

Session Cross-cutting: April 12th 11.30 hrs

5s3: Circular Textiles

The potential of mechanical recycling for post-consumer textiles

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Currently, the amount of post-consumer textile waste is growing. Unfortunately, the European recycling infrastructure is lacking, preventing efficient recycling operations. It is still difficult to set up production lines of high-quality products with shredded textile waste fibres, yet the demand for these products is rising. The goal of this study was to find out how the mechanical recycling process for mixed post-consumer textile waste garments could be improved and integrated into circular supply chains. A literature study, semi-structured interviews and a multi-criteria analysis on Manufacture Readiness Levels were conducted to investigate the several challenges and production opportunities for recycled textile waste fibres from a technical, logistical and economic point of view. Thereafter, a roadmap for future mechanical recycling was established. The key technical challenge of the mechanical recycling process for post-consumer textiles is a resulting low quality and short lengths of shredded fibres. Adjusting the cutting and shredding machines per fibre type could enable change. Integrating textile waste fibres in supply chains has proven to ensure environmental benefits. From an economic perspective, the cost price of shredded textile waste fibres hinders the manufacturability, which could be resolved through the creation of new cross-sectorial open- and closed-loop production capabilities. Regarding logistics, the set-up of regional recycling hubs could scale up and map out the supply of post-consumer textiles. The evolvment of intensified collaborations could ensure the quality improvement of recycled waste fibres and extend the product applications opportunities. The potential of shredded textile waste fibres could be increased by improving manufacturing and profitability, as suggested in the roadmap proposal. However, the feasibility of the elaborated opportunities of this study is not yet proven, empirical studies on the profitability of textile waste fibres are recommended.

Keywords: mechanical recycling textile waste supply chain