

## **Realising a Circular Economy for Textiles**

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UK consumers spent £44 billion on new clothing in 2012, buying some 2.5 billion items. The global CO<sub>2</sub> impact of this consumption equates to approximately 38 million tonnes CO<sub>2</sub>e, with the UK component of the figure representing 2% of the country's overall impact. Annual water consumption associated with clothing equates to 6,300 million cubic metres. Over 75% of the CO<sub>2</sub>e total and 90% of the water footprint results during the production phase, predominantly during the fibre, yarn and fabric processing stages.

Over the same period the UK disposed of around 1.8 million tonnes of textiles, of which 350,000 tonnes was landfilled, representing a significant loss of resource and embodying the linear business model, make – sell – dispose that typifies current practices.

The potential benefits from re-introducing end-of-life textiles back into the value chain, to be reused in the next generation of new clothing – a circular business model - thereby reducing environmental impact and mitigating against raw material shortages, whether caused by increasing global demand or poor crops yields, will comprise the first section of this paper.

To migrate to a circular economy model, the textiles sector requires not just new business thinking, but new enabling technologies, new supply chain management, new partnerships and a new collaborative relationship with the consumer.

The author has been involved in a three year UK Technology Strategy Board collaborative research project *SUSCORP* developing a novel patent-pending process to enable 'on-demand' textile separation and subsequent disassembly at end-of-life. The process, branded now as wear2, incorporates a unique yarn which when processed in a microwave field loses most of its tensile strength, enabling garment seams to be pulled apart with minimal force and no damage to the surrounding fabric. Buttons, zips, pockets and jacket linings can all be completely separated from the body of the garment, removing material contamination and providing pure material streams of a quality suitable for reuse back into fabric and the next generation of garments. An overview presenting the results from the *SUSCORP* project will be the second section of the paper.

As part of their on-going commercialisation activities involving desktop research and discussions with forward thinking global clothing brands, the wear2 team have developed a practitioners understanding of some of the other emerging technologies, business drivers and operational barriers associated with implementing closed loop apparel. Additionally, by the time of the Sustainable Innovation conference it is anticipated that an extended wear2 supply chain project will be underway. This 'how to' knowledge and a vision of a plausible commercial circular business model for clothing will comprise the third and final section of the paper.