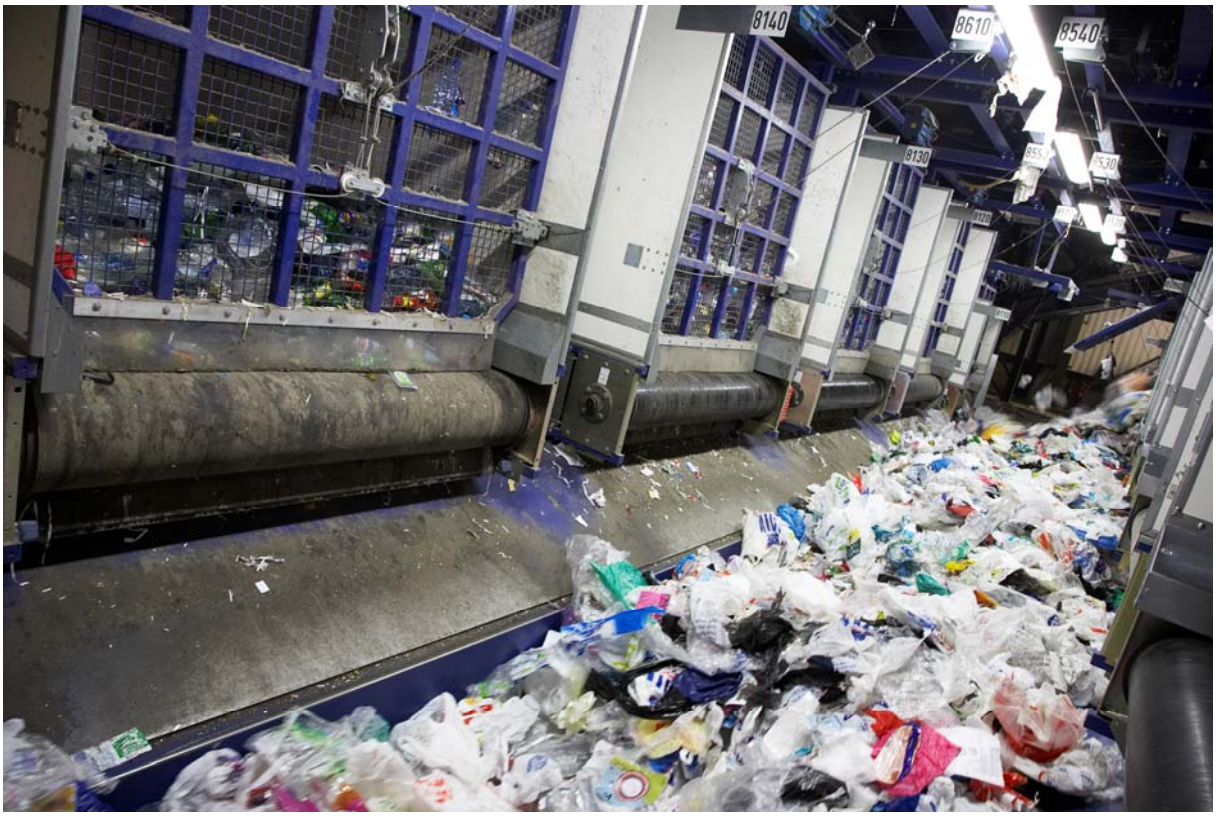
Material change for a better environment

Market Situation Report – Summer 2010

Realising the value of recovered plastics – an update



Date: August 2010

WRAP's vision is a world without waste, where resources are used sustainably.

We work with businesses and individuals to help them reap the benefits of reducing waste, develop sustainable products and use resources in an efficient way.

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Front cover photography: Mixed plastics in a materials recycling facility

Introduction

Welcome to the recovered plastic market situation report update, part of our series of reports that examine current economic conditions in the markets for recovered materials.

We published our first plastic market situation report in late 2007. This update looks at the key developments in the UK markets for recovered plastic since that report was published including trends in collections, existing and planned domestic reprocessing capacity, export markets, prices and legislative issues.

Key themes to emerge from the plastics recycling sector are:

- in 2009, an estimated 900,000 tonnes of plastics was collected for recycling. Of this, 590,000 tonnes was plastic packaging;
- over 700,000 tonnes of recovered plastics were exported for recycling in 2009, predominantly to China. About two-thirds of this is estimated to be packaging. The primary trading route for material destined for China continued to be via Hong Kong;
- the plastic bottle recycling rate now stands at over 40% and there has been extensive investment in UK plastic bottle processing capacity over the past two years;
- attention has now turned to collecting and developing infrastructure to recycle mixed packaging plastics, less than 5% of which is currently recycled. Around 20% of local authorities already operate kerbside mixed plastic collections, and 2011 will see the operation of the UK's first mixed plastic reprocessing facility;
- demand for food-grade recovered polymers currently outstrips supply. With demand likely to strengthen further, this represents an opportunity for UK manufacturers of recovered polymers;
- recycling of non-packaging plastics has also increased in recent years, largely as a result of regulatory drivers; and
- prices for recovered plastics have been volatile over the past two years, but currently stand close to, and in some cases higher than, the peaks they reached in mid 2008.

Contents

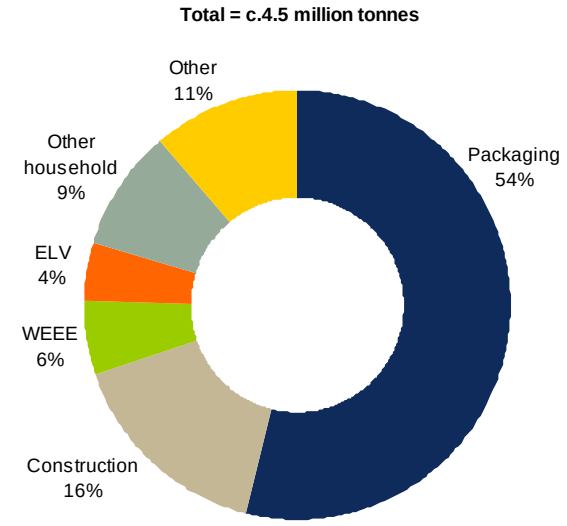
1.0 Plastics consumption and waste arisings

UK consumption of plastics is estimated to be around 5 million tonnes a year.[1] Of this, nearly half is used in packaging, and a further quarter is used in the construction sector. Long-term trend growth in plastics consumption is estimated to be around 1% per annum, although plastics consumption is believed to have fallen during the recession in 2009, largely as a result of the contraction in the construction sector.

Although estimates vary, around 4.5 million tonnes of plastics is believed to enter the UK waste stream each year. This figure is lower than the estimated consumption of plastics, because some plastics products (e.g.those used in construction) have long lifetimes and, as plastics use has increased over time, more is being used in new products than is being disposed of. Other products – such as plastic packaging – have a short lifespan, so they comprise a greater share of waste arisings than of overall plastics consumption.

More than half of plastics waste arisings – around 2.4 million tonnes – is packaging (Graph 1). About 1.7 million tonnes of this comes from households, with the rest from commercial and industrial firms. Plastics in waste electrical and electronic equipment (WEEE) and end-of-life vehicles (ELVs) collectively account for about 10% of plastics waste arisings. The remainder spans the range of other applications and comes from both household and business sources.

Graph 1: Estimated plastics waste arisings

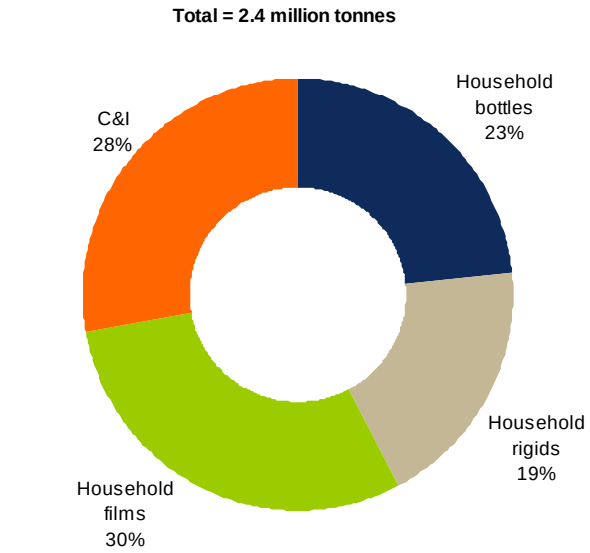


Source: WRAP estimates

[1] *Source: British Plastics Federation (BPF). This figure does not include plastics embodied in imported products (so-called 'indirect imports').*

Of the 1.5 million tonnes of plastics packaging consumed by households each year, about a third is plastic bottles, a quarter is rigid plastic packaging (such as pots, tubs and trays) and the remainder is films and bags (Graph 2). Commercial and industrial plastic packaging waste tends to be plastic films, which are used as secondary packaging (to get a product to a retailer or distribution centre), and larger rigid items such as crates, totes and drums.

Graph 2: Plastic packaging waste arisings (2009)



Source: Defra and WRAP estimates

2.0 Plastics collection and recycling in the UK

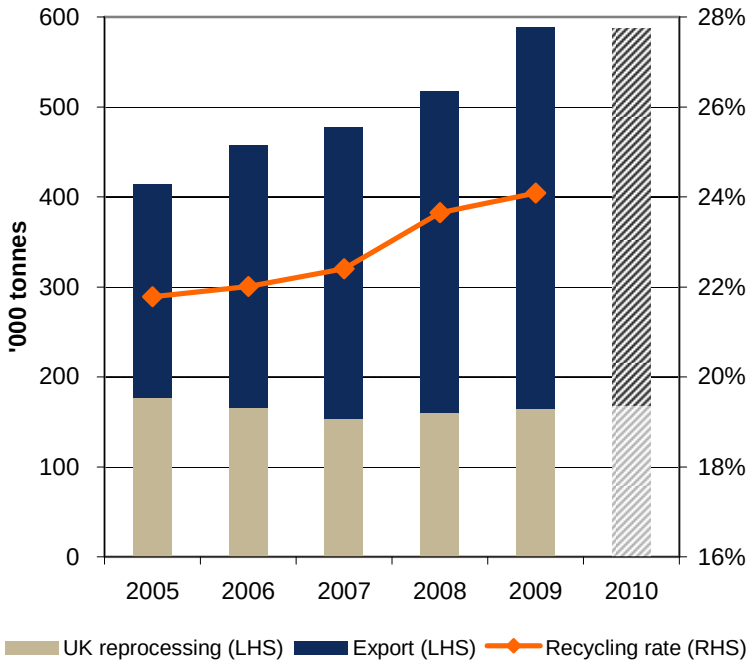
It is estimated that 900,000 tonnes of plastics were recovered for recycling in 2009, although a lack of comprehensive data means that there are wide margins of error around this figure. The vast majority of this was packaging, ELV and WEEE plastics, in large part reflecting the legislative drivers targeting these waste streams.

2.1 Plastic packaging

The amount of plastic packaging recovered for recycling has grown rapidly in recent years. According to the National Packaging Waste Database (NPWD), around 590,000 tonnes of plastics packaging was recycled in 2009, 14% more than in 2008 and 23% more than in 2007. Nevertheless, this equates to a recycling rate of under 25% (Graph 3). The true level of recycling could be understated because the NPWD data include only plastics reprocessed or exported by businesses accredited with the Environment Agency (EA). As will be discussed later, this understatement could be more acute now than it has been in the past.

The recent increase in packaging recycling has come mainly from plastic bottles. The following sections consider the state of play for a wider range of plastic types, and the prospects for UK plastic packaging collection and recycling.

Graph 3: Plastics packaging recovery and recycling



Source: Defra, NPWD and WRAP calculations.
2010 data grossed up from Q1 and Q2 returns.

2.1.1 Local authority collections

More than half of the plastic packaging collected for recycling is from the municipal waste stream. In 2008/09, UK local authorities (LAs) are estimated to have collected 320,000 tonnes of plastics from the municipal waste stream (Table 1), almost three times what they collected in 2005/06

Table 1: Plastics recovered from the UK municipal waste stream (2008/09)
thousand tonnes

	Kerbside	Bring/CA sites	Other	Total
England	229	38	1	**268**
Wales	15	4	0	**19**
Scotland	17	3	0	**21**
Northern Ireland	10	0	0	**11**
Total	**271**	**45**	**2**	**318**

Note: Data relate to amount of material collected for recycling. 'Other' includes municipal collections of commercial, industrial and other non-household waste. Data include an assumed plastic fraction from co-mingled collections.
Source: WasteDataFlow and WRAP estimates.

The growth in plastics collections has been achieved by rapid expansion in LA kerbside collection schemes. In 2008/09, more than 80% of UK LAs operated kerbside plastic collection schemes (Table 2). In terms of household coverage, it is estimated that 70% of households have plastic bottle collections. By contrast, only around 20% of LAs offered kerbside collections of mixed (non-bottle) rigid plastics.

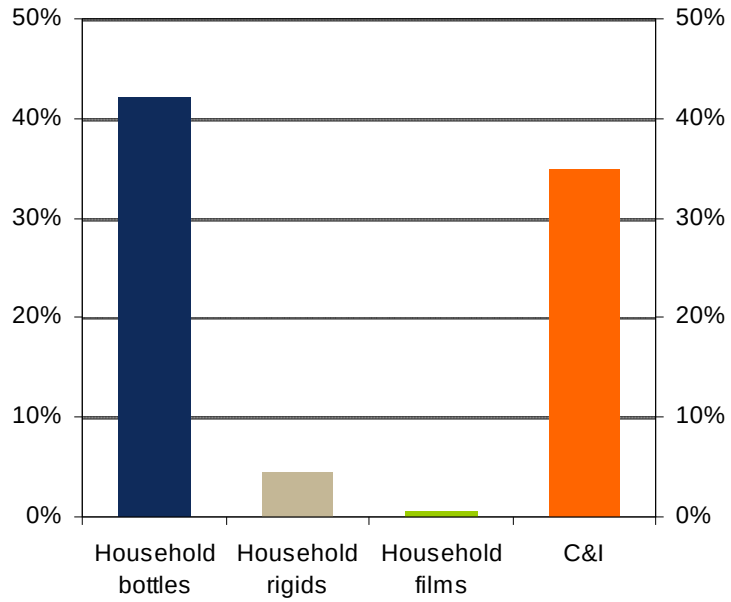
Table 2: Local authority plastic collection schemes (2008/09)

	Plastic Bottle Collections		Mixed Plastic Collections	
	Number of authorities	*Percentage*	*Number of authorities*	*Percentage*
England	279	*79%*	73	*21%*
Wales	19	*86%*	10	*45%*
Scotland	26	*81%*	4	*13%*
Northern Ireland	26	*100%*	0	*0%*
UK	**350**	***81%***	**87**	***20%***

Note: This information represents WRAP's best understanding of plastic collections schemes being operated by local authorities in the UK during 2008/09. Not all households within the local authority may have access to these collection schemes. Schemes that are offered to less than 5% of households or 3,000 households in the authority (whichever is lowest) are not counted in this analysis.
Source: WRAP

Accordingly, the vast majority of the plastic packaging collected from households for recycling is plastic bottles. Data from Recoup's annual household plastic packaging collection survey[2] suggest that around 90% of the plastic packaging collected from local authorities is plastic bottles. The recycling rate for plastic bottles is estimated to be over 40% compared with around 20% in 2006. By contrast, less than 5% of mixed plastic packaging is recycled (Graph 4).

Graph 4: Plastic packaging recycling rates (2009)



Source: WRAP estimates based on data from NPWD, Defra and Recoup

In order to bring the recycling rate for rigid plastic packaging to a level comparable with that for plastic bottles, a further 160,000 tonnes of rigid plastic packaging would need to be collected. To achieve this, more mixed plastics collection and sorting capacity will need to be put in place. However, the substantial growth in mixed plastics collection and sorting must be achieved in a way that does not impair downstream recycling activities. Collection quality is key to the technical and commercial viability of recycling operations. WRAP research has shown that widening existing plastic bottle collections to collect all rigid packaging will be cheapest for LAs that already collect plastics co-mingled with other materials,[3] but there are examples of LAs that collect mixed rigid plastics separate from other materials.

Plastic films are more difficult to collect than rigid plastics, because they are hard to separate once combined with other materials. Reflecting this, WRAP has been working with retailers on behalf of the OPRL on-pack recycling label scheme to expand the collection of plastic films for recycling through existing front of store carrier bag banks, and an on-pack label has been produced to help communicate this recyclability to consumers.

[2] *Recoup (2009), 'UK household plastics packaging collection survey' www.recoup.org*
[3] *Source: 'The financial costs of collecting mixed plastics packaging', WRAP, June 2009.*

2.1.2 Domestic recycling of plastic packaging

NPWD data suggest that around 165,000 tonnes of plastic packaging were recycled in the UK in 2009. This figure has been stable for a number of years, despite substantial investment in UK plastic bottle processing capacity. Part of the explanation for this apparent inconsistency is that some of the new facilities are sorting and baling plastics that are subsequently exported for recycling, and some of the new capacity is not yet fully utilised (in part as a result of fires in 2009 that affected two major facilities).

However, it is likely that some domestic recycling activity is not reflected in the NPWD statistics because it is undertaken by facilities that are not accredited by the EA (there is no legal obligation to be accredited). Lower PRN prices in 2010 have reduced the incentive to obtain accreditation, although there does not appear to have been a fall in the number of accredited plastics reprocessors. Nevertheless, it seems probable that the NPWD data understate the amount of domestic recycling of plastic packaging because NPWD does not record any recycling beyond that needed for compliance with the packaging regulations.

There is estimated to be about 280,000 tonnes of annual capacity in the UK to sort and/or reprocess plastic bottles. An additional 100,000 tonnes of annual plastic bottle reprocessing capacity is planned to come on-stream over the next five years. Although this capacity seems high relative to the amount of bottles currently collected, collections are continuing to grow and some of this is also used for non-bottle plastics.

At present, the main outputs from domestic reprocessing facilities are non-bottle products, including non-food recovered plastics and food-grade sheet. However, there has recently been significant investment in bottle-to-bottle facilities, the first of which starting operating in 2008.

To date, there has been less investment in domestic capacity to recover and recycle mixed plastic packaging. A key barrier has been a lack of capacity to sort mixed plastics into separate polymer streams, which in turn reflects the difficulty of competing with low-cost manual sorting in the Far East. As a result, most of the mixed plastics collected are exported for reprocessing.

WRAP research[4] has shown that plastics recovery facilities (PRFs) that sort mixed plastics into separate polymers can be commercially viable in the UK. Indeed, PRF capacity has already started to develop in the UK, with two firms already having built plastic sorting lines that can sort and bale non-bottle rigid plastics although neither is capable of handling plastic films.

In 2009, WRAP awarded grant funding to support the development of the first UK facility to be able to both sort and process a range of non-bottle rigid polymers from municipal plastics collections. The Greenstar WES facility is expected to starting operating in early 2011, and it is hoped that its development will help catalyse further investment in the sector. Key to the success of future investments will be the development of collection schemes that are able to provide a secure supply of high quality mixed plastics feedstock.

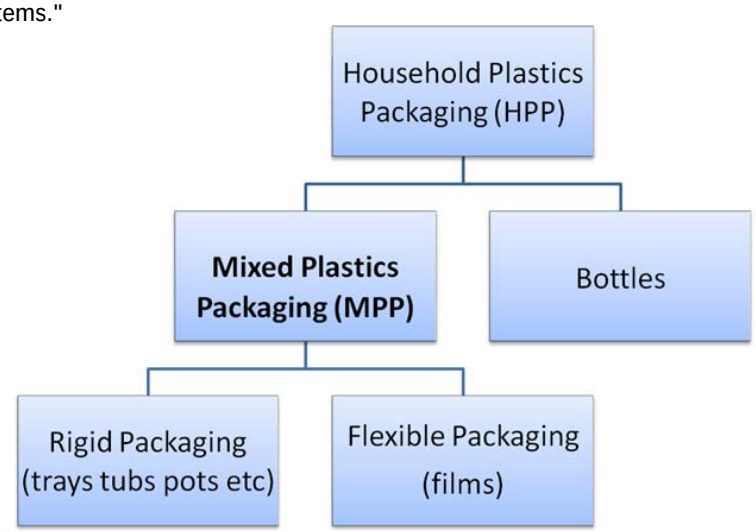
New EU legislation that requires all recycling processes used to manufacture recycled plastics for food contact to be authorised by the European Food Safety Authority (EFSA) came into force at the end of 2009.[5] Existing facilities can continue to operate pending authorisation, provided they have previously received national government approval. However, no new plants or processes may supply food-contact recycled plastics until they have received EFSA approval. To date, operators in the sector have not reported any difficulties arising from the new arrangements.

[4] *'A financial assessment of recycling mixed plastics in the UK', WRAP, June 2009.*
[5] *Regulation (EC) 282/2008*

Definition of mixed plastics

One barrier to developing the market and infrastructure to recycle mixed plastics has been the differing interpretations of the composition of this waste stream. The definition of the term 'mixed plastics' has been the subject of industry-wide debate, with much of the discussion centred on whether or not 'mixed plastics' include plastic bottles and commercial waste. This lack of an agreed definition has led to confusion and inconsistent specifications for mixed plastic waste.

WRAP uses the following definition when referring to mixed plastics: "Mixed plastic is a term that covers all non-bottle plastic packaging sourced from the household waste stream, including rigid and flexible plastic items of various polymer types and colours that are typically found in the household waste bin. It excludes plastic bottles and non-packaging items."



Under this definition, mixed plastics include packaging items such as plastic trays, films, pots and tubs. This definition does not encompass plastic bottles or plastic items that are not used in packaging, such as plant pots or toys.

2.1.3 Domestic demand for recycled plastics

There is strong demand for recovered clear PET and natural HDPE bottles. Domestic demand for food-grade recycled plastics currently outstrips domestic supply, and there are believed to be significant imports, largely from the EU, to meet this demand. Accordingly, prices for food-grade rPET and rHDPE are currently comparable with virgin polymer prices.

Demand – and hence prices – for recovered coloured plastics is lower, because the end markets for this material are more limited. Coloured PET is typically used in strapping (which has 100% recycled content), while coloured HDPE is used in applications such as buckets and pipes.

Demand for food-grade recycled plastics has increased in recent years as retailers and brand owners seek to increase the recycled content of their products. For example, a number of brands active in the UK have introduced high rPET content and/or are looking to increase the rPET content into their packaging.

There are limited, if any, financial savings from switching to recovered food-grade polymers, but there have been other drivers for the increase in demand. For example, the Milk Roadmap[6] included a commitment to increase the rHDPE content in new milk bottles to 10% by 2010, 30% by 2015 and 50% by 2020. To meet the 2020 requirements of the Milk Roadmap, the dairy sector will need around 60,000 tonnes of rHDPE per year.

[6] *'The Milk Roadmap', Dairy Supply Chain Forum, May 2008.*

Looking forward, the Courtauld Commitment Phase 2 is likely to support further increases in demand for rPET and rHDPE because one of the ways in which signatories can reduce the carbon impact of their packaging is by increasing its recycled content. [7]

The strong and increasing demand for food-grade recovered polymers represents an opportunity for UK manufacturers of recovered polymers. Nevertheless, market anecdote suggests that the capital expenditure and risk – particularly security of feedstock – is discouraging some processors from entering the market.

2.2 Non-packaging plastics

Recycling of non-packaging plastics has also increased in recent years, largely as a result of regulatory drivers. A further driver for market development was the launch of the Non-Packaging Plastics Quality Protocol in May 2009.[8] The protocol was produced in consultation with key stakeholders from the plastics industry, and establishes end-of-waste criteria for the production of secondary raw materials from waste non-packaging plastics. Plastic converters or manufacturers who buy Quality Protocol compliant material may benefit from a reduction in their material costs; and will have the assurance they are purchasing a fit-for-purpose and consistent non-waste product.

2.2.1 WEEE

The Waste Electrical and Electronic Equipment (WEEE) Directive seeks to increase re-use and recycling of WEEE by making producers responsible for financing the collection, treatment, and recovery of WEEE and by obliging distributors to allow consumers to return their waste equipment free of charge. The current directive – which came into force in 2007 – set a collection target of 4kg per person per year by 2008.

450,000 tonnes of WEEE were collected from the household waste stream for recycling in 2009, almost 10% more than in 2008.[9] This equates to slightly less than 8kg per person.

The increase in collections in 2009 was driven by higher collections of display equipment and small WEEE (such as small kitchen appliances and mobile phones). Collections rose despite a 10% decline in household purchases of electrical and electronic equipment (EEE). As a result, the apparent collection rate (WEEE collected divided by EEE placed on the market in the same period) rose to 37% in 2009 from 31% in 2008. The collection rate for small WEEE items rose from 13% to 19%, while the collection rate for large WEEE rose from 41% to 48%.

As a result, the apparent collection rate (WEEE collected divided by EEE placed on the market in the same period) rose to 37% in 2009 from 31% in 2008. The collection rate for small WEEE items rose from 13% to 19%, while the collection rate for large WEEE rose from 41% to 48%.

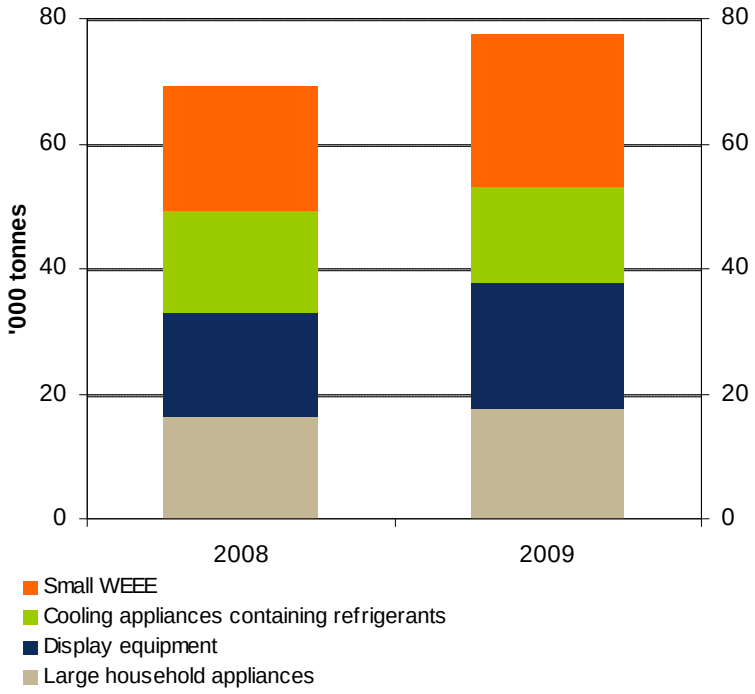
A number of factors complicate the interpretation of these changes in collection rates. First, the recession is likely to have temporarily affected both purchasing behaviour and recycling behaviour (perhaps because a greater proportion of purchases might have been to replace broken equipment which was then disposed of rather than to upgrade functioning equipment which might be kept as spares). Second, the apparent collection rate for display equipment is currently biased upwards because heavy CRT monitors are being replaced by lighter LCD screens.

The recast of the WEEE Directive proposes higher collection targets. One proposal is a target equal to 65% of the average weight of electrical and electronic equipment placed on the market over the two previous years. Although the exact structure of the targets has yet to be agreed, this suggests that WEEE collections might have to almost double over the next 10 years.

The plastics fraction of WEEE is estimated to be 12%-16% for large WEEE (such as washing machines, fridges and televisions) and around 30% for small WEEE.[10] This suggests that 75,000-80,000 tonnes of WEEE plastics were collected from the UK municipal waste stream in 2009 (Graph 5).

[7] *For more information, see http://www.wrap.org.uk/retail/courtauld_commitment/index.html*
[8] *The Quality Protocol for the manufacture of secondary raw materials from waste non-packaging plastics.*
[9] *Source: Environment Agency WEEE UK data reports. Small WEEE is defined as categories 2-9.*
[10] *Source: WRAP market analysis.*

Graph 5: Estimated collections of household WEEE plastics



Source: WRAP estimates

Market contacts indicate that there is domestic capacity to process only about 5,000 tonnes of WEEE plastics per year. Accordingly, more than 90% of the UK's recovered WEEE plastics are currently exported for reprocessing. However, under the Stockholm Convention, plastics containing brominated flame retardants (e.g. circuit boards and cabling) cannot be legally exported out of the EU for recycling.[11] This suggests that, as collections of WEEE increase, more domestic reprocessing solutions will have to be found.

2.2.2 Other non-packaging plastics

Around two million vehicles reach the end of their life each year in the UK. These vehicles are classed as hazardous waste until they have been fully treated. An estimated 1.1 million tonnes of end-of-life vehicles (ELV) were scrapped in the UK in 2007, of which 920,000 tonnes were recovered for recycling.[12] With 9% of a typical passenger car made of plastic,[13] this suggests that around 85,000 tonnes of ELV plastics is potentially recoverable, although in practice much of this is difficult to separate from other materials. ELV plastics comprise a wide range of polymers, the most common being polypropylene (which is used in bumpers, wheel arch liners and dashboards) and polyurethane (which is used in seat foam).

[11] *For more information see* Stockholm Convention *on Persistent Organic Pollutants (*POPs*)*.
[12] *Source: Eurostat http://epp.eurostat.ec.europa.eu/portal/page/portal/waste/data/wastestreams/elvs*
[13] *Source: ACORD (2001). More recent data suggest that this may have increased to 12%.*

An estimated 700,000 tonnes of PVC were consumed in 2008 in the UK, down from around 770,000 tonnes in 2007. Data from Recovinyl indicate that around 34,000 tonnes of post-consumer PVC was recycled in 2009, compared with 43,000 tonnes recycled in 2008. The decline largely reflected the impact of the downturn in new-build construction activity on the demand for new windows. Large renovation projects still provided old windows and window recyclers registered some increase in the volume of this material collected.[14]

More than 225 tonnes of vinyl flooring waste has been collected since January 2009 under the Recofloor initiative, the UK's first vinyl flooring take-back scheme. This represents only a small fraction of waste arisings of vinyl flooring but the scheme is a key step in demonstrating the viability of vinyl floor recycling.

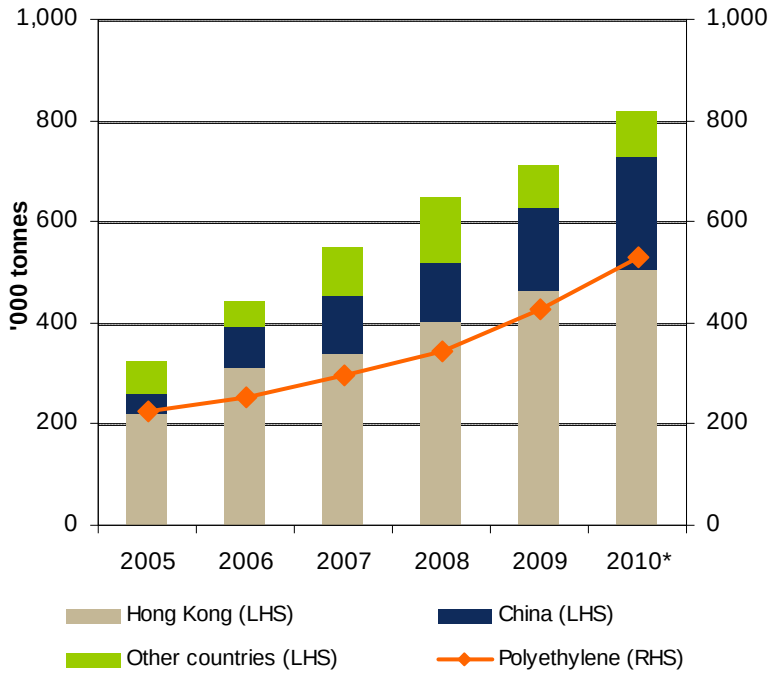
[14] *Source: Vinyl 2010 Progress Report, Vinyl 2010.*

3.0 Export markets for recovered plastics

The UK exports a large proportion of its recovered plastics for recycling – to China in particular. Exports of recovered plastics increased from 548,000 tonnes in 2007 to 711,000 tonnes in 2009 (Graph 6). Almost 90% of this was ultimately destined for China. The primary route for shipping plastics to China continues to be via Hong Kong – around three-quarters of plastics destined for China travel via this route. Around 60% of the UK's recovered plastic exports are polyethylene polymers (HDPE or LDPE), which would be consistent with these being primarily packaging plastics.

Chinese imports of recovered plastics rose by 6% from 6.9 million tonnes in 2007 to 7.3 million tonnes in 2009. The UK's share of total Chinese imports stands at around 10%, hence the UK is much more dependant on China as an end market for its recovered plastics than China is on the UK as a supplier of recovered plastics. This means that UK materials need to compete with those from other countries and that UK exporters (and domestic processors) generally have to accept prices set by Chinese buyers (i.e. UK market participants are price takers).

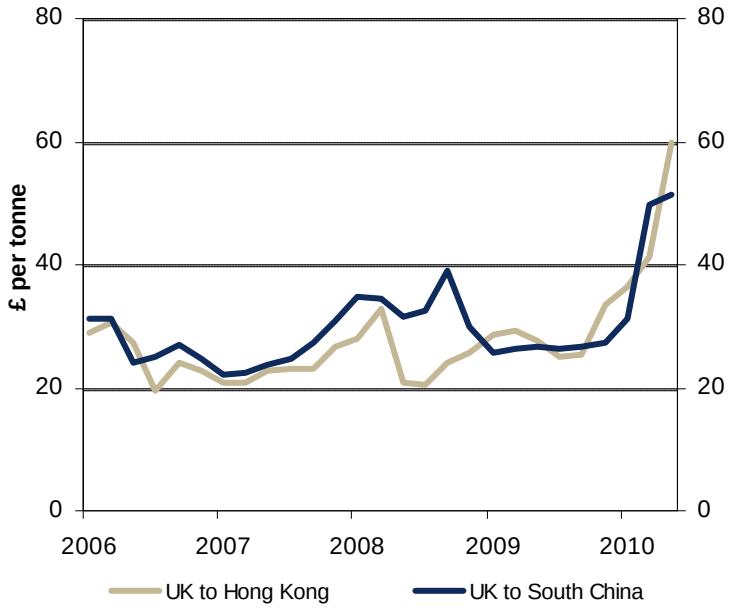
Graph 6: UK exports of recovered plastics



Source: HM Revenue and Customs.
2010 data grossed up from data to April 2010.

In 2009, direct shipments to China grew much more rapidly than transhipments via Hong Kong. The balance of exports to Hong Kong versus exports to mainland China reflects the relative economics of the two routes and the nature of import controls. Market contacts have suggested that key factors prevailing in 2009 were higher shipping costs to Hong Kong relative to mainland China, and increased enforcement of import controls on shipments from Hong Kong to mainland China. In early 2010, freight rates to both China and Hong Kong increased sharply (Graph 7), but it is too soon to observe what effect this might have on the pattern of trade. Despite the trend towards a greater proportion of direct shipments, 70% of the UK's combined exports to Hong Kong and mainland China are still destined for the former.

Graph 7: Container freight rates



Source: Drewry and WRAP estimates. Note that these rates are indicative and not necessarily the actual prices paid by UK recycling industry exporters.

Recent changes to Chinese regulations suggest that China is tightening its enforcement of import controls. For example, as of April 2010, additional detail was required in paperwork for imports of some recovered materials in order to clarify their nature and condition. In addition, new packaging requirements for imports of some scrap materials came into force in June 2010, the intention of which appears to be to stop importers who try to evade import duties on certain materials by misclassifying them. There remains uncertainty about the likely impact of a change to Chinese import legislation, announced last year, that appears to allow whole (as opposed to chopped) clear and blue tinted PET bottles to be imported directly into China.

Chinese perceptions of the relative quality of UK recovered plastics were analysed in recent WRAP research.[15] A survey of Chinese reprocessors and trade associations suggested that UK recovered plastics were perceived to be of relatively good quality, but by no means the best, and that there were some grade-specific issues. A key risk facing the sector is that a fall in demand or increased focus on quality in China might close some end markets for lower quality UK materials.

[15] *Source: 'China Market Sentiment Survey', WRAP, February 2010.*

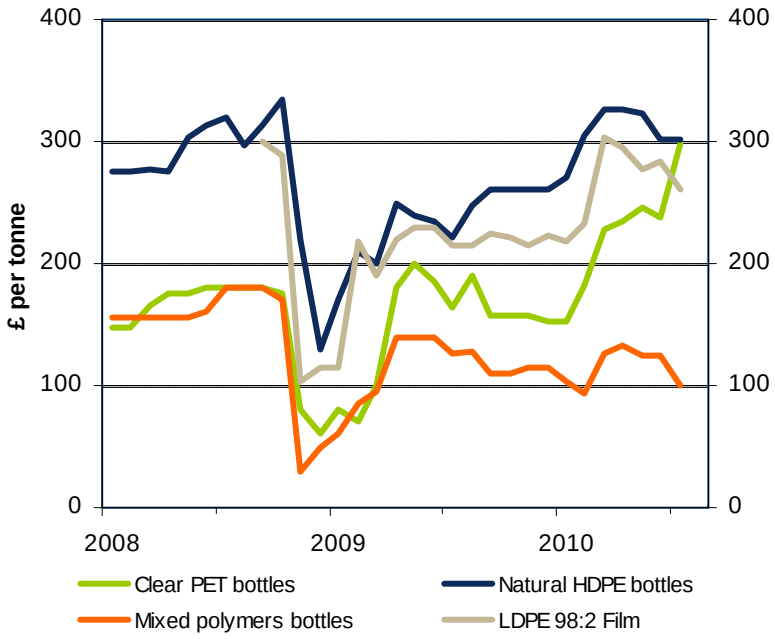
4.0 Prices

Recovered plastics prices have been unusually volatile over the past two years.

Prices for recovered plastic packaging fell sharply at the end of 2008 as the combination of lower demand from China, increased concern about counterparty risks and difficulty in obtaining trade finance led to temporary disruption in market functioning (Graph 6). Prices and export volumes both recovered in early 2009 as Chinese buyers returned to the market in early 2009 to take advantage of the low prices available. This episode demonstrated the risks of reliance on a few export markets – a broader base of domestic market outlets may have forestalled some of the volatility. Nevertheless, the disruption to the market was relatively short-lived, and demand recovered quickly.

Prices for high quality sorted materials (such as clear PET and natural HDPE bottles) increased further in the first half of 2010, reaching or even surpassing their late 2008 peak levels (Graph 8). Prices for other grades of recovered plastics have been broadly stable since the middle of 2009. Strong demand from Chinese reprocessors, which has been compounded by the depreciation of sterling against the US dollar (prices are typically set in US dollars), appears to be the main factor driving prices. Other factors include strong domestic demand for food-grade recovered plastics, tight domestic supply (which may reflect lower consumption as a result of the recession) and higher virgin plastics prices. Historical prices are not available for mixed packaging plastics, but market contacts indicate that prices are typically in the range £0 - £40 per tonne.

Graph 8: Prices for recovered plastics

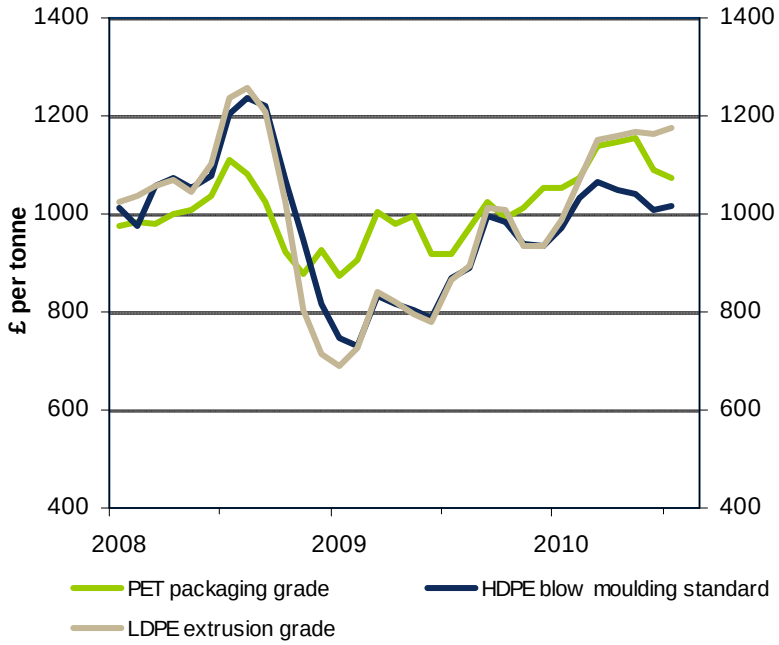


Source: WRAP Materials Pricing Report

Market contacts indicate that WEEE plastics prices have followed a similar pattern to plastic bottle prices over the past two years. Recovered plastic from fridges and televisions (which include typical engineering plastics such as ABS and PS) traded in the region of £190-200 per tonne in September 2008, but fell to £60-£110 per tonne in early 2009. Prices subsequently rebounded and, by early 2010, stood at around £160 per tonne.

Virgin plastic prices are a key determinant of recovered plastic prices.[16] Recovered plastics prices typically trade at a discount to virgin polymer prices (although strong demand for food-grade recovered plastics has eroded this differential). Prices of virgin plastics fell at the end of 2008 – as did those of other commodities, including crude oil. Prices recovered throughout 2009, driven in part by rising oil prices, and by mid 2010, they were approaching their mid-2008 highs (Graph 9). Virgin PET prices were significantly less volatile than HDPE prices during this period, in part because the inputs for virgin PET are less highly correlated with oil prices.

Graph 9: Virgin plastics prices



Source: Plastics Information Europe (Piew eb), DOE

Bio-based plastics[17]

The bio-based plastics market in the UK is in its infancy: industry sources have suggested UK consumption of just 15,000 tonnes per annum in 2007, less than 1% of total packaging plastics consumption.[18]

Although recycling is technically feasible for some bio-based plastics, this does not happen at present because volumes are too low to make recovery economic. Meanwhile, because consumers are unsure how to identify and dispose of them, contamination of conventional recovered plastics streams with bio-based plastics increases costs and can lead to quality problems.

The global bio-based plastics market is forecast to increase dramatically in size over the next few years, from production of 0.36 million tonnes in 2007 to 2.33 million tonnes by 2013[19]. However, when set against global plastics production of 245 million tonnes in 2008, the market will remain small.[20]

Therefore, despite the forecast rapid pace of growth, the amount of bio-based plastics in the UK waste stream is unlikely to be sufficient to form a viable stream of recyclable material in the near future. But there is a need to ensure that sorting facilities are capable of identifying and removing bio-based plastics from other recovered plastics streams, and WRAP has demonstrated that bio-based plastics can be sorted using infra-red technology.

[16] *'The global determinants of recovered plastic prices', WRAP, 2008.*
[17] *The term 'bio-based' refers to plastics manufactured from crop (i.e. non-oil) sources.*
[18] *Source: HGCA: Industrial uses for crops: markets for bio-plastics, April 2009.*
[19] *Based on company announcements. Source: 'Product overview and market projection of emerging bio-based plastics' European Bio-Plastics, 2009.*
[20] *Source: PlasticsEurope.*

5.0 Conclusions and challenges going forward

There have been rapid increases in the amount of plastics recycled in recent years, and it is estimated that around one quarter of plastic packaging in the waste stream is currently recycled. The recycling rate for plastic bottles stands at over 40%.

Given that more than 80% of local authorities already have kerbside collections of plastic bottles, further increasing the recycling rate for plastic packaging would require widening existing plastic bottle collection schemes to include mixed (non-bottle) rigid plastics and significantly improving capture rates from existing schemes. Any substantial growth in plastics collections must be achieved in such a way that the quality of the material collected does not compromise downstream recycling activities. Central to this will be an increase in sorting and reprocessing capacity.

There has already been substantial investment in domestic plastic reprocessing capacity in recent years, particularly closed-loop food-grade facilities. With a pipeline of further planned new capacity, one challenge will be to ensure that the new domestic facilities are able to secure supplies of appropriate material in the face of prices set by strong overseas demand.

Despite this expansion in domestic reprocessing capacity, the UK remains heavily dependent on export markets for recycling its recovered plastics. Recent market volatility and uncertainty in key export markets have highlighted the risks associated with having concentrated end markets. Accordingly, there is a need to continue to develop a portfolio of markets for UK materials.

Glossary

C&I	Commercial and industrial
EA	Environment Agency
EEE	Electrical and electronic equipment
EFSA	European Food Safety Authority
ELV	End-of-life vehicle
HDPE	High density polyethylene, typically used in milk bottles and shampoo/cleaning product bottles
HMRC	HM Revenue and Customs
NPWD	National Packaging Waste Database
PET	Polyethylene terephthalate, typically used in fizzy drink/water bottles and salad trays
PRF	Plastics recovery facility
PRN	Packaging Recovery Note
rHDPE	Recycled HDPE
rPET	Recycled PET
WEEE	Waste electrical and electronic equipment

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