

# Production and processing of textile waste in countries of the Central Europe



**According to estimation of European Commission, the EU textile industry generates around 16 million tonnes of waste per year, most of which end up in landfills or incinerators. In 2015, over 6 million tons of clothing was consumed in the EU, of which only 13-25% is estimated to be recycled in some way. Less than 1% of the materials used for garment production are recycled in new clothing; most of the recycled textile materials go to other industries for use in lower-value applications such as insulation, cleaning cloths or mattress fillings that are no longer recycled after use. An alternative to recycling is also the sorting of worn garments from separate collection for "second hand" and charity (weighing up to half of the total amount of collection).**

Within the ENTeR international project, an extensive survey was carried out to map the production of textile waste in Central European countries and the ways in which they are processed. The aim was to collect information on the current state of use of these wastes, constraints (technical and legislative) making their recycling difficult and the needs of enterprises in the field of innovation. The results of this survey are the basis for the development of the Strategic Agenda and the Action Plan for the management and recycling of textile waste, which are one of the project outputs and which, on the basis of defined problems relevant to the participating regions, formulate a common vision, goals and priorities for recovery and recycling of textile waste in the medium to long term. These should provide the authorities, industry organizations, businesses and research and innovation centres with an idea for their further work in this area.

The survey was conducted in the countries and regions participating in the ENTeR project, i.e. in the Czech Republic, Poland, Hungary, Lombardy (Italy) and Saxony (Germany), through questionnaires and personal interviews. The situation in other countries (Slovakia, Austria, Slovenia, Croatia) was mapped in the form of searches.

In the Czech Republic, a questionnaire survey was provided at the beginning of 2018; 75 textile companies and waste processors were approached, and in cooperation with APAČ also the industrial laundries offering leasing services; about 25% of respondents answered. Respondents' responses have shown that enterprises producing textile waste have long been actively seeking to use their waste and find further processing and recovery for them either internally or externally; the textile waste is mainly processed mechanically (cutting, tearing) and forwarded for use in the production of various cleaning materials, fillers, insulations or parts for the automotive industry. This also applies to old clothing and other textiles collected from a public in the collection containers. Annually, about 80-90 thousand tons of industrial textile waste are produced in the Czech Republic and 10 thousand tons of worn clothing and other textiles in separate collection; companies that use their waste often handle it outside the waste reporting system, for example as a by-product. The technological solution for the use of textile wastes is mostly available for "simple" textile materials, as opposed to technical textile waste, the processing and utilization of which is often difficult or costly due to their technical nature (coatings, laminations, composites ...). Due to the significant position of the production of technical textiles in the Czech Republic, the solution of recycling of this type of textile waste represents an innovative opportunity for waste-processors. Respondents also pointed out the difficulties in using waste as a secondary raw material from the legislative point of view.

In Hungary, the textile industry has experienced a significant decline following a dramatic reduction in its former capacities for hemp and flax production and processing. At present it is represented by the small and medium-sized enterprises and micro-enterprises. Around 50% of the textile production is represented by the production of technical textiles. Large clothing companies are mostly part of multinational companies. The results of the questionnaire survey show that Hungarian businesses are also actively seeking to find use for their textile waste and are interested in solving them. Obstacles are often caused by the technical nature of textile materials (lack of technological solution) or small volume of waste produced. The system of the separate collection of old textiles from the population is practically not available here, and old clothing therefore mostly end up among the municipal waste. As in the Czech Republic, technologies for the processing and recycling of "simple" textile materials are available in Hungary as well; processing methods are mostly mechanical (tearing, cutting) and recycled material is mostly used for nonwoven fabrics, cleaning cloths, fillers, upholstery, insulation or geotextiles. Approximately 7,600 tons of industrial textile waste is produced in Hungary each year.

Also in Saxony (Germany), the textile industry experienced a dramatic decline (92%) in the first half of the 1990s; starting with the restructuring process since 1995. The Saxon textile and clothing industry is one of the few in the EU characterized by a closed production chain including spinning and weaving mills, the production of non-woven fabrics, knitting, finishing, storing, production of household textiles, design and production of clothing and working clothes and the production of technical textiles. The main position in the regional textile industry has the production of technical textiles, garments and household textiles. In Germany, in general, a total volume of 1.5-1.9 million tonnes of textile waste are produced per year. There is a well-organized system of separate collection of old clothing, which represents a large part of it; according to the quality, the collected textiles are further distributed to charity, sold to second-hand in developing countries, or recycled. The traditional methods of textile waste processing are tearing and cutting, the obtained material is mostly used for the production of non-woven fabrics, cleaning cloths, insulation, fillings, etc. However, at least 300,000 tons are burned or deposited annually in landfills. The volume of textile waste is increasing, but with regard to the structural changes of the German textile and clothing industry as well as the significant orientation to the production of technical textiles, it is not enough to increase the processing capacities for textile waste, but also new technological solutions are needed. The progressive development of new materials and composites is followed in Germany (STFI) by intensive research and provision of pilot capacities for the processing of special waste, including carbon fibers. Pilot capacities are also available for new nonwoven fabrics.

Also in Austria, there is a well-organized separate collection of worn-out clothing (charities, private companies); annually they collect around 28 000 tonnes, which is about 90% of the total amount of disposed old textiles from the population. Most of the collected clothing is sold to recycling companies that are part of the international textiles trade; about 45% of usable clothing is exported to other European countries, to Eastern European countries or to Africa. Concerning the industrial textile waste, about 2/3 is processed (mainly mechanically) and further utilized.

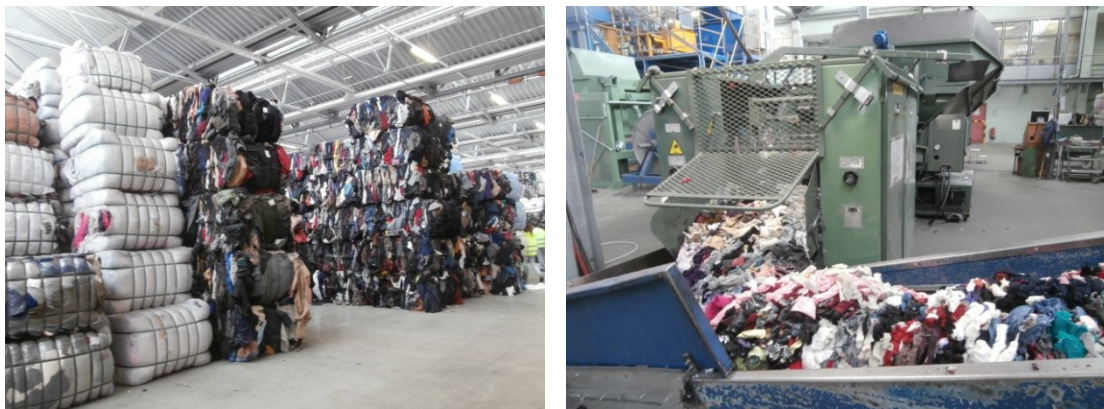
Unlike the countries mentioned above, in Lombardy, the textile and clothing industry (together with the leather industry) has a very strong position and represents 17.4% of the total number of production units of this branch in Italy. Concerning the production of waste from the textile industry, almost 87% of the total quantity comes from the manufacture of textiles and the remaining 13% from the production of clothing, leather and fur products. Textile wastes include also waste from the production of composite materials (impregnated fibers and elastomers), which may complicate possible recovery and recycling.

In Poland, the textile industry has experienced a significant rise since 2014, after falling in 2010-2013. The apparel industry focuses mainly on the production of underwear, workwear and sportswear. Textile production is focused on production for the needs of the mentioned clothing sector; the increasing share represents also the production of technical textiles for

sectors such as healthcare, automotive, construction, agriculture and highly technologically advanced materials for protective clothing (rescue items, police, army). The questionnaire survey in Poland was attended by 13 companies; they highlighted the urgent need to find recycling opportunities. There is often no technological solution, as well as the capacity to process textile waste in Poland is insufficient and is not sufficient for the current increase in production. The report also highlights the substantial volume of textile waste from the health and the veterinary sector, consisting of one-off clothing, bandages or diaper panties. Reuse/recycling if this waste is complicated by the fact that it belongs to the category of hazardous waste.

In Croatia, the textile and clothing industry is currently on the rise due to investments and orders from transnational fashion chains (H & M, C & A, Zara, Calzedonia, Benetton). Concerning the textile waste, it is estimated that about 46 thousand tonnes of old textiles per year is part of the municipal waste, while only 8.5 thousand tonnes is disposed in separated collection. One reason for such a small proportion of separate collection may be the fact that the relevant national legislation has only been issued recently. The leading Croatian textile waste recycling company is Regeneracija in Zaboka, with a capacity of 8,000 tons / year, processing waste mainly mechanically for further use in automotive, floor coverings, filter cloths and furniture.

In contrast, the textile industry in Slovakia faces a significant drop in production and is mainly focused on the production of technical textiles for the automotive industry. Approximately 6.8 thousand tonnes of textile waste from industry and 4.4 thousand tonnes of separate collection of textiles and clothing are produced annually. A separate collection is organized by charities and private companies (often with a foreign owner) in cooperation with municipalities. Thanks to the orientation towards the production for the automotive industry, Slovakia has become a leader in the recycling of mixed textile waste from the automotive sector and discarded cars. In 2013, the company PR Krajné launched its patented technology for recycling of textile waste from automotive production and discarded vehicles; the output is a new construction material with excellent acoustic and thermal insulation properties.



*ENTeR – Expertní síť pro recyklaci textílií*

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