already in Aotearoa the majority of textile waste ends up in landfill - an estimated 220,000 tonnes every year.

There is no doubt the world is on the threshold of a rapid and far reaching shift across all of the foundational sectors of the economy: materials, information, energy, food and transport. What is unfolding now is not incremental but era-scale change. This includes a shift away from very large scale centralised industrial production systems which the textile industry has been dependent on for several decades, towards distributed models and supply-chains. This migration will create more autonomous production regions, which combined with technology advances such as fibre-to-fibre, transparency platforms and sorting systems, and supported by organising systems such as laws and regulation, will facilitate the arrival of emergent circular systems.

If we are to transition to a new economic model, we must understand the resources in the system which are available to us - both in terms of characteristics like volume and material type, but also in terms of

the potential roles of each organisation, business, or person in the value chain. To-date in Aotearoa there has been a lack of local information to develop an overview of textile material flows - not only clothing, but also linen, home textiles, and carpets. In addition, the various efforts of stakeholders in the textile space to adopt more circular and resource-efficient solutions, including product stewardship have so far been fragmented. A strong and broad foundation is needed, in order for the industry to start driving the necessary change to a circular textiles system.

Clothing and textile waste in Aotearoa has, until recently, been viewed as fairly inert and unimportant. While much attention and funding has been focused on the issue of plastic pollution, this has not included synthetic clothing - an important contributor. Nor does it address clothing in its own right as a major contributor to waste and climate impacts. Although there are signs of



consumer sentiment shifting away from 'fast' use of textiles, the industry has so far failed to gain acknowledgement and support from the government to implement change.

As a geographically remote small island nation of approximately five million people, our clothing and textile industry is very small on a global scale, made up of even smaller sub-sectors, from corporate fashion and commercial retailers, commercial and domestic textile and flooring suppliers, garment manufacturers, designer and bespoke brands and wholesalers. What we have discovered through this research is an industry highly aware of two of the critical transitions the world needs to make – transitioning to a low emissions living and the transitioning to a low waste society. We also found an industry with a strong appetite for improved models that serve our communities and our environment better. To achieve this locally will require those who bring products to market to take more responsibility

beyond the point of sale, as well as greater collaboration between brands and between sectors, between government, industry and community. As our reaction to the COVID-19 pandemic has shown, we have the potential to pivot and to change our ways of working. The challenge now for the wider textile industry is to turn towards a more circular, resource-efficient way of making, using, and reusing textiles in Aotearoa.

We are grateful to the Ministry for the Environment's Te Pūtea Whakamauru Para – Waste Minimisation Fund and the Textile Reuse Programme Foundation Partners, AlSCO NZ, Barkers Clothing, Deane Apparel and Wellington City Council for their support. To everyone who has supported Usedfully - Textile Reuse Programme on our journey, especially everyone who contributed to this report, thank you for sharing your insights, your knowledge and your time.

# The Case For Collaborative Change

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Jason Kibbey – CEO Higg Index

Over the past decade, the fashion industry has demonstrated tremendous growth – a steady 4-5% economic increase each year (though expected to dip in 2020 because of COVID-19). By 2030, the industry is expected to reach \$3.3 trillion in value, with 102 million tonnes of merchandise manufactured globally.<sup>1</sup> As an ever more inclusive and diverse industry, apparel remains unsurpassed as the most personal and expressive consumer goods industry on the globe.

Yet, this growth has taken an environmental and social toll. 80% of all apparel merchandise ends up in landfills – a shocking figure, driven by accelerating consumption and the era of fast fashion. Because of its energy intensive manufacturing processes, fashion contributes 10% of global greenhouse gas emissions, and it can require more than 2,500 litres of water to produce a single cotton t-shirt.<sup>2</sup> Taken together, rapid industry growth tethered to devastating environmental impact have put fashion on a literally unsustainable path.

The world is waking up to this fact – and companies, brands, stakeholders, and shoppers are asking: how can we change this broken system? Can we transform the idea of waste in fashion? How do we improve worker livelihood? What might fashion look like in a 1.5° world? But trying to answer these questions alone can lead a single actor to feel a sense of despair. Restructuring global supply chains and overhauling industrial

practices are beyond the scope of a single company, individual brand, or country.

To tackle these systems-level issues at the required scale, solutions must be collaborative – and I believe we’re beginning to see some promising developments within the apparel industry. In my own two decade career in fashion, I’ve watched firsthand as sustainability has moved from a niche concern to an overriding imperative. After launching the upstart organic apparel brand Pact, I became the first employee of the Sustainable Apparel Coalition, which has grown to be the largest industry cooperation of its kind. In parallel, collaborative initiatives like Fashion for Good, The Fashion Pact, the Clean Clothes Campaign, and Global Fashion Agenda have made great progress in creating industry forums for sustainability, sparking innovation in materials and processes, and scaling promising pilots to more parts of the industry. Now as CEO of Higg, I’m helping to build software



tools that enable end-to-end sustainability measurement, so that brands, retailers, and manufacturers can make smart decisions based on dynamic value chain data. These are just some of the many emergent initiatives within fashion that are built upon collaboration and shared data in order to drive progress on key issues.

However, while collaboration within the industry is incredibly impactful, transformative change requires an even deeper level of collaboration: between the industry, its stakeholders, and government as well. That's why I'm so impressed with the trends I'm seeing in New Zealand. New Zealand has long had a history of environmental leadership at a government level and strong collaboration amongst its stakeholders. The recently announced Usedfully® Textile Product Stewardship Project for clothing and textiles is the latest example. This sort of multi-stakeholder programme is an opportunity for New

Zealand to showcase its unique strengths: a government committed to positive change, an engaged citizenry, and an industry that's willing to roll up its sleeves and work together to create meaningful impact.

Without a doubt, our year has been a tumultuous one in every category: politics, health, environment, commerce. The whole world is looking for practical examples of collaboration on behalf of the greater good, that can deliver meaningful benefits now while also providing a positive path for the longer term. It's incumbent on all of us working in apparel, textiles and sustainability to initiate and support these types of deep public/private sector collaborations.

# Introduction

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This report forms the first part of the 'Textile Product Stewardship Project' (TPSP), delivered by The Formary under the Textile Reuse Programme (TRP) which was established in 2016 as a cross industry collaboration aligning industry players in a joint vision and commitment to a circular economy for clothing and textiles in Aotearoa driving large-scale cross-value chain projects to develop and implement new systems, business models and technology at scale to radically reduce the environmental impacts of the current linear system and transition the market to a low carbon circular economy.

The ultimate goal of the TPSP is to establish a national accredited voluntary textile product stewardship scheme for textiles in Aotearoa, financing the costs of end-of-life textile

management, and ensuring the maximum possible volumes of textiles are diverted from landfill. The concept of 'Product Stewardship' is that the responsibility and cost of product waste, which currently sits with local authorities and ratepayers, is transferred to producers and consumers in a user pays model. Adoption of a voluntary scheme can help industry to meet market expectation and to front-foot potential regulation and policy changes.

The TPSP commenced in April 2020 and will run until early 2022, and is designed to inform a future Product Stewardship Scheme. It is guided by an Advisory Board which reviews project planning and progress providing expert input into the TPSP. The Advisory Board comprises Brian Johnston

– Sustainability Specialist at The Formary (Coordinator), Juhi Shareef – Sustainability Lead at Vector, James Griffin – General Manager Projects & Advisory at the Sustainable Business Network, Lauren Degenstein – Researcher from Alberta University, Canada.

This 'Summary Report' is a condensed version of 'LOOKING IN THE MIRROR – A review of circularity in the clothing and textile industry in Aotearoa. Full Report', available at [www.usedfully.com](http://www.usedfully.com)

# Methodology

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The starting point for this research was the relative lack of granular data on existing textile flows, and existing stakeholder actions and intentions relating to circularity. To further uncover the textile and clothing landscape the researchers took a mixed method approach generating both quantitative and qualitative data. The research methodology primarily involved the analysis of qualitative data collected through in-depth structured stakeholder interviews. To ensure a holistic view, industry sectors were identified from across the textile value chain. Textile product categories were identified as Clothing (both personal and commercial), Textiles (home and commercial) and Textile Flooring/Carpets. Over 70 priority stakeholders were identified as targets for interviewing and were approached for one-

on-one interviews. A total of 36 interviews were completed between August and October 2020.

Priority stakeholder interviews generated rich but fragmented primary data and valuable real-world insights. These data sets were then combined with secondary data sourced through a number of organisations and individuals - Statistics NZ, WasteMinz, Local Council Data, university and independent research were collected through direct approach to research owners and internet research, data was then compiled for analysis. Interview responses from all the participants were collated to allow for comparison and analysis.

The interviews were structured to explore key aspects of textile manufacture, use, and end-of-life in order to characterise each stakeholder's understanding of textile flows and circularity, including:

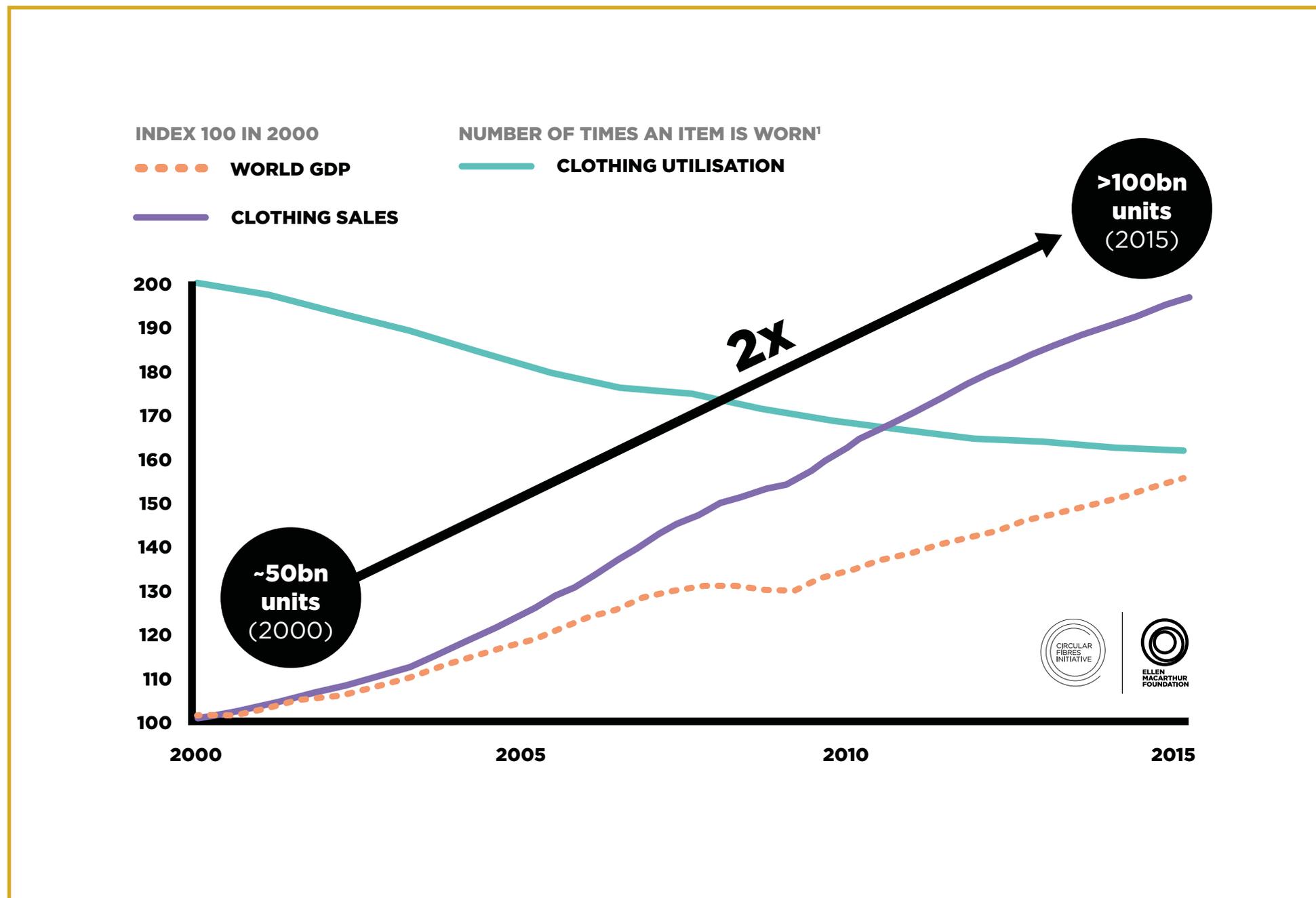
- Whether textiles were included in the broader sustainability strategy
- Level of current (and planned) activity
- Drivers for getting involved, including key stakeholders
- Barriers to getting involved
- Understanding of textile volumes handled (and end-of-life destinations)

# Global Context

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Textiles are so ubiquitous their presence is profound, covering and protecting us from within moments of birth until we are laid to rest. They adorn homes and offices, provide protection from the elements and from disease. Unlike other consumer products, peoples' relationship with clothing (and therefore textiles) is deeply complex; consumption is intrinsically bound to the concept of self and to social identity.<sup>3</sup> The textile industry is present in every country on Earth, materials and products criss-cross the globe prior to reaching their intended markets. But while the value chain is global it has local consequences. The industry is based on a linear production model geared for growth transforming in recent years with the adoption of the 'fast fashion' model; offering consumers more choice for a lower

price and bringing products faster to market. The consequences of this approach are numerous, including a decline in durability of product, consumers wearing each item less, and rapidly increasing volumes of textiles being disposed of. As Figure 1 from the Ellen Macarthur Foundation shows, the clothing industry has doubled its output in just 15 years (faster than global GDP growth) to over 100 billions units per year, while clothing utilisation is on the decline.<sup>4</sup>



**FIGURE 1: Growth of Clothing Sales and Decline in Clothing Utilisation Since 2000**

'A New Textiles Economy: Redesigning Fashion's Future', Ellen Macarthur Foundation (2017)



The model depends on taking more and more resources, processing them into products, selling them to consumers and then encouraging them to buy more. The unintended environmental and social consequences of this model have become too big to ignore.

Figure 2 illustrates the current global textile value chain model. A linear system, with some reuse, repair and repurposing occurring, but the vast majority of textiles ending up in landfill or incineration (depending on the destination country). Research suggests that the global clothing industry is currently 97% linear i.e. 97% of materials used as input are virgin, and only 12% of clothing at end of life is recycled in any form. Only 1% of clothing is recycled back into clothing.<sup>5</sup>

The textile industry is not alone in its adoption of a linear model cumulatively this is leading to significant imbalances between resources consumed, and the Earth's ability to renew resources. The organisation 'Earth Overshoot' measures the short-fall of resources in comparison to population, calculating that the world overshoot its annual ecological resources this year on August 22nd, in eight months instead of twelve. Drawing more from nature than the world can replace in the whole year, leaving the world in a resource deficit.

FIGURE 2: (Current) Linear Textiles Model

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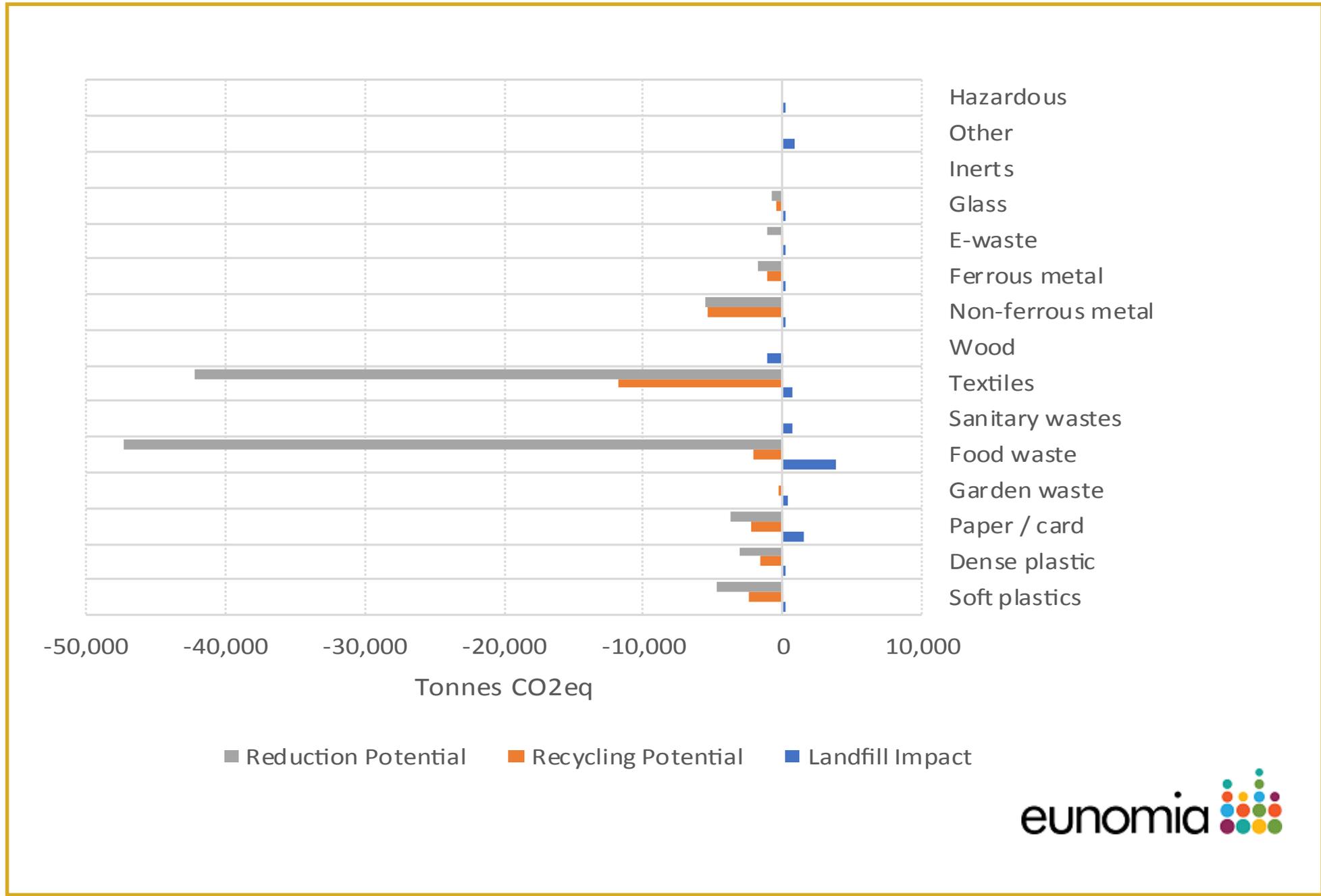
All types of textile fibre are resource intensive and have an embedded environmental cost from the land, water, energy and chemicals used. The industry is starting to bump up against the limits to growth. Natural materials such as cotton or wool require a lot of land and water for cultivation, the fashion industry is projected to use 35% more land for fibre production by 2030 – an extra 115 million hectares (or 4.3 times the landmass of Aotearoa) that could be protected, left for biodiversity, to preserve forest to store carbon, or used to grow crops for food to help to feed an expanding population.<sup>7</sup>

Synthetic fabrics are generally derived from non-renewable fossil-fuels, research has found that textile fibres make about 35% of marine plastic pollution.<sup>8</sup> Global warming, and the carbon emissions driving this, are of increasing concern to society. The textile industry is a significant contributor with global textile production generating about 1.2 billion tonnes of CO<sub>2</sub>e per year. If the industry continues on its current consumptive

growth path, by 2050, it could be consuming more than 26% of the carbon budget associated with the 2°C pathway to limit global warming.<sup>9</sup>

Landfilling textiles at their end of use creates a further issue, the release of greenhouse gases as they decompose. While the rate of emissions varies by geography (and level of research), there is alignment on the fact that after food waste, textiles are a hotspot for emissions in landfill. This research estimates that annually 220,800,000 kgs of textiles are landfilled in Aotearoa each year. The Ministry for the Environment calculates landfilled textile emissions at 1.80 CO<sub>2</sub>e per kg.<sup>10</sup> Equating to 397,440,000 kgs CO<sub>2</sub>e per annum. Vast amounts of money are spent landfilling these valuable commodities, while virgin resources continue to be extracted to supply the industry. According to recent research in Australia by Eunomia,<sup>11</sup> textiles were identified as having the second highest potential both in terms of reduction of consumption, and improved recycling (Figure 3).





**FIGURE 3: Analysis of Differing Carbon Impacts Per Waste Stream**

Taken from Melbourne City analysis conducted by Eunomia (2019)



The interim secondhand 'reuse' route via charities is hugely beneficial for not only prolonging a textile product's useful lifetime and helping the charity to raise funds for its cause, but also to provide meaningful work for those who may be excluded from the job market. However, the increasing volume of donated textiles is testing the ability of charities to sort and process efficiently, and much of it is ending up in landfill (damaged or soiled) or sent offshore (to be sold in less affluent countries).

The export of our unwanted clothing has a number of negative consequences - it undercuts local clothing production resulting in the loss of skilled jobs, and it replaces localised clothing with used western clothing, with the loss of local interpretation and cultural expression through clothing design. Off-shoring used garments also pushes the associated environmental and social impacts to countries with less infrastructure and less social and environmental protections than

the originating country. It does not address the volume of textiles we are consuming and also does not meet consumer expectations of resource reuse and environmental stewardship. The issue is so significant that in 2016 a block of East African Governments proposed a ban on the importation of secondhand clothes.

# Developing Technological Solutions

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Recycling technology lags well behind the 'fast fashion' phenomenon. This is in sharp contrast to the situation in the mid 20th century. During World War II there was a global shortage of textiles due to military demand (for uniforms, blankets, tents, parachutes, bandages etc). In that period, the textile recycling business boomed meeting the demand for scarce fabrics and yarn. Once the war finished demand for textile reprocessing plummeted and technology stalled. Research into technological solutions to the 'textile waste' problem is belatedly gearing up, but it is already clear that we cannot rely on these solutions to 'solve' everything.

Mechanical recycling operations exist in Europe and North America, however many are only able to 'down-cycle' textiles to lower quality forms e.g. clothing to insulation material. In recent years there has also been a large increase in blended textile production, i.e. textiles made from a combination of natural and synthetic fibres. This presents a huge challenge to current (limited) recycling processes, as the blended textiles cannot easily be separated back into their fibre types. US-based business Renewal Workshop's research showed over half of the products they assessed for Brands contained blended textiles.<sup>12</sup>

Technologies that loop textile resources back into fibre and enable the transition to a lower emissions industry are being piloted in various locations around the world but still need further development to achieve commercial scale. This has been referred to as the Achilles heel of the industry and is a hurdle to a lower impact industry. Research and development of automated, or partly-automated solutions is underway, a good recent example being the 'Fibresort' pilot facility opened in The Netherlands in 2020.<sup>13</sup>

# Increasing Regulation

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Non-financial impacts are increasingly being factored into the requirements of doing business, particularly in Europe where the European Commission is expected to start developing a new comprehensive strategy for textiles. Stakeholders have been lobbying in this space for some time, including releasing a shadow strategy<sup>14</sup> to bring the textile industry in line with other industries.

Extended Producer Responsibility (EPR) has been applied in Europe to many product categories. The term is often used interchangeably with 'Product Stewardship'. The leading example of EPR in textiles has been running in France since 2008 administered by the Producer Responsibility Organisation 'Eco TLC' ('Textiles d'habillement, Linge de maison et Chaussures' i.e. clothing, household linen, and shoes) The scheme has doubled

its diversion from landfill to reuse and recycling from 18% in 2009 to 36% in 2017<sup>15</sup> Fees charged are based on quantity of textiles brought to market, with a discount for more sustainable materials. The income from fees charged is allocated to fund sorting operations, community education, communication, research and development and efficiency projects. Although the scheme is driven by waste reduction goals, through the creation of employment it has also contributed to increased social and economic opportunities.

Not all countries with an interest in EPR are adopting a formal product stewardship approach. Research in Nordic countries suggests that such schemes focus on collecting, sorting, and recycling, and do not adequately address the sustainability of the system.

**'EPR systems have a big impact on collection of used textiles, but little impact on upstream stages i.e. design. Conversely, new business models like leasing/ reselling have a clear upstream effect but little impact on collection etc'**

The research also found 'A mandatory EPR system embodies the potential to integrate a range (combination) of complementing policy measures'<sup>16</sup> creating a good systems foundation. The research found social and economic opportunities beyond waste diversion, estimating that for every 10,000

tonnes of recovered textile waste 296 new jobs are created in sorting, disassembling and re-use and approx 2000 additional work training, internships and community service opportunities.<sup>17</sup>

The Finnish approach is also of interest as it applies the EPR concept without a regulatory framework. The 'Telaketju project'<sup>18</sup> involves a broad engagement of retailers, waste businesses, municipalities, investors, central government, charities, and research organisations, with the ultimate goal to build an ecosystem to drive circularity. Each stakeholder is focused on supporting progress in its part of the ecosystem. Although not a regulated EPR scheme, the approach of 'Telaketju' is strongly influenced by two regulations at national level: The 2016 ban on organic waste being sent to landfill (which technically includes organic textiles), and the upcoming EU member state requirement to start separately collecting textile waste by 2025.



# Rising Expectations

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Through COVID the fragility of the world's economic model suddenly became more apparent. A recent report by environmental consultancy Trucost<sup>19</sup> found that of the top 20 region-sectors ranked by environmental impacts, none would be profitable if environmental costs were fully integrated (paying their full costs). Herein lies the conundrum for business adopting more sustainable behaviours competing in the same marketplace. The current distributed costs model is a society pays model, although appearing cheaper to the consumer, many costs are none-the-less present but are absorbed by society and the environment. Sustainable models represent a user pays model where all costs are internalised, from paying workers living wages to paying for environmental impacts of products and services offered.

**“Collectively we have created a world where our emissions have destabilised the planet’s climate and our waste has disrupted every ecosystem on the globe.”**

**– Dr Stephanie Pride**

In the world's current linear model, goods become a waste cost borne by the holder, the environment and society at their end of use. Through the establishment of a more circular model, used resources that are currently incurring a cost could instead

be flipped into revenue generation and job creation in the textile sorting and recycling sector. Encouragingly, there are signs that global textile businesses are becoming aware of the need to adopt a more circular approach and to lighten the burden on the Earth. For example, around 12.5% of the global fashion market made a public commitment to circularity in 2019 by signing the Circular Fashion System Commitment.<sup>20</sup>

Consumer sentiment is changing, and expectations of textile businesses and government are rising. People have an affinity with the textiles that they wear, and do not want to feel guilty when they purchase products. The viewpoint that textile businesses are the cause of environmental and social impacts is a major risk to the entire industry.

# NZ Context

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The local textile industry has undergone significant change since it was founded over 150 years ago. Deregulation of the textile industry in the 1980s led to the loss of a mass-manufacturing, encouraging specialisation within the industry but at a much lower level of activity. Wool fibre dominates local fibre production, with Aotearoa the third largest producer in the world in 2019, producing over 9% of global production.<sup>22</sup> Very little other textile fibre manufacture occurs. Local manufacture of textiles also tends to be focused on wool due to the availability of raw materials, however manufacture of high-value woollen textiles such as super-fine merino occurs offshore.

The majority of the textiles that enter the market originate offshore. Much of the non-financial impacts of these textiles therefore

also occur offshore also e.g. water pollution, carbon emissions and social impacts. However, once the textiles are onshored they tend to remain here. Export of secondhand textiles to less affluent nations does occur, typically to Pacific Island nations, in particular Papua New Guinea.

A good understanding of the Aotearoa context in this space is prevented by a lack of data. With only high-level data available in terms of textile volumes being disposed of in landfill. MfE estimates that textiles comprised 4% of total waste volumes to landfill in 2008 (126,240t).<sup>23</sup> Auckland Council estimates that textiles are currently 9% of their landfills, and that at current growth rates this would rise to 14% by 2040. Better quality data capture would enable better management of resources and issues.



There is currently little to no local operational textile recycling in Aotearoa. The Textile Reuse Programme has explored some of the emerging fibre-to-fibre technologies at pilot stage; trialing Moral Fibre's technology converting Air NZ polyester uniforms into recycled PET (commonly referred to as 'rPET') and BlockTEXX technology separating cotton and polyester textiles. Worn Again in the UK is further potential technology which is being explored. As these technologies are developed to commercial scale the business case for implementing them onshore can be advanced. There is some promising technology developed locally which can support more efficient textile waste identification and sorting - a key component in the development of commercial textile sorting infrastructure. Waikato based technology provider Sagitto combines miniature spectroscopy with machine learning models to scan, test and validate the composition of textiles.

The Waste Minimisation Act (2008) is the foundational legislation at central government level for waste management. After many years with few changes to the Act, the 2018-2020 Government triggered multiple reviews and a strengthening of its approach to waste management. In 2019 the waste levy charged at landfills that take household waste was increased from \$10 per tonne to \$60 per tonne and the levy expanded to cover additional landfill types, (previously there was no levy on almost 90% of landfills throughout the country). It is expected that this change will make disposal less favourable for textiles, and increase the level of reuse and recycling. Government has also committed to improved data collection for better resource management which will assist stakeholders to implement improvements and monitor progress. The Act includes provision for product stewardship schemes, both voluntary and regulated schemes. Although it has been in place for

12 years, it was only recently (in 2020) that the Government designated certain products as 'priority products' textiles were not included. The following product categories have been defined for inclusion in a regulated pathway:

- Plastic packaging
- Tyres
- Electrical and electronic products (e-waste)
- Agrichemicals and their containers
- Refrigerants
- Farm plastics

Expectations are rising in Aotearoa, particularly amongst younger consumers, that the textile industry must adopt a more circular approach. Most awareness is centred in the fashion industry which has established reuse pathways of donating to charity or op-shops, and in recent years the growth of resellers (selling on behalf) such as Recycle Boutique. Significant changes to the global recycling export market have also had an indirect effect on the textiles industry in Aotearoa, with many stakeholders increasingly looking to the industry to develop local solutions to its end-of-life textile challenges.



# What We Found

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The textile industry in Aotearoa comprises many subsectors. Fashion clothing has a high profile, with much of the focus on sustainability, environment and social/ ethical considerations on this sector, However businesses in other textile subsectors are also under increased pressure from customers to provide more sustainable offerings, solutions for end-of-use and greater transparency. Until now, no overview of the textile flows in Aotearoa has been available to inform stakeholder of the scale of the challenge. Given the small size of the local industry and market, a clear overview of the state of current textile flows is an essential starting point for building consensus and collaboration in order to gain better scale.

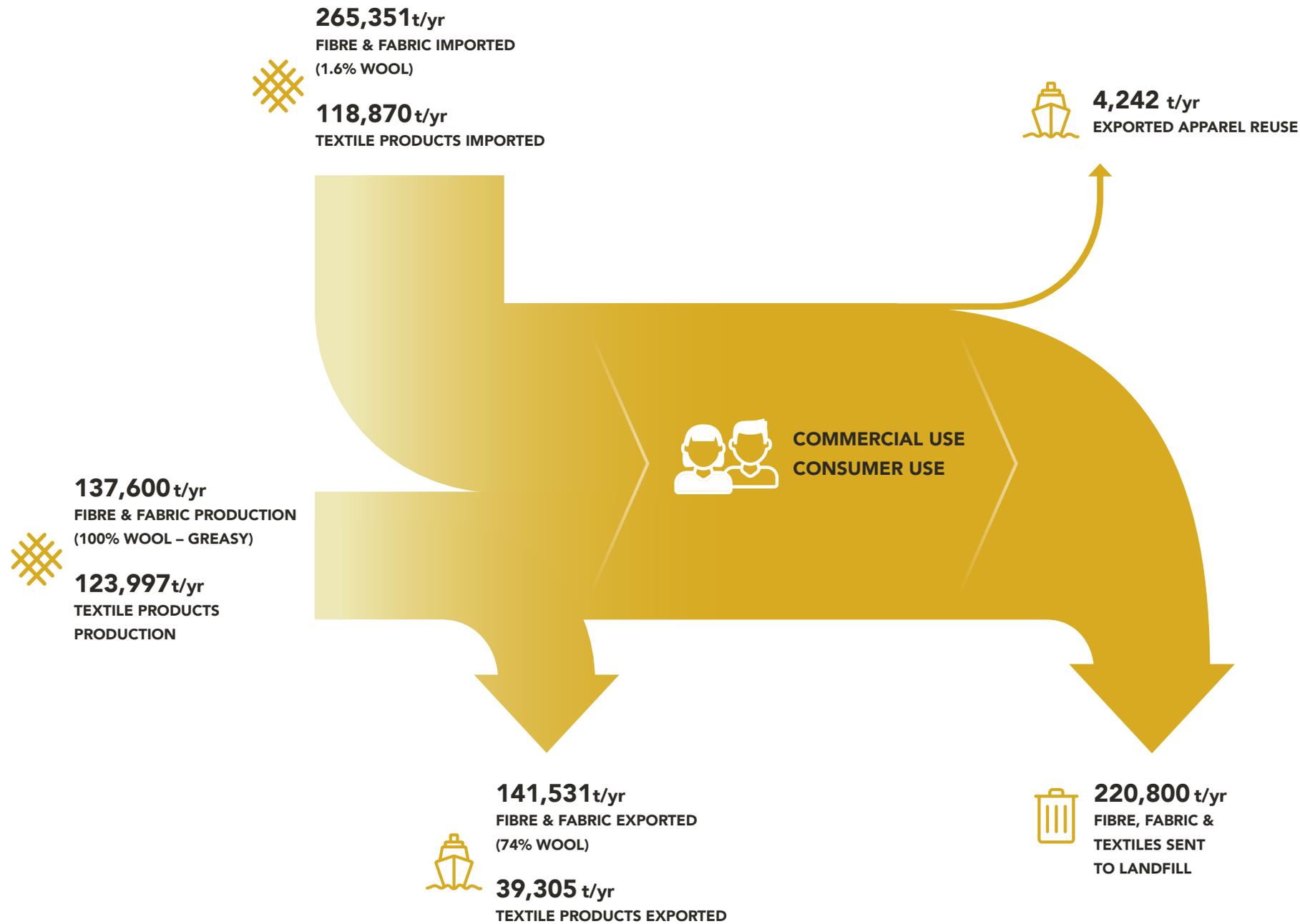
# Textile Flows in Aotearoa

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## HIGH-LEVEL OVERVIEW OF FABRIC AND TEXTILE FLOWS

Aotearoa is a net-importer of fibre, fabric and textiles. Over 380,000 tonnes of fibre, fabric, and textile products are imported into the country every year. This is significantly higher than the volume of fibre (mostly wool) and textile products produced locally. Importing and local production is mostly for local consumption, excluding the majority of wool which is shipped offshore. Landfill is the main destination for end-of-life textiles in Aotearoa.



**FIGURE 4: Overview of Textile Flows in Aotearoa**

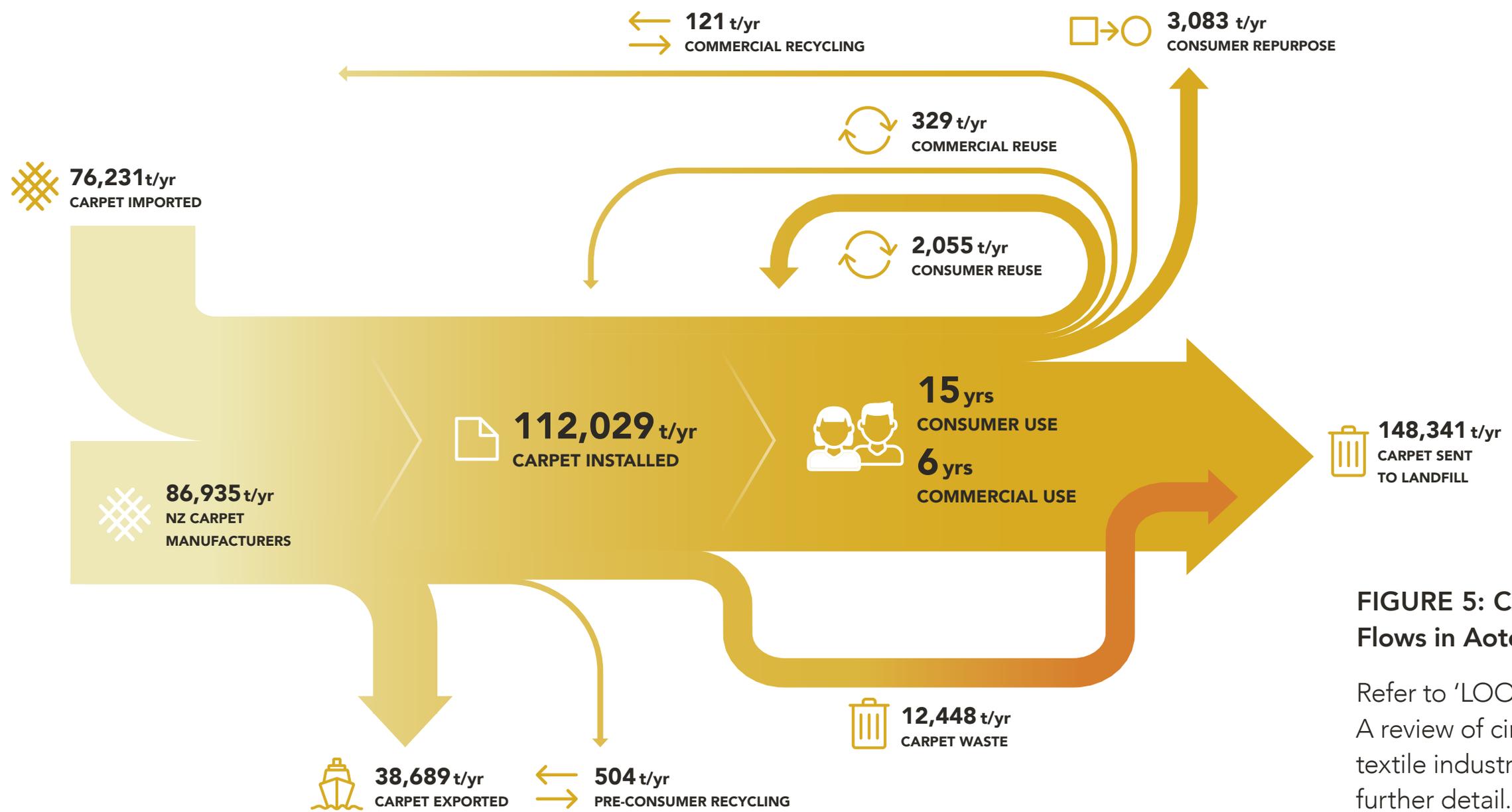
Refer to 'LOOKING IN THE MIRROR – A review of circularity in the clothing and textile industry in Aotearoa' Full Report for further detail. © Usedfully®

## CARPET TEXTILE FLOWS

Aotearoa still maintains a local carpet manufacturing industry, mostly linked to the availability of wool fibre for use in carpets. Local manufacture of carpets is a similar volume to imported carpets, although imports are likely to be mostly synthetic in composition. Over 112,000 tonnes of carpet and carpet tiles are installed in Aotearoa per year, with typical lifetimes varying from 6 years for commercial use (linked to typical space lease contracts) through to an average of 15 years for residential carpets.

A limited amount of carpet reuse and recycling is occurring currently in Aotearoa. In the commercial space this is mostly via the 'Re:Entry' accredited voluntary product stewardship programme, which diverts 329 tonnes of carpet tiles per year to reuse, and 121 tonnes per year to be recycled back into carpet tiles. In addition, some reuse of residential carpets does occur at a low level, including repurposing for uses such as weed mats. The vast majority of end-of-life carpets are sent to landfill.





**FIGURE 5: Carpet Textile Flows in Aotearoa**

Refer to 'LOOKING IN THE MIRROR – A review of circularity in the clothing and textile industry in Aotearoa' Full Report for further detail. © Usedfully®

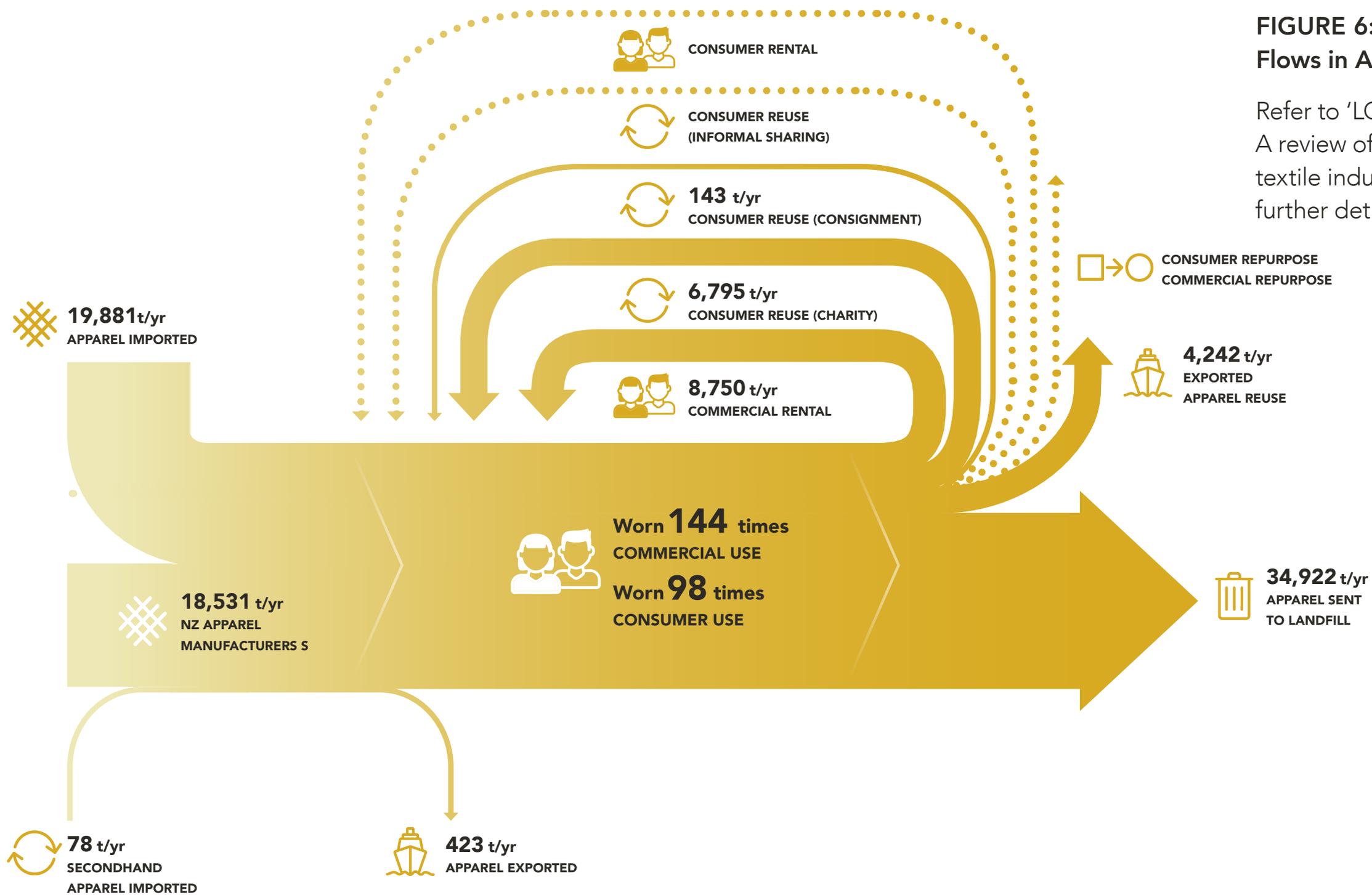


## APPAREL TEXTILE FLOWS

The local apparel industry has declined in recent years due to increasing competition offshore, however it remains a significant manufacturer of apparel entering the market. Local apparel production tends to be in niche specialised categories, and less so in mainstream categories. A small proportion of apparel made onshore is exported, reflecting the local industry's niche approach. The vast majority of textiles end up in landfill at end-of-life, before that nearly 7000 tonnes per year are channeled via secondhand stores and charities and into the reuse cycle.

This volume excludes the proportion of donated apparel which is not of sufficient quality and condition to be resold (typically 50% of the donated volume).

Commercial reuse of apparel via a rental model does occur in Aotearoa, at a relatively low level (in comparison to commercial linen rental). In recent years there has been a growth in consumer apparel rental businesses. While this trend is positive, it was not possible to calculate the actual volume of textiles flowing through this category at this stage.



**FIGURE 6: Apparel Textile Flows in Aotearoa**

Refer to 'LOOKING IN THE MIRROR – A review of circularity in the clothing and textile industry in Aotearoa' Full Report for further detail. © Usedfully®

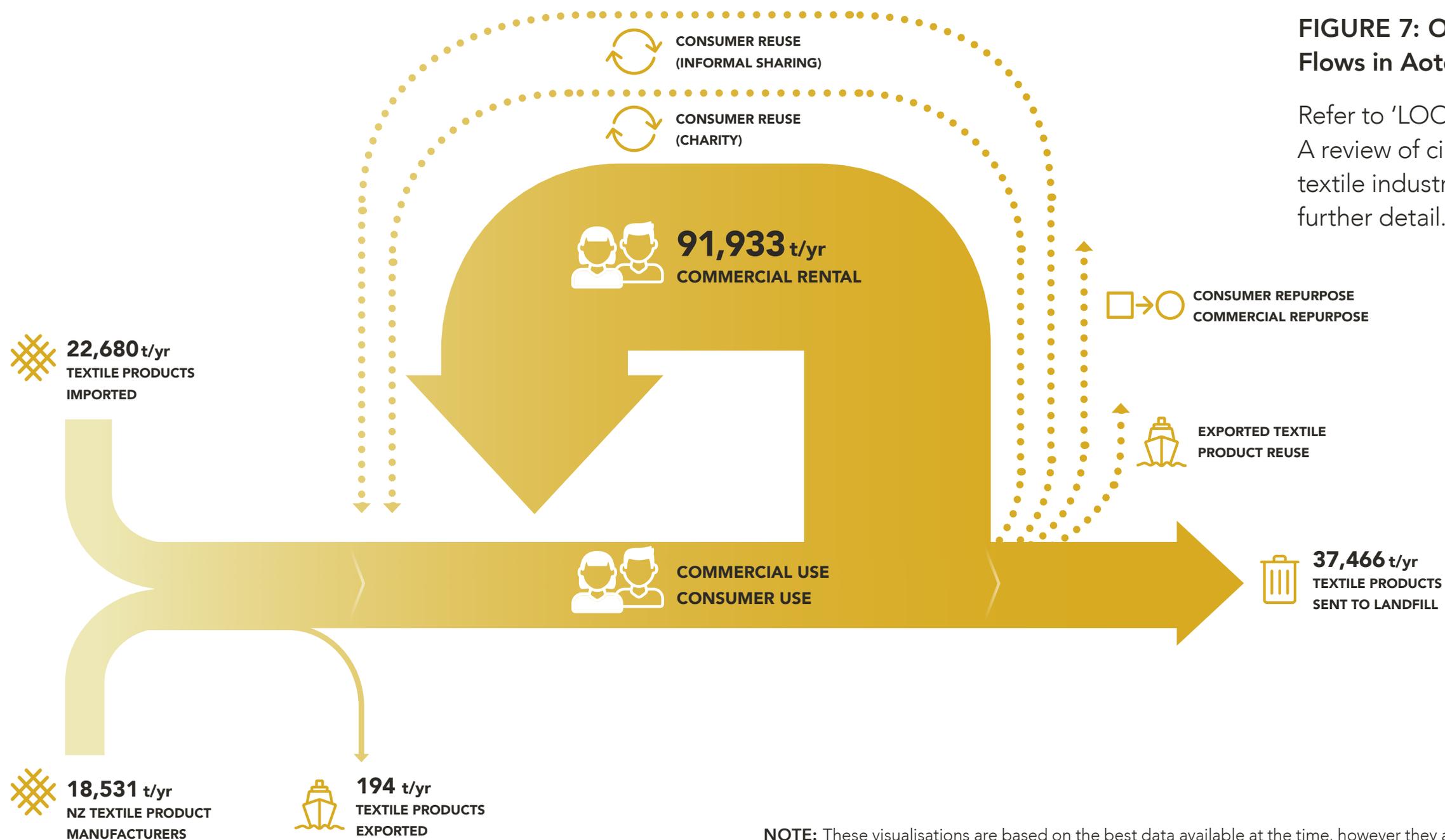
## OTHER TEXTILE FLOWS

The flows of the remaining textile types e.g. linen, towels, curtains, home textiles were also mapped in order to characterise this category and enable some comparison with the others. Much less data was available for this category, and in many cases it was not possible to estimate data to fill gaps. Again, a similar volume of textile is imported versus manufactured locally.

Commercial textile rental is a significant and mature circular activity in Aotearoa, and particularly popular with the hotel and healthcare industries. Perhaps linked to this,

little data was available on rental textiles at end-of-life. Stakeholders reported that most textiles in this condition were unsuitable for further reuse, and were cut into rags. No data was available on the volume of rags produced via any textile category locally, but there was sufficient evidence from interviews that it is a common end-of-life 'repurposing' for linen and towels in particular. Regardless, the majority of these textiles still find their way to landfill.





**FIGURE 7: Other Textiles Flows in Aotearoa**

Refer to 'LOOKING IN THE MIRROR – A review of circularity in the clothing and textile industry in Aotearoa' Full Report for further detail. © Usedfully®

**NOTE:** These visualisations are based on the best data available at the time, however they are indicative as significant data gaps remain e.g. available data has in some cases been extrapolated in order to present an overview of the current situation. The intention is to inform the reader and stimulate discussion and thinking about how to both improve the accuracy of this picture, and move from the linear model to a more circular one.

# Textile Industry Perspectives

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From the analysis and distillation of data from the 36 participant interviews, six main themes emerged:

- Waste and end-of-life
- Resource and opportunity loss
- Infrastructure and regulation
- Competition and collaboration
- Reputation and willingness
- Expectation and opportunity

# Waste and End-of-Life

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While Aotearoa does have limited onshore manufacturing, by far the vast majority of textile products are imported fully made up, placing the market at the end of the value chain. Not surprisingly, waste and end-of-life were dominant and consistent themes presented by interviewees:

**“Far too much is made, consumed, used and thrown away without having a decent life”**

- “Textile waste is a priority environmental issue”
- “Mixed waste is difficult to address because it is mixed, better separation is necessary to unlock better outcomes”
- “Waste is a big problem, the lack of processing facilities and technology to deal with textile waste”
- “The environmental challenge is keeping the stuff out of landfill. The unsold unwanted clothing from our charity shops.”

A number of participants focused directly on the issue of post-consumer product end-of-life (EOL):

- “Lack of solutions for EOL clothing, lots of people and brands interested in EOL”
- “EOL is too hard”
- “End of cycle stuff, one of the major issues especially for us as a business reselling clothing”
- “EOL, there’s been charities and things that we’re giving clothes to, but that’s not sustainable”

With the rise of the secondhand, reseller market, more used clothing flows first through resellers before donation to charity stores. Charities are being left with lower quality goods, attracting lower returns and higher volumes of waste and disposal costs. The alternative, exporting clothes for reuse and recycling is perceived as increasingly risky. With the closure of borders due to COVID-19 and the added environmental and financial costs of transporting used resources across borders, international shipments of used textiles are decreasing. Waste textile volumes in Aotearoa are forecast to continue increasing, along with their associated environmental impacts and costs.



# Resource and Opportunity Loss

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Several charitable organisations observed that the sheer volume and seemingly endless supply of clothes and large amount of waste was creating “eco-anxiety” amongst staff members:

**“Lack of product design for recyclability”**

- “Volume. Too much stuff, it’s overwhelming and time consuming”
- “Low value textiles are not valued by the user, so unlikely to be looked after or kept long”
- “Donation of textiles at end of life is not sufficient to support repair, repurposing or recycling activity at scale”
- “Commercial fitouts are linked to lease term, and not product lifetime”



A perceived skills and knowledge loss (of how to use, mend and reuse the resources people have) plays into the high level of donated goods.

Corporate and other donations of textile products to charities do not come with financial assistance to convert the donations into saleable products, leaving the costs and risk of repair or re-engineering, stock holding and resale to be borne by the charity

**“It is time consuming and labour intensive. Majority of donations are junk, cheap manufacturing”**

To re-engineer donations that are not saleable as is into good quality products requires a high level of skill not readily available in charity’s volunteer staff or within the community skills programmes offered by some charities.

Further observations included how the lack of onshore circularity of resources results in a continued over-reliance on virgin raw materials. Also that mixed / blend textiles are not designed with their end in mind and pose a barrier to recycling. The focus on recycled material to market, while positive, without the product being designed to be recycled at end-of-life is adding further obstacles to circularity.

The larger brands in Aotearoa perceive themselves as small on the global scale, and too small a part of a global supply chain’s customer base to have leverage with suppliers.

# Infrastructure and Regulation

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Multiple respondents noted a lack of government strategy for textile waste as a pain point. Government's focus on plastics not extending to, or even including synthetic textiles (a significant contributor to plastic pollution), and a lack of understanding and recognition of the seriousness and impact of textile waste were seen as hindering policy and access to funding to support and drive change.

"Government is a pain point, textile waste has been pushed to the background, don't pay attention to how big the scale of the problem is in NZ. Legislators when they think about the environment they focus on clean water, food waste but ignore textiles, the elephant in the room."

"You've got the government passing legislation, even down to the plasticisation of the labels that go on apples, there's nothing like that in the clothing space. That's the sort of focus that we need to get government to have, we need to seriously look at building a plant here for end of life garments. We want clarity on approval levels, we want tax breaks, and a strategy in place so that we can drive it forward for New Zealand. Similar to what the tyre industry has done here, that would then provide some strong traction."

"There is a clash of ideology, council revenue generation from landfills versus impact of waste."

Lack of infrastructure for post-consumer textile goods was viewed as leaving little alternative to landfilling. Lack of aggregation, sorting and access to clean sorted resources is a common issue. The lack of awareness of textile flows and management at landfills, due to most arriving as mixed waste, and the cheap cost of landfilling compared to the costs of repurposing were also identified as barriers to progress.

From a corporate procurement perspective, although wanting to make more holistic decisions, the lack of standardisation and information on textiles leaves businesses procuring textiles and uniforms focused solely on price point decisions.

“Being able to source and to understand the impact of the textiles that we’re buying. You can’t make decisions if you don’t have the information. If you compare it to food, nutrition, you can look on a packet and go, it’s got this much fat. We can’t make that decision around clothing and that’s what we were lacking, information to drive informed decision making.”



# Competition and Collaboration

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The level of industry fragmentation is notable, and while there are lots of small players their ability to scale up sustainability initiatives on their own is limited and challenging. The lack of industry collaboration, within sectors and across sectors increases the inefficiencies. A number of brands in this highly competitive market have established, or are being encouraged to establish individual initiatives to improve circularity and gain market advantage. However, individual initiatives each with one-off overheads, attract low volumes and result in minimal overall impact.

In the evolution of the industry to a lower emissions model, greater strides can be achieved at a faster rate through collaboration, the pooling of resources and the sharing of knowledge. While this may be counter to how the industry usually operates, the overheads that would need to be carried for advancement are too great to be carried by one single organisation alone.

Collating data for this report proved difficult due to a lack of impact measurement in the sector, but perhaps more importantly, the absence of measurement and available data indicates there is limited oversight over resources.

# Reputation and Willingness

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Risk to reputation was perceived from an organisational and industry perspective but also from a macro, country perspective. Open source research and availability of information from global initiatives left some respondents frustrated by what they perceived as a lag between what was happening globally and the state of play within their own country.

**“Understanding that if NZ doesn’t do something, we will fall behind what is happening in the world, we have to catch up.”**

43% of respondents expressed a willingness to be more active, to engage in initiatives to improve the current linear system, or to actively advance the development of local solutions.

“Want to go to government to drive forward a (fibre-to-fibre) solution in NZ. Time is right. That would enable some serious traction.”

“So how can we do things better? What does best practice look like? What opportunities are there?”

# Expectation and Opportunity

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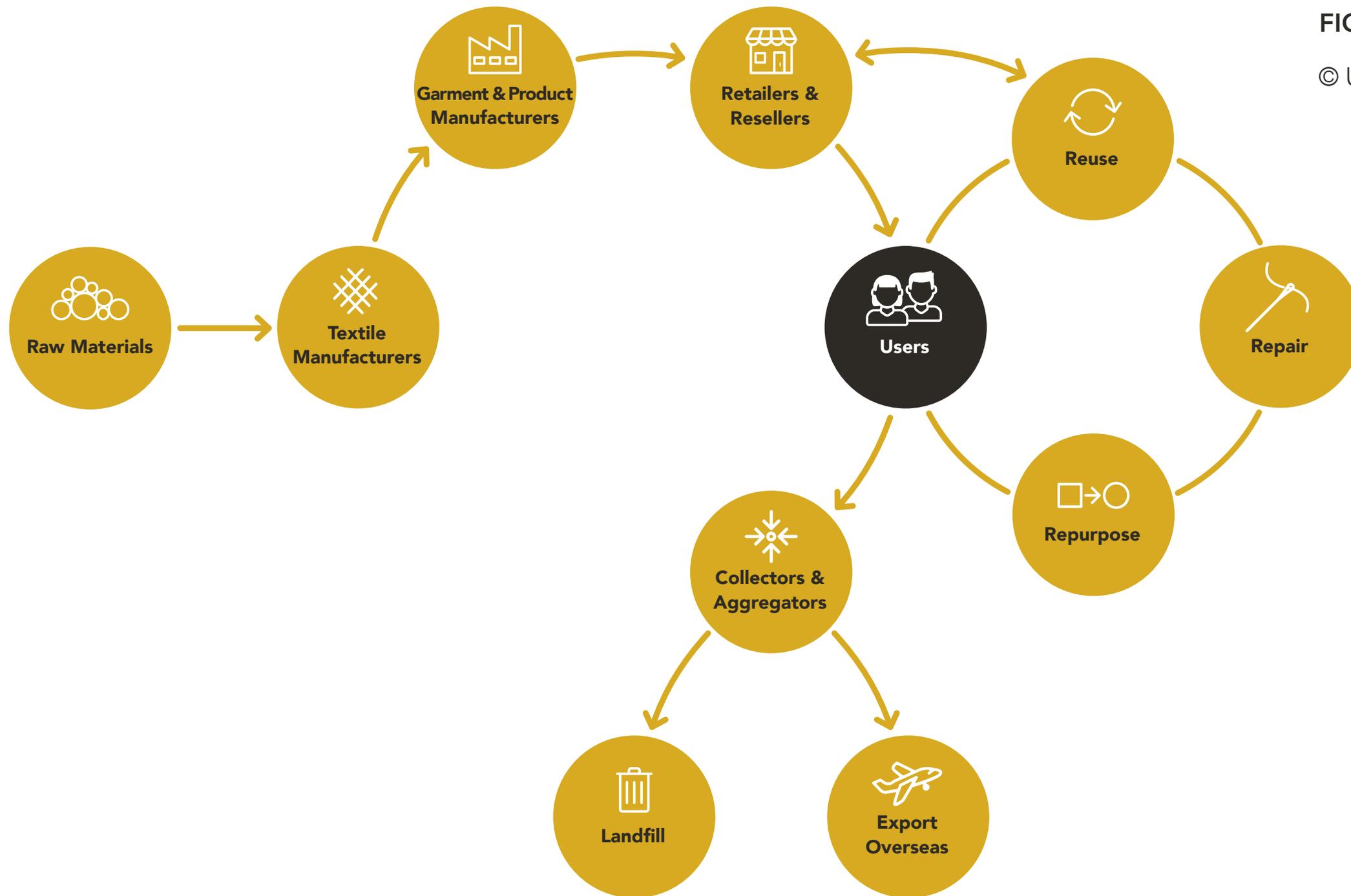
Both B2C and B2B businesses are under increasing pressure from customers to provide greater stewardship and EOL solutions. Some participants described how they used sustainability as a platform to express their organisational and personal values system. Participants that were engaging in circularity and product stewardship initiatives also recognised the opportunities for leadership, consumer loyalty, innovation, impact, collaboration or all of the above.

“It’s the reason we’re in this industry, to provide people with the most convenient way to recycle their clothing to make the longest

life cycle out of it, to reduce landfill. And just really make the most of what someone doesn’t really want, I guess is probably the best way to put it because people do want it.”

An increase in the awareness of the impacts of clothing production has led to increased demand for second hand and vintage clothing as a more environmentally friendly alternative to new clothing. Globally over the last three years second hand markets grew 21 times faster than the retail apparel market. The secondhand market, currently worth USD\$24 billion, is expected to reach USD\$51 billion in five years.<sup>24</sup>

**“It’s the reason we’re in this industry, to provide people with the most convenient way to recycle their clothing to make the longest life cycle out of it, to reduce landfill.”**



**FIGURE 8: Transitional Textiles Model**

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Some front-footed designer clothing brands have moved into the reseller space offering their own product as preloved, generating a new revenue stream without the draw of virgin resources. This also provides the opportunity to re-engage with customers and further build loyalty. The addition of mending services builds on established sustainability positioning.

The reseller market is positioned between retailing of new products and the charity donation sector, and is changing the retail landscape. It is acquiring market share from both quarters with some retailers offering both new and second hand clothing in response, to enhance their offering to environmentally conscious consumers. Coupled with an increased interest in repair<sup>25</sup> and reuse, the linear model is moving towards improved reuse loops and greater potential for circularity (as illustrated in Figure 8), albeit currently operating at low levels.

# Conclusion: A Vision of a Future State

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Futurists predict a rapid move away from the current centralised extraction, the breakdown of resources and large physical scale production, to a model of localised creation. Arbib and Seba in their book 'Rethinking Humanity' calls this fundamental shift not simply an Industrial Revolution, but the beginning of the Third Age of Humankind. Foreseeing a migration away from a world built on coal, oil, steel, livestock, and concrete to one built on "photons, electrons, DNA, molecules and (q)bits"<sup>26</sup> A future production system that relies on technologies we are already using today, and new technologies like fibre-to-fibre that take used textiles back to their molecular parts and regenerates them for reuse in new filaments and products. Moving industry away from one of extraction to a world of creation.

Ten years from now there will be little tolerance for waste in the value chain. Research company McKinsey and Co suggest that "By 2030, we need to live in a world in which 1 in 5 garments are traded through circular business models".<sup>27</sup> At today's global scale that equates to 20 billion garments produced and reused through a circular system. Pride describes a future state where "waste is an unnecessary burden on us all" and where "low emissions are a key part of marketing and a source of pride for business and community."<sup>28</sup>

Bending the current linear system into a closed loop means collecting and sorting used textile resources in Aotearoa and feeding them back into the start of the value chain (Figure 9). When most production starts offshore this seems unlikely to be



feasible or economic. However, in the midst of the pandemic, disruption in supply chains resulted in a degree of near-shoring and on-shoring of production. Predictions of more distributed and autonomous production regions suddenly began to seem more realistic. To further their adoption Aotearoa would need to re-believe in its potential as a manufacturing country.

Current uncoordinated initiatives can be harnessed to create meaningful impact through multi-stakeholder collaboration between sectors and between private business and the public sector. This is an imperative given the small size of the textile sub-sectors – let alone the textile industry as a whole – and will provide an opportunity for Aotearoa to move away from high risk, competitive individual activities, to more resilient and scalable collaborative systems.



FIGURE 9: (Future) Circular Textiles Model

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Improved data capture and better quality data on textiles and the waste entering landfills in Aotearoa will provide the missing information needed to support investment decisions in new technologies and physical infrastructure. Although technological solutions on their own cannot achieve the transformation needed to reach a low carbon future. What is also needed is the support of the organising system, society and its institutions, the laws and regulation, to unlock the potential to reduce environmental and social impacts in the value chain.

Product Stewardship has been identified by the Government as a foundational element of a low emissions future. If applied to the textile industry, there is huge potential to accelerate the transition to a circular textiles model.

What this research uncovered in Aotearoa is a textile industry no longer satisfied with business as usual. Business owners and employees committed to creating a better future, with the drive and the tenacity to make that future a reality.

# Mā pango, mā whero ka oti te mahi

*Through cooperation, objectives can be achieved*

# Acknowledgements

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Lynette Fielding – Glassons & Hallenstein Brothers

James Walker – Mindful Fashion

Jacinta Fitzgerald – Mindful Fashion

Geraldine Tew – The Recreators

Caroline O'Reilly – Vinnies Resew

Rob Ward – Beverley Productions

Emily Miller-Sharma – Ruby

Toby Clark – Toby Etc

Sarah Lei – Trevelyan

Vanessa Thompson – Unravelled Consultants

Adele Dubarry – Waste Not Create Space

Zoretta Rose – Recycle Boutique

Mark Cowie – Recycle Boutique

Nadine Koruna – Accor Group

Manjula Sickler – ADHB

Parul Sood – Auckland Council

Julie Dickenson – Auckland Council

Ben Kepes – Cactus Outdoor

Rochelle Flint – Cavalier Bremworth

Kay Murray – Connections Trust

Chris Ellis – Earthlink

Larissa Thathiah – Enviro NZ

Steve Aschebrock – Inzide

Renee Woolcott – Jacobsens

Mark Borgfeldt – Textile Products

Logan Mudge – Trade Me

Luke Brody – Vandella International

Sue Wallace – Zero Waste Waiuku

Amanda Ashby – Sustainability Trust

Polly Griffiths – Sustainability Trust

Susie Robertson – Sustainability Trust

Jacqui Simpson – Tech Futures Lab

Lisa McNeill – University of Otago

Erin Anderson Scott

## **ADVISORY GROUP**

The project is guided by an Advisory Group comprising of Brian Johnston – Sustainability Specialist at The Formary, Juhi Shareef – Sustainability Lead at Vector, James Griffin – General Manager Projects & Advisory at the Sustainable Business Network and Lauren Degenstein – Researcher from Alberta University, Canada.

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# Appendix 1: Biographies

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## **Bernadette Casey**

CREATIVE DIRECTOR, USEDFULLY & THE FORMARY

Bernadette is the Founder and Creative Director of Usedfully and Sustainability Consultancy The Formary, founding the company after guest writing for *Melting Point*, a book about global warming published by Penguin in 2008. She is also a Sustainability Advisor at Entire Studios and Whitecliffe Fashion School. A University guest lecturer on Circularity, Stewardship and the Environment she has presented her research on systemic change and circular systems at a number of international conferences, including the Global Fashion Conference. Bernadette holds an MSc in Marketing, her research explored ethical consumer purchasing behaviour for which she was awarded a University of Liverpool Dissertation of the Year.



## **Brian Johnston**

SUSTAINABILITY SPECIALIST, THE FORMARY

Brian is a business sustainability specialist with extensive textile industry experience working within ASICS and other brands to integrate sustainability into business strategy. He has worked closely with global industry groups including the Sustainable Apparel Coalition, AFIRM Group and Science Based Targets to develop tools that help the apparel and footwear industry to adopt a more sustainable approach. Brian believes that local fashion and textile businesses have a critical role to play in helping society to address its sustainability challenges and exceed customer expectations.

# Appendix 2: Usedfully – Textile Reuse Programme

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Usedfully® is a low carbon clothing system where textiles are utilised to their full potential through technology and cutting-edge research. Usedfully's mission is to radically reduce the environmental and social impacts of what we wear, by building a circular system for clothing and textiles in Aotearoa and abroad. Working together with industry partners, we are driving the reuse of unwanted clothing and textiles, preventing them from going to landfill, and instead creating a circular system that fully utilises this untapped resource.

After a decade of individualised textile waste diversion and reuse projects The Formary® founders realised that the only way we can achieve our vision is through systems' change, so we created Usedfully. The Usedfully system is recognised through the following streams:

1. Textile Reuse Programme membership programme of ongoing Research and Development of solutions to utilise used textiles in industrial applications such as roading and building products.
2. Textile Product Stewardship voluntary Textile Product Stewardship Scheme currently being co-designed with industry to be piloted early 2021.
3. Usedfully Reporting and Management for resource transparency and impact reporting (at MVP stage).
4. Usedfully Marketplace (at design phase) enabling efficient trading of textile resources, connecting used textile resources with reuse markets.
5. Expert advice providing support to organisations from global giants to small social enterprises to resolve hot spots in the value chain and transition to a low-carbon future for long-term sustainability and profitability.

# Usedfully® Circular System



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