

Advancing textile circularity

*Europe's textile waste surge:
The case for system-level scale-up*



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Why we did this

- Establish a robust and decision-relevant fact base on textile waste and circularity in Europe to guide regulatory design, industrial investment and brand strategy
- Provide a foundation to assess whether and under which conditions textile-to-textile (T2T) circularity can become a viable pathway for managing Europe's growing post-consumer textile waste (high-level business case & indicative break-even conditions)

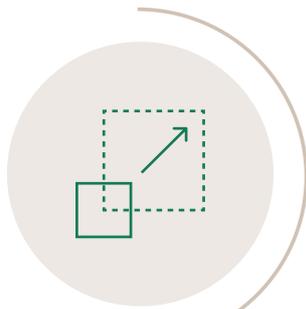
What we did

- Built a harmonized baseline of post-consumer textile waste flows in Europe.
- Assessed what it would take to reach a first meaningful scale milestone for T2T by 2035 (in volumes, CAPEX/OPEX, and stakeholder economics)

What needs to be done

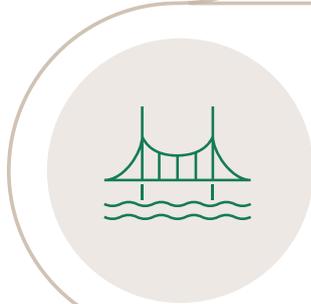
- Design and size enabling mechanisms to close the economics gap (e.g., EPR design, eco-contribution fees, CAPEX grants, risk-sharing, offtake commitments, standards)
- Translate the diagnosis into an actionable roadmap: targets, sequencing, responsibilities, and cross-border coordination

Key messages

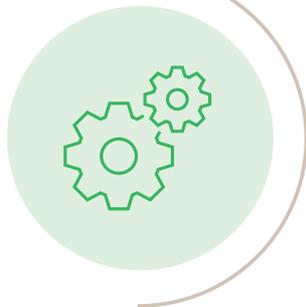


A viable European textile-to-textile system requires major investment: c. €8–11B in CAPEX and c. €5–6.5B in recurring OPEX per year by 2035

Yet profitability profiles remain unattractive—especially for standalone recyclers (baseline EBIT deeply negative across fibers)—making first-wave assets difficult to finance



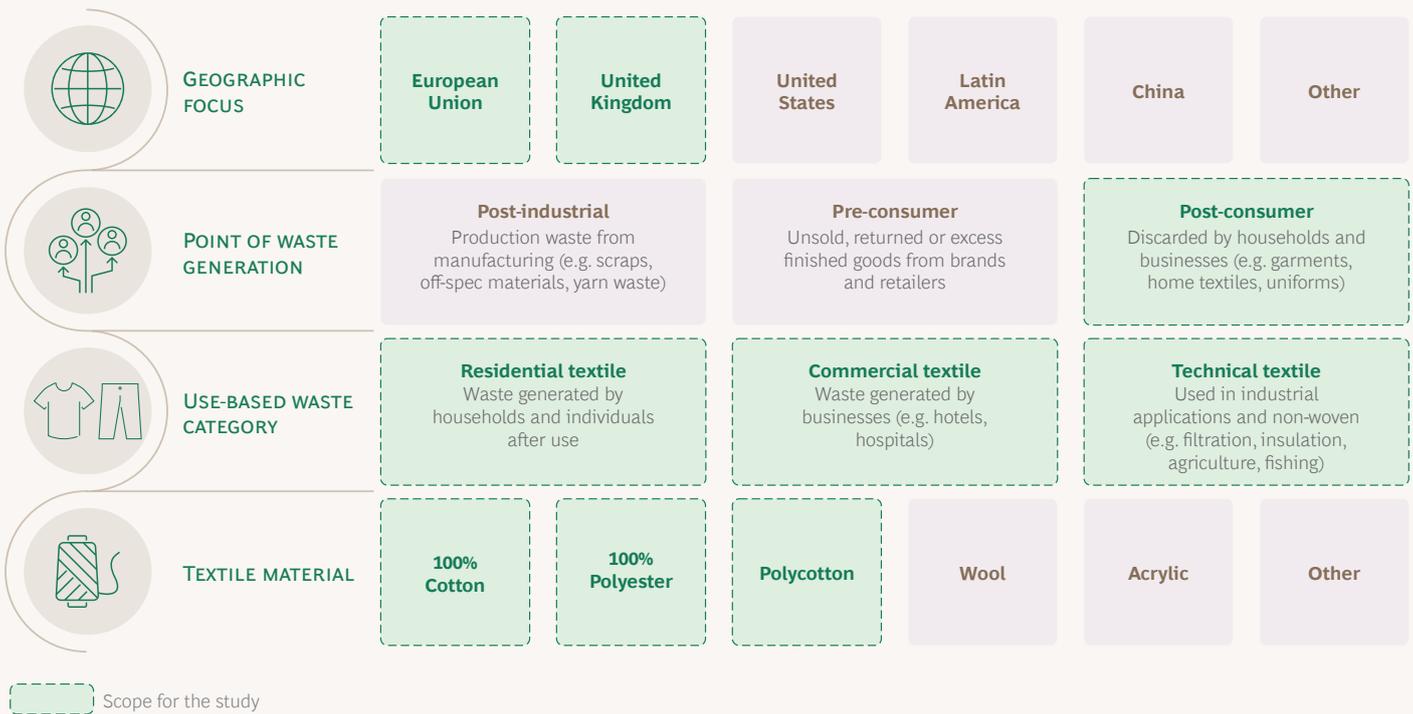
Bridging the economics gap requires enabling mechanisms that coordinate the chain and share risk (e.g., standards and specifications, EPR design/eco-contribution fees, public/private de-risking and financing tools)



Textile-to-textile recycled fibers are a new product category answering a planetary need for circularity, but with structurally higher processing costs. Under current conditions, they will not be cost-competitive with incumbent recycled routes (e.g., bottle-to-textile)

SCOPE

Defining the playing field for this study



Simplified Textile-to-Textile waste value chain



1. Assumed to remain predominantly manual; **2.** We assume automation primarily scales during pre-processing phase; **3.** Feedstock is textile material that has been cleaned of disruptors and low-purity fractions, limited to high-quality cotton and polyester textiles (100% cotton, 100% polyester, or polycotton >70% of either polyester or cotton), and pre-processed into small pieces suitable for recycling; **4.** In this report, the recycling scope covers the full process from collection to yarn production. Volumes labelled 'recycled' in Exhibits 9–10 refer to recycling-ready textile feedstock sent to recycling facilities (input). Output products (e.g., monomers/pellets, dissolving pulp, fibers/yarn) depend on process yields and are treated separately in the techno-economic assumptions. For polyester, chemical recycling output refers to recycled PET polymer (e.g., pellets) subsequently spun into yarn. For cotton/cellulosics, output refers to recycled dissolving pulp used for MMCF spinning.

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Executive summary

1. Europe generates considerable post-consumer textile waste (c. 25 kg per person in 2025), but the system captures and qualifies only a fraction for recycling

TEXTILE WASTE IS GROWING RAPIDLY IN EUROPE, EXPLAINED PRIMARILY BY POST-CONSUMER VOLUMES. IN 2025, EUROPE GENERATED AROUND 15.2 MT OF TEXTILE WASTE, OF WHICH 13.3 MT IS POST-CONSUMER (I.E., 9 OUT OF 10 TONS). EACH PART OF THE VALUE CHAIN FACES CONSTRAINTS OF ITS OWN:

1. Once generated, collection and sorting are constrained, limiting the playing field for T2T recycling. Europe generates 13.3 Mt of post-consumer textile waste in 2025, but only 1.5 Mt is collected and sorted - roughly one ton in nine. With collection around 33% and sorting around 36%¹, the addressable base for T2T remains small and concentrated. Polyester & cotton (including polycotton²) represent 79% of molecules within post-consumer collected and sorted textile waste.

2. Generation is accelerating with the rise of fast fashion: more purchases, fewer wears, and shorter lifetimes. Structural demand growth (4% p.a. since 2020) is amplified by a fast fashion market projected to expand at 11% p.a. between 2025 and 2035, enabled by low-cost production and global e-commerce. The result is a steady compression of product lifetimes: EU consumers buy around 95 textile pieces³ per year (up 12% versus 2019).

Policymakers have acknowledged the challenge and are taking action across the value chain, as the policy framework continues to take shape. From 2025, mandatory separate collection of textiles and the roll-out of textile EPR will set a baseline for collection performance and funding, while export restrictions on unsorted textile waste and bans on destroying unsold textiles will reduce the system's escape valves. The next step is to translate this policy momentum into operational reality: expand collection capabilities, upgrade sorting depth into recycling-grade streams, introduce recyclability and recycled-content criteria in textile production, and align definitions and data to provide more confidence for investors.

Scaling T2T will require the establishment of robust economic conditions that make collecting, sorting and recycling financially viable at scale.

2. Assessing the viability and economics of T2T circularity in Europe

TO HELP CONTAIN THE PROJECTED GROWTH IN POST-CONSUMER TEXTILE WASTE, TEXTILE-TO-TEXTILE (T2T) RECYCLING WILL NEED TO SCALE RAPIDLY IN EUROPE. THE KEY QUESTION IS WHETHER THE ECOSYSTEM CAN BE INDUSTRIALIZED QUICKLY ENOUGH - AND UNDER WHICH ECONOMIC CONDITIONS - TO MOVE BEYOND PILOTS AND ABSORB A MEANINGFUL SHARE OF INCREMENTAL WASTE VOLUMES.

1. "Sorting rate" as used in this report refers to the share of collected textiles (excl. direct reuse) that is converted into non-reuse, recycling-oriented sorted streams (i.e., material passed on for textile recycling). It does not represent total operational sorting capacity or overall sorting performance across all end-markets.; **2.** Polycotton is a blended textile fabric made from a mix of polyester (PET) and cotton fibers; **3.** Textile pieces include apparel and home & technical textiles (e.g., mattresses) excluding footwear

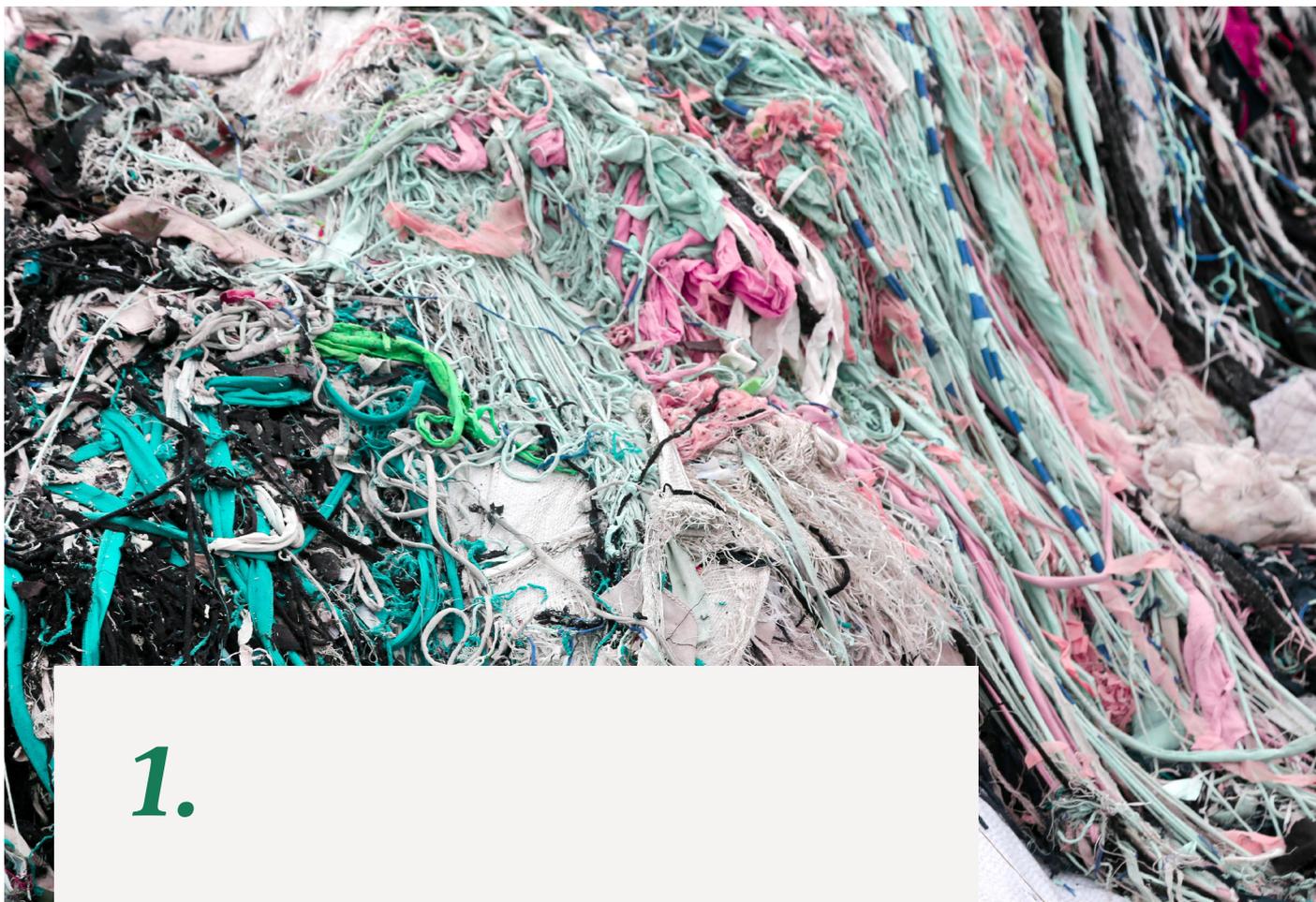
This section therefore assesses what a system build-out would entail to scale T2T recycling from below 1% today to around 15% by 2035. Reaching this level by 2035 implies early action: industrial investment cycles typically span 5+ years, especially for first-of-a-kind assets, with a whole value chain to be set in motion and supporting mechanisms to be put in place upfront (e.g., technology validation, offtake agreements, demo-plant readiness).

In practice, scaling T2T circularity towards c. 15% by 2035 translates into step-changes across the value chain. Collection through dedicated channels would need to increase materially from c. 33% in 2025 to c. 50% by 2035. Sorting would need to scale from c. 36% in 2025 to c. 63% by 2035, alongside the deployment of associated pre-processing capabilities to prepare recycling-ready feedstock. At the back-end, recycling into new textiles would need to expand sharply and reach 2.7 Mt of textiles recycled into new textile fibers.

Achieving this scale-up is estimated to require an incremental €8-11B in CAPEX “one-off investment” and €5-6.5B in OPEX “cost recurring every year”. Under the baseline assumptions used in this economic model, T2T circularity tends to imply lower profitability for several links in the chain, compared to incumbent textile waste-management streams. This translates into compressed or negative EBIT margins in some cases (e.g., -75% to -25% for polyester recyclers).

As a result, enabling mechanisms are required for T2T circularity to become investable—and hence scalable—over the transition period. These could take the form of public policies (e.g., education programs to raise collection), targeted CAPEX grants (e.g., to pre-processors or recyclers), eco-modulated fees (designed to cover the true net end-cost across collection, sorting, pre-processing and recycling) and regulatory measures (e.g., mandating a minimum share of recycled fibers in textile production). Additional sensitivities could also be explored (e.g., alternative operating models such as sorting in lower-income economies).

Beyond the gross CAPEX and OPEX requirements, a complete business case should also account for the avoided costs currently borne by the general waste system to manage textiles that end up in residual streams (e.g., collection and treatment of mixed waste, bulky waste handling and local clean-up), which could be reduced through segregated textile collection—an area that will need to be sized to assess the net system economics of T2T.



1.

Diagnosing today's textile waste challenge and policy context

Europe's textile circularity gap is explained by rising consumption and the limited capacity of post-consumer systems to capture, sort and recycle textiles back into new textiles. In 2025, Europe is expected to generate 15.2 Mt of textile waste, including 13.3 Mt of post-consumer textiles, yet only 1.5 Mt—roughly one ton in nine of the post-consumer stream—is currently collected and sorted. Moreover, less than 1% is recycled back into new textiles.

Global textile waste is rising faster than the system can absorb, fueled primarily by post-consumer waste

Global textile waste is projected to grow by about 50 Mt by 2035, with post-consumer as the growth engine. Volumes are projected to rise from 127 Mt in 2025 to 180 Mt by 2035. Textile waste is no longer concentrated at production sites but

increasingly generated by households and businesses after use (e.g. individual garments, hotel linens, hospital uniforms, ...), where capture and qualification are structurally more complex.

The current system drives escalating emissions, mounting disposal burdens, and higher system costs. It increases costs and regulatory exposure linked to emissions, water and chemical pollution, microplastic release, and landfill saturation. At the same time, this leakage results in a loss of economic value: textiles that could serve as secondary raw materials are instead turned into disposal costs, while their loss reduces future access to recycled feedstock and compromises the economics of a European textile recycling industry.

Structural demand growth and fast fashion accelerate post-consumer waste generation

Underlying demand for textiles keeps rising, making waste growth structurally embedded. Global textile consumption grows at around 4% per year since 2020, outpacing population growth. Rising incomes and an expanding global middle class translate into higher per-capita purchases and a larger stock of textiles that will eventually reach end-of-life streams.

Fast fashion¹ amplifies churn through low prices, rapid turnover, and global e-commerce reach. The fast fashion market is projected to grow around 11% per year from 2025 to 2035, multiplying collections and shortening replenishment cycles, and reaching a total size of \$472B by 2035. In parallel, the textile mix keeps shifting toward polyester, reinforcing both volume growth and recycling complexity.

Shorter lifetimes are the hidden multiplier converting demand into post-consumer waste. EU consumers buy around 95 textile pieces per year. In France, consumers buy around 48 garments² per year, and some estimates suggest around two-thirds are never worn before disposal - converting purchases almost directly into waste.

1. Refers to low-cost, rapid-turnover apparel produced and distributed at scale. Ultra-fast fashion is a more extreme subset of fast fashion, defined by ultra-short lead times and very high SKU churn via digital-first models; **2.** Refers to apparel only (excludes home textiles)

Only a limited share of post-consumer waste is currently available for T2T recycling in Europe

Europe generates 13.3 Mt of post-consumer textile waste in 2025, but only about 1.5 Mt are collected and sorted.

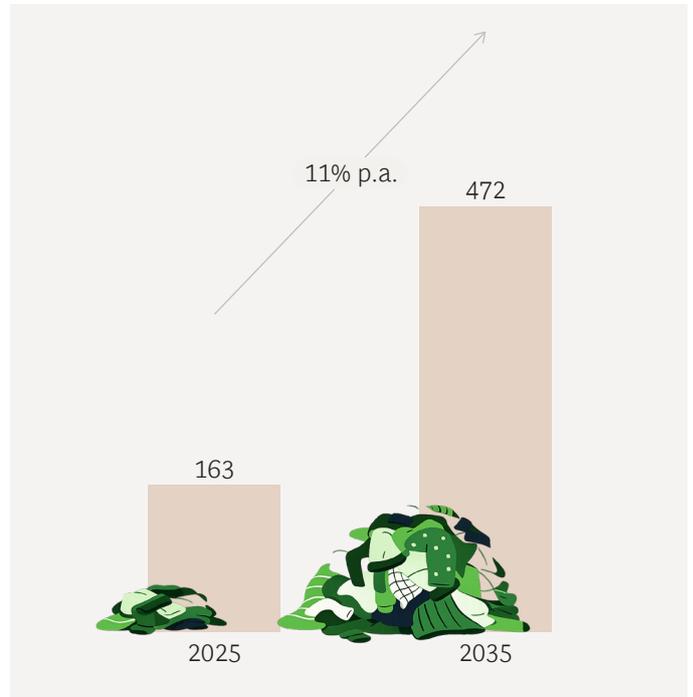
Collection and sorting performance – respectively 33% and 36% – explain most of the gap between theoretical and addressable feedstock. This leaves large volumes uncollected, unsorted, or diverted to other routes, either sustainable (reuse) or unsustainable (landfill, incineration).

The resulting feedstock base is narrow, concentrating early T2T pathways on the largest fiber families.

Polyester and cotton represent 79% including polycotton of molecules within post-consumer collected and sorted textile waste. Other fibers are smaller, more fragmented in end uses, and currently less mature in T2T pathways.

EXHIBIT 1

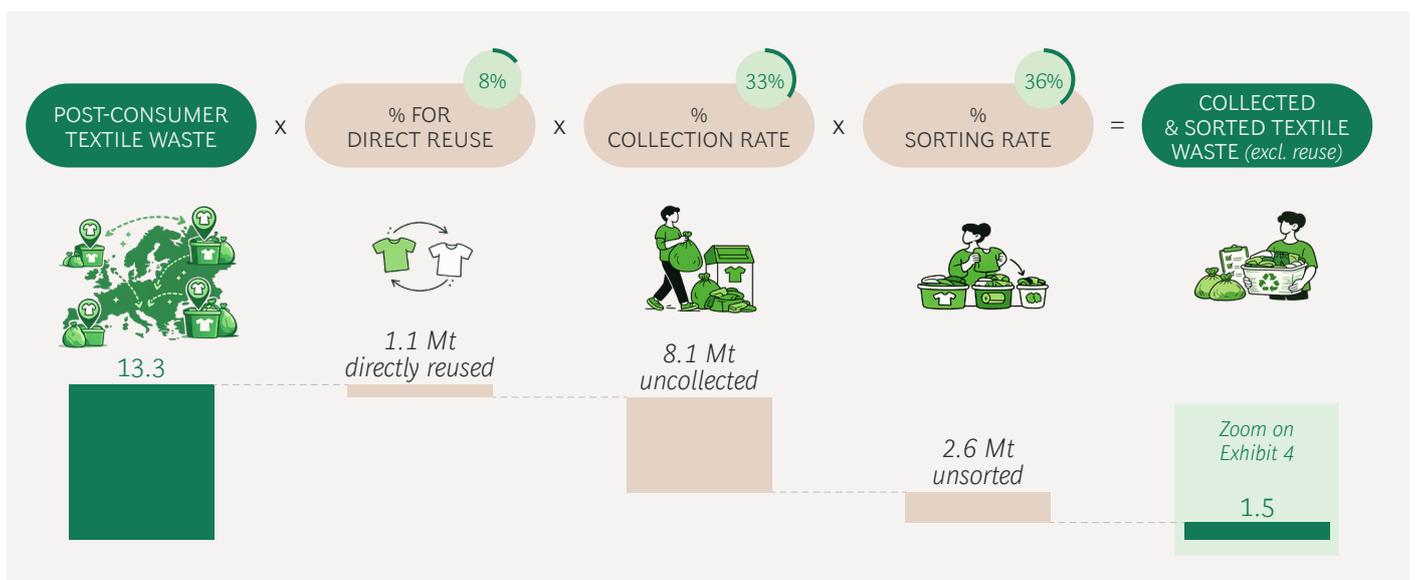
Fast fashion is expanding rapidly worldwide — increasing textile waste generation and shortening lifetimes (\$B)



Source: Fortune business insights report 2024; Desk research; BCG analysis

EXHIBIT 2

Textile waste flows in Europe (2025) and composition of the collected-and-sorted fraction, Mt

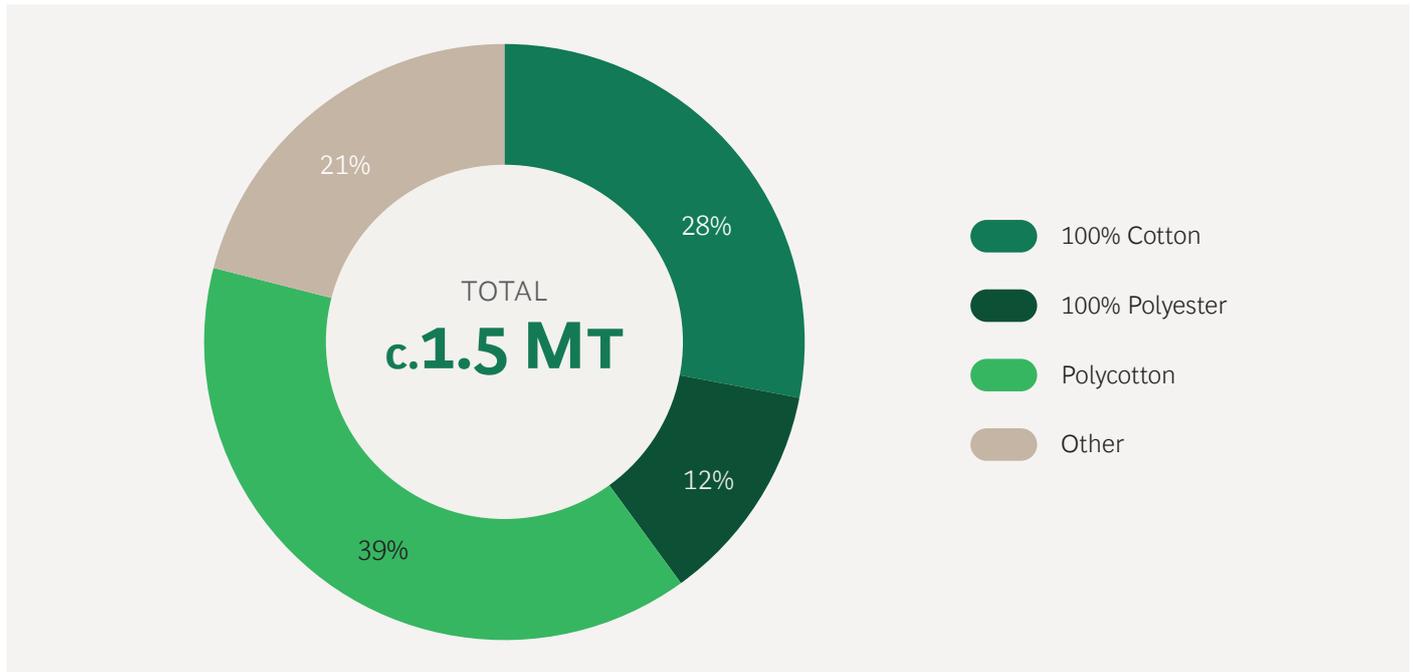


Note: The collection rate (33%) is calculated on post-consumer textile waste excluding direct reuse. The sorting rate (36%) is calculated on the collected fraction excluding direct reuse (4.1 Mt) and represents the share converted into non-reuse “collected & sorted textile waste” (1.5 Mt)

Source: BCG analysis

EXHIBIT 3

Composition of the collected-and-sorted waste, %



Source: BCG analysis

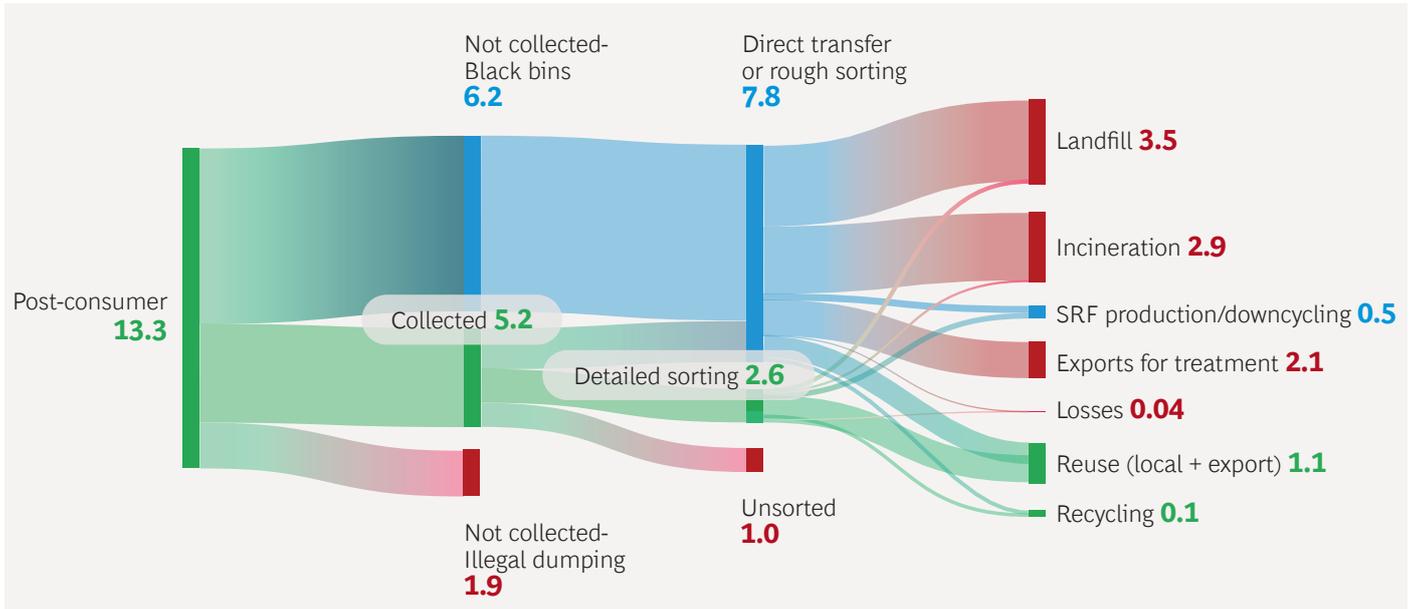
Post-consumer waste is largely routed to landfills and incineration rather than circular recovery

Even before sorting, a large share of post-consumer textiles never enters dedicated collection channels. Collection remains incomplete: only around one third of post-consumer waste is collected through separate textile collection, while around half is discarded in residual household waste (“black bins”), where it is heavily contaminated and degraded, rendering it effectively lost to the recycling system. The rest of post-consumer waste is mostly subject to illegal dumping. This upstream leakage is the main reason recyclers lack stable and predictable access to post-consumer feedstock today.

But even where textiles are collected, the dominant route is still disposal through landfill or incineration - not closed-loop recycling. Limited sorting depth and routing practices mean that landfilling and incineration absorb the majority of volumes outside of illegal dumping and unsorted waste. Textile-to-Textile recycling remains marginal at less than 1% of total post-consumer textile waste, keeping circularity outcomes far below policy ambition.

EXHIBIT 4

Estimated split of post-consumer textile waste flows from generation to treatment in Europe (2025, Mt)



Source: EEA, Fashion for Good, Expert interviews, BCG textile waste model, BCG analysis

The EU is aiming for a system-wide regulatory response to address textile waste and circularity gaps

EU regulation is moving to a lifecycle approach—design and traceability upstream, end of life obligations and financing downstream—with 2025 as a clear step change. Measures now cover the full lifecycle (from waste generation to treatment and disposal), with two cross-cutting enablers: circular design and growing public funding. For example,

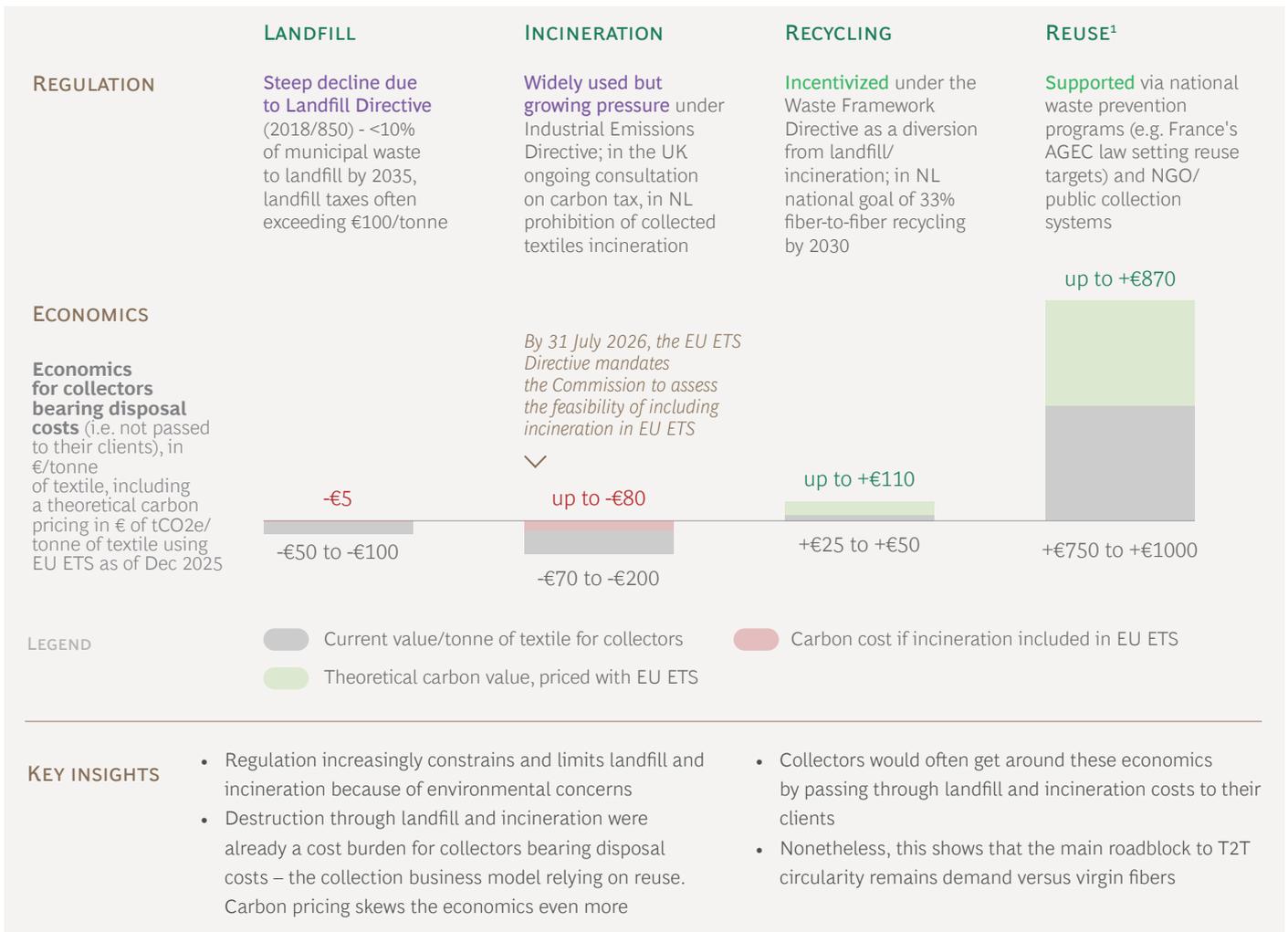
- Upstream (waste generation)
 - *The Ecodesign for Sustainable Products Regulation (ESPR)* establishes in 2024 binding sustainability and circularity requirements for products sold in the EU and introduces the Digital Product Passport, a digital record that will centralize verified lifecycle, material and compliance data to enhance traceability and transparency across the value chain. Textile-specific parameters are expected via delegated acts (expected 2027-2028)
 - *The Green Claims initiative* raises the evidentiary bar for environmental marketing claims.
- Midstream (collection and sorting)
 - Mandatory separate collection of textiles from 2025 and the roll-out of textile *Extended Producer Responsibility (EPR)* schemes are expected to reshape first-mile economics (for textiles in scope as defined under WFD/EPR and national transpositions).
 - Eco-modulated fees and clearer expectations on sorting and cost recovery should improve financing and accountability across collection, sorting, pre-processing and recycling—covering the true net end-cost of end-of-life operations.

- Downstream (treatment & disposal)
 - Restrictions on exports of unsorted textile waste and a phased ban on the destruction of unsold textiles (from 2026 for large companies) reduce the system’s ability to divert excess volumes.
 - These measures will increase the need for domestic treatment capacity in Europe, recycled-content requirements for selected textile categories are expected through delegated acts around 2027–2028.

The exhibit below shows how tightening regulation is eroding the potential for landfill and incineration, and how carbon pricing would erode their economic viability even more, while improving the business case at the collector level for recycling and reuse.

EXHIBIT 5

Waste management | Regulatory pressure pushes out landfill and incineration, creating opportunities to scale recycling via economics **for collectors** bearing disposal costs



Note: This exhibit shows collector economics (€/tonne) and an illustrative carbon-price overlay (EU ETS, Dec-2025) applied to incineration emissions only. It is not a life-cycle assessment and does not quantify substitution effects (e.g., avoided virgin textile production) nor reuse market feasibility constraints
Source: A Larsen et al. – CO₂ emission factors for waste incineration: Influence from source separation of recyclable materials, 2011; JRC Environmental and economic assessment of plastic waste recycling, 2023; IEA; ZeroWasteEurope; Expert interviews; Desk research; BCG analysis; 1. Reuse economics apply to the reusable fraction only; non-reusable textiles still require recycling or disposal routes. Reuse channels have historically benefited from public/NGO support and established infrastructure, which contributes to their relative economics today.

EXHIBIT 6

Selected EU policy and regulatory milestones that would enable textile circularity (2022-2025)

WASTE GENERATION	WASTE COLLECTION	TRANSFER & SORTING	WASTE TREATMENT & DISPOSAL
MANDATORY TRACEABILITY AND CIRCULAR DESIGN			

- **2022** EU Strategy for Sustainable and Circular Textiles: policy agenda for durable, repairable, recyclable textile, largely made of recycled fibers

- **2023** Green Claims: Requires scientific proof for environmental claims - Still under negotiation in Brussels (trilogue stage)

- ● **2024** Ecodesign for Sustainable Products Regulation (ESPR): Digital Product Passport to track materials throughout a product's lifecycle + Eco-design requirements; textile-specific parameters to be defined via delegated acts (expected 2027-2028)

PUBLIC FUNDING AND INDUSTRIAL INCENTIVES

- **2022** Innovation Fund: EU-level grants for textile recycling and circularity projects

- **2024/2025** Horizon Europe: EU-level grants for innovations in fiber-to-fiber recycling, bio-based textiles and circular business models in fashion

- ● **2025** Waste Framework Directive (rev): mandatory national EPR¹ programs, where producers pay eco-modulated fees to finance collection, sorting, reuse and recycling (producers pay less if their products are more durable or easier to recycle) – to be implemented at national level by 2028

WIDESPREAD ADOPTION OF EPR FOR TEXTILES	MANDATORY SEPARATE COLLECTION OF USED TEXTILES	REQUIREMENTS FOR SORTING, INCLUDING COST RECOVERY	LANDFILLING AND DESTRUCTION BANS
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- **2018** Waste Framework directive: mandatory EPR for textile

- **2018** Waste Framework Directive: separate textile collection required from Jan 2025 across EU

- **2024** Waste Shipment Regulation: tightens conditions under which textile waste can be exported from EU to non-OECD countries, expected 2026-2027

- **2024** ESPR: Bans destruction of unsold textiles from 2026 for large companies (2027–2030 for SMEs), obligation to publish information on discarded unsold goods – with exceptions like recycling to be adopted through delegated act, expected 2027-2028

- **2025** National EPR implementation deadline for textiles by 2028

MANDATORY RECYCLED CONTENT TARGET

- ● **2024** ESPR: minimum recycled content requirements (via delegated acts, expected from 2027-2028)

20xx Entry into force

- Legally binding regulatory framework
- Program: EU funding initiative, not legally binding
- Strategy or Guidelines: EU-issued, non-binding
- Not yet fully enforced (e.g. pending delegated acts or transposition)

1. Extended Producer Responsibility
Sources: Desk research; BCG analysis

FRANCE SNAPSHOT



France has established regulatory foundations, but still captures only a limited share of post-consumer textiles through separate collection (c. 34% in 2025). Most losses occur upstream in residual household waste, while sorting performance is relatively strong once textiles enter the system (c. 76% of collected volumes).

Collected & sorted post-consumer textile waste in France by material in 2025, Mt



Regulatory Environment



WASTE GENERATION

- Textile EPR (Refashion) with eco-modulation (bonus-malus)
- Proposed anti fast-fashion bill under discussion to penalize low environmental scores (not adopted at this stage)



WASTE COLLECTION

- EPR operator obligated to maintain a nationwide collection network
- National decrees separate textile collection requirements



TRANSFER & SORTING

- Decrees specify sorting/reuse/treatment obligations and assign cost coverage to producers under the EPR system



WASTE TREATMENT & DISPOSAL

- Ban on destruction of unsold textiles
- Mandatory recyclability information and recycled-content disclosure (no minimum threshold)



Policy proposed or debated; not yet adopted



Policy formally adopted, but not yet fully implemented



Policy applies in practice and sets binding obligations



Policy applies and actively monitored and enforced

Source: EEA, Fashion for Good, Refashion, Expert interviews, BCG textile waste model, BCG analysis

GERMANY SNAPSHOT



Germany achieves high separate collection (c. 65% in 2025), but only a small share is converted into sorted volumes (c. 24%). As a result, a large fraction of collected textiles remains unsorted, limiting access to recycling-grade feedstock despite strong collection performance.

Collected & sorted post-consumer textile waste in Germany by material in 2025, Mt



Regulatory Environment

			
WASTE GENERATION	WASTE COLLECTION	TRANSFER & SORTING	WASTE TREATMENT & DISPOSAL
<ul style="list-style-type: none"> National Circular Economy Strategy (2024) signals support for circular business models Textile EPR legislation anticipated but not adopted 	<ul style="list-style-type: none"> Waste management act (KrWG) requires separate textile collection by public waste authorities 	<ul style="list-style-type: none"> Producer financing/ cost-modulation principles expected under future EPR, but rules are still pending 	<ul style="list-style-type: none"> Restrictions on destruction of unsold textiles expected to be introduced
<ul style="list-style-type: none">  Policy proposed or debated; not yet adopted  Policy formally adopted, but not yet fully implemented 		<ul style="list-style-type: none">  Policy applies in practice and sets binding obligations  Policy applies and actively monitored and enforced 	

1. "Unsorted" textile waste in Germany flows largely to export or low-grade routes
 Source: EEA, Fashion for Good, Expert interviews, BCG textile waste model, BCG analysis

NETHERLANDS SNAPSHOT



The Netherlands stands out as a reference case where binding EPR and enforcement translate into performance. Collection is moderate (c. 47% in 2025), but nearly all collected textiles are sorted (c. 97%), resulting in consistently high conversion into qualified post-consumer feedstock.

Collected & sorted post-consumer textile waste in Netherlands by material in 2025, Mt



Regulatory Environment



WASTE GENERATION

- EPR decree (2023) plus per-item EPR fees (2024)
- Circular Textile Policy 2025–2030 sets sustainability criteria



WASTE COLLECTION

- EPR enforcement requires producers to establish separate collection systems



TRANSFER & SORTING

- Legal targets for reuse/recycling and fiber-to-fiber rates (25% by 2025; 33% by 2030)



WASTE TREATMENT & DISPOSAL

- EPR decree prohibits landfilling/incineration of collected textiles, prioritizing reuse and recycling



Policy proposed or debated; not yet adopted



Policy formally adopted, but not yet fully implemented

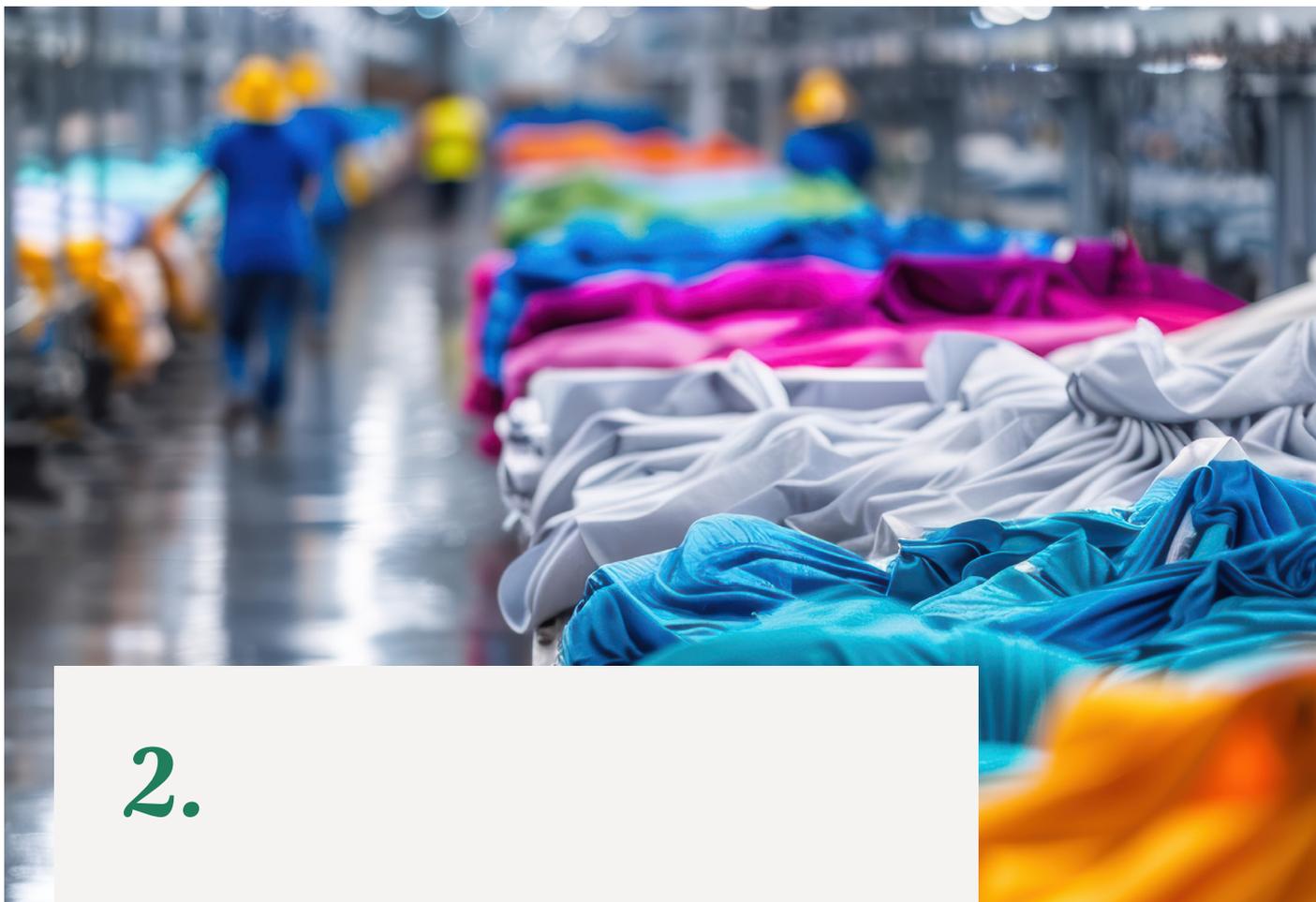


Policy applies in practice and sets binding obligations



Policy applies and actively monitored and enforced

Source: EEA, Fashion for Good, Refashion, Expert interviews, BCG textile waste model, BCG analysis



2.

Assessing the viability and economics of T2T circularity in Europe

Textile-to-Textile (T2T) circularity is constrained by economics at system level, across collection, sorting, pre-processing and recycling. Pilots have proven feasibility of T2T circularity; the real question is what conditions are needed to scale and form a viable market.

Multiple pilot projects already demonstrate technical feasibility. However the system today remains characterized by fragmented volumes, bespoke economics and limited coordination across the value chain. At this scale, T2T recycling operates as a niche activity rather than a structural response to the growth of post-consumer textile waste.

In this section, we outline the approach used to assess the economics of T2T scale-up, then present the core results—starting with the investment and operating cost envelope required to launch the ecosystem. A technical appendix provides additional detail on methodology and the key assumptions underpinning the modelling.

EXHIBIT 7

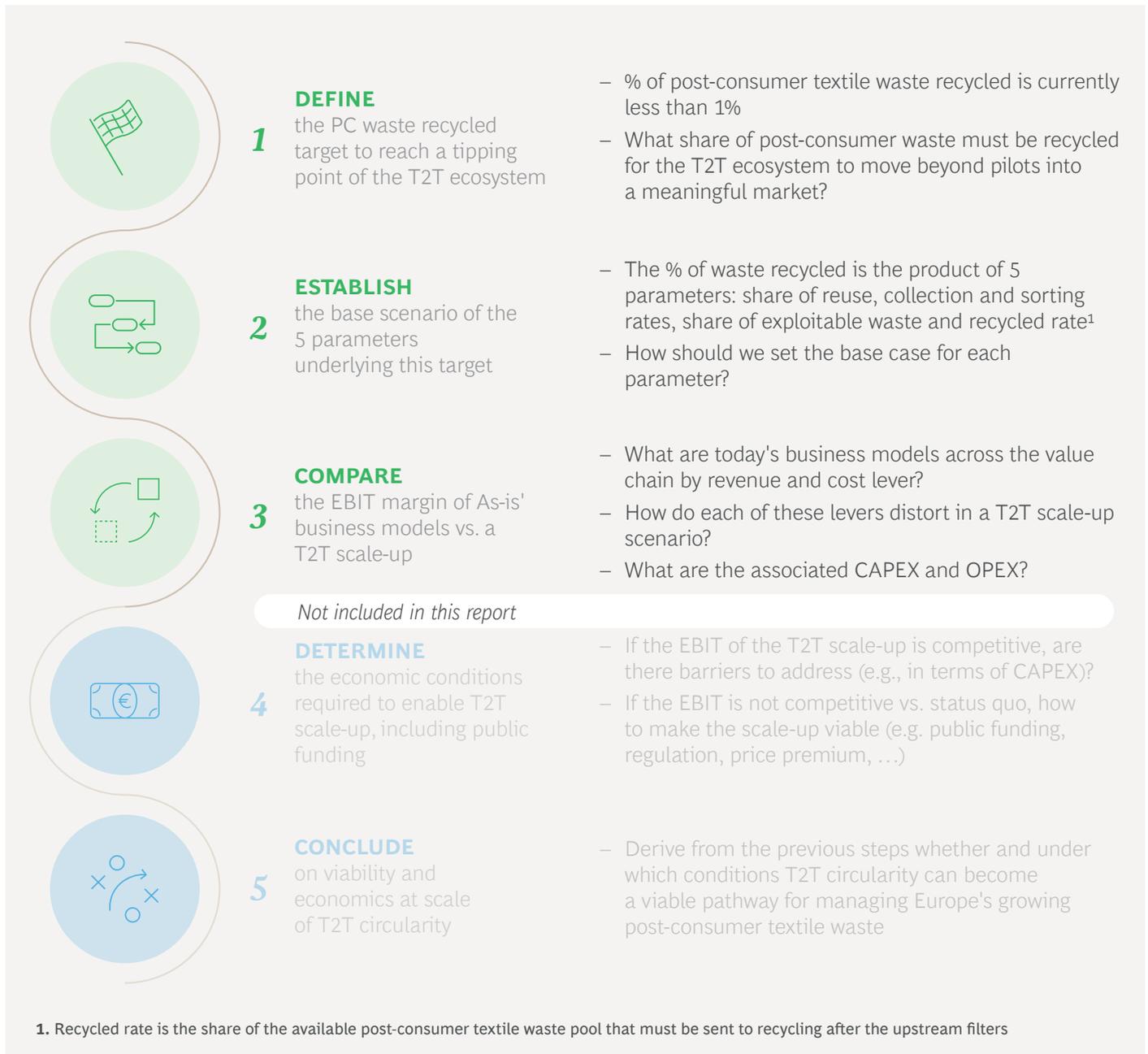
European textile stakeholders: The core textile waste value chain is supported and shaped by transversal stakeholders

CORE WASTE VALUE CHAIN STAKEHOLDERS	Collectors	Sorters	Pre-processors	Recyclers	Yarn manufacturers	Brands
	Collect post-consumer textiles from households, retailers, and public collection points	Sort collected textiles by quality, material, and end-use (reuse, recycling, disposal)	Prepare sorted textiles into recycling-ready feedstock (e.g., shredding, cleaning, contaminant removal)	Convert textile waste into recycled fibers or polymers through mechanical or chemical processes	Transform recycled polymers or fibers into yarns suitable for textile production	Create demand by specifying, purchasing, and integrating recycled yarns into finished products

TRANSVERSAL STAKEHOLDERS	Regulators & policymakers <i>Rule-setting, mandates, targets, enforcement</i>				
	European Commission Waste Framework Directive, separate collection, decarbonization, etc.	European Parliament ESPR, Digital Product Passport, recycled content mandates	EU member state governments Ministries of Environment / Industry	National environmental agencies	EU agencies and technical bodies Monitoring, reporting, policy support Technical input underpinning EU legislation
	System enablers & implementation bodies <i>Execution, funding, coordination, data, industry alignment</i>				
	Producer Responsibility Organisations (PROs)	Industry & ecosystem platforms		Public financing & investment bodies	Applied research & public innovation bodies
	Private investors <i>Capital providers enabling scale-up, infrastructure deployment, and commercialization</i>				
	Infrastructure & industrial investors	Private equity	Venture capital & growth equity	Impact & sustainability-focused investors	Corporate venture & strategic investors

EXHIBIT 8

Our approach to assess the viability and economics at scale of T2T circularity



Our approach: testing what it would take for T2T to scale

We assessed the viability and economics of scaling T2T circularity through a decision-oriented sequence (Exhibit 9).

This section answers practical questions that matter for investment and policy design:

- What CAPEX and OPEX levels are required by each stakeholder to launch the T2T ecosystem?
- How does T2T profitability (EBIT margin) compare to the current (“As-is”) business model for each stakeholder?

Results: the investment envelope and the economics gap to close

The analysis yields a clear message. Launching T2T at scale is both an investment challenge and a profitability challenge for several links in the chain. Both must be addressed in parallel to unlock coordinated scale-up.

Exhibit 10 outlines the baseline assumptions underpinning this analysis. Achieving meaningful scale in T2T recycling requires c. 2.7 Mt of textile waste to be recycled by 2035, corresponding to approximately 15% of post-consumer textile waste. This target translates into coordinated progress across three interdependent operational levers—collection, sorting, and recycling—which must advance in parallel to enable scale.

Even if the system lands below 15%, the message holds: credible trajectories across published analysis span ~10-20%, and depend on the same levers—collection, sorting and recycling yield.

EXHIBIT 9

Scaling T2T depends on 3 levers:

COLLECTION, SORTING, and RECYCLING among available fabrics



	% OF POST-CONSUMER WASTE RECYCLED		PC WASTE EXCL. REUSE ¹		COLLECTION RATE		SORTING RATE		SHARE OF EXPLOITABLE TEXTILE WASTE ²		RECYCLED RATE ³	
			FIXED		ACTIONABLE LEVER	ACTIONABLE LEVER			FIXED		ACTIONABLE LEVER	
Today – 2025	<1%	0.1Mt	92%	12.2Mt	33%	4.1Mt	36%	1.5Mt	59%	0.9Mt	16%	0.1Mt
Scenario 1 – Base scenario 15% target by 2035	15%	2.7Mt	88%	15.9Mt	50%	8.0Mt	63%	5.1Mt	62%	3.1Mt	87%	2.7Mt
<i>Example of alternative scenarios:</i>												
Scenario 2 - 10% target + higher collection	10%	1.8Mt	88%	15.9Mt	60%	9.5Mt	63%	6.0Mt	62%	3.7Mt	48%	1.8Mt
Scenario 3 - 20% target + lower collection	20%	3.6Mt	88%	15.9Mt	45%	7.2Mt	82%	5.9Mt	62%	3.6Mt	100%	3.6Mt

1. Reuse is assumed to grow from 8% in 2025 (~1.1Mt) to 12% in 2035 (~2.2Mt). While exports for reuse should decrease slightly due to the competition of fast fashion in emerging economies, local reuse should keep increasing with the development of sustainable practices and because collectors derive 90% of their revenues from reuse, making reuse a critical part of the system's economic viability; 2. Share of exploitable textile waste is the share of collected & sorted textiles that can be converted into recycling-ready feedstock after removing disruptors and low-purity fractions. In this report, acceptable textile quality includes 100% cotton, 100% polyester, and polycotton (>70% cotton or >70% polyester) The rate is supposed to increase over time through an increased acceptable textile quality share (more polyester in fabrics) and a slightly decreased loss due to disruptors; 3. Recycled rate is the share of recycling-ready feedstock that is directed to recycling facilities (input), after upstream filters (collection, sorting and quality)

Figures are order-of-magnitude estimates of the incremental CAPEX (build-out) and recurring OPEX (run-rate in 2035) required to move from today's baseline to the 2035 scale-up scenario.

1. Investment needs: €8–11B CAPEX and €5–6.5B recurring OPEX by 2035

Under Scenario 1 (base case), bridging the gap between today's system (2025) and the levels required in 2035 implies a step-change in both one-off investment needs and recurring operating costs. Overall, the incremental effort is estimated at c.€8–11B in CAPEX and c.€5–6.5B in OPEX per year by 2035.

Underlying scale and volume assumptions are described in the Appendix.

EXHIBIT 10

Case study – Even with €8–11B CAPEX and €5–6.5B recurring OPEX by 2035, selected textile-focused players would require additional levers to achieve sustainable T2T profitability – under as-is pricing (no T2T premium) assumption

How to read: EBIT ranges reflect a strict baseline (as-is pricing / no T2T premium; simplified EU-based chain) to size the economics gap — not a forecast of long-term industry economics. Alternative geographic configurations and/or learning-curve improvements can improve economics, but are not modelled in this baseline.

STAKEHOLDER GROUP ¹	WHAT CAPEX AND OPEX LEVELS ARE REQUIRED BY EACH STAKEHOLDER TO LAUNCH THE T2T ECOSYSTEM?			HOW DOES T2T PROFITABILITY (EBIT MARGIN) COMPARE TO THE CURRENT ('AS-IS') BUSINESS MODEL FOR EACH STAKEHOLDER?	
	To reach	One-off ² In CAPEX	Recurring every year ² In OPEX	'As-is' EBIT margin	T2T EBIT margin ³
TEXTILE COLLECTORS	8Mt collected	€300M	€900M to €1.2B	0 to 5%	0 to 5%
TEXTILE SORTERS	5.1Mt sorted	€300M to €450M	€500M to €850M	3 to 5%	-5 to 0%
TEXTILE PRE-PROCESSORS	3.1Mt pre-processed	€600M to €850M	€550M to €750M	5 to 10%	4 to 8%
TEXTILE RECYCLERS – polyester ⁴	1.1Mt recycled into polyester	€5B to €7.5B	€1B to €1.3B	n.a.	-75 to -25%
TEXTILE RECYCLERS – cotton ⁵	1.6Mt recycled into cellulose	€2B to €2.2B	€2B to €2.5B	<i>No existing model of T2T recycling</i> n.a.	-100 to -50%
TOTAL	2.7Mt recycled	€8B to €11B	€5B to €6.5B		

LEGEND	% T2T EBIT margin higher or equal to 'As-is'	% T2T EBIT margin close to 'As-is'
	% T2T EBIT margin lower to 'As-is' or negative	

Note: values shown are based on limited data; **1.** Scope limited to independent, textile-focused collectors, sorters, pre-processors and recyclers. Integrated multi-activity waste management groups are excluded; **2.** Incremental CAPEX and OPEX required to bridge the gap between current (2025) collection, sorting, pre-processing and recycling rates to required levels in 2035; **3.** T2T EBIT margins are calculated on an “as-is equivalent pricing basis: the same output prices/transfer prices and commercial terms as today are assumed (i.e., no T2T price premium); **4.** Recycling of polyester through chemical recycling, assumed to be the most scalable pathway; **5.** Cotton/cellulosic T2T recycling assumptions are less mature; Source: BCG analysis

Two implications stand out. First, CAPEX is heavily concentrated in recycling—particularly polyester—reflecting the capital intensity of (chemical) recycling and the need to build new industrial assets at scale. Second, recurring OPEX is material across the chain and cannot be treated as a secondary consideration in the design of financing and policy mechanisms.

II. Profitability: T2T is an “EBIT delta” question vs. “As-is”

To make stakeholder economics comparable and to reflect the constraints of the initial scale-up phase, the profitability assessment in this section is conducted under a set of four design premises. These premises are not intended as a prediction of the final market structure; they aim to create a consistent baseline to identify where the economics do not yet close and, therefore, where enabling levers may be required.

The EBIT comparison presented in exhibit 10 should therefore be read as a strict baseline under these premises: it is designed to surface the economics gap that must be addressed through productivity improvements, market design choices, and—where relevant—policy and financing mechanisms.

These results do not imply that T2T cannot become investable. They indicate that, at the levels of performance and pricing captured in this draft, the ecosystem requires mechanisms that accelerate learning curves, improve yields and shift value to the parts of the chain that carry additional costs.

III. Closing the gap: levers to improve economics and the role of public support

Where economics fall short under the strict baseline used in this draft, the objective is not to permanently substitute market forces, but to catalyze market formation until learning

T2T circularity can deliver real-world impact: cutting CO2 emissions and breaking dependence on virgin oil, at a realistic price

Material climate impact

- Recycling 2.7Mt of textile waste avoids c.2-3 Mt of CO₂e
- Equivalent to 1-2x the annual emissions¹ of a city like The Hague



Cost-realistic T2T circularity scale-up

- €10B in CAPEX may sound high but is realistic vs past green transitions
- Example of European offshore wind
 - Capacity scaled from 0.1GW (2005) to ~13GW (2016)
 - Required €50B cumulative investment
 - Achieved despite being one of the most expensive green electricity sources at the time (120+€/MWh)

Strategic opportunity: diversify material inputs and reduce reliance on virgin oil

- Synthetic textile production and oil-based cotton pesticides are dependent on virgin oil
- T2T circularity represents a pathway to:
 - Separate textile growth from virgin oil inputs
 - Re-industrialize material value chains in Europe
 - Reduce exposure to oil price volatility and geopolitical risk

1. Emissions of 2022 as reference; **Source:** The Hague Climate City Contract 2030 Climate Action Plan; 4C Offshore; Desk research; BCG analysis

EXHIBIT 11

T2T economics were built under 4 design principles. However, strict application of the first principle undermines the economic viability - What this means for scaling

01



No price premium for textile-to-textile vs. bottle-to-textile recycled fibers, to ensure market demand. The model absorbs the higher costs upstream – **creating a structural economic deadlock**

02



Companies would adopt T2T only if **profitability matches the As-is model** – hence the comparison of current vs. scale-up EBIT margins

03



Yarn manufacturers process T2T recycled and virgin fibers similarly, with **no significant economic impact**

04



The entire T2T chain is based in Europe, rather than outsourced to lower-income regions¹



Scaling T2T circularity from <1% today to 15% by 2035 is estimated to require ~10B in CAPEX and creates a material profitability gap under current assumptions



To close the profitability gap, someone must absorb a green premium:

- ✗ **RECYCLERS:** lack a viable model to carry the costs
- ✗ **GOVERNMENTS:** unlikely to cover costs sustainably over time
- ✗ **BRANDS:** margins too thin to absorb the ~2.5x higher costs of T2T vs. virgin fibers
- ✓ That leaves **CUSTOMERS** to bear the cost indirectly, as brands pass through higher prices driven by regulation (e.g. via EPR or minimum recycled content imposed on brands)

*Order of magnitude
Estimate of a cost surplus of T2T rPET on a €10 t-shirt = 60 cents*



A viable T2T scale-up would benefit from Europe-level coordination, including cross-country mutualization and supportive industrial policy environments

¹ To kickstart the T2T European ecosystem, a pragmatic transition approach could allow selected downstream activities (e.g., yarn manufacturing, garment production) to remain partially based in lower-income economies in the near term

curves, productivity gains and scale effects can take over. The question is therefore not “should Europe build T2T?”, but “what needs to change for the first wave of assets to be investable?”

Implications: coordinated scale-up, not isolated pilots

Taken together, these results suggest that T2T can become a viable pathway for managing Europe’s growing post-consumer textile waste, but only if scale-up is coordinated across the system. Recycling is the critical pivot point of the investment envelope, while upstream collection, sorting and pre-processing determine feedstock availability and quality. This reinforces a key conclusion of the study: scaling T2T requires aligned incentives, shared definitions and predictable flows—not isolated initiatives.

EXHIBIT 12

Europe faces a structural T2T circularity gap: system-wide intervention could enable scale

ECONOMICS DO NOT CLEAR AT SYSTEM LEVEL – ESPECIALLY FOR RECYCLERS

1

Structural negative profitability today, with high CAPEX and OPEX and insufficient revenues

Current regulatory developments may not be sufficient to unlock scale under modeled assumptions

DEMAND IS THE ULTIMATE SYSTEM TRIGGER

2

The system only moves when brands create credible, long-term demand for recycled fibers
Landfill and incineration are system costs, not sustainable economic solutions

WHILE COLLECTION AND SORTING REMAIN LARGELY NATIONAL, COORDINATED EU-LEVEL APPROACH COULD ENABLE ECONOMIC VIABILITY OF T2T RECYCLING

3

A fragmented approach where each country builds sub-scale assets would structurally weaken recycler economics

National upstream upgrades combined with cross-border mutualization and hub logic (e.g. multi-country recycling hubs by material) may improve economic viability of T2T recycling

SCALE REQUIRES SYNCHRONIZED VALUE-CHAIN BUILD-OUT

4

Recycling is the pivot point of the investment envelope, while upstream collection, sorting and pre-processing enable feedstock availability and quality

Scaling T2T means aligned incentives, shared definitions and predictable flows - fragmented or sequential initiatives will fail to unlock scale



- What combination of cost and revenue levers to unlock profitability at scale? Pricing, subsidies, mandates, contracts, risk-sharing?
- Who must pay, how much and for what outcome? Public authorities vs. brands vs. consumers
- Which interventions unlock scale fastest – and which are ineffective? Where should capital and policy focus first?
- Is T2T circularity the most viable pathway?

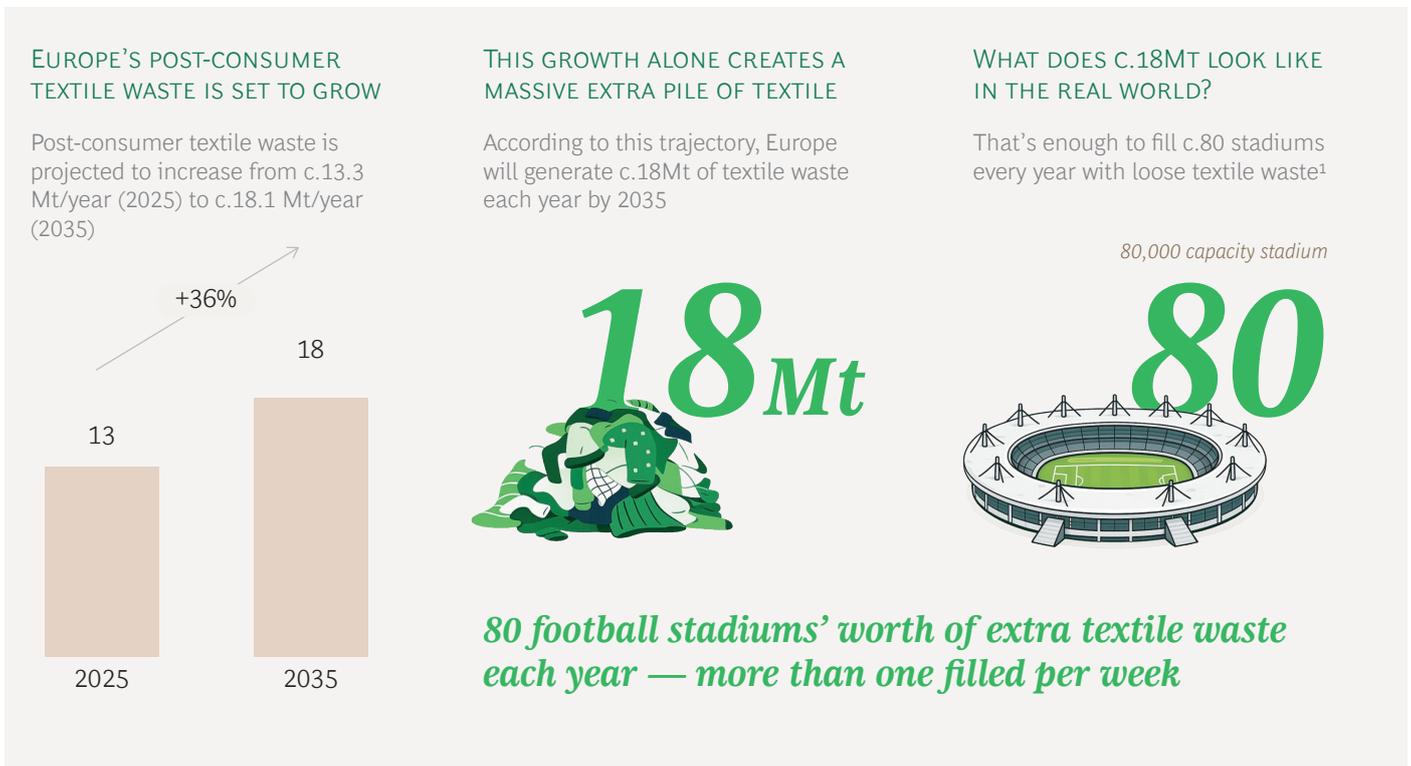
EXHIBIT 13

Illustrative | Combination of levers to scale T2T circularity

	 COLLECTION	 SORTING	 PRE-PROCESSING	 RECYCLING	 BRANDS
DEADLOCK	Insufficient collection levels	Increased opex (labor) and capex	Increased opex (mostly energy) and capex	Structural imbalance of costs and revenues; high capex	Low margin, support for status quo
LEVERS	<ul style="list-style-type: none"> Mandatory separate textile collection Store take-back obligations Yearly awareness campaign at school 	<ul style="list-style-type: none"> EPR funded sorting floor price Re/Insertion programs with public authorities Smaller tech equipment (e.g. portable scanners) 	<ul style="list-style-type: none"> Publicly backed PPAs or pooled energy procurement CAPEX grants Harmonized EU definitions for T2T-ready feedstock 	<ul style="list-style-type: none"> Price premium CAPEX grants Public guarantees & risk sharing Accelerated permitting 	<ul style="list-style-type: none"> Recycled content commitments Strengthened eco-modulated fees Mandatory recycled content in production

EXHIBIT 14

The cost of inaction | Europe’s textile waste could fill c.80 football stadiums each year, over the decade



1. Stadium equivalence based on 80,000-seat stadium volume filled with loose textiles

From diagnosis to action: what this report delivers— and what should come next

In this report, we built a Europe-focused, decision-oriented baseline on post-consumer textile waste and the end-to-end T2T value chain.

We quantified where volumes are lost today (collection, sorting-to-recycling conversion, recycling yields) and why feedstock and economics remain structurally constrained.

On that foundation, we modelled what it would take to move from <1% T2T today to a first meaningful scale milestone around 15% by 2035—incl. the CAPEX/OPEX required across the chain and the resulting “EBIT delta” versus the current as-is system.

This diagnosis surfaces the core bottlenecks and system conclusions: economics do not clear at system level—especially for recyclers; demand commitments from brands are the trigger; recycling capacity is dependent on EU-level coordination; and scale is enabled by aligned incentives, shared definitions, and predictable flows.

It also reinforces the central message that T2T recycled fibres are a new product with structurally higher processing costs—so scaling is dependant on enabling mechanisms rather than expecting virgin parity under current conditions.

Building on this diagnosis, the next step is to translate the economics gap into a decision-grade roadmap to scale T2T in Europe—clarifying stakeholder roles, timelines, and coordination mechanisms

Such roadmap could be structured by stakeholder group (brands and retailers; collectors, sorters and pre-processors; recyclers and downstream converters; policymakers/EPR bodies; investors) so each actor sees its role in a coordinated plan.

For each lever, the next step is to define the mechanism (e.g., standards and feedstock specifications, offtake and contracting models, incentives and EPR design, financing and de-risking tools, infrastructure and capacity build-out), quantify the impact on cost/yield/revenue, map dependencies across the chain, and sequence the interventions required to move from pilots to industrial scale.

The outcome would be a clear set of actionable interventions and an implementation path that aligns public and private roles—aiming for an affordable price level (rather than virgin parity) and making first-wave assets bankable.

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Appendices

This appendix summarizes the high-level business model assumptions and the key modelling inputs used to size investment needs and benchmark stakeholder economics in Section 2. All figures should be read as indicative and represent costs incurred up to EBIT.

Methodology overview and scenario boundary

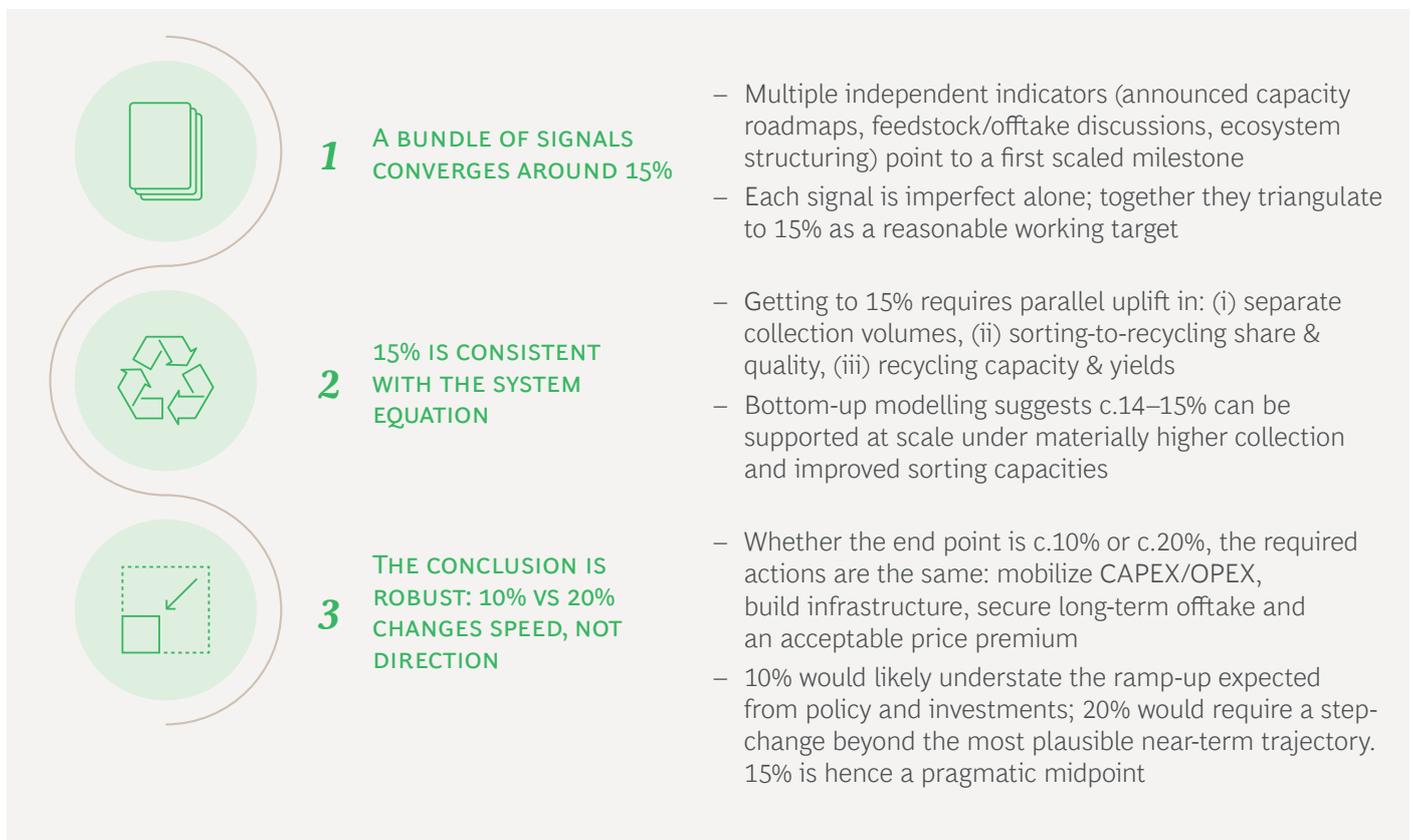
This section is based on bottom-up waste, feedstock and economics modelling, triangulating multiple sources and cross-validation through expert interviews and sensitivity checks. Investment needs reflect incremental CAPEX (one-off) and OPEX (recurring, per year) required to bridge the gap between current (2025) performance and the required levels in 2035 under Scenario 1.

Reference scaling milestone

To size infrastructure and economics, the modelling uses a reference scaling milestone corresponding to a first meaningful level of T2T deployment. This milestone is used as a practical anchor for Scenario 1 and is not intended as a forecast.

EXHIBIT A1.

From pilots to scale: ~15% recycled content as a reasonable working target



We use 15% T2T recycling of post-consumer textile waste by 2035 as a pragmatic central reference point. While no single metric is definitive, evidence converges toward a low-teens milestone. In practice, reaching 15% requires coordinated scale-up across separate collection, sorting-to-recycling conversion, and recycling capacity/yields—with 2035 reflecting the time needed to mobilize CAPEX/OPEX and ramp assets. Even if outcomes land nearer 10% or 20%, the implication is unchanged: Europe's trajectory will depend on the pace of action taken.

At system level, the share of post-consumer textiles recycled is the product of collection performance, sorting performance, the share of exploitable textile waste, and the recycling yield. This decomposition highlights that T2T scale-up is constrained as much by upstream capture and qualification as by recycling technology itself.

High-level business model assumptions

To create a consistent baseline across stakeholders in the post-consumer textile waste value chain, we applied the following high-level business model assumptions:

COLLECTORS

- CAPEX levels are driven primarily by trucks (facilities assumed to be rented with limited equipment required).
- Economics from the current “As-is” model are assumed to be similar to T2T collection (i.e., collection through trucks).
- Revenue channels and volume mix are assumed unchanged (implicitly reflecting a growing reuse share as collection expands).

SORTERS

- Revenue channels and volume mix are assumed unchanged (implicitly reflecting a growing reuse share as sorting volumes increase).
- Cost categories are assumed similar to today, but at higher levels due to tighter feedstock specifications required for recyclers (leading to increased labor and equipment costs).

PRE-PROCESSORS

- Business model is assumed similar to today’s “As-is” pre-processing, but with higher OPEX and CAPEX driven by stricter feedstock specifications (e.g., higher energy use and more advanced equipment).
- All additional pre-processing capacity is assumed to be newly built, with no spare capacity available from existing pre-processors.

RECYCLERS – polyester

- Recycled polyester price is assumed at parity with the closest “As-is” benchmark (rPET from bottles).
- Polymerization is assumed to be mostly in-house.

RECYCLERS – cotton

- Cotton/cellulose recycling assumptions remain less mature; values shown are indicative and will be refined.

GLOSSARY

ABBREVIATION	DESCRIPTION
T2T	Textile-to-Textile
CAPEX	Capital Expenditure
EBIT	Earnings Before Interest and Taxes
EPR	Extended Producer Responsibility
ESPR	Ecodesign for Sustainable Products Regulation
DPP	Digital Product Passport
EU ETS	European Union Emissions Trading System
PC	Post-Consumer
OPEX	Operational Expenditure
PET	Polyethylene Terephthalate
rPET	Recycled PET (can refer to T2T or bottles recycled PET)
Bottles rPET	Recycled polyester from bottles
SRF	Solid Recovered Fuel
T2T rPET	Textile-to-Textile recycled PET (post-consumer and post-industrial variants)
Virgin PET	Virgin, oil-derived PET



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