South East Capacity Review
Stage 2: Materials Review

Scoping Review Of Recycling & Reprocessing Infrastructure in South East England

Prepared for

SEEDA
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Working for England's World Class Region

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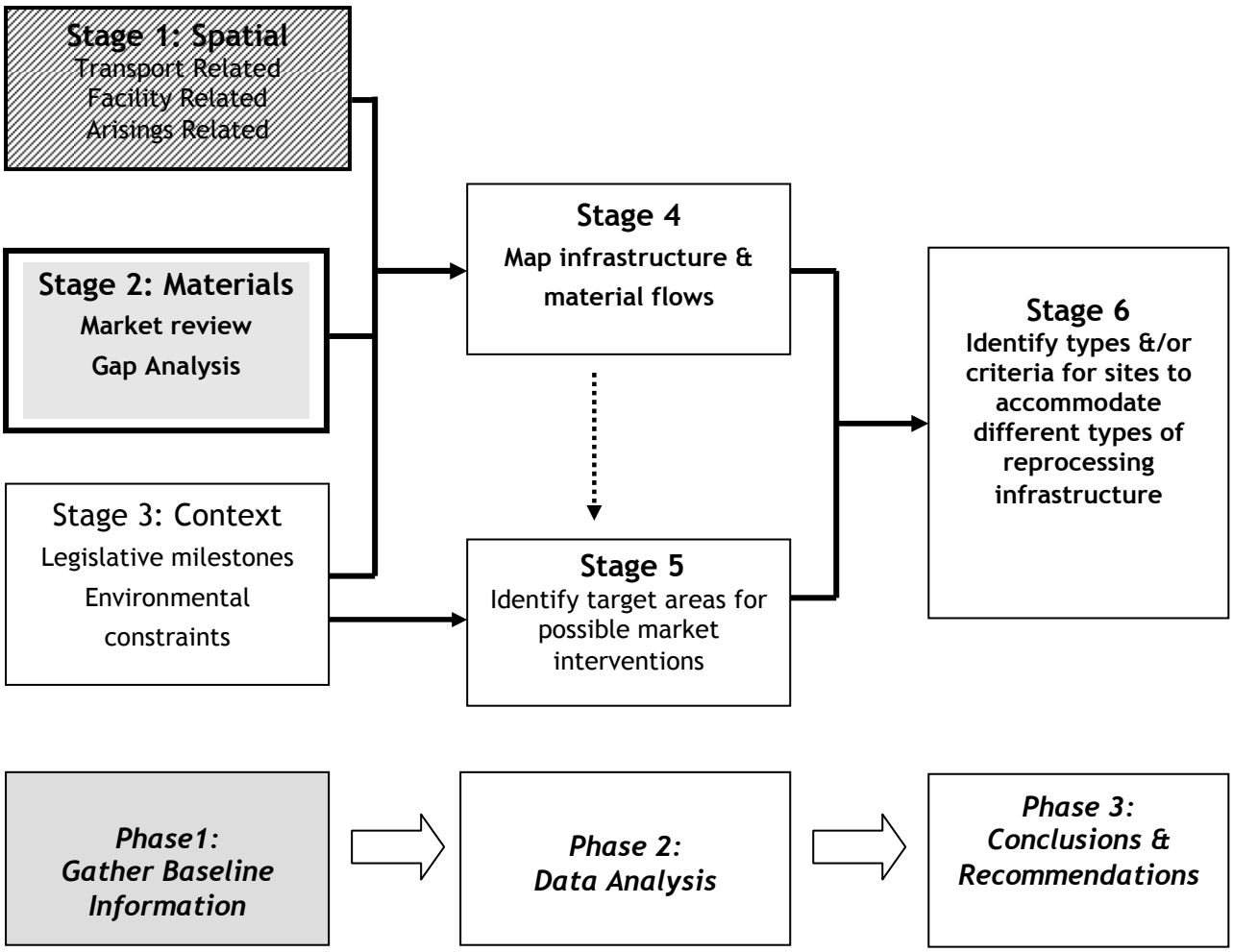
Introduction

The South East England Regional Development Agency commissioned Beyond Waste to undertake a scoping review of recycling and reprocessing capacity and associated infrastructure within the region. The key aim of the project is to assess current regional capacity for recycling and reprocessing, identify possible gaps and needs for future capacity within the region for the following materials:

1. Paper/Card
2. Glass
3. Plastic
4. Wood
5. WEEE
6. ELV
7. Tyres

Project Structure



This report summarises the findings of our work on Stage 2 of the project focussed on materials.

This draws on a survey of operators within the region undertaken during October and November 2005, the WMDG Vision Event held at the end of November 2005 and subsequent in depth discussions with sector players on a material by material basis. From this, seven detailed material sector profiles have been generated on which the summary report is based.

Methodology

We undertook a material-by-material analysis of the recycling and reprocessing sector within the South East region to establish baseline conditions of the second-life material supply chain. The term 'second-life' has been used throughout this project as the term 'secondary' might be construed to imply that such materials are subordinate to 'primary' materials.

This was based on an operator-by-operator telephone survey carried out over October and November 2005. Operators were identified through searches of:

1. The Environment Agency list of reprocessors accredited for the purposes of the packaging regulations
2. Interrogation of web based data sources listed in Table 1
3. Responses to a survey of local authorities which identified recyclers and reprocessors receiving materials from the MSW stream for onward recycling.

All operators with addresses located within the South East were identified. Listed operators were contacted by telephone. A telephone survey was undertaken of those operators who declared themselves to be operating as pre-processors, reprocessors or fabricators.

Operators identified through the local authority survey were surveyed regardless of whether the receiving facility was located within the South East so that flows of MSW sourced recyclables could be mapped.

Through this reprocessor and recycler profiles were compiled.[1] These profiles were then aggregated to develop a profile for the material sector. These profiles were then subject to peer review.

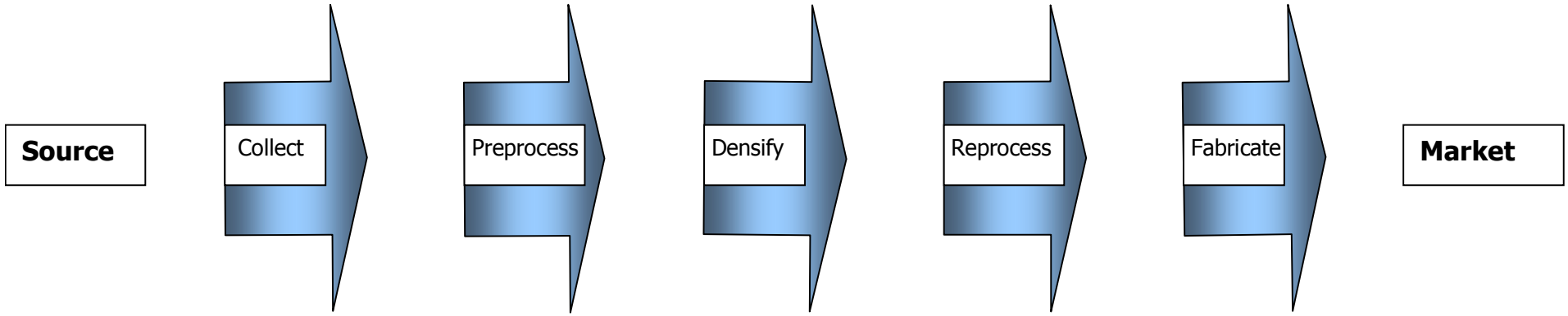
A generic model was developed to cover all points in the second-life material supply chain (see Figure 1). Operators were then classified against this. Where operators carried out reprocessing activities information on site size and plant capacity was also elicited so that footprints for different types of facilities could be developed.

1 Because of the commercial sensitivity of some of the information provided by individual companies during the course of the survey these company specific profiles have been retained by the consultant.

Source	Material Type	Format
Environment Agency Accredited Reprocessors	Packaging	http://www.environment-agency.gov.uk/business/444304/444641/136872/508243/?version=1&lang=_e
Project Integra Waste Exchange Directory	Various	http://www.integra.org.uk/wastedirectory/companies/companydetail36.html
Environment Agency Waste Minimisation & Recycling Directory	Various	http://www.environment-agency.gov.uk/commondata/acrobat/waste_recycling_directory_for_ha
WRAP Recycled Products Guide	Various	http://www.recycledproducts.org.uk/
Tyre Industry Council Responsible Recycler Scheme	Tyres	http://www.tyresafety.co.uk/
Letsrecycle.com	Various	http://www.letsrecycle.com/directory/index.jsp
The waste book	Various	http://www.recycle.mcmail.com/
Sustainlite scheme	Lamps (WEEE)	http://www.sustainalite.co.uk/accredited.html
WRAP Wood Project	Wood	Appendix
ICER Directory of Recyclers	WEEE recyclers and refurbishers	http://www.icer.org.uk/direct.htm
British Plastics Federation	Plastics Recyclers	Hard copy listing of membership
E Generation Recycling Directory	Various	http://www.egeneration.co.uk/centre/services/rb/search.asp?accepted=T&search_output=&recycle=T&wanted=T&rb_type_id=6&description=&rb_subtype_id=0&county_id=0&x=27&y=3
Applegate	Various	http://www.applegate.co.uk/indexes/products/all-r.htm
Confederation of Paper Industries Recovered Paper Member Directory	Paper	http://www.paper.org.uk/recoveredsector/members/southeast.htm
Corporate Environmental Advisory Centre	Various	http://www.ceac.co.uk/waste___recycling.html#Consultancy
Oxford Brookes Environmental Information Exchange	Various	http://www.brookes.ac.uk/eie/recycl.htm
ReMade Kent & Medway.Local Waste Recyclers/Reprocessors	Various	http://www.remade-kentmedway.co.uk/remade/docs/services/kent_profile.html#
SEEDA Directory of Environmental Industries in South East	Various	Pdf
DTI directory of companies involved in disposal and storage of refrigeration equipment	Fridge Recyclers	http://164.36.164.20/cgi-bin/wr/search.pl

Table 1:Data Sources Used to Identify Recyclers & Reprocessors in South East

Figure 1: Conceptual Supply Chain



Analytical Framework

A 5 stage model has been developed for the recycling chain as detailed above. This structure has been applied to each priority material to establish the size and distribution of capacity at each point in the chain. It is recognised that some routes combine steps in the chain. For example newspaper recycling to newsprint may go direct from Collection to Reprocessing & Fabrication.

South East Capacity Review
Stage 2: Materials Review
Cardboard Sector Profile

The Recycling Process

The cardboard fabrication stage is a two-stage process - the sheet feeder supplying corrugated cardboard material (CCM) and a sheet plant converting CCM into boxes. These stages may be carried out in a single integrated plant or in two separate plants, as is the case for Smurfit/Kappa. The vertical integration of the businesses guarantees supply to the mills but all companies trade raw materials and manufactured CCM outside of business boundaries where logistics make it beneficial. There is some export of surplus but this generally occurs where materials is collected outside the region.

Collect	Densify/Bulk	Preprocess	Reprocess	Fabricate	Market
Corrugated Packaging from C&I	Baling	Pulp & Clean	Corrugated Case Materials Production (CCM)	Corrugated Board (sheet feeder) to Boxes (sheet plant)	Display & Transit Packaging

Table 2: Steps in the Second life Cardboard Supply Chain

Capacity Review

Within the South East there are 3 major integrated operators:

- SCA Group
- Smurfit/Kappa[2]
- Severnside

These companies all operate collection systems, depots and mills.

	Source	Mills	Mill Capacity[3]	Product
SCA Group	SCA Recycling	SCA New Hythe	250,000 tpa	Corrugated Sheet
Smurfit		Snodland	250,000 tpa	Corrugated Sheet
Severnside	Severnside Recycling	St Regis Taplow[4] St Regis Kemsley	90,000 tpa 500,000 tpa	Corrugated Sheet & Specialist Products
Cardboard		**Total Capacity**	**1.09 million tpa**	

Table 3: Regional Cardboard Reprocessing Capacity (2005)

[2] Smurfit merged with Kappa during the course of this project.
[3] Mill outputs roughly corresponds to a total recycled input of a combination of cardboard (OCC) and mixed paper – the vast majority of this is sourced from the commercial sector.
[4] This plant is reported to be in the process of closure.

Supply of corrugated board and boxes is generally relatively local to the point of production due to moderately high transport costs for a low-density product. It has been estimated that about 90% of material feed to the mills is sourced from commercial and industrial streams. There is some competition for lower grade mixed paper (News & PAMS) but the price offered by newsprint mills is generally higher.

SCA Group, Smurfit/Kappa and Severnside (via its parent company D S Smith) have established capacity to convert the cardboard mill output into final product to achieve the total integration of the supply chain as follows:

	Collect & Densify	**Reprocess**	**Fabricate**	**Market**
SCA Group	Basingstoke Newhaven Portsmouth Charlton (Kent)	Larkfield, Aylesford Kent	Aylesford plant Thatcham, Berks	Display & Transit Packaging for South East. [5]
Smurfit	Marchwood Snodland	Snodland	Whitney Oxon Gosport. Hants	Display & Transit Packaging
Severnside	Taplow Gosport Ashford	St Regis Taplow St Regis Kemsley	Sheerness Kent Larkfield Kent Andover Hants	Display & Transit Packaging

Table 4: Regional Locations of Supply Chain Facilities

The distribution of facilities in the chain suggests the flows of materials shown in Map 1 overleaf.

Production Prospects

Mill closures across the UK are consolidating the position of the region as the focal point for cardboard reprocessing. *However during the life of this project the closure of the Taplow mill has been announced.* Since the board mills are the overwhelming outlet for recovered card the long-term security of this outlet relies on the health of the sector. Appendix 1 gives an outline SWOT analysis drawn from industry sources.

[5] Main market sectors are agrochemicals, beverages, retail (food), plastics and paper industries and merchants / distributors

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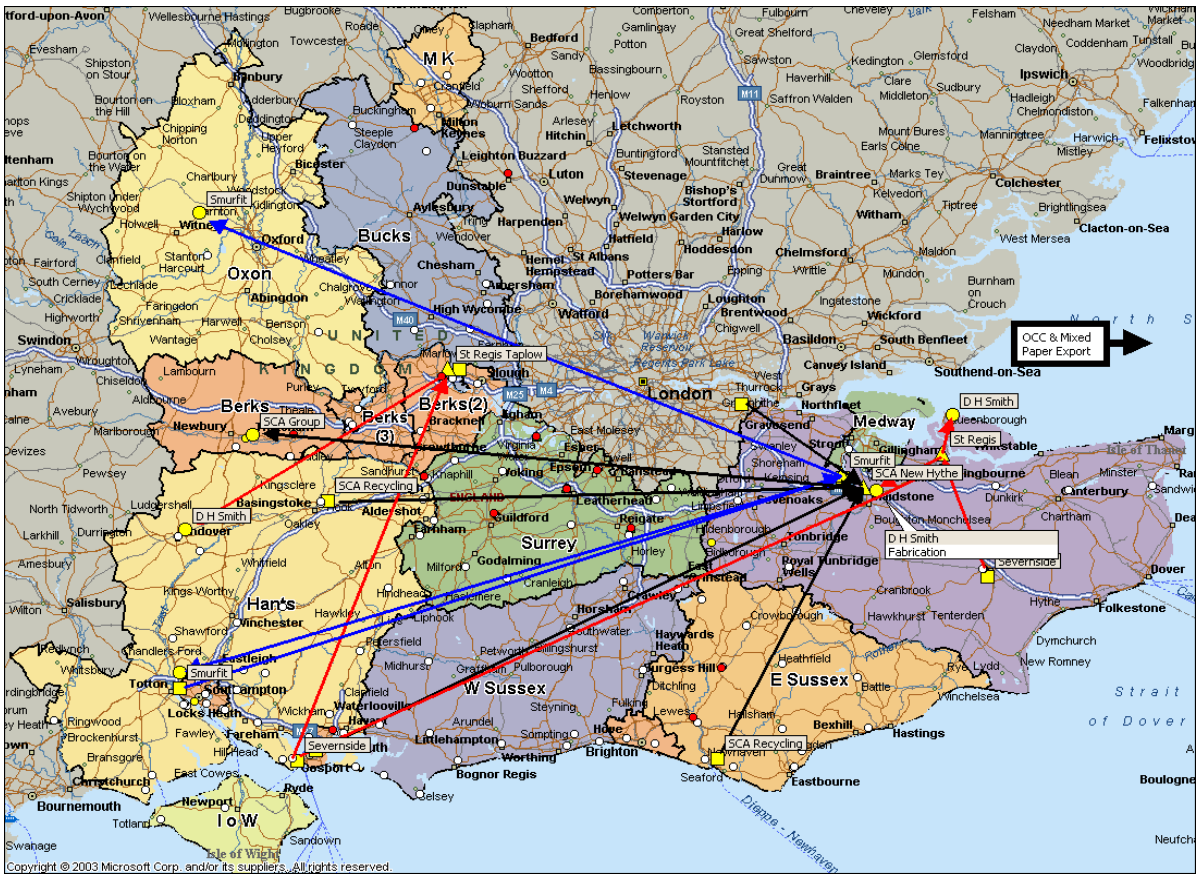


Map 1: Notional Cardboard Flows

Paper Sector Profile

The Recycling Process

Collect	Densify/Bulk	Preprocess	Reprocess	Fabricate	Market
Newspapers & PAMS from MSW	Direct delivery or bring banks	Pulp & Clean	Deink	Newsprint	Newspaper Printing
Office Paper from C&I	Baling	Pulp & Clean	Deink	Office Paper	Wholesale & retail outlets

Table 5: Steps in the Second life Paper Supply Chain

Capacity Review

Within the South East there are 2 major integrated operators:

- Aylesford Newsprint
- MReal

These companies source their material via direct collection & third party supply.

Aylesford Newsprint papermaking site is 60 acres and has facilities for raw materials storage, pulping, paper making and automated dispatch. There is also waste fired CHP as well as a railway siding and railway loading facilities. It actively promotes itself as a supplier of newsprint to anywhere in Northern Europe being connected to the continent by "an integrated distribution network of road, rail and sea and The Channel Tunnel is only 35 miles"[6].

Aylesford Newsprint is 50% owned by SCA Forest Products and 50% owned by Mondi. Aylesford sources its raw material from direct collection schemes to local authorities (less than 10% of input) and by purchasing paper from third parties including SCA Recycling. Despite sharing part parentage with SCA Recycling there is no preferential arrangement for mill supply from SCA Recycling. Over 80% of input is sourced through long-term contracts in the municipal sector.

[6] Sales & Marketing Report http://www.aylesford-newsprint.co.uk/ReportFiles/sales_and_marketing.pdf

Production Prospects

Aylesford Newsprint has a positive desire to expand capacity at the Aylesford site and was an unsuccessful bidder for the WRAP support that went to Shotton Paper. It is now waiting for capacity pressure to build in the market to create sufficient demand for further capacity. A critical factor in this investment is the ability to secure supply of fibre to utilise in the mill. The material is largely sourced from the municipal waste stream although the magazines used as a source of high quality fibre are sourced largely from the print works surplus and rejects.

	Source	**Mills**	**Mill Capacity**[7]	**Product**
Aylesford Newsprint	Direct Collection & Third Party Supply (80%+) MSW	Aylesford	500,000 tpa[8]	Newsprint
News & PAMS			**500,000tpa**	

Table 6: Regional Newspaper Reprocessing Capacity (2005)

M Real operates a mill at Sittingbourne that produces office paper with 100% recovered content the vast majority of which is sourced from post consumer higher quality office paper via a dedicated recycled fibre plant. This is largely serving the commercial market.

	Source	**Mills**	**Mill Capacity**[9]	**Product**
M Real	Direct Collection & Third Party Supply – 90% C&I	New Thames Kemsley	180,000tpa	Evolve Office Paper
Office Paper		**Total Capacity**	**180,000 tpa**	

Table 7: Regional Paper Reprocessing Capacity (2005)

Our survey did not reveal the presence of any significant alternative users for recovered paper operating within the region.

[7] Mill output roughly corresponds to a total recycled input of post-consumer newspapers and magazines- the vast majority of this is sourced from the municipal sector.
[8] Aylesford Newsprint is one of three newsprint mills in the UK, which currently consume around 1.3 million tonnes per year of post-consumer newspapers and magazines.
[9] Mill output roughly corresponds to a total recycled input of mixed paper – the vast majority of this is sourced from the commercial sector.

Glass Sector Profile

Source

The South East region is a major source of glass due to the large number of consumers.

The focus for collection has been on container glass. Bottle bank systems are considered to be 'excellent' as they provide colour-sorted glass. Mixed glass from kerbside collection can be sorted but this is seen as less efficient because it adds costs and it is difficult to segregate the colours once mixed.

Berrymans provide bins for off cuts and broken plate glass. Plate glass is not sourced from the domestic stream e.g. CA sites as it poses a significant health and safety risk to anyone carrying out sorting. Other more 'exotic' sources include glass from End of Life Vehicles and CRTs.

The UK Glass Imbalance

Clear (flint) glass represents 70% of UK production but much is exported (as containers of export product e.g. whiskey, gin and jam) and is not available to reclaim from the UK waste stream. Thus the imperative is to maximise reclamation from UK stream of remaining clear glass if recycled cullet input to furnaces is to be maintained. Currently only 30% of all the colours recovered is clear glass. The growing practice of co-mingled collection with glass being sorted at the MRF is leading to contamination across colours rendering the recovered glass only suitable for either green glass production or second-life aggregates.

Green glass production represents just 15% of UK production, but wine producing parts of the world sell us their wine in green glass. So much so, that 60% of the glass recovered is green. The UK furnaces are technically full. It is reported that the market for export of the green back to the continent is flourishing.

Supermarkets are being encouraged by WRAP to consider reducing imports of green glass bottles by bulk importation of wine and bottling in the UK.[10] In doing so they will not only contribute towards the Courtauld Commitment

[10] This is reported as supporting an increase in UK green glass production at Quinn's works in the North West. Letsrecycle.com

target of stabilising packaging waste production but also substantially reduce CO2 emission associated with long distance transport. It is believed that more than 300 million litres of wine is already transported in this way. The opportunity to increase this is substantial and New World producers are taking a close interest due to sensitisation with the 'food miles' debate. [11]

UK amber glass represents the other 15% of production and 10% of collections. UK furnaces are finding it hard to source amber glass from UK glass stream and O-I imports cullet. Lewis & Towers, (now closed) was primarily supplied by Industrial Reclamation in Faversham.

Mixed collected glass is only suitable for use in a furnace producing green glass (maximum 10% of mixed glass can be used due to furnace chemistry & colour considerations) unless it can be colour sorted to recover the flint and amber. To be colour sorted it has to be above 15mm in size so careful collection is essential. Co-mingling with other materials generally produces a glass crushed and heavily contaminated. The destination of mixed glass collected in the South East follows the market. Choices are:

- to export direct;
- colour sort for UK use;
- colour sort, clean and export; or
- use for alternative applications such as aggregate production.

Residue from colour sorting i.e. glass which is too fine to be sorted, can be used as an abrasive in cleaning as can all cullet (if sufficiently purified).

Densifiers

The OFT identified four main companies which sort and clean collected bottles ready for manufacturing new glass products in the UK: Reuse (Collections) Ltd trading as Berryman; Biffa operates a cleaning plant dealing with around 100,000 tonnes of glass each year; Glass Recycling (UK), which deals solely with P L M Redfearn but does not operate in the South East; and Industrial Reclamation Ltd a small collector and preprocessor in Kent.

The principal collectors of glass operating within the South East are:

1. Berryman. Berryman supplies Reuse. Berryman collect three colours of glass, kerbside mixed glass, plate glass into a depot in Dagenham. From

[11] G Roberts (Hillebrand); P Roberts (Corby Bottlers plc) (Pers Comm)

there it is primarily used in UK or European bottle manufacture, with some poor quality going to aggregates

2. Biffa. Biffa processes glass purchased by O-I (formerly United Glass) in Harlow, Essex. O-I purchases glass from local authorities and private sector collectors across the South East (as far as Rugby and the South West).

3. Industrial Reclamation. Industrial Reclamation supplied the Lewis and Towers furnace in Edenbridge. They process glass from local authorities, businesses and individuals, mainly from South East – focusing on Kent, Surrey, Essex, and London areas. Handles approximately 25,000 tonnes annually.

Preprocessors

Industrial Reclamation is a pre-processor crushing and cleaning glass to supply both the furnace market and the second-life aggregates market.

Recresco (aka Midland Glass Recycling) has a facility on Southampton docks[12] that colour sorts mixed glass using optical recognition technology at a rate of up to 40 tonnes an hour. The plant processes around 40,000 tonnes of glass each year most of which arises from authorities in the South East (Hampshire (24ktpa), Bucks (10ktpa), Surrey and Dorset (10ktpa)[13]). There is potential to extend to 24 hour working which would allow up to 100,000 tonnes of glass to be processed.

The port location of the facility gives access to coastal shipping to serve glass producers in UK coast locations with facilities in Londonderry, Ayr and Jarrow as well as Goole (Yorkshire) and overseas markets (green glass only). Recresco reports that currently export of glass from this site is minimal.

Recresco is also an accredited reprocessor and deploys a mobile crusher to process rejects (circa 10,000 tpa) at the Tarmac site (Berks) to supply the second-life aggregates market. This activity encompasses densification through to fabrication in a single operation. However it regards this as an option of last resort.[14]

[12] The facility built with the support of a £800,000 freight facilities grant.
[13] This selection of suppliers suggests a 90-minute drivetime isochrone.
[14] Tim Gent pers com

Reprocessors/Fabricators

There are only seven reprocessor/fabricators in the UK, three of which (P L M Redfearn, O-I (Ohio-Illinois Glass formerly known as United Glass), and Rockware) currently reprocess about 90% of the UK's cullet.

Lewis and Towers was the only remelt furnace within the South East. It took primarily amber glass from Industrial Reclamation (2,500 tpa) but closed during the course of the project.

The two principal outlets for glass cullet identified in our survey are as follows:

O-I in Harlow is the most proximate major glass user to the region. It also owns a processing plant adjacent to the Harlow furnaces, that is operated by Biffa. They run three furnaces; clear, brown and green. The green furnace serves the national market and is technically full and their green surpluses are traded in the industry. The other colours are still required, but increasingly difficult to find as more councils switch to co-mingled collection. For instance it is reported that amber glass is being imported from Canada and Netherlands to keep the furnace running at capacity. At the same time, in Harlow District Council, amber glass goes to roadfill in their mixed colour collections.

Rockware via Berryman. Reuse Ltd. is the operator of the glass pre-processing plant and Rockware is the bottle maker (fabricator). In Yorkshire, Reuse Ltd runs 1 x colour sort plant (200,000 tonnes p.a. capacity) and 2 x Glass processing plants (200,000 tpa each) to prepare the glass for Rockware's furnaces. Processing plants are built next to the furnaces they serve. Processing residues, generally glass too small to colour separate, go to second-life aggregates from the W Yorkshire colour sort plant.

Collect	Densify/Bulk	Preprocess	Reprocess	Fabricate	Market
Berryman		Reuse		Rockware	
Berryman Councils & Others	Dagenham Depot	Colour Sort Plant	Cleaning Plant	Bottle making	Bottling Plant & Packer/ fillers

Figure 2: Example Second-life Glass Supply Chain

Glass furnaces are generally located in the North of England and the small works that manufactured amber glass containers in Kent is now closed.

A small user of recycled glass to produce high value product – Eight Inch – has recently relocated from London to East Sussex. Eight Inch produces a worksurface that consists of 85% recycled bottle glass. The glass is currently supplied from Yorkshire at a cost of £300-400 per tonne. Last year the company used about 10 tonnes but with major media exposure (it is promoted by WRAP via the recycled kitchen concept) and proper support could expand production considerably.

Market

WRAP has been working to develop sustainable markets for glass and markets now completing the development stage include:

- Second-life Aggregates: All of these applications have the potential to be high volume, low cost local markets offering lower transport costs. The principal growth area for this application in the region is in asphalt production.
- Shot blast abrasives: Glass grit as a substitute for abrasives such as sand or copper slag. 'TruGrit' is a product manufactured by a Dorset based company 'Krysteline' from coloured glass at plants in Ireland and Belfast. (Plants were built with assistance from regional development funds). Approximately 15,000tpa of this material is supplied to the UK and other markets.
- Water Filtration: Glass sand has the potential to replace silica sand.
- Decorative Applications: This market tends to require clean and colour separated glass. The glass requirement is relatively small and most products tend to be high value due to labour intensive manufacturing processes. This market was reported as being stagnant or even declining due to lack of sustained outlets.
- Fibreglass production: The manufacturers of insulation fibre have traditionally used flat glass cullet as it contains fewer contaminants. We were unable to establish if any capacity exists within the region.

Survey of Second-life Glass Supply Chain in the South East

Within the South East there are 5 operators identified as large[15] accredited reprocessors of glass as follows:

Operator	Activity	Location	Tonnage per annum	Source	Usage	Future Prospects
~~Lewis & Towers Limited~~	~~Glass bottle manufacture~~	~~Edenbridge Kent~~	~~2,500~~	~~Industrial Reclamation (Faversham)~~	~~Takes all amber cullet plus 30% green and Berryman (Yorkshire)~~	~~Could increase amber if available but under threat of closure~~
Tarmac Limited	Glass as aggregate	Newbury Berks	7,000	Recresco who supply mobile crusher	Mixed colour/ rejects	Majority supplied to asphalt plants (W Sussex, Middx & Dorset.) Aim to increase significantly 2006 volume through expansion of glass recycling to other sites.
Recresco Limited	Glass cullet for export & glass for bottles and glass as aggregate	Soton	40,000	Hampshire (24ktpa), Bucks (10ktpa), Surrey & Dorset (10ktpa). Also Devon & Herts	Process bottle glass into refined glass cullet. Port location allows access to both overseas markets (green glass only) and coastal shipping to serve glass producers in UK coastal locations.	There is potential to extend to 24 hour working which would allow up to 100,000 tonnes of glass to be processed.
Jackson Civil Engineering	User of glass mixed with IBM	Gerrards Cross Bucks	n/a	Hanson/Onyx Rainham	n/a	n/a
RMC Materials Limited	Glass as aggregate	Dagenham	500	Bottles from Berrymans.	Crush glass, mix with primary aggregate. 10-15% per product	Low market penetration. Closure of Robertsbridge site and transfer to Dagenham. Sporadic demand - 3,000 tonne stockpiles - low demand market.
Total			**47,500**			

Table 8: Activities of Accredited Glass Reprocessors in the South East

[15] The Environment Agency Listing of Reprocessors Accredited under the Packaging Regulations identifies large as being in excess of 400 tonnes.

In addition to these reprocessors there are a number of other significant reprocessors and collectors active within the region.

Operator	Activity	Location	Tonnage per annum	Source	Usage	Future Prospects
Berryman	Glass Collection	Dagenham	250,000[16]	Local authority bottle banks & kerbside Commercial glass. Plate glass manufacturers	To Yorkshire for processing and use by bottle makers in UK and Europe. Direct export Aggregates	Plans to build colour sort and cleaning plant when economics make it sensible.
Industrial Reclamation	Process & supply to furnaces	Faversham	20,000	Local Authority collections	Collect glass, crush and screen supplying cullet to furnace	No plans to expand
The British Glass Recycling Company	Bulk purchase only.	Harlow Essex	100,000[17]	Local authorities, waste management companies, retailers, food and drinks companies, other bodies involved in the collection of glass packaging.	Supplies O-I Works beer bottle plant at Harlow that supplies bottles to major brand owners such as Scottish Courage, Guinness, Anheuser Busch, Interbrew and Coors.	In addition to the steady demand from UG, also supply other container manufacturers. UG invested over £1.2 million of PRN funds in an upgrade of cullet cleaning plant in Scotland
Possible New Entrants						
~~*FM Conway Ltd*~~	~~*Glass in concrete blocks*~~	~~*Dartford*~~	~~*11,500*~~[18]	~~*Mixed container glass is sourced from local authorities around the UK, and crushed and screened*~~	~~*Larger grades used in road construction, the smaller sizes are used in concrete applications, either for CCP's products or sold for use in ready mixed concrete.*~~	~~*Plans to increase glass throughput to around 25,000 tonnes/year once product approval under British Standards has been achieved*~~
Day Aggregates	*Glass as aggregate*	*No current recycling sites in SE*	*40,000*	*This is in addition to W London site so definitely South East source.*		*Looking at site at Reading (Beenham Grundon) to produce foamed glass. WRAP insufficient funds.*
Total			***410,000***			

Table 9: Activities of Other Players in Regional Second life Glass Supply Chain

[16] Source : WRAP Market Review 2003
[17] Source : WRAP Market Review 2003
[18] Source: WRAP Market Review 2003. FM Conway has withdrawn from developing this outlet and has sold its block making site.

Capacity Review

Operator	Collect	Reprocess	Fabricate	Market
~~Lewis & Towers Limited~~		~~X~~	~~X~~	~~Filler~~
Tarmac Limited		x	X	Asphalt Plant
Recresco Limited	x	x	X	Export, Furnace & Tarmac
Jackson Civil Engineering		x	X	Road Builders
RMC Materials Limited		x	X	Road Builders
Berryman	x			Fillers
Industrial Reclamation		x		Bottle Furnace
Day Aggregates		x	X	Construction
Biffa	x	x		Bottle Furnace

Table 10: Overview of Regional Capacity

Production Prospects

The UK glass packaging market has experienced a 3.5% decline during the first six months of 2005 due to a decrease in demand from UK and overseas manufacturers. In addition we are seeing the continuation of a trend, which has emerged over the last 10 years, towards increased consolidation of the major players in the UK glass industry. This has led to uncertainty for some of the industry's larger customers who have previously had a choice of two suppliers for their high volume orders but now may only have one following the latest consolidation. Quinn Glass is also entering the arena with additional capacity targeted at high volume drinks customers who can take advantage of its filling and warehousing facilities. *Lewis & Towers the only glass furnace operating in the region closed during the life of this project*.

Plastic Sector Profile

An example of the second-life plastic supply chain (for film polypropylene) is shown below:

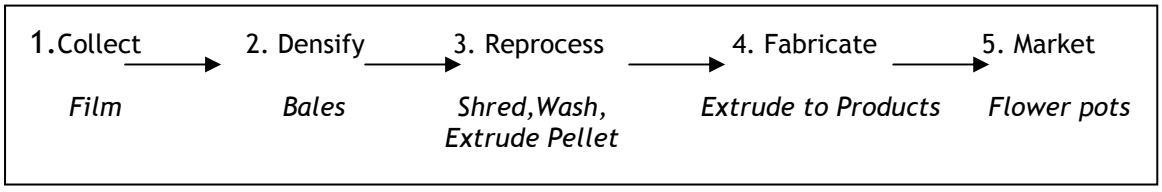


Figure 3 : Example Second-life Plastics Supply Chain

Plastic packaging represents up to 50% of total plastic used. It is generated both by commercial outlets (plastic film wrap and crates, used for transit packaging) and by households (although, since film wrap may be contaminated by food, only rigid containers are recycled). While the

recycling of packaging film and crates from commercial sources is comparatively easy, and the UK has excelled at this through its Packaging Directive compliance scheme it is more challenging to produce high-quality recyclate from domestic waste.

Collection/Preprocess/Densification

Sorting

A major issue surrounding the reprocessing of plastic is contamination arising from the presence of non-plastic materials or due to the mixing of various plastic polymers. Manual and automatic sorting systems are available. However this often proves to be labour intensive, costly and time consuming and can produce variable results. Alternatively mixed plastic can be sold for reprocessing to make lower grade products. The latter may be the only option with certain plastic e.g. sourced from the WEEE stream or where PET bottles have PVC sleeves.

Once the polymers have been sorted into their various types, if they are to be used as feedstock for anything other than low-grade material they are put through a washline. This is an expensive process and can represent the limiting factor to increasing plastics recycling capacity.

PVC

Currently most PVC recycling is carried out during manufacturing or processing new products, where 95% of production waste and offcuts are recycled. The PVC industry has now established a European wide project funded by Vinyl 2010, formed to demonstrate commitment to sustainable development known as the 'Recovinyl scheme'. This scheme targets the more complex post-consumer waste market, for example when properties are refurbished and existing PVC windows or plastic gutters are discarded. Recovinyl provides financial incentives to support the collection of PVC waste from the construction and demolition sectors. It subsidises those who collect and send PVC waste to accredited waste recovery companies and recyclers. Subsidies - incentive payments - encourage the recycling of PVC products on an industrial scale by making up for the higher cost of recycling. The scheme is designed to compensate waste collectors and recovery operators for additional costs incurred in the process of sorting and transporting separated PVC waste for recycling back in production. It aims to establish a network of accredited recyclers across the UK.

Currently within the South East the following companies are accredited recyclers and hence receive subsidies under the scheme:

- Cylinder Plastics in Faversham Kent,
- Associated Polymers in Hampshire,
- RPCS in Newbury Berkshire.

These companies collect, sort and regrind post consumer PVC and supply the granulate back to manufactures within and outside the region. Other companies in the scheme offer collection services within the South East to process outside. The administrators of the scheme are keen to promote new entrants but it is proving difficult to recruit companies. The companies will link in with existing recycling infrastructure such as transfer stations where separate bins will be provided to collect PVC products. Around 1,500 tonnes per annum are being recycled through the scheme but this is expected to grow with the increase in replacement windows from housing stock.

Expanded Polystyrene (EPS)

This is another material sector that is establishing dedicated collection arrangements. The British Plastic Federation's EPS Packaging Group estimates that 6,000 tonnes of used EPS packaging was recycled in 2004. This equals 26% of EPS packaging produced in the UK in 2004. This already exceeds the Packaging Directive targets for 2008.

This has been achieved through a combination of take-back schemes with a number of electrical retailers and the food packaging sector[19]. These usually involve the supplier taking back the EPS packaging from the customer, compacting the material at central depots and selling it on to a preprocessor where it is processed into a bead that can be used in a variety of new applications. The recycled EPS is fabricated into a range of products including replacement 'hardwood' lumber, simulated slate tiles, picture frames, coat hangers, disposable cameras, plant pots, videos, tape cassettes and loose fill packaging.

There is a strong demand for EPS from UK recyclers and there are opportunities to increase supply by encouraging food retailers to return EPS packaging (such as fish boxes). The recovery of EPS in this way carries great financial incentives for producers. Collectively Panasonic, Sanyo, Sony and Honda saved more than £500,000 per year in landfill and transport costs through recovery and recycling of the used EPS (EPS Group 1997).

[19] Retailers and suppliers such as Thorn Rentals, Granada, Epson and Dixons Group operate EPS recycling programmes.

The EPS Recycling Group[20] has undertaken initial work to evaluate recycling of expanded polystyrene (EPS) from household sources. Markets exist for post consumer EPS if collected to recyclers' specifications but to date such schemes have not proved viable due to collection limitations. A number of EPS Packaging Group members have set up one, or more, local recycling points to collect post-consumer EPS on their own manufacturing sites. They are inviting Local Authorities to participate with members offering collection and recycling services free of charge.

Reprocessing

The recycling of plastic is generally achieved using mechanical processes such as shredding, grinding and pressing plastic into granules that are subsequently used, often with virgin resin, to produce the same, similar or different products to the original. Hence the principal reprocessing route is through established manufacturing industry.

Primary recycling refers to the reprocessing of waste plastic generated from the manufacturing processes such as resin production or moulding. This pre-consumer material is then mixed with virgin material and reused in the manufacturing process. The recycling rate for this type of plastic is estimated to be 95% in the UK.

Secondary recycling refers to post consumer plastic, collected where one or more polymers are present. Post consumer plastics are often contaminated making sorting a complex and expensive process. Most of the recycling activity identified through our survey originated from this.

Feedstock recycling (or Plastics Cracking) describes an alternative approach whereby plastics are broken down to form short chain hydrocarbons. These can be used as the building blocks for new polymers or other petrochemical products. Thermal cracking is used to break the plastics into smaller chemicals for use as a feedstock in refineries for the production of chemicals or even new plastics. The plant can tolerate mixed plastics and contaminants and can therefore reduce collection and sorting costs. This approach offers the possibility of very large-scale plastics reprocessing with strong synergies with petrochemical production, leading to clear benefits from regional nodes or specialisation in areas with significant petrochemical clusters.[21]

[20] The EPS Packaging Group, which represents 85 per cent of the EPS packaging industry in the UK, sponsors a communications campaign to raise awareness of the recyclability of EPS and it provides advice and support to any business that is looking to set up a recycling scheme. http://www.eps.co.uk/

[21] Scottish Plastics and Rubber Association. *Polymer Cracking*. 2000.

Plastics reprocessing in the UK is a fragmented business, made up of over 100 separate firms. The diverse nature of plastics and its applications makes it difficult to give an accurate assessment of capacity for the total stream. Capacity suited to one type of plastic may be suited to others but not all. For example industrial reprocessors of polystyrene may also accept polythene film for preprocessing.

Fabrication

Two constraints limit the range of possible end products from recycled material:

1. Colour contamination - coupled with the high cost of adding new colour - means that products are drab;
2. The possibility of contamination means that applications of recycled plastics are limited.

At present, plastic recyclate is used to make a wide range of relatively low value products including refuse sacks, drainage pipes, flower pots, fibre filling, garden and street furniture, and substitute wood products. Generally the material cannot be employed in the food and drinks industries - the sectors that account for the bulk of virgin plastic packaging. WRAP is supporting trials by M&S and Boots to use recycled PET in food packaging.

It has not been possible within the scope of this project to establish if manufacturing capacity exists in the region. However one fabricator of street furniture from second-life plastic and one fabricator of can crushers was identified.

South East Capacity Review
Stage 2: Materials Review

Types of Plastic	Source	Applications as recyclate	Fabrication Outlets	Prospects
PET (Polyethylene Terephalate)	Bottles	Fibre fill for jackets & pillows, fleece jackets, pallets, back into bottles.	Research for London ReMade found that most recovered PET in the UK is used to make fibre for the textile and carpet industry as well as being used in some non-woven applications.	London ReMade is working with Visy Closed Loop on plans for 36,000 tonnes plastic bottle plant in Dagenham. The initial plan is to source from London and the South-East, The recovered PET material - taken from soft drinks bottles - will be used to produce food packaging. Currently around 15,000 tonnes of PET/HDPE bottles are collected by local authorities within the region.
HDPE (High Density Polyethylene)	Bottles,	Crates & general mouldings, wood polymer composite products, pipes & ducting water butts & compost bins, car windscreen washer bottles		WRAP capital support up to 30% of the cost of HDPE plastic bottle reprocessing plant for up to 13,000 tonnes of each year. The bidding process for WRAP's tender closed at the end of August. Contracts could be agreed by Christmas.
LDPE (low Density Polyethylene)	Packaging & Cling Film	Wood polymer composite products, damp-proof membranes packaging film traffic cones	Bpi are the major producer of products drawn from these materials and operates a national collection network.	
Polystyrene	Packaging	Wood polymer composite products, remanufacture for packaging applications.	Centriforce in Liverpool is the major supplier of "Stokbord" which has global demand for applications like street furniture and bridge walkways. These products include decking and landscape products, containers and other joinery products	The company wants to expand its extruded plastics operation, but has had trouble getting hold of enough waste plastic. It has suggested that the key element to strengthen in UK is the collection and densification infrastructure so reliable supply can be sourced by existing reprocessors.
PVC	Cable Scrap, Window frames	Road cone bases, Conduit & ducting, UPVC window frames.	UPV window manufacture.	Recovinyl scheme should increase quantities collected.
Mixed Plastic	ELV, WEEE	Export markets		Axion Recycling has registered its interest in building a reprocessing plant for polymers from WEEE and ELV within the South East region. It is currently building a recycling plant in the North West. They would like to work with LAs to increase WEEE collections to build up a critical mass of supply.

Table 11: Select Plastic Applications & Prospects

Survey of the Second-Life Plastics Supply Chain in the South East

The industry is characterised as being much less mature than for other material streams where vertical integration across functions have occurred with diverse range of players. This may be partly due to the limited participation of producers in the recycling loop. Combination of:

1. Industrial pre-processors and reprocessors that utilise their own post production scrap and have opened the facility to other producers to save on virgin inputs. Mainly around polystyrene.
2. Commercial processors
3. Collectors & Merchants.

Operator	Activity	Location	Tonnage per annum	Source	Usage	Future Prospects
FABRICATORS						
Vencel Resil Limited	Collect, preprocess, densify, reprocess, fabricate expanded polystyrene products.	Belvedere Kent (just outside region)	200 EPS	Collecting from Kent, Essex, Sussex, Hants - whole SE Also internal arisings.	Industrial sources only. Accredited Reprocessor Invest PRN revenue back into compliance for group own arisings	Shortage of polystyrene for 'rework' due to contraction of industrial base. Under-utilised capacity. Could take 500 tpa. Talking to LAs and Cleanaway
Hampshire Insulation Products	Preprocess, densify, reprocess and fabricate polystyrene. Preprocess, densify and sell on polythene sheet.	Winchester Hants	50 polythene 20 EPS	Compactor and chipper acquired for own process waste. Hampshire catchment.	Accept polystyrene for fabrication of insulation. Accept polythene sheet for onward UPVc fabrication.	50 tonnes capacity for polystyrene if commercially attractive but storage space limitation
Earth Anchors Ltd	Cut and assemble street scene	CROYDON, Surrey (just outside region)	n/a	Waste-derived plastic composite materials from Scotland BPI	Supplies street scene furniture etc, Mainly LA market - contracts with some LAs. Supply nationwide	

PlasCan Limited	Make plastic injection moulds and manufacture plascan. Can and bottle crusher made from recycled plastic	DARTFORD, Kent (just outside region)	13 tonnes of clean pellet for 100,000 crushers.	Extruded pellets. Problem of consistency of recycled polypropylene - only use 2/3 ratio.		
			270 (n4)			
PRE PROCESSORS						
Associated Polymer Resources	Collection and preprocessing of plastics to produce granules& pellets	Soton	25,000	Industrial sources primarily but do take PET bottles.	Re-use within the plastics industry	Member of Recovinyl scheme. Looking to relocate and expand.
Bayliss Recycling	Taking in mixed cans and plastics pick HDPE - flaking washing and drying	Langley, Slough	HDPE 1500 PET 2000	Mainly supplied by Local Auths - S Bucks , Wycombe, Banstead	Supply HDPE to Centriforce for direct remanufacturing. PET is baled for onward processing	
G.H. Services – Recycling	Granulate plastics - polyprop and styrene	Hilsea Portsmouth	240	mainly C&I – from car manufacturer	Goes for reprocessing	
Rubber And Plastic Collection Services (RPCS)	Manual sort, shred and granulate	Newbury Berkshire	10,000	Collect solid plastics and film - UK wide. Buy in from EU - Germany, 70% export to Europe supplied as general plastic product.	Post industrial scrap only at present 3 granulators and 2 shredders.	Member of Recovinyl scheme so will be extending into post consumer PVC collection.
MDJ Lights	Process PET bottles and WEEE plastics	Lewes E Sussex	750	Take PET bottles from LAs and flake via Daventry plant		Intend to install granulation plant at E Sussex site given long-term contract.
Cylinder Plastics	Collect & process PVC, PPP, PE and PET by washing, granulation and	Faversham	8,000	Collect from Portsmouth, Bristol, Birmingham, Norwich, Lincoln	Looking to supply UK markets via closed loop but limited capacity. Most exported to Europe and some to Far East.	Member of Recovinyl scheme. Diversifying and installing new washing and granulation equipment. Looking to relocate secured support

	pulverisation					on grant from Business Link Kent.
			47,490 (n6)			
In house recyclers						
Styropack (UK) Ltd	In house recycling onsite.	Ford W. Sussex				
Linpac Moulded Foams	Fabricate from material supplied by own reprocessing plant Scunthorpe.	Chichester W. Sussex		Return own waste to Scunthorpe	Closed loop only	
COLLECTORS						
Materials Recovery Ltd:	Collector and Exporter of all forms of plastics washing, flaking through partners			No facilities in SE - collect from SE - LAs and Commercial - 50:50 Somerfield, HVM Humber (nursery) Geest	Film is recycled in UK market some export Far East - HDPE, PET etc 15% of 35,000 tpa. 3k tpa Skegness 6-10 k exports UK market for Rigid Plastics 4k	
Bestway Recycling	Polythene is sorted and baled at the depot in preparation for recycling into various second-life products.	Upchurch Kent,	3,600	collects waste polythene throughout then UK	Contaminated waste export - supermarket waste and mixtures. Supply recyclers - bpi. No MSW,	Looking in Kent - Gillingham - 200 tcm - looking towards 100 tonne per week.
BPI recycled products	Reprocessor fabricator of recy polyethylene products	Outside region	n/a	Nationwide collection	Plaswood is manufactured by BPI recycled products, 100% recycled damp proof membrane, plastic bags. Ability to recycle 70,000 tpa	

Save A Cup Recycling Company Ltd		Outside region		Nationwide collection supplied to Linpack Castleford	Hard wall polystyrene vending cups are processed into clean flake or pellets for remanufacture into non-food-contact products. The high impact polystyrene recyclate is used to make a variety of plastic components and products.	
Regenthill Ltd	purchase or collect plastic scrap and export			C&I sources - most types collected in volume	Export to Far East (Hong Kong) via special relationship	
Total			**n5**			

n/a indicates – information not available

Table 12 : Survey Outputs on Regional Plastic Supply Chain

	Collect	Preprocess	Densify	Reprocess	Fabricate	Market
PET	n5	n5				
PVC	n4					
LDPE	n3	n4			n1	
HDPE						
EPS		n2				(Closed Loop) Insulation Products
PS	N3	n4				
PP	N4	n5			n1	

Table 13: Number of Players in Regional Plastic Supply Chain

Wood Sector Profile

An example of the wood waste supply chain (for wood chip) is shown below:

Collect	Densify/Bulk	Preprocess	Reprocess	Fabricate	Market
W M Sector or fabricator own collection	Chipping	Screening	Dried & Compressed	Cut into Board	Furniture & Worktop Manufacture

Figure 4: Example Wood Chip Supply Chain

Source

The WRAP study produced in Spring 2005 is regarded as the most definitive source of information on the subject. It estimated arisings at approx 1 million tpa wood waste within the study area. This covered an area beyond the South East region including London and therefore its findings need to be disaggregated. It is possible that market characteristics differ between Greater London, the more rural East of England and the South East covered by the study.

This volume is divided between a number of sources:
1) 35% from construction/demolition waste
2) 30% from packaging waste
3) 25% from municipal waste (domestic and civic amenity sites)
4) 5% from the secondary wood processing industry (mainly furniture industry)
5) 5% from other sources

More than 300 000 tonnes of waste wood per year are currently recovered from the general waste stream and reused for a number of purposes. Another 55 000 tonnes is segregated by waste management companies, but ending up in landfills due to lack of proper processing facilities. The total volume of waste wood being sent to landfills is estimated at 650 000 tonnes annually.

Collection

According to the WRAP study collection infrastructure is in place. This is in the form of existing waste collection & transfer facilities that already handle waste wood that is landfilled. Wood recyclers handle approximately 70% of the waste wood that is recovered and reused. Waste management companies handle large volumes of waste wood, but the majority is not segregated. The share of total wood recovery by waste management companies constitutes some 23% with the remaining 7% going directly from

sources (typically secondary wood processing industries) to end users. Scope for recovery of CA site delivered wood waste is limited.

The WRAP study reports that geographically the wood recycling businesses in SE England are fairly well distributed except for an apparent vacuum south-east of London, principally in Kent. One of the reasons behind the current geographical distribution of businesses is the lack of outlet possibilities in Kent combined with the high transport cost sensitivity of low value bulky materials such as recycled wood.

Within the WRAP wider study area the 7 largest wood recyclers handle 60Kta+ each and are believed to represent ~50% of the market. However, none of those identified were located within the South East region (1 in London all others Midlands and North)

The Brighton and Hove Wood Recycling Project (B&HWRP) collects wood that can be re-used from local construction sites at equivalent cost as landfill. It then sorts and sells higher value timber for reuse back to the construction sector and for household DIY. Unsuitable timber is sent for chipping for composting or use as fuel. This scheme has been so successful it is now being replicated in a number of other urban areas across UK. The business is relatively small scale (~1Kta) due to the large quantity of material that proves to be unsuitable for resale.

Preprocess

Pallets sorted on the site of production or pallet distributor and sent for chipping or refurbishing depending on condition. With the focus of demand on untreated timber there is some competition between reconditioning pallets and chipping for fuel

Some specially designed office furniture can be disassembled and re-manufactured. The DTI New Technology Programme has funded a pilot collaborative R&D project on the subject that started in 2005. This has yet to be developed on a large scale.

Pre-sorting on C&D sites where segregation systems are in place offers benefits but nationally this is considered to be marginal. Good practice on segregation is spreading via a number of initiatives funded by landfill tax.

Densification

Wood is chipped before being sent to chipboard manufacturers due to low density of wood and associated cost of transporting unprocessed loads.

An export market does exist for reprocessing. Netherlands has a large wood chipping plant taking 100-150,000 tpa from across Netherlands, 90% of which is exported to Belgium and Germany for chipboard and use as a fuel. The transport impacts associated

may be less than transport to out of region chipboard manufacturers although these movements tend to be on a return load basis.

Reprocessing

WRAP sought to fill the gap identified by its study by offering capital support (part funded by SEEDA) for a wood refining centre in the South East with a focus on a possible site in Kent but no one responded positively to invitation. The call was national with an emphasis on the SE, size was not a specific requirement. One tender was received but was outside South East and not progressed.

Fabrication

Chipboard - untreated timber

Approx 1.22 million tonnes of wood was reprocessed in the UK in 2004 and 75% of this was consumed for the manufacturing of chipboard. There are no chipboard manufacturers in the South East. Chipboard manufacturers consuming recycled wood are in Mid Wales, Merseyside, Northumberland, Scotland and North Devon. Chipboard and finished chipboard products are also imported from manufacturers throughout the world. South East recyclers are supplying out of region factories as a back load after delivery of finished product (to B&Q stores.) This means that chipboard supplier catchment for raw materials closely corresponds to their customer base.

Chipboard manufacturers are applying tougher quality standards to input e.g. will not accept coated or laminated wood. This is driven by a combination of CEN product standards, Climate Change Levy and IPPC emission limits. Further work is needed to understand how these drivers influence the supply chain.

UK market for chipboard is dependent on health of economy e.g. if lots of people can afford new kitchen units then there will be a demand. There is a link between development of new housing and demand. Current demand is not believed to warrant a new chipboard manufacturer in the South-East . However chipboard manufacturers have expressed interest in exploiting the SE supply base further. Some chipboard manufacturers offer exclusive supply contracts on a medium term basis if geographically viable. This offers security for investment and supply.

Gate price for chips can be £10- £15 per tonne depending on transport arrangements.

Use as a Fuel

The Slough Heat and Power CHP Plant is the principal fuel user taking around 165,000 tonnes per annum of clean timber waste of which it has been estimated 70% may be pallets (115,500 tonnes per annum). This is sourced through a network of suppliers

within London and the South East. Outlets are now constrained by the Waste Incineration Directive (WID) emission standards with the Slough Plant being the only plant taking wood as fuel within the region meeting the standard. Power stations were reported in the WRAP study as taking clean chip as it does offer benefits on sales of generated renewable electricity. However this is believed to have ceased with the advent of WID. [22]

Chips may also be used to produce logs for burning in household grates and pellets suitable for industrial boilers. Pellets are currently being imported from abroad to supply this market. A focus on use in small generation and CHP applications is being supported by grants from central Government.

Horse-bedding - untreated timber

This has a more demanding feedstock specification and much more demanding end product specification due to direct contact at end use. In some cases there is a demand for materials overseas that are of high value e.g. equine market for wood material in Saudi Arabia - £1000/tonne.

Pet-litter- untreated timber

Some manufacture of pet litter is taking place in the South East

Reclaimed timber

Local wood recycling projects sell reclaimed timber that has value in its natural aged form e.g. floorboards, and offcuts suitable for use for household DIY.

Pallet Reconditioning

New pallets are made from old damaged pallets. Our survey suggests that a lot more reconditioning could be happening- one operator wants to set up a dedicated site in the SE region.

A WRAP study estimated that there were some 90 million pallets circulating in the UK alone. The total volume of waste wood arising from the packaging sector in Southern England (SE, London and part of EERA) has been estimated at 285,000tpa (30% of 950,000).

64 pallet suppliers have been identified within the South East via www.palletguide.com. It has been calculated that if each supplier sells 5000 pallets per week (average weight

[22] The European Commission has proposed the development of specifications for waste as a fuel – which if met would mean that the material would no longer be classed as waste and hence not subject to the emissions standards of the Directive. Should this come to fruition this constraint on use as a fuel may not apply in the medium to long term.

20kg), over a year each supplier is handling 5,200 tonnes of timber. Taking this figure across all suppliers yields a figure of 332,800 tonnes of timber. Of this 20% may be single trip or limited life and end up being chipped. This would amount to 66,560 tonnes. This includes imports from US which are generally not reusable because they are either not size compatible with fork lift machinery or they are difficult to repair due to being made of hardwood.[23]

Many pallets will be reconditioned and there is a growing sector focused on this. Manufacturers now have the financial incentives to use reconditioned wooden pallets. The Environment Agency has determined that timber pallets, repaired with new components, will not incur a recovery or recycling obligation under the Packaging Regulations, and second-hand timber pallets are not subject to the packaging recycling obligation because they are re-used.

[23] Tracie Brookes Palletmaker.com Pers comm

Survey of the Second-Life Wood Supply Chain in the South East

Operator	Activity	Location	Tonnage per annum	Source	Usage	Future Prospects
Slough Heat & Power Limited	Collect, Preprocess, Reprocess, Fabricate	Slough	100,000 tpa WDF 300,000 tpa wood 50% waste wood	Network of shredders - mainly London based. Lana Pallets - Wood Recycling Services. Aggregators - Shred Co - biomass Thames Valley bio energy, Jenkinson - tree surgery and sawmills source material from different sources.	waste wood - predom pallet - waste derived fuel - from MRF residue - Grundon MRF, Hants, Kent, Suffolk, Beds - pellet production facility onsite (fibre fuel Co)	Further 200ktpa capacity with £12-15 million investment. Seeking reasonable capital contribution - 3 boilers. Mothballed turbine hall. Potential for district heating supply of local community initiatives or new housing. Need at least 10 year contract for heat. £0.5 million capital cost.
Reprocessor Total			**150,000**			
H&M. Glover Recycling of Andover, Hampshire	Processes and sorts Wood wastes		3,500		Supply graded chips for boardmills, playground chips or animal bedding',	Nominal Capacity 50,000 tpa
Clembins	n/a	Reading, Berkshire	n/a	n/a	n/a	n/a
Lift and Shift	n/a	Farlington	n/a	n/a	n/a	n/a
Basingstoke Skip Hire	Collects, Preprocess, Densify	Basingstoke	5,000	untreated chipped from own transfer station - Hampshire/Surrey/ catchment - Soton/Ports 40 miles	Supply Slough HP	Would like to expand given end market security.
J James Ltd	Accredited reprocessor Collect, Preprocess, densify – supply to reprocessor or end market	Steventon, Oxfordshire	7,000	Collect scrap pallets from Oxon	Sort and repair (small) and sell reconditioned. Chip and then supply power stations Slough, compost - Thames Water, bedding for stables.	

Portswood pallets,	pallet reconditioners	Southampton				
Kingswood pallets	pallet reconditioners	Bracknell,				Kingswood looking to expand.
NI Pallets	pallet reconditioners	Maidstone,				
County Crest,	pallet reconditioners	Botley				
Palletmaker.com	work with pallet reconditioners					Looking to establish pallet repair /reconditioning facility in Portsmouth
Shorts Services	Collect, Preprocess, densify – supply to reprocessor or end market.	Ascot Berkshire	6,000	Majority of woodchip is supplied to Nexfor for chipboard manufacturers while the dust has a variety of uses including bedding for poultry or medium density board.		Forecast increase to 10,000 tonnes
The Woodhorn Group	Collect, chipping for compost, chipboard manufacture Norboard and Slough	Chichester West Sussex	3,000	Commercial but looking at MSW, pallets/packaging, builders and sawmill, joinery waste. From Hants, Sussex and Surrey.	Sort and send on good ones for reuse. Chip and then supply Slough power station, compost	Nominal capacity is 25,000 tpa. Problem of accessing substantial source of untreated timber from SMEs.
Preprocessor Total			***24,500***			

n/a indicates information not available

Table 14: Wood Capacity Review

Recycling Chain

	Collect	Preprocess	Densify	Reprocess	Fabricate	Market
Chippers	23,500 (*n*8)					
Slough CHP				150,000 (*n1*)		Heat & Power
Pallet Reconditioning	266,240[24] (*n 64*)					Pallets

Table 15: Capacity of Players in Regional Wood Supply Chain

WEEE Sector Profile

This summary was prepared at the time when compliance scheme arrangements were anticipated. These arrangements are still subject to be finalised by DTI.

Capacity Survey

Retailers are responsible for arranging for WEEE to be taken back. They may either offer in-store like-for-like take back or pay into the Retail Compliance Scheme (RCS) operated by Valpak. The RCS aims to work with Local Authorities to set up Designated Collection Points (DCPs) at existing Civic Amenity Sites / Household Waste Recycling Centres to avoid the need for individual retailers setting up take back facilities. 100 such sites have been identified within the region based on a review of the Environment Agency licensed site database. To encourage Local Authorities to participate, the RCS will allocate funds to help upgrade sites. If Local Authorities choose not to participate then alternative arrangements to provide an equivalent collection network will need to be made by the RCS.

When determining whether to establish a site as a DCP, Local authorities will consider the balance between the revenue currently obtained from WEEE (scrap and totting) and existing and future costs for the management of WEEE. When considering how they are going to separate and store the WEEE for collection, the factors in Table 16 need to be considered.

[24] Total estimated timber pallets handled minus wastage

	Current	Future	Comment
Fridges and freezers	Segregated since 2002 due to ODS regulations	No change until CFC fridges purged	
Other large household appliances (cookers, washing machines etc.)	Delivered by householders or via local authority bulky waste collection to the scrap bin [25]	No change if shredding white goods is classed as an acceptable form of treatment	Key uncertainty
CRT containing WEEE e.g. TVs and PC monitors	Classed as hazardous waste that must be dealt with separately if delivered separately since July 05.	No change until CRTs purged	
Lighting (tubes)	Classed as hazardous waste but disposed in general waste unless delivered in bulk.	Provision for separation required	Bulk deliveries unlikely to be from domestic source
Small household appliances / IT hardware / power tools and other mixed WEEE.	Disposed in general waste unless metal content for scrap or reclaimed for reuse	Provision for separation from general waste Minimum size 1m3.	If WEEE is delivered mixed then no expectation to separate.

Table 16: Considerations for Designating CA Sites as DCPs

Table 16 suggests that the additional burden of separation comes primarily from the lighting and small WEEE stream. A number of Local Authorities report that they will not have space at CA sites to provide further segregation. Space will be at a premium for LATS diversion waste e.g. green waste or cardboard, which they are obligated to deal with to meet LATS targets. An assessment by Network Recycling of the capacity of CA sites to separate WEEE, [26]determined that up to 91% of CA sites in the UK are currently separately collecting WEEE. It also estimates that nearly 85% of CA sites would be capable of being expanded to receive segregated WEEE to varying degrees.[27]Without site-specific information it has not been possible to eliminate any CA sites on the basis that only 90% might be able to segregate WEEE.

The RCS estimates that the annual average bill for local authorities collecting hazardous waste is £750,000. This is currently met by 'new burdens' funding but there is no guarantee that this will continue in the future. If authorities choose not to offer DCPs, they will bear all costs of treating and recycling hazardous WEEE. If the site is a DCP, material recycled will still count towards meeting local authority recycling targets.

Business-to-Business WEEE

[25] Cambridgeshire County Council report that up to 65% by weight of scrap metal separated at CA sites may consist of Cat 1 WEEE.
[26] CA Site WEEE Capacity in the UK: an Assessment of the Capacity of Civic Amenity Sites in the United Kingdom to Separately Collect WEEE Network Recycling (why all upper case?)
http://www.defra.gov.uk/environment/waste/topics/electrical/pdf/weee-casite.pdf
[27] "The potential for expanding collection of WEEE is fairly large, with 37.8% of UK CA sites estimated to be capable of implementing Scenarios 4, 5 or 6 and an additional estimated 47.1% of sites capable of collected WEEE on smaller scales" P 68. Ref 5.

B2B WEEE falls outside the DCP requirements and separate arrangements will need to be made by suppliers. The RCS points out that if business waste is collected at CA Sites this equipment will not be removed from these sites by allocated (B2C) producers. Business users may end up funding treatment of 'new' WEEE by agreement (the responsibility may be shifted to the end users by the supplier through contracts). They may also end up funding treatment of old WEEE if not replacing like for like. They are likely to establish contracts directly with ATF operators or transport providers to take waste or sign up to a compliance scheme.

Also B2B users who are unable to return old equipment because it is not like for like, may seek separate collection and disposal (although they are not obligated to do so). However the expectation is that most non hazardous business WEEE is likely to continue to be disposed of with general waste unless the producers take it back on like for like basis or collection contractors seek to influence/educate customers.

Preprocessing

Authorised Treatment Facilities

Producers must ensure that facilities exist for the treatment of separately collected WEEE using authorised operators. REPIC has short-listed from responses to expressions of interest and has identified around 50 ATF operators across UK. Of these there are 5 or 6 identified within region.

REPIC did consider establishing capacity where gaps had been identified but has decided to leave the market to respond. Most established operators of WEEE processing equipment are looking across the stream to provide additional capacity. There may well be some new entrants as well.

B2B WEEE will either be delivered direct to ATFs or bulked at an intermediate transfer station and then transferred on to ATFs. Waste transfer stations are likely to be the first point of receipt of unsegregated WEEE. It is unclear how WEEE might be dealt with in such cases. These sites might segregate business-to-business WEEE into metal rich streams, those containing hazardous elements and those which contain neither. The metal rich stream would then be moved onto metal recycling sites. The WEEE containing hazardous elements would go to specialist WEEE treatment facilities. This identifies the base of DCPs for household and business-to-business WEEE in Table 17. [28]

[28] It is not considered sensible to estimate capacity based on licensed maxima as WEEE is likely to represent a proportion of input and it is known that licensed maxima can be much higher than reality

	Site Type	DCPs (*n*)	ATFs (*n*)	Comment
Household				
White Goods	CA sites	100	4	3 Shredders plus one specialised plant
Small WEEE			3	One dedicated to household to open to B2B as well
Fridges			1	
CRT/TV			1	
Lamps			N/a	
Business				
White Goods	MRS	N/a	4	
Small WEEE			2	
Fridges			1	
CRT/TV			1	
IT			2	Refurbishment sites
Lamps			2	

n/a indicates not applicable

Table 17: WEEE Management Capacity in the South East Region (2005)

Densification

Shredder Sites

Nearly all inputs handled at the shredder sites are fragmentised. Shredders process a mixed range of equipment to recover different materials and have traditionally handled large household appliances like cookers and washing machines which they process with end-of-life vehicles and light iron. Our survey established the ELV input to the three regional shredder sites to be in the range 40%- 65%. 10% was estimated to be WEEE with the balance being made up by CA site scrap (15%) and general light iron (factory arisings, packaging etc). Taking an estimate of 60% of CA site scrap being WEEE this suggests a total circa 19% of fragmentiser input to be WEEE[29]. This gives a total notional capacity figure of just over 85,000 tonnes per annum.[30]

The impact of the interaction of the pressure to recover plastic from the heavy stream for both ELV and WEEE to achieve the specified material stream recycling targets respective remains to be determined. It is possible this may drive some WEEE from fragmentisers to more specialist shredding plants that have integral separation of outputs and thereby produce a cleaner higher value product.

[29] Polymer Processing B: Towards Processing Polymers from ASR Waste & Energy Research Group, Dr. Harder, University of Brighton gives a typical feed as 40% light iron, 20% domestic goods, and about 40% ELV. http://www.brighton.ac.uk/environment/research/sustainability/werg/P2bFinal4.pdf

[30] This is only notional since the fragmentiser sites may increase the ratio of WEEE to ELV inputs. However there may be pressure to utilise more capacity for ELV to meet ELV Directive targets.

Fridges

Refrigerators and freezers formerly processed through fragmentisers are now processed through dedicated ODS plant. The only ODS processing plant within the region operates in East Sussex. Other operators collect fridges from the region and deliver them to reprocessing sites in adjacent regions. The fridges are shredded in a vacuum and foam chunks. The end products include steel, aluminium and mixed plastics which go for onward sale. The ground foam has found a market in fabrication of absorbent pellets.

Capacity Review

Inquiries of the planning authorities within the South East region indicates the planned dedicated capacity in Table 20. It is however possible that WEEE collection points and even refurbishment sites may operate under permissions for light industrial or even wholesale use. Thus they may not always go to the WPA to determine as county matters and hence may not register in our survey. An example of this is the UKrecycleIT joint venture by ReMade Kent & Medway, Royal British Legion Industries & ADM Computing. This has been established as a trial centre of excellence in the South East for the recycling of IT and electronic equipment and aims to achieve 100% recycling of electronic waste. It is now seeking a commercial partner. The 'asset management' network for business-to-business IT equipment would not register as waste handling operations.

	Fridges & freezers	**Other white goods** [31]	**Small household appliances /IT**	**CRT containing WEEE**	**Lighting (tubes)**
Hants/Portsmouth		Shredder 24,000tpa	3,000tpa (household only)		Collection for export
E Sussex	Fridge CFC processing 7000tpa (200k units)	Shredder 24,000tpa	WEEE processing (business & household) 55,000tpa Printer refurbishment 2,000 units pa	CRT splitting & shredding of casings 6,500 tonnes – 13,000 tonnes	
Kent		Shredder 24,000tpa	WEEE Refurbishment UKrecycleIT		
Berkshire			WEEE processing (business & household)		
Surrey					5 million lamps per year.
Totals	**7000**	**72,000**	***58,000 (provisional)***	**13,000(max)**	**5m lamps**

Table 18: WEEE Processing Capacity (planned & existing)

[31] Calculated on spare capacity after ELV

Reprocessors

Table 19 gives a breakdown by material for WEEE arisings and the current outlets.

Material	%	Status	Outlet
Ferrous metals	47	Already recycled	Steel Production
Non-ferrous	4	Already recycled	Metal Smelting
Glass	6	Hardly recycled	CRT problematic
Plastic	22	Hardly recycled	Brominated Flame Retardants problematic
Other	21	Mostly recovered	Various Unknown

Table 19: Composition of WEEE (ICER status report)

The bulk of materials derived from WEEE processing is destined for export being primarily ferrous and non-ferrous metals and mixed plastic. There is some small-scale fabrication of absorbent granules from fridge foam within the region and potential for a foam glass facility to be established that may take CRT glass as an input.

WRAP has already targeted the two problematic waste streams for research.

CRT Glass

Arisings & Current Management Routes

	CRT glass		Casings
Arisings 2002	**104,532 tonnes**		**25,000 tonnes**
	TVs	PCs	
Arisings	69,000 tonnes	26,000 tonnes	
Entered recycling chain		80% of arisings	
Exported for re-use outside the UK.		15% of arisings	
Exported for recycling		10% of arisings	
Sold on and probably exported	500,000 units = 10,000 tonnes	30% of arisings	
Disposed to landfill		25% of arisings	

Table 20: CRT Arisings & Fate (ICER status report)

It is predicted that there will be some 102,000 tonnes of arisings of CRT glass in 2012. Of this, some 88% will come from TVs, reflecting the increased weight of glass in newer TVs. Only 5% are predicted to come from PC monitors, because of the switch to LCD technology. The Market Transformation Programme is looking at the impact of digital switch over on potential arisings. A spike is anticipated in 2008 when digital switch over occurs.[32]

32

Potential Outlets for CRT glass

Research carried out by ICER[33] examined potential end markets for waste cathode ray tube (CRT) glass. Some 35 possible applications were identified and five were then prioritised for in-depth study, taking into account the quantities of glass likely to be used, economics and environmental considerations.

The preferred applications of direct relevance to the South East were as follows:

1. Use unleaded waste CRT glass process to make bricks and tiles or as a flux in the manufacturing process for clay and brick tiles. The inclusion of 5% glass was found to provide significant cost savings from savings on virgin materials and energy costs. It concluded that the combined brick and ceramics markets were a significant potential consumer of waste glass. There are at least 14 brick kilns active within the region. It has not been possible to establish brick making production capacity to determine what 5% input might represent. [34]

   Finely ground glass is required for this application. The lack of fine grinding capacity in the UK has been recognised by WRAP and in September 2002 tenders were invited for capital grant assistance in fine grinding capacity. It has not been possible to establish if there is any in the South East.

2. Use the glass to replace sand in metal smelting. There is no primary lead smelting in the UK. However Britannia Refined Metals operates a lead refinery in Kent. This processes bullion smelted from ore in Australia. Silica is not used in the refining of lead, though it is used in primary smelting. Although CRT glass could in principle be used, the elevated lead levels may cause problems of disposal for the resultant slag.

<u>BFR Plastics</u>

Currently any WEEE plastics containing BFR must be treated as low-grade material requiring disposal. There is a prohibition in the ROHS Directive to reintroduce BFR into electrical and electronic products. The WRAP funded project undertaken by Axion Recycling Ltd aims to find a complete solution for the removal of BFRs from the variety of different waste streams which fall within the WEEE category. The whole recovery and recycling process is included, from WEEE polymer identification and mechanical sorting in order to separate non-BFR polymers for direct recycling, through to the technologies that could be employed to remove BFRs. The work has yielded a number of important results:

- the identification of BFR-containing polymers by both BFR content and polymer type at WEEE dismantling facilities is technically feasible;

[33] Materials recovery from waste cathode ray tubes (CRTs) Project code: GLA15-006 Date of commencement of research: 2nd September 2002 ICER for WRAP

[34] Based on the total UK production of 7 million tonnes of bricks per year and a 5% addition of glass, the maximum potential for use of glass could be 350,000 tpa.

- separation of polymers should be commercially viable for WEEE items over about 0.5kg (providing the requirements of Annex 2 of the WEEE Directive regarding separate treatment of hazardous materials prior to shredding are implemented in the UK);
- bulk separation of a clean mixed polymer fraction from mixed WEEE polymer by density is technically feasible and should be commercially viable in the UK – however further separation of the clean fraction and also bulk separation of BFR-containing from BFR-free polymer is difficult with currently available technologies ;
- X-ray based polymer chip sorting is extremely promising as a commercially viable technique for bulk separation of polymers containing bromine, and other elements such as chlorine, lead and cadmium – and it also has potential for separation of styrenic polymers by type; and
- two solvent-based BFR removal processes appear at this stage to offer the best commercial and environmental potential. Creasolv has produced high quality, almost BFR-free recycled polymer in the course of the project from waste TV casings.

ELV Sector Profile

Source

Every year, Britain's metal recycling industry recovers over 10 million tonnes of metals per year of which just less than 9 million tonnes is iron and steel. A significant source of this is the two million motor vehicles that cease to be roadworthy annually.
It has been predicted that arisings of ELV in the South East in 2010 will equate to 391,433 tonnes[35]. Applying the ELV Regulation targets to re-use and recover 85% of ELVs by weight, with at least 80% of the weight of ELVs being recycled this gives a tonnage of 332,718 tonnes requiring recovery of which 313,146 tonnes must be recycled.

Collection

The ELV Regulations require that vehicle producers establish a contracted network with the capacity to handle all vehicles of their brand. As well as the capacity, the producer networks must demonstrate convenience for the last owner.

End of Life Vehicles collectors can be identified from the Environment Agency listing of Authorised Treatment Facilities (ATF)[36] authorised to carry out de pollution of vehicles under the ELV Regulations. Information on ATF sites is combined with information on licensed metal recycling sites operating within the South East provided by the Environment Agency[37] to get full coverage of the collection network. Because some ATFs still operate under exemptions they do not appear on the licensed site listing. Similarly some licensed sites that are identified as vehicle dismantlers do not appear in the ATF listing. Where this is the case it has been assumed that these operators do not carry out depollution activities and are merely concerned with parts supply prior to de-pollution. From this a three-tier hierarchy has been developed:

[35] Estimated Waste Arising in the South East Region, Viridis Ltd. for SEEDA. Whitting E. (2005)
[36] http://www.environment-agency.gov.uk/business/444217/444663/591015/850487/?version=1&lang=_e
[37] http://www.environment-agency.gov.uk/business/444217/444663/591015/850487/?version=1&lang=_e

1. Sites that receive vehicles but do not de pollute. These may take non-mechanical spares from vehicles and then pass the vehicle to another operator. (collectors)
2. ATFs that receive vehicles direct or from first order sites. (pre-processors)
3. Sites that operate fragmentations/shredder capacities. All shredder sites within the South East are also ATFs. These sites receive de polluted and un de polluted vehicles and are fed both by 1 or 2 type sites. (pre-processors and densifiers).

Through this process 140 ELV related sites were identified within the region.

In reality vehicles will not necessarily be shredded at the nearest available facility. This is due to a combination of commercial and logistic issues. Significant inter regional movement occurs. This will be further affected by the establishment of compliance schemes for ELV, where ATFs are expected to be contracted to supply shredder sites within each scheme. However for the purposes of the survey it has been assumed that there is a net balance of movement so that shredder capacity more or less represents the total arisings of the region.

Preprocessing & Densification

Within the South East there are 2 major integrated operators:

- European Metals Recycling (EMR)
- CD Jordan.

These companies also operate Authorised Treatment Facilities that supply their fragmentiser sites. Table 21 details the declared capacity of their operations.

	ATFs	**Capacity**	**Shredders**	**Capacity**
EMR	Ridham	10,000 tpa	Ridham	75,000tpa[38]
	Rochester	10,000tpa		
	Shoreham	10,000tpa		
	Soton	10,000tpa		
C D Jordan	Newhaven	10,000 tpa	Newhaven	100,000tpa[39]
	Winchester	6,000 tpa		
	Portsmouth	10,000 tpa	Portsmouth	100,000tpa[40]
	Isle of Wight	6,000 tpa		
	Combined Capacity	**72,000 tpa**	**Total Capacity**	**275,000tpa**

Table 21: Estimated Capacity of Principal ELV Players in Region

Purpose-built depollution rigs are operated at the ATF sites. Vehicles are sourced directly from local authorities, insurance companies and the public.

Densification at Shredder Sites

[38] Based on 50% of 150,000 tpa input being depolluted ELV (EMR)
[39] Based on 65% of 300,000 tpa combined input being depolluted ELV (CD Jordan)
[40] Based on 65% of 300,000 tpa combined input being depolluted ELV (CD Jordan)

Nearly all of inputs handled at the shredder sites are fragmentised. These are then separated into different metal types using processes such as magnets, eddy currents and cyclones. They produce a clean shredded steel product and a mixed non-ferrous product. Steel is supplied to the UK market, exported to mills in Europe and the Far East market using containerised transport via 5 sites with integral wharfage. Deep sea exports also take place out of Tilbury. The mixed heavy materials (5% input) are transferred out of the region to facilities for density separation known as 'frag non ferrous'.

Fragmentisers also produce a waste stream, made up of dirt, glass, concrete, rubber and plastics, which is known as 'fluff'. Currently fragmentiser fluff goes to local non-hazardous landfill. This represents between 18 -23% input.

The British Metals Federation estimated that of the 2,750,000 tonnes of waste fragmentised nationally in 1998 55-60% of the waste input was ELVs, whilst white goods and light Iron were 15% and 25% respectively[41]. Our survey established the range to be 50%- 65% for the region.

Comparison of shredder capacity against integral ATF capacity indicates a surplus of 203,000 tpa for ELV coming from third party sites within the region.

Comparing predicted arising figures of 391,433 tonnes against current fragmentiser capacity it appears that there will be a notional shortfall of around 60,000 tonnes. Actual fragmentiser capacity within the region is 450,000 tonnes and there is a high degree of elasticity in how this capacity is utilised. i.e. there is no reason why the ratio of ELV to other input such as WEEE could not be altered. Our survey revealed a current range between 50 and 65% input depending on source stream. If the facility currently accepting 50% increased to 65% this would absorb a further 25,000 tonnes, leaving just over 35,000 tonnes There is no reason why input ratio could not increase across the board. Hence the impression of a capacity shortfall may be misleading.[42] The limiting factor according to operators is the time and space required for de-pollution activities not the fragmentising process itself. That having been said the current recycling limit of fragmentiser output is a real limitation and is shifting attention onto recycling of plastic the next most significant component of ELVs.

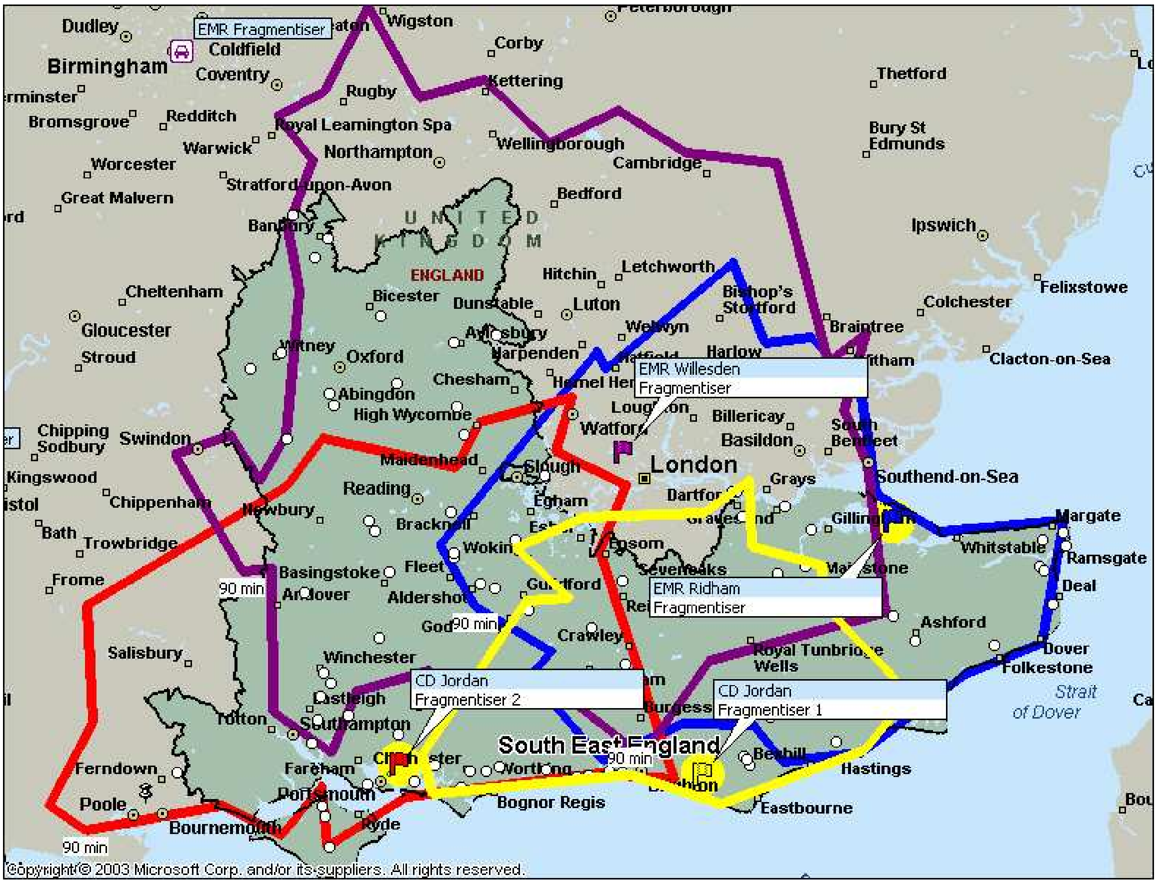
On the plus side this doesn't account for 3% by weight of tyres[43], which will no longer be fragmentised and will find alternative management routes (12,000 tonnes). In addition 2% by weight is calculated to be liquids, which will be drained at the de-pollution phase. This equates to circa 8,000 tonnes.

Both operators have established compliance schemes that offer the complete recycling package to vehicle manufacturers for ELV compliance purposes. This includes sourcing outlets

[41] These ratios may have changed since the advent of the Directive on Ozone depleting substances with diversion of fridges from the fragmentiser stream.
[42] If this route to compliance were followed then this might leave WEEE that is currently fragmentised requiring treatment by an alternative route. This is addressed in the WEEE material sector profile.
[43] Source: ACORD, 2000.

for tyres for reuse and disposal. This arrangement also offers security of supply to the shredders by capturing a network of ATFs within the scheme.

Map 2 maps the ATFs and adding drivetime isochrones of 90 minutes for each shredder site. This shows that by adding the EMR site located at Willesden London that is reported by a number of South East local authorities to take ELVs there is virtually 100% coverage.



Catchment boundary colour corresponds to colour of site flag.

Map 2: ELV Fragmentiser Catchments (90 minute isochrone)

Plastic (convergence material)

Currently plastic makes up 12% of a typical vehicle and this figure is growing[44]. The demanding targets for ELV recycling will require recycling of some plastics. Applying this figure to predicted arisings of ELV in the South East in 2010 of 391.433 tonnes[45] it suggests that nearly 50,000 tonnes of plastic will need to be recovered from this stream for recycling.

Currently plastic forms part of the fluff and heavy element that goes for subsequent separation. It has been estimated that combined plastics represent around 17% by weight of shredder residue[46]. Recovery of these plastics once shredded is difficult and does not yield a high value product. Shredder operators are reviewing the establishment of capacity to improve material separation from the heavy fraction of the shredder waste stream. It is reported that the sector plans to export post shredder residue for plastics recovery as an interim measure until capacity has been established in the UK.[47]

An alternative approach is to recover plastics at or prior to the de-pollution phase. A specialist automotive plastic recycling operation (PPR Wipag) set up in Kent. It has developed a technique of separating the materials of a three-layered car instrument panel. Through a series of reprocessing stages it produces a compound material that is re-used in the manufacture of original parts. PPR WIPAG reprocesses some 35 tonnes of production waste each week (1820 tonnes per year). The reclaimed plastic which the company produces is of such high quality that it is worth in excess of £1000 per tonne. PPR WIPAG currently imports material from manufacturers in France and supplies it back to the source. It is reportedly struggling to penetrate the UK market and may be looking to relocate to the continent.

Glass (convergence material)

On average the glazing in motor vehicle contributes 3% towards the total composition of the vehicle and therefore in its fullest extent would give around 12,000tpa of glazing for potential recycling. Currently a proportion of this is being reclaimed through density separation plant and goes on for secondary aggregate production.

If automotive glass is to be recycled at the dismantling stage it must first be removed from the vehicle. The ease of removal is dependent upon the method of sealing used in manufacture. Studies funded by the Consortium for Automotive Recycling (CARE)[48] have shown it is difficult to recover significant tonnages due to the technical problems in removing the glazing.

The CARE study concluded that present day methods of glass removal are not economically feasible. However as the cost of meeting the ELV targets falls upon the manufacturers the

[44] The ProVE project calculates that a new automotive vehicle typically contains about 12% by weight plastic, with tyres and door seals adding a further 6%.

[45] Estimated Waste Arisings in the South East Region Viridis January 2003

[46] Polymer Processing B: Towards Processing Polymers from ASR Waste & Energy Research Group, Dr. Harder, University of Brighton
http://www.brighton.ac.uk/environment/research/sustainability/werg/P2bFinal4.pdf

[47] UK misses end-of-life vehicle recovery target The ENDS Report June 2006/ Issue 377

[48] CARE Report on automotive glass recycling 2004 Update www.**care**group.org.uk/Glass_Report_2004.doc

solution to the problem lies in the manufacturing stage such that bonding methods are changed and developed to make glass removal more efficient at the ELV stage of a cars' life cycle.

Reprocessors

Steel Reprocessors

UK steelworks use between 4.5 million and 5 million tonnes of recycled metal a year in making about 18 million tonnes of new steel.

Thamesteel steelworks at Wellmarsh, Sheerness, Kent is the only steel works within the region. It manufactures approximately 740,000 tonnes of steel billet per year requiring about 60,000 tonnes per month of steel scrap to sustain normal levels of output. Scrap steel is purchased and brought onto the site using both road and rail. Until July 2005 Thamesteel sourced its steel scrap direct from EMR supplying the billet to its Al-Ittefaq rolling mill in Saudi Arabia, but it suspended billet production in May due to low prices for its product. It restarted production in July 2005 after making a 'scrap-for-billet' deal with steel trading company Stemcor which sources scrap from home and abroad.[49] Thamesteel Ltd has announced that, subject to contracts, they are going to refurbish their Reheat Furnace and 500t Cold Shear. They also intend to purchase a new Rolling mill for the site which aims to be running at a capacity of 500,000t/pa in 2006. [50]

Steel Fabricators

Istil Queenborough is located on the Isle of Sheppey in Kent. The site has its own wharf capable of receiving vessels up to 6000 tonne. The site is also linked to the British Rail main line freight system. Billet supply is currently sourced from the Ukranian sister company and is shipped directly from the Group's own berths in Odessa to the wharf at the Queenborough site. [51]

Other Materials

No reprocessing capacity for other materials was identified within the region. This is largely because the non ferrous residues go to out of region media separation facilities from where the separated materials go on to be utilised as products.

Prospects

Anglo-Dutch steelmaker Corus has estimated that the successful London bid for the 2012 Olympics will add about 250,000 tonnes to UK steel demand (including rebar), or about 2% of the UK's annual consumption of 12 million tonnes per year. The British Constructional Steelworks Association also predicts an estimated 300,000 tonnes of additional UK steel demand in the period 2006 – 2010 as a result of winning the 2012 Olympics. [52]

[49] Metal Bulletin No. 8903, p 17
[50] Thamesteel website (http://thamesteel.co.uk/default.htm)
[51] ISTIL Group website http://www.istil.com.ua/istiluk.html
[52] http://www.timesonline.co.uk/article/0,,4662-1683964,00.html

Exports

The UK generates more recyclable metals than it can use. More than 3.5 million tonnes of ferrous material (i.e. 40%) is sold annually to around 30 countries, earning some £400 million in export revenue. Non-ferrous metals have a higher value than ferrous, and the volume recovered by the industry is reported to be worth some £2 billion a year. As much as 50% of the 1 million tonnes recovered is exported.[53]

Tyre Sector Profile

Source

Data in the UK indicates that approximately 2 million new vehicles are registered and a similar number are scrapped every year. Over 50 million tyres (just over 480,000 tonnes) were discarded of which around 80,000 tonnes were disposed of in landfill sites around the UK in 2004. [54]

Application	'000 tonnes	%
Reuse	29	6
Export	14	3
Retread	52	11
Reuse Subtotal	***95***	***20***
Material Recovery (crumb)	227	47
Fuel Substitute	76	16
Recovery Subtotal	***303***	***63***
Landfill & Unknown	85	17
Disposal Subtotal	***85***	***17***

Source: BLIC European Tyre & Rubber Manufacturers December 2005 www.blic.be

Table 22: Fate of Used Tyres in UK (2004 Data)

Although the retread market is the most effective method of recycling used tyres, from an environmental impact viewpoint, it is struggling over recent years. This may have been impacted by tighter regulations such as Europe standards for retreading introduced in 2003. The Retread Manufacturers Association reports that over large parts of the UK it is almost impossible to obtain retreaded tyres. It is believed that there is sufficient 'pull' from the consumer (especially a growing swell of environmental consumers) but there is a lack of 'push' from the retailer and distributor market.

The landfilling of whole tyres has, since July 2003, been banned while the landfilling of shredded tyres will no longer be an option after July 2006. However the Government has now confirmed that the use of shredded tyres in engineering applications in landfill would not be banned and this is expected to be a significant outlet. The introduction of the ELV Directive

[53]Source: British Metals Recycling Association website http://www.recyclemetals.org/index.shtml
[54] BLIC European Tyre & Rubber Manufacturers December 2005

is giving rise to more tyres requiring dedicated handling – it is not clear whether shredding for landfill engineering will count towards recycling or recovery targets.

Collection

ELV Sites

Taking the composite site input figures for all licensed vehicle-dismantling sites, [55] ELV ATF and known sites taking ELV we arrive at a capacity figure of just over 1.2 million tonnes per annum. Using a 3% of vehicle weight factor this suggests that these sites receive around 37,000 tonnes of tyres per year. It is believed that up to 70% of incoming tyres are suitable for reuse or remoulding leaving only 30% for management as waste. This suggests that just over **11,000 tonnes**[56] of tyres require separate management.

The 3 ELV shredder sites within the region handle around 12,000 tonnes of tyres per annum. Currently these tyres are shredded in the fragmentiser and the rubber goes to landfill. This will cease next year (2006) as the ban on landfilling of shredded tyres will affect this material although it appears to only represent 10% of the content of the fluff. Both operators will be relying on third parties to process tyres to produce shred or crumb for energy production or surfacing applications depending on the by the recovery protocols. However if one applies the 70% reuse factor this will leave 3,600 tonnes per annum (33% of total tyres requiring disposal) requiring management through these routes.

Tyre Centres

In addition to tyres arising from ELV tyres arise from tyre replacement servicing centres and garages. There is an established network of tyre collectors that service these centres. The collectors have standing arrangements with the national tyre suppliers such as ATS (Michelin part own) and KwikFit. They collect tyres, deliver to depot and make the judgement on route for subsequent management.

Pre-Processors

There are three principal pre-processors in the region.

Sapphire Energy, a joint venture between tyre manufacturer Michelin and cement manufacturer Lafarge Cement aims to shred in excess of 100,000 tyres in 2005 from across the UK for use as fuel. These are used to fire kilns outside the region operated by all the cement manufacturers. Supply to the kilns is an exclusive arrangement.

The site that serves the South East is located on an industrial estate in Thurrock. It has a licensed capacity of 50,000 tonnes per annum but only 8,000 tonnes were accepted in 2004

[55] Based on reported inputs for survey or where not available declared input data for 2003/04) Environment Agency site returns and where data not available licensed maximum.
[56] A conversion factor of 154 tyres per tonne

according to site returns data. If one assumes that the current input is based on tyre servicing centre supplies then further capacity of up to 11,000 tonnes would be needed to service the ELV and landfill tyre bans. Sapphire Energy's Oldham plant serves the north of the region.

Murfitts Industries operates a major tyre processing plant at Littleport, Cambridgeshire. It has capacity to process up to 75,000 tonnes from East of England, East Midlands, Greater London and the South East. Up to 10,000 tonnes may be collected from the South East each year. Approximately 60% of input is car tyres that are shredded for use in landfill engineering and crumbed for equestrian uses. The remaining 40% is from trucks that are crumbed and then sold on for higher value surfacing applications. The company has room to expand having secured a planning consent for waste management activities but the company does not anticipate major growth in throughput in the short to medium term.

Credential Environmental collects within the region and delivers to a site in Edmonton where tyres are sorted and then shredded. The shredded tyres are then further granulated to supply aggregate replacement schemes. Credential also supply Duralay the UK's largest manufacturer of carpet underlay to be made into the company's leading 'Treadmore' range, a rubber crumb underlay. More than 70,000 tyres a week are sent to the Duralay plant but these are not sourced from within the South East.

In addition to this there are a number of smaller tyre reprocessors active within the region. Their main activity is shredding and granulating tyres and supplying the crumb as surfacing material to the local market. Since 2003 the region has seen the loss of at least one processing site.

Reprocessors

One retreader of truck tyres and one company that collects and bale tyres (6,000tpa) to produce Euroblocks for landfill drainage were identified as being active within the region.

Baling of tyres for use in sea defences and as substitute gabions is being explored by Environment Agency. [57] This presents the opportunity to bulk and bale more locally and deliver to application sites. One company was identified as offering this service but is based out of the region.

No users of crumbed or shredded tyres were identified within the region although the dispensation to allow the use of shredded tyres for engineering material may result in use at in region landfills.

[57] In a trial one million used car tyres, compressed and bound into bales of approximately 100 tyres, were used as a lightweight fill material.

	Collect	Reprocessors	Fabricate	Market
ELV network	11,000 (n140)			
Tyre Services	8,000 (n182)			
Sapphire/Willow	10,000	50,000		
Murfitts Industries	10,000	75,000		
Credential				
Poutney (euroblock)	75			
Shred & Crumb	8,500			
Retread		n1	n1	

Table 23: Regional Tyre Supply Chain Capacity (tonnes)

Markets

The main factors influencing development of capacity are as follows:

Markets stability and investment costs

Competition for post-consumer tyres in some areas, and high transport costs in more rural areas can lead to raw material supply problems. The risk that the processing capacity in place will not be able to source the tonnages required to reach efficiency and will therefore be short lived is very real. Our survey found that at least two tyre-processing facilities had closed in the past 2 years.

Many technologies exist to recycle post-consumer tyre arisings. However, set up costs can be relatively high and it can be difficult to obtain funding, especially when either the technologies or the economics are unproven. These would need to compete with the now established network provided by Sapphire Energy.

Logistics

The logistics (and associated costs) required to collect post-consumer tyre arisings from around the country from a large number of sources and deliver them to the limited number of large processing sites are challenging. For example, WTS collect 12 million post-consumer car casings and 0.5 million post-consumer truck casings annually (two hundred and twenty thousand casings a week). This requires approximately one hundred thousand collections by truck from all over the country. The minimum collection size is 100 car tyres and 20 truck tyres, with the average collection size being 160 tyres. The cost and environmental burden of this is significant and it raises the question of whether the small number of large centralised processing plants should be balanced with a larger number of small local processing facilities.

Processing Technologies

End of life tyres represent an alternative supplementary fuel, with the same energy content as coal, with lower percentages of sulphur compared to coal. A tonne of tyres is equivalent to a tonne of good quality coal or 0.7 tonne of fuel oil.

Use in power stations as a dedicated fuel

This would require construction of a dedicated plant but experience with such a plant in Wolverhampton makes it unlikely the market will respond through this route.

Use in power stations

When end-of-life tyres are used as a supplementary fuel source to coal, in general no modification is required to the installation. There may be scope for co firing in regional power stations although this would compete with wood chip which offers the advantage of being from renewable sources and eligible for ROCs and would also require WID clearance.

Use in cement kilns

Whole or shredded tyres are used as supplementary fuel in cement kilns. This application utilises all the components of the tyre. The combustible components of the tyre generate heat while other components – silica and steel cord – are used as second-life raw materials in the cement production replacing primary glass sand and ferric oxide. UK cement kilns are estimated to offer 200,000 tonnes of tyre burning capacity however input is currently limited to 120,000 tonnes per annum. This is primarily due to the fact that this application requires some mechanical modifications to the plant, which may cost up to £1million depending whether whole or shredded tyres are used. There is only one cement kiln in the region (Northfleet) but this does not take fuels sourced from waste streams and is scheduled for closure.

Cryogenics

During cryogenic fragmentation, tyres are shredded and cooled to below minus 80 degrees C. A hammer mill then pounds the chips to separate the components. The resultant rubber granules can be used for athletics tracks, carpet underlay, playground surfaces and rubberised asphalt for road surfaces. The energy input required for such low temperatures is relatively high.

Future markets

WRAP has launched a major programme focussed on tyres. It is focusing on the application of current technologies to viable products funding Research & Development projects, operational trials, demonstration trials and work into developing specifications or standards which relate to recycled rubber or use of whole recycled tyres.

The use of crumb in road surfacing is a way of recycling substantial quantities of tyres. The adoption of a specification using the material would be a major step forward. WRAP is undertaking at least one UK trial utilising crumb rubber as a bitumen additive in a surface or binder course of a road construction project during 2006 to promote the benefits of using rubberised asphalt. There is substantial scope for local government procurement to develop this market.

Materials Review Summary

Input Material	Collectors	Preprocess	Densifier	Reprocessor	Fabricator	Output	Est. Number of Sites	Est. Chain Capacity (tpa)
Mixed Paper	Own bins or third party		Baler	Deinker	Papermills	Paper	2	680,000
			Baler	Shredders		Animal Bedding	n/a	n/a
Card	Own bins or third party		Baler	Packaging Manufacture		Packaging	4	1.09 m
			Chipper	Composters		Compost	n/a	n/a
Glass		Sorter	Crusher	Smelter	Container Manufacture	Container	2	60,000
			Crusher			Aggregate	2	7,500
			Crusher			Sand	0	0
Plastics		Washing/ Sorter	Granulator/ Flaker	Extruder	Melting to new plastic products	Pellets, Flakes & Granules	15	51,360
Wood			Chipper			Energy	7	150,000
			Chipper	Mulch Producer		Mulch	1	3,000
			Chipper	Chipboard Manufacture		Chipboard	7	24,500
		Sorter		Pallet Refurbishment		Pallets	5	n/a
WEEE					Refurbishers (includes asset management)	Reused WEEE	16	n/a
				Dismantler/ shredder		Ferrous, non ferrous for smelting. Granulated Plastics Glass	3	275,000
ELVs	140	Depollute		Dismantler		Segregated car parts	n/a	n/a
		Depollute	Crusher	Shredders	Smelter	Ferrous, non ferrous for smelting. Granulated Plastics Glass	5	275,000
Tyres	322	Sort	Shredders		Fuel user	Shredded Tyres as fuel	1	10,000
			Crumb and compact.			Euroblocks for landfill drainage	1	75
			Shredders	Granulators	Surface or underlay Manufacture	Rubber Crumb	2	8,500

n/a indicates data not available as part of project. Total tonnage figure totals across each chain.

Table 24: Aggregated Totals for Regional Supply Chain Capacity

Table 24 shows that there are facilities at some point in each material supply chain sited within the region. Aggregate tonnage figures should not be totalled across activity as that would double count in some cases.

Emerging Themes

A number of themes emerge from the operator survey as follows:

1. On the whole distinct communities deal with different materials, although we are seeing convergence in interest occurring. So for example some paper collectors are interested in collecting plastic as are some glass collectors. ELV and WEEE processors are taking a closer interest in plastic markets and glass outlets.
2. There is competition for material streams from different end use applications. So for example with wood there are pallet refurbishment operations competing for pallets against chippers supplying wood chip as fuel. Similarly glass bottlers are competing with second-life aggregate producers. Also WEEE might be refurbished at small scale or be processed through larger plants.
3. Operators do not necessarily see themselves as a discrete sector but may identify more with their customer base than with the waste management sector. This means that they may not be reached via the traditional communication routes used for the waste and resource management sector. This is particularly the case when dealing with plastic pre-processing.
4. Markets are in very different states of maturity. Some are vibrant and growing e.g. WEEE while others are contracting e.g. cardboard when it comes to reprocessing capacity.
5. Supply chains for mature materials tend to be vertically integrated from collection to reprocessing/ fabrication. This particularly applies for the traditional materials of paper, card and glass. It applies to some extent with ELVs particularly as compliance schemes have 'captured' ATFs as suppliers to certain fragmentiser operators. However the tight recycling targets means that the traditional focus on the metal fraction is shifting to other materials that appear in other streams (referred to as convergence materials in this report). Therefore operators are developing relationships with markets outside their normal sphere of operation.
6. Emergent markets tend to be fragmented. This particularly applies to plastics and WEEE which again cover a number of distinct material streams and wood which tends to divide between clean and contaminated timber. The exception to this is tyres which links between an established network of collectors and a number of emerging outlets.
7. A number of voluntary producer responsibility initiatives have been identified for emergent specific materials e.g. Recovinyl. These are fairly low profile but there is opportunity for linking in with these initiatives.
8. Capacity requirements vary according to material source and method of collection. Method of collection was a recurring issue for some materials particularly around co-mingled material collection and contamination across material streams reducing the quality of delivered second-life material.

Beyond Waste
15.12.06

Appendix 1

Lead Reprocessing Sector Status Review

Source: Various

Paper/Card

Pricing and margins in corrugated packaging are strongly influenced by pricing developments on corrugated case materials (CCM), the paper used as the principal component in manufacturing corrugated packaging. This typically accounts for approximately 50% of the cost of a box.

Within the total estimated European market for CCM of circa 20 million tonnes, approximately 75% is recycled paper. European CCM producers sell their product throughout Europe, so demand and pricing for CCM are heavily influenced by demand for corrugated packaging and the CCM supply position in Europe as a whole.

Growth Inhibitors	Growth Drivers
Decline in demand in EU with transfer of manufacturing to lower cost countries.	Relatively strong usage for fast-moving consumer goods, which accounts for at least 55% of the corrugated market due to the continuing growth of this economic sector.
Purchasing power of retailers and direct customers creating downward pressure on selling prices.	Home delivery of products from internet purchases.
Excess manufacturing capacity depressing selling prices throughout EU market.	Shelf-ready packaging - used as both transit and display packaging
Increased energy costs	
Relatively high cost of recovered paper due to continuing high level of demand for recovered paper in Asia.	
Relatively low paper PRNs prices during 2004 but has firmed in calendar year 2005 to date. PRN revenue offset against the cost of recovered paper.	

Table 25: Factors Affecting CCM Reprocessing Sector

Outlets for recovered paper within the UK will to a large extent be determined by the health of the UK papermaking sector[58]. In Europe there is over 1 million tonnes overcapacity much of which is taking recovered paper. Industry sources[59] predict further rationalisation of uneconomic capacity.

	Capacity Lost	Capacity Added
2005/6	200,000 tpa Denmark	400,000 tpa Spain
	150,000 tpa Switzerland	450,000 tpa France (x2)
	165,000 tpa UK	250,000 tpa Portugal
	50,000 tpa France	610,000 tpa Germany (x3)
2004		130,000 tpa Italy
2003	430,000 tpa inc UK, France & Germany	600,000 tpa Germany
Net Gain 1.445 m tpa	995,000	2,440,000

Source: Paper Technology, the official journal of the Paper Industry Technical Association (October 2005)

Table 26: Capacity Gains & Losses in Europe

[58] Presuming a recycling loop is pursued. Recovered paper can also be burnt for EfW.
[59] Primary Source: DS Smith Plc Annual Report 2005

Sale of Taplow Site and Proposed Closure of Taplow Mill

DS Smith Plc (SMDS), the international packaging manufacturer and office products wholesaler, announces further progress in the strategic rationalisation of its UK Paper and Corrugated operations. DS Smith has sold its site at Taplow near Maidenhead, Berkshire to Towntalk Limited, a commercial property developer, for a cash consideration of £30.25 million and announces the proposed closure of its Taplow Mill.

Taplow Mill, which currently manufactures 95,000 tonnes per annum of corrugated case material (CCM), has been adversely affected by difficult market conditions and substantial increases in energy costs. It made losses in financial year 2005/06 and is not expected to return to adequate profitability. Consultation will commence immediately with the Mill's 85 employees, with a view to mitigating the effects of the proposed closure. It is proposed that the closure of the Mill will be implemented by the end of October 2006. The Group's Severnside waste collection depot, which also operates on the Taplow site, will be relocated.

The consideration for the sale of the site will result in an exceptional profit in the current financial year of £20.7 million, net of the book value of the site of £9.0 million and related disposal costs. It is also estimated that the proposed closure and relocation will result in an exceptional charge to the profit and loss account in the current financial year of the order of £12 million; approximately one third of which will be cash costs and the remainder will be the write-down of assets.

The proposed closure of Taplow Mill is another important step towards raising the returns of the Group's Paper operations. Following the proposed closure of Taplow Mill, St Regis' principal mill at Kemsley will represent approximately 70% of the division's output of over 840,000 tonnes per annum of paper; Kemsley Mill is ranked in the top quartile of European CCM mills in terms of competitiveness.

Source: DS Smith Press Release 23 August 2006 http://www.dssmith.uk.com/readPR.asp?ID=166

Glass

The UK glass industry (all sectors) produces an estimated 2.8 million tonnes of glass per year, with a saleable value of approximately £1,500m.
The glass sectors divide into the following generalised sub-sectors: Container, Flat Glass, Fibre, Special and Domestic.
Production of containers for the food and drinks industry, glazing in construction and the automotive industry account for around 90% of glass produced in the UK.

Container
Container glass, mainly bottles and jars, accounts for around 64% of all UK glass production. The majority of the container glass produced in the UK is clear.

The UK container industry presently comprises seven manufacturers operating 30 furnaces on 14 sites. Total production was 1.9 million tonnes or 7 billion units in 2003.

Flat
The flat glass industry, fuelled by demand for building and automotive glass, has, over the last 20 years, achieved an average growth rate of approximately 5% per annum and represents the second largest sector in the UK glass manufacturing industry.

Currently, three companies produce flat glass in the UK and annual domestic production in 2002 was estimated at 750,000 tonnes; 70% going towards glazing products for buildings; 10% for automotive applications and 20% comprising laminated, coated low-emissivity, silvered and the resistant glasses. Production of clear float glass constitutes the single largest product and unlike container glass, is usually used in long-term applications.

Fibreglass
There are five fibreglass manufacturers in the UK operating eight sites and producing two main products. Fibre has over 40,000 different applications, including reinforcement of plastics and rubber, electronics and wall coverings. A 3% to 4% growth is forecast for the European market. Production from this sector is estimated at 220,000 tonnes per year.

Domestic Glass
Domestic glass production covers ovenware, drinking glasses and giftware. Throughout the 1990s, domestic demand supported two large-scale manufacturing operations which used to produce around 40.000 tonnes per year. The arrival of the new century marked the demise of both. The UK currently has no volume producer of domestic glass but has several small manufacturers producing giftware from either lead crystal or common soda-lime glass. Typically they operate small pot furnaces melting a few tonnes per week. Production for this sector is estimated at around 6,000 tonnes.

Special Glass

Special Glass covers an extremely diverse group - lighting, television tubes, oven hobs, optical, medical and scientific. Production capacities range from large 200 tonne per day furnaces to specialist melters producing a few kg per week.

The sector comprises some 13 operators with a combined output of around 150,000 tonnes per year, having a sales value of approx £200m.

Other Information

Data reveals a net flow of 3.6 million tonnes of glass within the UK economy; some 2.8 million tonnes is domestically produced, with net imports contributing a further 800,000 tonnes.

Sand, limestone and soda ash are the principal virgin raw materials used by the industry. Approximately 2.5 million tonnes of these minerals were used by the industry in addition to the 850,000 tonnes of recycled glass that is actually remelted.

The industry is not a large user of water, average consumption being slightly in excess of 1.0m3 for each tonne of glass produced.

Glass manufacture is an energy-intensive process and the UK industry consumes approximately 8.6 GWh of energy; 80% of this is natural gas - the majority of which is used to fire the high-temperature furnaces.

As the industry can recycle almost all of its own rejected production, very little solid waste is produced. Furnace rebuilds produce a large amount of refractory waste but this in turn can be recycled and a typical furnace has a life in excess of 10 years.

Current State of Market

The UK container glass market has experienced a 3.5% decline during the first six months of 2005 due to a decrease in demand from UK and overseas manufacturers. In addition we are seeing the continuation of a trend, which has emerged over the last 10 years, towards increased consolidation of the major players in the UK glass industry. This has led to uncertainty for some of the industry's larger customers who have previously had a choice of two suppliers for their high volume orders but now may only have one following the latest consolidation. Quinn Glass is also entering the arena with additional capacity targeted at high volume drinks customers who can take advantage of its filling and warehousing facilities.

Added to the market conditions the sharp rise in gas prices and the 'knock-on' impacts on raw material and other costs is compounded with already significantly increased costs resulting from global supply and demand issues, oil prices and the challenges posed by the ever increasing regulatory burden. 2005 witnessed a number of businesses announcing redundancy programmes and nearly one thousand jobs have been lost to the industry in the last quarter, the closure of four glassmaking facilities and one business entering administration.

Prospects

Market Expansion

50% of carbon emissions come from buildings and there are calls for a complete rewriting and extension of the building regulations to include the existing housing and commercial stock. This offers the flat and fibre glass sectors a growth opportunity.

The focus of future waste strategy on energy and carbon reduction is seen as presenting an opportunity for container glass. It is reported that plastic packaging is experiencing open hostility from the environmental lobby with threats of total bans in France. This may drive material substitution although if one accounts for the reduced weight of plastic packaging this may prove plastic to be a superior material from the transport emission element of a carbon balance. Taking the carbon view the recent argument in favour of export of glass for remelt as preferable to alternative applications suggests that there is little need to sustain UK glass making capacity for reprocessing capacity alone.

Energy Costs

The annual sector energy bill based on November 2005 prices was reported as £110m whilst that calculated on January 2006 prices was £204m. The industry is also subject to a further £3m p.a. the residual 20% of the Climate Change Levy. On top of this each company must meet its Climate Change Agreements targets if necessary through the purchase of UK CO2 allowances whilst those who entered the EU emissions cap and trading scheme may also have to purchase EU allowances to comply with that scheme.

The March 2005 Carbon Trust report "Energy Use in the Glass Container Industry" highlighted the fact that energy consumption per tonne of glass had halved over the last 20 years. In the container sector making bottles lighter had meant more bottles per tonne giving a 60-70% energy reduction per unit. Total Container energy consumption fell between 1996 and 2003 by 220 GWh or 4.5% with consumption down from 2.79 to 2.30 MWh/tonne packed.

Glass Recycling Targets

The amount of recycled glass used in making new containers in the UK increased by an stood at an all time high of 742,000 tonnes in 2005; Provisional figures also reveal that an additional 250,000 tonnes of recycled glass were exported to other EU container makers, and that alternative markets such as aggregates consumed 280,000 tonnes of glass. This could mean that the overall amount of glass recycled in the UK in 2005 was 1,272,000 tonnes, or 50.8% of the waste stream.

To meet the 2008 glass recycling target, the UK will need to expand glass recycling by around 160,000 tonnes per year. Glass collections from UK households need to almost double from 27kg per household (kg/HH) in 2003/04 to 50kg/HH by 2007/08.

Source: http://www.britglass.org.uk/Files/annual_review_2005.pdf