

SPMT12\_002: The Market Potential and Demand for  
Product Re-use  
Product module: Furniture

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Product module: Furniture

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## 1. Introduction

Around 930,000 tonnes of furniture are placed on the market each year in England<sup>1</sup>, of which the majority is household furniture. This section looks at the arisings of household furniture and commercial office furniture, the levels of re-use currently being achieved and the potential to encourage further re-use.

The material in this section covers:

- The levels of end of life material arising each year
- The levels of re-use currently being achieved and the major channels through which items are re-used
- The potential for re-use of items in the waste stream that are currently not being re-used, and the composition of this material
- A discussion of the level of consumer demand for a range of second-hand furniture items and the implications of this demand for potential for expansion of re-use
- Current and emerging market barriers and opportunities to expanding furniture re-use
- A discussion of a range of possible actions that could be taken to encourage increased re-use, along with an estimate of the impact of these measures and potential costs
- Modelling of re-use scenarios to examine the effect of measures to increase re-use, taking variations in demand into account
- Assessment of the potential carbon impacts of these scenarios
- Summaries of the case studies conducted as part of the furniture module of this project (more detailed case studies are presented in Appendix 1).

Table 1 below shows the range of products examined in the study, and the segmentation used when classifying items, as well as examples of the items covered. Furniture was first split between domestic and commercial (office) furniture, and then by furniture type. Other commercial furniture (e.g. commercial kitchens, stadium seating, hotel and cruise liner furniture) covers a hugely disparate range of products and has been excluded from this study.

**Table 1: Product segmentation for furniture**

Product	Segmentation 1	Segmentation 2	Example of items covered
Furniture	Household furniture	Soft furniture	Sofas and upholstered chairs Upholstered bed bases
		Hard furniture	Tables
			Chairs
			Sideboards
			Chest of drawers
			Wardrobes
			Bed frames
	Office furniture	Workstation	Shelves and bookcases
			Desks
		Storage	Chairs
Cupboards			
		Filing cabinets	

<sup>1</sup> WRAP (2012) *Furniture mass and product flow and market development opportunities in the UK* estimates that a arising across England of products it examined of 744,000 tonnes. The WRAP report examined an estimated 80% of the furniture market, and the 930,000 tonne figure is derived from this.

## 2. End of life arisings and re-use baseline

Tables 2 - 7 below show the estimated end-of-life arisings, baseline re-use levels, major pathways and condition of material (suitability for re-use) when it is discarded. This research uses the amount of discarded material that is readily reusable in its current condition as a strong indicator of the technical potential for re-use in the medium term<sup>2</sup>, as this is the stock of material available to be targeted.

### 2.1 Arisings and general fate of end-of-life products

Table 2 below shows the estimated total end-of-life furniture arising for England and the amounts of disposal / recycling and re-use. Arisings data are based on WRAP's (2012) *Furniture Mass and Product Flow* report.

As discussed in the introduction module, in a stable economy (where the stockpile of goods is not growing), the level of re-use in an economy (excluding export for re-use) represents a closed loop, while the amount of new goods entering the system is equal to the amount of material sent for disposal or recycling in the long term.

Table 2 below assumes that the amount of material sent for disposal is equal to amount of material entering the economy, minus 5%<sup>3</sup> - this is to account for the small amount of furniture that is exported for re-use and for growth of the stockpile of furniture in current circulation.

It should be noted that the study was not able to source reliable figures for furniture recycling, and so recycling has been counted along with disposal for the purposes of these tables.

**Table 2: New product entering the market, recycling/disposal and re-use of furniture in England**

	Combined (tonnes)	Domestic (tonnes)	Commercial (tonnes)	Notes	Data confidence
New product entering the market	930,000	791,000	139,000	Combined: WRAP Furniture flows; commercial consumption, CRR <sup>i</sup> ; domestic arisings derived by subtraction.	Medium. Medium in WRAP estimate; CRR puts commercial office furniture (UK) in range 165-200,000 tpa. Study assumes long term, waste arisings will equal new product purchase.
Current disposal and recycling	884,000	752,000	132,000	Arisings of new goods minus 5% to account for economic growth and exports for re-use.	Medium. Arisings data is medium confidence.
Current re-use	247,000	229,000	18,000	For domestic, sum of re-use pathways in Table 4. For commercial, re-use at 13% (WRAP <sup>ii</sup> ).	Low, due to low confidence of key aspects of pathway data.

<sup>2</sup> Levels of re-use potential given long-term changes such as alterations in design, changing attitudes to what is reusable, growth of affordable repair and modification options etc. have not been quantified, since the results would be speculative.

<sup>3</sup> 5% is an assumption to account for this element of the market in the absence of reliable published data.

It is noted that the re-use figure in Table 2 is high and may be an over estimate. As noted throughout this research, the data on re-use is of varying quality. Specifically in this case data in regards to private sector second hand shops and informal exchange, which combined account for 122,000 tonnes, are noted as being low confidence sources – refer to table 4 and section 1.11 for further details.

## 2.2 Fate of disposed and recycled material

Table 3 below shows the breakdown of the material sent for disposal or recycling. Data was only available for the domestic waste stream, since there is little published information on the commercial waste stream. Disposal methods likely to be important for office furniture include direct trade waste collections, asset management companies and office clearance companies.

**Table 3: Recycling/disposal pathway for domestic furniture**

	Domestic (tonnes)	Notes	Data confidence
Current disposal and recycling	752,000		Medium
HWRC disposal (household only)	501,000	Assumed 2:1 distribution of disposal between furniture in HWRC and bulky waste collections (Waste Data Flow). No recorded information on commercial furniture disposal routes.	Medium. Disposal figure has medium confidence and good evidence of the relative HWRC / bulky waste collection split based on Waste Data Flow.
BWC disposal (household only)	251,000	See above.	Medium

## 2.3 Current levels of re-use

Table 4 below shows the estimated current level of re-use in England, broken down by pathway. The headline figure was calculated by adding together the amount of re-use that could be accounted for through each pathway for domestic furniture. For office furniture, WRAP estimates that around 13% of office furniture is re-used, and this forms the basis of the headline estimate.

**Table 4: Re-use pathways for furniture**

	Tonnage: Combined Domestic Commercial	Notes	Data confidence
FRO (whole sector)	56,000 54,000 2,000	FRN data on goods passed on for re-use in the UK by the FRO sector as a whole, weighted down by population to account for England only.	Medium. High for FRN member data, but other assumptions reduce reliability.

	<b>Tonnage:</b> <b>Combined</b> <b>Domestic</b> <b>Commercial</b>	<b>Notes</b>	<b>Data confidence</b>
Charity shops	35,000 35,000 n/a	CRA total figure is around 71,000 tonnes (weighted for England), but many of these are FRN members. To compensate, 50% of the estimated charity shop arising has been counted.	Medium (High confidence in total CRA figure, but low confidence in split between FRN and non-FRN members).
Online exchange	17,000 16,000 1,000	WRAP furniture flows. Resource Futures research based on WRAP online exchange data suggested 15-20,000 tonnes. LRS have estimated furniture re-use through online exchange at 238,000 tonnes <sup>iii</sup> .	Medium. High level of agreement between independent WRAP and Resource Futures figures.
Commercial second hand shops	42,000 36,000 6,000	Based on estimated size of total UK second hand market at £1.9bn per annum (IBISWorld 2011), of which £0.98 bn is estimated to be from charity shops (CRA). Furniture is an estimated 12% of second hand revenue (IBISWorld 2011), or £110m. At average £2.20 per kg (estimated from charity shop prices supplied by British Heart Foundation), this equates to 50,000 tonnes. This was weighted by population for England and split between domestic and commercial furniture based on arisings.	Low.
Other commercial re-use channels	8,000 n/a 8,000	Based on 13% re-use rate (WRAP) and unaccounted for by other channels. Figure will include second hand and office clearance.	Low.
Car boot sales	8,000 8,000 n/a	DEFRA (2012) <i>Estimating levels of re-use exchange activity via car boot sales</i>	Medium. Study restricted to a single region, but methodologically robust.
Informal giving	80,000 80,000 n/a	DEFRA <i>Reuse scoping study</i> estimates that a further 100,000 tonnes of non-WEEE items (predominantly furniture) are given away or sold privately, and that over 80% of this material is given away.	Low. Single source based on small sample of households in Bath, Swindon and Portsmouth.
<b>Combined re-use</b>	<b>247,000</b> <b>229,000</b> <b>18,000</b>	Sum of re-use pathways detailed above.	Low, due to low confidence of key aspects of pathway data.

### 3. Technical potential for additional re-use

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The technical re-use potential of material sent for recycling or disposal is assessed below. This represents material that could potentially be diverted into re-use, in addition to current re-use levels.

For domestic furniture, potential for re-use has been based on WRAP's (2012) bulky waste study<sup>iv</sup>. This project included characterisation and assessment of bulky items at HWRCs and collected through bulky waste collections. Items were assessed for potential reusability, according to the following classification:

- Reusable in current condition
- Reusable with slight repair
- Not reusable

For the purposes of this study, only items classified as reusable in their current condition have been included as having potential for re-use. There are two reasons for this:

- Other WRAP work has suggested that visual inspection tends to overestimate the potential reusability of items
- The low profit margin on second-hand furniture means that renovation work is generally not feasible. As such, items requiring repair are often not economically viable for re-use.

The estimation of domestic re-use potential uses the composition and arisings data from the (2012) WRAP furniture flows study – this was analysed to determine the number and proportion of each item type that was classified as re-useable in its current state. HWRC condition data were used because this section of the bulky waste work was able to obtain much more detail and accuracy on potential for re-use than the complementary section covering bulky waste kerbside collections. The table below assumes that the material discarded to bulky waste collections has the same level of potential for re-use as material taken to a HWRC. The WRAP study showed that this is in fact considerably lower; however, the main causes of this are items being left outside prior to collection and transit damage during collections. The HWRC potential for re-use level is therefore likely to represent a more reasonable (possibly conservative) proxy for the levels one might look to attain if a re-use-led bulky waste service was introduced to overcome these barriers (this hypothesis is supported by the findings from the bulky waste case studies covered later in this report).

For office furniture, potential for re-use has been estimated at approximately 50%. Figures on potential re-use quoted in interviews with office clearance companies were generally higher (in the region of 75%), but a more conservative figure has been adopted to account for cases where individual items of furniture are disposed of (office clearance tends to involve companies closing, moving or carrying out large-scale replacement of items, and so will tend to include items of furniture that would not otherwise be discarded).

**Table 5: Estimate of proportion of discarded material potentially suitable for re-use**

	Combined	Domestic % re-use	Commercial % re-use	Notes	Data confidence
Potential for re-use of material on disposal		Shown below	Est. 50%	Conversations with re-use-led office clearance organizations suggest office potential for re-use could be up to 80%, but working on 50% as a conservative assumption at this stage.	Low. Used as a working assumption.
Soft furniture		27%		Source: WRAP bulky waste study data, items defined as "reusable in current condition"	Medium. Based on visual assessment on HWRC sites.
Large hard furniture		24%		Source: WRAP bulky waste study data, items defined as "reusable in current condition"	Medium. Based on visual assessment on HWRC sites.
Small hard furniture		43%		Source: WRAP bulky waste study data, items defined as "reusable in current condition"	Medium. Based on visual assessment on HWRC sites.

### 3.1 Domestic furniture

The tonnage of domestic furniture currently sent for disposal or recycling that is potentially suitable for re-use is shown in table 6 below.

This has been calculated by modelling the composition of furniture arisings based on the proportions disposed in WRAP's Furniture flows report (pp. 60-81) and then applying to modelled arisings the percentage of each furniture category assessed as reusable in current condition from the WRAP bulky waste report data set.

**Table 6: Arisings of end-of-life domestic furniture suitable for re-use in current condition**

	Percentage of furniture waste+	Arising (Tonnage)	% Readily reusable ++	Potential reusable material (Tonnage)
Soft furniture	48%	361,000	27%	97,000
Hard furniture large	42%	315,000	24%	76,000
Hard furniture small	10%	75,000	43%	32,000
<b>Total furniture</b>		<b>751,000</b>		<b>206,000<sup>†</sup></b>

+ Source: WRAP furniture flows report (2012; pp. 60-81)

++ WRAP bulky waste report data (2012)

† Does not sum due to rounding error

### 3.2 Commercial furniture

The following table shows the estimate arisings and potential for re-use of office furniture. These are based on the estimated non-re-use waste arising (132,000 tonnes per annum) and industry figures for the production of office chairs, desks and pedestals (British Furniture Manufacturers' Association 2008).

**Table 7: Arisings of end-of-life commercial furniture suitable for re-use in current condition**

	Units <sup>†</sup>	Est. weight per unit (kg)	Waste tonnage	Potential re-use tonnage <sup>±</sup>
Office chairs	1,550,000	12	19,000	9,000
Desks and pedestals (including imports)	3,200,000	26	83,000	42,000
Other office furniture <sup>‡</sup>	1,050,000		30,000	15,000
<b>Total office furniture</b>			<b>132,000</b>	<b>66,000</b>

<sup>†</sup> British Furniture Manufacturers' Association (2008)<sup>v</sup>

<sup>‡</sup> Remainder of commercial furniture based on Centre for Remanufacturing and Re-use (2009) data

<sup>±</sup> Assuming 50% potential for re-use

## 4. Pathways to re-use

The major pathways to re-use for which reasonable supplier data are available are Furniture Re-use Organisations (FROs) and charity shops. Other pathways that have been considered are second hand shops, online exchange, informal giving and office clearance companies.

### 4.1 Furniture Re-use Organisations

Furniture Re-use Organisations are social enterprises or charities that receive items (predominantly furniture and large electrical goods) which are refurbished – if required - and sold on, at a low price, to

households and families in social need. Increasingly, many of these organisations are adopting a dual pricing system, allowing those (who do not otherwise qualify) to purchase goods at a higher price. The principal aims of these organisations are typically social rather than environmental, including the alleviation of poverty and the provision of training. There are an estimated 370 FROs in the UK, of which around 225 are members of the Furniture Re-use Network, a national organisation that represents the interests of FROs and provides member services.

Donations, including from manufacturers and retailers, are the main source of items for FROs, but other sources include working with local authorities to deliver bulky waste collections and to pick up reusable items from HWRCs.

Sales data from the FRN membership survey, weighted up to account for the sector as a whole, shows that, in 2011, the FRO sector moved approximately 64,000 tonnes of domestic furniture and almost 3,000 tonnes of office furniture into re-use. Weighting this by population for England gives 56,000 tonnes of furniture re-used through this pathway.

## 4.2 Charity Shops

There are around 9,000 charity shops in the UK, about 7,000 of which are operated by members of the Charity Retail Association. Charity shops receive and sell on donations from the public, with the aim of raising money for the charities they represent. While some charity shops are FROs, the majority have a very different business model, being run as commercial enterprises with the aim of maximising profit, which is then used to fund the charity's activities. This difference is reflected in the example price lists shown below.

A number of larger charities, most notably the British Heart Foundation, run specialist stores that concentrate on furniture and household goods. At the time of writing, 145 of approximately 700 BHF charity shops in the UK were specialist furniture stores, selling an estimated 26,000 tonnes of furniture each year – weighted by population; this gives a figure for England of around 22,000 tonnes.

Overall, the Charity Retail Association estimates that its members sell around 85,000 tonnes of second-hand furniture each year, or 71,000 tonnes weighted for the English population (data received from WRAP), accounting for around 27% of the total re-use market; however, caution must be exercised as there is a risk of double counting CRA members that are also members of the FRN.

**Table 8: Example costs of furniture from an FRO and from a charity shop**

Item	Cost range (FRO)	Cost range (charity shop)
Table	£10-25	£45
Dining room chair	£5-10	£15
Sofa	£25-60	£145
Chest of drawers	£10-45	£50
Wardrobe	£20-70	£70

Source: Genesis Furniture Project, Bath; British Heart Foundation.

## 4.3 Second hand shops

Commercial second hand shops – ranging from “junk shops” to antique dealers – are a third, potentially major pathway. However, the lack of an industry association for the second-hand sector and its disparate nature makes gathering data on the levels of re-use attained very difficult. The project was not able to locate any published literature on the size of the second hand furniture market<sup>4</sup>. While a number of second hand shops and auction houses were approached and asked to participate in the study, all declined. Given these restrictions, the project has attempted to estimate the tonnage of furniture sold through second hand stores using the approach outlined below.

<sup>4</sup> The 2012 DEFRA study *Estimated baseline levels of reuse exchange activity* estimates the re-use of furniture through commercial shops at 163,000 tonnes, out of a total annual furniture re-use of 1 million tonnes. However, these figures were discounted as unreliable, since they seem questionably high (higher than the amount of new furniture placed on the market each year).

IBISWorld<sup>vi</sup> estimates the size of the second hand commercial sector in the UK at around 1.9bn, with about 12% of revenue from furniture. Evidence from the Charity Retail Association puts the value of the UK charity shop sector at £974 million. If we take the value of the UK private second hand retail sector at approximately £900 million, we can estimate the value of second hand furniture sold through this route at around £111 million. Data provided by the British Heart Foundation for a range of furniture products allows us to calculate a value for an “average” item of furniture sold of around £2.20 per kilogram. If we assume that the overall price of second hand furniture is equivalent to the price of furniture in charity shops (as charity shops are run on a commercial basis and compete with private second hand shops) we can then derive a tonnage from this value, of around 50,500 tonnes, which, weighted by population from the UK to England gives 42,000 tonnes.

Another pathway related to the second hand commercial market is the antique trade, which is conducted through both shops and auction houses. Again, there is a lack of published data on the size of the antique market, in terms of material tonnages. Several antique auction houses were contacted as part of this project, but all declined to respond. It should be borne in mind, however, that the antique trade represents a mature and functioning market, and likely offers limited scope for increasing the amount of re-use for the materials traded through this pathway.

#### 4.4 Online exchange

Another significant pathway to re-use for domestic furniture is online exchange. This was estimated at 15-20,000 tonnes per year in England by Resource Futures based on an examination of data on Ebay, Freegle and other sites carried out as part of WRAP’s Online Exchange research, and at 17,000 tonnes per year by WRAP’s 2012 Furniture flows research.

#### 4.5 Informal exchange

Informal exchange of goods refers to situations where goods are passed from person to person directly. This could take the form of giving items to family or friends, selling items or leaving items outside for disposal which are then taken by passers-by. This is the hardest pathway to quantify, since items do not enter the waste stream or pass through any organisation that could record a sale or transfer of goods, and the project could identify no reliable data on the extent of informal exchange.

The Defra Re-use scoping report suggests a figure of 100,000 tonnes of goods given away or traded (including online exchange) based on work conducted at Southampton University<sup>vii</sup>. It notes that over 80% of this is given away, and so we have estimated the extent of informal exchange at 80,000 tonnes (30% of UK furniture re-use).

#### 4.6 Office clearance companies

Office clearance companies represent an important route into re-use for a proportion of office furniture. These companies will typically collect material from an office for a fee, and then sell the reusable goods on, either to a supplier of second hand furniture or directly to businesses. Some office clearance companies offer a proportion of the resale value of furniture to clients in order to encourage re-use, while others are now offering remanufacturing services direct to clients (see interviews).

Although not counted in the table of pathways (Table 4) (due to the risks of double counting), these organisations account for an estimated 13,000 tonnes of re-use, including sales to the public and donations to FROs<sup>viii</sup>.

## 5. Market demand

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Empirical quantification of demand was beyond the scope of this research. As a function of price, demand is inherently elastic, and an analysis would have required access to detailed market information that was not available to the study<sup>5</sup>. An analysis of the social need (as distinct from market demand) for second-hand goods would require an in-depth study of the scale and needs of these potential second use consumers.

The level of demand for each product was assigned on the basis of interviews with market actors (such as re-use projects, industry experts and retailers) supplemented by published sources where these were available. Demand represents a subjective assessment on the part of suppliers that a particular item is more or less desired by consumers and is more or less easy to sell at a sustainable price. This informed subjective assessment is indicated in the report with demand defined as high, medium or low.

We have assumed that products that are seen by suppliers as being highly desired by consumers, and which are relatively easy to sell, are likely to have the largest potential for expansion. It should also be noted that this characterisation refers to the capacity of the market to accept **additional** material without a collapse in market price. Low demand does not therefore preclude a high baseline of existing re-use activity, but merely denotes that the capacity to expand further from this baseline may be limited.

It is clear from interviews with FROs and charity furniture sellers that demand is very specific to product and condition, and that this applies both to household and office furniture. The following section presents a discussion of the current state of market demand, based on interviews and a review of the existing literature. Demand has been characterized as high, medium or low.

### 5.1 Household furniture

Demand for household furniture is highly variable, depending on the item and condition. While sofas represent the single largest number of furniture item currently sold by FROs, research suggests re-use of soft furnishings is generally viewed negatively by consumers<sup>ix</sup>. It is likely, if the FRO sector wishes to expand its target audience to high street consumers rather than those in need, that room for expansion will be greatest for hard furniture such as tables, chests of drawers and bedside cabinets. Overall, we would characterise demand for re-use of domestic furniture as **medium**, but note the high degree of variation. Table 9 shows a list of the items that account for the greatest potential additional re-use tonnage, along with the additional amount that could potentially be re-used (the technical potential for increasing re-use) and the perceived level of demand for the item.

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<sup>5</sup> Such a calculation would require accurate information on the amounts of each specific product sold over a given time period at a range of different prices.

**Table 9: Arisings of and demand for domestic furniture items**

Item	Total tonnage available for re-use	Market demand (potential)
Wardrobe	27,000	High
Bed frame	12,000	High
Chest of drawers	12,000	High
Shelving	5,000	Medium
TV unit	3,000	High
Dining table	4,000	High
Bookcase	3,000	High
Display cabinet	3,000	High
Other hard furniture large	8,000	Low
Chair	7,000	High
Table	5,000	High
Bedside cabinet	4,000	High
Desk	4,000	High
Other hard furniture small	13,000	Low
Sofa	46,000	Low
Armchair	26,000	Low
Fabric bed	16,000	Low
Other soft furniture	9,000	Low
<b>Total</b>	<b>206,000</b>	

Source: Arising of large hard, small hard and soft furniture items suitable for re-use (Table 6 above); breakdown of HWRC bulky items in WRAP bulky waste report background data (2012); interviews and discussions with FROs and other re-use industry actors.

## 5.2 Office furniture

Demand for commercial (office) furniture is high according to sellers. Demand is primarily from small businesses and start-ups. We would characterize this product stream as **high** demand for most items, with the highest levels of demand being for good quality / condition office chairs and for foyer-type furniture (coffee tables, comfy chairs etc.). There is also a steady demand for office storage (filing cabinets and cupboards), particularly for smaller items (reflecting the popularity of this route among small businesses, start-ups and those with home offices). The one significant exception is older (typically 1,600 – 1,800mm) desks, which tend to be larger than those currently in use (typically around 1,200mm). These older, larger desks we would characterize as **low** demand. Some operators are now providing a modification service, whereby older desks can be remanufactured to meet the client's new requirements.

**Table 10: Arisings of and demand for commercial furniture items**

Item type	Est. reusable (tonnes)	Demand
Office chairs	9,000	High
Desks (small)	42,000 (figure includes pedestals)	High
Desks (large)		Low
Other office furniture	15,000	High (esp. for foyer furniture and smaller storage)
<b>Total</b>	<b>66,000</b>	

In both commercial and domestic furniture re-use, the major issue constraining market growth is the **restricted supply of high quality items for re-use**. Provided that items of suitable quality can be obtained, there is sufficient market demand to accommodate growth, at least for the majority of items

for which demand is healthy. Attempting to persuade the public to re-use items that they are fundamentally averse to reusing (i.e. some soft furnishings) is likely to be a very expensive undertaking with very little impact in the short-medium term.

The majority of market barriers that need to be addressed lie on the **supply side**.

## 6. Barriers

The table below outlines some of the major barriers to expanded re-use of furniture, as gathered through interviews, discussions with the sector and a review of the existing literature. The barriers are arranged in approximate order of priority, with those having the largest potential effect listed first.

**Table 11: Barriers to increased furniture re-use**

Barrier	Pathways and product applies to	Notes
Social and attitudinal barriers surrounding stigma attached to re-use	All re-use, particularly charity shop and furniture re-use organisation re-use of domestic furniture.	There is a stigma attached to second hand purchase, which retains an association with poverty <sup>viii</sup> .  It is not possible to quantify the impact, due to lack of boundaries between social/attitudinal and technical issues, but this is an important issue. This could be partly addressed by rebranding, marketing etc, but large scale behavioural change is notoriously difficult to achieve, and a change in the overall image of the re-use sector would likely require access to expensive retail space (see below).
Perception that second-hand goods are poor quality or do not represent value for money	All consumer decisions relating to purchasing re-used goods.	Potential consumers tend to associate second hand goods with poorer quality, shorter life expectancy and a higher risk that the item will not be fit for purpose <sup>x</sup> . This results in expectation of a substantial price difference between new and re-used items that is typically not deliverable.
Costs of refurbishment	Some furniture re-use organisations, potential remanufacturing operations.	Low price point means only minimal refurbishment is commercially feasible unless subsidised (e.g. through training budgets).

Barrier	Pathways and product applies to	Notes
Geographical separation of manufacture and consumption	Manufacturer led remanufacturing	The geographical separation of manufacture and consumption implies a separation of consumption and remanufacturing infrastructure. This limits the potential impact of remanufacture through retailer takeback etc. An example is Hermann Miller, a US based manufacturer with a commitment to remanufacture and resale. Herman Miller has had great success with this programme in the US, but has struggled in the European market due to a lack of infrastructure for remanufacture.
Lack of storage space on part of residents or businesses disposing of furniture	Any system that aims to collect material for re-use.	Prioritises disposal. Can be addressed by speeding up collection times or by encouraging bring-based (e.g. HWRC) disposal.
Transit damage	Any system that aims to collect material for re-use.	Serious barrier, greatly reducing potential for re-use. Can be managed with specialised re-use collections. If we apply this to local authority BWC collections, FRN has reported potential for re-use as low as 2% – the gap between this and WRAP potential for re-use data at HWRCs suggests that damage on BWC could account for up to 44,000 tonnes of furniture.
Lack of access to prime retail space	Furniture re-use organisations. Charity shops have been more successful at establishing a high street presence, but rarely in prime retail space.	Less immediately critical than operational space, but more intractable. Lack of prime retail space prevents effective competition with new products.
High space requirement for furniture storage and refurbishment	Furniture re-use organisations; less so to charities (less refurbishment work). Less of an issue for HWRC re-use, provided an on-site shop is not required. Also less of an issue in areas where property is not so expensive.	Serious barrier to expansion of supply capacity, especially in more expensive urban areas. Can be managed through local authority support with premises etc.

Barrier	Pathways and product applies to	Notes
Concern from industry about impact on sales	All furniture re-use activities.	Given the lower sale value of re-used furniture, manufacturers and retailers often see re-use as competing in different market, and are not unduly concerned about re-use activities. However, this could change if re-use activity expanded to become more mainstream. Difficult to quantify, but will limit extent of partnership working etc.
Changing use of office space	All office furniture re-use	Offices have become smaller and desks have decreased in size due to increasing price of space and growth of flat screen monitors. Has led to a substantial decrease in demand for older office desks.

## 7. Opportunities

The section below outlines potential opportunities for the expansion of furniture re-use identified during the research. An opportunity is defined as one of two types in this context:

- A social, technological or market development that is there to be taken advantage of. For example, technological changes that might make re-use easier, or an existing collection and disposal system that could be repurposed towards a re-use led service.
- A broad aim or strategic goal that can be readily identified in the context of existing market conditions (e.g. diverting more items from HWRCs).

Opportunities differ from specific measures to increase re-use in their broader focus, though they often suggest measures that might be implemented to take advantage of the opportunity. Opportunities have been presented organised by priority (largest potential impacts first).

**Table 12: Market opportunities for increased furniture re-use**

Opportunity	Applies to	Notes
Development of manufacturer-led remanufacturing and changing product-service models (e.g. leasing or buy-back).	Most potential for office furniture	These models are already in operation for some high value office furniture, but do not scale to low value items. Movement to domestic items would require a wholesale shift in social attitudes around ownership and consumption, but the potential impacts of such a shift are theoretically very high (potentially hundreds of thousands of tonnes).

Opportunity	Applies to	Notes
Growth of retailer takeback	Retail sector, particularly in partnership with charities or FROs, or with manufacturers	This mostly exists for WEEE, though some companies will collect furniture for disposal on delivery of a new purchase. This provides a potential transport route that could be used to collect items for re-use. However, this is unlikely to develop unless there is a pressing reason for retailers to acquire items, such as through producer responsibility legislation.
Diverting furniture items from HWRCs through on-site re-use shops or segregation and storage for off-site retail	Mostly furniture re-use organisations and charities (though there are also examples of partnership with private sector second-hand retailers).	See case study of on-site re-use shops later in this report. Cost to local authority is typically limited to storage location on site. Where a shop is located onsite, this can be leased to the re-use organisation. Re-use tonnage of 80-100 tpa for a typical HWRC (e.g. Norfolk, Glasgow). With 447 HWRCs in England, 50% roll out could account for approximately 20,000 tonnes of material.
Diverting from bulky waste collections through partnership with a re-use organisation	Furniture Re-use organisations and charities	Addresses barrier of transit damage by creating a re-use led service. Is still affected by lack of householder space and inconvenience of storing items indoors. Case studies show re-use rates of over 40%.
Partnership working between furniture re-use organisations and housing associations	Furniture re-use organisations	Partnerships of this sort are mutually beneficial to both the housing association (residents have access to reasonably priced furniture) and to re-use organisations, who increase both their supply of potentially reusable items and the demand for these items. See case study later in this section.
Growth of online exchange	All domestic and office furniture	Current online exchange for domestic furniture estimated at 15-20,000 tonnes per annum, with office furniture around 1,000 tonnes, suggests potential for growth. However, this would be difficult to influence directly through policy. The WARPit system of organisation for specific online exchanges, if extended across the public sector, could, however, account for a significant tonnage of material while reducing public sector procurement costs.

## 8. Potential actions to encourage re-use

This section considers a number of potential interventions in terms of likely outcomes, based on a consideration of the barriers and opportunities discussed above. Measures are not necessarily linked to specific barriers or opportunities, but take place in the context of these factors.

In considering interventions, we have produced an estimate of the potential impact of specific measures. While it is not possible to accurately predict the outcome of a measure without trials, we have considered a range of information in order to produce the most reasonable estimate available. Key factors that have been considered include:

- Performance data from existing re-use schemes highlighted through interviews and case studies
- The size of the existing re-use market
- The size of the potential pool of reusable material that a measure can target
- Readily achievable capture figures in the context of existing producer responsibility legislation (e.g. we know from the implementation of the WEEE Directive that it is feasible to capture more than 30% of a target stream, so where capture of a pool of reusable material is considered we have adopted 30% as a conservative estimate).

It should be noted that the cumulative impact of a range of measures outlined here would not be additive, since it is highly likely that re-use schemes will divert goods from one another. For example, establishing a re-use led bulky waste service and introducing retailer takeback will likely result in less of an impact than simply adding the impact of each measure would suggest. At the same time, certain measures (e.g. establishing quality standards or other measures to boost demand) could potentially interact with measures to boost supply in ways that produce a higher diversion into re-use than simple addition would suggest.

Implementation costs have been assessed using an approach broadly based on the European Commission's Impact Assessment Guidelines (2009). The table below indicates three cost areas – costs for firms (cost to companies of implementing measures), government (cost to the taxpayer) and consumers (through increased product prices) – as well as broad estimate of relative magnitude, in terms of high, medium, low or cost saving. These cost estimates are indicative, and are not based on a quantitative financial calculation. Instead, they aim to indicate the likely distribution of the costs among stakeholders – though these are likely to vary widely depending on the specific method of implementation and phase of development (for example, one set of costs may apply during an initial market development or implementation phase, changing as the market becomes more competitive or implementation matures). Values assigned were based on stakeholder feedback and team expertise.

**Table 13: Potential measures to increase furniture re-use**

Measure	Impact (estimated)	Costs to introduce	Discussion
Local authority re-use targets	High (est. 62,000 tonnes)	Industry: None Taxpayer: Med Consumer: None	Figure based on capturing 30% of reusable furniture in municipal waste stream
Increase partnership working between local authorities, businesses and charities / FROs on bulky waste collections	Medium (est. 21,000 tonnes)	Industry: Low Taxpayer: Low Consumer: None	Figure based on capturing 30% of reusable furniture in bulky waste stream
Increase number of HWRC re-use centres or re-use specific bring sites	Medium (est. 20,000 tonnes)	Industry: None Taxpayer: Med Consumer: None	Figure based on scaling up examples of re-use to half of England's 447 HWRCs.

Measure	Impact (estimated)	Costs to introduce	Discussion
VAT relief on sales of used items	Medium (est. 16,000 tonnes)	Industry: Benefit Taxpayer: High Consumer: Benefit	Effect would depend on extent to which the VAT rebate was passed to consumers and price elasticity of demand. CRR (2008: 23) suggest pass through likely to be around 100%. The report (p1) also notes that price is an important factor in second-hand purchases. Report assumes this could lead to a 10% increase in re-use sales .
Increase partnership working between housing associations and FROs.	Medium 17,000 tonnes	Industry: None Taxpayer: Benefit Consumer: Benefit	Based on extension of results of partnership working case study to 1/3 of social landlords.
Introduction of product specific re-use standards and accreditation, accompanied by market promotion activity	Low (est. 7,000 tonnes)	Industry: Med Taxpayer: Low Consumer: Low	While this would address a barrier to re-use demand, the effects would be difficult to quantify without a trial. As a conservative estimate, it has been assumed that a package of standards, accreditation, labelling and a national campaign might increase demand for re-used furniture from FROs, second hand shops and charity shops by around 5% from its current level. Does not act in isolation, but linked to access to material – see points on HWRC re-use sites and retail space.
Introduction of Government procurement re-use targets and disposal requirement to prioritise re-use	Low (est. 8,000 tonnes)	Industry: None Taxpayer: Low Consumer: None	CRR (2009) estimate that Government procures 16-19,000 tonnes of furniture each year. Figure quoted assumes that 50% of purchases are re-used items.
Engagement with chambers of commerce to promote donation and use of second-hand office furniture	Low (est. 2,000 tonnes)	Industry: Benefit Taxpayer: Low Consumer: None	Based on a 10% increase in office and small business furniture re-use
Landfill ban on wood or other items	Low (no estimate available)	Industry: High Taxpayer: High Consumer: Low	Unlikely to lead to a significant increase in re-use on its own, since high tonnage arisings and low secondary value will prioritise incineration and recycling.
Producer responsibility with a mandatory re-use element	No impact (see below)	Industry: High Taxpayer: Med Consumer: Med	Evidence suggests that introduction of a 10% re-use target would have no impact on current levels of re-use (see below for discussion).

## 8.1 Producer responsibility

While producer responsibility legislation with mandatory re-use targets might appear as an obvious, high impact measure, the situation is more complicated. One problem is that, if existing re-use channels were not accredited to issue evidence of re-use, introducing targets would undermine the sector as it currently stands, which would lose access to products targeted by producer responsibility schemes requiring evidence. If existing re-use organisations were accredited, existing re-use would need to be counted against the target.

For example, introducing a mandatory re-use target of 10% of new material placed on the market would result in a target of 93,000 tonnes of re-use. Re-use channels that could be accredited to offer evidence of re-use (FROs, charity shops, second hand shops and other commercial routes for commercial furniture) currently account for an estimated 141,000 tonnes of re-use, more than the potential target. The result would be a system that imposed administrative expenses without producing any significant incentive to increased re-use. In order to produce an incentive to increase re-use, any target would need to be set at a level closer to 20%.

In addition to their lack of effect, re-use targets within producer responsibility legislation have other drawbacks. Items that are re-used do not change their state. This makes it highly difficult to develop end-of-waste criteria based on re-use, which has serious implications for administering targets and preventing fraud. Key issues that would need to be considered include:

- Unlike items that are recycled, items that are re-used can be re-used more than once. It is theoretically possible to have a level of re-use higher than the quantity of materials being placed on the market.
- Re-use is an ongoing condition rather than a one-off event. As discussed in the introduction and in the modules, the length of time for which an item is re-used relative to its typical first lifetime is critically important when assessing its impact. The duration of re-use relative to a typical original first lifetime (and auditing to ensure that item is actually being used) would need to be a factor in determining whether an item counted towards targets.

Given the above points, there are serious barriers to introducing effective producer responsibility legislation – at least along the lines of current UK legislation on WEEE or packaging – to promote re-use. This study does *not* conclude that a producer responsibility approach is impossible, but more research is required into how industry and retailers could be made accountable for expanding re-use above its current level without undermining the sector as it currently exists or creating opportunities for fraud.

## 8.2 Scenarios

The table below outlines two hypothetical scenarios of increased re-use. These scenarios are based on achieving a percentage of diversion of the available material into re-use. For each scenario, the amount of each item type diverted is based on the quantity available in the waste stream suitable for re-use and the market demand for that material. Amount diverted is calculated by multiplying the total amount available for diversion by a percentage figure, based on the level of consumer demand. These figures should not be taken as providing accurate accounts of the level of diversion of *specific products* that would take place, since the relationship between the three figures in each scenario is an estimate. The overall level of diversion occurring under these scenarios is based on the quantities derived in Table 13 above – scenario 1 models a moderate level of capture for re-use (medium impact), while scenario 2 outlines a higher level (high impact).

**Table 14: Diversion scenarios**

Demand	Scenario 1 (% diverted)	Scenario 2 (% diverted)
High	12%	36%
Medium	8%	24%
Low	4%	12%

Applying the capture rates above to the available material, we can derive the additional amounts of each material entering re-use. This is shown in Table 15 for domestic furniture and in Table 16 for office furniture.

**Table 15: Diversion scenarios applied to domestic furniture**

Item	Total tonnage available for re-use (see Table 9)	Market demand	Scenario 1	Scenario 2
Wardrobe	27,000	High	3,300	9,800
Bed	12,000	High	1,400	4,200
Chest of drawers	12,000	High	1,400	4,300
Shelving	5,000	Medium	400	1,100
TV unit	3,000	High	400	1,200
Dining table	4,000	High	500	1,400
Bookcase	3,000	High	300	1,000
Display cabinet	3,000	High	300	900
Other hard furniture large	8,000	Low	300	1,000
Chair	7,000	High	800	2,500
Table	5,000	High	600	1,900
Bedside cabinet	4,000	High	500	1,400
Desk	4,000	High	400	1,300
Other hard furniture small	13,000	Low	500	1,500
Sofa	46,000	Low	1,800	5,500
Armchair	26,000	Low	1,000	3,100
Fabric bed	16,000	Low	600	1,900
Other soft furniture	9,000	Low	400	1,100
<b>Additional re-use (nearest 1,000 t)</b>			<b>15,000</b>	<b>45,000</b>
<b>Current re-use level</b>			<b>229,000</b>	<b>229,000</b>
<b>Total re-use</b>			<b>244,000</b>	<b>274,000</b>

**Table 16: Diversion scenarios applied to commercial furniture**

Item type	Est. reusable (tonnes)	Demand	Scenario 1	Scenario 2
Office chairs	9,000	High	1,100	3,300
Desks (small)	21,000	High	2,500	7,500
Desks (large)	21,000	Low	800	2,500
Other office furniture	15,000	High (esp. for foyer furniture and smaller storage)	1,800	5,400
<b>Additional re-use (nearest 1,000 t)</b>			<b>6,000</b>	<b>19,000</b>
<b>Current re-use level</b>			<b>18,000</b>	<b>18,000</b>
<b>Total re-use</b>			<b>24,000</b>	<b>37,000</b>

Scenario 1 (moderate increase) would result in a combined increase of 21,000 tonnes of material, while Scenario 2 (high re-use) would increase re-use by around 64,000 tonnes.

## 9. Potential impacts of product re-use

### 9.1 Carbon offset values of re-use

Re-use has no intrinsic environmental benefit, but is based on the amount of new product displaced by the re-use of an item (and taking into account other factors, such as the environmental impacts of product use during its lifetime).

The value of reusing a piece of furniture will vary according to its displacement value (i.e. the proportion of a new purchase that it displaces), and its material composition (i.e. what it is displacing). As a general figure, discussions with WRAP have suggested a CO<sub>2</sub> abatement factor (relative to disposal) of 1 tonne of CO<sub>2</sub> per tonne of re-use, and 0.5 tonne of CO<sub>2</sub> per tonne of preparation for re-use (preparation here implying collection, storage, renovation and repair).

We know from interviews with charities and furniture re-use organisations that renovation work takes place on only a very small proportion of furniture that is re-used, since the cost of renovation tends to make it uneconomical. For this reason, we have assumed that only 10% of furniture re-use can be counted as preparation for re-use, resulting in a CO<sub>2</sub> abatement per tonne of furniture diverted for re-use of 0.95 tonnes per tonne re-used ( $0.9 \times 1 + 0.1 \times 0.5 = 0.95$ ).

Using this figure, the table below shows the CO<sub>2</sub> abatement associated with the current level of re-use and the scenarios outline above.

**Table 17: carbon impacts of baseline re-use and scenarios**

Scenario	Tonnes re-used	CO <sub>2</sub> abatement	Difference from baseline
Baseline - domestic	229,000	218,000	0
Scenario 1 - domestic	244,000	232,000	14,000
Scenario 2 - domestic	274,000	260,000	42,000
Baseline - office	18,000	17,000	0
Scenario 1 - office	24,000	23,000	6,000
Scenario 2 - office	37,000	35,000	18,000

This suggests that furniture re-use currently saves around 235,000 tonnes of CO<sub>2</sub> emissions per year, and that this could be increased to around 295,000 tonnes if scenario 2 were achieved.

## 9.2 Impact of re-use of product lifetime

The impact of furniture re-use is very much dependent on the ratio of the expected re-use lifetime of a product to the typical first use lifetime.

There is very little available data on the typical first use lifetimes of furniture items. DEFRA's product lifetimes work includes some estimates (based on consumer focus group research) that suggest a typical lifetime for beds and sofas of 7-10 years, and for wardrobes and kitchen units of 10-25 years. However, these times are based on the subjective opinions of a limited number of consumers, and present no guidelines as to how long a typical re-use lifetime might be.

The table below shows the average age of a range of furniture types donated to re-use organisations, based on data collected by the FRN. This data was gathered using questionnaires administered to donors. Data was also collected from FRO customers on how long they retained items once they had purchased them from the FRO.

**Table 18: Lifetime extension through furniture re-use**

Item	First life in years (FRN)	Second life in years (FRN)	Lifetime extension
Bed	5.3	2.08	39%
Sofa	6.9	2.1	30%
Wardrobe	10.1	2.03	20%
Cupboard	8.2	2.16	26%
Dining suite	9.4	2.16	23%
Hardwood furniture	9.3	2.12	23%
<b>All</b>	<b>7.3</b>	<b>2.02</b>	<b>28%</b>

The table suggests that, on average, items donated to an FRO have their lifetime extended by around 28%.

We cannot readily generalise from this data, because it is specific to FROs. There are other routes to re-use, including informal giving, charity shops and online sale. These are likely to attract different types of items and lead to different types of re-use activity. One would not expect the above figure to

apply to an antique shop, for example, where items will typically be much older when donated and kept for much longer.

If we were to generalise from this data, with the assumption that goods that are not re-used are sent for disposal at the end of their “first” lifetime, and that goods reaching the end of their second (re-use) lifetime are sent for disposal, then re-use of a product would result in a 28% extension of the product’s lifetime.

## 10. Case studies

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This section includes summaries of the case studies that were conducted as part of the furniture module. As stated in the introduction, the key factors considered where selecting case studies were:

- Innovation – does the project illustrate a new or improved way of doing things?
- Barriers and opportunities – preference was given to projects that overcome a barrier or exploit an opportunity, as identified above
- Availability of data – case studies were selected in order to provide data on the impacts and costs of specific projects and measures
- Scalability – projects were selected on the based on the potential to generalise from the project results.

The three case studies conducted within the furniture category were:

- Third sector partnership with housing associations to conduct void clearance. This case study illustrates an example of a partnership that boosts both market demand and supply, and provides data on the potential impact of such partnerships nationally.
- Establishment of re-use shops at HWRCs. On-site re-use shops run by charities increase re-use rates at HWRCs, while increasing the profile of re-use organisations. Again, the study provides data on potential impacts if re-use shops were rolled out UK wide.
- Third sector partnerships to conduct local authority bulky waste collections. These initiatives help to address the barrier of transit damage on bulky waste collections, and provide scalable data on costs and impact.

The cost and impact assessment findings in the case studies below have been incorporated into the costs and impacts in the table of measures set out above.

### 10.1 Case Study: Housing Association partnership with FROs

**Furnishing the Future** is a partnership between Ascham Homes and two social enterprises: ReStore Community Projects (Tottenham) and Forest Recycling Project (FRP) (Walthamstow). The aims of this partnership are:

- To maximise economic benefits for Ascham Homes residents by promoting access to affordable reclaimed paint from FRP and furniture and white goods from ReStore;
- To maximise environmental benefits from reusing and recycling redundant furniture and white goods from Void properties.

Ascham Homes is the Housing ALMO for the London Borough of Waltham Forest. It has 11,400 properties let to people on its housing register. A Void is any property that is untenanted for a period of time, because the tenant has moved on or abandoned. ReStore Community Projects started running a Voids clearance service for Ascham Homes in March 2011. The service clears designated properties within 24 hours, with an average of 10 void clearances requested every week.

When a home is vacated, all large and small furniture, bric-a-brac, white goods and carpets are cleared out. Historically these items were disposed of by incineration or landfill. Under the new arrangement, items are now warehoused and sorted into reusable, recyclable or residual waste. The reusable items undergo cleaning, safety testing and restoration and are sold on. The re-use

organisation sells the goods on a two-tier pricing system, with customers on low incomes, including Ascham residents, paying the lower price and the general public paying the full price.

Ascham also runs a Decorating Voucher Scheme for New Tenants with Forest Recycling Project. Under this arrangement, new Ascham Homes tenants receive a voucher for up to 50 litres of reclaimed paint from FRP, depending on the size of the property. Ascham pays FRP for the paint and residents receive it for free. Any additional paint over their free allowance is charged at 50p per litre to the resident. All residents may purchase paint at this discounted price.

The scheme provides a number of benefits to the partners:

- Ascham House saves on waste disposal, and is able to provide its residents with access to furniture and white goods in a very cost-effective way.
- The furniture re-use organisation receives a supply of items for re-use from void clearance.
- The re-use organisation also has access to a new market, in the tenants from Ascham House.

Setup costs were negligible – the only cost incurred by Ascham House was the £100 membership fee for Forest Recycling Project's paint re-use scheme. The re-use organisation covers its costs for clearing the properties (paid van and driver, helper and volunteers, and warehousing space etc) and in addition receives goods to pass on for re-sale.

In the first 12 months of operation, the void clearance scheme managed 176.4 tonnes of products and materials, collected from 284 Void properties. From this material, 41.1 tonnes of furniture and white goods were diverted for re-use (a re-use rate of 23.3%). A further 18.2 tonnes (10.3%) was sent for recycling, with the remainder taken to the HWRC for disposal.

The Re>Paint decorating scheme has also enjoyed success, with 156 residents assisted. 55% of new tenants took up the offer of reclaimed paint, using 4802 litres or 31 litres of paint per property. The take-up rate increased to 73% in the first 3 months of year 2.

Applying the proxies from this initiative across England:

150,000 lettings are made each year by local authorities, out of 1.7m properties (equivalent to a 9% re-letting rate).

If this ratio were applied to the approx. 4m properties managed by social landlords in England, then around 350,000 lettings are made each year in England. Assuming no similar partnerships are already in place and using the same outputs from the Ascham partnership:

- re-use of items from Voids could be around 51,000 tonnes across England
- recycling from Voids could be 22,650 tonnes
- paint re-use would total 7.9m litres or 11,110 tonnes

## 10.2 Case study: Warwickshire Re-use shops on HWRCs

Warwickshire County Council partners with a number of charities to run re-use outlets on its HWRCs. The outlets are set up as the HWRCs are redeveloped on a rolling programme. All sites with outlets on them are run directly by the council.

The first on-site re-use shop was set up in 2003 on Burton Farm HWRC, and run by Shakespeare Hospice. Since then the number of sites with re-use shops has expanded to seven, with four of these opening in the last year.

The shops are branded with the name of the local charity. This makes it clear to residents that the revenue from the shops goes to charity, rather than to private individuals/contractors or to the council. The management of the shop by established charities, with high levels of retail experience, also avoids the negative associations of many people around practices perceived as scavenging and concerns around quality and faulty goods.

The major items sold on site are furniture, WEEE, bric-a-brac and books. The shops target only small WEEE – such as kettles and toasters and lamps – as these require only a PAT test and visual/heating test which can be done in a corner of the shop.

Re-use organisations often struggle to find suitable premises in a location visible to the public, and face a choice between off-street industrial units, (not accessible or visible to most people) or a high-street shop on a short-term lease. This latter scenario does not maximise re-use, as many mid to low value items, especially large items, cannot be accepted in these small, expensive-to-run stores.

Having a charity run an on-site HWRC shop allows them to be almost rent-free, directing profit from the shop into charitable activities, while allowing the shop to accept a wider range of items. Having customers drop off and pick up items saves collection and delivery costs, while the large number of HWRC users ensures a high level of visibility and a constant supply of stock.

In addition to the cost of providing waste and recycling containers, and council officer time for liaison, the setup costs for the three established stores are shown below.

**Table 19: Costs to local authority of re-use shops at HWRCs, Warwickshire**

Site	Established	Council investment	Shop income p.a.
Burton farm	2003	£26,000	£200,000+
Princes Drive	2006	Refurbished existing building	£100,000
Hunters Lane	2008	£122,000	£100,000+

Projected total material throughput for these three HWRCs in 2011-12 totals 33,278 tonnes, of which 319.5 tonnes (1%) is diverted into re-use through the re-use shops. This 1% re-use rate suggests that extending this system to each of the 447 HWRCs in England could achieve a total re-use diversion of around 15,000 tonnes (based on the 1,500,000 tonne HWRC arising in DEFRA's *Local authority collected waste for England* quarterly statistics<sup>6</sup>).

The council does not share the profit generated from sales. Charities pay rent quarterly. The minimum rent is £5,000 per annum, or 5% of the annual income of the shop should this exceed £5000.

Taking the Hunters Lane shop as a typical brand new small shop for an average site, the financial components for the business case to local authorities comprise:

- Set up costs = £122k
- Landfill savings (73.5 x £85 per tonne to dispose) = £6,248 pa
- Income from shop = £5k pa.

At this rate, the shop will pay back the cost of investment within 12 years.

As the re-use area does not have to be covered by a Waste Management licence, the shops do not have to be located on the waste sites. They could be located on an adjacent piece of land if such a space is available.

### 10.3 Case Study: Bulky waste collections partnerships to maximise re-use

Shropshire Council operates in partnership with its main waste contractor (Veolia) and a consortium of third sector furniture re-use organisations to deliver bulky waste collection services across the county. The FROs involved are the Shropshire Housing Alliance, South Shropshire Furniture Scheme and the Shrewsbury Furniture Scheme.

When residents call the council to book a bulky waste collection, they are first advised that they do not need to use the bulky waste service if their item is reusable and should instead make use of one of the cheaper or free services provided directly by the FROs.

<sup>6</sup> No weighting has been made to account for factors that affect tonnage throughput for example, trade waste controls, urban v rural sites, recycling performance etc. The calculated re-use rate has been applied to total material throughput to produce an estimate.

If the resident still requires a bulky waste collection, the collection is charged at a set rate (see below). Payment is taken over the phone in advance and the FRO scheduled for pick up. Items collected through this route are also assessed for potential for re-use. Waste or recyclable items are taken to the nearest designated civic amenity site for disposal or recycling. Reusable items are cleaned, refurbished and passed on for re-use.

This approach, integrating the waste and re-use services, ensures that every resident who calls with potentially reusable items is captured. This help to overcome the barriers of lack of information for the public, without the need for an advertising budget.

The system does not place a financial burden on the local authority or waste contractor, as all payments to the FROs are covered by the collection charge to residents. The council and Veolia keep around 10% of the charge to cover their own costs. The rest is passed to the relevant FRO – in 2012/13 the basic charge for 3 items is £25. Of this, Shropshire council keeps £2.50 per collection to cover call centre costs, Veolia keeps £2.25 to part cover depot call staff costs and the FRO receives £20.25. Re-use collections booked directly with the local FROs are charged at a lower rate or are free.

Shropshire Council also pays the FROs re-use credits – these are paid at £38.50 per tonne. Additional grant monies are also paid through the Council's Shropshire Adult and Community Learning Department for the delivery of training opportunities. The organisations provide recycling NVQs, certificates in woodwork, health and safety, computer recycling, first aid, fire safety, manual handling and fork lift truck training.

A breakdown of the amounts of material collected, re-use levels achieved and cost to the local authority over the past three years is shown in the table below.

**Table 20: Re-use levels achieved by bulky waste collections in Shropshire**

Year	Total bulky waste (tonnes)	Re-use tonnage	Re-use rate	Cost of re-use credits	Avoided landfill cost	Saving to council
2009/10	Not known	358	N/A	£13,771	£20,106	£6,335
2010/11	682	377	55%	£14,515	£24,882	£10,368
2011/12	747	394	53%	£15,150	£29,513	£14,363

The combined re-use rate for the bulky collection services across the county is around 53-55%, taking into account all bulky items collected and the FROs re-use credit claims. However, this would be lower if non-household items (e.g. clearances for social landlords) were filtered out. The council estimates that a more realistic integrated re-use rate is around 45%, with an additional 20% recycled.

Third sector partnership is also in place in Lancaster, where the bulky waste collection has been run by furniture re-use organisation Furniture Matters since 2006.

Furniture Matters emphasises the importance to residents of keeping their items inside in order to avoid damage. In order to achieve this, it guarantees pick up within three days (often earlier) and offers residents the choice of a 3-hour time slot, including evenings. The levels of re-use achieved by Furniture Matters in Lancaster are similar to those in Shropshire, as shown below.

**Table 21: Re-use levels achieved by bulky waste collections in Lancashire**

	Tonnes	Percentage
Re-used	123	50%
Recycled	43	17%
Disposal	81	33%
<b>Total</b>	<b>247</b>	<b>100%</b>

If this 50% re-use rate could be replicated throughout England, this would equate to 121,000 of the 242,000 tonnes of bulky waste collected per annum (figures from Waste Data Flow) entering re-use.

## 11. Summary of findings

Key findings of this module report include:

In England, around 930,000 tonnes of furniture enter the market each year. Allowing a 5% drop off for export for re-use and an expanding stockpile of in-use furniture, we can estimate that around 884,000 tonnes is sent for recycling or disposal each year. The current level of re-use is estimated around 247,000 tonnes. Of this, 229,000 tonnes is domestic furniture while commercial furniture re-use is estimated at 18,000 tonnes (however, data for both domestic and commercial furniture use has a low level of confidence). The headline figures for the arisings and end fate of furniture are summarised in Table 22.

**Table 22: New product entering the market, recycling/disposal and re-use of furniture in England**

	Combined (tonnes)	Domestic (tonnes)	Commercial(tonnes)
New product entering the market	930,000	791,000	139,000
Current disposal and recycling	884,000	752,000	132,000
Current re-use	247,000	229,000	18,000

The estimated potential for additional re-use was calculated by estimating the amount of end of life material not currently being re-used that is suitable for re-use (based on observational data). The estimated potential for additional re-use is shown in Tables 23 (domestic) and 24 (commercial).

**Table 23: Arisings of end-of-life domestic furniture suitable for re-use in current condition**

	Percentage of furniture waste+	Arising (Tonnage)	% Readily reusable ++	Potential reusable material (Tonnage)
Soft furniture	48%	361,000	27%	97,000
Hard furniture large	42%	315,000	24%	76,000
Hard furniture small	10%	75,000	43%	32,000
<b>Total furniture</b>		<b>751,000</b>		<b>206,000</b>

**Table 24: Arisings of end-of-life commercial furniture suitable for re-use in current condition**

	Units†	Est. weight per unit (kg)	Waste tonnage	Potential re-use tonnage‡
Office chairs	1,550,000	12	19,000	9,000
Desks and pedestals (including imports)	3,200,000	26	83,000	42,000
Other office furniture‡	1,050,000		30,000	15,000
<b>Total office furniture</b>			<b>132,000</b>	<b>66,000</b>

Demand for re-used furniture is generally medium to high, but is lower for upholstered furniture. In general, high quality goods have strong demand, and the major constraint to market growth is securing a reasonable supply of such goods. Demand for specific items and the amounts potentially available for re-use in the waste stream are shown in Tables 25 and 26.

**Table 25: Arisings of and demand for domestic furniture items**

Item	Total tonnage available for re-use	Market demand (potential)
Wardrobe	27,000	High
Bed frame	12,000	High
Chest of drawers	12,000	High
Shelving	5,000	Medium
TV unit	3,000	High
Dining table	4,000	High
Bookcase	3,000	High
Display cabinet	3,000	High
Other hard furniture large	8,000	Low
Chair	7,000	High
Table	5,000	High
Bedside cabinet	4,000	High
Desk	4,000	High
Other hard furniture small	13,000	Low
Sofa	46,000	Low
Armchair	26,000	Low
Fabric bed	16,000	Low
Other soft furniture	9,000	Low
<b>Total</b>	<b>206,000</b>	

**Table 26: Arisings of and demand for commercial furniture items**

Item type	Est. reusable (tonnes)	Demand
Office chairs	9,000	High
Desks (small)	42,000 (figure includes pedestals)	High
Desks (large)		Low
Other office furniture	15,000	High (esp. for foyer furniture and smaller storage)
<b>Total</b>	<b>66,000</b>	

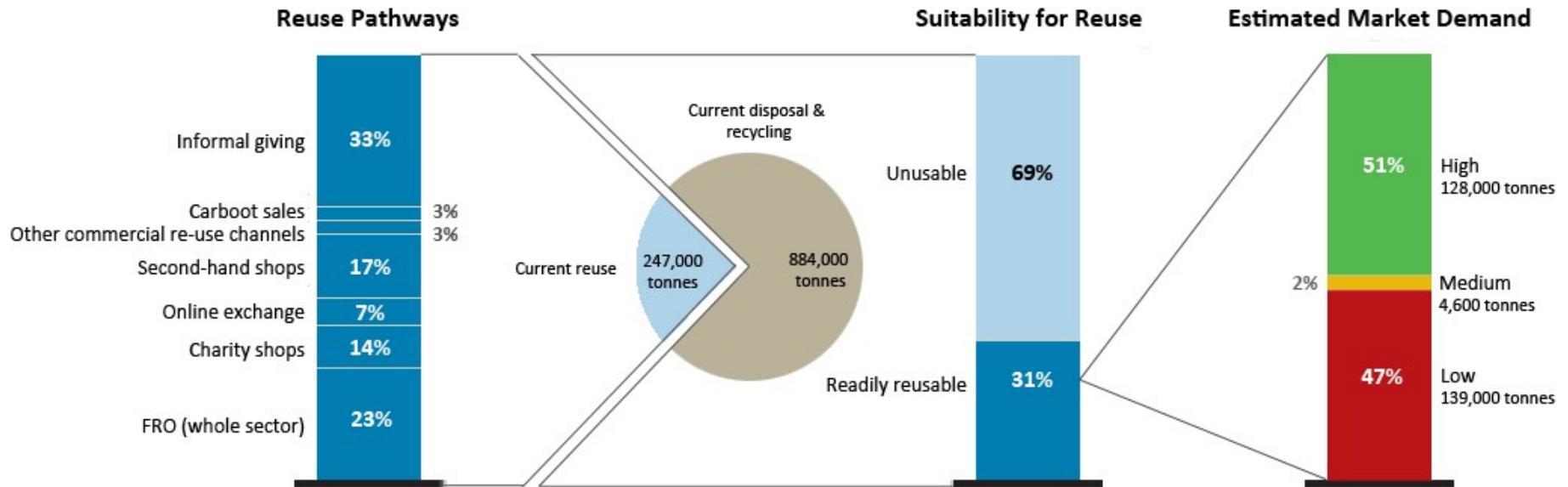
The major barriers to furniture re-use on the demand side are a perceived stigma around purchasing second-hand and concerns over product quality. On the supply side, major barriers are the cost of refurbishing goods and space constraints, particularly those affecting the disposer, who often will not have space to store an item indoors awaiting pickup. Transit damage and damage at HWRCs due to improper storage are also issues, highlighting the difficulties with collecting goods for retail using a waste-management infrastructure.

The most effective actions to encourage furniture re-use are likely to be legislative measures such as re-use targets for local authorities. Such measures could reasonably expect to divert in the region of 60-70,000 tonnes of furniture into re-use.

Smaller scale measures that would have a lower impact include encouraging third sector partnerships with local authorities to conduct bulky waste collections and re-use items from HWRCs or the introduction of VAT relief for sales of second-hand goods – here the impact is likely to be in the order of 20,000 tonnes.

Figure 1 overleaf illustrates headline findings for furniture, covering arisings, current re-use baseline and major pathways, potential for increased re-use and market demand for material.

Figure 1: Summary of furniture arisings, current re-use and market potential



## 12. Data gaps and future work

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This research was conducted with the aim of establishing the current extent of re-use in England, and the potential for expansion of the re-use market, based on reviewing existing data and interviewing industry stakeholders.

In the course of this work, a number of data gaps have emerged, where the certainty in the data is relatively low. However, policy implementation is inherently unpredictable, and studies such as this can at best approximate the likely outcomes. With this in mind, we can be reasonably confident that the data presented is an adequate approximation of the current situation and market potential.

A number of areas did present themselves where additional, more accurate, data would have been very useful, in particular:

- There is no reasonable baseline information on the amount of goods retailed by second-hand shops (including traditional “junk” shops and high-street chains such as Cash Converters and CeX).
- There is limited published information on arisings, composition, pathways and end fates for commercial furniture. Additional work on the roles played by office clearance and asset management companies would be particularly useful in this context, in addition to some scoping research into the size and nature of the non-office commercial furniture sector (street furniture, stadium seating, restaurant, kitchen and hotel fittings etc.)
- Informal giving represents a major data gap, and one that will not be easy to address. Realistically, the most reliable approach would be a large-scale longitudinal behavioural study (e.g. measuring the re-use activity of several thousand residents over a 6-month period).
- Consumer data on attitudes to re-use does exist (e.g. DEFRA 2011), but needs to be significantly expanded upon to investigate attitudes to a more wider and detailed range of products, preferred re-use outlets and perceptions of the market value of second hand items.

Many of the gaps in this study stem from a fundamental lack of empirical data, making attempts at modelling highly sensitive to gross assumptions.. Much of this data is held by companies (e.g. furniture retailers, clearance firms etc) who generally are not enthusiastic about sharing operational data (the majority of companies contacted as part of this study either refused to participate or did not respond). With this in mind, future data gathering needs to work with industry in order to gain access to these figures, as they cannot be reliably inferred by external analysis.

We have already noted that the impacts of potential interventions are unpredictable, especially in terms of how policies interact with existing conditions and other policy measures. For this reason, our final – and most important – recommendation in terms of further work would be to conduct a range of intervention trials, in order to provide a more reliable basis for evaluating likely impacts.

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<sup>i</sup> Centre for Remanufacturing and Reuse (2009) *Reuse of office furniture*. This report uses the low-end estimate of 165,000 tonnes of office furniture per annum weighed for England by population.

<sup>ii</sup> WRAP (2011) *Benefits of re-use case study: office furniture*

<sup>iii</sup> DEFRA (2012) *Estimated baseline levels of reuse exchange activity*

<sup>iv</sup> WRAP (2012) *Composition and re-use potential of household bulky waste in the UK*

<sup>v</sup> BFM (2008) *Zero emissions from office, contract and kitchen furniture*

<sup>vi</sup> IBIS World (2011) *Everything old is new again: economic turmoil breathes new life into an old industry*

<sup>vii</sup> Alexander, C., Curran, A., Smaje, C. and Williams, I.D. (2009) “Bulky waste and furniture re-use schemes: an evaluation of potential and constraints”. ICE Proceedings, Waste and Resource Management, 162(WR3), 141-150.

<sup>viii</sup> WRAP (2012) *Furniture mass and product flow and market development opportunities in the UK* estimates that office clearance companies are involved in 71% of all office furniture re-use.

<sup>ix</sup> DEFRA (2011) *Public understanding of product lifetimes and durability*

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<sup>x</sup> Centre for Remanufacturing and Reuse (2008) *A review of policy options for promoting remanufacturing in the UK.*