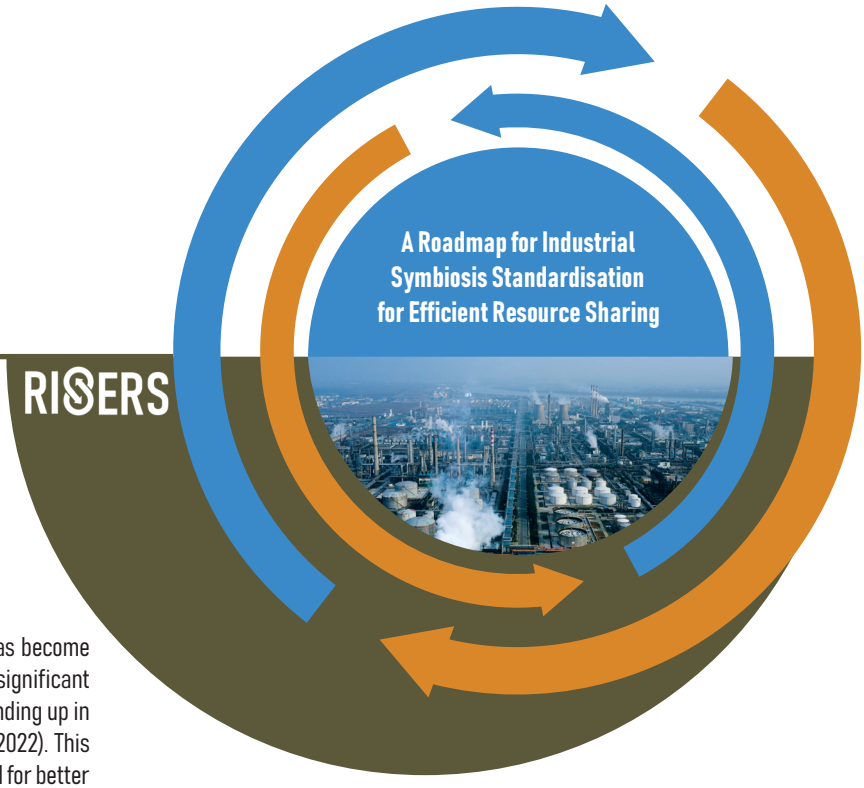
Synergy Fact Sheet

TEXTILES

Produce secondary raw materials from unwearable textile waste



Introduction

Due to its rapid growth and the fast fashion trend, the textile industry has become one of the main causes of environmental problems. Textiles make up a significant portion of municipal solid waste, with an estimated 75% of textile waste ending up in landfills and only 25% being recycled or reused (Juanga-Labayen et al., 2022). This heavy reliance on landfill is unsustainable and emphasises the urgent need for better recycling and reuse strategies to reduce textile waste. Innovative solutions such as anaerobic digestion, fibre regeneration and thermal recycling, together with policy measures such as extended producer responsibility (EPR), lay the foundation for a circular economy in the textile sector.

Modern recycling technologies are now addressing the challenges posed by blended fabrics, which often combine materials such as cotton, polyester and elastane. While mechanical recycling methods have reached their limits in separating these blends, advanced chemical techniques such as dissolution and hydrolysis have shown great promise. These processes enable the recovery of high-quality fibres that can be reintegrated into production to promote sustainable practises and reduce the environmental impact of textile manufacturing (Stubbe et al., 2024).

As consumers and governments increasingly demand more sustainable textile products, the industry is being pushed to move from traditional linear models to circular models. Key innovations such as automated sorting technologies and virtual platforms that encourage collaboration between stakeholders are helping to streamline recycling efforts. With these advances, the textile industry is taking meaningful steps to reduce its environmental footprint and strive for a more sustainable future (Choudhury et al., 2024).

Adopting these innovative practises and technologies gives the textile sector the opportunity to take a leading role in the circular economy. By fostering collaboration and innovation, textile fibre recycling not only contributes to economic growth, but also plays a crucial role in achieving global sustainability goals

Supplying sector(s)		Receiving sector(s)	
Textiles	Textiles	Various	Various

TECHNICAL FEASIBILITY

Industrial scale: Large-scale recycling of textile fibres is feasible to effectively manage the significant volume of waste generated by the industry. By operating on this scale, recycling plants can process large quantities of material, ensuring efficiency and broad impact.

High technical requirements: Advanced recycling systems for textiles rely on sophisticated methods, especially when it comes to blended fabrics. Technologies such as chemical dissolution, hydrolysis and enzymatic treatments require specialist expertise and equipment to ensure the successful recovery of fibres.

PPP IMPACT – EU wide potential

Profit

Wins in industry

Recycling textile fibres reduces dependence on virgin raw materials and enhances waste management systems, creating significant economic value. By introducing circular practises, companies strengthen their supply chains, reduce production costs and open up new opportunities in the market for recycled textiles.
According to McKinsey (2022), fibre-to-fibre recycling could recover approximately 18-26% of gross textile waste by 2030, translating into a projected profit of €1.5-2.2 billion annually. This demonstrates the significant economic potential of scaling recycling technologies within the textile industry.

Planet

Environmental gains

The introduction of advanced recycling technologies minimises the environmental footprint of the textile industry. Reducing landfill waste and lowering greenhouse gas emissions are important outcomes, as well as reducing resource extraction and energy consumption, which are in line with global climate goals. For

REFERENCES

- Juanga-Labayen, J. P., Labayen, I. V., & Yuan, Q. (2022). A Review on Textile Recycling Practices and Challenges. *Textiles, 2*(1), 174-188. https://doi.org/10.3390/textiles2010010
- Stubbe, B., Van Vrekhem, S., Huysman, S., Tilkin, R. G., De Schrijver, I., & Vanneste, M. (2024). White Paper on Textile Fibre Recycling Technologies. *Sustainability, 16*(2), 618. https://doi.org/10.3390/su16020618
- Choudhury, K., Tsianou, M., & Alexandridis, P. (2024). Recycling of blended fabrics for a circular economy of textiles: Separation of cotton, polyester, and elastane fibers. *Sustainability, 16*(14), 6206. https://doi.org/10.3390/su16146206
- McKinsey & Company. (2022). *Scaling textile recycling in Europe—Turning waste into value*. Retrieved from https://www.mckinsey.com/industries/retail/our-insights/scaling-textile-recycling-in-europe-turning-wasteinto-value
- Eionet. (2019). *Textiles and the environment in a circular economy (ETC/WMGE 2019/6)*. Retrieved from https://www.eionet.europa.eu/etcs/etc-wmge/products/etc-wmge-reports/textiles-and-the-environment-in-acircular-economy/@@download/file/ETC-WMGE_report_final%20for%20website_rev20221118.pdf

example, fibre-to-fibre recycling could avoid approximately 15-35 tonnes of CO2 equivalent emissions per tonne of textile product (ETC, 2019), amounting to a reduction of around 4 million tonnes of CO2 equivalent by 2030 (McKinsey, 2022). These measures significantly support international climate objectives.

People

Wins for society

Recycling programmes contribute to job creation, particularly in the areas of sorting, processing and technological innovation. These initiatives also promote skills development and strengthen local economies, bringing far-reaching societal benefits while driving sustainable practises. As highlighted by McKinsey (2022), the scaling of textile recycling initiatives could create approximately 15,000 skilled jobs by 2030, fostering expertise in sustainable industries and contributing to local economic resilience.

RISERS

About this factsheet

This fact sheet is based on the findings of the RISERS project. Led by Ghent University with the support of project partners, the study involved a systematic assessment of 600+ industrial symbiosis (IS) cases across urban-industrial and cross-sectoral clusters in Europe. These cases formed the basis for the mapping of over 300 MES (Materials, Energies, Services) streams, categorised by output (source) and input (sink) sectors.

The fact sheet provides a detailed overview of a high-potential and high-impact IS synergy, evaluating its implementation feasibility and sustainability impact. Supported by data from public databases (MAESTRI, SCALER, EPOS, AIDRES, etc.) and literature, it offers a generalised insight into the economic, environmental, and social benefits per synergy.

Factsheets authors:

Lieven Demolder, Greet van Eetvelde (Ghent University)
Izabela Ratman-Kłosińska, Grzegorz Gałko, Mateusz Korcz (IETU)

Published in march 2025

For more information and access to the full reports, please visit https://risers-project.eu

About the RISERS project

RISERS is a Horizon Europe project aimed at developing an Industrial Symbiosis Standardisation Roadmap supporting the uptake of high impact synergies and resources considering:

- identification of the needs, gaps and opportunities,
- revision of current standards and standardisation efforts relevant for CE and the priority synergies and resources,
- initiating the process of new standards development (especially for newer technologies and pilot-scale synergies).

The RISERS project was launched in January 2024 with a duration of 3 years.

For more information visit: https://risers-project.eu

Funded by the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or European Health and Digital Executive Agency. Neither the European Union nor the granting authority can be held responsible for them.