Reducing the carbon footprint through textile reuse: the case study of a textile valuation company

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Abstract

After food, housing, and transport, textiles are the fourth most pressured category in terms of raw material and water use, and the fifth in terms of greenhouse gas emissions. In order to significantly reduce waste and the use of natural resources in the textile and clothing industry, and to reduce the environmental impact associated with the sector, thus contributing to sustainable development, there is a need to create business models based on the principles of circular economy, in which clothes, fabrics, and fibers re-enter the economy after their use. In environmental terms, we can say that reuse provides greater benefits than recycling because it reduces the impact generated by the life cycle of textiles, particularly in reducing greenhouse gas emissions (GHG). Currently, a few companies exist in the country to collect urban textile "waste" with the purpose of textile valuation. Ultriplo (U3) is a nationwide company that aims essentially at the valuation of collected textile waste by promoting reuse, contributing to sustainable development in its environmental, social, and economic dimensions. The main objective of this study is to evaluate the potential environmental benefits of reusing clothing at the end of product life, namely by reducing the carbon footprint associated with the textile industry. For this study, the company provided a database for the northern part of the country. The company's database is extensive and complex and can be described simplistically as a table that compiles and integrates all the information regarding all the textile collection routes. Furthermore, the database was limited to the first six months of the year 2021. In this study, only variables such as Id, Start, End, Schedule, Mileage (Km), Total Pickups, Contentores, Filing, Weighing, Id Contentor, Município, Filing contentor (%), and Weighing contentor (kg) were used. These variables were selected because they were required to evaluate the reduction in greenhouse gas emissions (GHG) resulting from the textile reuse activity developed by U3. Each kilogram of clothing that is reused and not incinerated avoids the emission of 3.169 kg of CO_{2e}, according to data from the European Commission. This value was used to acess the reduction in GHG emission reduction assessment methodology developed in this study. This methodology has allowed estimating the amount of CO_{2e} not emitted to the atmosphere at the municipality scale. The results show that, for instance, for Santa Maria da Feira municipality, for the six months under study, a total of 330,61 tonnes of CO_{2e} were not emitted to the atmosphere due to the total weight of clothes collected for reuse. The developed methodology has the potential to be replicated in other regions of the country.

Keywords: clothing, circular economy CO_{2e} not emitted, norther sector municipalities, sustainable development.