WP T2 – INNOVATION ON TEXTILE WASTE MANAGEMENT

ACTIVITY A.T2.3 PILOT CASES

D.T2.3.3 PILOT CASES TECHNICAL REPORT

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(Saxony)

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ENTeR – Expert Network on Textile Recycling

ENTeR works in five central European countries that are involved in the textile business, to promote innovative solutions for waste management that will result in a circular economy approach to making textiles.

The project will help to accelerate collaboration among the involved textile territories, promoting a joint offer of innovative services by the main local research centres and business associations ("virtual centre"), involving also public stakeholders in defining a strategic agenda and related action plan, in order to link and drive the circular economy consideration and strategic actions.

The approach of the proposal and the cooperation between the partners is oriented to the management and optimization of waste, in a Life Cycle Design (or Ecodesign) perspective.

CONTENT

1. Pilot case description – aim and scope

STFI contacted the company Textilausrüstung Pfand GmbH, Lengenfeld (DE) as partner for the Pilot case.

Company Textilausrüstung Pfand GmbH offers contract finishing and functionalization of high-quality home textiles, household textiles and textiles for public areas, functional fabrics for clothing and technical textiles. Novel and innovative finishings for technical products, functional textiles and high-quality home textiles coming from own research and development activities are the basis for a steadily improving product range of the company. The services offered by Textilausrüstung Pfand GmbH include finishing and functionalization of textiles by means of chemical (wet), thermal and mechanical treatments. In detail, the following can be offered: optical whitening finish, rinsing, tentering, softening, fixation, flame resistant treatment, stain repellency, antistatic or antibacterial finishing, stabilisation against environmental influences (UV radiation). Multifunctional finishings, such as combinations of flame retardancy and stain repellency together with antibacterial finishing are more and more increasing. Pre-treatments as well as after-treatments for printing and embroidering processes and also thermosol dyeing are carried out.



The company produces different types of textile waste: selvedges (edge strips), end pieces/ leftover pieces, mixed textile waste from products coming from customers for finishing, dust and pieces of thread and yarn waste. A part of the unmixed waste is taken back by customers to be reused again in the production process, but the major share is transported to disposal companies to be finally incinerated or landfilled; fees have to be paid for the waste disposal (approx. 185€/ton).The following needs of waste management for the future were defined by the company:

Technological needs	Shredding/cutting of waste directly at the point of origin (online processing) → technical development of such a shredding unit Find solutions where such chopped pieces can be used Finding solutions for the use of shearing dust (airlaid method, papermaking)
Economical needs	Economically reasonable solutions for waste disposal Disposal of unmixed (pure) waste free of charge
Logistical needs	Regular disposal/take away of waste by external providers to save storage capacities Easy and non-bureaucratic handling of waste
Environmental needs	Reduction of waste amounts to be disposed

2. Mapping of the market available technologies for waste pre-treatment in partner region

Analysis of textile production waste: Following the interviews with Saxon textile and clothing companies, the textile production waste comes from the manufacturing of all kinds of textile products. Main types of textile production waste are: fibre waste (also including dust and fluff), yarn residues, textile fabrics (coated and uncoated), pieces of textile fabrics (selvedges), cutting waste, defective products and other non-textile waste such as paper, cardboards, films, wood etc. The material composition of the textile waste comprises nearly all kinds of known natural and synthetic fibres.

Waste treatment & recycling: The favourite option is to re-utilize the waste material by returning it directly into the production process to save raw material. Waste material from defective production is sometimes used as cleaning wipes. The traditional method for the recycling of textile waste is the use of tearing and cutting processes to obtain reclaimed fibres. The material obtained is mostly used for the manufacturing of fibre nonwovens (needle-punched or stitch-bonded) or for the production of cleaning rags, filling material, insulation material, geotextiles, upholstery and automotive textiles which means a secondary use of waste. Further options used by the companies are physical or chemical recycling. Physical recycling is feasible for thermoplastic materials and the waste is regranulated and can be used as raw material again. Chemical processes such as depolymerization or re-polymerization are applied to recycle unmixed synthetic textile waste. Disadvantage of both recycling methods are high expenditure of time, energy and costs. If no reutilization, no recycling or functional disposal (secondary use of textile products for another application, such as paper machine felts as geotextiles) is possible, the textiles waste becomes part of industrial waste or residential waste. Then a thermal/energetic exploitation is applied in public incineration plants or preferably in the producing companies. Finally, the waste is disposed in landfills.

Waste collection and waste disposal is mainly done via disposal companies. Local disposal companies provide waste containers for the disposal of textile production waste as well as of non-textile materials (such as paper, cardboard…). The different types of waste are collected separately. Expenses occur for the rental of the containers as well as the collection/emptying of them. The interviewed textile companies are collaborating with the disposal firms listed below which are situated mostly in Saxony but also in neighbouring regions. The disposal companies carry out mechanical recycling and the reclaimed materials are re-utilized as described above. To save money, one important aspect for the textile companies is that the distances between the companies are not too long. The collection of the textile waste is done on demand. To reduce the required space, the textile waste is often pressed into bales. The other types of waste like paper-board, films and packaging material are regularly collected by the municipal waste collection.

Main actors in the field of textile waste disposal in Saxony and Bavaria are:

- Forster Vliesstoffe und Textilrecycling GmbH, Forst (Lausitz)
- Gebr. Spitzner, Auerbach, OT Schnarrtanne
- Horst Mündel GmbH & Co. KG, Hof
- Industrierecycling Janasch, Ebersbach-Neugersdorf
- Kirschauer Textil GmbH Dr. Münzberg & Sohn, Schirgiswalde-Kirschau

- RVN Faserproduktion GmbH, Neuenmarkt
- RHW Handelsgesellschaft mbH, Seesen
- Veolia Umweltservice Ost GmbH, Chemnitz
- Becker Umweltdienste GmbH, Chemnitz
- Glitzner Entsorgung GmbH, Reichenbach

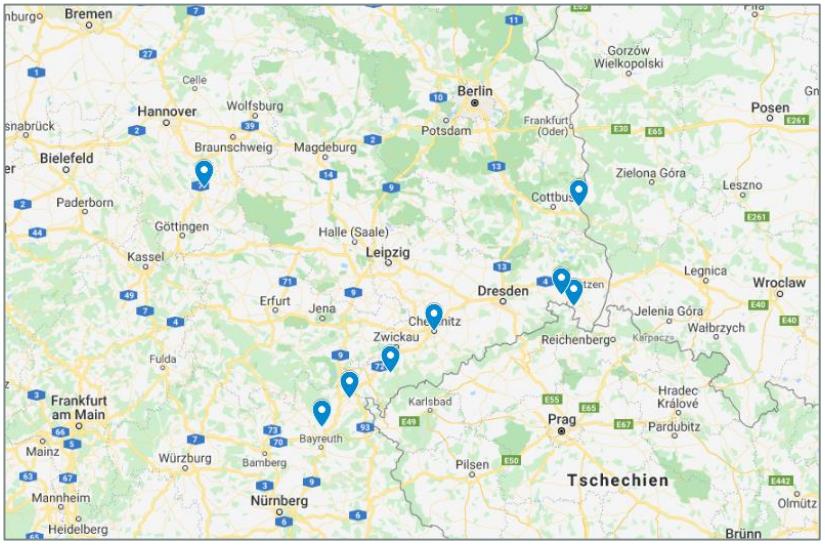

Figure: Overview of disposal companies in and around Saxony

The listed companies offer different technologies to recycle the textiles waste as well as different options how the recycled material is processed/used further.

Forster Vliesstoffe und Textilrecycling GmbH
Triebeler Straße 107/ 03149 Forst (Lausitz) /Saxony
Homepage: www.forster-vlies.de

- High-performance tearing plant, modern fibre blending unit, nonwoven plants
- The produced reclaiming fibres are exclusively processed at own nonwoven lines into mechanically, thermally or chemically bonded nonwovens.
- The nonwovens are made on demand from synthetic fibres (polyester, polypropylene) or natural fibres (wool, cotton, viscose, jute). Fibre blends are also possible.
- The nonwovens can be used as geotextiles or textiles for the building sector (reinforcement of roads, slopes, embankments, sealing material, insulation material).

Gebr. Spitzner OHG
Schoenheider Strasse 221 / 08209 Auerbach, OT Schnarrtanne / Saxony
Homepage: www.gebrueder-spitzner.de

- Offers disposal of textile production waste (yarns, filamnets, fabrics, cut residues…). The waste material is sorted (separation by material or colours). The sorted material is pressed into bales which are sold to interested companies for further processing (material reutilization).
- The waste is furthermore processed into cleaning cloths which are sold to manufacturing industry or as industrial accessories.

Horst Mündel GmbH & Co. KG
Ostendstraße 1 / 95028 Hof / Bavaria
Homepage: http://www.muendel-hof.de

- Trading with textile production waste, yarn residues, waste paper, plastics and films.
- Non-mixed plastic waste is grinded or regranulated.
- Modern pressing, shredding and granulating units ensure a gentle processing of material. The raw material is used for the production of new products.

Industrierecycling Janasch
Bleichstraße 5-7 / 02730 Ebersbach-Neugersdorf / Saxony
Homepage: http://industrierecycling-jannasch.de

- Container service; Purchase of scrap metal, non-ferrous heavy metal, easte aper, worn clothing

Kirschauer Textil GmbH Dr. Münzberg & Sohn
Niedere Fabrik 8/ 02681 Schirgiswalde-Kirschau / Sachsen
Homepage: www.kirschauer-textil.de

- Company-own tearing unit

Production of cleaning cloths and packaging blankets from recycled fibres

RVN Faserproduktion GmbH
Neue Siedlung 27 / 95339 Neuenmarkt / Bavaria
Homepage: www.rvn-faserproduktion.com

- Production of reclaimed fibres (around 12000 t/a) as customised fibre blends mainly for the automotive sector
- Collection and processing of production surplus, cut residues and fibre residues (fibres, threads, fabrics, knitwear, nonwovens from natural fibres, synthetic fibres, special fibres)
- Upon request, the textile waste is picked up on-site.
- The raw material has to be dry, odour neutral, unmixed and homogenously blended. The material must not be coated, laminated or contaminated.
- Foreign objects like metal, zippers, buttons, and films must not be contained.

RHW Handelsgesellschaft mbH
Dehnestr. 31 / 38723 Seesen / Lower Saxony
Homepage: www.rhw-handel.de

- The company is buying great amounts of the following materials: cotton and wool waste, waste from natural fibres (flax, hemp, jute, kenaf, and sisal), synthetic fibres (acrylic, polyamide, polyester, viscose), and cut residues.
- The waste is sorted and then sold to industrial partners.

Veolia Umweltservice GmbH
Hammerbrookstr. 69 / 20097 Hamburg
Parent company in Hamburg, but 14 subsidiaries in Saxony, 8 in Thuringia, 1 in Saxony-Anhalt.
Homepage: www.veolia-umweltservice.de

- Veolia is involved in all general disposal service activities. Besides the company is selling cleaning cloths.

Becker Umweltdienste GmbH
Sandstraße 116 / 09114 Chemnitz / Saxony
Homepage: www.becker-umweltdienste.de

- Disposal of all kinds of waste from industry and households, including textile waste.

Glitzner Entsorgung GmbH
Weißensander Weg 8, 08468 Reichenbach / Saxony
Homepage: www.kreisentsorgung.de

- Disposal of all kinds of waste from industry and households, including textile waste.

Identification of the gaps, problems, advantages

Gaps & problems:
Material: • Non-defined waste • Only small amounts are available • No regular volume available • Waste is contaminated (polluted), reutilization is not possible
Costs: • Long distances to disposal companies • Expenses for pre-sorting • High expenses for treatment and re-processing • Investments to solve the waste problems are needed (additional costs) • Additonal storage capacity needed
Further: • Missing market acceptance for recycled products • Legal rules/guidelines (for instance REACH or special certificates)
Advantages:
• Textile waste is valuable (intrinsic value) • Cheap quality waste • Reutilization of waste in the own company (recirculation in the production cycle) sometimes possible • Disposal companies are available in the region

3. Results and conclusions

a) Referring to waste

- Low amounts of waste available, but a great variety of waste types, therefore a regular waste generation is mostly not given.
- Different waste types are collected jointly, no separation processes take place. This complicates a subsequent waste management.
- Non-textile waste (paperboard, bobbins) is also a problem. Large volumes are collected and have to be finally disposed.

b) Referring to waste processing

- Most of the waste cannot be processed by available mechanical methods such as tearing, since the material is coated or the material structure is not suitable for such treatments.
- A processing technology which might be suitable for the textile materials which cannot be processed by tearing is milling (textile mill-shredder technology), where the textile fibres are milled and broken into very small particles. The resulting material can be used in building (insulation material) and automotive industry (mats for car interior).
- Pure (made of only one fibre type) and untreated waste is easier to handle and can be cut or teared or given back to the production process.
- For those materials which can be teared or shredded applications of the recycled material have to be found.

Main output: Only for the pure PES scraps a reasonable solution for waste management could be identified. The selvedges from knitwear (white, nearly untreated and smooth structure) are of interest for the Czech company “Green way recycling” to use it as underground in horse arenas and for the automotive industry. Currently, transfer activities for the waste are planned by the involved companies with support of STFI and Inotex.

Furthermore, to push the development of textile recycling, a regional network project (RE4TEX – New technologies for textile recycling) which is nationally funded has been established to find further solutions for waste management and application of recycled material. Company Pfand is one of the industrial network partners.