TEXCENE SPA
EPR – Analysis of the potential economic value of waste

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TEXCENE SPA

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The EPR – Analysis of the potential economic value of waste is in fulfillment of the **TEXCENE SPA** commitment to the DETOX solution which was made public on 18th July, 2017.

TEXCENE SPA supports the Detox solution to ban hazardous chemicals from fashion

This report was prepared on behalf of TEXCENE SPA by Blumine Srl, an independent consulting company specialized in supporting textile and fashion companies in sustainability projects.

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1 Introduction: purpose and scope of the EPR report

In addition to the main theme of hazardous chemicals management, the Detox commitment also envisages a commitment to "Responsible Design and Consumption or Living - via Extended Producer Responsibility[1]" - (art 6.). The goal is to ensure a non-polluting and circular approach to companies' productive activities throughout the entire product life cycle: from procurement to design through the use, reuse, recycling and disposal of products and resources.

The Detox commitment includes the publication of a report analyzing the economic value of production waste, by-products and leftovers, and their management.

This study reports the overall budget of economic costs and environmental impacts, incurred or avoided by TEXCENE SPA with its waste management system, in line with best circular practices.

Definitions

In line with industrial uses and Italian and European legislation, this report defines:

Waste: according to the European Directive 2008/98/EC on waste and Italian law, art.183, paragraph 1, letter a Dlgs 152/2006 waste is defined as *"any substance or object which the holder discards or intends or is required to discard"*. The European Waste Catalogue (according to the Commission Decision 2014/955/EU) assigns different waste codes with a variety of hazard, recyclability, transport, installation permits and other characteristics. Management costs - for paid disposal of waste destined for energy

[1] From the Detox Commitment text:

(11) Extended and Producer Responsibility is individual and global company responsibility to ensure the whole lifecycle of a product and the delivery of a function (from sourcing and design to use, re-use and recycling or final decontamination and treatment):

- *protects the well- being of the natural environment, stays within planetary boundary limits and supports the socio- economic well-being of workers and local communities;*
- *ensures the system for end-of-life collection achieves high use of product and material quality through effective collection, disassembly and re- use or recycling;*
- *ensures the system for reuse (or any life-extension of the product), recycling and final treatment incentivises changes in design by the product designer both financially , through internalization of the real own-brand/differentiated end-of-life costs into the company business model, and through information feedback, including to other actors in the extended life-cycle;*
- *includes supporting and implementing fully circular resource use and full resource stewardship (recognizing that natural resources are not 'owned' but 'borrowed' to meet a need) and the duty to return all resources to their natural uncontaminated state after making use of them.*

(12) Responsible Design and Consumption or Living business models – are systems of products and services that are designed to deliver functions to meet needs, integrating full circularity and EPR (as defined above). These systems include a comprehensive process for identifying all lifecycle aspects, considering the most responsible design, production, product use and closed- loop reuse and recycling, aiming to maximize the use of closed-loop and slow-loop manufacturing and value creation. Closed loop systems should give preference to local solutions where possible.

generation or landfill - or market value - for waste sold or ceded for free, diverted to new production processes[2] - vary accordingly. Typically, the textile and accessories manufacturing generates: 1. hazardous waste: sludge, fluids...; 2. non-hazardous waste: yarns, fabrics, metals…; packagings; machineries.

Byproduct: according to the European Directive 2008/98/EC on waste and Italian law, art. 184 bis Dlgs 205/2010 *"A substance or object, resulting from a production process, the primary aim of which is not the production of that item, may be regarded as not being waste (...) but as being a by-product only if the following conditions are met: a) further use of the substance or object is certain; b) the substance or object can be used directly without any further processing other than normal industrial practice; c) the substance or object is produced as an integral part of a production process; and d) further use is lawful, i.e. the substance or object fulfils all relevant product, environmental and health protection requirements for the specific use and will not lead to overall adverse environmental or human health impacts."*

Leftovers: for the purposes of this analysis, it is worth to distinguish those production residues of lesser value than the original ones, not yet waste or byproducts, which are potentially still usable, retaining original use, but only outside the originally destined channels. Eg. inventory, unsold products, old samples, etc.

Declaration of waste disposal (*Modello Unico di Dichiarazione ambientale - MUD*): form for official declaration of quantities of waste disposed in one year, in kilograms, per category of waste. According to the Directive 2008/98/EC on waste and Italian Law n. 70/1994, accounts for waste generated by economic activities, those collected by the Municipality and those disposed of, started to be recovered, or transported, in the year preceding the declaration. It is normally submitted by April 30 of each year.

Overview of TEXCENE SPA processes

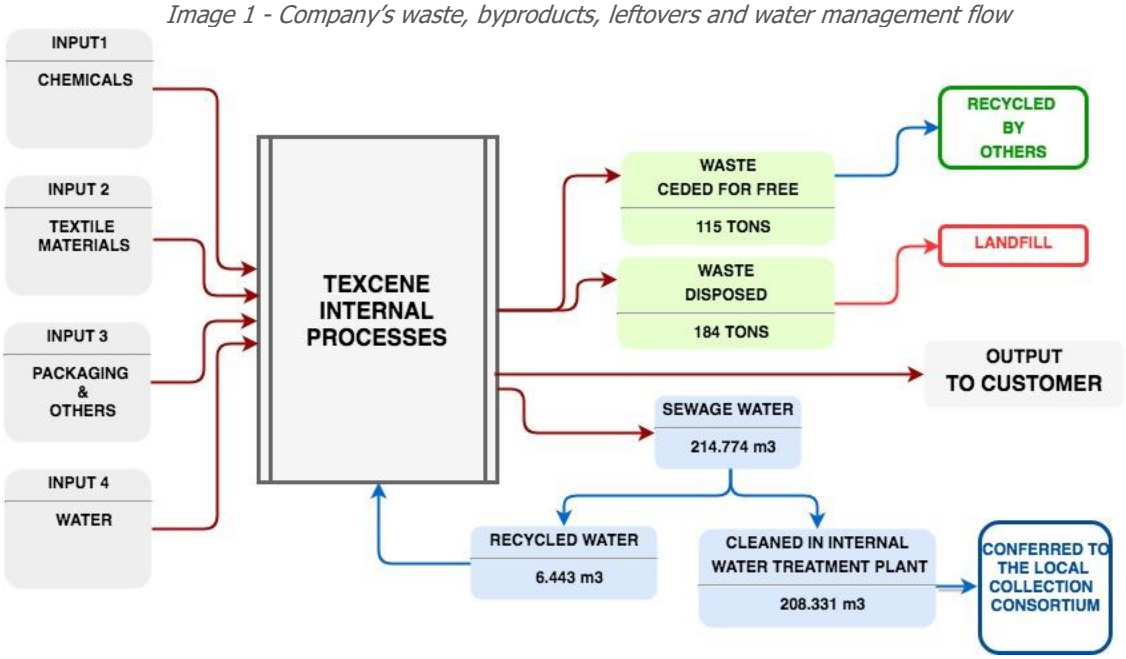
TEXCENE SPA, part of the Pezzoli Group, relies on over 35 years of experience in delivering high quality solutions for bleaching, dyeing and finishing on a complete range of textiles: yarns, fabrics and terry cloths. We can meet any of our customers' requirements with a flexible customer-oriented approach: high quality and fast service for tailored solutions.

[2] This case is defined as *"End-of-waste status: Certain specified waste shall cease to be waste (...) when it has undergone a recovery, including recycling, operation and complies with specific criteria to be developed in accordance with the following conditions: a) the substance or object is commonly used for specific purposes; b) a market or demand exists for such a substance or object; c) the substance or object fulfils the technical requirements for the specific purposes and meets the existing legislation and standards applicable to products; and d) the use of the substance or object will not lead to overall adverse environmental or human health impacts"* (Directive 2008/98/EC on waste and Italian law, art. 184 ter Dlgs 205/2010)

In our 20,000 square meters plant in Cene (Bergamo, Italy) we implemented all our textile finishing processes in parallel, using machinery available only for a limited number of top players in the European textile industry.

Aware of our intense use of energy and water, every day we renew our commitment to protect the environment and improve people's wellbeing by integrating in our processes energy saving technologies, such as a 450 KWh hydroelectric power station, 980 KWh solar panels and a co-generation plant fueled by natural gas to produce 2 MWh of electricity and 0.85 MWh of thermal power. We also employ heat recovery units, fume abatement equipment and purifiers.

Image 1 - Company's waste, byproducts, leftovers and water management flow



2 Methodology

TEXCENE SPA has conducted an internal investigation aimed to gather, from analytical or industrial accounting or by estimate, the information needed to integrate the MUD: the amount of waste water; the amount of waste, byproducts and leftovers sold or ceded for free[3]; byproducts internally re-used; costs, revenues and savings related to such waste management.

[3] it is assumed that waste sold or ceded for free becomes a raw material in a new production cycle. Therefore, it can be considered as recycled.

Waste was analyzed in economic terms and volumes and aggregated according to the following categories: Sludge, Packagings, Textiles, Metals, Others.

The results were processed in the form of tables and charts:

1. Material volumes:
    a. Waste material balance 2016:
        - Balance sheet: the data related to waste management for the year 2016 have been reassembled in order to highlight not only the waste disposed of, whether for free or not, but also that diverted from landfill through reuse or sale of byproducts and leftovers, to quantify the waste potentially generated by the production activities.
        - Diagram: the aggregate figures for the 2016 waste balance were reported graphically to highlight the portion of waste diverted, sold or ceded free of charge and disposed of on the total of the potential waste.
    b. Waste water balance 2016:
        - Balance sheet: the data related to wastewater management for the year 2016 were reassembled in order to highlight not only those discharged, but also those diverted through of recovery systems, to quantify the wastewater potentially originating by the production activities.
        - Diagram: the aggregate figures for the 2016 wastewater balance were reported graphically to highlight the portion of wastewater diverted and discharged on the total of the potential wastewater.

2. Waste financial balance 2016:
        - Balance sheet: the data related to waste management for the year 2016 have been reassembled in order to highlight not only the actually recorded values for the water discharge, the wastewater treatment plant management, the disposal, the transportation and the eventual sale of waste, byproducts and leftovers, but also the internal costs for the waste management structure (personnel, warehouse, etc.) and the savings generated by the sale, the non-disposal of waste and the non-purchase of raw materials and the water recovery and the closed cycles beyond the water one.
        - Diagram: the aggregate figures for the 2016 waste economic balance were reported graphically to highlight the savings, the sales revenues and the costs to the total potential costs of waste management.

3 Outcomes

3.1 Waste material balance 2016

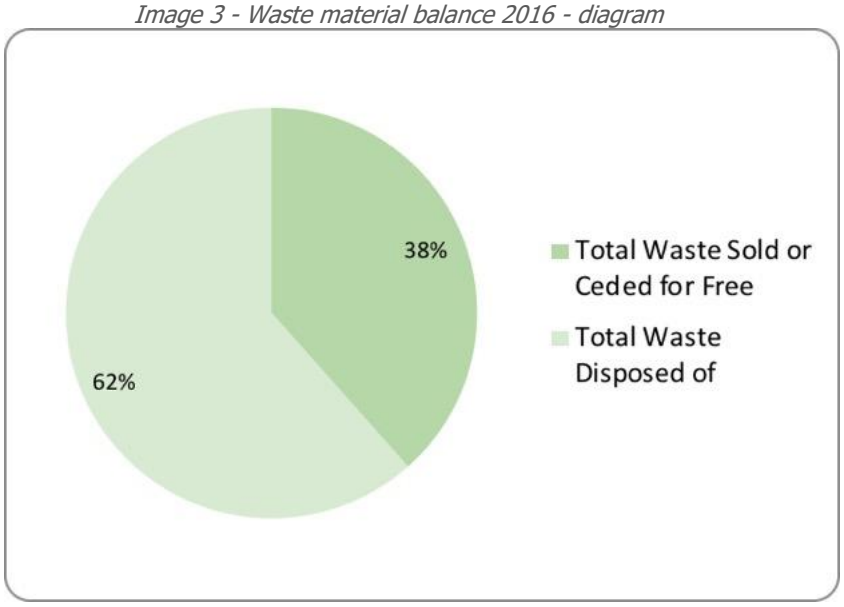
Considering, in addition to waste disposed of, the one diverted through the re-use or sale of byproducts and leftovers, the quantity of waste avoided is almost 40% of the waste potentially generated by the production activities.

This result was achieved through the following waste management activities: free or paid disposal for other external recycling purposes of 115.000 kg of waste, that is 38,5% of the annual potential waste

Image 2 – Waste material balance sheet 2016

YEAR 2016	kg	%
Waste Potentially Generated by the Production Activities	**299.034**	**100,0%**
Total Waste Diverted	*0*	*0,0%*
Total Waste Managed	**299.034**	**100,0%**
Sludge/Waste aqueous solution	86.080	28,8%
Packagings	170.490	57,0%
Textiles	37.360	12,5%
Others	5.104	1,7%
Total Waste Sold or Ceded for Free	**115.000**	**38,5%**
Total Waste Disposed of	**184.034**	**61,5%**
Waste Reduction achieved	**115.000**	**38,5%**

Image 3 - Waste material balance 2016 - diagram



3.2 Waste water balance 2016

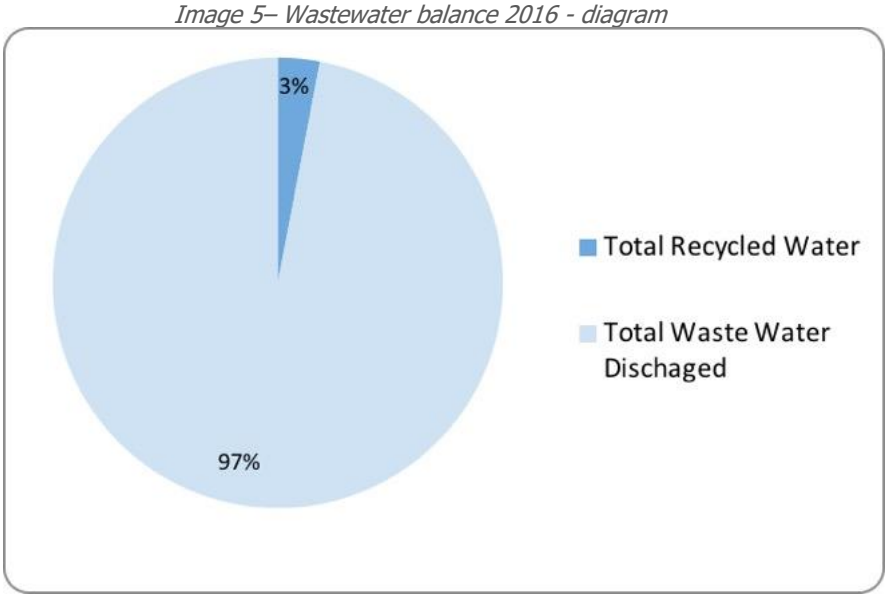
A condensate water recovery system allows to recycle 3% of the water consumed each year from the production plants, as high as 6.443 m^3 in 2016.

In the last year, the sewage plant produced 208.331m^3 of wastewater equal to 20 m^3 per 1.000 kg of ennobled textiles. After treatment in the internal biological plant, clean water is conferred to a collection consortium for treatment, Uniacque Spa, under the control of the responsible government body.

Image 4– Wastewater balance sheet 2016

YEAR 2016	m^3
Total Potential Waste Water	**214.774**
Total Waste Water Dischaged	**208.331**
Total Recycled Water	**6.443**

Image 5– Wastewater balance 2016 - diagram



3.3 Waste financial balance 2016

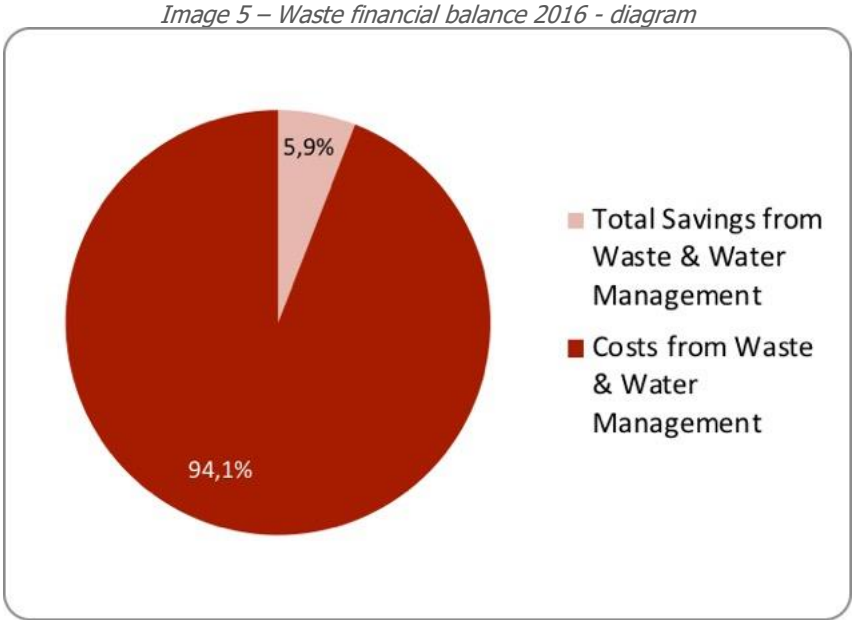
The annual negative balance of TEXCENE SPA's waste and water management is 554.579€, that is 94,1% of the potential cost, that is 589.373€. The waste reduction achieved is 5,9%, that is the share of costs avoided resulting from the following waste management activities:

- 4.794€ savings from water recycling
- 30.000€ savings for the avoided costs of disposal of byproducts, leftovers and waste sold or ceded for free for textile and other external recycling purposes

Image 4 – Waste financial balance sheet 2016

YEAR 2016	€	%
Potential Cost of Waste & Water Management	**€589.373**	**100%**
Savings from waste disposal costs (byproducts, leftovers and waste sold or ceded for free)	€30.000	5,1%
Savings from water recycling	€4.794	0,8%
Total Savings from Waste & Water Management	***€34.794***	***5,9%***
Costs of waste disposal (internal operations and third parties' services)	€35.000	5,9%
Of which, sludge	*€7.355*	*1,2%*
Cost of wastewater discharge	€155.000	26,3%
Cost of sewage plant management	€364.579	61,9%
Costs from Waste & Water Management	***€554.579***	***94,1%***
Waste & Water Management Negative Balance	**€ 554.579**	**94,1%**
Waste Reduction achieved	**€ 34.794**	**5,9%**

Image 5 – Waste financial balance 2016 - diagram



4 Conclusions and next steps

The waste management system implementation, in line with best circular practices: savings for the avoided costs of disposal of byproducts, leftovers and waste sold or ceded for free for textile and other external recycling purposes, and recovered water, allowed TEXCENE SPA to cut the economic and environmental costs in 2016 by:

- 6.443 m3 or 3% in waste water
- 115 t or 38,5% in other waste volumes
- 34.794€ or 5,9% in value

These encouraging results give directions on how to continue to apply TEXCENE SPA's "Responsible Design and Consumption or Living - through Extended Producer Responsibility", which we will account for in the forthcoming reports.

TEXCENE SPA, as part of the Italian DETOXLeader Group together with Canepa Spa, Miroglio Group, Italdenim Spa, Besani Srl, Berbrand Srl, Tessitura Attilio Imperiali Spa, Zip Gfd Spa, Cotonificio Olcese Spa, Ditta Gaetano Lanfranchi Spa, Fellicolor Spa, Mabo Spa, Itaclab Srl, Taroni Spa, Alesilk Sas, Dienpi Srl, Filmar Spa, Filmar Nile Textile S.A.E., Imbotex Srl, Italtextil Sarata Srl, Maglificio Ripa Spa, Monticolor Spa, Ongetta Srl, Calzificio Eire Srl, Texcene Spa, is fully aware that only with the active participation of the entire fashion industry it is possible to deliver the desired outcomes on a global scale.