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SYSTEMIQ

THE TEXTILE RECYCLING BREAKTHROUGH

EXECUTIVE SUMMARY

WHY POLICY MUST LEAD THE SCALE-UP OF POLYESTER RECYCLING IN EUROPE

IN PARTNERSHIP WITH

ARC'TERYX · EASTMAN · interzero® zero waste solutions · Textile Exchange · TOMRA

About this publication

About Systemiq

Systemiq is a systems change company that works with businesses, policymakers, investors and civil society organisations to reimagine and reshape the systems that sit at the heart of society - energy, nature and food, materials, built environment, and finance - to accelerate the shift to a more sustainable and inclusive economy. Founded in 2016, Systemiq is a certified B Corp with offices in Brazil, France, Germany, Indonesia, the Netherlands, and the UK.

Find out more at www.systemiq.earth or via LinkedIn. To access the full report, 'The Textile Recycling Breakthrough', visit www.systemiq.earth/textile-recycling

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The economic modelling is based on publicly available sources as well as stakeholder input across the value chain, which has been averaged, triangulated and vetted to produce credible yet non-attributable results. As such, the absolute figures need to be considered directional and will differ across different markets within the EU. Specifically, cost estimates and EPR fees are assuming a specific process in a scaled system scenario and might therefore not be fully representative of the ramp-up period, or if the modelled levers do not materialise as assumed. Please see our technical appendix for more details.

Scope

For the purpose of this study and our own analysis, the material scope is textiles, which we define as all apparel (clothing and footwear) and home textiles, in line with the scope of the EU EPR scheme for textiles. For textile waste, the analysis focuses on post-consumer waste originating from private households. Please see our technical appendix for more details.

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Systemiq core team

Sophie Herrmann, Clara Luckner, Carl Kuehl, Leonard von Boetticher, Juliette Kool and Ulrike Stein.

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Steering Group

Organisations	Main contributors	Job title
Accelerating Circularity	Karla Magruder	Founder
Andritz	Thomas Wallert	Sales Manager – Textile Recycling
Arc'teryx	Kyle Wood	Senior Director – Strategy
Circle Economy Foundation	Hilde van Duijn	Managing Director
CuRe Technology	Josse Kunst	Chief Commercial Officer
Eastman	Reinier de Graaf	Director – Circular Feedstock Strategy Europe
Ellen MacArthur Foundation	Valerie Boiten	Senior Policy Officer
Fashion for Good	Priyanka Khanna	Innovation Director – Scaling
GR3N	Dr. Maurizio Crippa	Chief Executive Officer
H&M Group Ventures	Laura Coppen	Board Director – Sustainability Investments
Interzero	Julia Haas	Head of Commercial Partnerships
Joint Research Centre	Dries Huygens	Scientific/Technical Officer
Lululemon	Robyn Kimber	Senior Manager – Circularity
Patagonia	Willem Swager	Director – Finance & Operations EMEA
Textile Exchange	Beth Jensen	Senior Director – Climate and Nature Impact
Tomra	Louisa Hoyes	Segment Director - Textiles
University of the Arts London	Prof. Kate Goldsworthy	Professor of Circular Design and Innovation

Other contributors and reviewers

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Report design
Sam Goult

EXECUTIVE SUMMARY

Recycling of polyester textile waste in Europe will not reach a breakthrough in scale without significant policy action.

Advanced textile recycling technologies have developed significantly in recent years but remain nascent in their adoption. Depolymerisation methods are a promising solution for processing large proportions of Europe's growing volumes of polyester textile waste when reuse or mechanical recycling are not viable. These depolymerisation technologies are both environmentally attractive and technically capable of producing virgin-equivalent outputs, with the potential to significantly reduce the negative consequences of burgeoning textile waste and to reduce greenhouse gas (GHG) emissions compared to virgin polyester production. However, despite its attractiveness, depolymerisation is not yet scaling. To reach a tipping point for mass adoption – where recycling polyester waste through depolymerisation becomes more competitive than virgin polyester production from fossil fuels – two more conditions must be met: affordability and accessibility. Affordability remains the most significant constraint: producing recycled polyester from post-consumer textile waste in Europe costs around 2.6 times more than the average cost of virgin polyester in Asia. Accessibility challenges exist on both the supply and demand side. On the supply side, access to textile waste feedstock at the necessary quality and quantity for at-scale recycling remains out of sight. On the demand side, the current premium of ~2.6× means that most brands continue to favour cheaper virgin polyester or recycled polyester from PET beverage bottles, while the production value chain has little incentive to incorporate this material on its own accord. Without targeted policy action to address both affordability and accessibility, depolymerisation will remain stuck in pilot purgatory, and the breakthrough to mass adoption will not happen.

2.6×
more expensive
Recycled polyester (from Europe) vs. virgin polyester

This matters because the global textile system remains extremely linear – and the waste crisis is worsening as volumes grow and quality declines.

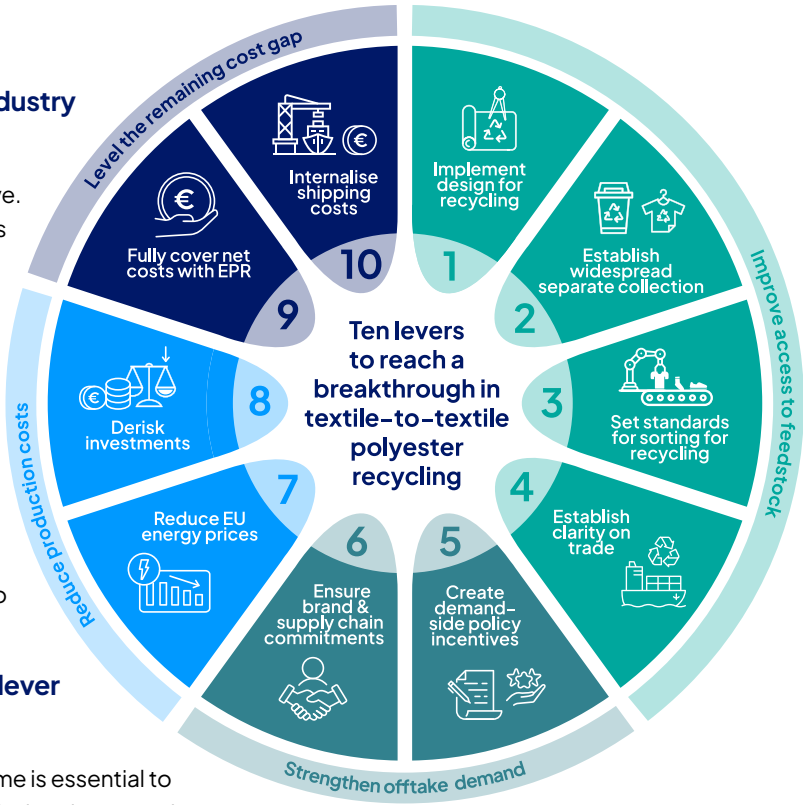
Each year, over 125 million tonnes of material are consumed by the global textiles industry, yet less than 1% of textiles are made from recycled textile waste[1]. Most textile waste is landfilled, incinerated, or exported, often to regions lacking the infrastructure to manage them responsibly, which results in significant negative environmental and social impacts. Meanwhile, the share of textiles suitable for reuse is declining, driven by ultra-fast fashion and the rise of low-cost, low-durability garments. Export markets – once a significant source of demand for textile waste from the Global North – are stagnating due to market saturation and growing competition from new clothing. These trends are placing mounting pressure on collection, sorting, and reuse systems across Europe, which are already struggling to handle the existing waste volumes and remain financially viable. Without a recycling system, the linear status quo will continue to deepen Europe's – and the world's – textile waste crisis.

<1%
recycled content
In new textiles from textile waste

Ten levers to trigger a tipping point: policy and industry action needed across four areas.

The uptake of a new technology typically follows an S-curve. History suggests that once a positive tipping point is reached, exponential uptake of the new technology will commence. A positive tipping point occurs when a clean technology is more affordable, attractive and accessible than the conventional alternative, as has been concluded in Systemiq's Breakthrough Effect report[2].

To scale the depolymerisation of post-consumer textile waste in Europe, the barriers of accessibility and affordability must be addressed. This requires coordinated action by policy and industry on ten interdependent levers that should be activated together to reach a tipping point.



An ambitious EPR scheme is the most important lever to close the cost gap and enable a tipping point.

An ambitious Extended Producer Responsibility (EPR) scheme is essential to bridge around 55% of the affordability gap between recycled and virgin polyester, and thus critically required to make the business case work and reach a breakthrough on textile-to-textile recycling. Besides directly bridging the majority of the cost gap, an EPR fee indirectly underpins multiple other levers. These include derisking capital investments, strengthening offtake demand, incentivising better design and improving access to feedstock by financing waste management infrastructure of separate collection and automated sorting. Based on our system assumptions and available data, an EPR fee of approximately €250/tonne by 2028, rising to €330/tonne by 2035, would be needed to cover the net costs of collection, sorting, and recycling. This is directional and will differ by Member State. Put in perspective, the combined effect of a €330/tonne EPR fee and a €55/tonne green premium would result in a total cost uplift of €385/tonne. For a 400-gram jumper, this translates to just €0.15 per item. In addition to the EPR fee, policymakers should pursue pull mechanisms that create demand for recycled materials such as recycled content mandates under the Ecodesign for Sustainable Products Regulation (ESPR) and provide clarity on end-of-waste status and trade rules for textiles. Policies to reduce industrial energy prices in the EU would further strengthen Europe's competitiveness as a recycling hub – reducing production costs for recyclers and improving investor confidence.

~55%
of cost gap
Should be covered by ambitious EPR policies

+€0.15
per item
Impact of EPR fee and green premium

If activated, these levers could grow depolymerisation output from textiles in Europe nearly tenfold by 2035 and unlock the tipping point to scale-up.

By addressing feedstock access, production costs, market demand, and system funding in parallel, the proposed levers could trigger a tipping point for textile-to-textile recycling. With these conditions in place, the economics of producing recycled polyester through textile-to-textile recycling could become competitive with producing virgin polyester from fossil fuel feedstocks – enabling a meaningful breakthrough. European output of recycled polyester from depolymerisation could grow from around 30,000 tonnes expected before 2028 to 300,000 tonnes annually by 2035 – a nearly tenfold increase. This would represent a ~15% share[a] of the polyester textiles consumed in Europe and would demonstrate exponential growth, as seen in other breakthrough technologies. As a result, a competitive, circular industry contributing to economic resilience, job growth and GHG emission reductions can be created in Europe. While depolymerisation alone will not solve the textile waste challenge, it seems essential for addressing non-reusable polyester waste. And, critically, the infrastructure, market mechanisms, and policy frameworks required to scale depolymerisation will also support other recycling solutions.

10×
polyester recycling scale-up by 2035
Possible with the right conditions

a Assuming the share of textiles consumed which is polyester mirrors waste composition, where it is estimated at 21%, and assuming ~10 million tonnes of textiles are consumed in the EU by 2035. Note that globally, polyester makes up 57% of the fibre mix.

Endorsements

"This study helps chart a path forward for brands looking to support a circular transition and shift toward regenerative textile systems in Europe. It's also a powerful reminder that design does not exist in isolation, and must proceed in partnership with long term commitments and policy frameworks. We're excited to contribute to this conversation and help push the industry in the right direction.

Kyle Wood
Senior Director Strategy
Arc'teryx

"Through the interplay of both political and industry-driven levers, Europe has a great opportunity to make circularity in textiles a reality – and turn it into a competitive advantage. The study proves that bold, long-term policy action is needed to help create stable market conditions and reduce investment risks. At the same time, collaboration within the industry is essential to drive the necessary infrastructure transformation. Both need to work hand in hand to reach the breakthrough in textiles recycling.

Julia Haas
Head of Commercial Partnerships
Interzero

"Scaling textile-to-textile recycling is both possible and urgent – but it won't happen without bold policy support. This report is a much-needed blueprint for unlocking the environmental and economic benefits of polyester recycling in Europe.

Karla Magruder
Founder
Accelerating Circularity

"This report brings to light the multiple levers necessary for scaling textile-to-textile chemical polyester recycling in the EU. These levers are in the domain of multiple stakeholders who all need to support their segment developments, cross-industry information exchanges and actions on building textile-to-textile circular systems through industry wide collaborations.

Louisa Hoyes
Segment Director, Textiles
TOMRA

"Europe has the opportunity to lead the transition to circular textiles, and technologies like depolymerization are ready to play a central role. What's needed now is the right and demanding policy framework, long-term offtake commitments, and de-risking mechanisms to take these solutions to scale.

Eric Dehouck
Managing Director
Eastman Circular Solutions France

"This report highlights the interventions needed to accelerate textile-to-textile recycling in the EU, which Textile Exchange believes will be an important impact reduction strategy. Its findings complement the dataset we are building to capture global sources of textile waste and availability projections, for inclusion in our long-standing annual Materials Market Report.

Beth Jensen,
Senior Director, Climate and Nature Impact
Textile Exchange

"Addressing growing environmental concerns and the demand for sustainability, thisreportunderscores the urgent need to scale up textile recycling across both post-consumer and textile production waste streams. These materials are valuable resources that can be recycled through economically viable solutions, fostering a circular economy. By integrating innovation and collaboration, as detailed in the report, the textile industry is reducing its environmental footprint while meeting market needs for spinning and nonwoven applications. The report highlights that circularity must become the standard — not the exception — to achieve significant environmental and economic benefits.

Thomas Wallert
Area Sales Manager, Textile Recycling
Andritz

Endorsements

"Analyzing in great detail the economic barriers to reach full textile circularity is crucial to develop meaningful policy interventions. This report gives a great overview to start building this much needed transition.

Josse Kunst
CCO
CuRe Technology

"This report offers a much-needed reality check on the challenges we face in achieving textile-to-textile recycling at scale. Significant investments and coordinated policy measures are required to create the necessary infrastructure and improve the economics and output quality. These investments need to happen alongside industry-wide efforts on scaling circular business models, such as resale, rental, repair, and remaking, which keep textiles in use for longer and decrease the volumes of textiles ending up as waste in the first place.

Matteo Magnani
Policy Officer
Ellen MacArthur Foundation

"GR3N actively supported the project by providing data because we strongly believe that we need to create an ecosystem to make the recycling of garments feasible. This can only happen trough collaboration between all the players of the value chain: collectors, sorters, mechanical transformers, and chemical recyclers. Ultimately a better world can be created using technologies for a better society.

Maurizio Crippa
CEO
GR3N

"This report offers a clear and actionable roadmap to unlock recycling of polyester textile waste at scale. Robust policy, especially EPR, is essential to close the cost gap and enable real investment in scalable solutions.

Willem Swager
Director of Finance & Operations
Patagonia EMEA

"Scaling post-consumer polyester depolymerisation could be a cornerstone of EU industrial strength; but requires substantial investment to reach price parity with virgin materials. This challenge demands that we finally internalise the environmental and social costs that linear production models have long placed on society.

Hilde van Duijn
Managing Director
Circle Economy Foundation

"This report makes clear what's needed to scale Textile to Textile polyester recycling in Europe: investment in infrastructure, clear feedstock standards, and supportive regulation. It's a practical guide for policy to enable circularity at scale.

Priyanka Khanna
Innovation Director
Fashion for Good

"An important report with key findings brought together by Systemiq experts and a diverse group. A must read.

Laura Coppen
Sustainability Investments
H&M Group

"This study offers actionable information and perspectives from a broad range of stakeholders on fibre-to-fibre recycling of polyester-dominated textile waste.

Dries Huygens
Scientific/Technical Officer
Joint Research Centre

"This report is a pivotal call to action highlighting the urgent need for systemic change through circular design and policy innovation to support advanced recycling technologies. The identification of ten integrated levers spanning EPR reform, feedstock access, and sorting standards, provides policymakers and industry with a clear framework for accelerating circularity. It's been over 20 years since the first commercial recycling process was launched in Japan and the recommendations in this report offer the route out of 'pilot purgatory' that we really need.

Kate Goldsworthy
Professor of Circular Design and Innovation
University of the Arts London

THE TEXTILE RECYCLING BREAKTHROUGH

Why policy must lead the scale-up of polyester recycling in Europe

The Textile Recycling Breakthrough is a multi-stakeholder study led by Systemiq, providing the first tipping point analysis on textile-to-textile polyester recycling. Drawing on economic modelling, systems analysis, real financial data and insights from 17 organisations across the value chain – including brands, recyclers, civil society, and infrastructure providers – the study identifies ten key levers to unlock exponential growth in polyester recycling in Europe. It quantifies the cost gap between chemically recycled and virgin polyester, outlines policy and investment solutions, and shows how Europe can scale depolymerisation nearly tenfold by 2035 – cutting waste and emissions.

The study was funded by grants from Arc'teryx, Eastman, Interzero, Textile Exchange, and Tomra, and was guided by an independently chaired Steering Group representing industry, civil society, and academia which ensured its independence and rigour.

Find out more at www.systemiq.earth or contact plastic@systemiq.earth