

What happens to non-reusable textiles?

Eco TLC is committed to promoting the circular economy with respect to Clothing, Linen and Footwear (CLF). Identifying and classifying recycling solutions for textiles is a crucial step in understanding the issues involved in closed-loop or open-loop recycling.

This first chart illustrating the products obtained through recycling of post-consumer textiles depicts the different technical steps required to transform an item of clothing that cannot be re-used into a new product. At present, these products are available on a commercial scale or are at the experimental stage. In addition, the chart also includes R&D projects into textiles that are supported by Eco TLC as well as a selection of other interesting research projects into recycling of textiles. This mapping allows you to visualise the diversity and interdisciplinarity of the sectors involved when we speak of the circular economy for post-consumer textiles and the potential of specific solutions still under-exploited. It also allows us to shed light on processes into which research should be funded and that Eco TLC could co-finance as part of its call for R&D project proposals, in particular. It is certainly the case that developing a textile recycling industry in France and in Europe for the long-term, which will therefore be profitable, is now a matter of some urgency.

This will necessarily involve:

- validating the industrial viability of the different solutions;
- qualifying and quantifying the potential volumes of textile materials that could be used by each of these solutions;
- measuring and analysing costs to improve their competitiveness;
- collaboration between firms capable of transforming materials obtained through sorting of CLF ("preparers") and firms which are going to make use of these new materials ("integrators");
- improving and upgrading textile operators' expertise so they can also become preparers and thus be able to best meet the integrators' specifications.

Our mission is guiding the textile sector in the transition towards a 100% circular economy. To achieve this, we are convinced that we need to exploit to the maximum the re-use of CLF and the material value of non-reusable CLF.

And finally, do not hesitate to send us any information you may have about other products that incorporate recycled textile fibres or other processes for preparing/integrating non-reusable textiles. This chart will be updated regularly.

We hope you enjoy reading it.

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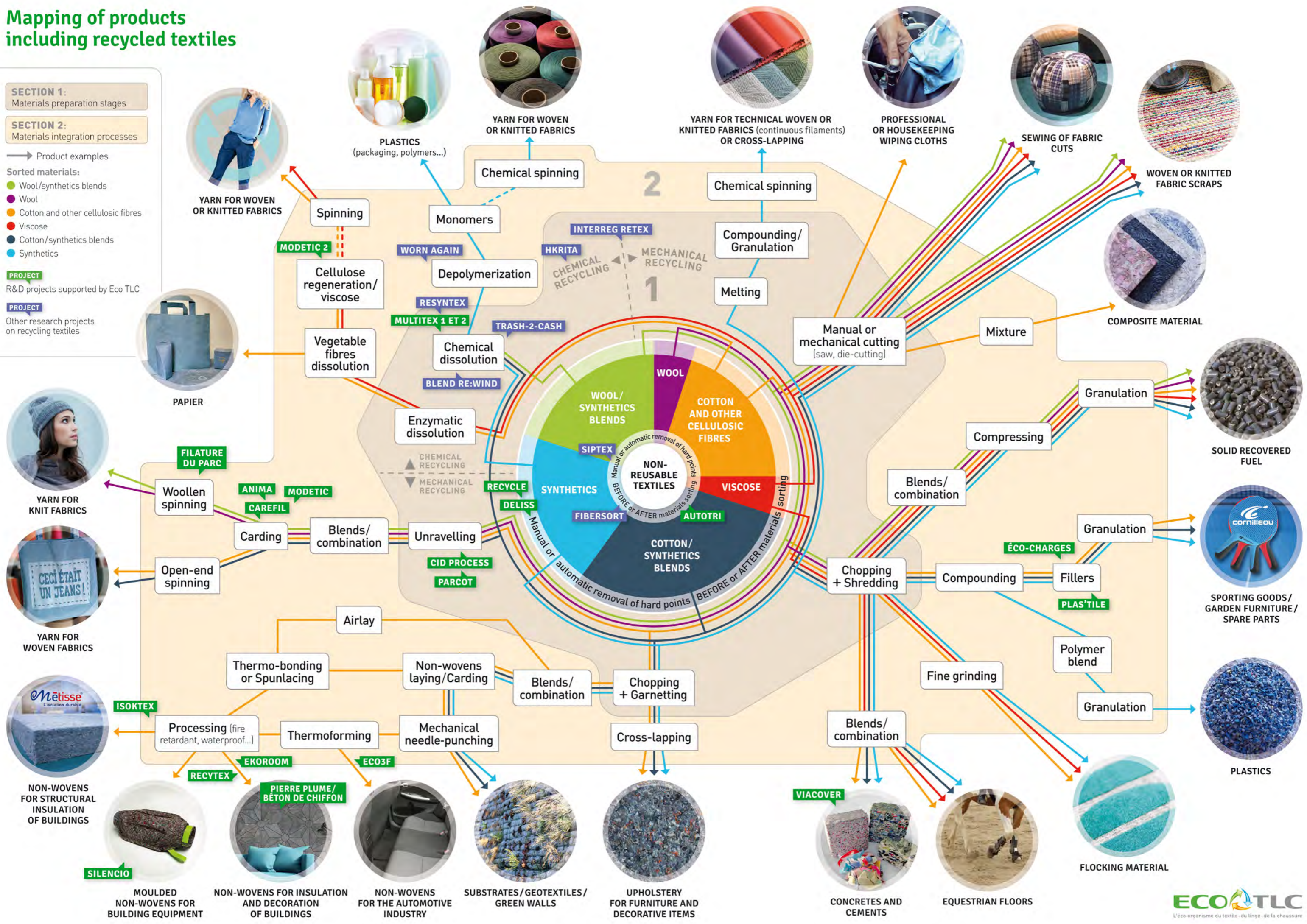


For more information

Learn about R&D projects on textiles supported by Eco TLC in "Roads to Innovation" available in English on www.ecotlc.fr

Mapping of products including recycled textiles

- SECTION 1:**
Materials preparation stages
- SECTION 2:**
Materials integration processes
- Product examples
- Sorted materials:
- Wool/synthetics blends
 - Wool
 - Cotton and other cellulosic fibres
 - Viscose
 - Cotton/synthetics blends
 - Synthetics
- PROJECT**
R&D projects supported by Eco TLC
- PROJECT**
Other research projects on recycling textiles



Focus on a selection of interesting research projects into textiles recycling

→ BLEND RE:WIND / MISTRA FUTURE FASHION – SWEDEN

Develop a new chemical recycling process that recycles polyester/cotton fibres blends.

Materials: *cotton and polyester blends*

<http://mistrafuturefashion.com/rewind-recycles-cotton-polyester/>

→ FIBERSORT / CIRCLE ECONOMY – THE NETHERLANDS

Create a new sorting technology that enables to identify and separate textiles based on fibre type.

Materials: *all*

www.circle-economy.com/case/fibersort

→ HKRITA – HONG KONG

Develop practical solutions to recycle blended textiles in closed loop.

Two directions are identified: biological and chemical recycling.

Materials: *cotton and polyester blends*

www.hkrita.com/newsletter/issue41/making.htm

→ INTERREG RETEX – FRANCE / BELGIUM

Develop new collaborations & business models and share knowledge to create added value. Focus on eco-design and textile recycling. Key goal : reduce textile waste and enhance innovation.

Materials: *all*

www.dogetheretex.eu

→ RESYNTEX / PROSPEX INSTITUTE – BELGIUM

Create a new circular economy concept for the textile and chemical industries to produce secondary raw materials from unwearable textile waste.

Materials: *all*

www.resyntex.eu

→ SIPTEX / IVL – SWEDEN

Develop an automatic sorting process by using optical sensors.

Materials: *all*

<https://www.ivl.se/english/startpage.html>
Top menu "Pressroom" > Press releases > 2017-03-28



→ TRASH-2-CASH – SWEDEN

Create new regenerated fibres from pre-consumer and post-consumer waste thanks to chemical recycling.

Materials: *cellulose and polyester*

www.trash2cashproject.eu/

→ WORN AGAIN – UNITED KINGDOM

Develop a textile to textile recycling technology that can separate and recapture polyester (PET) and cotton from used clothing.

Materials: *cotton, polyester, cotton and polyester blends*

<http://wornagain.co.uk/>

Glossary

- **Airlay:** Pneumatic method for laying a non-woven.
- **Carding:** Linear arrangement of textile fibres to produce a web.
- **Cellulosic fibres:**
 - Natural: cotton, linen, hemp...
 - Artificial: viscose, modal, polynosic, Tencel®, Lyocell®.
- **Chemical dissolution:** Chemical recycling. Re-producing synthetic or artificial fibres through reclamation of the raw materials, which are again re-polymerized.
- **Chemical spinning:** Extrusion of continuous filaments.
- **Chopping:** Process of successive cutting up of textiles to obtain scraps.
- **Compounding:** Process involving forming of granules based on formulation (polymer, additives, fillers) for the plastics processing sector.
- **Compressing:** Process for forming coarse granules.
- **Cross-lapping:** Production of a web through carding of fibres.
- **Depolymerization:** Process of converting a polymer into a monomer or a mixture of monomers.

- **Enzymatic dissolution:**
 - Recycling of fermentable organic products characterized by their biodegradable nature; can lead to composting and methanation.
 - Recycling textiles by treating them with enzymes and decomposition of polymers, allowing a textile filament to be recreated.
- **Fillers:** Additives in the form of pulp, powders or textile fibres, used to obtain specific properties in any type of polymer (fibres, composites).
- **Fine grinding:** Further processing of scraps or shredded material into textile pulp.
- **Flocking:** A coating process in which short fibres obtained from shredding textiles are applied.
- **Garnetting:** Mechanical procedure involving successive chopping and drawing of textiles in order to recover the fibres.
- **Granulation:** Process of transforming the material into granules.
- **Materials sorting:** Operation in which used textiles and/or their components are separated, enabling them to be recycled in order to obtain new products or materials.
- **Needle-punching:** A method of mechanical bonding for non-wovens.

- **Non-wovens:** Production of a web of fibres.
- **Open-end spinning:** Subsequent processes for transforming textile fibres into yarn: carding, sliver, yarn manufactured in a turbine machine.
- **Removal of hard points:** Disassembling of clothes in order to eliminate hard points (buttons, rivets, zips, patches etc.).
- **Shredding:** Process corresponding to coarse chopping, producing fibres.
- **Synthetics:** Fibres obtained through polymerization or polycondensation of petroleum-based monomers.
- **Thermo-bonding:** Production of a web of non-wovens bonded using thermofusible additives (fibres, powders).
- **Thermoforming:** Forming of plastic products.
- **Unravelling:** Mechanical procedure involving successive drawing of textiles to recover the fibres.
- **Viscose:** Cellulosic fibre obtained from wood or other vegetal pulp.
- **Woollen spinning:** Subsequent processes for transforming textile fibres into yarn: carding, production of rovings then yarn.

