

Circular textile value chains

Business case:

Creating a network for textile waste valorization and recycling market opportunities in Tunisia

The challenge

The denim industry is facing a significant challenge in managing the high volume of post-industrial textile waste generated during the production of jeans. In Tunisia, the textile and garment industry produces over 31,000 tons of textile waste yearly, with over half originating from post-industrial cutting scraps from jeans production.¹

The challenges in recycling post-industrial textile waste lie in the diverse material compositions, contamination levels, and the need for advanced technologies to efficiently sort, process, and recycle these materials into high-quality products.

Denim waste can be divided into three categories based on its composition and recyclability. The first category is denim waste made of 100% cotton. The second category is denim waste of 95% or more cotton, typically with minimal elastane fiber content. Finally, the third category is denim waste made of less than 95% cotton and contains varying proportions of synthetic fibers. Denim waste from the first two categories is generally considered high-quality waste, while denim waste from the latter category is of low quality.

Recycling for Fashion-to-Fashion applications, such as yarns, fabrics, and garments, is limited to higher-quality waste due to strict technical specifications. Many recyclers exclusively accept 100% cotton fiber and preferably single-colour scraps.

Textile fibers of lower quality can be downcycled into non-woven products without colour limitations. These lower-quality fibers are used in many applications, such as insulation fiberboards for construction, furniture, automotive industries, mattresses, wadding, and filling.

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At WICMIC, valorizing post-industrial textile waste is crucial for resource preservation. By repurposing waste, we enhance resource efficiency, reduce environmental impact, and bolster our competitiveness in the market. This initiative aligns with our commitment to sustainability and drives innovation, positioning us as leaders in responsible fashion production.

Eric Linczowski
CEO of WIC MIC

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The scope of the pilot project

Beginning in 2019, the United Nations Industrial Development Organization (UNIDO), under the regional EU-funded SwitchMed Programme, demonstrated how circular economy practices can improve environmental performance and competitive advantage in Tunisia's textile value chain. To further this objective, in 2023, UNIDO launched a pilot project to increase the volumes of sorted post-industrial textile waste reaching the market through establishing a robust recycling ecosystem in Tunisia.

The pilot project involved a collaboration with the WICMIC Group, a Tunisian textile manufacturer specializing in producing jeans for various global clients. The WICMIC Group operates ten production facilities and 8,700 employees and produces over 11 million garments annually. Together with the WICMIC Group, Tunisian recyclers and producers of non-wovens, the pilot project undertook activities to:

- Improve the textile waste segregation and classification procedures at the WICMIC Group garment-making facilities.
- Determine the potential for an industrial symbiosis business model that recycles lower-quality waste into non-wovens for non-fashion end-uses in the local value chain.
- Demonstrate the business case for recycling higher-quality textile waste in a local value chain to raise the potential interest of international brands to engage in a closed-loop recycling initiative.
- Identify technology solutions and prepare pre-feasibility analysis for the WICMIC Group investing in:
 - I. a shredding unit for producing recycled fibers out waste stocks;
 - II. an advanced process for recycling the wastewater treatment sludge.

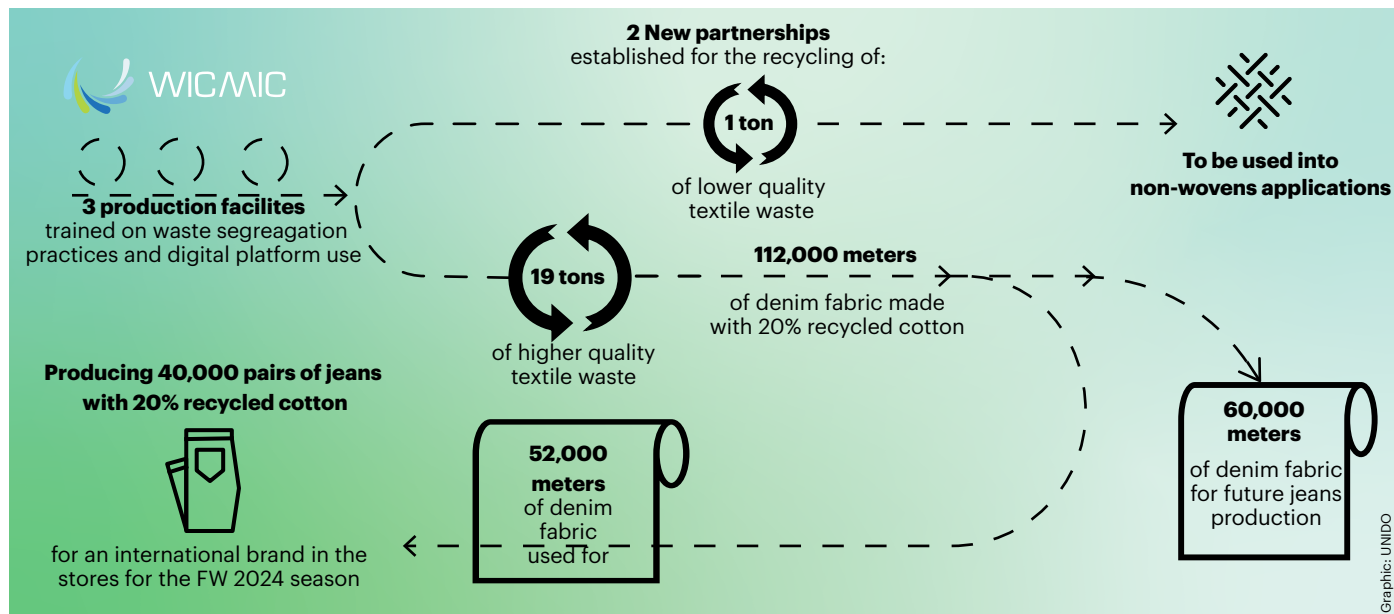
Introducing a waste management protocol and the use of a digital platform to collect, register and track waste management data

A group of international experts audited the textile waste management procedures at three facilities of the WICMIC Group: PIC 1, PIC 2 and NABIHA STORY. The audit aimed to design a training session on textile waste segregation, storage, and classification. The training focused on the separation of higher-quality and lower-quality fibres. Participants were also instructed on using an international digital platform developed by Reverse Resources that digitizes, connects, and scales global textile-to-textile recycling.

SOTRAFIB, a textile waste recycling operator based in Ksibet El Médiouni, was selected as a partner of the WICMIC Group for recycling low-quality textile waste into non-wovens. For industrial symbiosis applications, the first recycling test was done at SOTRAFIB, containing 1 ton of denim waste from WICMIC.

¹ SwitchMed Textile waste mapping in Morocco and Tunisia, Blumine & Reverse Resources, 2020

Pilot project in numbers



Engagement of global brands in closed-loop fashion to fashion recycling initiatives

Through the pilot project, the WICMIC group received support in communicating with customer brands about their commitment to the project for a more responsible management of textile waste. Meetings and project presentations were organized between the WICMIC management and international brands to engage new customers for recycled production capacities. Through these consultations, an agreement was reached with the PVH Corp., a global fashion group with brands such as Calvin Klein Jeans, to produce jeans from recycled textile waste. Building on the training received through the project, WICMIC collected and segregated 19 tons of cutting waste to produce 112,000 meters of denim fabric with 20% recycled cotton fiber. This was achieved thanks to the collaboration between the WICMIC Group and SWIFT/SITEX, a Tunisian vertically integrated spinner/weaver and recycler with know-how in recycling for textile-to-textile applications.

Preparing a business plan for investment in textile recycling equipment, business contact and the evaluation of wastewater treatment sludge transformation equipment

Given the WICMIC group's interest in entering the recycling business, a study was conducted to identify investment opportunities in mechanical recycling. Installing a shredding unit will further national capacities in producing recycled fibers that could be used on the local market or exported. Additionally, as per the request by the WICMIC Group, an investigation into wastewater sludge recycling technologies was carried out.

The WICMIC Group was introduced to two technology suppliers, one of which manufactures textile waste recycling equipment and another of which produces innovative equipment for wastewater sludge treatment. Furthermore, a visit was organized to a leading finishing company in Italy to see the equipment in an actual production environment.

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Embracing circularity isn't just a choice; it's a necessity. By valorizing post-industrial textile waste from our jeans production, we reduce landfill waste and minimize our environmental impact. This initiative aligns with our Forward Fashion commitment to have all PVH products contribute to the circular economy throughout the product lifecycle by 2030.

PVH Corp.

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