Evaluation of a European textile sorting centre: Material flow analysis and life cycle inventory

Life cycle assessment (LCA) studies have shown that the optimal treatments of textile waste follow 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. Despite the fact that textile sorting centres play a central role in ensuring a high reuse rate, they have either been left out of previous LCAs or modelled based on low-quality data. In this study, a material flow analysis (MFA) of the textile flows in a sorting centre, and a life cycle inventory (LCI), was undertaken for the period 2015–2017, along with an assessment of the main economic factors. 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 undergo 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%. The number 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.