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TEXTILE SORTING FACILITIES – MATERIAL FLOW ANALYSIS AND THE IMPORTANCE OF QUALITY CRITERIAS

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ABSTRACT

Environmental evaluations of the management of textiles when at end-of-useful-life for the initial consumer have shown that the optimal treatment of textile waste follows the waste hierarchy. Consequently, there is great potential for environmental improvements through ensuring that textiles are collected, reused, recycled and disposed of in the best possible way. This is one of the main reasons that the European Union has mandated that textiles in the future need to be collected at end-of-life, and since not all textiles are worn out when they are discarded potentially a larger share of the textiles can be collected for reuse and recycling than what is done today.

An important part of an improved management of textiles at end-of-life is professional textile sorting centres, which can ensure that the largest share possible of textiles reach a second life. Despite the fact that textile sorting centres play a central role in ensuring a high reuse rate, few studies have analysed their performance, and they all applied a more qualitative than quantitative approach in their assessment. In this study, a material flow analysis (MFA) of the textile flows in a sorting centre and a life cycle inventory (LCI) were undertaken for the period 2015–2017, along with an assessment of the main economic factors (Nørup et al., 2019). Data was gathered in collaboration with a large textile sorting centre in Lithuania. On this basis, an MFA was established for the material entering the facility, in which the flows were mapped to the different categories (reuse, recycling and waste) and final destinations for second life. The quality of the data was assessed to indicate, which flows were known and which flows were determined through data reconciliation. Furthermore, an inventory of energy and material use was established for the three years.

The MFA showed that the majority of the sorted textiles were indeed reusable, but their numbers decreased in the reference period, from 79.8% to 74.9%. The LCI and economic analysis showed increasing resource consumption in terms of electricity, gas (trucks) and packing per sorted tonne. Furthermore, the quality of textiles has generally decreased over the last decade, which is reflected in the share of reusable textiles of the highest quality, which undergoes additional fine sorting. While in 2015, almost 33% of the reusable textiles were sorted out for fine sorting, in 2017, this figure was down to 29%. A part of this drop in quantity and quality was due to a drop in overall quality of material

received, and it is expected that with the increased sorting due to the EU mandate a further drop can be expected. The amount of recyclable textiles increased over the period, from 12.9% to 17.3%, and the amount of waste also increased, from 5.4 to 6.0%. The results presented herein are important for properly representing the sorting process in modelling textile waste management, and for ensuring the highest recovery possible. Comparisons with other textile sorting centres with lower amount of categories for reuse and recycling, show that the quality criteria for the materials sorted out guide the amount of material ending up as waste, and it is therefore important to ensure that there are markets for both high and low quality material.

The results of this study are presented in the following paper published in *Resource, Conservation and Recycling*. Please cite the original paper:

Nørup, N., Pihl, K., Damgaard, A., Scheutz, C., 2019. Evaluation of a European textile sorting centre: Material flow analysis and life cycle inventory. *Resource, Conservation and Recycling*, 143, 310-319.