

An Investigation of **Bulky Waste**

Arisings & Flows in South East England

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Executive Summary

This report represents the output of a 6 month intensive research project into arisings and flows within the South East region of waste materials that may be regarded as ‘bulky’ or ‘difficult’. This covers materials that either pose a disposal challenge at landfill or mass burn incinerators or offer an obvious diversion opportunity given the necessary infrastructure.

Remade South East commissioned Beyond Waste to undertake a survey of different sources and organisations to quantify and identify the routes available to increase the exploitation of specified bulky waste landfill diversion opportunities in the region. This is part of the overall ERDF project intended to trial methods so this project was undertaken with a delivery focus in mind.

The intention is to generate baseline data that may help quantify the market opportunity; to identify business opportunities; and to promote the development of stronger relationships between waste management companies, social enterprises and local authorities so that collaborative market solutions for these materials might be developed. In addition the information generated will contribute towards raising awareness of Small & Medium Enterprises (SMEs) producing bulky waste streams of the potential benefits (cost savings and environmental impact reductions) from alternative outlets for these materials.

What is Bulky Waste?

The target materials identified for study range from truly bulky items (high volume low weight like furniture) through to difficult waste streams such as plasterboard.

1. Flooring - carpets and tiles
2. Mattresses - foam and sprung
3. Furniture - household and commercial
4. Bulky Plastic - industrial and household
5. Treated Wood - category C & D
6. uPVC - windows and other
7. Plasterboard - new and old
8. Ceramics - sanitaryware and other

These are referred to as the ‘target materials’ throughout the report.

Why Bulky Waste?

Increasingly as recycling rates improve for materials such as paper, green waste, cardboard and producer compliance schemes for packaging and Waste Electrical & Electronic Equipment (WEEE) take effect the residual waste stream begins to consist of greater proportion of materials that are in effect ‘orphaned’ under current arrangements. Bulky waste items start representing a significant proportion of residual waste outputs from Household Waste Recycling Centres (HWRC). Local authorities starting to look at diverting these materials opens the way to consideration of arisings outside the municipal solid waste (MSW) stream as combined tonnages may generate a critical mass to support action. In addition the difficulty posed by certain bulky waste going to mass burn incineration opens up the opportunity for diversion to higher levels of the hierarchy as it requires pre treatment (size reduction) anyway.

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How Much Bulky Waste is Out there?

Through an in depth desk research process we have derived estimate for arisings for each of the target materials arising within the South East. Due to the relatively scant nature of data these are necessarily high level estimates and should only be seen as indicative values.

	Total Estimate (tpa)
Flooring	83,500
Furniture	164,900
Mattresses	27,000
Bulky Plastics	22,000
Treated Wood	393,000
uPVC Windows	33,350
Plasterboard	155,000
Ceramics	36,800

Table 1: Headline Estimated Arising Data for Target Materials in the South East

A total value across the entire target streams is meaningless as the materials differ so much in nature. What is more relevant is identifying within each stream the material breakdown as commonality of material content leads to synergies between streams. Table 2 presents an indicative apportionment of material content. Plasterboard and Ceramics have been excluded from the breakdown as they are composed of materials with their own distinct management routes.

	Total Estimate (tpa)	synthetic				metal	wood		organic
		hard plastic	fibre	foam & fabric	other		Cat D	Cat C	fibre
Flooring	83,500	908	29,043		40,842				12,707
Mattresses	27,000	0	1,080	4,050	4,860	8,100	0	6,210	4,050
Furniture	164,900	8,579		6,196		52,901	55,284	41,940	
Bulky Plastics	22,000	22,000							
Treated Wood	393,000						393,000		
uPVC Windows	33,350	33,350							
Plasterboard	155,000								
Ceramics	36,800								
		64,836	30,123	10,246	45,702	61,001	496,434		16,757

Table 2: Approximate Material Content of Streams from Table 1 data

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Accounting for Bulky Nature

Due to the bulky nature of many of the target materials it is the low density that may be of more significance operationally. We have applied some conversion factors to the total tonnages to arrive at a volume figure for each stream. Results are shown in Table 3.

	Total Estimate (tpa)	Volume (tonnes/m3)
Flooring	83,500	363,043
Furniture	164,900	499,697
Mattresses	27,000	182,039
Bulky Plastics	22,000	88,000
Treated Wood	393,000	701,786
uPVC Windows	33,350	115,000
Plasterboard	155,000	254,098
Ceramics	36,800	n/a

Table 3: Notional Volumes Occupied by Table 1 estimates

This is as delivered and gives some indication of the volume occupied in transit plus of landfill space that may be occupied. This gives a total notional volume of **2.2 million m3**. This equates to more than the combined remaining non inert landfill capacity in Surrey and Berkshire¹. Ceramics have been discounted as its inert nature means it will be acceptable into non landfill routes such as hardcore fill.

Economics

Until either landfill prices are set to reflect volume and diversion targets are expressed in more than just tonnes the true value of diversion of bulky waste from landfill is unlikely to be captured. On reflection charging by volume at the landfill would seem sensible as it is void that is of value to the operator rather than tonnage-. It was reported that some sites did charge a surcharge for mattresses and a US study has calculated that the void saving could be worth landfill site operators subsidising diversion to the tune of \$15 per mattress. Certain EfW plants discourage receipt of mattress-only loads by premium gate fees due to the operational problems associated with mattresses management. There are also issues about transport costs reflecting the true cost of use of fossil fuels when moving materials around the country working against the development of local markets. The move towards carbon avoiding metrics to measure recycling for more traditional materials such as glass packaging combined with the opportunity for local authorities to claim carbon savings under the Carbon Reduction Commitment may open up a shift beyond weight based recycling targets in the medium term.

Data Quality

Due to the very nature of most of the target materials, arisings are occasional - some being seasonal (household bulky plastic such as garden furniture for example), others only arising as items are replaced (furniture for example) or at the point of demolition (treated wood and plasterboard). Both types of arising are subject to fluctuation in economic conditions where sales of new products tail off and new build and a more 'make do and mend' approach might be taken.

¹ Table 9 Declared Capacities of Landfill First Annual Strategic Waste Monitoring Report for South East England Beyond Waste for SERTAB February 2010.

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Due to the scant nature of data it is not possible to apportion the arisings down to sub regional or county level. We have however sourced data from WasteDataFlow for materials that fall within the MSW where they have been reported on separately. We recommend that more local studies be undertaken for the true potential to be exploited. In order to do this effectively a methodology that reflects the variable nature of arisings need to be developed so that estimates from snapshot studies can be extrapolated up realistically. For local authorities, seasonal studies of inputs to HWRCs combined with monitoring of kerbside collections should start to yield a picture that a comprehensive diversion service could be rolled out.

Future Proofing the Findings

The data obtained is based on snapshot of products that are currently working their way through their useful lives to the End of Life phase. In many cases materials coming through may be at least 10 years old. As materials and products evolve so will the material composition of target streams change. For example the introduction of laminated and multi layer plasterboard is not accepted by the key recycler serving the southern sector of the South East. This will present a growing challenge over time.

There is therefore a need to forecast arisings into the future accounting for these compositional changes and then monitoring any challenges that arise. Our desk research has identified a number of useful studies in this regard - particularly central Government's Market Transformation Programme and Sustainable Consumption & Production functions -which could be used as a basis to develop forecasts for the region. This data and projection might then be usefully exposed to peer review to get a clear sense of what challenges might lie ahead.

Study Findings

The research has revealed a number of interesting initiatives either happening or planned for many of the materials targeted by the study, opportunities that have previously been neglected. It is perhaps significant that, since Remade South East originally identified these materials as requiring specific attention in its bid to the SEEDA administered ERDF fund 2 years ago, market conditions have changed considerably.

Most materials are the focus of market development and much progress has been made. However, there is still work to be done if the carbon reduction benefits of diverting these materials from landfill are to be realised and maximised. Some initiatives elsewhere in Europe provide a steer towards new market possibilities - however these must always be read with an eye towards the ways in which waste is managed in the UK. They may not always be replicable given the current institutional arrangements, legal requirements and financial and operational context.

The report outlines existing initiatives, identifies potential gaps in market and geographical and recommends how these gaps might be filled. The wider context of the ERDF project may allow some of these possibilities to be explored further, translating the written word to practical action.

Carbon Implications

The growing policy focus on carbon reduction is resulting in the development of metrics to measure carbon savings associated with diversion of certain materials from landfill. A thorough review of technical sources for the target materials has been undertaken in collaboration with a Life Cycle Assessment expert from the Technical University of Denmark. While this has revealed some useful indications of benefits we found that there is insufficient data to form firm conclusions on the merits of different End of Life routes for all materials under consideration.

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However the following preliminary findings do emerge:

- For carpet there is a strong indication that reliance on traditional Energy from Waste plants may be the least preferred option for synthetic based carpet. The use of material either for high grade recycling or SRF would be better to reduce carbon emissions. For wool rich material landfill may even be preferred over EfW as the organic carbon is sequestered.
- The complexity of composition of items such as furniture make it impossible to arrive at any definitive conclusion around preferred management routes other than to promote reuse as the carbon savings of replacing new for old are apparent.
- For plasterboard, local open loop recycling routes such as use to land may be preferable to long distance closed loop recycling back to plasterboard manufacture. However bearing in mind that there are two manufacturing sites in the region closed loop outlets may be preferable for the South East.

Further work is needed to firm these findings up and we recommend this be flagged to national delivery bodies such as WRAP and DEFRA too.

Recommendations for Action

Three principal follow-up priorities emerge from the 'emerging markets analysis'. Each requires discussion with key delivery partners to agree the 'opportunities to be exploited', and 'obstacles to be overcome'.

1. Piggy back bulky plastic onto existing collection and processing systems for other polymers.

These offer potentially the biggest single opportunity from the range of material streams studied - Do contractors collecting commercial waste plastic have the capacity to expand to process bulky plastics, including the wider polymer types and item sizes involved, and the removal of residues in plastic containers? Our analysis suggests the answer to this is yes, and that bulky plastics will continue to be generated at similar volumes in future, notwithstanding continuing changes in both applications and polymers used.

The Kent County Council bulky plastic trials show there is a specific opportunity at HWRCs given sufficient space for separate large skips for plastics. However there is a tension between compacting for transport efficiency and effective separation if undertaken by manual sorting, or a mixture of manual and mechanical sorting. Development of source separation (to eliminate contamination & improve quality) or reconfiguring existing mechanical sorting systems could resolve this. Another route would be a network of local sorting sites, located in and targeting areas of higher population density in the South East, where the necessity to compact would be reduced/eliminated.

2. Expand reuse, and 'preparation for reuse' including cleaning/repair

The most prominent gaps in the region often fall into the reuse category. While reuse potential may be limited for certain target materials e.g. plasterboard, considerable untapped reuse potential still exists in furniture, bedding and wood in particular - as highlighted by an audit of Medway Council's bulky waste kerbside collection scheme where at least a third of the residual material was identified as being suitable for diversion via reuse. The revision of the Waste Framework Directive has introduced shift towards reuse, and should see a resulting expansion in capacity. However, there is some doubt about whether contractors and third sector reuse projects collecting or handling bulky goods, particularly furniture, have the capacity and interest

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in targeted expansion to a full range of bulky items including those that may be of lower value or may require some refurbishment work prior to being in reusable condition.

The first consideration is the extent to which reuse can be achieved with minimal extra handling, storage and/or processing costs. The second is the cost of addressing contamination and any extra future regulatory requirements on reused product e.g. to viable and environmentally safe cleaning prior to reuse, including residue removal from plastic drums or mattress cleaning and repair that guarantees that outlets for reused product can be developed. The development of reuse credit schemes for third sector bodies entering into contractual relationships with local authorities for municipally sourced bulky waste may assist this.

3. Biomass offers significant opportunities

The definition of biomass applies to feedstock of sufficient quality for use in non- Waste Incineration Directive compliant boilers. Extra definitions can be expected in national guidance on compliant plant and inputs, given the new Government's pledge to support renewable energy expansion. An international trade in wood chip already exists with significant exports to Germany and Scandinavia - where different classes of plant take various grades of wood chip. The opportunity is there to develop capacity locally, were secondary material prices to be sufficiently attractive to outbid the net income from export. The recent introduction of Renewable Obligation Certificates and prospect of a Renewable Heat Incentive should all help tip the balance towards development of local capacity.

A network of aggregators is already established but, if the region is to develop its own capacity, higher priority needs to be given to supply inter- regional demand. In turn demand needs to be stabilised, by the identification of (at least four), and preferably more accessible southern UK biomass plants. This would address current concern at inconsistent demand from Slough HP (Scottish and Southern Energy). There are also problems of inconsistent nature of waste wood, both in tonnage volume (seasonal) and composition (contamination issues).

The plant in Lancing operated by Sussex Waste Recycling is actively seeking clean wood to offset the high calorific value of skip waste residues due to technical limitations of the installed plant. The main driver will continue to be the market price for waste wood. Possible solutions that will assist will include a range of clear specifications for grades of biomass suited for use in non WID compliant plant; this is something being developed as part of the WRAP/Environment Agency Wood Waste Protocol. Integration of consideration of the energy agenda with waste should help smooth consideration of planning applications for such plants.

WIDER RECOMMENDATIONS

a. OVERALL

- Create a link to new Government's emerging 'zero waste' focus, and convergence between waste and energy policy via commitments on Anaerobic Digestion and renewable energy expansion. This will be clearer when the draft thinking on the revised Waste Strategy is issued, following inputs by industry and stakeholders. Given the new Government's objectives to reduce avoidable controls on industry, it will be likely that any new policies will involve the minimum market intervention needed to achieve proportionate benefits, and may involve strategies of more barrier removal rather than interventions.
- The Waste Framework Directive revision is likely to lead to initiatives at all hierarchy levels with an emphasis on raising attention towards reuse. To promote this there is a need to

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develop a wider understanding on what is 1. Reusable, 2. Recyclable, and 3. Recoverable, to inform all stages from source to disposal. For reuse, exploration and development of leasing models can be expected to become increasing economic for other higher value products and equipment, as has been shown in research by feedback into product design by the Centre for Sustainable Design (CfSD) and Brighton University. Businesses also need to know much more on what happens to their waste and audit their contractors to ensure what they believe is happening is actually happening to their waste.

Unless landfill bans are introduced for certain materials, as was mooted by the previous Government, this may be left to be driven in larger organisations by Corporate Social Responsibility and the Carbon Reduction Commitment.

- Encourage local authorities and waste contractors to recognise the potential inter-connections of apparently disparate bulky elements in different waste streams. Combined these could form a critical mass of target material. For example the textile content of furniture and beds. This synergy is being recognised by some market leaders - for example Matt UK is now entering into an agreement with LCRN to use its mattress recycling facilities to take furniture for repair and dismantling.
- Opportunities for parallel and joined-up diversion of carpets, mattresses and furniture are an example of the greater opportunity from combining several bulky waste materials into a single collection and bulking system, ahead of separate processing streams later. They might lend themselves to blending into quality Solid Recovered Fuel (SRF).
- Remade South East needs to build relationships with material or sector-led initiatives e.g. Carpet Recycling UK, Recovynyl, that are seeking to enhance activity in the region on the basis of an overall framework and co-operate with parallel initiatives, engaging with sector organisations on how other agencies in the South East might assist collectors and manufacturers in non-monetary ways and act as broker.

b MATERIAL SUPPLY QUALITY FOCUS

- Focus on dealing with single material items or items where different materials can be readily separated first. These should be easiest for producers to understand and tackle. Improving separation for recycling/reuse through onsite separation trials may help. For example, introducing a second non-inert skip for PVC windows and bulky plastics on construction sites. Separating window glass from uPVC window frames also has an emerging market which is currently not being fully exploited.
- Explore potential for establishment of network of sites for separation of house clearance and building maintenance waste through 'Man in Van' type operators through setting up a trial to separate out and quantify actual arisings, establish the contribution these waste make to residual waste coming for transfer stations and establishing willingness of customers to pay for landfill diversion.

c BULKY ITEM REUSE

- Organise specific events to increase awareness of potential of large item reuse e.g. 'Bulky Item Reuse - Plenty of Opportunities Beyond Furniture and Electricals' perhaps with sector focus. Use events to raise awareness and sharing learning on mattress and carpet reuse, wood and bulky plastics opportunities.

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Event design will need to include the different drivers and separation challenges for the three core sectors (commercial and industrial, municipal and construction) as well as provide intelligent analysis on the differing projected opportunities for these four target materials. This promotion should ideally be supported by basic cost data to support development of business case.

- Develop links between MSW stream sites such as HWRCs and commercial reuse operations such as the Brighton & Hove Wood Recycling Project and Tiger Enterprises and similar entities with synergies in approach or resource opportunities. For example linking Tiger into local HWRC to supply reusable items like sanitaryware.
- Develop proactive models for social enterprise and community recycling networks, small waste and recycling companies, and councils to work together.
- Where reuse is not feasible explore possible 'secondary reuse' options - the use of an item for a different purpose from that which it was originally intended to be used, e.g. large plastic drums and containers capable of easy cleaning and/or adaption into new containers, water butts or compost tumblers being made in Greenwich from concentrated orange juice drums. Similar models exist with the Mid Sussex Wood Recycling project where drum reels are converted to garden seating.
- Promote commercial waste exchange websites, and listing on sites already operating in the South East. But aim to consolidate too.

d PROCESSING FOCUS

- Organise targeted event for bulky plastics, recognising that progress depends on networking sources, collector/processors and end users in the region to create a critical mass of good quality material.
- Address the need for increased flexibility of container plastic recycling infrastructure including agricultural sources. Critical issues include sharing best practice on size reduction for larger items feeding recycle, or best viable use of compaction while remaining aware of the need to deal with potentially hazardous residues.
- Conduct a market risk assessment on implications of tightly defined specification of feedstock suitable for biomass with waste and recycling companies and possible impact/opportunities of waste protocol for wood on South East businesses and users.
- Consider trials on the separation of feedstock suitable for non Waste Incineration Directive compliant biomass and Solid Recovered Fuel. Also trials on carpet separation for recycling in view of significant demand expressed by contract installers.
- Promote processors in the region who responded to survey, by way of entry to material specific web directory e.g. bulky plastics focus, and commit also to promote new processors arising after study publication. This could be via entry to the Environment Agency maintained Waste Directory and WRAP online material specific database.

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To the Reader

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