

CLOSING THE LOOP

By Brett Mathews

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Closing the Loop: Circle economy work

Holland has established itself as a global leader in circular economy developments and thinking. As part of the *Closing the Loop* report, we asked Gwen Cunningham and H elene Smits of Dutch-based circular economy co-operative, Circle Economy, to contribute an opinion piece tackling some common misconceptions around circular textiles, looking at what is needed to close the loop, and ask what 'going circular' will ultimately mean for apparel brands and retailers.



visionary brands and retailers, forward thinking textile collection companies and supply chain partners to support innovative material recovery technologies in transforming the market.

The moment of now is as turbulent as it has ever been. Nobody wants to be left behind, but the mission to 'close the loop' for textiles reaches beyond the technology and cannot be tackled by one organisation alone.

The mission to close the loop is, however, by no means a 'mission impossible'. Can you imagine the 'ifs' and 'buts' that were raised when the goal to land a man on the moon was first set? This uncertainty did not hold mankind back.

Just like the space race, we believe it is not a question of whether it will happen, but when it will happen and who will make the revolutionary breakthrough.

Getting there will require strong commitment and serious investments in the journey. It will take

'Similar to the excitement of the space race over 60 years ago, fashion & textile brands are now anxiously looking left and right at the competition to see 'who's doing what' in the recycling technology rat race.'

**Prof. Rebecca Earley,
University of the Arts London**

However, having recycling technologies in place will not magically close the loop. New technologies need to be part of wider market developments that includes circular business models, other enabling innovations in materials and technology, and regulations and policy frameworks that incentivise the transition toward this new way of doing business. Without this supporting ecosystem, material recovery technologies will not reach scale.

Circular economy defined

So what exactly does 'circular' mean for the fashion and textiles industry? The essence of the concept of 'closed loop' or 'circular economy' is quite simple and elegant: 'an industrial system that is restorative by design and in which materials are kept to circulate infinitely and in high quality'. We have translated this into a more specific definition for a circular textiles industry.

"A circular textiles industry is based on a system where textiles products, fabrics and fibres are infinitely and effectively cycled through connected loops within and across industries in a transparent and economical way, where producers apply business practises that enable circular use of textile resources and promote social justice, and consumers have a healthy relationship with textiles, based on sustainable consumer practises."

However, this definition is not specific enough to provide the needed guidance to take proper action, and it is in the application of the concept that misinterpretations arise of what is and isn't



circular. Therefore, a crucial part of the mission as we move forward is to create and maintain a common understanding of what these concepts, models and processes actually mean. We need to learn to speak the same language and quite often, the best way to clearly define something, is to precisely outline what it is not.

So let us start with the following, very important statement: Circular is not the same as recycling, it is much more.

Circular or closed loop?

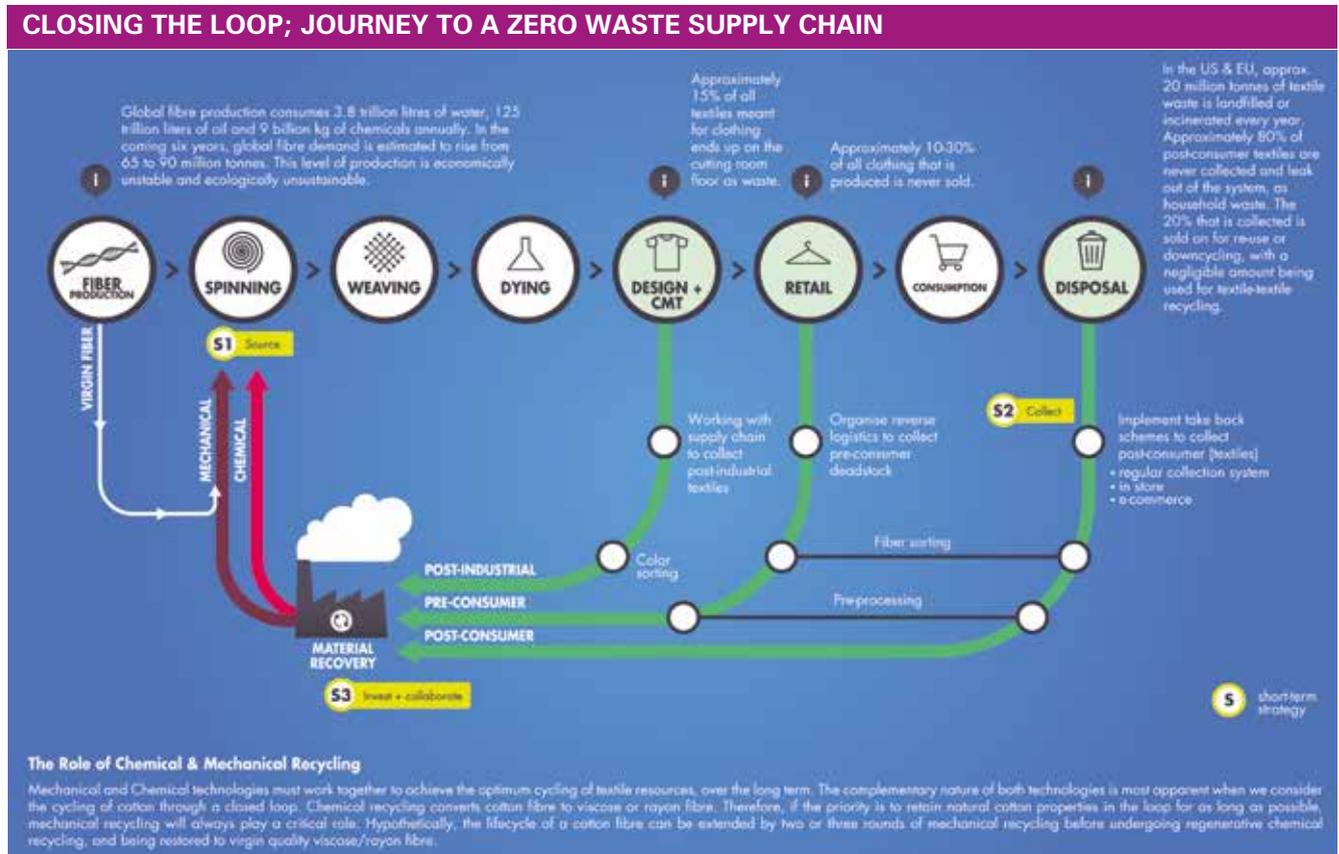
Circular is a new approach that encompasses the whole value chain of the industry – changing the way textile products are designed, produced, shipped, bought, used and recycled. For individual businesses, these approaches come in the shape of circular business models.

Circular business models include products and business processes designed to enable the retention of material quality and value at end of use to ensure ‘endless’ cycling of resources through a circular system. In order to ensure fully closed loops, the business model needs to

address the inherent recyclability of materials, design of the product (enabling disassembly of components to separate into ‘pure’ material streams), the infrastructure for product take-back and collection and process infrastructure for recovery of materials and product manufacturing.

It is important to bear in mind that the business model for closed loop may still be a ‘traditional’ product sales model, so long as the above-mentioned aspects are addressed and longer use, return, re-use and recycling is ensured or stimulated.

To close the loop, a variety of recycling technologies will have a part to play, but the ‘lead’ will be taken by technologies that can recover or regenerate fibres to virgin quality (full circular chemical recycling technologies). Today, mechanical methods are already playing a crucial role in paving the road to circular, offering ‘textile to textile’ solutions that proximate virgin quality and that are ready for further scaling. However, the race towards full circular continues while new chemical solutions continue to develop and prepare for commercialisation.



Now we are clear on definitions and technological factors, we may well ask: well why isn't it happening already? The real revolution for making future textiles from existing textiles, thus reducing the need for virgin resource use in production, will be the material recovery technologies which are currently under development. A truly circular textiles industry will not happen until these technologies are fully developed, industrialised, and replicated globally. The 'winning' technologies will not only have to be 'robust' and provide high quality fibres as output, they will also need to work in a sustainable way and be able to produce recovered fibres in a cost effective way to compete with virgin resources. Also key is that recycling systems effectively deal with blended fibre compositions, given the high proportion of blends currently produced and found in the textile recycling supply chain.

Right now, our ability to truly 'go circular' is limited by a technological bottleneck. However, promising new technologies are on the cusp of commercialisation and promise to revolutionise the industry in the near future. That doesn't mean we should just sit back and wait for the technology. If we do that, we will ultimately be faced with a completely different bottleneck: a circular technology in a linear system. We need to push to accelerate the necessary industry, consumer and governmental action and allow for a swift tipping point to circular once new (chemical) technologies are ready and existing (mechanical) technologies are up-scaled.

So what does this new circular system look like? What market factors are essential to enable technologies to be a success and enable us to 'go circular'? It means that the approximately 80 per cent of end of use textiles that currently end up in household waste and 'leak' out of the system via landfill or incineration, are actually collected for re-use and material recovery.

It means textile collectors and sorters need to adopt new processes and material sorting technologies (e.g. Fibersort technology) to be able to supply existing (mechanical) and upcoming (chemical) material recovery technologies with high volumes of high quality feedstock for their process. For governments it means a coordinated approach to introduce positive legislative drivers such as waste prevention targets and incentives for circular material recovery routes (e.g. introducing Extended Producer Responsibility schemes similar to EcoTLC in France, improving conditions for textile collection and sorting at municipal level, and developing consumer awareness programmes).

It means brands and retailers need to revisit their business models to include circular strategies, engage in 'closed loop' partnerships with collectors, sorters and recyclers, and integrate approaches like true costing or natural capital valuation, like Kering's Environmental P&L, to allow for a more holistic assessment of value. More importantly, it means an overall mindset



Myth: Chemical recycling is dirty
'Chemical recycling uses toxic chemicals and is therefore environmentally damaging!'

Chemical recycling technologies differ greatly depending on the fibre that is recycled. However the main principle is that fibres are broken down into their basic chemical components (monomers, cellulose), impurities are removed, and components are subsequently built up to form virgin quality, regenerated fibres. While the exact footprint of the varying emergent technologies remains largely unknown by the general public due to their stage in development, this is not cause for alarm and should not deter investment or support. There is widespread assurance and confidence that the second generation chemical processes have a low environmental impact and are non-toxic, with chemicals often cycled in a closed-loop. Additionally, the use of bio-chemical and ionic processes holds great promise for further control of environmental impacts.

Myth: Mechanical recycling is ugly
'Mechanical recycling causes significant fibre degradation, resulting in poor quality textiles that will never meet virgin quality'

While it is true that mechanical processes cause some degradation to the staple fibre, this degradation can be controlled and minimised with the correct opening and spinning technologies. Additionally, recycled fibres can be strengthened with other recycled or virgin fibres to create an output yarn or fabric that is comparable with 100 per cent virgin in both quality and cost. Successful examples can be seen all around us (Recover, H&M, Pure Waste) and great strides are being made in pushing recycled percentage in new materials.

Myth: Recyclable/recycled = circular
"If my clothes are recyclable or made from recycled fibre, then they are circular"

'Made from recycled materials' doesn't mean that a) it is actually recyclable itself OR b) it will ever be recycled. Similarly, 'recyclable does not mean that it will be recycled. No matter how much care is put into the design, after a garment 'made from recycled fibres' or 'made for recycling' has reached end of use, to expect it to get back to a producer with the recycling capabilities needed to actually turn it back into usable fibres is unrealistic. Approximately 80 per cent of post-consumer textiles are never even collected and from the 20 per cent that is collected most is sold on for re-use or downcycling.

“Material sorting technologies that are able to provide high volumes of suitable feedstock for our process are absolutely essential to enable rapid industrialisation of our technology on a global level. We need to secure our ‘supply’ for the future and for this reason we are already involved in development of a promising new material sorting technology, the Fibersort.”

Cyndi Rhoades, CEO, Worn Again

shift for all stakeholders involved to view ‘used’ or excess textiles not as waste but as valuable resources for the future.

Economics

Closing the loop is increasingly seen as the ‘new sustainability’; it has surpassed trend status and offers huge potential for multiple value creation. What we must understand is that circular models are not only about environmental efficiency, but economic efficiency.

Not investing in a circular resource industry now will mean making your company particularly vulnerable to a sourcing crisis in the not too distant future, when virgin prices flare due to inevitable resource scarcity. Consistent and scaled supply is more feasible to maintain with closed loop systems, as this kind of resource efficiency will keep raw material costs relatively low and stable, with the additional benefit of cutting energy and transportation costs significantly.

More immediately, sustainability overhauls can promise increased profitability. A recent report by the University of Oxford & Arabesque partners (*How Sustainability Can Drive Financial Outperformance*, 2014) confirms the positive link between sustainability and financial performance, and recommends that sustainability should be on the agenda of senior executives and investment professionals alike. Leading companies including Unilever, Body Shop, Patagonia, Ecover and Interface are living examples of how companies in

practise have successfully captured value and created competitive advantage through new models based on resource efficiency, sustainable inputs and (re)cycling resources.

Interface, the world’s largest manufacturer of carpet tiles, is a great example of the compelling business case behind circularity. Since the adoption of its zero-impact goals in 1995, based on the bold vision of founder Ray Anderson, the firm’s use of fossil fuels and water, its greenhouse emissions and waste generation has fallen dramatically. In 2012, a switch to 43 per cent bio-based/recycled yarn allowed it to partially decouple its supply chain from virgin fossil fuels, which resulted in reduced GHG emissions of 10,300 tCO₂e and annual cost savings of Euro 1.1m. In the meantime, sales have increased by two thirds and profits doubled. The US\$400 million the company saved in costs avoided through the pursuit of ‘zero waste’ has paid the costs of transforming its practices and facilities.

Next steps?

Assuming these truths are inevitable and there is no other way than to ‘go circular’, what are the next steps? How does the industry get behind circular recycling technology? Here we have outlined a number of ways in which we believe the apparel industry could transition towards more circular ways of working.

Short-term Be demanding (Strategy 1)

Already there are mechanically recycled cotton, wool and polyester fabrics on the market that can be more price competitive when scaled and which meet a high quality. Hilaturas Ferre, maker of

“Resources are becoming more scarce and we’re running out of land for growing food. Agricultural land can’t be used for fibres when it’s needed for food. Keeping textiles and fibres endlessly circulating makes good business sense.”

**Dr Kate Goldsworthy,
University of the Arts London**

“Transitioning towards a circular textile industry requires innovation, risk-taking and collaboration in a highly traditional industry. Not impossible but challenging!”

**Dr Kate Goldsworthy,
University of the Arts London**

Recover recycled cotton yarns, is a 100 year old family owned business that has been recycling cotton textile waste for almost 70 years. Four generations of R&D has led to some impressive technical advantages that make Recover yarns quality comparable to virgin, at a competitive price and with a fraction of the environmental impact. In the short term, brands need to represent the demand for these fabrics and actively encourage a sourcing culture and buying standard that supports recycled content – slowly weaning off virgin while the industry shifts from a linear to a circular model. The more we demand for recycled material, the more widely available and affordable these fabrics will become.

Bring it right back (Strategy 2)

What you add in demand you can match in supply. A circular textiles industry is dependent on used resources being fed back into the system. Closing the loop therefore means that brands take the responsibility to act in mass balance, collecting and recycling as much as they produce, therefore keeping textile resources in circulation. While the growing movement toward organic cotton and other sustainable materials is exciting and warranted, we should not only be concerned with where fabric comes from and how it is made, but also where it goes and how we can get it back. This model is a type of voluntary Extended Producer’s Responsibility, whereby the transaction between brand and consumer doesn’t end at the point of sale. What this looks like is yet to be revealed – whether it’s a communications campaign (H&M), relationship with a recognised collection partner (Oxfam & M&S) or via an inbuilt business model (MUD Jeans). It will be interesting to see how this activity moves from a marketing initiative or CSR project towards an essential business strategy

once resource scarcity is truly felt at the core. Once this reality hits, collected textiles ‘waste’ streams (post-industrial, pre-consumer and post-consumer) will represent a source of raw materials to fuel production and bring a competitive sourcing advantage.

Collaboration is key (Strategy 3)

Resource security for the future is already a crucial challenge for all brands, retailers and producers. It is the assumption of most brands, many tiers away from raw fibre and material production, that ‘the supply chain is responsible for and should invest in sustainable innovation’ and that ‘brands have no part to play in this risky business and can come on-board later.’ This is simply not the case. We cannot expect the supply chain to be the only investors – closing the loop is about industry systems change and resource security for all, not a new technical fabric. Given the benefits that potential innovation in recycling technologies could bring for brands, it seems reasonable that these stakeholders would be the leading supporters of the process optimisation, and scaling required to commercialise these technologies.

So which technologies should brands and producers invest in? As mentioned previously, as many of the emerging technologies are at a crucial and sensitive stage of development, they are understandably careful when disclosing information. Speculating the ins and outs from the outside is a futile exercise at this stage; while emerging recyclers may not be sharing much detail, there is ample opportunity for would-be investors to sign NDAs, conduct due diligence, invest and potentially secure commercial benefits as an advantage over the rest.

Long-term

In the long term, companies will need to get behind a circular resource model, when technologies have enabled it, by providing continued market demand and commitment to buy circular raw materials. This is key. But what does this actually mean? How will it be possible to ensure companies commit to increase circular sourcing year in and year out when external factors like rapidly falling oil prices make virgin polyester cheaper than recycled polyester? Going



“There is commonly held misconception that a closed-loop textile industry is a distant dream. A goal to be planned for perpetually, inched ever closer to, but nearly impossible to reach in our lifetimes. The fact is that existing mechanical and new chemical recycling technologies are ready to be put to work immediately. With the support of global brands and retailers who have the most to gain, these technologies will rapidly become super-efficient profit generators creating a new foundation of long term stability for the entire textile and fashion sector. And let us not forget the most important part, our habitat and natural resources will be preserved for future generations in the process for a true win-win situation.”

Isaac Nichelson, chief sustainability and marketing officer, RECOVER

back to sourcing more virgin produced raw materials, simply because the market price has dropped over a quarter, shouldn't be an option. The point of circular supply is stability, not competing with virgin resources as they rise and fall due to market factors. The point is for recycled resources to significantly reduce the need for virgin resources, if not replace them entirely, for reasons much more important than short term profit motives.

Will it require a focused circular sourcing initiative, similar to what BCI is for cotton? Or an annual reporting model, built into a company's P&L, with natural capital reporting incorporated? Whatever strategies and measures are used, at some stage, industry leaders will be forced to make a very clear commitment. Unless there is industry wide buy-in to support this transition to a global and scaled textile recycling system, the metaphorical moon landing we all need will be an aborted mission.

Price points for circular resources will not only depend on the cost effectiveness of the technology but also on the cost of feedstock (end of use textiles). Of course, as demand for low value textiles increases, this will have an effect on market value. However, recycling technology companies like Worn Again indicate that currently there are enough end of use textiles already in circulation to satisfy the annual consumption of polyester and cellulosic fibres. This indicates that, when industrialised circular recycling technologies are able to secure long term, stable supply contracts with textile collectors and keep production costs stable, the goal of long-term price stability and competitiveness when compared with virgin resources is likely to be achieved over time.

We should also not avoid a more fundamental assessment of the meaning of 'price' or 'cost'. In circular economics, sustainability and social cost and value should ideally be an integral part of the metrics. When we start incorporating true costs into the price of a fibre (putting a monetary value on the impacts of CO₂ emissions, natural resource depletion, deteriorating human health, etc.), the metrics will most likely tip the balance in favour of circular resources.

The closed loop race can also be accelerated through the introduction of new business models that are circular, make business sense and are attractive from a consumer perspective. Conventional approaches driven by compliance and risk mitigation have shown limited results and it is expected that the sustainability agenda of industry will be shaped by innovative approaches driven by increased competitive advantage and market share growth within the coming 5 years. This offers a great window of opportunity for companies to make the shift from optimisation strategies (eco-efficiency) to future-proof circular business models (eco-innovation). New circular business models and consumer practices offer huge potential to not only be more sustainable, but to also explore more connected, creative and empowering ways of designing, producing, marketing and selling. Many of the innovative new circular concepts out there today come from start-ups that do not have a status quo to

overcome and can leverage the market positioning as a new sustainable brand towards consumers. However, we also need established brands to join the movement to shift these innovative concepts from niche market segments to the mainstream.

Conclusion

There is still a long road ahead but we believe we are farther along than some people might think. The concept and vision are there, the technologies are ready for optimisation and scaling, and a growing sense of urgency amongst consumers, industry, entrepreneurs and government is fuelling the movement towards a circular textiles Industry.

However, ultimately, going circular will be more than a technology solution and sourcing issue. 'Going circular' will be a state of mind; a new understanding of production and consumption from an economic perspective, where design for cyclability means to not only think about the theoretical recyclability of a material and product at end of life, but also to play an active role in making sure it happens in practise. Therefore, we also encourage brands and retailers to look beyond the technologies to the bigger system and participate in pilot projects and industry collaborations. Closing the loop requires 'coopetition'; not only pioneering or risky efforts that pay off in increased competitiveness for the 'winning team' but also collaborative efforts to create the ecosystem that enables the circular textile revolution that will benefit us all.

Helene and Gwen would like to thank the following contributors to this editorial:

- Cyndi Rhoades - CEO, Worn Again
- Isaac Nichelson - chief sustainability and marketing officer, RECOVER®
- Kate Goldsworthy - senior research fellow, University of the Arts London

About Circle Economy and the Circular Textiles Program

Circle Economy is looking for brands and retailers who want to be at the forefront of change by joining its Circular Textiles Program. Circle Economy's strategic partners in the

Textiles Program benefit from a broad network of organisations working towards shared objectives, circular business opportunities and alliances to jointly accelerate the transition towards a circular economy.

Contact Circle Economy's membership manager Vera Moll vera@circle-economy.com to learn more about how your organisation can become a partner of the Circular Textiles Program.

Started in 2011 as a cooperative, Circle Economy's goal is to create a planet where global prosperity is achieved in a sustainable manner, creating more jobs and strengthening ecological systems in a way that is financially and socially responsible.

Circle Economy accelerates the practical implementation of the circular economy. It does so by working on projects that are both practical and scalable, by sharing insights, connecting parties involved in circular economy around the globe, raising awareness and hosting events to share experiences and solutions.

The Circular Textiles Program (CTP) is a sector specific initiative within Circle Economy. Since its launch in 2014, the focus of the programme has been to accelerate the system innovation (e.g. circular business modelling, regulatory incentives, design and marketing strategies, consumer engagement, market development) needed to allow technological innovation in textile material recovery reach its full impact.

Its mission is to 'close the loop' for textiles and create a system whereby products, fabrics, and fibres are infinitely and effectively cycled through connected loops within and across industries in a transparent and economical way. Such a system will enable it to capture the inherent value of textiles, while eliminating waste downstream and displacing the virgin industry upstream. Circle Economy envisions a textiles industry where producers apply business practises that enable circular use of textile resources and promote social justice, and consumers have a healthy relationship with textiles, based on sustainable consumer practises. ○



Collection and Sorting

A transition to a circular economy in textiles will require an increase in textile collection rates and investment in better sorting technology. **Hélène Smits** and **Gwen Cunningham** of Circle Economy look at the key issues involved.

If the global textile industry is going to move towards more circular ways of working, many people believe it is vital to improve collection rates in order to provide the feedstock for this potential new business model. Would you agree with this?

Overall, textile collection rates are around 20 per cent globally. In some EU countries this figure is higher but never exceeds 40 per cent in general. General opinion is that collection rates are important, but currently we don't know what to do with all the textiles which are collected. The re-use market is stagnating and low grade textile recycling provides a 'bleeder' for industry.

Before increasing collection rates, it is perhaps important to create business models and infrastructure that support the highest value reuse and recycling of textiles.

It is also worth noting evidence from the second hand clothing market in West Africa where re-use is not necessarily having a positive effect, with local textile markets being swamped by cheap second hand textile imports. A group of West African countries have been considering a ban on second hand clothing imports, and this could have huge ramifications for the used textile market.

How do different countries differ with regards to collection?

As mentioned above, rates vary. If you look at the numbers, the Netherlands and UK have high rates of collection. The UK, in the form of WRAP, has seen a major marketing drive urging people to place a higher value on their used clothing items and this has helped to improve collection rates. Regulations in other countries are placing the emphasis on not only collecting more used textiles, but in finding the right end of life

solutions. For example, in Finland textile waste cannot be landfilled after 2016 (when a ban on landfilling any waste with more than 10 per cent organic substances will be introduced).

Could the collection and sorting industry as a whole learn any lessons from individual countries?

Definitely there would be something to say for gathering best practises here but it must be appreciated that every country context is different and these factors affect the business case for textile collection and recycling. Costs of labour, transport distances, processes, regulation and even the quality of clothing need to be considered and are unique to individual countries. What might make economic sense in one country from a collection and sorting standpoint might not necessarily be economically viable somewhere else.

What we could say is that France is leading the way in this area. Here, Extended Producer Responsibility legislation has been introduced as part of France's commitment to comply with the European environmental standards regarding sustainable waste management. EPR applies to clothing, household linen and footwear (TLC in French) producers, distributors or importers.

This means companies in these areas are now considered responsible by law for providing or managing the recycling of their products at the end of their usage. They can either organise their own recycling programme that must be approved by the French Public Authorities, or contribute to an organisation accredited by law to provide for them.

One could put quite a compelling case for extending EPR legislation beyond France.

How can we improve collection rates generally?

The short answer to this is by making it as easy as possible for consumers to hand in used clothing by, for instance, providing more collection point methods, whether through local authorities or via organisations such as I:CO.

Individual apparel brands are already looking at variations of that take-back model. One encouraging example is replacing 'bins' (which may still encourage the idea that old clothes are 'waste') with a personal exchange which is over the counter.

We would also suggest more transparency and information is required from organisations such as I:CO in terms of telling the public exactly what happens to the clothing that is collected.

Collection initiatives and take-back schemes often use 'closing the loop' as part of their marketing material, but if the clothing collected is simply being down-cycled into a second life before ultimately being incinerated, then this can send a false message to consumers.

Closely intertwined with textile collection is sorting. Sorting is a key step before textile recycling but this is an area we don't hear much about. Why is this?

Textile sorting might not sound very exciting, and usually the focus in the industry is very much on recycling. However, we believe textile sorting is actually quite essential to enable the high value recycling of post-consumer textiles.

In fact, many of the recyclers we talk to confirm that for them to be able to produce high quality recycled yarns, they need to have optimal control of input, meaning they need to know the fibre composition of the materials that they recycle. Material sorting is therefore essential to identify appropriate feedstock from post-consumer source for high quality and yield of recycling.

In addition, material sorting is a key enabler for capturing the value of post-consumer textile resources and for improving the business model of collectors and sorting companies.

Post-consumer, non-rewearable textiles are a 'bleeder' in the industry. Costs for collection and sorting are high and revenues very low or even negative due to limited and low value recycling possibilities.

The fast fashion trends associated with low quality clothing and the setting of collection targets at a higher level is already drawing in higher quantities of lower quality used clothing and other textiles and increasing the cost of collection and sorting further.

So better sorting is important in order to make the overall business model viable?

That's right. Higher value recycling options become available due to material sorting and therefore can improve the revenue coming in for recyclable grades.

Currently the best way to know which material post-consumer textiles are made from is by looking at the label.

This is not only very time consuming, it is also not always possible since labels are cut out, and labels do not always tell the truth. In some cases you can make an educated guess based on how a material feels, but that is not very exact and even people with experience in the industry can make mistakes here.

This means that for the majority of post-consumer textiles, there is not yet a good way to identify the material composition.

Is there a solution to this issue?

The only solution we are aware of at present is Fibresort. Basically, Fibresort is a machine that is able to detect – through optimal detection technology – the fibre composition of garments that are fed into the system. We are aware that there are more groups looking into automated sorting but most are in very early (concept) stages. We are not aware of any other technologies being used though.

How revolutionary is Fibresort?

The basic technology is used in multiple sectors for different applications. In the carpet industry



for example, it is used to scan carpet tiles and can confirm which material it is. However, this is very basic: the difference between Nylon 6 or Nylon 6,6 for example.

If we can make this technology work for post-consumer textiles, however, we believe it could really be a game changing technology since it would allow us to material sort large quantities of low grade textiles with high accuracy so that they can be fed into the high value recycling or upcycling industry. Instead, as is presently the case, of being down-cycled, incinerated and landfilled. The key requirements for commercial application are accuracy and speed.

What is the current situation with Fibresort?

At Circle Economy we are currently looking at how to commercialise the use of the Fibresort machine for textiles as part of a project which involves textile sorter Wieland Textiles, engineering firm Valvan Baling Systems, clothing collection company Reshare, Worn Again, Faritex and Metrohm, which is responsible for developing the optimal detection technology.

What does the project involve?

The textile sorting project exists of three main tracks. These include optimising the sorting process (machine sorting based on optimal detection technology) in order to make it fit for commercial use; creating insight into the volumes and fibre composition of post-consumer textiles in order to assess the exact nature of available feedstock; and creating a market demand and improving the business case for high-value recycling of postconsumer textiles.

If successfully commercialised, could Fibresort change the textile recycling landscape?

We are currently mainly seeing the down-cycling

of post-consumer textiles, because high value recycling requires that you know exactly what the feedstock is – output is only as good as the input. Efficient fibre sorting technology is key to unlocking the value of post-consumer.

Especially as we move towards chemical recycling, technology such as Fibresort which can process large volumes accurately becomes increasingly important.

However, the business case is a problem at the moment because virgin resources are very cheap while the collection/ recycling process is relatively expensive. Costs can be reduced by scaling up, however, the costs of collection and pre-processing are still relatively high.

Positive legislative drivers, such as tax incentives for producers using circular or recycled fabrics or government subsidies for collection and sorting processes, could help to overcome this barrier and bridge this transitional phase.

Are there any results from the Fibresort project yet?

No technological results can be shared at this stage of development.

We can however, share some research results into the composition of post-consumer textiles (PCT) from a label sort batch test that was conducted on recyclable PCT bales from the UK, the Netherlands and Germany. From this research we found that:

- Approximately 2/3 of recyclable post-consumer textiles are pure materials;
- Of these pure materials cotton is by far the largest fraction;
- The most common blended materials are a mix of cotton and polyester fibres. ○

Notes

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