

Towards scale-up – challenges and opportunities for industry in cellulosic textile fiber production and recycling

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The textile industry is facing challenges due to production-related issues such as high land freshwater usage when producing cotton and use of fossil-based raw materials with the production of synthetic polymers. Within the regulatory framework, the industry must deal with the tightening legislation banning landfilling and incineration and promoting reuse and recycling instead. In addition, consumers have started to demand more sustainable products and value chains, making the brand owners also react. Textile recycling technologies are still at their infancy and according to Ellen Mac Arthur Foundation, only 13% of the clothing is being recycled and only 1% recycled in closed-loop recycling, i.e., recycling materials in similar or higher value applications. To meet the future demands especially from legislation and consumers, the industry needs to transform from linear economy into circular economy, thus requiring recycling to take place. This has led to research and development of innovative technologies within this industry seeking support for scaling-up their processes.

This transformation also needs a wide collaboration between all the stakeholders of the textile value chain. Valmet with its expertise in machinery manufacturing for pulp and paper processing is one of the suppliers in front-end of this value chain and sees new opportunities for its business development further in this area both in fiber-to-fiber recycling and man-made-cellulosic fibers (MMCF). Additionally, Valmet's knowledge in scaling up and building innovative technologies will be an asset in this regard.

Valmet's target in textile recycling is to develop and commercialize novel processes and related equipment with the technology owners. We are currently formulating a processing concept including unit operations from textile pre-treatment to production of dissolving-grade pulp suitable for further processing into textile fibers. The pre-treatment includes processes for size reduction in both dry and wet form, removal of impurities, mechanical and chemical fiber treatments, and fiber separation etc. For MMCF, the aim is to develop and commercialize alternative production processes and process equipment to replace the traditional viscose process.

In this presentation, we will highlight the targets of Valmet in process development and scale-up for sustainable textile recycling and MMCF production and discuss the opportunities for the industry as well as the challenges they might face. Concrete examples on how the future processes will look like will be given.