



**Fashion, Circular Economy &**  
**Bangladesh**

## **Fashion, Circular Economy & Bangladesh**

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# Forward



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In an era marked by rapid environmental change and a growing commitment to sustainable practices, the global textile and fashion industries stand at a pivotal crossroads. As one of the world's leading garment producers, Bangladesh is uniquely positioned to pioneer innovative recycling initiatives and embrace the principles of circular fashion.

The textile and fashion sector is a cornerstone of Bangladesh's economy, employing millions and contributing significantly to the nation's GDP. However, the environmental toll of this industry is considerable, characterized by high levels of water consumption, chemical pollution, and waste generation. This report delves into the burgeoning field of textile and fashion recycling on a global scale, with a specific focus on the opportunities available in Bangladesh.

The concept of circular fashion offers a transformative opportunity to mitigate these impacts by promoting Reduce, Reuse, Recycling, and sustainable management of textiles. Many of Bangladesh's largest customers in the fashion industry are now keenly interested in the country's efforts to promote circular textiles. Alongside decarbonization, recycling is currently a major focus for sustainability teams and boardrooms across the fashion industry.

In this report, we explore how circular fashion is not just an environmental necessity but also a compelling economic opportunity. As global markets and investors increasingly favor sustainable products, Bangladesh's adoption of recycling practices in its textile production can open new market avenues and enhance its international competitive edge. Moving towards a circular economy can spur innovation, drive technological advancements in recycling processes, and create new jobs, thereby bolstering economic growth while addressing environmental concerns.

We examine several key areas where Bangladesh can harness the potential of textile recycling, highlighting technologies and processes that can transform waste into valuable resources, drawing on successful models from around the world. Additionally, the report underscores the importance of policy frameworks and government incentives in creating a conducive environment for circular fashion initiatives.

Crucially, the transition to a circular economy in fashion requires collaboration across multiple stakeholders, including manufacturers, government bodies, non-governmental organizations, and consumers. This report provides a roadmap for such collaborative efforts, proposing strategies to engage various actors and build a collective commitment towards sustainability.

As we present this analysis, it is vital for decision-makers, industry leaders, and all stakeholders involved in Bangladesh's textile and

fashion sectors to recognize the urgency and benefits of adopting circular practices. The opportunities for growth presented by textile and fashion recycling are not just pathways to environmental sustainability but also gateways to strengthening Bangladesh's economic resilience and global standing.

Embracing circular fashion and recycling is not merely an option but a necessity for Bangladesh. By seizing this opportunity, we can lead by example on the global stage, demonstrating how integrating environmental sustainability into economic strategies can yield benefits for both the planet and the economy. This report aims to inspire action and contribute to a sustainable and prosperous future for Bangladesh's textile and fashion industry.





# Executive Summary



This report explores the transformative potential of textile recycling and circular fashion, with a specific focus on Bangladesh, a leading player in the global garment industry. As the second-largest garment producer, Bangladesh faces significant barriers to adopting circular practices, including technological gaps, informal supply chains, and inconsistent regulatory enforcement. Despite these challenges, there is considerable potential for the industry to lead in sustainability.

Key market players, both established and emerging, are driving progress through innovative recycling technologies. Companies like Recover, Spinnova, Teijin, and Evrnu are at the forefront, showcasing diverse approaches to transforming textile waste into high-quality fibers. The Circular Fashion Partnership (CFP) exemplifies collaborative efforts within Bangladesh to capture and repurpose post-production waste, highlighting the country's potential in circular fashion.

Technological advancements in mechanical and chemical recycling, along with enzymatic and solvent-based methods, are enhancing the efficiency and scope of textile recycling. However, the adaptation of these technologies in Bangladesh remains limited, necessitating targeted investments and support for research and development.

The report underscores the importance of regulatory frameworks, such as the European Union's Green Deal, which introduce measures like Extended Producer Responsibility (EPR) schemes to drive circular practices. For Bangladesh, implementing stricter environmental regulations, supporting research and development, building recycling infrastructure, and promoting sustainable design are crucial steps.

Collaboration among stakeholders is essential. Investors should focus on leadership excellence, industry dynamics, and financial viability. Fashion brands need to maintain communicative integrity, embrace circular design, and adapt pricing strategies to support recycled fibers. The Bangladeshi government should enhance policy and regulatory support, educate stakeholders, and facilitate circular business models.





By adopting these strategies, Bangladesh can transform its garment industry, achieving significant environmental, economic, and social benefits. Embracing circular practices promises a sustainable future, positioning Bangladesh as a global leader in the fashion industry's shift towards sustainability.



# The Rise of Recycling in Fashion





# A Journey Towards Circularity



As the world confronts escalating environmental challenges, textile recycling has emerged as a pivotal solution to mitigate waste and foster sustainability, particularly within the fashion sector. The fashion industry, notorious for its significant environmental footprint, is increasingly compelled by regulators and activists to embrace circularity and sustainability as core principles.

Within this overview, we delve into the global dynamics propelling textile recycling forward. This includes spotlighting key players driving innovation, highlighting progressive initiatives by fashion brands, tracking advancements since 2020, and examining the evolving regulatory frameworks that facilitate increased adoption of recycling practices.

Regulation has emerged as a prominent catalyst for enhancing recycling rates within the fashion industry. Collaborative efforts between private enterprises and policymakers are essential to address this widespread issue. Governments worldwide are leveraging legislative tools to accelerate environmental progress, with a notable uptick in regulatory action observed since the onset of the pandemic.

The European Union stands out as a leader in regulatory advancements, notably through its ambitious European Green Deal. This comprehensive strategy prioritizes sustainable and circular textiles, aiming to revolutionize textile recycling practices within the EU. Key measures include the introduction of Extended Producer Responsibility (EPR) schemes, compelling producers to design products with circularity in mind and manage end-of-life phases effectively.



# Textile Recycling Regulations by Country



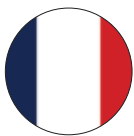
**United Kingdom**

Multiple laws have been enacted to focus on textile waste prevention and to encourage recycling. However, recycling rates remain low, with many textiles ending up in landfills or incinerators.



**USA**

Textile recycling is subject to federal and state regulations, but overall recycling rates are modest. California is leading with an EPR program aimed at enhancing textile recycling.



**France**

Boasts relatively high recycling rates, supported by a robust national program and EPR regulations that include financial incentives for recycling.



**Germany**

Promotes sustainable textile practices through initiatives like the Alliance for Sustainable Textiles, though recycling rates could be improved.



**Netherlands**

Takes a proactive approach with new EPR regulations and substantial government support for textile recycling infrastructure.



**India**

Faces challenges due to limited regulation and infrastructure, which hampers the potential for circular textile initiatives.



**Australia**

Despite some local and national efforts, textile recycling rates are low, with most waste going to landfill or incineration.



Several EU countries, including the Netherlands and France, have already implemented their EPR schemes, signaling a broader trend likely to be emulated globally. The EU strategy also emphasizes enhancing collection, sorting, and recycling processes to create an environment where textiles are designed for longevity and ease of recycling, fostering innovation in recycling technologies and promoting secondary raw materials.

Additionally, the EU plans to restrict textile waste exports to ensure proper management within the region and prevent environmental harm globally. While the United States lacks a unified national strategy akin to the EU, various state-level initiatives, such as those in California, encourage recycling and environmental stewardship within the fashion industry.

Even in the United Kingdom, a significant market for the fashion industry, efforts are underway to align environmental strategies with circular practices, including considerations for EPR schemes. These regulatory advancements underscore a collective global effort to promote sustainable practices and circularity within the fashion industry, heralding a transformative shift towards a circular economy.



# Technological Advancements in Textile Recycling

As interest in textile recycling has soared, the sector has witnessed numerous technological innovations and milestones in recent years. Research continues to be conducted, and technologies are being commercialized.



## Mechanical Recycling Enhancements

In mechanical recycling, where textiles are mechanically shredded into fibres that can be reused, the most prominent advancements can be seen in sorting and processing technologies which now uses infrared and other scanning technologies to better identify and separate different textile materials based on fibre composition, improving the quality of recycled fibres and expanding their potential applications.

## Enzymatic and Solvent-based Recycling

Enzymatic recycling uses enzymes to selectively break down cotton and other natural fibres into their glucose building blocks, which can then be used to spin new fibres. Solvent-based recycling involves the use of solvents to dissolve textile materials so that they can be spun into new fibres.

Lenzing's Refibra technology, for example, combines cotton scrap and wood pulp to produce new virgin-quality Lyocell fibres, which are both sustainable and biodegradable.

## Chemical Recycling Breakthroughs

Chemical recycling represents a significant leap forward, allowing for the recovery of polyester and other synthetic fibres from blended materials. Companies like Evrnu and Worn Again Technologies have developed sophisticated chemical recycling methods that can handle a wider variety of textiles, including heavily dyed and treated fabrics that are not suitable for mechanical recycling.

## Artificial Intelligence and Machine Learning

Artificial intelligence and machine learning are being employed to enhance the sorting process, which is crucial for effective recycling. Sophisticated algorithms can now more accurately identify textile compositions and determine the most suitable recycling pathway, improving both efficiency and outcomes.

## Closed-Loop Systems

Brands and technologies are increasingly moving towards closed-loop systems, where the output of one product becomes the input for another, minimizing waste. Adidas introduced its Futurecraft.Looped sneakers, which are designed to be fully recyclable, allowing worn-out shoes to be returned, broken down, and used to make new performance footwear.



# Major Brands Paving the Way



Several prominent fashion brands are leading the charge in recycling initiatives, setting ambitious targets for incorporating recycled materials into their collections.

H&M has committed to using only recycled or sustainably sourced materials in its clothing by 2030.

Inditex aims to have 40 percent of its materials be recycled.



Luxury fashion houses are also partaking in recycling initiatives.

Stella McCartney has been a long-time advocate of incorporating recycled materials across her product lines.

Burberry has launched initiatives to use recycled materials in its iconic outerwear offerings.

## Patagonia's Worn Wear Programme

Patagonia encourages customers to trade in their used clothing items, which are then repaired, refurbished, and resold at a reduced price, extending the life of garments and reducing waste.

## H&M's Garment Collecting Initiative

Customers can bring any textiles from any brand to H&M stores, receiving a discount voucher in return. The collected clothes are reused, reworn, or recycled into new products, promoting a circular fashion approach.

## Levi's Recycling Programme

Levi's encourages consumers to recycle their jeans through an in-store recycling programme, where the collected denim is transformed into new products or insulation for community buildings.

## Adidas x Parley for the Oceans

Adidas collaborates with Parley for the Oceans to create footwear and apparel made from recycled ocean plastic, transforming upcycled plastic waste into high-performance sportswear.

## Eileen Fisher's Renew Programme

Eileen Fisher takes back old clothing from customers, reselling or transforming them into new designs. If the garments are too worn out, they are turned into art or other useful items through their Waste No More creative projects.

These initiatives demonstrate that recycling is being addressed innovatively and creatively across the fashion industry. However, the key question remains: are these efforts enough? The challenges around chemical and mechanical recycling must be addressed.





Swedish fast fashion brand H&M has for many years been preparing for a world in which recycling is mainstreamed. As well as being the first major fashion company to establish a clothing take-back and collection scheme, the business has also invested heavily in novel recycling technologies.

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H&M also went one step further than this in early 2024 when, along with Vargas Holding, it launched Syre, a new venture to scale textile-to-textile recycled polyester.

The co-founded venture aims to rapidly scale textile-to-textile recycling of polyester and contribute to a more sustainable textile industry. H&M Group has secured an offtake agreement with Syre worth a total of US\$600m over seven years, covering a significant share of H&M Group's long-term need for recycled polyester, which is currently primarily sourced from rPET bottle-to-textile.

This deal emphasises how investment in recycling is viewed by big players such as H&M as a way to future-proof supply chains.



# Exploring Mechanical & Chemical Textile Recycling Methods



Credit: Felix Oebell for The New York Times



# The Legacy of Mechanical Recycling

For over two centuries, the textile industry has embraced mechanical recycling, an industrial-scale process that breathes new life into discarded fabrics. This age-old method involves breaking down textiles mechanically or melting and extruding them into fibers, which are then spun into new yarns, used as insulation, or transformed into non-woven fabrics.

## The Benefits of Mechanical Recycling:

Despite its limitations, mechanical recycling offers several compelling advantages:

### 1. Reduced Environmental Impact

By diverting waste from landfills and decreasing the demand for virgin resources, such as new cotton or synthetic fibers, mechanical recycling helps reduce the industry's environmental footprint.

### 2. Energy Efficiency

Compared to producing new fibers from scratch, mechanical recycling typically requires less energy, as it avoids the energy-intensive processes associated with raw material extraction, processing, and fiber production.

### 3. Cost-Effectiveness

Involving simpler technology and less processing than chemical recycling, mechanical recycling is generally more cost-effective. This accessibility makes it a widely used approach, particularly in regions with limited technological infrastructure.

Despite these challenges, mechanical recycling remains a valuable tool in the industry's quest for sustainability. To counteract the drawbacks, currently, mechanically recycled fibers are frequently blended with virgin fibers, enhancing the overall quality of the end product. By acknowledging its limitations and continually striving for improvements, this time-honored tradition can continue to play a vital role in reducing the environmental impact of textile production.

## Addressing the Challenges:

This tried-and-true approach is not without its challenges.

### 1. Fiber Quality and Durability

The mechanical recycling process often results in shorter fibers, which can be less durable and of lower quality than the original material.

### 2. Difficulty Handling Blends

Mechanical processes struggle with textile blends, such as cotton-polyester, as they cannot easily separate different types of fibers. This reduces the quality and usability of the recycled material.

### 3. Contamination and Color Sorting

Recycled fibers can be contaminated with dyes, finishes, or other materials, requiring additional processing. Additionally, sorting textiles by color before recycling can be labor-intensive and costly.

### 4. Potential Waste Generation

Even in the mechanical recycling process, some residue might still end up in landfills, as not all material is recoverable or usable after being mechanically processed.

# The Pioneering Path of Chemical Textile Recycling



Credit: Felix Odeh for The New York Times

In the pursuit of a more sustainable fashion industry, chemical textile recycling has emerged as a pioneering approach, offering a promising solution to the environmental challenges posed by textile waste. This innovative process breaks down old or used textile materials into their basic chemical components, allowing these components to be reused in creating new textiles, effectively closing the loop in the fabric life cycle.

## Processes of Chemical Textile Recycling

Chemical recycling often involves sophisticated chemical reactions or the use of solvents to dissolve the textiles and extract useful molecules. The primary goal of this process is to reclaim fibers with a quality comparable to that of virgin materials, ensuring that the recycled fibers can be seamlessly integrated into high-quality textile products. The scope of chemical recycling extends across various textile materials, each with its unique process:

### 1. Polyester Recycling

Polyester, a widely used material in clothing and plastic bottles, can undergo chemical recycling by breaking it down into its basic chemicals, such as terephthalic acid and ethylene glycol. These chemicals are then purified and used to produce new polyester fibers, giving new life to discarded polyester products.



### 2. Nylon Recycling

Similar to polyester, nylon can be depolymerized, a process that breaks it down into its original monomers, such as adipic acid and hexamethylenediamine. These monomers are subsequently repolymerized to create new nylon fibers, showcasing the versatility of chemical recycling in handling synthetic materials.



### 3. Cellulose Recycling

Cellulosic fibers, like cotton and viscose, can also benefit from chemical recycling. These natural fibers are dissolved in specific solvents and then regenerated into new fibers. Technologies like the Lyocell process use organic solvents to dissolve wood pulp and produce new fibers that are both strong and eco-friendly, offering a sustainable alternative to conventional cellulosic fiber production.



# The Pioneering Path of Chemical Textile Recycling

While chemical textile recycling has received significant media attention in the past decade, it remains a relatively small-scale operation compared to mechanical recycling. However, its potential to address the environmental impacts of the fashion industry cannot be overlooked.

## The Benefits of Chemical Recycling:

The advantages of chemical recycling are multifaceted:

### 1. Reduces Waste and Landfill Impact

By transforming old textiles into new materials, chemical recycling helps reduce the volume of textile waste that ends up in landfills, extending the life cycle of these materials and minimizing their environmental impact.

### 2. Conserves Resources

Chemical recycling has the potential to reduce reliance on virgin materials, such as petroleum for synthetic fibers and water for cotton cultivation. By repurposing existing materials, this process conserves natural resources and reduces the environmental footprint associated with raw material extraction and processing.

### 3. Energy Efficiency

Depending on the specific technology and scale of operation, chemical recycling can be more energy-efficient compared to the production of new fibers from scratch, especially when considering the entire lifecycle of the textiles. This energy efficiency contributes to a lower overall carbon footprint for the recycled fibers.

### 4. Quality of Recycled Fibers

One of the most significant advantages of chemical recycling is its ability to potentially restore fibers to a near-virgin quality. This high-quality output allows the recycled fibers to be used in a wide range of applications and products, including high-value apparel and textiles, without compromising on performance or aesthetics.

Overall, chemical textile recycling presents a forward-looking solution to textile waste, offering the promise of a more sustainable and circular fashion industry. However, its successful implementation requires addressing certain challenges. Through continued technological advancements, cost reductions, and improvements in environmental management practices, the broader adoption of chemical recycling can become a reality, contributing to a more environmentally responsible and resource-efficient fashion ecosystem.



## Addressing the Challenges:

While chemical textile recycling presents a forward-looking solution to textile waste, its broader implementation hinges on addressing several challenges:

### 1. Chemical Usage and Pollution

The chemical recycling process often requires the use of harsh chemicals, which, if not managed correctly, can lead to environmental pollution. The handling, disposal, and potential recycling of these chemicals pose significant environmental risks that must be carefully mitigated through rigorous safety protocols and responsible

### 2. High Costs

The technology for chemical recycling is often expensive due to the complexity of the processes and the need for sophisticated equipment. This high cost can make recycled fibers costlier than virgin materials, limiting their attractiveness to manufacturers and investors. Continued research and innovation are necessary to drive down costs and make chemical recycling more economically viable.

### 3. Technical Challenges

While chemical recycling technology has advanced significantly, it may not yet be effective for all types of textiles. Blended fabrics, for instance, can be particularly challenging to recycle chemically due to the difficulty in separating different fiber types. Ongoing research and development are crucial to overcoming these technical limitations.





# Chemical Recycling Challenges

## 4. Scalability Issues

Scaling up chemical recycling processes to handle large volumes of textile waste efficiently and economically remains a challenge. This has, so far, limited the widespread adoption of the technology in the fashion industry. Addressing scalability concerns will require collaborative efforts between industry players, researchers, and policymakers to develop robust infrastructure and logistics solutions.

## 5. Potential Reduction in Fiber Quality

While chemical recycling can restore fibers to a high-quality state initially, repeated recycling processes may degrade the quality of the fibers over time, affecting their durability and usability in new products. Ongoing research into maintaining fiber quality through multiple recycling cycles is crucial for the long-term viability of this approach.

# Between Mechanical and Chemical Textile Recycling

	Mechanical Recycling	Chemical Recycling
1	The quality of fibers obtained from mechanical recycling is generally lower than the original because the fibers can be damaged or shortened during the process. This makes them less suitable for high-quality applications.	Chemical recycling can potentially restore the original quality of the fibers, allowing them to be used in high-quality products just like new materials.
2	Limited to producing lower-grade applications like insulation materials, carpeting, or padding. Often need to be blended with virgin fibers to use in fashion.	Can produce high-quality fibers suitable for making new garments and other premium textile products.
3	Generally uses less energy and fewer chemicals than chemical recycling, making it less resource-intensive.	Although more energy and chemical-intensive, it allows for a broader range of textile types to be recycled and can help reduce reliance on virgin resources by producing high-quality fibers.
4	This method is less complex and cheaper because it involves straightforward physical processes.	More complex and often more expensive due to the need for specific chemicals and controlled processing conditions to break down and regenerate fibers.





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# Key Market Players in Fashion Recycling



The past decade has witnessed a remarkable surge in the realm of fashion recycling and circularity, with numerous ventures eager to make their mark in this rapidly evolving segment. From established industry giants to innovative startups, the landscape is teeming with activity, showcasing a diverse array of approaches towards sustainable fashion.



Photographed by Terrey Grason, Vogue, September 2019

# Key Market Players in Fashion Recycling

## 1. Recover

Recover is a Spanish company which has a history in the mechanical recycling of textiles stretching back to the 1940s. Notably, the company has established recycling hubs in Bangladesh and Pakistan with future hubs planned for India and Vietnam. Recover mechanically recycles three categories of textile waste: post-industrial, pre-consumer, and post-consumer. Its process starts from the collection of textile waste up to their recycling and the production of new fibres, fabrics and clothing lines. The company works with strategic partners to integrate its process into the supply chain by providing an end-to-end closed-loop solution.



## 2. Teijin

Teijin is a Japanese company which is leveraging its existing manufacturing infrastructure. It has developed RePEat, a recycling technology focusing on polyester recovery through a process involving dimethyl terephthalate (DMT), facilitating the breakdown and reformation of polyester. This method also efficiently removes dyes and impurities, potentially returning recycled PET to a virgin-like quality. This is crucial as PET is widely used in consumer goods ranging from packaging to textiles.



## 3. Worn Again

Worn Again Technologies, since its 2005 inception in England, has been advancing textile recycling technologies capable of separating, decontaminating, and extracting both polyester and cellulose from blended fabrics, producing high-quality fibres comparable to virgin materials. Its chemical process, leveraging cost-effective protic ionic liquids, is optimized for a variety of poly-cotton blends, significantly pushing the boundaries of textile recycling.



## 4. Spinnova

Spinnova, founded in 2015 in Finland by Janne Poranen and Juha Salmela, is attempting to revolutionize the textile industry with its fibre production technology, which it is selling on a licensed basis. Unlike traditional methods that rely heavily on chemicals and water, Spinnova's process transforms raw plant-based materials directly into textile fibres without harmful solvents. This innovative method significantly reduces the environmental footprint typically associated with fibre manufacturing, conserving water and energy while eliminating waste. Spinnova's technology can use various plant sources, including wood, agricultural waste, and even textile waste, making it versatile and sustainable. The fibres produced are biodegradable and recyclable, aligning with global efforts toward circular economies. Spinnova has partnered with numerous global brands, bringing sustainable textile options to the market that meet the growing consumer demand for environmentally friendly products.





# Key Market Players in Fashion Recycling

## 5. Evrnu

Evrnu, founded in 2014 and based in Seattle, is at the forefront of textile recycling innovation with its proprietary technology which is designed to repurpose discarded clothing into high-quality, sustainable fibres. The company's groundbreaking process, known as NuCycl, focuses on transforming cotton garment waste into a new lyocell-type fibre, r-lyocell, which can be spun into yarn or woven into fabrics. This process not only revitalizes textile waste but also significantly reduces the environmental impact associated with traditional fibre production, including water and pesticide use. Evrnu has established strategic partnerships with prominent brands like Levi's, Target, and Stella McCartney, integrating its recycled fibres into their products and pushing the boundaries of sustainability in fashion. With over USD 30 million raised, Evrnu is scaling its technology to handle a broader range of fibre types, including synthetics like polyester and elastane. By promoting a circular economy model, Evrnu aims to decrease the reliance on virgin materials and reduce textile waste, setting new standards for sustainability in the fashion industry.



## 6. Infinited Fiber Company

Infinited Fiber Company, based in Finland, represents a forward-thinking approach to textile recycling that focuses on transforming post-consumer waste into high-quality, sustainable fibres. Founded on innovative technology, this company has developed a process known as carbamation, which rejuvenates cellulose-rich materials like discarded textiles, paper, and agricultural residues into new, bio-based fibres. The cornerstone of Infinited Fiber Company's process is a unique method of breaking down cellulose into a stable intermediate form called cellulose carbamate. This compound is then dissolved to form a viscous solution, which is spun into new fibre filaments branded as Infinna. These filaments boast the same natural, soft qualities as cotton and are 100 percent recyclable, supporting continuous reuse within the textile industry. Infinna represents a significant advancement in sustainable textiles, offering a practical alternative to virgin cotton and synthetic fibres, both of which are resource-intensive and environmentally taxing.



## 7. Circ

US-based Circ has attracted huge global interest and a host of investors have backed the company. Circ uses solvents, heat, and water whose pH has been raised to liquefy polyester and break it into monomers of terephthalic acid (PTA) and ethylene glycol (EG). The PTA and EG can then be re-joined to make virgin PET for new fibres. The cotton is dissolved in a solvent before processing into lyocell fibres. Circ says its process can reclaim 90 percent of impurities.

## 8. HKRITA

The Hong Kong Research Institute of Textiles and Apparel (HKRITA) is a leading research center based in Hong Kong. The institute has developed the Green Machine, in collaboration with the H&M Foundation, which showcases a novel method for separating mixed fabric types using hydrothermal treatment. This technology ensures the sustainable recovery of materials by preserving the quality of polyester fibers while converting cotton into usable powders.

# Key Market Players in Fashion Recycling

## 9. Södra

Södra's 'OnceMore' initiative is a pioneering venture in the textile recycling industry, leveraging the cooperative's deep roots in sustainable forestry practices to revolutionize textile production. Founded in 1938 in southern Sweden, Södra is primarily known as a cooperative of forest owners focused on environmentally responsible forestry and wood product manufacturing. With OnceMore, Södra expanded its sustainable approach into the textile sector by developing a unique process that combines post-consumer textile waste with renewable wood cellulose sourced from its members' sustainably managed forests.

The OnceMore technology specifically addresses the challenge of recycling cotton and polyester blends. Through a sophisticated mechanical and chemical process, the technology separates the cotton fibres from polyester. The recovered cotton cellulose is then integrated with wood-based cellulose to produce a high-quality dissolving pulp. This blend is subsequently transformed into viscose or lyocell fibres.



## 10. Renewcell

Renewcell is a Swedish enterprise which pioneered an innovative method for recycling old clothing, particularly denim, into a new material called Circulose. Renewcell's first facility began operations in October 2022 and the company filed for bankruptcy in 2024 after running into financial difficulties at the back end of 2023. However, we felt it was important to mention Renewcell's in this publication because it has been a genuine trailblazer in this sector.

Renewcell's flagship product is crafted through a process that converts cellulose-rich fabrics into dissolving pulp. Renewcell shreds the fabric, removes accessories like buttons and zippers, extracts dyes, and turns the material into a slurry. This mixture is then refined to eliminate synthetic contaminants like polyester, isolating the biodegradable cellulose. The clean slurry is dried into sheets of Circulose, which are then dispatched to manufacturers.



## 11. Ambercycle

Ambercycle's innovative product, Cycora, introduced in 2021, is a circular polyester made from end-of-life textiles. Unlike conventional recycled materials, which can suffer from quality degradation, it is claimed that Cycora maintains consistent quality and performance across multiple life cycles. Ambercycle's process sees end-of-life textiles intercepted from landfill. Textiles are shredded and fed into a series of reactors. There are two main steps to purify this raw material and extract polyester. Firstly, blended materials like cotton, spandex etc that are common in real world clothing are separated. Secondly, additives and dyes and other finishes are removed. The polyester extracted from this process is further purified at a molecular level and reconstituted into virgin-grade pellets. The regenerated pellets are spun into new fibers and yarns, for use in new premium cycora® fabrics. Ambercycle has announced collaborations with major brands, including Inditex and Ganni.







## 12. Eastman

Eastman Chemical Company is an American company primarily involved in the chemical industry. The company's methanolysis technology is a groundbreaking approach in the area of textile recycling, specifically targeting the complex challenge of recycling polyester. This is a fine example of a global manufacturing company with global reach and financial clout using its infrastructure to address one of the foremost challenges of our time – the widespread prevalence of end-of-life polyester clothing.

Methanolysis by Eastman breaks down polyester into its basic building blocks, primarily through the interaction with methanol. This process depolymerizes the polyester, converting it into monomers that can be purified and re-polymerized to produce new polyester fibres of virgin-like quality. This innovative cycle not only ensures the quality of the polyester remains high, but also significantly reduces the need for virgin petroleum-based resources, thus minimizing the environmental footprint. One of the key advantages of Eastman's Methanolysis technology is its ability to handle mixed polyester waste, including coloured and contaminated post-consumer materials that are typically challenging to recycle.







# Bangladesh's Textile Industry



The potential for substantial economic gains from recycling cotton waste is clear, with the possibility of reducing costly imports and tapping into lucrative new markets. As the trend towards a circular economy begins to take hold, the next decade will be pivotal for Bangladesh in leading the charge towards a sustainable, innovative, and environmentally conscious textile industry. By embracing this shift, Bangladesh stands to secure a prosperous future that benefits both its economy and the planet.



# Embracing the Circular Economy

Bangladesh, the world's second-largest player in the global textile industry, stands at a pivotal crossroads where the adoption of textile recycling and circular fashion could transform its economic, environmental, and social frameworks. As the industry contributes significantly to the nation's GDP and employs millions, the implementation of circular economy principles offers a strategic opportunity to mitigate environmental impact. At the same time, recycling offers a substantial opportunity to enhance economic resilience and tap into new markets.





# The Opportunity in Circular Fashion

Textile recycling and circular fashion involve reusing and repurposing textile materials to manufacture new products, decreasing waste and reducing the dependency on virgin resources. For Bangladesh, a leading garment producer, this shift could redefine industrial practices, elevate its global stature, and align with the demands of environmentally conscious consumers and international stakeholders.

At the time of writing, the trend towards recycling in Bangladesh's garment industry has only just begun to materialize. The next decade will be critical in determining the nation's trajectory towards a more sustainable and circular textile industry.

Bangladesh is currently heavily reliant on the import of textile fibers. In 2019, the country imported 1.63 million tons of staple cotton fibers, estimated to be worth US\$3.5 billion. Based on the Circular Fashion Partnership findings, if just 100 percent of cotton waste were recycled within Bangladesh, imports could decrease by around 15 percent, saving half a billion USD that would have been spent on cotton imports.



## 577,000

Tons of waste were produced by Bangladesh's ready-made garment sector alone.

## 1.63 M

Tons of staple cotton fibers were imported by Bangladesh in 2019.

## US\$3.5 B

was the estimated worth of the imported cotton fibers.

## 100%

of cotton waste recycling within Bangladesh could decrease imports by around 15%, saving half a billion USD.



Research led by Global Fashion Agenda, with partners Reverse Resources, BGMEA, and supported by P4G, found that in 2019, Bangladesh produced approximately 577,000 tons of waste just from ready-made garments and fabric mills, of which almost half (250,000 tons) was 100 percent pure cotton waste. It is estimated that factories in Bangladesh could sell this 100 percent cotton waste to the recycling market for up to US\$100 million.



Circular Fashion Partnership

# The Circular Fashion Partnership



One of the most high-profile initiatives in this area is the Circular Fashion Partnership (CFP) in Bangladesh, announced in 2021. This collaborative effort aims to enhance domestic recycling by capturing and repurposing post-production fashion waste into new garments. It is a joint effort between the Bangladesh Garment Manufacturers and Exporters Association (BGMEA) and Reverse Resources, supported by prominent brand partners such as H&M Group, Primark, United Colors of Benetton, Bestseller, Teddy Group, and OVS.



Moreover, in collaboration with partners, work is being carried out with the Bangladeshi government to enhance the regulation of the waste management sector. This involves promoting recycling through incentives and tax benefits for manufacturers and developing a robust national strategy for the sustainable management of fashion waste post-production.



# Key Actions for Transformation



Transitioning Bangladesh's textile industry to a circular model will lead to more sustainable practices. To achieve this transformation, five key actions are crucial:

## 1. Investment in Recycling Technologies

Developing and implementing advanced textile recycling technologies is paramount. This includes:

### Chemical Recycling Methods:

Processes that can break down textiles into their original fibers without degrading their quality, enabling the creation of new garments from recycled materials.

### Mechanical Recycling:

Techniques for non-reusable fabrics, diverting waste from landfills and reducing the need for virgin materials.

The widespread adoption of all types of recycling technologies throughout Bangladesh is essential to reduce reliance on virgin materials and lower environmental impacts.

## 2. Designing for a Sustainable Future

Encouraging and training designers to create garments with their end-of-life in mind can make recycling easier and more effective. This includes:

### Using Mono-Materials:

Garments made from a single type of material are easier to recycle than blended fabrics.

### Designing for Disassembly:

Enabling garments to be easily disassembled for recycling or reuse of components.

Bangladesh, with its heavy focus on cellulosic-rich cotton fibers, already has a significant advantage in this area and should capitalize on it.



## 3. Regulatory Support and Incentives

Government policies can play a pivotal role in driving the transition to a circular economy:

### Stricter Regulations:

Implementing stricter regulations on waste and pollution can incentivize sustainable practices.

### Financial Incentives:

Providing subsidies for sustainable materials or tax benefits for companies practicing circularity can encourage adoption.





#### 4. Collaboration Throughout the Supply Chain

Establishing partnerships among manufacturers, brands, NGOs, and government bodies can facilitate the sharing of resources and knowledge necessary for circular practices:

##### Standardizing Processes:

Collaboration can help in standardizing recycling and waste management processes across the industry.

##### Unified Approach:

A coordinated effort can create a unified approach to recycling and circularity, ensuring consistent progress.



#### 5. Consumer Awareness and Participation

Increasing consumer awareness about the benefits of circular fashion can drive demand for sustainably produced clothing:

##### Education and Transparency:

Educating consumers and providing transparent marketing can raise awareness about the importance of circularity.

##### Take-Back Programs:

Implementing programs or incentives for consumers to return used garments can encourage participation in the circular economy.



While discussions around the circular economy for fashion have been ongoing, progress has been slow and uneven. The transition to new systems of working is not straightforward, and there are many potential pitfalls along the way.

Success in this segment is contingent upon new recycled fibers being commercially competitive in an extremely price-sensitive market. The experiences of companies like Renewcell, which faced challenges despite its first-mover advantage and strong financial backing, illustrate the complexities of the industry.

To overcome these challenges, it is crucial to address both Bangladesh-specific barriers and broader, global obstacles to the adoption of circular fashion and textile recycling. By implementing these five key actions and addressing potential barriers, Bangladesh can pave the way for a more sustainable and circular textile industry.

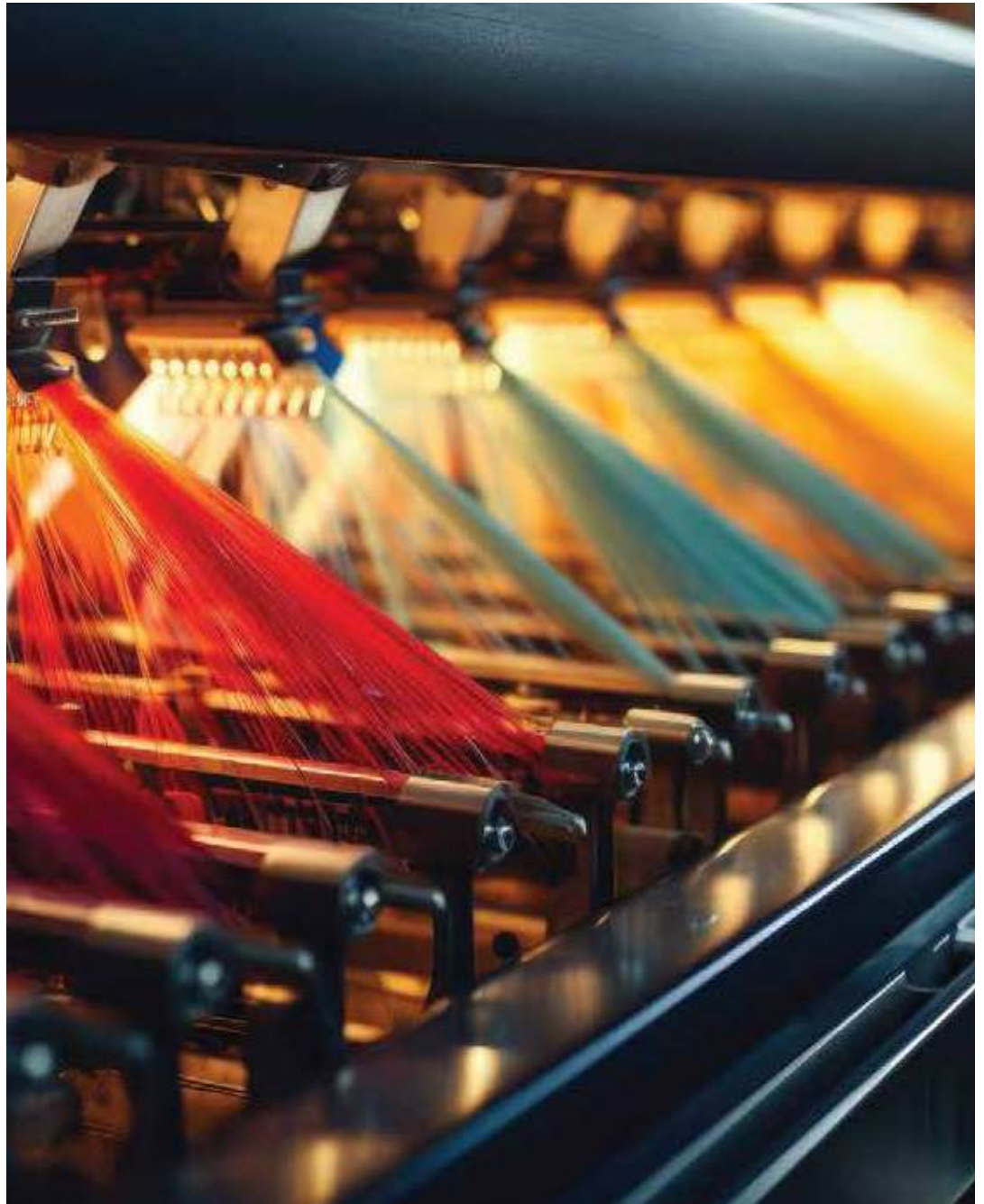


# Barriers to Textile Recycling: A Multifaceted Challenge



## Challenges Hindering Textile Recycling in Bangladesh

As Bangladesh's textile industry aims to transition towards a circular model, several barriers stand in the way of progress. These obstacles can be categorized into Bangladesh-specific challenges and broader, global hurdles that must be addressed.



## Technological Gaps

To recycle garments and other textile waste effectively, domestic manufacturers in Bangladesh must have access to the requisite technology. While mechanical recycling has been a long-held tradition in the country, much of the progress in chemical recycling has taken place in Europe and North America. This technological gap poses a significant barrier for Bangladesh's textile value chain. Modern chemical recycling relies on complex techniques, requiring modern equipment, know-how, and expertise. Licensing technology from new players in Europe or attracting businesses from Europe to bring their technology to Bangladesh could potentially lower costs and make recycled fibers more financially competitive.



## Informal Supply Chain

Bangladesh's textile industry, one of the largest in the world, produces a substantial amount of waste, estimated at about 400,000 tonnes annually. However, only about 5 percent of this pre-consumer textile waste, locally known as "Jhut," is recycled within the country. The process of recycling used textiles in Bangladesh involves several stages, including collection, sorting, and eventual recycling or remanufacturing. However, this process is complicated by the diversity of fabrics and the presence of non-textile elements like buttons and zippers, which complicate the sorting process. Most textile sorting in Bangladesh is still performed manually, limiting the efficiency and output quality necessary for high-quality recycling.

The importance of advanced sorting techniques in enhancing textile recycling rates and promoting circularity in the fashion industry is widely acknowledged. Effective textile recycling is complex and expensive. Even more, challenging textiles are not accurately sorted by grade, fibre type, and other criteria beforehand. Sorting involves categorizing textiles by type, material, and color, theoretically making recycling more efficient since different materials and colors often require different recycling methods. For instance, natural fibres like cotton and wool are generally easier to recycle compared to synthetic fibres such as polyester or nylon. Additionally, darker textiles may need more intensive processing to remove dyes. Proper sorting not only streamlines the recycling process but also helps identify textiles that are still wearable, allowing them to be reused or donated instead of recycled. This highlights the importance of effective sorting in enhancing recycling effectiveness and reducing costs. Globally, progress in textile sorting and recycling varies significantly by country, revealing common trends and unique approaches.

There is a notable trend of increasing advocacy for Extended Producer Responsibility (EPR) regulations in the textile sector. This policy framework shifts the environmental responsibility of a product from the consumer back to the producer, making the producer accountable for its end-of-life management. Many believe the widespread implementation of EPR regulations globally will make sorting easier as its 22 Appendix encourages producers to incorporate environmental considerations into product design, potentially leading to more recyclable and eco-friendly products. Could EPR be implemented in Bangladesh? This is certainly something which policy makers should be considering. They could learn valuable lessons in this area by talking to governments in France and the Netherlands which have already introduced EPR rules.





# Regulatory and Enforcement Challenges

While the Bangladesh government has implemented various environmental laws and regulations that apply to industrial waste, including fabric waste, enforcement can be inconsistent. The Environmental Conservation Act and Waste Management Rules under the Ministry of Environment, Forest and Climate Change lay out guidelines for waste management, but their specificity and enforcement regarding fabric waste can vary.

## Varying Waste Management Practices

Larger and export-oriented ready-made garment (RMG) factories tend to have more formal waste management processes, partly due to pressure from international buyers who often require compliance with environmental standards as part of their corporate social responsibility policies. However, a significant portion of fabric waste management remains informal, with smaller factories and workshops not strictly adhering to formal waste management practices due to cost constraints or lack of regulatory pressure.

## Informal Recycling Initiatives

While there are organized efforts involving collaborations between NGOs, international organizations, and local businesses to improve waste recycling practices and create value from waste, a considerable amount of waste recycling remains informal and is managed by local entrepreneurs and small businesses without much regulatory oversight. These informal initiatives often lack the necessary infrastructure, technology, and expertise to effectively sort, process, and recycle textile waste. Additionally, the absence of standardized practices and quality control measures can lead to inconsistent and suboptimal results, potentially hampering the overall quality and marketability of recycled materials.





## Financial Incentives

Many believe that the Bangladeshi government must provide policy incentives to encourage the uptake of recycling among manufacturers. On a positive note, in April 2024, it was reported that Bangladesh is considering removing value-added tax (VAT) on locally produced recycled fibers and raw materials to support the industry and lessen its reliance on imported cotton. This, along with other fiscal measures, is vital to financially incentivize the domestic industry in its recycling efforts.

## Cost and Pricing Challenges

One of the primary reasons for the slow shift towards recycling and the use of recycled fibers instead of virgin fibers is cost. As the price of cotton has been on a downward trend lately, low and falling cotton prices make it difficult for recycled fibers to compete in a price-sensitive market. Moreover, in many cases, recycled fibers must be blended with virgin fibers to fulfill quality requirements, further increasing the cost of production. It is imperative that fashion brands understand that recycled fibers are likely to cost more in the short to medium term. These buyers must commit to these fibers and absorb any price increases if they are serious about circular fashion and promoting sustainability within the industry.





# Broader Global Barriers

## Investment and Cost Issues

One of the primary financial barriers in textile recycling is the high cost associated with both establishing and operating recycling facilities. The initial investment required for infrastructure capable of processing textile waste on a large scale is substantial, involving advanced technologies for sorting, cleaning, and processing textile fibers.

Moreover, the operating costs are perpetually high due to the energy-intensive nature of recycling processes, especially in chemical recycling where textile waste is broken down at the molecular level. The cost of chemicals and other consumables also adds to the financial burden.

Consequently, the price of recycled fibers can often surpass that of virgin fibers, discouraging adoption by cost-sensitive manufacturers and brands. While cost equivalence can potentially be achieved in the long-term, it is difficult to match virgin prices until economies of scale have kicked in, which can take many years.

The profitability of investing in textile recycling technologies is another significant concern. The market for recycled textiles is still developing, and demand can be unpredictable and influenced by fashion trends and consumer awareness. This uncertainty makes it difficult for investors to see a clear and quick return on investment, which can deter funding and financial backing.



## Research and Development

There is a notable gap in funding for research and development of more efficient and cost-effective recycling technologies. While some government grants and private investments are available, they are often not sufficient to cover the high costs of innovation in this field. This funding gap slows down the advancement of new technologies that could potentially lower costs and increase efficiency.

Overcoming these barriers requires a multifaceted approach involving collaboration between industry players, governments, and research institutions.

Technological transfer, policy incentives, investment in infrastructure, and continued research and development are crucial to unlocking the full potential of textile recycling and fostering a truly circular economy within the fashion industry.

## The Staggering Cost of Chemical Textile Recycling Plants

When it comes to establishing a chemical textile recycling plant, the financial investment required is staggering.

This is an important question that demands a comprehensive understanding of the various factors that influence the overall cost of such a facility.

Beyond the machinery required for the recycling process itself, several other elements contribute to the total expenditure. These include:

### 1. Building or Facility Expenses:

The cost of constructing or acquiring a suitable facility to house the recycling plant can be a significant expense.

### 2. Utility Costs:

Chemical recycling processes are often energy-intensive, leading to substantial utility costs for electricity, water, and other necessary resources.

### 3. Research and Development Expenses:

Continuous research and development efforts are crucial to refine and optimize the recycling processes, incurring ongoing costs.

### 4. Permits and Regulatory Compliance:

Adhering to environmental regulations and obtaining necessary permits can involve considerable expenses.

### 5. Initial Working Capital:

Sufficient working capital is essential to cover operational costs during the initial phases of setting up the plant.



Additionally, once the plant is operational, there are various recurring operational costs to consider:

#### 1. Labor Costs:

Skilled labor is required to operate and maintain the complex recycling processes, contributing to ongoing expenses.

#### 2. Maintenance Costs:

Regular maintenance and repair of the machinery and equipment are necessary to ensure efficient and safe operations.

#### 3. Utility Costs:

As mentioned earlier, the energy-intensive nature of chemical recycling processes results in substantial utility costs.

#### 4. Transportation Costs:

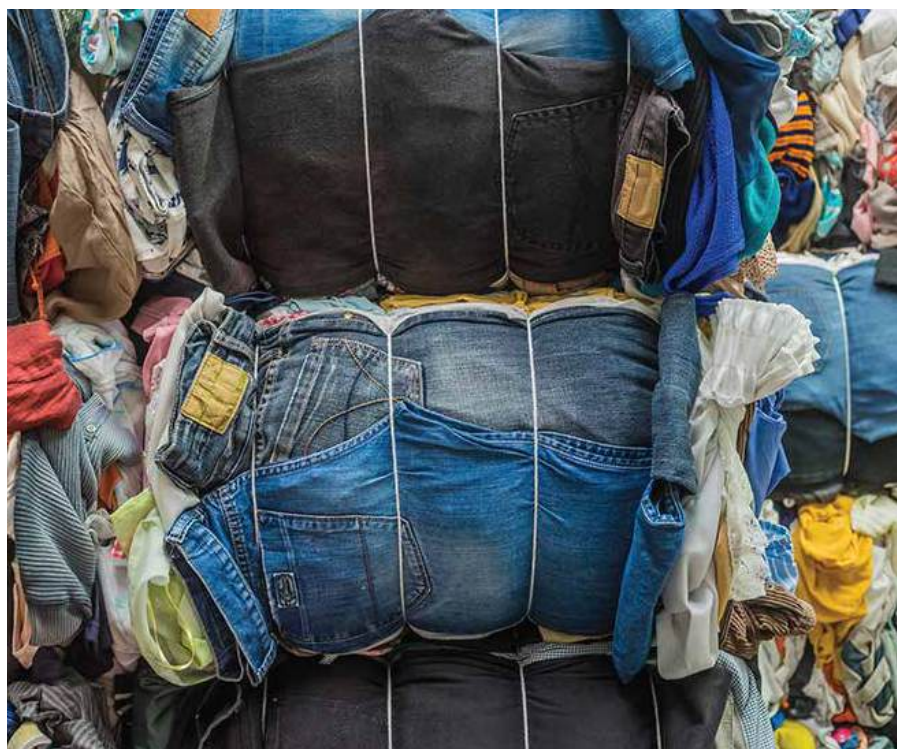
The costs associated with transporting raw materials (textile waste) to the plant and shipping recycled products to customers must be factored in.

#### 5. Marketing Costs:

Promoting and marketing the recycled products to establish a customer base and maintain demand is an essential expense.

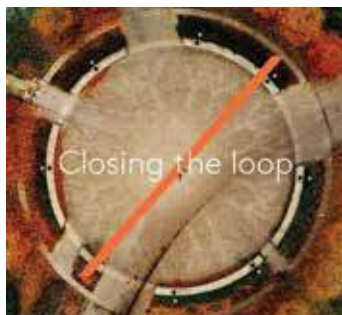
Research in the literature on this issue has found that typical capital expenditure for pilot plants varies from €5-10 million, while demonstration plants have been built for €30-50 million. However, commercial-scale operations, particularly for existing and proven technologies, can run into hundreds of millions of euros, with costs varying around the world.

It is crucial to remember that all of these substantial financial investments must be covered before a chemical textile recycling plant can even begin to think about profitability and return on investment (ROI). The road to establishing a successful and profitable chemical recycling facility is paved with significant financial challenges, underscoring the need for careful planning, robust business models, and unwavering commitment to sustainability goals.





# Technical Barriers to Textile Recycling



The transition to a circular economy in the fashion industry is fraught with numerous technical barriers that impede progress. These challenges span various aspects of the recycling process, from sorting and collection to the limitations of existing recycling technologies and regulatory hurdles.

## Sorting and Collection Challenges

Effective recycling begins with efficient sorting and collection systems, which are currently inadequate in many parts of the world. Textiles are often mixed with other types of waste, leading to contamination and devaluation of the recyclable materials. Furthermore, the diversity of textile materials — varying in fiber type, color, and treatment — complicates the sorting process, requiring sophisticated and often costly technology to accurately separate and process materials.

## Quality of Recycled Fibers

The quality of recycled fibers is a critical issue. Recycled fibers often suffer from degradation, which can affect their strength, color, and overall appeal. This degradation occurs because most recycling processes, particularly mechanical recycling, can damage the fibers. As a result, recycled materials may not meet the high-quality standards required for use in new garments, limiting their application to lower-value products.

## Technical Limitations of Recycling Processes

Both mechanical and chemical recycling processes have their own set of technical limitations. Mechanical recycling is less effective for synthetic fibers such as polyester, which are more resilient to breaking down. Chemical recycling, while more versatile, involves complex chemical processes that can be environmentally hazardous and energy-intensive.

## Regulatory Challenges

There is a significant lack of standardization in the textile recycling industry. Different countries and regions have varying standards and regulations, which can create challenges for companies operating internationally. This lack of uniformity makes it difficult to implement global recycling programs and complicates compliance with local regulations. As a general rule, the European Union is quite progressive in terms of supporting recycling efforts, while the United States is less so. Asia is very much a mixed bag.

## Inadequate Supportive Policies

The development of the textile recycling sector is further hampered by inadequate supportive policies. Many governments have not yet prioritized textile waste management in their environmental agendas, resulting in insufficient incentives for companies to invest in recycling technologies. Without legislative pressure or financial incentives, the fashion industry has limited motivation to change its practices.

## Evolving Regulations

As environmental awareness increases, regulations are becoming more stringent and more common. However, the evolving nature of these regulations can pose challenges for recyclers who must continually adapt their operations to comply with new laws. For instance, the European Union's strategy on textiles aims to enhance sustainability but requires companies to quickly adjust to new recycling mandates and extended producer responsibilities.

Overcoming these technical barriers requires concerted efforts from various stakeholders, including governments, industry leaders, and investors. Financially, it necessitates more robust funding mechanisms and incentives to lower the economic risks associated with recycling investments. Technically, advancements in recycling technology and improvements in collection and sorting systems are crucial.

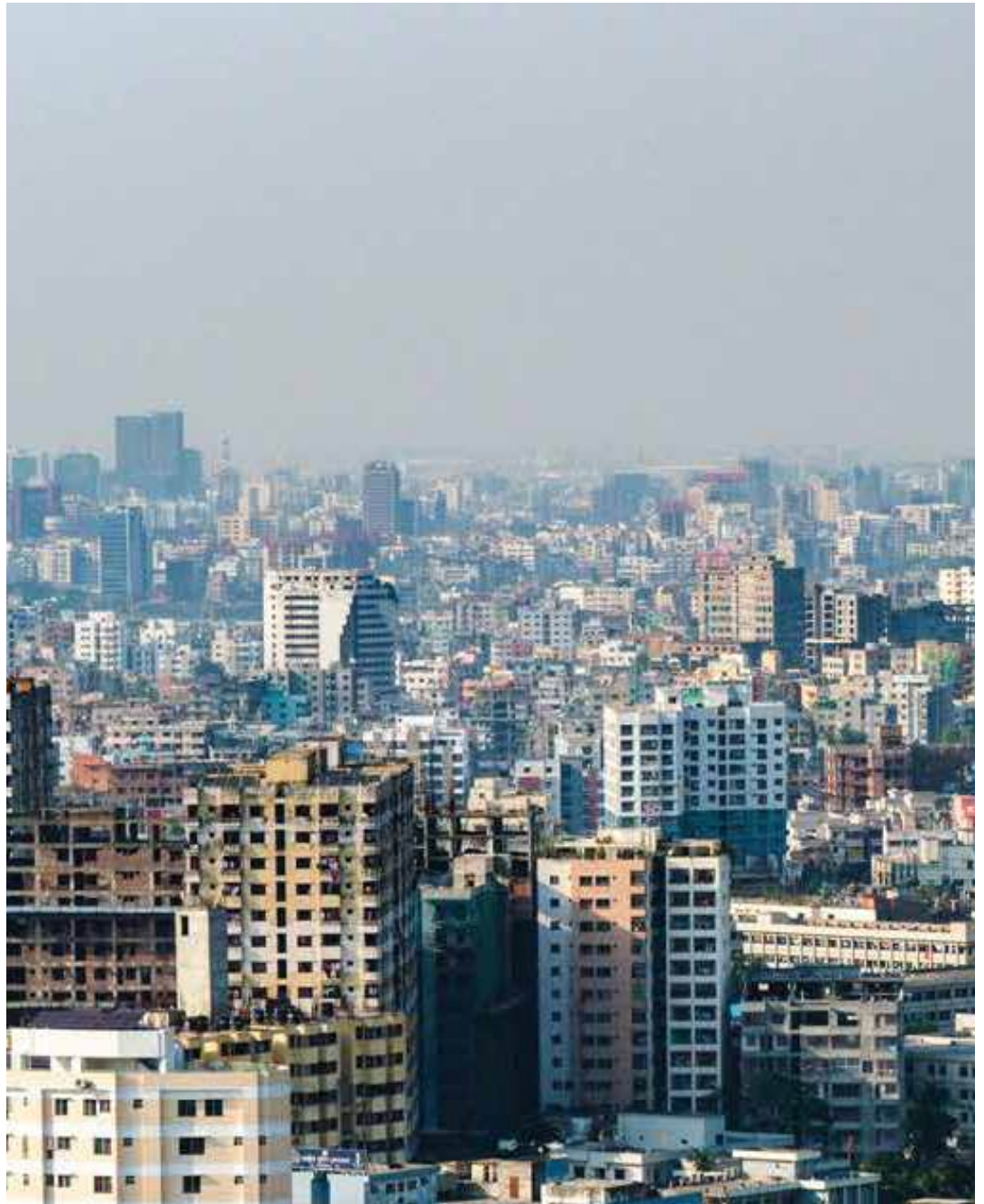




# Guiding Toward Circular Fashion: Insights for Governments, Investors, and Fashion Brands



In the pursuit of a circular economy, all stakeholders, including investors, manufacturers, fashion brands, and governments, must collaborate to ensure the financial viability and widespread adoption of recycling practices. Here, we delve into the expectations from investors supporting recycling initiatives, fashion brands embracing sustainability, and governments, with a focus on Bangladesh.



# For Investors

## Leadership Excellence:

A leadership team blending commercial acumen with technical expertise is crucial for success. Companies excelling in both areas are poised to lead the market by navigating complexities efficiently and innovating sustainably.

## Understanding Industry Dynamics:

Extensive experience within the fashion and textile sectors and solid relationships within the recycling supply chain are imperative for investors to understand market nuances, anticipate challenges, and capitalize on emerging opportunities effectively.

## Financial Viability:

Developing and scaling recycling technologies require substantial investment. Securing future revenue streams, such as contracts with fashion brands, is vital for sustainability and long-term profitability, ensuring investor confidence and continued support for recycling initiatives.

## Prioritizing Product Quality:

Despite technological advancements, the quality of recycled fibers remains paramount. Investors should assess product samples rigorously to ensure market readiness, fostering trust and credibility in the recycled textile market.

## Scrutinizing Marketing Claims:

Caution is advised when evaluating bold claims about technology capabilities. Thorough research is essential to verify claims and mitigate risks of overstatements, enabling informed investment decisions aligned with ethical and sustainable principles.

## Monitoring Global Developments:

China's significant advancements in textile recycling warrant close observation due to its escalating textile waste issues and evolving trade dynamics with the West. Keeping abreast of global developments enables investors to identify emerging trends and potential collaborations, enhancing strategic positioning in the market.

## Site Visits for Insight:

Operational site visits offer invaluable insights into technology that cannot be gleaned from reports alone. Witnessing firsthand the processes and operations of recycling facilities enables investors to assess operational efficiency, technological capabilities, and potential scalability, informing investment decisions effectively.





# For Fashion Brands

Fashion brands play a pivotal role in driving circularity within the industry. Key considerations for fashion brands include:

## Embracing Circular Design::

Circular design principles, supported by initiatives like those from the Ellen MacArthur Foundation, enhance the recyclability of materials from the outset. By integrating circular design principles into product development processes, fashion brands can minimize waste generation, optimize resource utilization, and promote a closed-loop system, contributing to sustainable fashion practices.

## Maintaining Communication Integrity:

Honest and authentic communication about recycling and sustainability is essential for shaping consumer expectations and avoiding greenwashing. Fashion brands should prioritize transparent communication strategies, providing consumers with accurate information about the environmental impact of their products, fostering trust, and fostering consumer loyalty through genuine commitment to sustainability.

## Adapting Pricing Strategies:

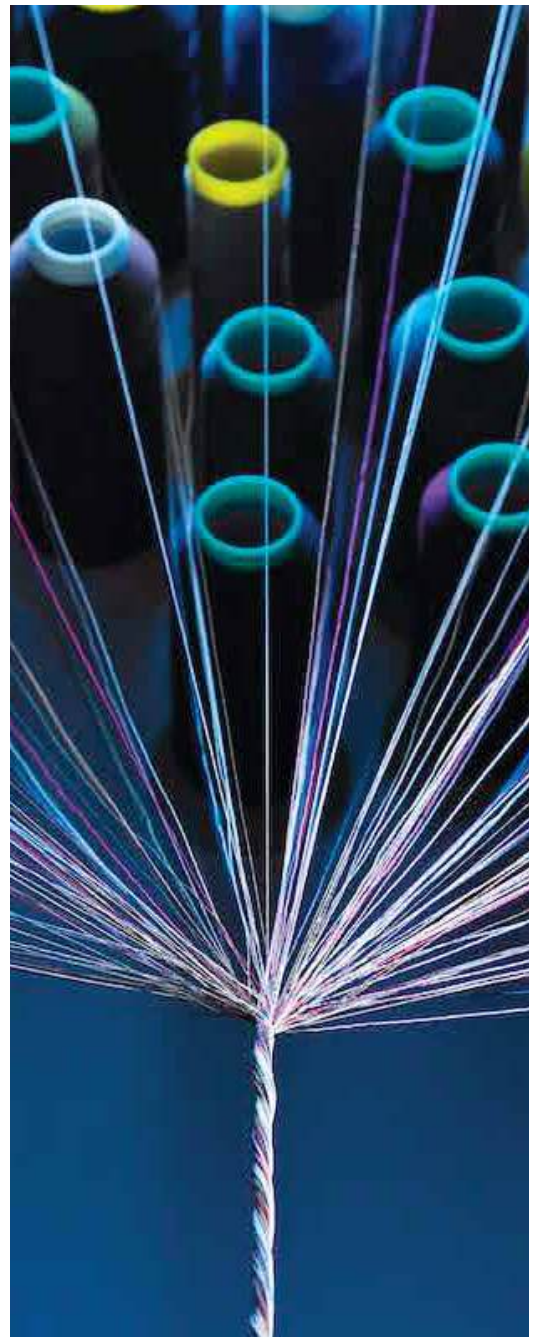
Discussions around the pricing of recycled fibers indicate a likely premium, reflecting the true cost of sustainable production. Fashion brands should anticipate and embrace this premium as an investment in sustainable practices, positioning recycled products as premium offerings with added value derived from environmental benefits, ethical sourcing, and social responsibility, thereby driving consumer demand and market acceptance of sustainable fashion.

## Securing Strategic Commitments:

Long-term viability hinges on robust demand for recycled products. Brands should secure future demand through purchasing agreements to signal commitment to recycling initiatives. By establishing partnerships and collaborations with recycling facilities and suppliers, fashion brands can ensure a consistent supply of high-quality recycled materials, promoting market stability and sustainability across the fashion industry value chain.

## Enhancing Industry Knowledge:

Increasing education and firsthand experiences at recycling facilities can deepen fashion professionals' understanding and involvement in the evolving sector. Fashion brands should invest in employee training programs, workshops, and collaborations with research institutions to enhance industry knowledge and technical expertise in textile recycling, fostering innovation and driving progress towards a circular fashion economy.



# Recommendations for the Bangladeshi Government

To foster circularity in Bangladesh's garment industry, the government can implement a range of strategies focusing on sustainable practices, waste reduction, and resource efficiency.

## 1. Policy and Regulation:

Implementing stricter environmental regulations for waste management and resource use is paramount. By providing incentives such as tax breaks, subsidies, or reduced tariffs on recycled materials, the government can encourage companies to adopt sustainable and circular practices. These regulatory measures can significantly minimize the industry's environmental impact and promote sustainable growth.

## 3. Build Infrastructure for Recycling:

Establishing specialized facilities for the collection, sorting, and recycling of textile waste is critical for streamlining the recycling process. Additionally, developing a national strategy for textile waste management, including infrastructure for both pre-consumer and post-consumer textile recycling, will ensure comprehensive waste recovery and management across the industry.

## 5. Encourage Sustainable Design:

Promoting design principles focused on disassembly and garment longevity is crucial for facilitating easier recycling and extending the lifecycle of apparel. Integrating sustainability into fashion and textile design curriculums will nurture a future generation of designers with a strong focus on circularity and sustainability, driving innovation and progress within the industry.

## 7. Facilitate Circular Business Models:

Supporting the adoption of circular business models such as rental, leasing, and repair services within the fashion industry will reduce waste generation and promote resource efficiency. The government should provide support for startups and initiatives focusing on circular economy business models in the garment sector, fostering innovation and driving sustainable practices across the industry.



## 2. Support Research and Development:

Investing in innovation is essential for driving progress in textile recycling technologies and methods that enhance recyclability and reduce environmental impact. The government should allocate funds for research initiatives and foster collaboration between academic institutions, industry players, and government bodies to develop sustainable textile materials and closed-loop systems. These efforts will accelerate the development and adoption of innovative solutions within the industry.

## 4. Build Infrastructure for Recycling:

Raising awareness among manufacturers, consumers, and stakeholders about the benefits of circular economy practices is essential. The government should launch extensive awareness campaigns and initiatives to promote sustainable practices and encourage consumer participation in recycling programs. By establishing accessible collection points and providing incentives for recycling initiatives, stakeholders can actively contribute to waste reduction efforts.

## 6. Enhance Supply Chain Transparency:

Enforcing regulations mandating companies to disclose information about material sourcing and environmental impact is essential for promoting transparency and accountability within the supply chain. By utilizing digital tools such as blockchain technology, the government can enhance traceability of garments from production to disposal, ensuring ethical practices and accountability throughout the supply chain.





# Conclusion

This report highlights the immense potential and urgent need for Bangladesh's textile industry to transition towards a circular economy. Bangladesh still faces significant challenges, including technological gaps, informal supply chains, and regulatory inconsistencies. However, these barriers also present opportunities for innovation and leadership in sustainable fashion.



The path to a sustainable future for Bangladesh's garment industry is clear. Embracing circular practices promises significant environmental benefits, economic growth, and enhanced social responsibility. By overcoming current challenges and leveraging opportunities, Bangladesh can position itself as a global leader in the fashion industry's shift towards sustainability, ensuring a prosperous and environmentally sound future for the industry and the nation.



Key industry players and technological advancements are paving the way for more efficient and comprehensive recycling processes. Companies like Recover, Spinnova, Teijin, and Evrnu exemplify how innovative approaches can transform textile waste into valuable resources. The Circular Fashion Partnership (CFP) within Bangladesh showcases the potential for collaborative efforts to repurpose post-production waste, setting a precedent for circular practices in the region.

The success of these initiatives depends heavily on strategic investments, robust regulatory frameworks, and active collaboration among all stakeholders. Investors, fashion brands, and the government each play a pivotal role in driving this transformation. By focusing on leadership excellence, industry dynamics, financial viability, and product quality, investors can support circular innovations. Fashion brands must commit to circular design principles, transparent communication, and adaptive pricing strategies to integrate recycled fibers into their products. The Bangladeshi government must implement stringent environmental regulations, support R&D, build infrastructure, and promote sustainable design and circular business models.





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