

CIRCULAR CLOTHING

Opportunities to increase textile resource recovery rates in South Australia

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Background

The Green Industries SA Women in Circular Economy Leadership Award recognises the contribution of emerging and established women leaders making a positive contribution to South Australia's waste and resource recovery industry and the circular Economy. The aim of the award is to provide an opportunity for a South Australian woman to pursue a research project of a kind that is not readily available in South Australia. In late 2018, I was fortunate to win the award with a project focusing on textile waste, with an emphasis on clothing waste: the Circular Clothing project.

Why textiles?

Textile waste is an environmental issue of global significance. Many clothing manufacturers and retailers have a “fast-fashion” production and marketing model, this term being defined by the Merriam-Webster dictionary as the *design, creation and marketing of clothing that emphasizes making fashion trends quickly and cheaply available to consumers*¹.

According to the [Ellen Macarthur Foundation](#), fast fashion has led to a doubling in global production of clothing between 2000 and 2015. The average number of times a garment is worn has also decreased by 36%.

Worn and unwanted clothing is often of poor quality and difficult to re-sell through second hand clothing merchants, leading to a large influx of used clothing into the waste sector, which currently doesn't have readily available technology to process clothing into new products. Australians are the second highest consumers of textiles globally. Of the 27kg of new clothing and textiles bought per person per year, 85% is disposed of in landfill.

Textile manufacturing is extremely resource intensive. The [UN Environment Programme](#) estimates that the fashion industry is responsible for 20% of global wastewater and 10% of global carbon emissions.

Textile waste occurs throughout the manufacturing and consumption supply chain and it's estimated that a third of garments are never sold due to oversupply. Another third of clothing produced is only ever worn once or twice due to an incorrect fit or personal preference.

Disposing of textiles through council kerbside general waste bins provides negative outcomes both economically and environmentally. A kerbside waste audit undertaken in 2016 found that the average City of Holdfast Bay general waste bin presented weekly contained 0.4kg of textiles, this equates to \$40,768 in landfill disposal fees annually. Textiles are the third most common contaminant in kerbside co-mingled recycling bins leading to processing issues at the Materials Recovery Facility (MRF).

Twelve of the 17 UN Sustainable Development Goals are dependent on natural resource management. Taking action to increase resource recovery therefore assists South Australia and Australia in reaching these goals. Furthermore, textile waste is an environmental issue of global significance.

Project Aims

The Circular Clothing project had three aims:

1. Understanding what proportion of Australian textiles donated to charities are reused and what programs could be implemented to ensure donations do not end up in landfill.
2. Researching engagement programs that motivate individuals to change their textile shopping behaviour and dispose of unwanted or used textiles responsibly.
3. Researching new opportunities for textile reuse and recycling.

The project involved travelling to Coffs Harbour and Sydney (NSW), Brussels (Belgium) and London (UK) to investigate new technologies, policy and program opportunities for both the South Australian and local government. Travel to Hong Kong (China) was planned but due to illness and political tension research into the H&M recycling program was undertaken remotely.

The website www.circular.clothing website was created on which my 10research blogs are published as follows:

Insert title of blog and date published

Project Findings

1. Charities and clothing donation programs

Interviews undertaken with two leading clothing donation charities in South Australia (St Vincent de Paul Society – Vinnies Shop and Salvation Army - Salvos Store) found that there is a common theme with clothing donations across the clothing charity sector. Whilst clothing donation numbers have increased with the rise of fast fashion, there has been an overall decrease in the quality of donated clothing.

As cited in the [‘Long live fashion! What happens to your donated clothes’](#) blog, clothes that cannot be sold in store through Vinnies Shops are on-sold to a second hand clothing distributor in the Middle East. A small proportion of store-grade quality clothing that cannot be sold in Salvos’ stores is also exported. Clothing that cannot be sold in Salvos’ stores is sold to a rag company. Both methods provide the stores with a significantly lower revenue.

Project research found a number of new and innovative donation programs and models that assist in increasing textile diversion rates.

The [SCR Group \(established in Victoria in 20XX\)](#) works with charities such as Save the Children and Australian Red Cross to redistribute clothing that cannot be resold. The Group also offers local governments, schools and private companies opportunities to host either temporary or permanent clothing drop-off hubs.

Of the 72 million kilograms of clothing the Group has collected since 2008, 70% is redistributed to local and international communities in need, 15% is repurposed into rags and 15% is used for biofuels. The Group also offer school education and fundraising opportunities and seek to partner with local government for the roll out the new *Thread Collect* on call clothing donations model. In this model wardrobe clothing baskets with *Thread Collect* instructions for participation are provided to residents. Are any councils participating? What are the barriers to participation? What are the pitfalls of this model?

Behaviour research undertaken through focus groups facilitated by [RESYNTEX](#) in five European countries found that convenience drives disposal decisions and individuals would be less likely to donate their clothing if they had to travel more than seven minutes from their home.

The on call clothing donation model brings clothing disposal to the individual and has been proven to lead to donations of a higher quality that are easier to re-sell. This model is documented in the [‘The clothing TRAIID in London – professionalizing the clothing charity market’](#) blog where [TRAID](#), a charity with a series of stores in England, has seen an increase in quality of donations through booked home collections.

Another at-home clothing collection model involves placing heavy duty bags of donated clothing into co-mingled recycling bins and has had mixed success in northern NSW. The [‘Bins at the Big Banana – Coffs Clothing Collection Trial’](#) blog details an Australian first model in Bellingen Shire, Coffs Harbour City Council and Nambucca Valley Council where households are provided with a heavy duty plastic bag for disposal of clean re-sellable clothing into recycling bins. Bags are removed from the recycling stream at a MRF and distributed to local not-for-profit charities for re-sale. The trial has received overwhelmingly positive support from the community, especially amongst residents who are less mobile. However, the program had challenges with bags splitting at the MRF, a large number of bags being presented outside the bin due to lack of room in the recycling bin and an oversupply of clothing

collected. So is this program continuing as a result of the trial? What is being done to address the issues via a household communications? Or is the program abandoned? Do you have any anecdotal information regarding receptiveness of this method in metro Adelaide (not asking you to do more work here just asking in case you already have info but not included it).

Clothing waste from the retail sector is significant and has been overlooked until recently. According to the Australian Circular Textile Association (ACTA) around 30% of all clothes made around the world are never sold. As detailed in the [‘Donated clothing that’s more than sew sew’](#) blog, [Thread Together](#) works directly with 40 retail partners to collect and distribute unsold clothing to those in need including those experiencing homelessness, youth at risk, Indigenous communities, survivors of domestic violence, refugees or long-term unemployed.

Legislation has also been used successfully overseas to increase textile recovery rates. For example, the French Government Extended Producer Responsibility (EPR) legislation dictates that companies are responsible for providing or managing the recycling of their clothing, home textiles and footwear (CHF) at the end of their usage (see [‘Leading through legislation’](#) blog for more details). Through the scheme, companies that produce and/or sell CHF products can commit to implementing their own internal clothing program accredited by French authorities or pay a contribution to a company called [Eco TLC](#) to provide the service for them. Accreditation of companies began in 2009 and all 4,237 companies participated in the scheme in 2018 elected to pay a contribution to Eco TLC.

Companies with a turnover of less than 750,000 Euros, or that place 5,000 items or less on the market annually, can pay a flat rate per year. Contributions from larger companies are calculated on a rate per item. The more environmentally sustainable an item is, the lower the contribution. Therefore, ‘eco-weightings’ are placed on CHF that meets certain durability criteria (lasts longer) or contains recycled fibres. Of the 624,000 tons of CHF that entered the French market as new products in 2019, 38% was collected for reuse and recycling. A significant proportion of the remaining 62% would still be in use, with some ending up in landfill bins.

Recommendations

Gathering further insight into South Australian behaviours towards clothing disposal would assist Local and State Government develop and implement tailored programs that maximise donation rates of quality worn clothing. The focus group model used by RESYNTEX has recently been expanded to additional European countries and would be a useful, verified tool to use for gathering and comparing data.

Recommendation: undertake research into South Australian clothing disposal behaviours in order to maximise donation rates of quality used clothing.

There are also opportunities for Local and State Government to become actively involved in clothing donation collection models through increasing the number of clothing donation hubs on council land and investigating alternatives such as involvement in at-home collections.

Recommendation: investigate options for councils regarding clothing donation hub programs and at-home collection programs.

Advocating to the Australian Government for the development and implementation of national legislation, similar to the French EPR, would also assist in increasing landfill diversion rates of textiles and provide Australia with a shared holistic approach to managing the issue.

Recommendation: South Australian Government consider options on how it can most effectively advocate to the Australian Government to adopt a national approach towards reducing textile waste and in alignment with South Australia's Waste Strategy

2. Engagement programs

Several new engagement programs were investigated as a part of the Circular Clothing project.

The Vinnies Shops and Salvos' Stores have recently expanded their donation model, in a partnership with the Australian Red Cross, to develop and implement the [Moving the Needle](#) program. The program is based on the pledge model of behaviour change, asking retailers to make a pledge to educate their customers about donating worn and unwanted garments to charities. Customers can also make a pledge to donate used or unwanted clothing. In order to promote this program, Moving the Needle recently held events at shopping centres in Victoria and SA where customers fill up empty racks with donated garments. ANY DATA ON OUTCOMES

In addition, the Salvos Stores have also recently partnered with online retail company, The Iconic, to launch the [Giving Made Easy](#) program. Upon making a purchase, customers are encouraged to download a pre-paid shipping label to donate an item(s) of clothing they no longer want. Packaging in which the new garment comes, can then be reused to send donations to the Salvation Army through Australia Post.

[MANRAGS](#) (an online sock and underwear retail store) has launched a clothing and shoe recycling campaign where individuals can purchase a \$5 compostable Australia Post satchel for up to 20 unwanted socks. Socks that can be reused are cleaned and donated to those in need. Socks that cannot be reused are recycled into new textile products. NAME COMPANY

UK charity, TRAIID, also runs campaigns to encourage people to donate unwanted clothes, such as the [23 percent](#) campaign. The campaign calls on residents to assist in putting the 123 million items of unworn clothes in London (this being 23% of clothes purchased) back into use. As detailed in this [blog](#), people can also undertake the [#secondhandfirst](#) pledge where individuals commit to sourcing a percentage of clothing second hand. Those that take the pledge can use the [#secondhandfirst](#) hashtag on social media to share their pledge journey.

Socialising new behaviours is an important element of the behaviour change process because it promotes the behaviour as a desirable social norm, increases behavioural observability and encourages peer-to-peer commitments. Where these behaviours are undertaken and then shared by social media influencers, these can generate substantial change with the right messenger. Pledge participants are also invited to exclusive in store events with DJ music, priority look at garments for resale and catering. TRAIID run several free education campaigns that fit in with recycling and reusing weeks. Successful upcycling days and repair cafes have been run and have correlated with a 5% increase in local clothing donations.

Importantly, pledges have also been used to encourage individuals to stop purchasing unnecessary new clothes in order to generate less unwanted items at the front end of the clothing life cycle. The [Fashion Detox Challenge](#) encourages people to pledge to not buy any new items of clothing for 10 weeks. Locally, the [Slow Fashion Festival](#) is an Adelaide event that showcases sustainable garments as well as holding mending workshops and a slow clothing exchange. Whilst its focus is the fashion and textile industry, it also aim sto 'instigate a wider conversation about sustainability, to redefine the way we wear, and share our heartfelt belief that this philosophy can be woven holistically into every aspect of our lives'.

H&M, the world's second largest clothing retailer, use an incentive-based approach with its [Recycling and Upcycling](#) program where people who drop off a bag of assorted textiles (from any

brand) receive a 15% off voucher on their next H&M purchase. As detailed in the [‘H&M – exploring the world famous Recycling and Upcycling textile program’](#) blog, clothing collected at H&M stores is passed on to an external partner [I:CO](#) who sort and evaluate the textiles based on almost 350 different criteria. For each kilogram of textiles collected, H&M donate two Euro cents to a chosen charity.

[Citizen Wolf](#) are an Australian, sustainably smart clothing brand in Sydney. As detailed in the [‘Howling for sustainably made clothing – the Citizen Wolf story’](#), it creates durable, custom made-to-fit basic clothing out of sustainable fabrics using a “magic fit” algorithm where height and weight (and bra size for women) are used to determine the perfect garment size and shape. Fabric is laser cut and garments can be altered for free, with free postage, up to 30 days after delivery. Citizen Wolf claims it is committed to the durability of its products and offer a free repair service no matter how old the garment is. The brand prides itself on being ‘zero waste’ with all offcuts being reused. In addition, the company endeavours to install a sustainable shopping culture within its customers, recently running a ‘Black Friday’ campaign where instead of buying more clothes through Black Friday retailer events, customers were encouraged to send in items of clothing to be dyed black and be given another life.

The above mentioned programs have been developed using strategies based on behaviour change psychology. As described in the *Behaviour Change for Nature* report¹, behaviour change is best achieved through providing motivations to change, socialising the change and making the desired change easy. As discovered by the RESYNTEX research (as mentioned on page six), convenience is a particularly prominent driver of textile disposal decisions. Pledges combined with exclusive events personalise the message with behaviourally-informed incentives. Pledges also encourage public and peer-to-peer commitments with a simple message.

Recommendations

There are many opportunities for both Local and State Government to promote the sustainable purchase and disposal of clothing.

Recommendation: Use a community engagement and pledge system, similar to those currently used to encourage residents to place food scraps in their Food Organics Green Organics bin, to encourage the South Australian community to buy second-hand clothing over brand new and donate unwanted clothing.

Recommendation: Local and State Government to increase the awareness and use of new innovative donation programs through both promotional campaigns and financial support.

Supporting multiple and numerous methods for clothing disposal is an imperative factor for reaching the largest number of donors and supporting all demographics with varying mobility and access to transport.

Recommendation: Increase the community's ability to repair damaged clothing through community workshops and additional development and wider access to repair cafes like that at the [Adelaide Sustainability Centre](#).

¹ Rare and The Behavioural Insights Team (2019) Behaviour Change for Nature: A Behavioural Science Toolkit for Practitioners. Arlighton, VA: Rare.

3. New technology

New textile reuse and recycling technology is moving at a rapid pace with many countries vying to be leaders in the field to boost their circular economy credentials.

European Union countries are working together to develop and implement recycling technology to assist with supply chains, boost circular economies and encourage investment in clothing manufacturing into the region, which has in recent decades moved to Asian nations. An example of EU recycling technology advancement is [RESYNTEX](#) - a research project that aims to create a new circular economy concept for the textile and chemical industries.

As documented in the '[RESYNTEX project – innovative research into consumer behaviour and chemical recycling of clothing](#)' blog, a chemical recycling plant with a 10,000 tonne stock input was set up in Slovenia. Innovative chemical and biochemical processes were used to produce the various chemical feedstock (adhesives, ethanol, PET resin and value add chemicals) from textile waste that cannot be reused. The research project found that in some cases, such as with bioethanol, more greenhouse gas emissions are produced through the chemical recycling process compared to creating virgin bioethanol. This demonstrates the importance of selecting the right end products for the best environmental benefit.

[Blocktexas](#) is an Australian company that has developed world leading technology in the recycling of clothing made from cotton and polyester. As detailed in the '[BlockTexas and block chain technology – a true closed loop approach to textile recycling](#)' blog, BlockTexas's chemical recycling process can recycle polyester/cotton blended textiles back into polyester pellets and cellulose slurry or powder.

Blocktexas has set up a pilot plant in Mackay, Queensland which was successful in achieving a 95% recovery rate. For every 10,000 tonnes of textile waste that goes through the plant, 285,000 tonnes of greenhouse gases are offset (compared to the use of virgin materials). The facility can process one tonne of textiles per hour, equating to 10,000 tonnes a year. Block-chain technology can also be incorporated into the process where those supplying the textiles can be given a report validating that the textiles have been processed, the kilogram output of the polyester and cellulose, and the details about who purchased the recovered material.

BlockTexas are seeking investor locations across Australia to set up a permanent recycling plant. A new factory is estimated to inject up to \$47 million into a regional community's economy and provide 30 direct and 30 indirect jobs.

There has also been local advancement into the repurposing of textiles. Professor Veena Sahajwalla, a world renowned leader in recycling technology innovation and Professor of Materials Science at the [University of NSW](#), has developed technology where textile and glass waste is compressed together to create panels that can be used for flooring, walls and furniture. As detailed in the '[Reforming textiles into high end furnishings](#)' blog, the same technology can be used to create panels out of used coffee cups and coffee grounds.

Many designers have commended the high-end unique look of the final product, which has been included in a housing display apartment in Sydney. Panels have been tested for fire and water resistance with positive results. The University of NSW intends to sell modules of the innovative technology to interested furniture manufacturers. Furniture manufacturers can then set up micro-factories to create the unique pieces and boost the circular economy (each factory supports three to five new jobs).

Recommendations

Recommendation: Invest in local textile recycling and new reuse and reclamation technologies through the provision of grant funding to assist and strengthen South Australia's commitment to moving towards a circular economy in the clothing and textile industry.

Conclusion

There have been radical technological advancements and innovative programs implemented in the past 18 months to assist in the resource recovery of textiles. This has, in part, been driven by a large proportion of global consumers becoming more aware of the environmental damage caused from fast fashion that has resulted in an expectation on manufacturers and retailers to commit to more sustainable practices and take responsibility for the collection of used clothing. Manufacturers and retailers are responding to this consumer pressure with various initiatives which range from systemic production changes to customer-facing promotional and behavioural change initiatives.

In summary, this research project has identified opportunities to increase resource recovery of textiles in the areas of education and behaviour change programs, new legislation and financial investments and incentives.

Behaviour Change

There are several areas where behaviour change activities can impact the behaviour of clothing and textile consumers through the development, support and implementation of programs, campaigns, activities and events that:

- increase the community's awareness of the environmental impact of fast fashion
- encourage the community to reduce the amount of new clothes purchased
- encourage the community to
 - prioritise second-hand clothing over new product purchases
 - if needing to buy new clothes/textiles, then to buy durable items made with sustainable fabrics and methods
- encourage the community to repair damaged garments where possible and donate used and unwanted clothing

All behaviour change programs should use proven methodologies to motivate the changes, socialise the changes and make the changes easy.

New Legislation

Legislation can be a powerful tool if well-thought out. There are two legislative opportunities identified in this project:

- Develop procurement legislation that supports recycled content buy back ([such as the recent MOU signed by nine South Australian councils](#))
- Develop legislation whereby companies are legally responsible for providing or managing the recycling of their textile products at the end of their usage.

Financial Investment and Incentives

Funding to assist in building local micro-factories, such as those mentioned, will create new jobs and industry in an economy that will need to recover quickly from the global COVID-19 pandemic. Investment in new technology will signal to other governments that South Australia is committed to remaining a national leader in sustainable waste management.

- Provide start up and business investment grants to support new circular industry technology that aims to increase recovery rates of textiles
- Provide subsidies for the purchase of goods with recycled textile content

In conclusion, there is no one size fits all solution to textile waste but a need for all levels of government and the textile supply chain (fabric suppliers, manufacturers, retailers, consumers, new technology companies and clothing donation organisations) to work together to provide a holistic approach to managing the issue.

Organisations and programs

This is a list of organisations and programs referenced in this report. It has been developed with the assistance of Dr Marcia Kreinhold, Green Industries SA.

International – policy

Ellen Macarthur Foundation

<https://www.ellenmacarthurfoundation.org>

UN Environment Programme

<https://www.unenvironment.org>

UN Sustainable Development Goals

<https://sustainabledevelopment.un.org/?menu=1300>

International – research, campaigns

TRAID

<https://www.traid.org.uk>

A charity working to stop clothes from being thrown away. It turns clothes waste into funds and resources to reduce the environmental and social impacts of our clothes.

23 percent campaign (TRAID)

<https://www.traid.org.uk/23percent/>

Drop –off options including home collection for unwanted clothing/textiles.

RESYNTEX

<http://resyntex.eu>

A research project which aims to create a new circular economy concept for the textile and chemical industries. Using industrial symbiosis, it aims to produce secondary raw materials from unwearable textile waste.

Australia – industry/technology/research

Australian Circular Textile Association

<https://www.linkedin.com/company/acta-global/about/>

Australasia's first collaborative industry body formed to realise full resource efficiency for textiles within Australia. ACTA was formed as a call to arms for fashion, charity and repurposing sectors to work together to build practical solutions to improve resource efficiency for textiles.

Blocktexx

<https://www.blocktexx.com>

BlockTexx recovers polyester and cellulose from textiles and clothing using proprietary technology that separates polyester and cotton materials such as clothes, sheets and towels of any colour or condition back into their high value raw materials of PET and Cellulose for reuse as new products for all industries.

University of Technology

<https://newsroom.unsw.edu.au/news/science-tech/your-old-unwanted-clothes-can-be-turned-building-materials>

Used and unwanted clothes could be converted into building materials instead of winding up in landfill. This is using a technique whereby last season's must-haves are shredded and turned into solid panels for floors or walls.

Retailers

Citizen Wolf (Australia)

<https://www.citizenwolf.com>

Ethically made to measure T-shirts from Sydney.

Manrags (Australia)

<https://manrags.com.au>

Clothing collection service for socks and underwear to avoid used clothing being sent to landfill through reuse or recycling.

H&M (Australia/international)

<https://www.hm.com/au/>

Collection program for clothing or textiles to enable rewear, reuse or recycling.

Australia – charities and collection/behavior change programs

Fashion Detox Challenge

<https://fashiondetoxchallenge.com>

10 weeks without buying any clothes

Thread Together

<https://www.threadtogether.org>

To deliver new, good quality clothing and shoes to people in the community who are doing it tough.

Moving the Needle

(Vinnies Shop, Salvos stores, Australian Red Cross and others)

<https://movingtheneedle.com.au>

Brands and customers sign a pledge to reduce the amount of textiles sent to landfill through donations.

SCRgroup

<http://scrg.com.au>

SCRgroup recovers Australia's unwanted clothing working with local government, national and local shopping centres, schools, private organisations, charities and retailers.

The Iconic – Giving made Easy

<https://www.theiconic.com.au/giving-made-easy/>

Partnering with Salvos Stores and Australia Post to help address clothing waste. By providing a pre-paid postage label people can donate pre-loved clothes at any time.

Local Government

City of Holdfast Bay

<https://www.holdfast.sa.gov.au>

Coffs Harbour City Council