

Demonstrating the viability of collecting non-clothing textiles

Overview

Collecting carpets, mattresses and pillows for re-use and recycling¹ can be financially viable, a new study has demonstrated. Even though end markets are relatively undeveloped and only a small proportion of non-clothing textiles are currently collected for re-use and recycling, eight business models analysed in this study proved to be viable for the collector – and cheaper than disposal via landfill.

The models assessed included direct collections from households and businesses, collections from central points (such as Household Waste Recycling Centres - HWRCs) and take-back schemes; undertaken by reprocessors, local authorities and third sector organisations. It is anticipated that as landfill tax rises², end markets for recycling and re-use grow, and reprocessing becomes more efficient and facilities more widespread, the viability of these business models – and others – will increase further.

Key findings and recommendations

The study set out to investigate different collection options being used for post-consumer non-clothing textiles (mattresses, carpets and carpet tiles, pillows and duvets) from both households and businesses in the UK. The key findings and recommendations are:

- Collecting non-clothing textiles for re-use or recycling can be cheaper than sending them to landfill. It may become cheaper still as landfill tax rises.
- There are a number of viable options for the re-use of carpet tiles, and the recycling of broadloom carpet and mattresses (see table below). Collecting pillows can be cost neutral under the right conditions.
- Revenue from the sale of items for re-use and materials for recycling is too low to offset costs alone; commercial collectors rely on service charges to make services viable; local authorities and third sector organisations may charge for collections or in some cases benefit from grant funding to help establish services.
- Viability can be increased by separating items at the collection point – allowing reprocessors or re-use organisations the opportunity to take only the materials they can use.
- Locating reprocessing points in close proximity to major sources of arisings, or using bulking points will reduce transport costs.

¹ In this document, re-use refers to re-use of whole items, and recycling refers to deconstruction of products into component parts, which may then be used in closed loop applications (to make the same product from which they have been sourced) or in other products.

² Landfill tax (for the UK) is due to rise to £80/tonne in 2014/15. The Scottish Government is consulting on a proposal for a Scottish landfill tax.

- Potential future increases in the value of materials could reduce reliance on the service charge which would improve the financial sustainability of collections.
- There is a need for wider education – of both consumers and businesses – about the options for re-using/recycling non-clothing textiles. In particular, they need to be made aware of alternative options for disposal locally, and of the importance of keeping items dry when waiting for collection, as the value to collectors, reprocessors and resellers can drop when they become wet.

Non-clothing textile waste and re-use in the UK: the current picture

An estimated 630,000 tonnes of non-clothing textiles enter the UK waste stream each year: 169,000 tonnes of mattresses, 400,000 tonnes of carpet and 61,900 tonnes of duvets and pillows. Only 16.5% of discarded carpet and 14.7% of discarded mattresses are currently re-used, recycled or used for energy recovery. This is in stark contrast to clothing and household textiles, of which almost 40% is now re-used or recycled.³

Previous WRAP studies have identified significant opportunities to increase the re-use and recycling of non-clothing textiles: for example around 30% of carpets and mattresses collected as bulky waste could be re-used without further processing. However, the vast majority are still sent to landfill, even though a growing number of options exist for re-use, recycling and recovery.

About the research

To get a better understanding of the current situation, WRAP commissioned a study of the existing landscape. The core of the research was an in-depth analysis of 10 case studies – nine existing collection options and one theoretical option – selected from over 40 examples collected. A comprehensive cost analysis was carried out on nine⁴ of the selected case studies, looking at cost and income at different stages from collection through to sale of products/materials onto the end market, to establish overall financial viability. As well as looking at each of the options in its own right, the research also sought to identify commonly experienced barriers to increased re-use and recycling.

Common factors in ensuring financial viability

The common factors identified were:

- applying a service charge for collection and/or gate fee at the reprocessor – resale revenues for recycled materials and re-usable items are currently low: the service charge is essential for enabling viability in most cases. This may change as markets for recycled material develop.
- high transport costs can impact considerably on overall costs. Non-clothing textiles are bulky and – in the case of carpets and mattresses – heavy. Therefore locating reprocessing points in close proximity to major sources of arisings, or using bulking points is important.
- segregating items at the collection point – separating out e.g. carpet from other textiles at HWRCs or other collection points allows reprocessors and re-use organisations to collect the materials they can use, rather than requiring them to separate the relevant materials themselves.

³ All data cited in this summary can be found in the full research report, *Collection of non-clothing textiles for re-use, recycling and energy recovery*, available from WRAP on request.

⁴ The cost model for the 10th case study is no longer valid due to changes in materials collected since the data was gathered, however we understand that collecting pillows can be cost neutral for the collector under certain circumstances.

Key barriers to increased re-use and recycling

Key barriers identified include:

- a lack of end markets– unlike clothing, there are limited opportunities for direct resale or re-use of used mattresses, carpets (except carpet tiles), pillows and duvets. When deconstructed for component recycling, the extent of the end markets varies considerably.
- a lack of awareness, amongst businesses and consumers, of the options of re-use or recycling.
- the bulkiness of the materials – carpets and mattresses are heavy and unwieldy to move, and difficult to store; pillows and duvets take up large amounts of space.

Analysis of ten collection methods

Method	Material	Facts and findings	Case study
Collection direct by reprocessor	Carpets (Household and business)	<ul style="list-style-type: none"> ■ Collects 1,000+ tonnes of carpet per month, primarily bulked from HWRCs ■ Recycled into equestrian surfaces or for use as fuel ■ Reprocessing is costly: key revenue stream is a collection charge 	Blackwater Ltd
Take-back scheme	Carpet tile (Business)	<ul style="list-style-type: none"> ■ Carpet fitters palletise used tiles for collection ■ Three outlets: re-use; recycling into new tiles by separation of yarn from backing; energy recovery ■ Collection costs offset by adding collections to delivery routes – using the same vehicles 	DESSO
Collection for re-use by third sector	Carpet tile (Business)	<ul style="list-style-type: none"> ■ Collects carpet tiles for re-use e.g. from office refits ■ Charges for collection; uses 3rd party hauliers ■ Tiles graded, cleaned and resold as used 	Greenstream Flooring
Segregation at HWRCs & collection through bulky waste service	Carpet and mattresses (Household)	<ul style="list-style-type: none"> ■ Collects items at HWRCs or through bulky waste collection service ■ Items transported to 3rd party for sorting, processing and deconstruction: steel mattress springs recycled; other materials used for energy recovery ■ Collection costs covered by local authority's waste budget: authority achieves savings through reduced disposal costs 	Nottingham City Council
Segregation at HWRCs & collection through bulky waste service	Mattresses (Household)	<ul style="list-style-type: none"> ■ Collects mattresses direct from HWRCs or through bulky waste collection service (for a fee) ■ Deconstructs mattresses at its depot into component parts for recycling ■ Sells on each material stream separately 	CAD Recycling Ltd
Co-collection for re-use by charity	Mattresses (Household)	<ul style="list-style-type: none"> ■ Collects from homes, free of charge, along with other bulky waste ■ Re-usable mattresses identified, treated where necessary & resold; non-re-usable sent for recycling ■ Revenue generated from sale of items and through grants 	toogoodtowaste
Mattress only	Mattresses	<ul style="list-style-type: none"> ■ Collects from homes: average 45 collected a day 	Lewisham

kerbside collection by council	(Household)	<ul style="list-style-type: none"> ■ Taken to reprocessor in same borough ■ Re-usable mattresses passed to local charity; others deconstructed into component materials, bulked & sold 	Council and Matt UK
Take-back scheme ⁵	Mattresses (Household and business)	<ul style="list-style-type: none"> ■ Collects used mattresses from homes when new ones are delivered ■ Operates in partnership with reprocessor, who deconstructs mattresses into component parts ■ Relies on collection charges to cover costs 	Airsprung and JBS
Collection from businesses during refurbishment ⁶	Pillows (Business)	<ul style="list-style-type: none"> ■ Collects/arranges collections of items for re-use during refurbishment of e.g. hotels and university accommodation – for a fee ■ Uses spare capacity on existing waste collection rounds (items placed in bags to segregate from other materials on curtain sider vehicle) ■ Delivers to reprocessor who sends items for re-use or to energy recovery. 	Veolia
Theoretical option - co-collection in clothing banks	Duvets and pillows (Household)	<ul style="list-style-type: none"> ■ Assumes collection from textile bring banks; materials separated at point of collection by residents, then taken to central location and bulked for re-use or recycling abroad ■ Not viable due to high collection costs and number of banks required 	Theoretical example

Re-use and recycling market options

Carpets

Of the products considered in this study, carpet is the one where recycling and re-use has increased the most in recent years.

- **Re-use** – this is a key opportunity for carpet tiles, which as the case studies show can be collected relatively easy, bulked and re-used. It is not really suitable for broadloom carpets however due to their size, unevenness of wear and because they are often cut up during removal or for collection.
- **Recycling** – modern carpet tiles that are manufactured to facilitate separation of fibre and backing can be recycled, with nylon fibre being used for new tiles and bitumen backing used in roofing and road surfaces. There are also some options for recycling broadloom carpets, such as for insulation, or when shredded for use in equestrian surfacing. However, closed loop recycling for carpets remains low – something which may change as several manufacturers have committed to produce more easily recyclable products. This could become increasingly viable as sourcing virgin fibre becomes more difficult.
- **Energy Recovery** – where items aren't suitable for re-use and recycling, energy recovery can be a viable option. Because of its bitumen backing, carpet has a high calorific value and is used fairly extensively to generate energy from waste.

⁵ Since data gathering in early 2013, this scheme has terminated due to scrapped mattress availability volumes.

⁶ This case study is not part of the business modelling.

Mattresses

- **Recycling** – Recycling is the key opportunity for mattresses. Around 25,000 tonnes per year are deconstructed to separate the steel springs from the textile ticking (cover) and padding material, and there is scope to increase this. Each material stream can be recycled depending on its condition, including closed loop applications through sanitisation (e.g. steam cleaning) for use in mattresses, and reprocessing for use in carpet underlay.
- **Re-use** – Mattress re-use is very low: it is thought that only 100 tonnes out of the 169,000 tonnes of mattresses arising annually in the UK are re-used each year. There is a low demand for re-used mattresses; this is primarily due to hygiene concerns.

Pillows and duvets

Opportunities for these products need to be better understood. Currently, the majority are simply disposed of through the residual waste stream. As demonstrated in a case study, there is the potential to re-use pillows from the hospitality sector (hotels, university accommodation) where, due to the size of the institutions, sufficient quantities can be collected at one location to make it viable. Items could be distributed for re-use through third sector organisations or sold through merchants. There may be the potential to recycle filling materials in future.

Next step for WRAP

More work is required to understand how the factors that influence collection viability interact to determine where more collections could be established. This work will involve engaging with key stakeholders and will be carried out during 2013/14. If you are interested in diverting more non-clothing textiles please contact ruth.ryder@wrap.org.uk

More information

For more information on the collection methods and the viability of these options, read the case studies published alongside this summary report: www.wrap.org.uk/non-clothing-textiles
For details of the research, including the cost analysis methodology, request the full report by emailing: lasupport@wrap.org.uk

While we have tried to make sure this summary report is accurate, we cannot accept responsibility or be held legally responsible for any loss or damage arising out of or in connection with this information being inaccurate, incomplete or misleading. This material is copyrighted. You can copy it free of charge as long as the material is accurate and not used in a misleading context. You must identify the source of the material and acknowledge our copyright. You must not use material to endorse or suggest we have endorsed a commercial product or service. For more details please see our terms and conditions on our website at www.wrap.org.uk