



# THREAD COUNT NSW TEXTILE DATA REPORT

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REPORT BY ACTA FOR THE NSW ENVIRONMENT PROTECTION AUTHORITY (EPA), 2021



# A MESSAGE FROM ACTA –

**The understanding of textile waste is maturing for consumers and businesses alike, and preliminary consultation has shown an informed and coordinated response is needed. Textile waste is now a million-tonne (per annum) issue, and one that is typically poorly captured by our systems for disposal based reporting.**

The data discussed in this report is intended to inform future initiatives by the NSW Environment Protection Authority (EPA), for whom it will provide a robust data basis for future initiatives. Furthermore, the details herein provide clues for quantifying the textile waste issue at a national level, and a clear indication that currently we are reliant on primarily offshore markets for end of life textile recovery – the fickleness of which pose a risk to waste management across all states and territories.

**This report:**

- Tests our existing assumptions on the scale of textile consumption and disposal and update these as needed;**
- Describes textile consumption across several key product categories and potential areas of intervention;**
- Provides recommendations on improved data capture to track and manage textiles with increased clarity; and**
- Identifies current data gaps and areas of future research to inform a circular textile economy.**

Early in our organisational journey, we identified data gaps as a critical barrier to a circular textile economy. Addressing this is identified as the first step in our 2020 Strategy – A Common Thread – and we are pleased to present this output as it applies to NSW.

We would like to recognise all the time and energy contributed by industry in the creation of this report – over 100 responded to our industry survey and close to 50 interviews informed our understanding of textile flows. We are grateful for all of your assistance.

In the spirit of collaboration, ACTA commits now and in the future, to making its research and insights freely accessible to stakeholders to accelerate the transition to a circular textile economy.

*We look forward to the journey ahead.*

# VOICES FROM THE INDUSTRY –

*We would like to recognise all the time and energy contributed by industry in the creation of this report.*

Over 100 responded to our industry survey and close to 50 interviews informed our understanding of textile flows. ACTA is grateful for all of your assistance, this is what we heard:

“Textile waste is a growing challenge for most councils, we need to see all sectors involved in producing and collecting textiles working together to find more solutions for reusing and recycling textiles within Australia.”

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*Annie Walker, SSROC*

“MTM is always looking for opportunities to further position ourselves in line with a circular economy model. There’s clearly an opportunity for recycling of MTM uniforms, and this is something we’d like to pursue and setup; to minimise our carbon footprint and seek more sustainable options in the first instance.”

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*Kieron Treasurer, Metro Trains Melbourne*

“Every month, we print in excess of 15,000m<sup>2</sup> of fabric displays and we recognise we have a responsibility to where that fabric ends up. In 2019, we launched the first fabric take-back scheme in the signage industry – ‘be sustainable’ to a great response. We are excited to continue shaping the future of textile flow in Australia.”

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*Glenn Watson, AFI Branding*

“The Australian cotton industry has for decades focused on sustainable farming, with data collection and interpretation a key factor in measuring and assessing impact to springboard improvements. Just like data has proved critical to cotton’s sustainability, we believe understanding the size and scale of the textile waste problem is a fundamental starting point for circularity. Big solutions require input from all sectors of the supply chain and beyond our current thinking. We believe good data and collaboration, including with the farmers that grow the raw materials, is the best path forward.”

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*Brooke Summers, Cotton Australia*

“Textiles are a major component of a number of products in the bedding industry including in mattresses and bedding that currently don’t have good economic and environmental options after original use. As only one user of textiles, we understand we can’t solve this problem on our own; we’re excited to work with fellow organisations to help overcome common challenges across the sector and find sustainable solutions.”

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*Janelle Wallace, Australian Bedding Stewardship Council*

“A major pathway to accelerating change and creating a circular economy for textiles is through sustainable procurement measures and shared ambition from government, industry, brand owners and community. Healthshare is already taking practical steps to achieve this – but we will get there faster through partnering for change.”

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*Fergal Barry, Healthshare NSW*

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**TODAY, TEXTILES ARE EVER-PRESENT.** Not only are they in our clothing, but they are also in our carpets, furniture and bedding, they are in the cars we drive, the events we attend, the hotels we stay in and the uniforms we wear.

**THE COMPLEX SUPPLY CHAIN REQUIRES US TO THINK GLOBALLY, BUT ACT LOCALLY.**

# A GLOBAL OPPORTUNITY—

Since 2000, the production of apparel has doubled internationally (in product units)<sup>1</sup>, yet recycling rates remain low.

**The textiles industry (across production, manufacture and disposal life-cycle) accounts for over 1.2 billion tonnes of CO<sup>2</sup> emissions every year – 8% of the global total.<sup>2</sup>**

The NSW Government, is committed to a Net-Zero Target by 2050. Textiles and its supply chain, has an important role to play in getting us there.

This report adopts an inclusive view on textiles to articulate the state and national context, acknowledging that the missed opportunity of textiles being sent to landfill (in an emissions sense) is too great to ignore.

We so often refer to the textile waste ‘problem’ – but it is poignant to reflect on the still largely unrealised opportunity textiles hold.

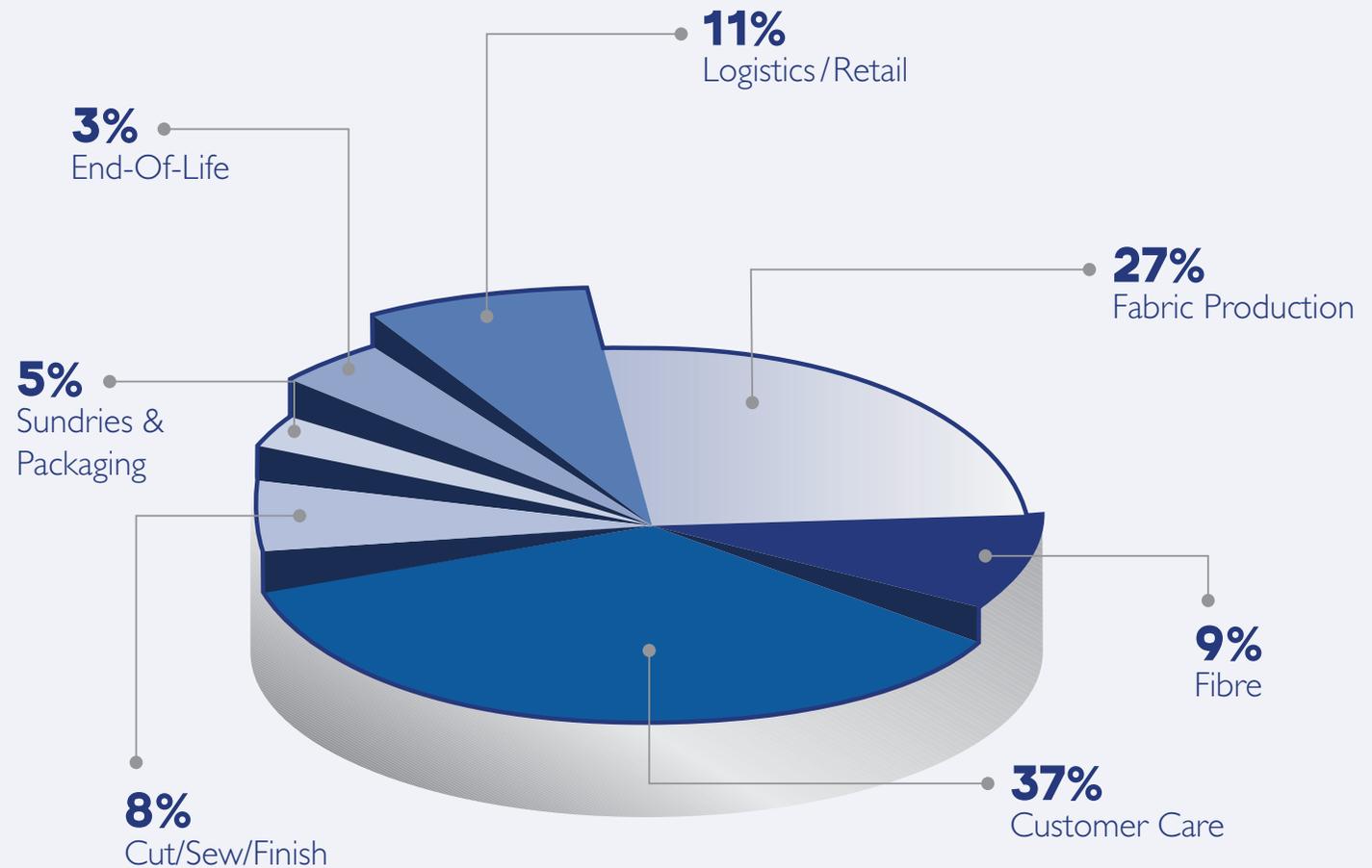
Using the example of a pair of jeans, Figure 1 (*below*) shows the relative intensity of emissions at each stage in the product life cycle. The relatively low portion of emissions generated during land-filling (3%), and the majority of emissions occurring in the production and use stage highlights the importance of higher-order recovery systems (ideally fibre-to-fibre).

The real opportunity of a textile circular economy – one that designs out waste, maximises product lifetimes and avoids the extraction of virgin material for textile manufacture.



# LEVI'S JEANS CARBON IMPACT<sup>3</sup>

FIGURE 01



# BALANCING THE TEXTILE EQUATION –

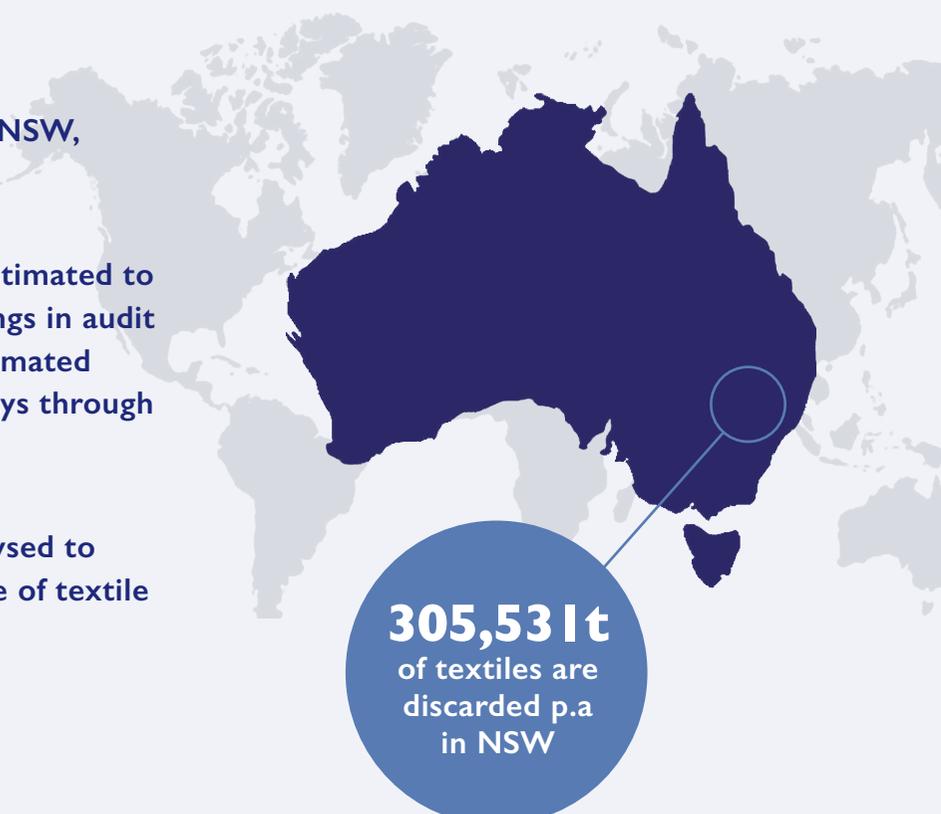
**Textiles face a significant data gap, widely acknowledged by industry and government. It was this data gap we set out to address.**

Traditionally, disposal-based auditing across Australia has grouped all textiles under one heading, leaving a void of information on fibre composition, product types and quantities – the information required to form a robust data basis for improving management.

This report finds that between 2005-2019 an average of **328,904t** of textile products have been imported to NSW annually, which is close to aggregated disposal data which estimates **305,531t** of textiles are discarded by residents and business in NSW each year.

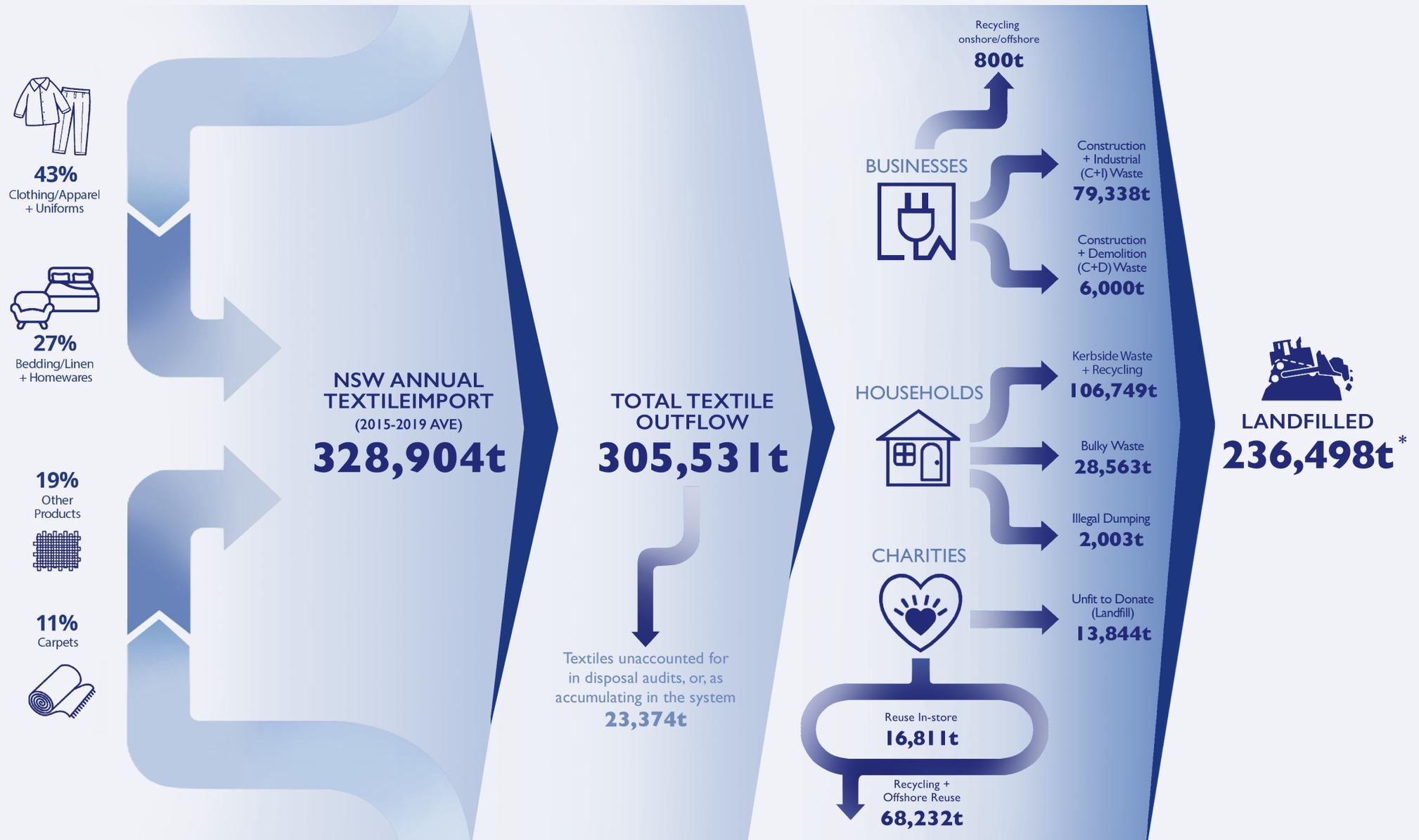
To re-evaluate textile flows for NSW, a two-step process was used:

- 1) Disposal accounts were re-estimated to address identified shortcomings in audit categories, and, totals re-estimated across the breadth of pathways through which textiles are discarded;
- 2) Textile import data was analysed to create a comparable estimate of textile consumption.



**305,531t**  
of textiles are  
discarded p.a  
in NSW

# BALANCING THE TEXTILE EQUATION \*(YEARLY FIGURE)



# TEXTILES IMPORTED TO NSW –

Import data from the Australian Bureau of Statistics (ABS) was used to calculate textile imports to NSW. Table 1 characterises the average of **328,904t** of textile products imported to NSW annually over the past five years (2015-2019), and Figure 3 provides a graphical representation.

TABLE 1 – Average (2015-2019) NSW textile imports (as defined by HTISC codes)

HS2	TARIFF CODE	DESCRIPTION	IMPORTS, 2015-2019 AVERAGE (t)	IMPORTS, 2015-2019 AVERAGE (%)
61	ALL	Articles of apparel and clothing accessories, knitted or crocheted	79,874	24.28%
63	ALL	Other made up textile articles; sets; worn clothing and worn textile articles; rags	73,002	22.20%
62	ALL	Articles of apparel and clothing accessories, not knitted or crocheted	61,890	18.82%
57	SELECTED	Carpets and other textile floor coverings	35,968	10.94%
56	SELECTED	Wadding, felt and non-wovens; special yarns; twine, cordage, ropes and cables and articles thereof	25,247	7.68%
94	SELECTED	Furniture; bedding, mattresses, mattress supports, cushions and similar stuffed furnishings	16,024	4.87%
59	SELECTED	Impregnated, coated, covered or laminated textile fabrics; textile articles of a kind suitable for industrial use	10,517	3.20%
54	ALL	Man-made filaments; strip and the like of man-made textile materials	9,318	2.83%
55	ALL	Man-made staple fibres	8,589	2.61%
52	ALL	Cotton	2,545	0.77%
53	SELECTED	Other vegetable textile fibres; paper yarn and woven fabrics of paper yarn	2,341	0.71%
60	ALL	Knitted or crocheted fabrics	1,809	0.55%
58	ALL	Special woven fabrics; tufted textile fabrics; lace; tapestries; trimmings; embroidery	1,545	0.47%
51	ALL	Wool, fine or coarse animal hair; horsehair yarn and woven fabric	194	0.06%
50	ALL	Silk	40	0.01%
<b>TOTAL</b>			<b>328,904t</b>	<b>100%</b>

# A DETAILED ANALYSIS OF TEXTILE IMPORTS FROM 2015-2019

*It can be stated that the vast majority of textiles are imported as finished products –*

**Clothing items and uniforms** (HS Codes – 61, 62) **comprise of 43.01%** of NSW textile imports. **The single largest component.**

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Furnishings and homewares (HS Codes – 63, 94) **comprise around 26.03%** of NSW textile **imports.**

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**Raw textile represent 15.7%** of textiles imported to NSW, most of which is 'value-added' by further manufacturing or finishing.

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Carpets and floor coverings (HS Code – 57) **comprise around 10.9%** of imports.

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Outdoor textiles (HS2 Code – 59) typically used in banners, flags, signage and industrial uses **comprise 3.2%** of NSW textile imports.

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Textiles used in mattresses (Tariff Codes 9404210005 & 9404210006) **account for 1.04%** of all textiles imported.

*(Total weights pro-rated to 25% to reflect their textile component)<sup>4</sup>*

# TEXTILES IMPORTED TO NSW BY PRODUCT TYPE

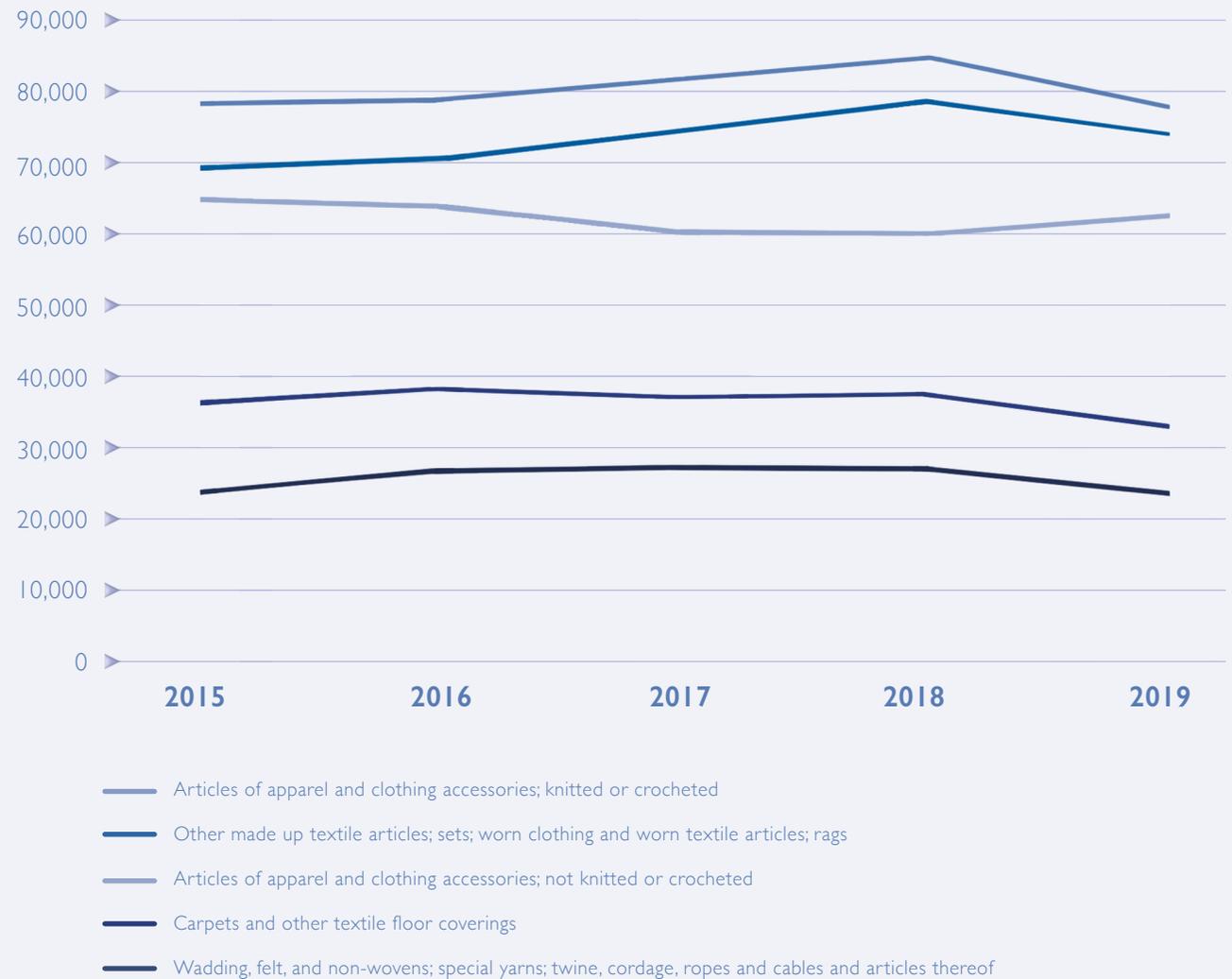
(2015-2019 AVERAGE)

## FIGURE 03

**Textile imports to NSW have shown a steady 1-2% annual increase from 323,934t (2015) to 337,736t (2018), before a 4% contraction in 2019 (considered a result of early supply chain interruptions from the COVID-19 pandemic).**

This graph reflects population growth in NSW over the same period which hovered between 1-2%, indicating that consumers may not be consuming more textiles on a per capita basis, but rather growth is being driven by population.

This data is somewhat at odds with international data on fibre production which reached an all-time high in 2019 and has shown consistent growth between 3-5% annually since 2000.<sup>5</sup> Figure 4 (below) shows the stability in NSW's major textile import categories between 2015-2019.



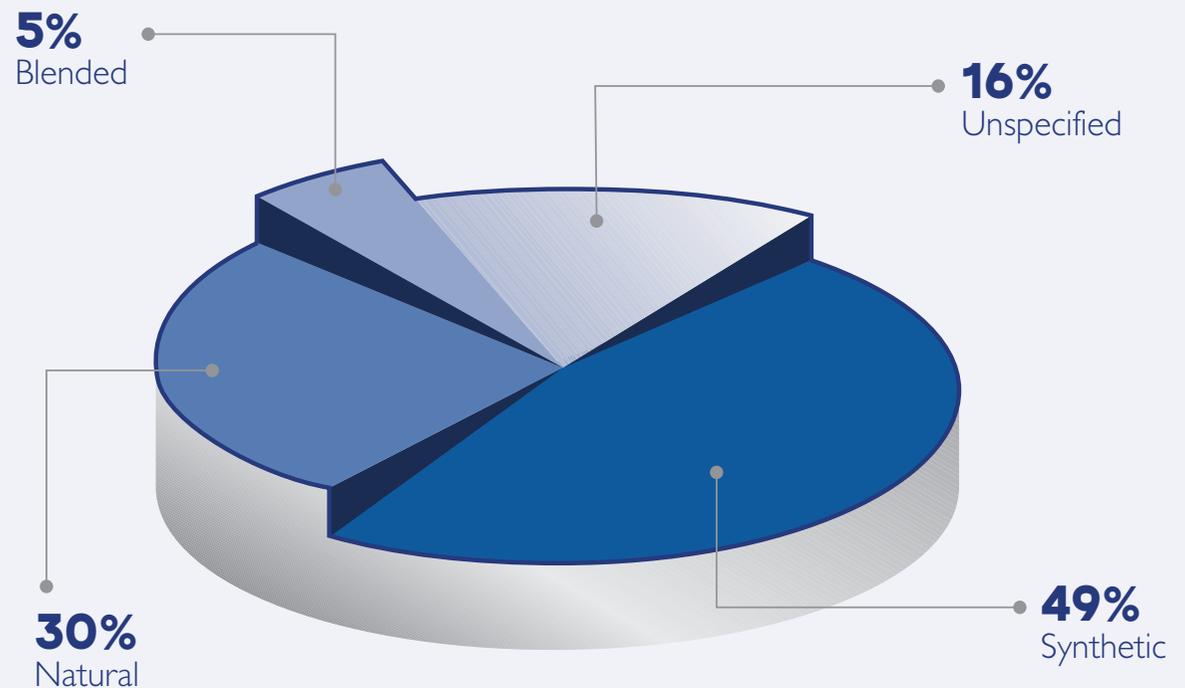
# FIBRE COMPOSITION ACROSS ALL NSW TEXTILE IMPORTS (2015-2019)

## FIGURE 05

This import analysis reflects the point of entry to Australia – which at the State level data reflects typically where these products will be bought or sold.

The analysis does not account for distribution and sale of product into other states of Australia (where they may eventually be disposed) but provides supporting evidence for the re-estimated disposal accounts.

Figure 5 provides an indication of fibre composition across all textiles imported to NSW. Where import tariff codes described products as '85% or greater' a certain material (i.e. cotton, wool, polyester) – a common distinction – they were listed here under their dominant material type. As a result, it is expected the graph under-represents blended fibres with small (>15%) secondary fibre types.



# TEXTILES END OF LIFE IN NSW

In total, there are **305,531t** of textiles being landfilled, recycled or exported in NSW every year.

This comprises of:

NSW households discard 137,316 tonnes of textiles in NSW annually

This is comprised of:

- 106,749t** via the kerbside collection system (including residual waste, recycling and organics services).
- 28,563t** via kerbside bulky waste collection.
- 2,003t** via illegal dumping (tracked through RID online).

NSW businesses discard an estimated 86,138 tonnes of textiles annually.

This is comprised of:

- 79,338t** was disposed of to landfill from C&I activity (via collection or drop-off).
- 6,000t** disposed to landfill from C&D activity.
- An estimated **800t** of textiles are recycled (outside of charity sector).

The NSW charity sector receives 98,887t clothing donations each year of which 16,811t are resold locally.<sup>6</sup>

The remaining 82,076t is comprised of:

- 32,633t** exported offshore for ragging or reuse.
- 35,599t** recycled domestically.
- 13,844t** is landfilled when unfit for either of the above.

# HOUSEHOLD TEXTILE WASTE –

**In the case of kerbside wastes, most existing quantifications of textile waste in NSW are reliant on a simplistic definition of ‘textiles’ used in auditing.**

In NSW, the kerbside general waste auditing guidelines<sup>7</sup> use the category code ‘Textile/Carpet’ (AWD-C02). As Table 2 highlights, textiles and textile containing products are recurrent throughout several category codes in smaller amounts.

**Table 2 – General waste categories referencing textiles in NSW audit guidelines** (refer to italicised parts in the table)

AWD	CATEGORY	MATERIAL TYPE	MATERIAL DESCRIPTION
A90	PAPER	Nappies & Feminine Hygiene	Used disposable nappies
C02	OTHER ORGANIC	Textile/Carpet	Wool, cotton and natural fibres
C03	OTHER ORGANIC	Leather	Leather clothing, craft leather, some shoes, belts with a buckle
E01	PLASTIC	PET (Other)	Pillow and sleeping bag filler, laminated sheets, carpet fibres
E03	PLASTIC	PVC (Other)	Electrical conduit, plumbing pipes and fittings, garden hose, shoe sole, tubing, rainwear
E05	PLASTIC	PP (Other)	Appliance parts, crates and boxes, toys, houseware/kitchenware, furniture, plant pots, mouldings, irrigation fittings
E07	PLASTIC	Other Plastic	Unidentifiable plastics, low-cost brittle toys, all other resins and multi-blend plastic materials, synthetic textiles, all other containers

*Audit data from 2011-2019<sup>8</sup> supplied by the EPA showed textile waste consistently contributed to around 0.46-0.47kg of each red-lid bin across all regulated areas.*

**THAT IS ON AVERAGE 4.39% OF THE RED-LID SERVICE BY WEIGHT.**

*By region, textiles account for:*

**3.92%** of the red-lid stream in the Sydney Metropolitan Area (SMA)

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**4.61%** of the red-lid stream in the Extended Regulated Area (ERA)

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**5.75%** of the red-lid stream in the Regional Regulated Area (RRA)<sup>9</sup>

# BUSINESS & CHARITY SECTOR TEXTILE WASTE –

**The NSW commercial and industrial (C&I) disposal-based audit of regulated areas indicates that 5.36% of the C&I waste stream was textiles, and that textiles appeared in over 40% of all loads.**

The 2015 C&I audit report recommends: *'In the future, the largest opportunities for increased recycling of C&I wastes are treated wood, followed by textiles.'*

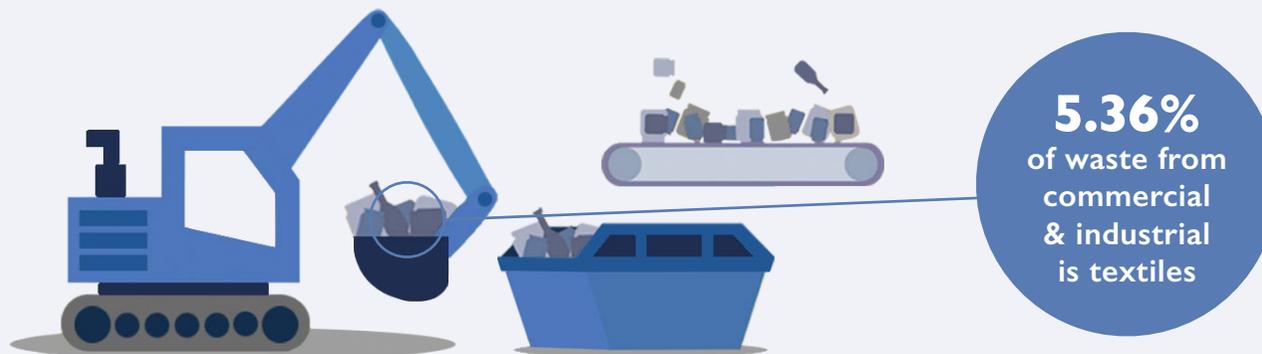
There is limited data on textile waste in the construction and demolition (C&D) stream. Available data from C&D waste stream auditing of the SMA in 2005, indicated that textiles also comprised **6,000t** (or 1.3%) of the overall C&D waste stream.<sup>10</sup> It is noted here that more recent data on C&D waste composition is unavailable, as is accurate data across the ERA, RRA and rest of state.

Based on industry consultation, it is estimated that around **800t** of textiles (less than 1%) is being collected from businesses in NSW – mainly sent offshore for recycling by ragging or felting.

**The charity sector is primarily responsible for the diversion of textiles from landfill in NSW.**

Charity organisations receive 12.1kg of clothing per person each year in Australia which has been pro-rated by NSW's population to arrive at a state figure. This data does not include textiles in furniture and manchester, or donations to commercial clothing reuse services,

Of the clothing donated to charity, Charitable Recycling Australia has identified the following end-uses; domestic reuse (17%), domestic recycling (36%), export (33%) and landfill of residuals (14%).<sup>11</sup>



# A NATIONAL PERSPECTIVE—

*Extrapolating NSW's textile importation figures to a National total\* –*  
**ACTA SUGGESTS THAT CLOSE TO 1,000,000T OF TEXTILES ARE  
BEING CONSUMED NATIONWIDE EACH YEAR.**

*This project gives reason to suggest that the following common factoids used to describe textile consumption and disposal patterns in Australia may be consistently under reporting the issue –*

***“Australians discard 23kg  
of textiles annually”***

Based on 2010 ABS data,<sup>12</sup> **501,000t** of “leather and textile waste” was landfilled, the figure was adjusted to a per-capita rate using the 2010 population of 22 million.

***“Australians throw-away 6,000kg  
of textiles every 10 minutes”***

Popularised by ABC's War on Waste, **6,000kg** extrapolates to an annual disposal of **315,000t** every year.

***“Australians purchase 27kg  
of textiles annually”***

Traced back to data from 'PCI Consulting Group' or 'PCI Fibres', first referenced in the industry publication Textile Beat. *The source document is unavailable, but extrapolated it amounts to* **675,000t** annually.



*It is estimated each year –*  
**AUSTRALIANS ARE CONSUMING  
39KG TEXTILES PER CAPITA.\***

# TEXTILE USE IN NSW –

Informed by stakeholder engagement Table 3 (below) provides an overview of key textile waste streams and options for program support (on a 1-5 year horizon) whilst textile recycling infrastructure is established.

TABLE 3 – Summary of textile waste streams & focus areas

PRODUCT & QUANTITY (t/pa)	CHARACTERISTICS	AREAS FOR PROJECT/PROGRAM SUPPORT
<p>Consumer Fashion &amp; Retail (130,000t/pa)</p>	<p><b>Any apparel or clothing items including activewear, sleepwear, underwear.</b></p> <p>At end of life, basic auditing by the charitable sector has suggested a typical fibre composition of cotton/poly (31%), cotton (30%), polyester (11%), other fibres (29%).<sup>13</sup></p> <p>The apparel industry in Australia is dominated by several large multinational brands (by % share of industry revenue)<sup>14</sup> – Cotton On Group (31.7%), H&amp;M (17.5%), Group Zara Australia (14.9%), UNIQLO (14.3%).</p>	<ul style="list-style-type: none"> <li>• Support brand/community led repair to extend product lifetime.</li> <li>• Improve the quality of clothing donations to reduce landfill burden of charity sector.</li> <li>• Support clothing donation through the Community Recycling Centre (CRC) network or consumer collection trials being tested by NSW Councils.</li> <li>• Support for peer-to-peer, or verified online resale networks.</li> </ul>
<p>Furniture, Soft Furnishings &amp; Homewares (62,000t/pa)</p>	<p><b>Upholstered furniture (sofas, armchairs, dining chairs), curtains/blinds and homewares.</b></p> <p>The textile component of furniture and soft furnishings are typically comprised of:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Cushions Padding and Fill &gt; Woven polyester or Polyurethane (PU) foams; and</li> <li><input type="checkbox"/> Upholstery &gt; Generally Synthetic textiles (Synthetic Leather, Polyesters, Polypropylene or Nylon).</li> </ul> <p>The Australian Furniture Association (AFA) estimates as much as 75% of products are manufactured or assembled in Australia, which could provide local markets for recycled content.</p>	<ul style="list-style-type: none"> <li>• The charity sector reuses/resells more than 60% of accepted furniture donations in NSW, supporting this industry extends the life of furniture and furnishings.</li> <li>• Support peer-to-peer resale of used furniture to extend product lifetimes.</li> <li>• Activate demand for recycled textiles in local manufacturing processes.</li> </ul>

# TEXTILE USE IN NSW –

TABLE 3 – Summary of textile waste streams & focus areas Cont.

PRODUCT & QUANTITY (t/pa)	CHARACTERISTICS	AREAS FOR PROJECT/PROGRAM SUPPORT
<p><b>Carpets</b> (36,000t/pa)</p>	<p><b>Woven carpets and carpet tile.</b></p> <p>Fibre types vary by carpet product:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Broadloom carpets can be made of natural (wool) or synthetic (polyester/nylon) fibres. Face fabrics comprise the majority of carpet weight (~70%).</li> <li><input type="checkbox"/> Carpet tiles allow modularity and ease of replacement as carpets age. They are typically a PVC backing (reuseable) with nylon or polyester faces attached.</li> </ul> <p>Several producer-led take-back programs for carpet tiles are available through larger manufacturers. Despite this, the Southern Sydney Regional Organisation of Councils (SSROC) auditing has shown carpets comprised 50% of the audited C&amp;I textile waste stream.</p>	<ul style="list-style-type: none"> <li>• Promote replaceable/reusable products (i.e. carpet tiles) in commercial spaces especially through government procurement.</li> <li>• Support producer led take-back programs already in place for carpet tiles.</li> </ul>
<p><b>Mattresses &amp; Bedding</b> (16,000t/pa)</p>	<p><b>Mattresses (of all types); bedding (including mattress protectors, bedding linens, blankets and duvets).</b></p> <p>There are close to 350,000 beds in the NSW healthcare and accommodation sectors and an estimated 5,000,000 in NSW households.</p> <p>Whilst mattress textiles are largely synthetic, bedding can comprise of:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Sheets and linens &gt; cotton or poly/cotton blend;</li> <li><input type="checkbox"/> Duvets, pillows and blankets &gt; mainly synthetic; and</li> <li><input type="checkbox"/> Mattress protectors &gt; mostly synthetic, some PVC-coated poly in accommodation and hospital use.</li> </ul> <p>The Australian Bedding Stewardship Council represents a collective of Australia’s largest mattress and bedding suppliers.</p>	<ul style="list-style-type: none"> <li>• Supporting mattress collection and drop off services (already widely provided by NSW councils) will support reduced illegal dumping and bulky waste collections.</li> <li>• 72% of bedding linen received by charities can be reused in country, promoting this can help extend product life-cycle.</li> </ul>

# TEXTILE USE IN NSW –

TABLE 3 – Summary of textile waste streams & focus areas Cont.

PRODUCT & QUANTITY (t/pa)	CHARACTERISTICS	AREAS FOR PROJECT/PROGRAM SUPPORT
<p><b>Uniforms &amp; Workwear</b> (10,000t/pa)</p>	<p><b>Branded clothing, PPE or specialised garments used in physical workplaces and school uniforms.</b></p> <p>Like fashion, the fibre composition of uniforms can vary, however, frequent staff turnover and makes rebranding these garments available in greater consistency than post-consumer clothing.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Branded clothing &gt; predominantly Cotton, followed by Poly/Cotton blend, Polyester/ Graphite, Cotton/Elastane, Polyester.</li> <li><input type="checkbox"/> Specialised garments (aprons, gloves, PPE, overalls, high-visibility apparel) &gt; mostly synthetic and can incorporate a range of alternative finishes and materials.</li> <li><input type="checkbox"/> School Uniforms &gt; very often a Poly/Cotton blend (70%/30%) and trending toward higher synthetic content.</li> </ul> <p>Australia’s largest suppliers engaged in the Circular Threads stewardship program include; Bizwear, Workwear Group, Bunzl, Dobsons, Absolute Apparel, Total Image Group, Blackwoods, RSEA Safety, Australian Defence Apparel, Bisley.</p>	<ul style="list-style-type: none"> <li>• Promotion of industry-led voluntary stewardship and the integration of this into NSW government/local government procurement, exploring design options for de-branding, reuse and take-back.</li> <li>• Trialling of textile collection systems for businesses in NSW.</li> </ul>
<p><b>Outdoor &amp; Signage</b> (10,500t/pa)</p>	<p><b>Banners, flags, scrim/fencing mesh, shade cloth, geotextiles and printed textile signage.</b></p> <p>These textiles are woven, flexible and typically entirely synthetic.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Flags, banners and billboards; PVC coating over a virgin PE/PP mesh or printed HDPE yarn.</li> <li><input type="checkbox"/> Fence mesh &amp; shade cloth – woven HDPE yarn.</li> <li><input type="checkbox"/> Geotextiles – typically woven polypropylene or polyester (e.g. Parawebbing, Bidim).</li> </ul> <p>The Specialised Textile Association (STA) and Vinyl Council of Australia (VCA) have been successful recipients of a grant to develop product stewardship in this sector.</p>	<ul style="list-style-type: none"> <li>• Explore opportunities for digital (projected) signage to avoid production.</li> <li>• Procurement guidelines for industry and government removing dates and locations from signage for recurring events (to allow reuse).</li> </ul>

# INDUSTRY PERSPECTIVES –

To inform the creation of this report, 110 survey responses were analysed from a range of textile users and procurers.

By sector, this included:

- Apparel and retail (32%)
- Government (16%)
- Charity and recycling (11%)
- Education (8%)
- Healthcare (4%)

The survey focused on identifying (by sector) current practices, understanding of textile flows, barriers and opportunities which are described below.

## SUPPLIER ACTIVITY BY CUSTOMER TYPE

Figure 6 and 7 (below) support the view that consumer facing fashion apparel manufacturers have, to date, been more proactive pursuing sustainable supply chain alternatives and adopting industry standards.

In the survey data collected, fashion clothing brands made up the 'business to consumer' category, whilst larger suppliers of textile products to industry made up the 'business to business' category.

This highlights the role an active consumer push for sustainability had driven in clothing and apparel and the opportunity for the government to support a similar push in industry through building transparency, supporting stewardship and raising awareness.

## TEXTILE FATES BY PRODUCT TYPE

The end fates of textiles vary significantly by product type.

The pie charts in Figure 8 (below) present the expected (or documented) fates of textile products for consumer and fashion products (left) and non-apparel textiles (right).

This highlights the availability (or reliance on) charitable recycling activity for clothing products, and the widespread land-filling of other textile products.

It is expected that these graphs are overestimating the recycling of textiles in general as data has been gathered from textile suppliers not end-users.

# CURRENT ACTIVITY PROCURING RECYCLED CONTENT

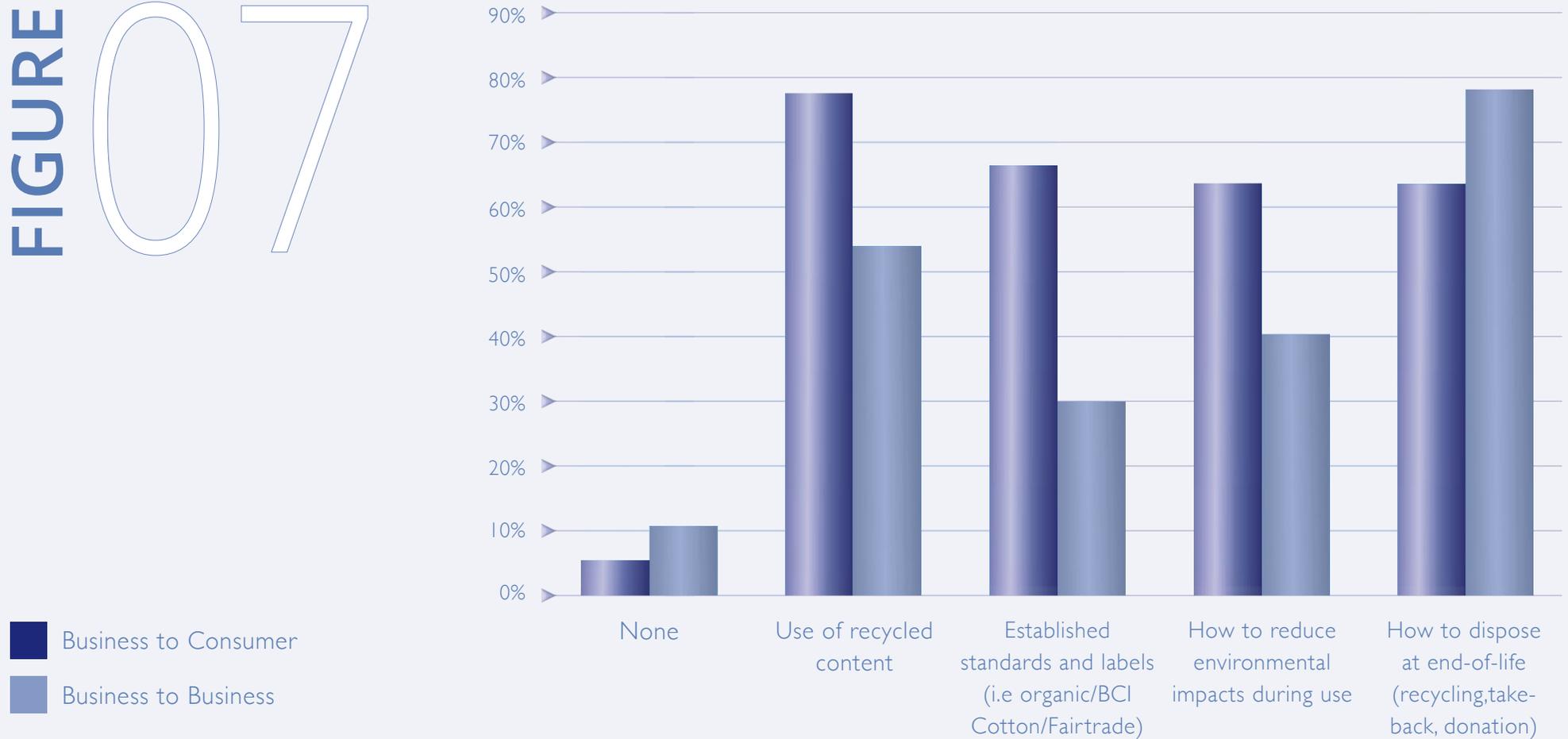
(BY CUSTOMER TYPE)

## FIGURE 06



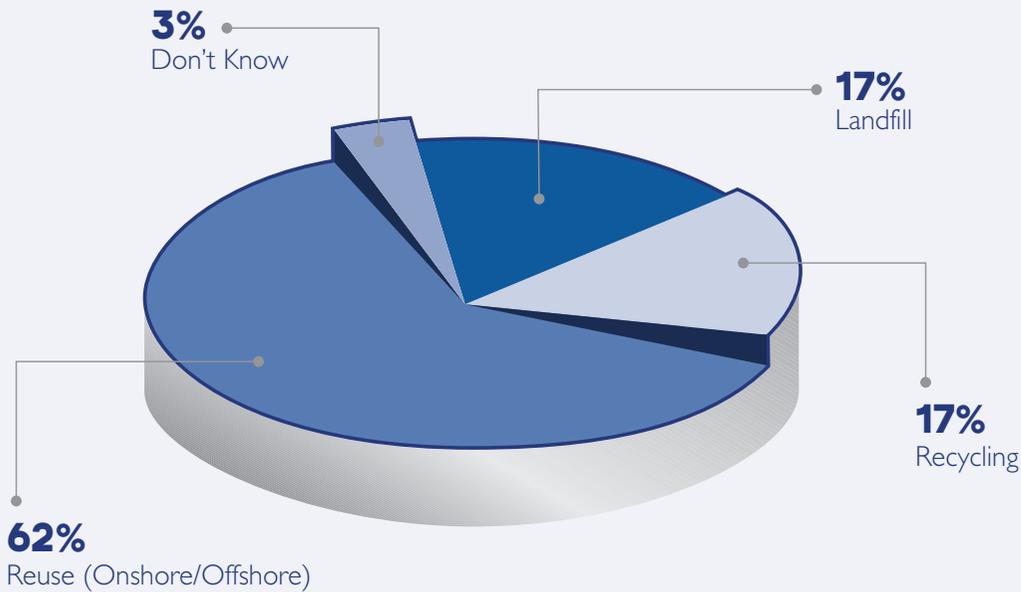
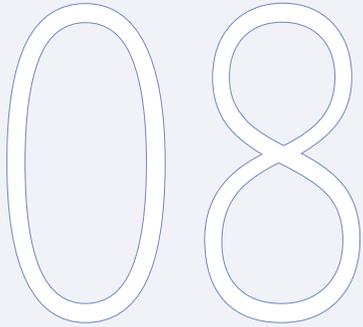
# CURRENT INTEREST IN SUSTAINABLE SUPPLY CHAIN ALTERNATIVES BASED ON QUERIES FROM CUSTOMERS

FIGURE 07

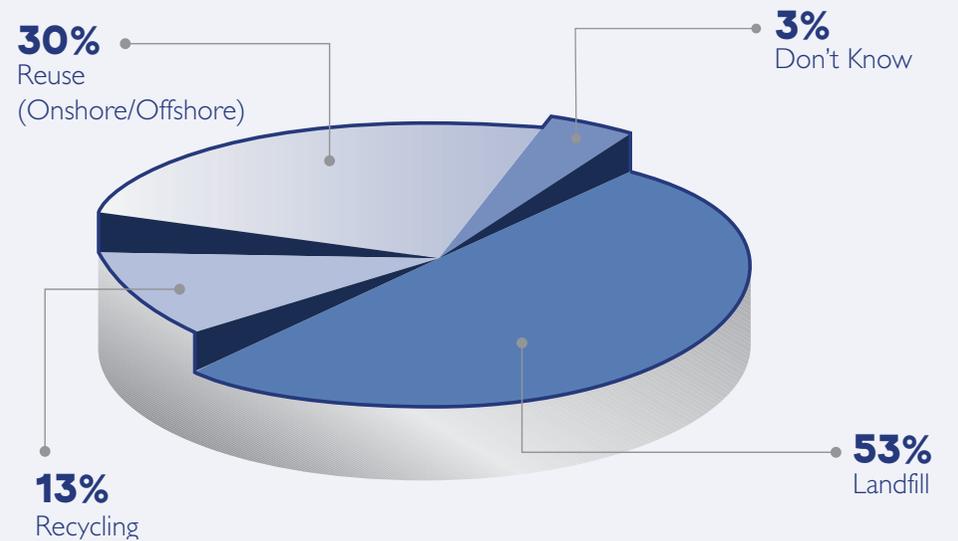


# TEXTILE END-OF-LIFE FATE BY PRODUCT TYPE

FIGURE



Retail > Consumer & Fashion Products



Non-Apparel Textiles

# SECTOR NEEDS FOR RECYCLING–

*The myriad uses of textiles provides an essential insight into the infrastructure needed to collect, sort and process end-of-life textiles.*

Table 4 (below) documents the various formats of textile waste across all sectors;

Clean or unused stock (and raw fabrics) are most common in the uniforms and clothing sectors;

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Solid contaminants (requiring mechanical processing – i.e. the complex waste stream) is prevalent across all sectors; and

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Contaminated textiles (during use) are most common in the healthcare sector.

Table 4 – Stakeholder interests in industry led collaboration (by sector).

	CONSUMER FASHION & RETAIL	GOVERNMENT	MEDICAL & HOSPITAL	UNIFORM PROVIDER	EDUCATION
<b>Complex</b> e.g. items such as clothing with zippers, carpet with rubber backing and curtains with metal eyelets; where the major component is textiles	63%	43%	27%	60%	50%
<b>Composite</b> e.g. furniture, mattresses, motor vehicle seats, textiles are a smaller component	0%	29%	9%	0%	25%
<b>Contaminated</b> e.g. soiled rags, nappies, medical waste	0%	14%	36%	0%	0%
<b>Clean/pre-consumer</b> e.g. offcuts, by the roll, consistent fibres	37%	14%	27%	40%	25%

# MOTIVATORS FOR COLLABORATING –

*80% of all respondents indicated in principle support for industry initiatives for textile recovery.*

Table 5 (below) outlines the motivations of each sector and the differing value propositions required in policy and program planning. There are two clear insights:

**1** The consumer fashion sector is broadly supportive of industry led action, eager to contribute to data collection and end-of-life management. Of all interests, access to funding was this group's least important motivation for action.

**2** Business-to-business textile industries are currently less engaged in sustainability and circularity, however, governments and a range of public services (healthcare and uniforms provision) are keen to see collaboration improved.

Table 5 – Stakeholder interests in industry led collaboration (by sector).

	CONSUMER FASHION & RETAIL	GOVERNMENT	MEDICAL & HOSPITAL	UNIFORM PROVIDER	EDUCATION
For recognition as an industry leader	72%	39%	50%	75%	44%
To develop aligned supplier networks and partnerships	78%	50%	67%	50%	44%
Funding opportunities	47%	50%	67%	50%	44%
Aligning all textile waste generators to support R&D for recovery	72%	39%	50%	75%	44%
To contribute to tracking textile consumption & waste	86%	72%	50%	50%	44%
Insight into recycling innovation	86%	78%	50%	50%	78%
To improve industry & government collaboration	83%	94%	100%	75%	56%



# DISCUSSIONS & **RECOMMENDATIONS—**

# IMPROVING DATA QUALITY—

Future information-gathering processes should be reviewed to ensure that the data is aggregated holistically and that it has a detailed composition:

- 1** The NSW Kerbside Waste Auditing Guidelines report textiles across as many as seven categories, consolidating these will ensure the full scope of textiles is captured in future auditing.
- 2** No additional detail on product or natural/synthetic/mixed fibre categorisations are currently collected in disposal auditing limiting the accuracy of decision making.
- 3** Homogenising disposal-based auditing accounts across C&I and households will aid in comparability and developing effective policy and programs.

*It is also noted, that the consumer fashion and retail sector indicated – by overwhelming majority – an interest in delivering collaborative or industry led activity, the primary motivator being contribution to tracking textile consumption and waste (86%).*

# RECOMMENDATION –

## INSIGHT

## RECOMMENDATION

1a

**Kerbside auditing guidelines and C&I audits do not adequately describe textiles in quantity and composition.**

- Correct the overlap of categories tracking components of the textile stream and provide further opportunity to report textiles as; synthetic fibres, natural fibres or blended fibres;
- Standardise waste categorisations across kerbside and C&I auditing guidelines to enable greater comparability;
- Expand detail and scope of C&I auditing in the state to deliver quality and consistent metrics for C&I waste textiles and fates in NSW.

1b

**Textiles from households account for 72% of NSW's textile waste.**

*Household focused education on apparel reuse, repair and donation will address the largest component of the state's textile waste and provides an immediate option for short term activity.*

Trials of collection services (such as Upparel, King Cotton or RecycleSmart) being undertaken by NSW Councils should also support improved data on quantity and type.

# DELIVERING PROGRAM & POLICY SUPPORT –

**TWO TEXTILE RELATED PROJECTS WERE RECENTLY FUNDED VIA THE NSW EPA'S CIRCULATE PROGRAM; THE CIRCULAR CENTRE AND TEXTILE RECYCLERS AUSTRALIA.**

*Further support is required for emergent collection systems, pilot or demonstration programs focussed on post-industrial products (with limited contamination available in large quantities) and have a direct alternative cost for disposal in landfill.*

# RECOMMENDATION –

## INSIGHT

## RECOMMENDATION

2a

**Textile recycling will be delivered by a suite of recycling technologies – providing clear data for business case development is critical.**

A mature textile recovery industry is likely to comprise several different technologies for sorting and recycling (due to presentation and origin, and the differences in natural/synthetic/blended fibres).

*In the short to medium term, revised estimates of textile occurrence in state infrastructure planning are essential, and can actively support business case development through regular data publication.*

2b

**Opportunities exist to reduce textile waste by reduction, reuse, and recycling – pilot programs should reflect this.**

*Sectoral and product differences provide opportunities to test different means of recovery, for example:*

- Complex textile waste streams (apparel, uniforms, furnishings) present greater opportunities for reuse or re-design intervention;
- Homogenous waste streams generated by businesses present the best prospects to support pilots for recycling, for example:
  - Polyester > banners and flags, corporate uniforms;
  - Poly/Cotton > linens, some sorted apparel waste; and
  - Cotton > Bedding and manchester.

2c

**Stakeholder feedback on textile waste streams suggests vastly different incentives between kerbside and C&I textile wastes.**

C&I stakeholders face increasing landfill costs when disposing textiles, typically with larger quantities of textiles in homogenous products, they often require documented secure disposal to manage brand risk (i.e branded uniforms). Comparatively, post-consumer textile waste is typically non-homogenous and has no (perceived) financial cost of disposal via kerbside collection.

*Currently, C&I stakeholders have greater incentive to act on textile waste, a focus for programs and pilots in a circular economy transition is essential.*

# COORDINATING ACTIVITY IN TEXTILE RECOVERY—

**Grants awarded under the National Product Stewardship Implementation Fund (NPSI) in 2020, support industry-led extended producer responsibility in several significant textile products (or containing textiles). These include:**

**Circular Threads** (led by ACTA) This programme oversees business case development and product stewardship scheme design to collect, reuse and recycle uniforms and workwear. Project value \$360,510.

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**Project Divert** (led by Asaleo Care) Establish an industry-led stewardship scheme for commercial facilities to recycle used absorbent hygiene products; problematic waste generated by healthcare and aged care. Project value \$561,031.

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**TexBack** (led by Vinyl Council of Australia) This project will develop a business case and a product stewardship scheme for PVC coated polyester textiles, typically used in outdoor signage. Project value \$349,850.

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**Mattress and Bedding Stewardship** (led by Australian Bedding and Stewardship Council) designing and implementing a product stewardship scheme for used mattresses and used bedding linens. Project value \$937,700.

Across governments, textile waste action plans are under development, local councils in Sydney are trialling collections from multi-unit dwellings, addressing in more detail consumer needs and access to collection services. These locally targeted plans will help identify responsibilities within the Local/State/Federal Government framework.

*Lastly, 80% of the interviewed stakeholders indicated a willingness to participate in industry-led initiatives. There is a need to support the creation of networks and platforms for the exchange of knowledge on textiles.*

# RECOMMENDATION –

## INSIGHT

## RECOMMENDATION

3a

**There is now proactive action on textiles across Local/ State and Federal Government, recognising cohesion is important.**

The National Product Stewardship Implementation (NPSI) grants have established priority programs in uniforms, outdoor textiles mattress – each focused on core subsets of textiles.

*Continued focus of data collection, internal procurement, trial projects and business/product evolution will complement local and federal activity.*

# REFERENCES

- 1/2 Ellen MacArthur Foundation, 2017, A New Textiles Economy: Redesigning fashion's future.
- 3 Levi Strauss, 2015, The life-cycle of a jean.
- 4 Based on input from the Mattress Product Stewardship Council (MPSS) and its members. As a sense check, LCA data from the EU which indicates mattresses contain between 1.7 and 9.5kg of fabric/textiles (Simones et al 2013) – also around 23-30% by weight.
- 5 Textile Exchange, Preferred Fibre Material Market Report, 2020.
- 6/11 MRA Consulting Group, 2021, Measuring the Impact of the Charitable and Reuse and Recycling Sector.
- 7 NSW EPA (2008), Guidelines for Conducting Household Kerbside Residual Waste, Recycling and Garden Organics Audits in NSW Local Government Areas, Sydney.
- 8 EPA de-identified raw data from data set collated for the Analysis of NSW Kerbside Red Lid Bin Audit Data Report March 2020.
- 9 Whilst the absolute weight of textiles is largely unchanged region-to-region, it is suggested that the higher percentage of textile waste in rural areas is a result of greater access to FOGO services and lower food waste in residual waste.
- 10 NSW Department of Environment and Climate Change, 2007, Report into the C&D Waste Stream Audit 2000 2005.
- 12 ABS, 2013, Towards the Australian Environmental Economic Accounts.
- 13 Based on auditing data from the Salvation Army (Nowra) - data provided for this project.
- 14 IBIS World, 2020, Fast fashion in Australia.

## APPENDIX A.

- 15 SSROC, 2018, Kerbside Waste Regional Report
- 16 Randwick Council, 2017, Waste Management Strategy
- 17 Ku-ring-gai Council, 2019, Waste Management Strategy
- 18 SSROC, 2014, Regional Clean-up Report

## APPENDIX A.

# DATA AVAILABILITY—

Aggregated data for each region has been used in this report, but it is acknowledged that individual councils in the SMA have reported textiles ('CO2') in households to be much higher; as much as 4.45% (SSROC, 2018) and 6% (City of Sydney, 2017). Additionally, this analysis also incorporates textiles disposed of through kerbside recycling services, which data from SSROC indicates is a contaminant comprising 1.2% of the region's co-mingled recycling waste stream.<sup>15</sup>

Across NSW, local governments provide for household bulky waste by collection services. In these, textiles are typically found as clothes, carpets, mattresses, soft furnishings, and furniture. Across these categories, audit data from Randwick Council<sup>16</sup> Ku-ring-gai Council<sup>17</sup> and the SSROC region<sup>18</sup> indicate that textiles comprise around 11% of total bulky waste collections.

Data from the Reduce Illegal Dumping (RID) online portal was provided to estimate textile occurrence in illegal dumping. This data describes textiles in two categories; 'household items (furniture, clothes, carpet)' and 'mattresses', which were used in this report.

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