REUSABLE TEXTILES SEEKING A NEW LIFE

UNDER THE LEADERSHIP OF ASSOSISTEMA, THE REUSABLE TEXTILE INDUSTRY HAS LAUNCHED AN ANALYSIS TO PROVIDE A STRATEGIC FRAMEWORK AIMED AT REDUCING DISPOSED WASTE AND PROMOTING RE-USE IN THE FRAMEWORK OF THE CIRCULAR ECONOMY.

In the transition to the circular economy, the reusable textile industry - i.e. companies dealing with the sanitization and sterilization of textile products and devices used in the healthcare, hotel and catering sectors and with the manufacturing, distribution and maintenance of personal and collective protection equipment – is assessing the sustainability of its business and services based on circular economy principles. In recent months, an analysis has been launched under the leadership of Assosistema to provide a strategic framework in this field. Every year, 1.5% of processed textiles leave the manufacturing cycle generating nearly 25,000 tons of sanitized textiles that are discarded and sent to landfill. Disposing this waste is an outlay cost for the company and an environmental cost for the society.

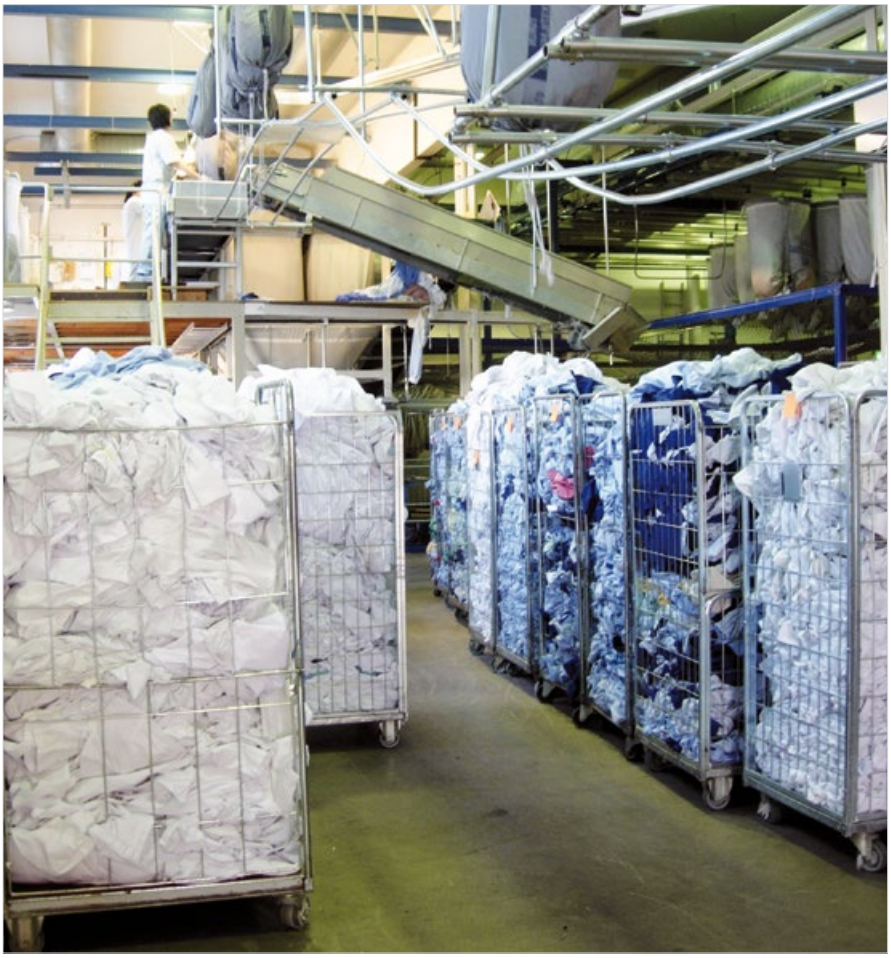
Textiles managed by Assosistema companies have standard technical and qualitative characteristics ensuring their durability and resistance to mechanical, thermal, chemical and biological processes during their lifecycle. Traceability is ensured by a product tag and microchip mapping each item throughout the various process steps.

Reusable textiles lifespan mainly depends on two factors:

- their usage and the consequent wear level
- the impact of sanitization processes.

Both aspects are strictly connected to what textiles are used for and to the statutory physical characteristics they are required to have to be considered fit for purpose. Based on that, companies set a maximum number of washing and sanitizing cycles after which items are discarded regardless of their conditions, although they might still be fit for use.

According to Assosistema, 600 industrial plants scattered throughout Italy send significant volumes of end-of-life textiles to landfill every year. Based on the sanitization procedure, items can be classified as special non-hazardous waste and be considered as either waste from processed textile fibres (CER 040222) or waste from clothes and textiles (CER 200110 and 200111) if treated as urban waste.



The final destination of reusable textiles depends on their composition:

- if they are 100% polyester, they are disposed of as waste due to the limited quantities which cannot generate economies of scale for companies
- if they are 100% cotton, they are both disposed of as waste and used for rags manufacturing made by hand inside the companies or through industrial processes by specialized companies
- if they are mixed fabrics, they are partly disposed of as waste and partly used for rags manufacturing (this is particularly the case for discarded overalls). However, these materials have low market value.

Textile waste in Italy

It is difficult to have a full picture of the actual production of industrial textile waste in Italy for two main reasons: on the one hand, data on special waste are not fully reliable, on the other textile waste is often considered as household waste.

National special waste production is calculated by the Italian National Institute for Environmental Protection and Research (Ispra) based on the

information provided in specific databases on the environmental declaration forms to be submitted every year under the legislation in force. The so-called "urban waste" produced by non-domestic users is not considered for this purpose. However, as outlined in the latest *Special Waste Report - 2015 Edition* by Ispra (www.isprambiente.gov.it/it/pubblicazioni/rapporti/rapporto-rifiuti-speciali), *"when comparing the information provided in the database of environmental declaration forms to that taken from databases of the Italian National Institute for Statistics, less than 10% of environmental declaration forms are submitted in many manufacturing sectors (e.g. in the textile and clothing industry)"*. This is due to the large presence of small businesses in the field, which are under no obligation to submit annual declaration forms. Therefore, the information inferred from the database above is supplemented with Ispra's estimates by using specific methodologies, although Ispra believes that *"supplemented data might still be partially underestimated"*.
Data provided in the *Special Waste Report - 2015 Edition* focus on 2013 and estimate a total national production of 300,000 tons of textile waste, mainly in northern Italy. Very little of this waste – about 1,000 tons - is used for energy recovery or incinerated. No detailed data are available on the final use of the remainder; only aggregate data on special waste management indicate that 74.9% of the material is recovered and 9% of the waste is disposed of through the landfill. However, this total breakdown does not apply to the textile sector.
Some waste produced by the textile industry is considered as household waste based on the assimilation rules defined by municipalities. This further complicates the calculation of waste produced by the textile industry, as there are no disaggregate data making the difference between real household waste and waste classified as such.
The *Urban Waste Report - 2015 Edition* by Ispra (www.isprambiente.gov.it/it/pubblicazioni/rapporti/rapporto-rifiuti-urbani-edizione-2015) provides overall data about household textile waste mainly including used clothing for which a recovery, re-use and recycling system has been set up at a national level. According to Ispra report entitled *L'Italia del riciclo 2015 (Italy recycling 2015)*, 124,300 tons of textile waste were collected in 2014 with a 12% increase compared to 2013, when 110,900 tons were collected.
Some of this waste is managed by Conau, an Italian consortium that was set up in 2008 upon the initiative of business operators consisting of bodies/companies operating in the recovery, distribution and recycling of used clothing and accessories and bodies/companies selling them. At present, the consortium manages about 50% of household textile waste (or classified as such) collected in Italy.
As to waste destination, a research on textile end-of-life management has been published by the Italian association Ambiente Italia based on the data provided by Humana, the major waste collection company. At a national level, it is estimated that 68% of waste is re-used, 29% is recycled for industrial purposes and 3% is disposed of. As already said, such data mainly refer to used clothing.
As highlighted in the previous paragraph, a lot of waste is potentially being produced by the textile industry in Italy, although it is difficult to quantify it because of traceability constraints.
In general terms, it can be stated that Italy produces:
- over 300,000 tons of special waste
- out of 124,300 tons of household textile waste (or classified as such), an undefined portion of sorted waste
- a portion of unsorted household waste.

If, on the one hand, a lot of clothing waste is recovered or re-used due to the presence of a dedicated consortium, on the other no information exists on the management of industrial textile waste, but it might reasonably be expected that most of it is sent to landfill.

Geographical area	Waste tons
Northern Italy	213.366
Central Italy	63.178
Southern Italy	28.706
Total	**305.250**

TAB. 1 - TEXTILE WASTE
Textile industry special waste production by geographical area.
Ispra data, 2013.

Management mode	Waste tons
Energy recovery	168
Incineration	835
Total	**1.003**

TAB. 2 - TEXTILE WASTE MANAGEMENT
Textile industry special waste management.
Ispra data, 2013.

WHO IS ASSOSISTEMA

Assosistema represents the companies operating in the manufacturing of goods and services for the hygienic safety of textiles and surgical products used in hospitals, healthcare institutes and nursing homes, in the manufacturing, distribution and maintenance of workwear and personal or collective protection equipment, and in the reconditioning of textiles used in the hotel and catering sectors.
This industry has a turnover of euro 4,200 m, employs about 35,000 workers in Italy (93% are fixed-term workers and 65% are women) with 26 employees on average, and ranks 5th among the 24 sectors identified by the latest census on Industry and Services performed by the Italian National Institute for Statistics (Assosistema data 2015).

The business focuses on 3 specific sectors: integrated healthcare services (supply, sanitization and sterilization of reusable textile devices and surgical instruments), integrated hotel services (supply, sanitization and integrated management of the store and laundry) and work safety (personal and collective protection devices, work safety systems).
Customers are large-size organizations such as hospitals, communities, hotels, restaurants, barracks, schools and chemical, textile and pharmaceutical companies outsourcing their services to pool their resources on their core business.

Member companies must provide customers with clean and stainless products that are fragrant and pleasant to the touch, with precise finishing and no unpleasant smell. Microbiological quality must be ensured both for finished products and throughout the process up to delivery. Microbiological contamination controls are in line with Assosistema guidelines complying with the UNI EN 14065:2004 standard, based on the assessment of the risk analysis and biocontamination control system.
Assosistema has set up a working group to deal with the analysis and implementation of the European novelties introduced by the new edition of the UNI EN 14065:2016 standard "Laundry Processed Textiles - Biocontamination Control System" to update the relevant association guidelines.

Circular economy scenarios in the textile industry

Assosistema has designed 3 possible scenarios to implement a circular economy model in its business. For each of them, operating models and good practices are already in place in the industry.

Scenario 1
Management and re-use of end-of-life 100% cotton textiles.
Oftentimes, end-of-life reusable textiles are transformed into rags either by hand by laundries or through industrial processes by specialized companies. That gives a longer life expectancy to items and a little higher margin of profit to companies. As explained above, rags can be used by customers of industrial laundries (hotels and restaurants), cleaning companies, car repair shops, machine shops, pizza houses and restaurants.
Longer life expectancy means that products can be re-used. This has a positive environmental impact and is in line with the strategic objectives of the European waste legislation focusing on prevention, also by re-using products or extending their life cycle (http://ec.europa.eu/environment/waste/prevention/index.htm).
At present, it is not possible to trace end-of-life rags, which are classified as special waste as they are drenched with biological or synthetic fats and/or other chemical products. Interviews and on-field data have shown that it is often impossible to monitor the management of their disposal, thus hampering any assessment of potential environmental impacts.
This scenario assumes that:
1) rags production should be maximized by extending the life cycle of all cotton garments
2) end-of-life textiles should be re-used and end-of-life rags should be collected and used for energy recovery.

Scenario 2
Secondary raw material production.
Cotton, polyester and mixed-fabric textiles can be recycled by specialized companies at industrial level to produce secondary raw materials and generate new products.
Textile recycling follows specific processes based on textile composition and intended purpose such as spinning, garneting, melting and grinding. In Italy, there are several companies dealing with

the collection, selection, processing and packaging of textile waste.
Textile secondary raw material can be used for different purposes, e.g. the production of:
- armchair and mattress padding
- nonwoven fabrics and felts for thermal and acoustic isolation in the nautical, automotive and building sectors
- agricultural textiles to protect land and crops
- medical textiles, such as those using super-absorber polymers for nappies and incontinence products
- drawing paper from white cotton.
This scenario implements circular economy principles in the supply chain through the production of secondary raw materials which are re-used in the production cycle, although trimming is more complex and expensive than crushing for cotton.

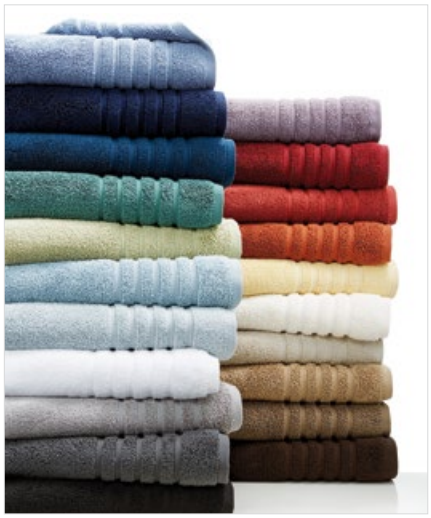
Scenario 3
Upgrade of textile waste, new production.
Many reusable textiles of Assosistema companies feature high quality even upon disposal. Although they no longer comply with the standards applied for the original intended purpose, they might still have better features than traditional textile waste.
This is why re-using them for the production of new products is very sustainable in economic and environmental terms.

CASE STUDIES: RESEARCH ON TEXTILE RECYCLING

Trash to cash project
This project is financed by Horizon 2020 (the European research fund) and gathers 19 international partners committed to using zero-value textile waste and cellulose fibres to create high-quality products by means of new design-driven technologies.
The team is made up of designers, researchers, technicians, raw material suppliers and manufacturing companies from all over Europe forming an interdisciplinary and intersectoral consortium.
Project website: http://trash2cashproject.eu

Aquafil Group
Specialized in the manufacturing of synthetic fibres (polyamide 6 in particular), this company has designed and developed an industrial system called Econyl® to produce nylon 6 from 100% regenerated waste materials out of:
- post-consumer waste, i.e. end-of-life products partly or fully made of polyamide 6 including fishing nets, fluff (the top part of carpets and rugs) and rigid textiles
- pre-consumer waste, generated from the production of nylon 6.

Interface
World leader in textile flooring, Interface has developed a system called ReEntry 2.0 collecting old carpets and rugs which are disassembled with a specific technology separating the different fibres. The whole process requires lower energy consumption compared to other methods and the company fully recycles its own waste materials.



This scenario has also been explored by the Lowaste project (financed by the EU through the Life+ instrument), which has tested the design and prototyping of products made of reusable technical fabrics used in hospital operating rooms. During the Life project, 32 projects have been identified and 24 have been prototyped with the support of 23 designers and makers.

The different types of re-products can be classified into the following categories:
- fair gadgets
- bags, sacks and cases
- furniture
- technical wear.

To conclude, not only waste but also industrial policies and corporate strategies should be considered when taking on the challenge of circular economy.
The circular economy requires reviewing strategies throughout the supply chain and should be supported by public policies, and in particular by:
1) *industrial policies:* a system of incentives should be in place to support research and investments in new plants and facilities promoting "return logistics", also by means of ad hoc associations;
2) *green public procurement:* disposable products – often coming from Asia with no industrial traceability – are negative for the local economy and subject to fewer checks, especially in the textile sector. Public administration GPP policies should consider their impact on the environment and the labour market. Compliance with the SA8000 certification could be included in the requirements
3) *local development policies:* oftentimes, public administrations enabling their economic communities to increase resource efficiency improve competitiveness at a local level (lower taxes, more connections, more trust). Local agreement models should be encouraged and supported.
Last but not least, companies are knowledge repositories: they quickly learn from the surrounding environment but do not always know how and when to transfer their knowledge. Unfortunately, that also applies to the circular economy.

The bias against companies and industries is often due to the lack of communication by manufacturers. If two worlds do not speak together, they stop understanding each other

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CASE STUDY: RECOVERABLE PRODUCTS IN SCARPERIA-SAN PIERO

In 2015, the municipality of Scarperia e San Piero near Florence, decided to reward good environmental sustainability practices implemented by businesses.
The local authorities introduced a 20% reduction of the waste tax for non-domestic users classified under category 22 (restaurants, small restaurants, pizza houses and taverns), 7 (hotels with restaurant) and 31 (holiday farms) proving they have fully replaced paper products with reusable textiles in running their business (for tablecloths, napkins, etc.). This initiative aims at promoting the adoption of sustainable practices by companies encouraging them to replace disposable products with recoverable ones. That has direct impacts on the environment such as lower waste production, reduction of disposal costs and better environmental sustainability. This good practice promoted by the municipality of Scarperia e Sanpiero has been replicated by the nearby village of Borgo San Lorenzo, whereas other Italian administrations are showing an interest in this initiative.
Chi-ma Florence Spa – an established local business member of Assosistema – is one of the most sustainable companies in this context. Founded in 1870 and managed by the Chiari family ever since, Chi-ma Florence Spa is a top leader in textile services for hotels, restaurants and nursing homes after 145 years of existence.

CASE STUDY: THE EXPERIENCE OF RIUP AND SERVIZI OSPEDALIERI SPA

Servizi Ospedalieri Spa is a member of Assosistema and one of the leading companies in Italy in the field of specialized services in the healthcare sector, with a focus on laundering & sterilization. Operating in the washing and rental of hospital linen for years, it has recently merged by incorporation with Omasa Spa and has become the largest Italian market player dealing with the outsourced management of sterilization units for surgical instruments.

Servizi Ospedalieri has supported the creation of Riup, a start-up re-using industrial waste to generate new products. Riup has presented its collections made by recovering reusable technical textiles used in hospitals at the event "Sharing Design - Making Makers" 2016 held at Fabbrica del Vapore, one of the most important venues at Milan's International Furniture Fair