Summary

Although an estimated seven million tonnes of textiles are discarded in the EU every year, the amount of post-consumer recycled material in textiles, i.e. textile-to-textile recycled yarns, is currently virtually zero (EEA, 2024). The Dutch government is therefore examining the viability of making a minimum percentage of post-consumer textile-to-textile recyclate mandatory for new textiles, and is seeking information to develop policy that encourages the production of textile-to-textile recycling. On the basis of five research questions this report analyses current developments and requirements, and what will be required in the near future:

1. Does Europe currently have sufficient recycling capacity to achieve the most optimal scenario, or how much additional capacity is needed?
2. What recycling capacity has been lost recently?
3. What sorting categories do recyclers need for recycling?
4. What innovations in recycling technologies are available or needed to enable higher percentages of textile-to-textile recyclate?
5. Where is the market for certain recyclers, and are there agreements whereby larger retailers have exclusive purchasing rights?

Approach

CE Delft consulted literature (articles, web pages) and spoke to various parties in the recycling chain and the VHT/Euric trade association. We also visited the Textile Recycling Expo trade fair in Brussels, where we spoke to sorters and recyclers and attended lectures on the subject.

Key findings

The current capacity for textile-to-textile recycling in Europe is estimated at 140 to 1,300 ktonnes per year. By 2030, this could rise to 2,150 ktonnes. Currently, even if half of Europe's post-consumer textiles (3,500 ktonnes) are collected and made available for high-quality recycling, there is insufficient capacity to recycle this into fibre. However, the parties interviewed also indicate that existing capacity is not being fully utilised.

The market is preparing for the European Ecodesign Regulation for Sustainable Products (ESPR) and the use of post-consumer textile-to-textile recycled material in textiles. Sorters and recyclers are ready to free up capacity and to scale up. They consider a mandatory percentage of post-consumer textile-to-textile recyclate to be necessary to stimulate and scale up the market: it stimulates demand, makes sure that recyclers can continue to exist, maintains recycling capacity and ensures that technical innovations are actually implemented. The Euric trade association has set a target of 15% on average. Several large chemical polyester and cotton recyclers have joined forces1 and want to build factories with a processing capacity of at least 50 ktonnes per year. They propose a mandatory percentage of post-consumer recycled materials of: 10% in 2028, 15% in 2030 and 30% in 2035. The recycling industry indicates that a clear definition is needed to distinguish between post-consumer (remnants intended for or originating from consumers) and post-industrial textiles (such as cutting remnants from production).

Sorting takes place in two steps: first, reusable textiles are sorted, followed by sorting for recycling purposes. The technology for automated sorting is available and in use at large sorting facilities (TRL 9). This technology supports virtually all recycling techniques and can quickly sort all combinations by colour, blend and fabric type. Pre-processing (such as automatic removal of zips and buttons), dismantling, removal of contaminants and quality measurements of recycled material are also technically possible.

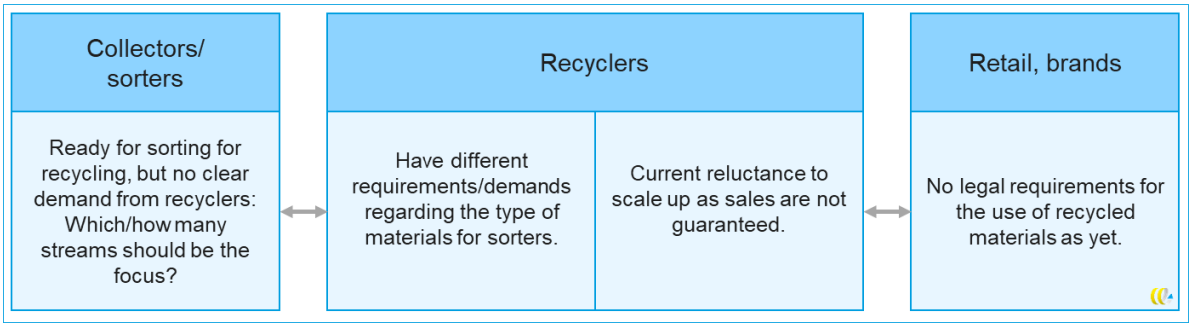
Some companies focus on one part of the recycling chain, such as collection, sorting, recycling or spinning yarn, while others are involved in the entire chain. Collaborations with clothing brands demonstrate that high-quality yarns (and therefore end products) are possible, consisting of 100% recycled material or mixed with post-industrial recycled material, r-PET from other sources or primary fibre. These collaborations are not exclusive – recyclers are free to work with multiple parties – but the contracts now offer recyclers guaranteed sales.

The current situation is characterised by mutual reluctance, which is preventing the large scale application of textile-to-textile recycling. The business model of the recycling chain is

currently still strongly focused on sorting reusable textiles. Parties in the recycling chain fear bankruptcy because reusable textiles are becoming increasingly poor in quality and there is no demand for high-quality recycled fibres. Chemical recycling of cotton and polyester in particular has not yet been scaled up. These techniques require a large-scale, stable input stream with specific quality requirements and large-scale purchase. The latter poses a dilemma for polyester: to what extent is it desirable to set up large-scale recycling capacity for processing cheap, primary polyester that is mainly marketed by fast fashion companies? On the other hand, some chemical recycling capacity will be needed, as current textiles inevitably contain polyester.

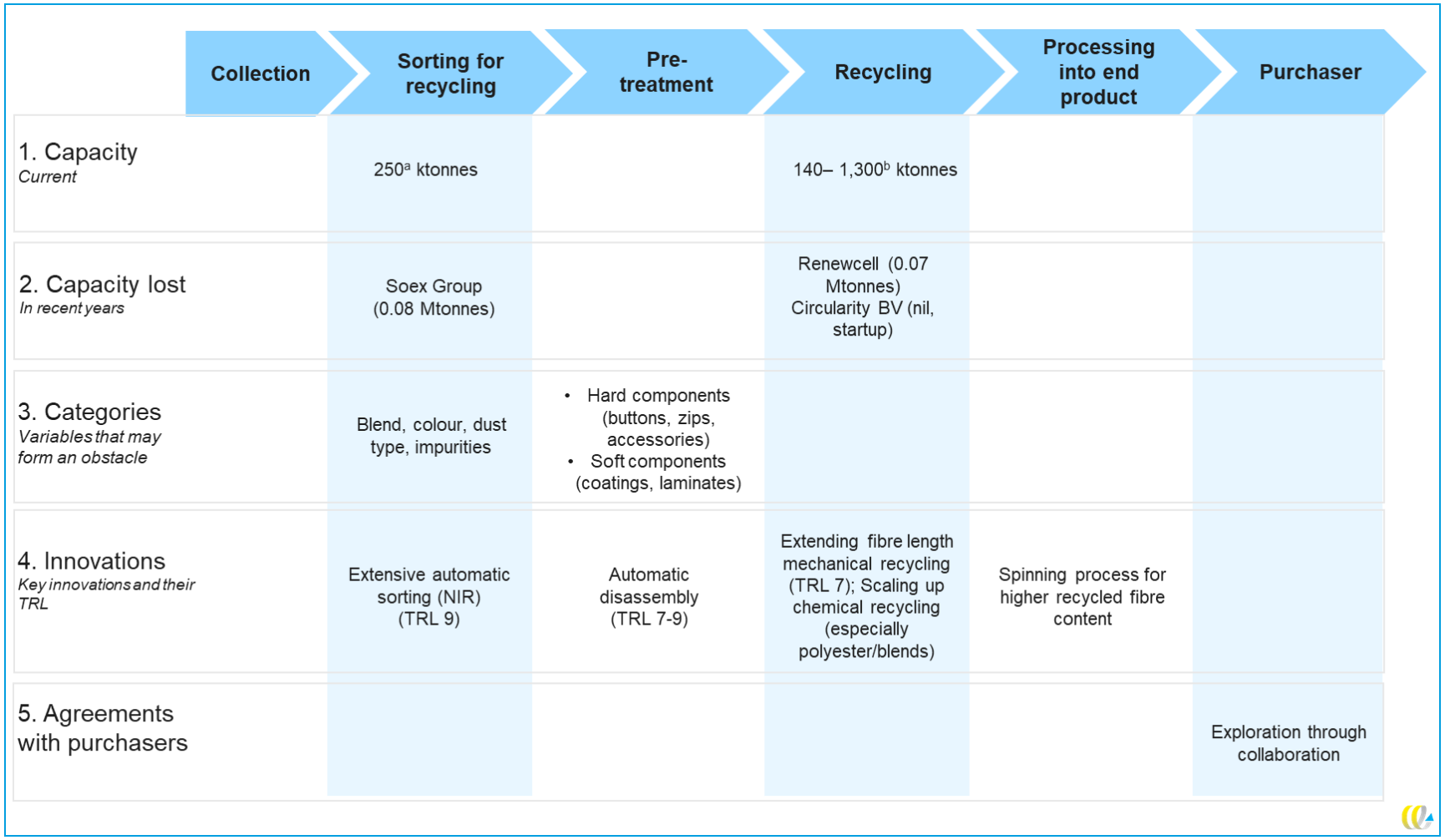
A mandatory percentage is seen as a necessary incentive to stimulate market development, even at a low starting percentage (1 to 5%). Brands will then coordinate with recyclers to determine which type of fibre and colour they want to use in their products and what exactly can be supplied. This provides sorters with guidance when setting up their sorting line, whether or not automatic: if brands and recyclers focus primarily on cotton or poly-cotton blends, for example, other fibres or colours do not need to be sorted as finely.

Figure 1- Parties in the recycling chain are waiting for each other to take action



Finally, Figure 2 contains a summary of the most important findings for each research question, presented for each phase in the recycling chain.

Figure 2- Summary of findings per research question, grouped according to where in the textile chain the answer lies



	Collection	Sorting for recycling	Pre-treatment	Recycling	Processing into end product	Purchaser
1. Capacity *Current*		250[a] ktonnes		140– 1,300[b] ktonnes		
2. Capacity lost *In recent years*		Soex Group (0.08 Mtonnes)		Renewcell (0.07 Mtonnes) Circularity BV (nil, startup)		
3. Categories *Variables that may form an obstacle*		Blend, colour, dust type, impurities	• Hard components (buttons, zips, accessories) • Soft components (coatings, laminates)			
4. Innovations *Key innovations and their TRL*		Extensive automatic sorting (NIR) (TRL 9)	Automatic disassembly (TRL 7-9)	Extending fibre length mechanical recycling (TRL 7); Scaling up chemical recycling (especially polyester/blends)	Spinning process for higher recycled fibre content	
5. Agreements with purchasers						Exploration through collaboration