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Tackling problematic textile waste streams

Research conducted by Kate Riley, Nia Bell and Nick Morley
Presented today by Nick Morley

Research commissioned by RESYNTEX

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Agenda

- Research overview
- Background and motivation
- Key findings
- Conclusions

Research overview

Aim:

To map the current and future supply of waste textiles in the EU

- *With a focus on the low- or no-value materials not suitable for reuse or even mechanical recycling*

Objectives:

- To quantify and better understand the **availability of waste textiles** in the EU
- To produce market information for use in assessing the **viability of RESYNTEX**

Background and motivation

RESYNTEX

An innovative multi-stage chemical recycling process

Residual textile waste
- including blends

Chemical feedstocks

Protein hydrolysates from wool/silk

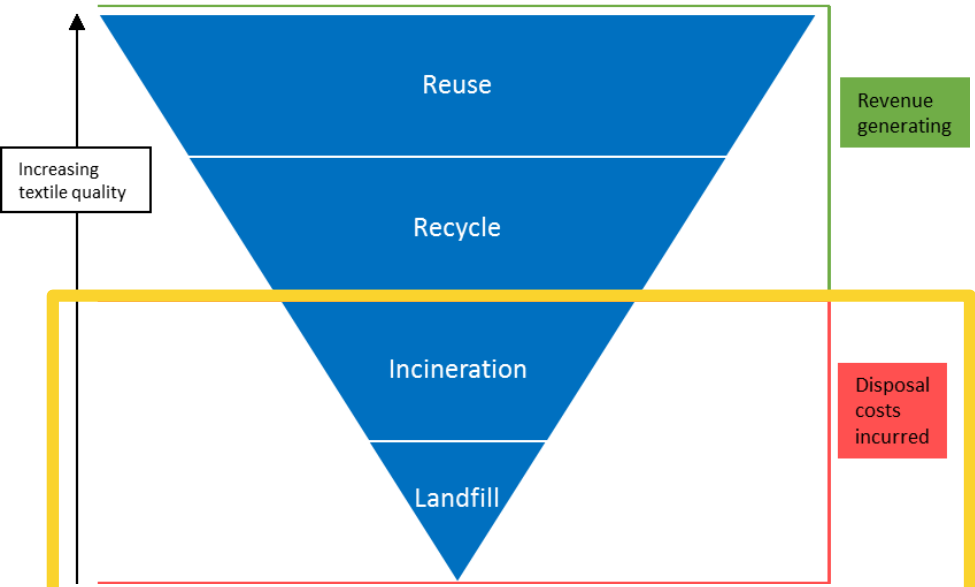
Glucose and bioethanol from cotton

Monomers from polyamide

PET from polyester

Scope definition and methodology

Scope



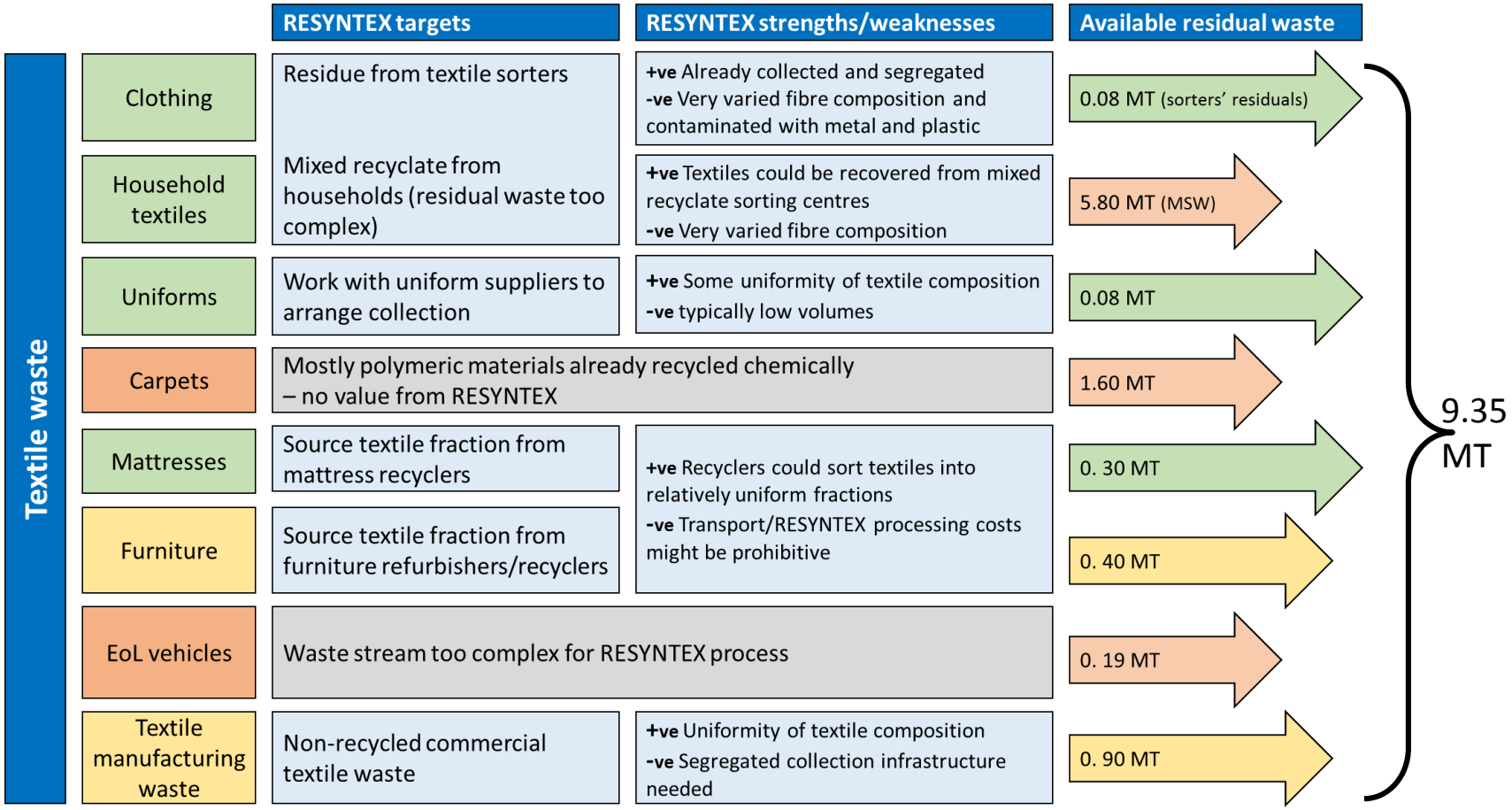
RESYNTEX does not intend to divert textiles from reuse or recycling but rather create a pull for the low-quality textiles currently incinerated or landfilled.

Methodology

Desk based research:

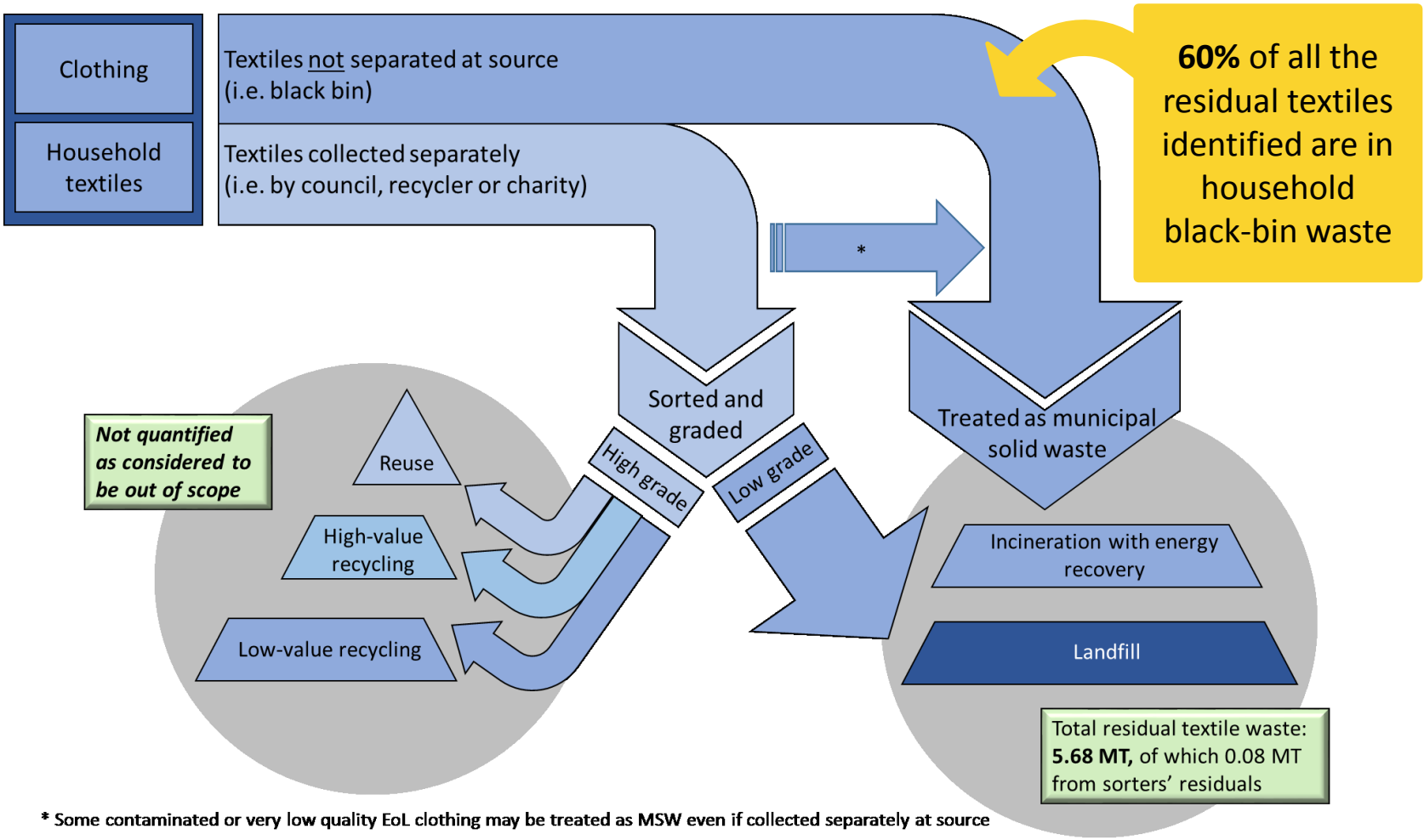
- Interviews with textile recyclers
- Customs and waste statistics
- Snapshot reports of particular waste streams or geographical regions

Textile waste streams



= High potential for RESYNTEX = Medium potential for RESYNTEX = Low potential for RESYNTEX

Clothing and household textiles



* Some contaminated or very low quality EoL clothing may be treated as MSW even if collected separately at source

Sorters' residuals

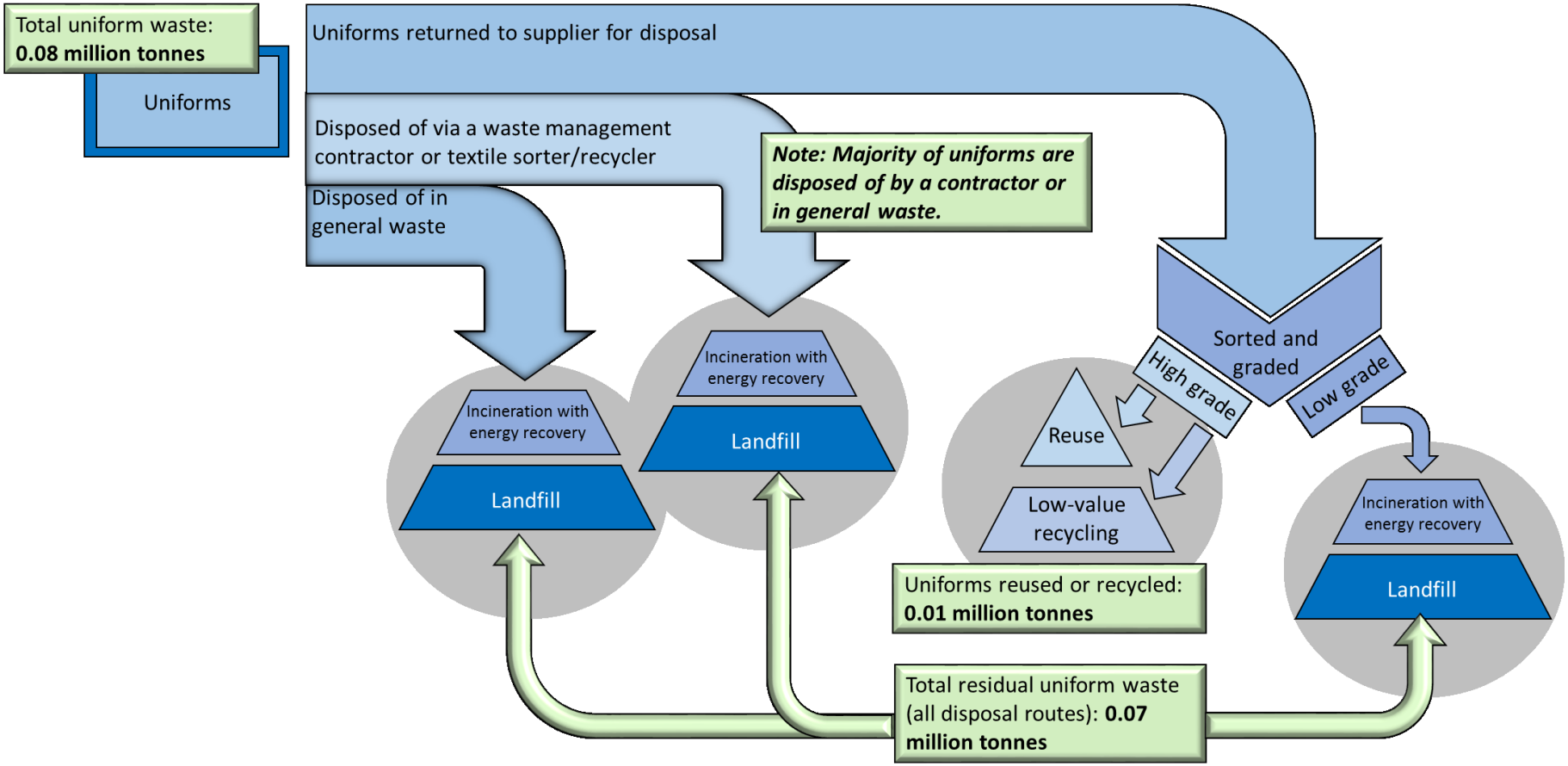
Material(s)	Approx. composition	Current treatment options
Fibre-containing waste (excl. carpet, incl. dust)	60%	Incineration with energy recovery
Carpet, cardboard/paper and feathers	15%	Other recycling
Mixed metal and plastic (e.g. electronics and toys)	25%	Treated as municipal solid waste

Source: interviews with sorters and the Eco-TLC report. Note: The non-carpet fibre-containing fraction of residuals reported or estimated varied between 40% and 85%, depending on the sorter.

Attractive to RESYNTEX because:

- Already segregated and concentrated in discrete locations.
- RESYNTEX plant can be co-localised with sorters
- Could improve textile sorters' competitiveness

Uniforms


Total uniform waste: **0.08 million tonnes**
Uniforms
Uniforms returned to supplier for disposal
Disposed of via a waste management contractor or textile sorter/recycler
Disposed of in general waste
Note: Majority of uniforms are disposed of by a contractor or in general waste.
Incineration with energy recovery
Landfill
Incineration with energy recovery
Landfill
Sorted and graded
High grade
Low grade
Reuse
Low-value recycling
Uniforms reused or recycled: **0.01 million tonnes**
Incineration with energy recovery
Landfill
Total residual uniform waste (all disposal routes): **0.07 million tonnes**

EoL uniforms

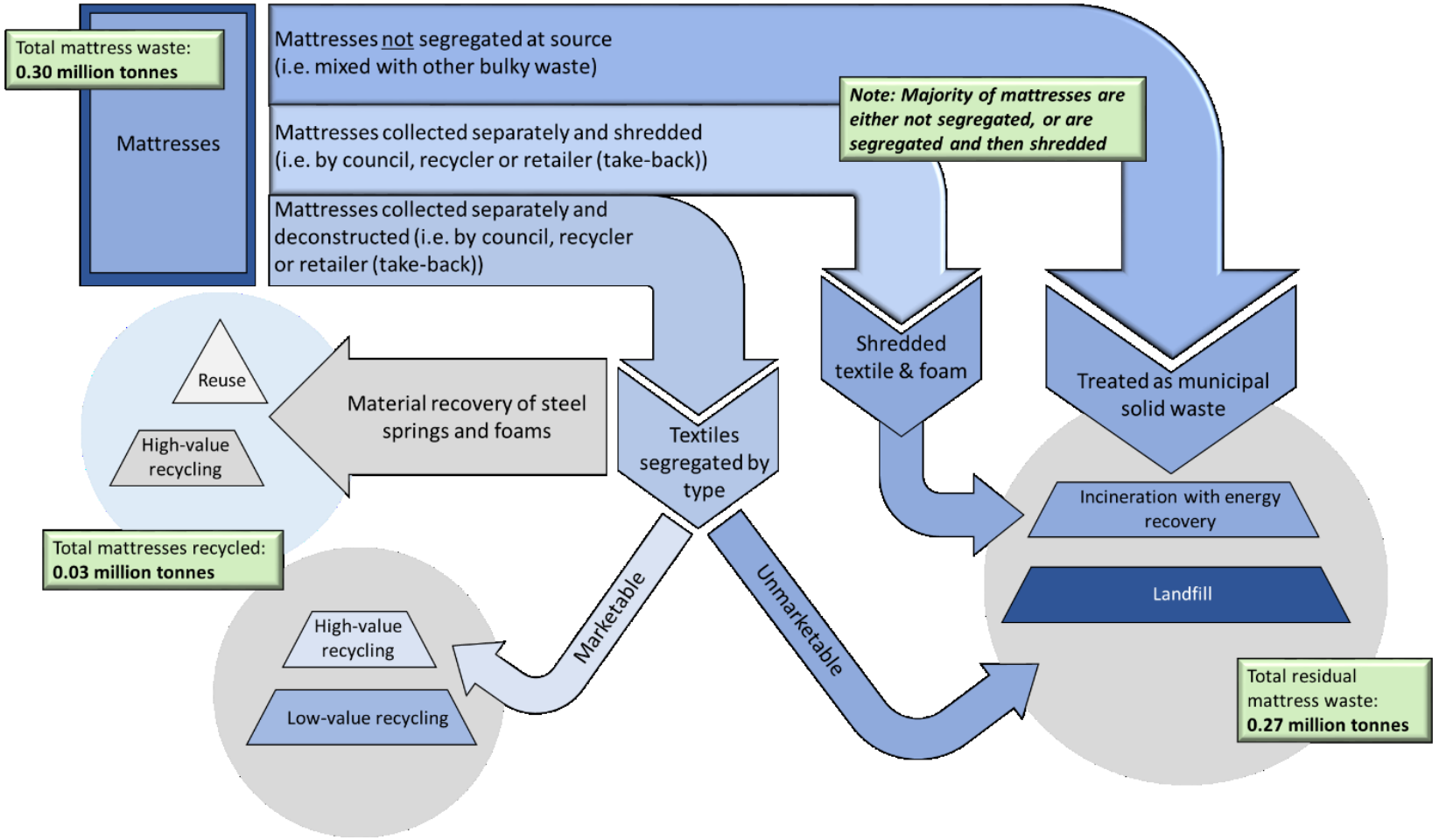
Composition of typical uniforms

Garment type	Fibres used	Composition
Blouses/shirts	Polyester, cotton, elastane	Blended (65% polyester/35% cotton or a variant which could include a small quantity of elastane), occasionally 100% polyester or 100% cotton
Suiting	Polyester, wool, elastane, nylon, viscose	Blended outer (for example: polyester/wool/elastane, polyester/viscose), linings usually 100% polyester
Outerwear	Polyester, nylon, acrylic	100%, and blended. Can be coated or laminated membranes
Leisurewear	Cotton, polyester, wool, acrylic	Blended, e.g. jumpers - wool/acrylic, polo shirts - polyester/cotton

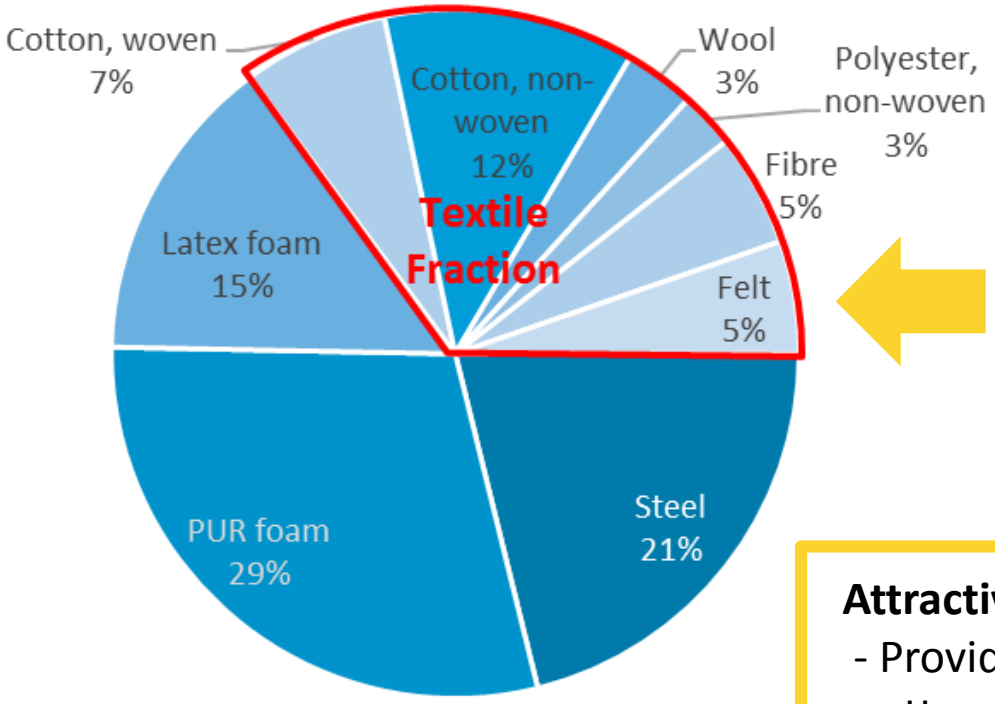
Attractive to RESYNTEX because:

- Relatively good quality and consistency of fibre composition
- Collection and transport could be arranged through uniform suppliers (take-back schemes)

Mattresses


Total mattress waste:
0.30 million tonnes
Mattresses
Mattresses not segregated at source
(i.e. mixed with other bulky waste)
Mattresses collected separately and shredded
(i.e. by council, recycler or retailer (take-back))
Mattresses collected separately and
deconstructed (i.e. by council, recycler
or retailer (take-back))
Note: Majority of mattresses are
either not segregated, or are
segregated and then shredded
Shredded
textile & foam
Treated as municipal
solid waste
Reuse
High-value
recycling
Material recovery of steel
springs and foams
Textiles
segregated by
type
Total mattresses recycled:
0.03 million tonnes
Incineration with energy
recovery
Landfill
High-value
recycling
Low-value recycling
Marketable
Unmarketable
Total residual
mattress waste:
0.27 million tonnes

EoL mattresses



Approximate material composition of the 900,000 tonnes (45 million units) of EoL mattresses generated in 2014 in the EU

Attractive to RESYNTEX because:

- Providing a market for textiles from EoL mattresses would increase the competitiveness of mattress recyclers.
- Mattress recyclers can sort textiles by fibre type.

Conclusions

- **Data availability on waste textiles with no- or low- value is poor**
  …if there aren't established markets for them then know-one really cares

- Of the 9 million + tonnes of residual textile waste identified **less than 0.5 million tonnes is readily accessible** to the RESYNTEX process
  …most residual textile waste is either too complex or don't have established collection mechanisms

- The main **target waste streams** for the RESYNTEX process are:
  1. Sorters' reisues
  2. EoL uniforms
  3. Segregated textiles from mattress recyclers

- The RESYNTEX process, if successful, would create a market pull that **would completely distort the markets for residual textiles**
  …potentially making much more textile accessible for chemical recycling

OAKDENE HOLLINS
RESEARCH & CONSULTING

Get in touch

Main contact at Oakdene Hollins: **Steve Slater**

Tel +44 (0)1296 423915 ext. 116
Email steve.slater@oakdenehollins.com

Twitter @OakdeneHollins
Website www.oakdenehollins.com

Main contact at the Faering Ltd: **Nick Morley**

Tel +44 (0)7790 610 580
Email nick@faering.co.uk

Twitter @faeringltd
Website www.faering.co.uk