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International  
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Organisation

# Recycling & Wool

## Well-Suited for Recycling

As a natural fibre, wool offers many opportunities to keep its product in circulation for a relatively long period of time, thereby reducing the product's environmental footprint.

Research by Textile Materials and Technology at Leeds University has shown that wool is extremely well suited for recycling. The 'cradle-to-grave' reality for wool could involve two or more lives and a total 'active life' of up to 20-30 years.

Research by the same university also shows that wool already is one of the most re-used of all fibres, accounting for up to 5% by weight of total clothing donated by consumers for recycling and re-use. This is substantially higher than wool's share of the virgin fibre supply, which is about 1.5%.

**"This high percentage of nitrogen is the reason wool biodegrades so well."**

## Wool in the Circular Economy

Wool, with a recycling history dating back over 200 years, fits well into the recycling or circular economy production model which aims at encouraging consumers to think twice before throwing away their used clothing.

Discarded clothing is a growing problem. In the UK, a 2016 survey conducted by a supermarket chain revealed that 75% of consumers throw away used garments, instead of reselling or recycling them. The United States Environmental Protection Agency estimates that more than 15 million tons of used textile waste is generated each year in the United States, and the amount has doubled over the last 20 years.

North Americans annually buy, on average, 37 kg of new textiles per person, followed by Australians (27 kg) and Western Europeans (22 kg). Consumption in Africa, the Middle East and India averages just 5 kg per person. The global average is 13 kilograms per person per year.

According to Australian sustainability consultant Jane Milburn, two-thirds of the clothes and textiles bought are made of synthetic fibres, which are derived from petroleum and don't decay readily when sent off to landfill.

Synthetics and mixes are not readily recycled due to a lack of technology and commercial viability.

## Commercial Options

There are three commercial areas of wool recycling:

- The closed loop system. This is a mechanical process through which garments are 'pulled' back into raw fibre state and re-used as a raw material to make fibre again, producing garments with a very high economic value. Wool knitwear is particularly well suited for this process and can yield yarn with which a new garment with all the natural beauty and performance qualities of virgin wool can be created.
- The open loop system and used as a raw material to make industrial products, such as insulation products and mattress padding. These products can also have a very long life.
- Garment collection and in-store recycling initiatives can also give a "second life" to wool garments (e.g. M&S' Shwop scheme).<sup>5</sup>



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## Prato, an Example of Wool Recycling

An excellent example of wool recycling is Prato in Italy, which is a centre for all types of recycled wool, from both pre- and post-consumer sources. Prato companies have been creating new textiles from used ones for well over a century.

The yarns are produced from carding noils (carding waste) or through the re-use of fibres obtained from recycled pre- and post-consumer textiles, both woven and knitted.

Prato's "Cardato Regenerated CO<sup>2</sup> neutral" trademark certification system guarantees that:

- Yarns contain at least 70% of wool fibre derived from rags, recycled clothing, or off-cuts.
- Production is carried out exclusively in the Prato district.
- The manufacturing process of the new garment has a limited impact on the environment and also guarantees that zero levels of CO<sup>2</sup> are produced during the regeneration process.

The system is supported by traceability, auditing, and inspection regulations.

## About IWTO

With a world-wide membership encompassing the wool pipeline from sheep to shop, the International Wool Textile Organisation (IWTO) represents the interests of the global wool trade. By facilitating research and development and maintaining textile industry standards, IWTO ensures a sustainable future for wool. To learn more about IWTO and its activities, visit [www.iwto.org](http://www.iwto.org).



Seven of 19 discarded items of clothing will not be recycled – Sainsbury survey: Sunday Post, 06 April 2017. [www.sundaypost.com/fp/seven-of-19-discarded-items-of-clothing-will-not-be-recycled-survey/](http://www.sundaypost.com/fp/seven-of-19-discarded-items-of-clothing-will-not-be-recycled-survey/) (retrieved 14/11/2017) | | United States Environmental Protection Agency: Advancing Sustainable Materials Management: Facts and Figures. Reported in Newsweek, [www.newsweek.com/2016/09/09/old-clothes-fashion-waste-crisis-494824.html](http://www.newsweek.com/2016/09/09/old-clothes-fashion-waste-crisis-494824.html) (retrieved 15/11/2017). | | Australia's obsession with new clothes and 'fast fashion' textiles hurting the environment: Jane Milburn, ~ABC Radio, Melbourne, 12 January 2017 [www.abc.net.au/news/2017-01-12/australias-obsession-with-new-clothes-hurting-the-environment/8177624](http://www.abc.net.au/news/2017-01-12/australias-obsession-with-new-clothes-hurting-the-environment/8177624) (retrieved 14/11/2017) | | How old wool garments make new ones better: Prof. Stephen Russell, Director of Nonwovens Innovation and Research, Leeds University, United Kingdom. Presented at IWTO Congress in Harrogate, 2017. | | A Second Life for Wool Clothing: Prof. Stephen Russell, Director of Nonwovens Innovation and Research, Leeds University, United Kingdom. Presented at IWTO Congress in Cape Town, 2014. | | Review of Wool Recycling and Reuse: 2nd International Conference on Natural Fibres: Feb 2017: Stephen J. Russell and Mariell Trebowicz: Nonwovens Innovation and Research Institute, Leeds, United Kingdom; Paul Swan and Angus Ireland: Australian Wool Innovation Limited (AWI), Sydney, Australia | | Evolution of the Prato Textile District: Unione Industriale Pratese Confindustria Prato [www.ui.prato.it/unionedigitale/v2/english/presentazioneidistrettoinglese.pdf](http://www.ui.prato.it/unionedigitale/v2/english/presentazioneidistrettoinglese.pdf) (retrieved 15/11/2017) | | Cardato Regenerated Co<sup>2</sup> Neutral: [www.csr.unioncamere.it/download/3919.html](http://www.csr.unioncamere.it/download/3919.html) (retrieved 15/11/2017)