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Creating markets for recycling resources

UK Plastic bottle recycling survey 2006

March 2006

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1 Executive summary

WRAP commissioned Recoup to undertake a national UK household plastic bottle recycling survey. This is the twelfth such annual survey undertaken by Recoup. The results are based on responses and information from all 471 local authorities within the UK. Work on the survey commenced in October 2005 and culminated in the publication of this report in March 2006.

To gain a more accurate idea of the actual tonnage collected during 2005 calculations have been made to take into account the likely gradual increase in tonnage collected throughout the year. It is therefore estimated that 67,000 tonnes of plastic bottles were collected during 2005, equating to an actual recycling rate of 13% for that year.

Collections are now performing at an annualised rate of 85,000 tonnes per annum, which equates to 17% of bottles in the household wastestream. This is almost double the quantity collected in 2004, with a significant increase in collections through both kerbside and bring collections.

Of the UK's 471 local authorities, 86% now offer recycling collection facilities for plastic bottles, ranging from one or two bring sites through to comprehensive kerbside coverage. 403 local authority recycling managers confirmed plastic bottle collection facilities within their council area. This reveals a 16% increase in scheme numbers, with a net increase of 55 schemes since the end of 2004. This therefore means that only 14% of UK local authorities do not currently offer a recyclables collection service to their charge-payers that includes plastic bottles.

11.5 million households in the UK now have the opportunity to participate in kerbside recycling collections that include plastic bottles, equating to 47% of all UK homes. A breakdown by country shows that 47% of households in England, 37% in Wales, 35% in Scotland and 90% in Northern Ireland have a kerbside system that includes plastic bottles.

The growth in plastic bottle recycling facilities can be attributed to a number of factors including:

- Increasing pressure for local authorities to provide effective recycling programmes in order to meet recycling targets and rising landfill tax on residual waste
- Government funding
- Increased recognition that plastic bottle recycling facilities can be provided cost effectively
- Improved baling/handling infrastructure
- Strong public demand for the service locally
- An increase in alternate weekly collections
- Increased confidence in markets for collected plastic bottles

Plastic bottle recycling is not a key driver for local authorities considering their recycling strategy. This is because bottles are low weight high volume items and existing recycling targets are weight-based. Despite these challenges, the increase in Government funding for new recycling infrastructure to hit statutory targets combined with strong public demand and the opportunity to introduce collection affordably, are enabling many local authorities to provide comprehensive recycling collections for a wide range of materials, including plastic bottles.

Collection scheme design is critical to ensure that the successful expansion of recycling schemes remains affordable. It is also important for local authorities to factor in cost savings in residual waste management when budgeting for recycling. Local authorities already incur significant costs collecting plastic bottles within the conventional wastestream and it is important that this is recognised and taken into consideration so that refuse and recyclables collections can be organised to enable valuable materials such as plastic bottles to be diverted from landfill to new product manufacture.

An increasing number of local authorities are now recognising that plastic bottles can be collected for recycling cost effectively. Ninety-one of the local authorities that responded to the survey reported that it costs them little or no extra to collect their plastic bottles for recycling compared to collecting them for landfill/other disposal route.

The four most important reasons given by local authorities for not including plastic bottles in their recycling schemes were, in order of priority:

- Focussing on heavier materials to hit weight based recycling targets (35%)
- Cost: A scheme has been costed and viewed as too expensive (22%)
- Difficult to add plastics due to use of kerbside sort vehicles - not enough compartments available (16%)
- No suitable local baling/handling facility (e.g. MRF) (12%)

Many factors will influence the current and future collection of plastic bottles for recycling. The survey revealed that the provision of plastic bottle recycling within kerbside collections is set to exceed 13.5 million households during 2007, representing 55% of UK households. In addition to this, 6,700 bring sites are expected to be operational by the end of 2007.

Despite the increasing coverage of recycling facilities, existing schemes capture just 17% of plastic bottles consumed in the household wastestream. There is thus a real need to focus on good practice and the removal of scheme inefficiencies to optimise current systems. There is a clear indication that a greater improvement in recovery rates can be achieved through the improvement of scheme performance, rather than extending plastic bottle recycling scheme coverage.

The average quantity of plastic bottles collected from households that are offered this service is now 5.5 kg/hh/annum, an increase of 1.6 kg/hh/annum on last year. Wheelbins have been shown to perform particularly well, having a higher average recovery rate than either boxes or bags. Given the now fairly comprehensive coverage of plastics recycling facilities throughout the UK, there is an opportunity to start targeting plastic bottles for recycling as part of national campaigns, which should help to increase this further.

Survey results demonstrate that it is important to continue to:

- Move emphasis towards kerbside systems, which on average outperform bring schemes by 4:1
- Increase the performance of existing kerbside schemes
- Provide local authorities with the information required to achieve sustainable, cost effective plastic bottle recycling. It is particularly important to high light the fact that purchasing sort-at-kerbside vehicles without full consideration of potential future changes can limit the versatility of the collection and the materials that can be collected
- Review baling/handling infrastructure in the UK and assess the potential to encourage expansion where necessary
- Communicate to members of the public which plastic items are suitable for recycling and why plastics other than bottles should not currently be placed in recycling receptacles unless specifically requested
- Encourage the provision of suitable alternatives to households unable to participate in kerbside such as tenement properties - work in this area is being taken forward, with a greater number of local authorities trialing recycling schemes from this type of property
- Review development in mixed plastic collection and provide fuller guidance in the area

Much work has been undertaken in the past year to address the above points, hence the noticeable increase in both the number of local authorities including plastic bottles in their recyclables collections and in the quantity of bottles being diverted from the residual wastestream for recycling. It is important that this work is continued if further improvements are to be seen. With regard to the recycling of other household plastics, 55 local authorities (just over 10%) stated that they were collecting plastics other than bottles. These plastics included various combinations of carrier bags, packaging film, tubs and trays, plant pots, expanded polystyrene and other dense plastics. These local authorities indicated that they had few or no problems with their schemes, yet few of them knew, or chose to state, where the material was being sent for recycling.

It is probable that, until the market for mixed plastic packing is better developed and understood and UK markets become available, the number of local authorities collecting this material will remain comparatively low. Work will also be required to demonstrate to local authorities that mixed plastic packaging is worth collecting for recycling and can be collected without causing operational issues. It is recommended that case study work be undertaken to further assess those local authorities that are currently collecting other household plastics for recycling in order to progress this.

The information within this document covers all the main elements of household plastic bottle collection systems. It provides current performance data across the UK for both bring and kerbside schemes together with analysis of key operational parameters, costs, local authority perceptions and predictions on future growth.

We would like to thank all recycling scheme managers who have taken the time to respond and have enabled us to compile this document.

2 Introduction and methodology

2.1 Introduction

WRAP commissioned Recoup to undertake a survey of local authority domestic plastics recycling schemes and to use this data to produce a survey report.

The purpose of this report is to enable WRAP to access data, which will support its programme by providing an up-to-date status of the current level of plastic bottle recycling in the UK. WRAP let a two year contract to ensure common methodology, enabling direct comparison between the 2005 and 2006 surveys.

Recoup has undertaken eleven previous UK plastic bottle recycling surveys, including the ones produced on behalf of WRAP in 2004 and 2005.

2.2 Methodology

Work on the survey commenced in October 2005 and culminated in the publication of this report in March 2006. Recycling managers from all 471 UK local authorities were contacted by e-mail to request participation in the survey. Recycling managers were encouraged to enter data directly into an electronic form accessible over the Internet, although postal/fax back forms were also made available on request.

E-mail reminders were sent to local authorities that did not respond to the initial invitation to participate in the survey. Local authorities that did not respond to the reminder were interviewed by telephone. Data supplied by local authorities over the Internet was entered automatically into the database, whilst data supplied by postal/fax back forms, or through telephone interviews was entered into the database by Recoup.

Data was reviewed and any apparent anomalies checked by telephone with the relevant local authority before analysis. This included comparisons with earlier survey data and other information available to Recoup. Supporting and cross-reference information was also obtained from local authority websites, the Audit Commission and other sources to assist this process and later analysis.

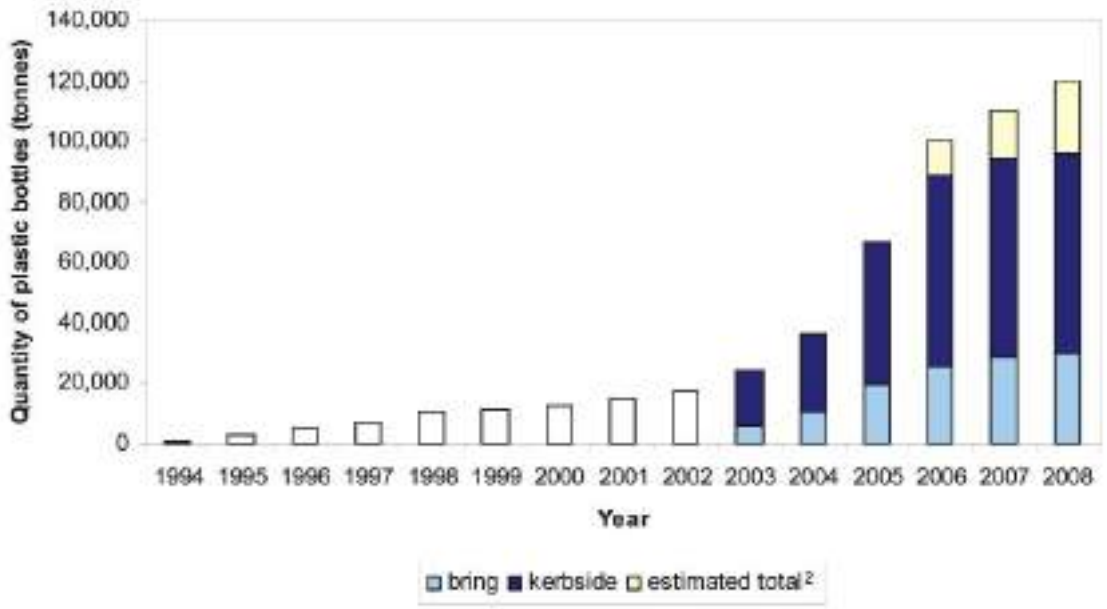
3 Plastic bottle recycling activity

To gain a more accurate idea of the actual tonnage collected during 2005 calculations have been made to take into account the likely gradual increase in tonnage collected throughout the year[1]. It is therefore estimated that 67,000 tonnes of plastic bottles were collected during 2005 (Figure 1). This is equivalent to 1,675 million plastic bottles, with a volume of 3,350,000 cubic metres. It represents an increase of 86% on the quantity collected in 2004, resulting from an increase through both kerbside and bring collection schemes.

Collections have surpassed predictions based on the 2004/05 survey, which suggested that 53,000 tonnes of plastic bottles would be collected in 2005. This is due in part to the fact that the actual future coverage of collection schemes is generally greater than reported. In addition, previous surveys have shown the average scheme performance to increase year on year. Taking this into account, the 'estimated total' provides an indication of the quantity of plastic bottles that is more likely to be collected, assuming an under-reporting of future coverage and a continued improvement in scheme performance.

At the end of 2005, plastic bottle collection levels in the UK had risen to an estimated annualised rate of 85,000 tonnes per annum. This is equivalent to 2,125 million plastic bottles, with a volume of 4,250,000 cubic metres. The annualised rate is based on data provided by local authorities at the end of 2005/start of 2006.

Figure 1: Household plastic bottle recovery in the UK



Approximately 47,000 tonnes per annum (70%) of the bottles are being recovered through kerbside collections, with the remaining 20,000 tonnes per annum (30%) being recovered through bring schemes. Responses from local authorities indicate a continuing strong growth in kerbside plastic bottle collections through 2006 to 2008, with a slower growth in bring schemes. Based on current local authority declarations, it is forecast that almost 96,000 tonnes per annum of plastic bottles will be collected by 2008.

The total quantity of plastic bottles entering the UK household wastestream is c. 510,000 tonnes per annum[3]. The annualised recycling rate for plastic bottles from household sources is therefore 17% per annum. The actual recycling rate for plastic bottles for 2005 has been calculated as 13%. This is an increase on previous years (for example, 2003 and 2004 showed a recovery rate of 5.5% and 10.5% respectively), although there remains clear potential for continued growth.

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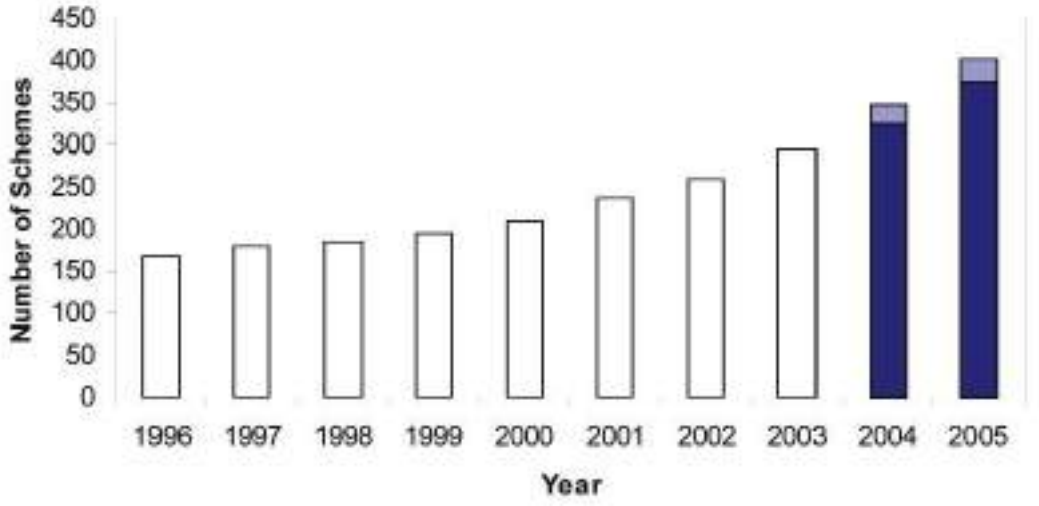
[1]To calculate the 2005 collection level collection facilities at the start and end of 2005 were assessed and an average taken.
[2]the 'estimated total' provides an indication of the total quantity of plastic bottles that is actually likely to be collected, assuming an under-reporting of future coverage and a continued improvement in scheme performance.
[3]Recoup (2006) Taken from work done on behalf of WRAP looking at export markets

4 Plastic bottle recycling schemes

Of the UK's 471 local authorities, 86% now offer recyclables collection facilities for plastic bottles, with 403 local authority recycling managers confirming plastic bottle collection facilities within their council area (Figure 2). This reveals a 16% increase in scheme numbers with a net increase of 55 schemes since the end of 2004. This therefore means that only 14% of UK local authorities do not currently offer a recyclables collection service to their charge-payers that includes plastic bottles.

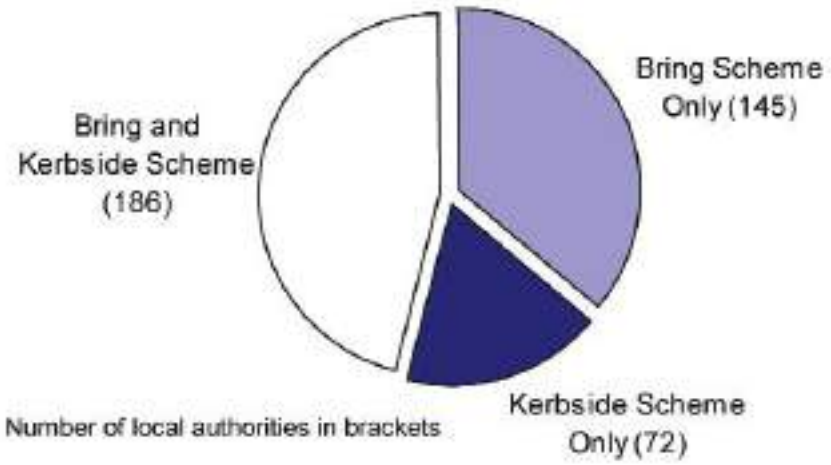
Figure 2: Number of UK local authorities that provide a plastic bottle recycling service



The two main approaches to the collection of plastic bottles in the UK are bring banks and kerbside collections. Bring schemes (plastic bottle banks) are available in 331 (70%) local authority areas. There are now 5,283 sites where plastic bottles are collected. Kerbside collections including plastic bottles now occur in 258 (54%) local authority areas. A total of 11.5 million households (47%) can have their recyclables, including plastic bottles, collected from the kerbside.

In many cases, a combination of bring and kerbside collections are provided within a single local authority area to address local circumstances (Figure 3). 186 (46%) local authorities operate both bring and kerbside schemes within their council boundaries.

Figure 3: Type of plastic bottle recycling scheme



Bring and kerbside scheme performance is reported in more detail later within this report.

5 Collection infrastructure

Collection infrastructure for plastic bottles has grown substantially in the UK since last year's survey. Tables 1 and 2 show the current plastic bottle recycling activity by country.

England has 273 bring schemes and 200 kerbside schemes that include plastic bottles. These are spread across 333 local authority areas with 140 of those areas operating both bring and kerbside collections. Overall these schemes cover 85% of all English local authorities. The number of bring sites has increased from 3,322 in 2004 to 4,158 and the percentage of households covered by kerbside has increased from 35% to 47%.

Wales has 19 local authorities with plastic bottle collection facilities, including 16 bring schemes and 13 kerbside schemes, with 10 of those areas operating both types of scheme. This equates to 86% of Welsh local authorities. The number of bring sites has increased from 142 in 2004 to 165 and the percentage of households covered by kerbside has increased from 30% to 37%.

Scotland has 78% of their local authorities collecting plastic bottles for recycling through 21 bring schemes and 19 kerbside schemes. Fifteen local authorities operate both types of scheme. The number of bring sites has increased from 324 in 2004 to 801, giving Scotland the highest average bring site density and the percentage of households covered by kerbside has increased from 23% to 35%.

Northern Ireland plastic bottle recycling comprises of 21 bring schemes and 26 kerbside schemes, with 21 local authorities operating both types of scheme. Since 2004/05 all local authorities in Northern Ireland have collected plastic bottles for recycling. The number of bring sites declared has increased from 138 to 159 and the percentage of households covered by kerbside has increased from 48% to 90%.

Table 1: Plastic bottle recycling activity by country

Country	Total No. Councils	Councils with plastic bottle collections	%	No. Councils with bring & kerbside plastic bottle collections	%	No. Councils with bring plastic bottle collection only	%	No. Councils with kerbside plastic bottle collection only	%
England	391	333	85	140	36	133	34	60	15
Wales	22	19	86	10	45	6	27	3	14
Scotland	32	25	78	15	47	6	19	4	13
Northern Ireland	26	26	100	21	81	0	0	5	19
Total	**471**	**403**		**186**		**145**		**72**	

Table 2: Plastic bottle recycling infrastructure by country

Country	Plastic bottle bring sites	Average household per available site	Total number of households offered kerbside collection including plastic bottles	% of all households
England	4,158	4,960	9,726,975	47
Wales	165	7,328	443,583	37
Scotland	801	2,737	759,018	35
Northern Ireland	159	3,942	566,158	90

6 Bring collection schemes

There are now 331 separate UK local authority areas with plastic bottle bring sites, with 5,283 sites in total. This represents a 35% increase in the number of sites available since 2004.

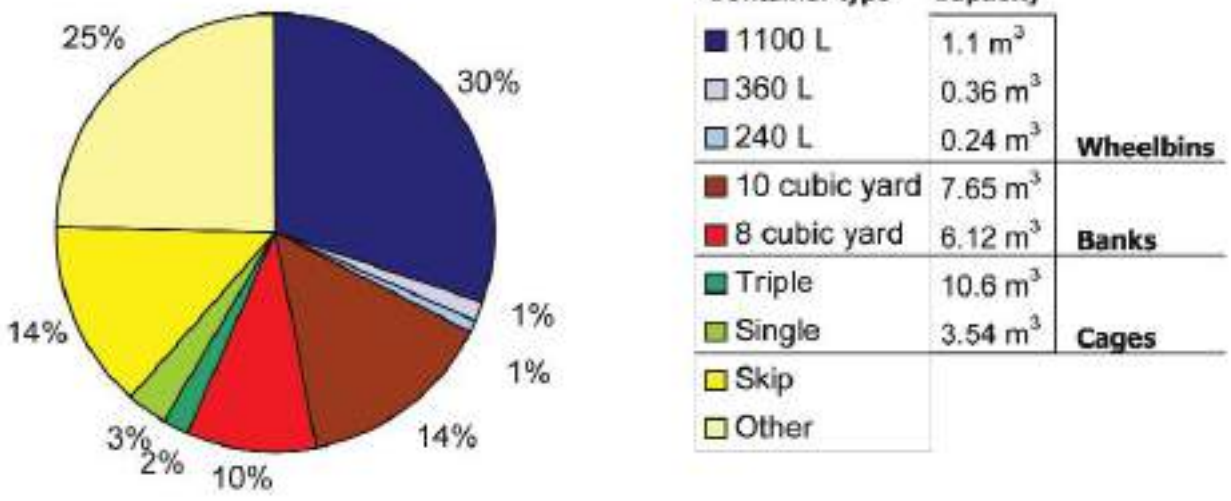
6.1 Container type

There are a range of different container types used in plastic bottle bring schemes. They have generally been added as a separate bank to existing bring sites for other materials, although in a small number of cases, plastic bottles are collected with cans and subsequently sorted at a central facility.

Figure 4 shows the main bank type used by the individual bring schemes. In previous surveys this chart has been based on the number of each bank type in use, but basing it on the main type of bank used by each scheme gives a better indication of scheme type. Generally local authorities will use the type and size of bank most appropriate to the size of the sites and frequency of use by members of the public. For example skips and other large containers are more likely to be used at large sites, such as Civic Amenity/Household Waste Recycling Centres, whereas smaller banks such as the 1100 litre wheeled bins are more appropriate for use where there are a larger number of small sites.

25% of local authorities that responded stated that they used "other" bank types. There are a wide variety of containers available for use in bring schemes, although the ones listed in Figure 4 are the most common types. Some local authorities that have stated they use "other" bank types may in actual fact use a range of different banks as appropriate to each site. This is particularly the case with Unitary authorities that operate both large sites for household waste and a number of smaller bring sites.

Figure 4: Proportion of local authorities that use each container type as the main container for collection



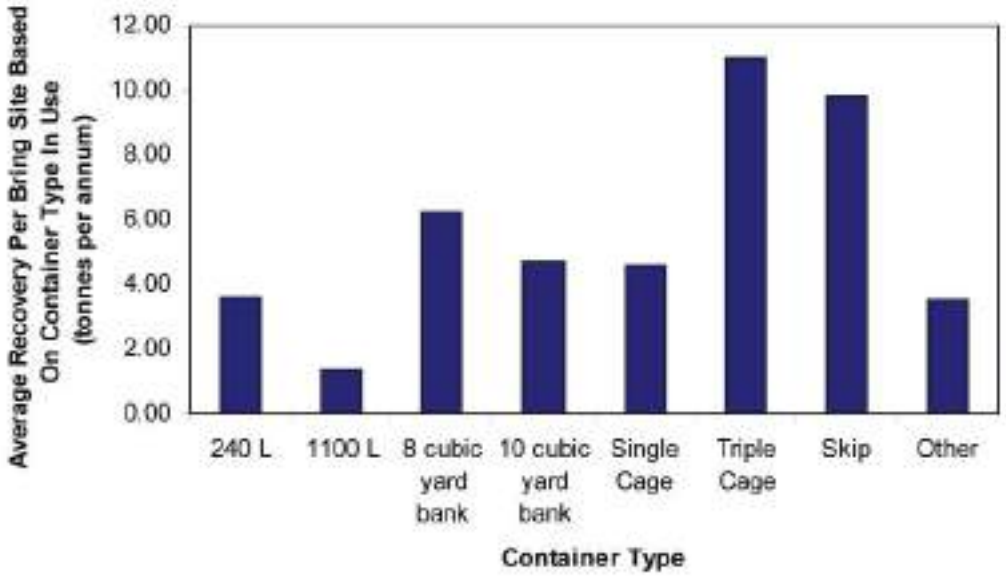
Bring schemes are calculated to have produced some 20,000 tonnes per annum of recyclable plastic bottles in 2005. This is an 82% increase since 2004, when some 11,000 tonnes of plastic bottles was reported as generated.

The average annual recovery per site has increased from 2.7 tonnes of plastic bottles in 2004 to 3.7 tonnes for 2005. Individual site performance will vary quite widely depending on the number and type of sites, and the catchment population. For example large household waste recycling centres operated by WDA's generate on average 13 tonnes per site per annum compared to the smaller more numerous sites operated by WCA's, which generate on average 3.5 tonnes per annum.

Some large household waste recycling centres can generate up to 30 tonnes or more of plastic bottles per annum if there are no other plastics recycling facilities in the area.

As can be seen (Figure 5) sites that generate high quantities of plastic bottles per annum tend to use larger banks, with greater storage capacity.

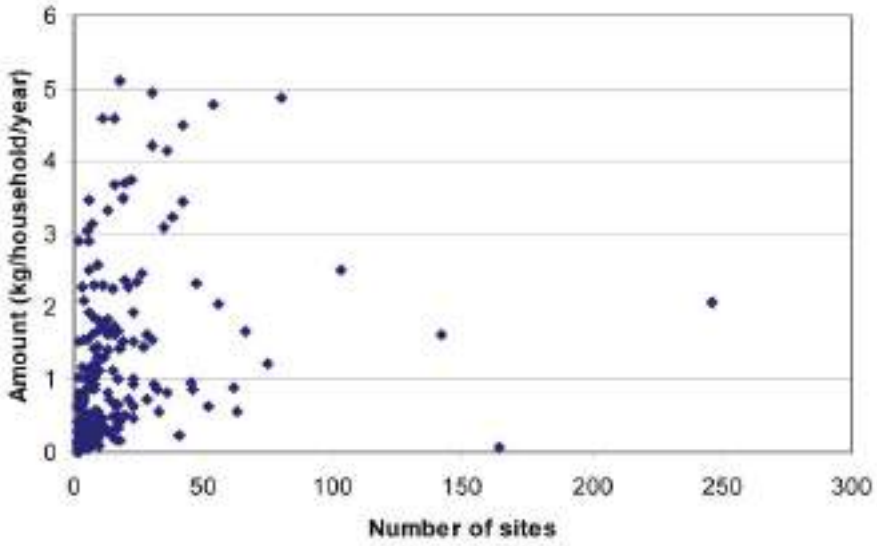
Figure 5: Bring scheme recovery performance by container type



6.2 Scheme performance

The number of sites has been plotted against recovery per household for more than 180 bring scheme datasets (Figure 6) to demonstrate the variation in performance. As can be seen 76% of local authorities operate fewer than 20 bring sites and 80% recover less than 2kg per household per annum. However there are an increasing number of schemes (37 according to the survey data) that are collecting between 2-5kg per household per annum. It would be useful to know whether all the plastic bottles being deposited at the bring sites of these schemes are from domestic or other sources.

Figure 6: Bring scheme performance analysis

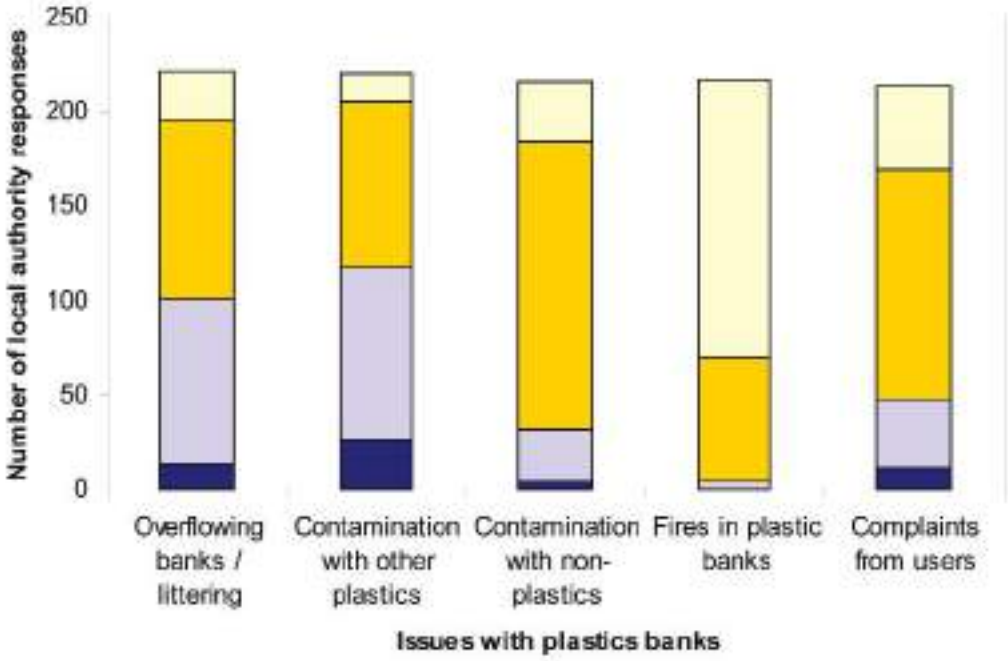


The lack of a significant correlation between the number of sites and the quantity of plastic bottles collected suggests that other factors such as type of site, local demographics and promotion also affect recovery rates.

Anecdotal reports from local authorities indicate that bring sites for plastic bottles remain very popular with members of the public. There are a few issues that local authorities commonly face when collecting plastic bottles through bring sites however (Figure 7).

6.3 Associated issues

Figure 7: Issues with collecting plastic bottles through bring sites



Due to the high volume, lightweight nature of plastic bottles they fill collection banks comparatively rapidly. If the banks provided have insufficient capacity to hold the bottles, or there is insufficient servicing the banks will overflow and littering will occur. This, together with contamination by other plastics is the most common issue faced by local authorities that operate bring schemes for plastic bottles. It is therefore important that container capacity and servicing frequencies are planned according to the quantity of plastic bottles expected to be generated at any given site.

As mentioned, contamination with plastic items other than bottles is common. Members of the public often assume that all plastics can be recycled, so yoghurt pots, food trays and so forth are frequently deposited in banks meant only for plastic bottles. Some local authorities collect mixed household plastic for recycling, but markets for the material are currently limited to export. This is discussed in more detail later in this report.

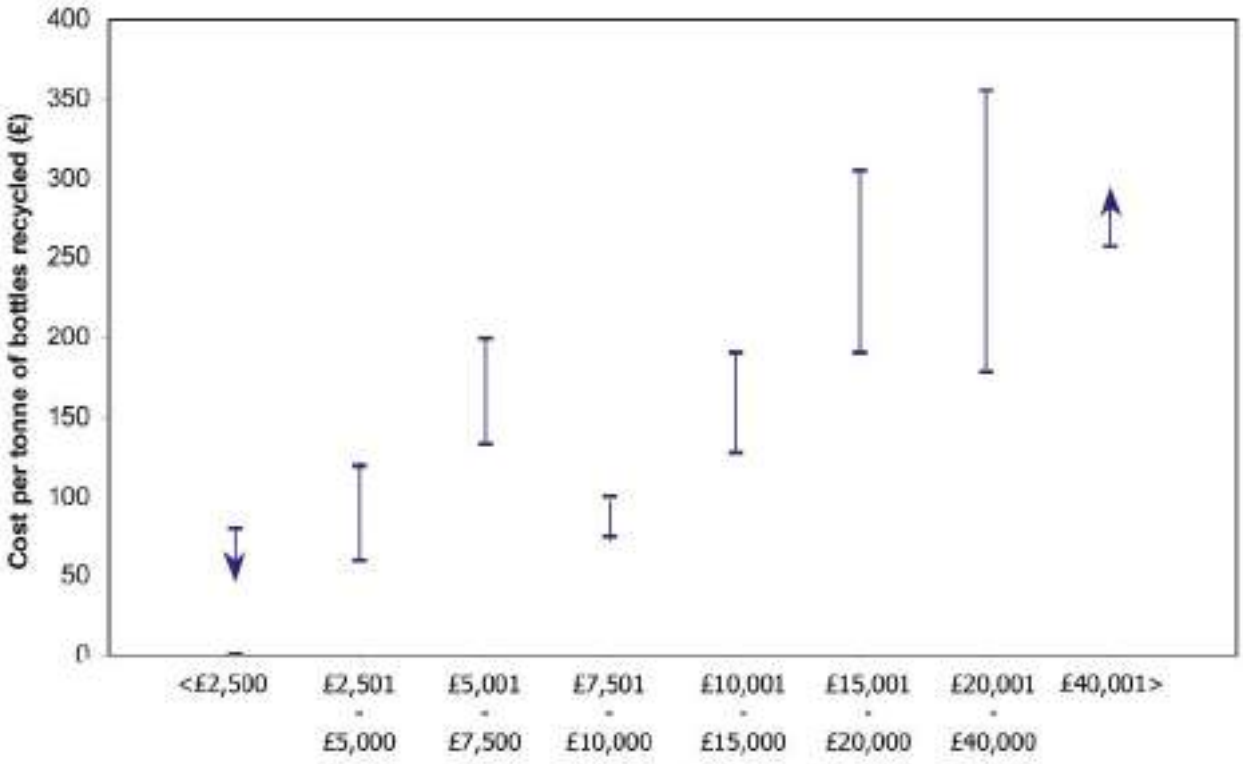
In order to help prevent contamination with unwanted plastic items it is important that banks are clearly labelled and have apertures of an appropriate size and shape to encourage only plastic bottles to be deposited.

Other common perceived concerns about collecting plastic bottles at bring sites include contamination by non-plastic items, complaints from users and fires being lit in banks. None of these seem to be major issues for local authorities already operating schemes however. For example, only 4 out of 217 local authorities reported fire damage to banks as a frequent problem.

6.4 Expenditure

Local authority recycling managers were asked to indicate their current annual expenditure on plastic bottle recycling through their bring schemes, choosing from a series of cost bands. 189 (57% of those with bring schemes) provided a response to this question, with 121 also providing tonnage data, used to analyse the relationship between declared cost and tonnage collected (Figure 8).

Figure 8: Associated plastic bottle recycling scheme costs



The reported costs for bring scheme systems were between £50 and £350 per tonne of bottles recycled. This is consistent with case studies[4] that suggest average direct costs of £150 - £250 per tonne would be typical. Issues such as locality, household density, contractor availability, collection method and material market value will all influence the overall cost per tonne of plastic bottle recycling. This data suggests that where bring schemes are incurring direct costs above £300 per tonne there may be inefficiencies in the system that could be beneficially resolved.

[4]Recoup (2003) Bring scheme case studies including; Greater Manchester, Derby, Bromley and Sevenoaks, www.recoup.org

7 Kerbside collection schemes

There are now 258 kerbside schemes including plastic bottles in the UK, representing 11.5 million households. The coverage of households has seen a 36% increase since the end of 2004 and is equivalent to approximately half of all UK households now having the opportunity to include plastic bottles in their local kerbside collection programme.

Participation in these schemes is essentially voluntary, so not all households within a scheme will participate. The reported participation for schemes is between 14 - 100 % (an average of 66%). It is calculated that the average capture rate of plastic bottles through current kerbside collection programmes is 32%. This is an improvement on previous years (the 2005 survey showed a 22% average capture rate), but still indicates the potential to achieve much greater levels of collection from current kerbside infrastructure.

Understanding the mechanisms that influence kerbside systems is fundamental if effective practice is to be identified. This is especially crucial for plastic bottle recycling, with a number of variables influencing a scheme's economic efficiency and recovery performance.

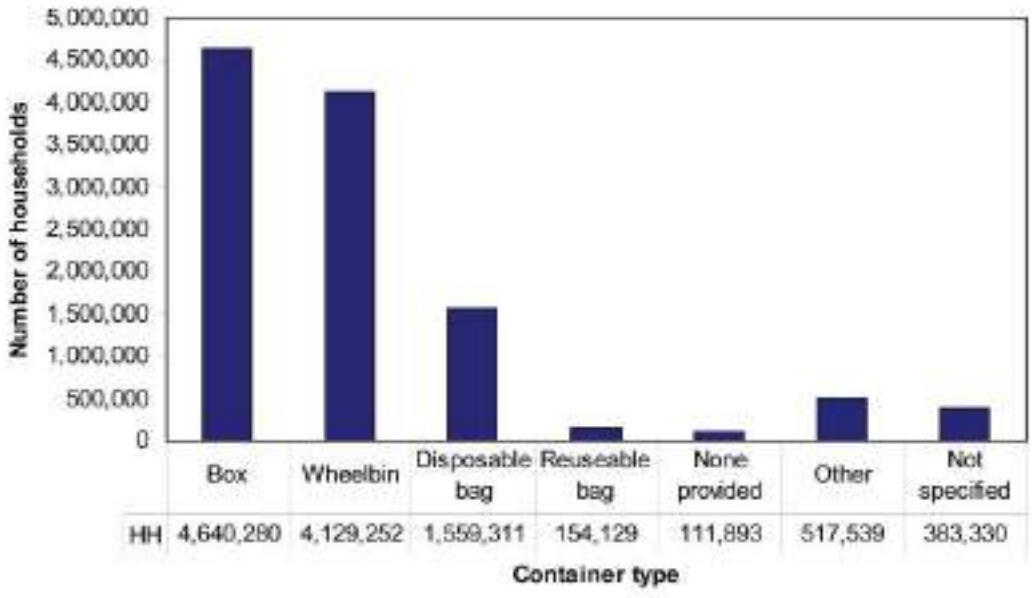
As in previous surveys, each variable has been isolated to assess its prevalence and influence on plastic bottle recovery; thus enabling the analysis of the range of opportunities for the recycling of plastic bottles from the kerbside. Each local authority will have unique features within their kerbside scheme, yet common elements such as frequency of collection, relation to residual refuse collection and container type can be compared and analysed.

Statistical analysis of the data has been undertaken to establish 95% confidence intervals for quoted average performance data, which provides useful predictive data for many types of scheme. Data sets are larger than in previous surveys and thus the confidence intervals on trends are smaller.

7.1 Container type

As can be seen (Figure 9), boxes and wheelbins are the most popular container type used for the collection of dry recyclables. The box has historically been the container of choice for kerbside collections however the number of households being provided with wheelbins for the collection of their dry recyclables is on the increase. In addition, although many local authorities have stated that they use a box, in reality many of them use two boxes and/or a reusable/disposable bag. This is particularly true for local authorities that sort dry recyclables at the kerbside, or use separate vehicles to collect different materials. Many of those that reported that "other" containers are used actually use a combination of containers.

Figure 9: Containers used for kerbside schemes including plastic bottles



The percentage of households that have a plastics kerbside collection and are supplied with wheelbins has increased from 33% in 2004 to 36%, while the percentage supplied with boxes has increased from 38% to 40%. Boxes typically have a 55 litre capacity and wheelbins generally have either a 120 or 240 litre capacity.

It is common practice to use different coloured containers to distinguish which materials the householder should place in each receptacle.

It is the additional capacity of the wheelbin, together with servicing benefits where on-vehicle sorting is not required, that has encouraged recycling managers to adopt it. The additional capacity provided by the wheelbin is of particular importance when high volume items, such as plastic bottles, are included in a dry recyclables collection.

The third major container option in use is the bag. These can either be supplied to the householder, or the householder can be encouraged to use carrier bags. Approximately 1.7 million householders have a separate collection of dry recyclables including plastic bottles through this option; although as stated previously, bags are often used in conjunction with a box to provide sufficient storage capacity for householders, so the actual number of householders using bags for dry recyclables is probably far greater than this.

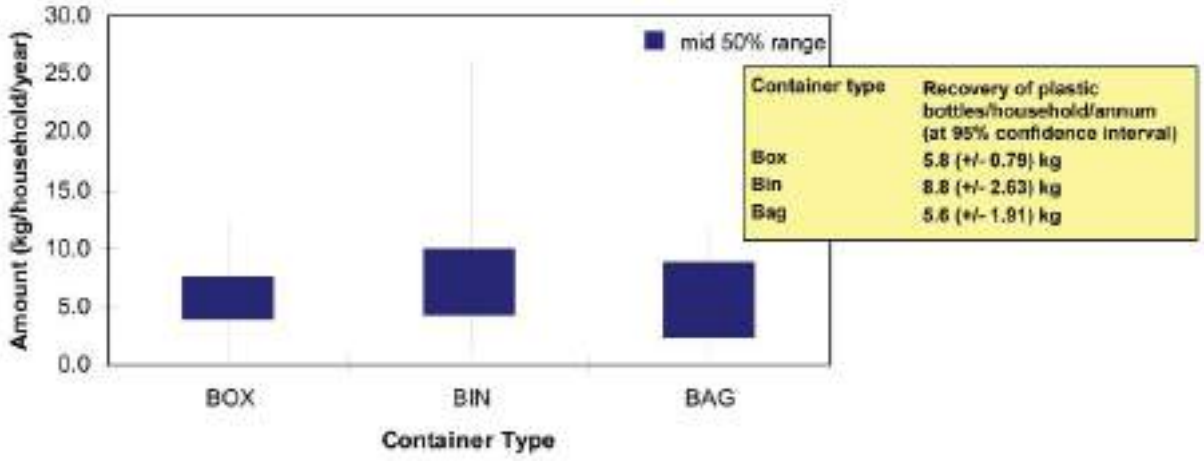
As with boxes and wheelbins, different coloured bags can be provided for different materials. Clear or tinted bags are frequently used as this assists with quality control at the kerbside, enabling collection crews to identify heavily contaminated bags. Perforated bags are sometimes used, as they can be opened more quickly and efficiently. Kerbside collection bags can be separately baled and sold for recycling following use.

The three main container types achieve an average recovery of 5.5 kg of plastic bottles per household per annum. This is an increase of 1.6kg from the previous survey. There are variations in scheme performance for each container type, but wheelbins are shown to have a higher average recovery rate (Figure 10) (in fact wheelbins are shown to perform statistically significantly better than boxes at a 90% confidence interval).

The highest performing kerbside schemes reported achieving in excess of 20 kg per household per annum of plastic bottles from households covered. The lowest performing kerbside schemes generated less than 2 kg per household per annum.

The data was analysed to identify average performance with 95% confidence interval for each dataset[5] (Figure 10). These are represented in "Box and Whisker" plots. The extremes of the lines represent the maximum and minimum performances from any individual scheme. The upper and lower limits of the box show the range, which represents the individual scheme performances that fall between the 25% and 75% quartiles.

Figure 10: Kerbside plastic bottle recovery performance by container type



It should be noted that while wheelbins are shown to achieve a higher recovery rate there are other influences on recovery, such as the quantity of other materials collected, promotion and frequency of service. It seems reasonable to expect that the higher capacity of wheelbins will facilitate improved overall recycling rates, compared to single box systems, as single box systems limit the quantity of recyclables that a household can store. As already stated though, many box schemes use more than one box and/or a bag for the collection of recyclables.

[5]i.e. There is a 95% probability that the average will fall within the confidence range

7.2 Frequency of collection

The frequency with which the container is collected is a major factor in recycling schemes. This also has a controlling influence on the type of container, as capacity becomes an issue. Weekly or fortnightly collections are the most common, although some collections are every four weeks, or on a set day each month. An increasing number of local authorities are also moving to alternate weekly collections, where refuse is collected in week 1 and dry recyclables and/or compostables are collected in week 2.

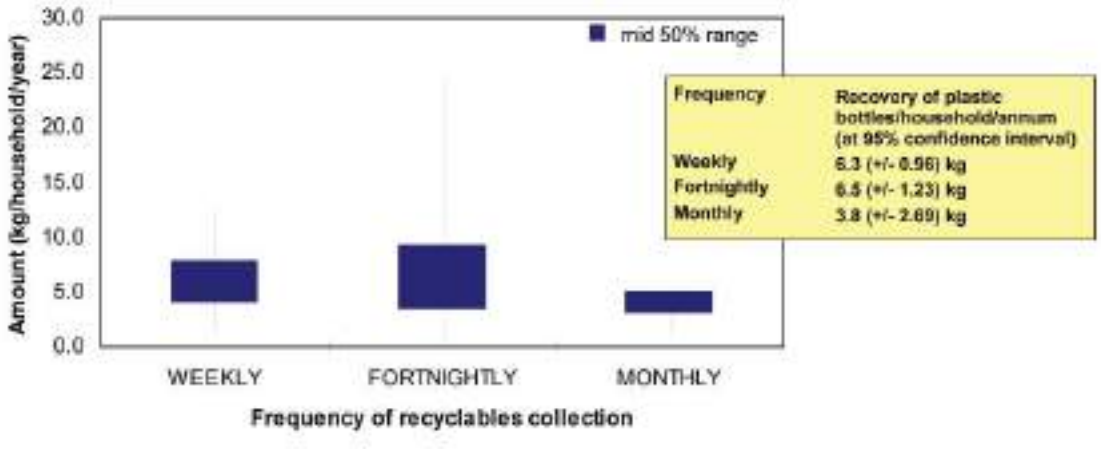
A fortnightly collection service of recyclables is particularly popular (Table 3), as it reduces servicing costs per household compared to weekly collections. It might be expected however that weekly collections would achieve a higher performance than fortnightly or monthly collections. This was indicated to be the case by the 2005 survey results, but the 2006 survey results (in-line with survey results previous to 2005) show little difference in performance between weekly and fortnightly collections, although these both out-perform monthly collections (Figure 11). It should be noted though that alternate weekly schemes perform statistically significantly better (at a 95% confidence interval) than fortnightly collections where residual refuse is collected weekly (alternate weekly: 9.0kg +/- 2.79kg; fortnightly: 5.2kg +/- 0.88kg).

Table 3: Frequency of kerbside collection

	Box	Wheelbin	Bag	None	Other	Not specified	TOTAL
Weekly	1,603,884	32,000	798,235	45,893	163,851	59,200	2,703,063
Fortnightly	2,757,178	3,460,610	863,355	66,000	176,720	141,191	7,465,054
Monthly	0	408,642	0	0	0	0	408,642
Other	5,718	31,500	50,650	0	176,968	35,000	299,836
Not specified	273,500	196,500	1,200	0	0	147,939	619,139
TOTAL	4,640,280	4,129,252	1,713,440	111,893	517,539	383,330	11,495,734

Monthly collections are least popular and have the lowest performance. As can be seen (Table 3) wheelbins tend to be required if collections are undertaken monthly to ensure that sufficient capacity is available to store the dry recyclables.

Figure 11: Kerbside bottle recovery performance by frequency of collection



The container capacity has an obvious relationship with collection frequency. Table 3 shows that a greater proportion of box schemes operate a weekly or fortnightly collection, while wheelbins tend to have a collection frequency of fortnightly or lower, due to large capacity. Like box collections, a majority of schemes using bags are serviced weekly or fortnightly, however the versatility of bags allows them to be collected at less frequent intervals, as there is no issue with limited capacity providing householders can easily restock their supply of 'recycling bags' and find a space to store them once full.

7.3 Relationship to refuse collection

The majority of local authorities operate recyclables collections on the same day as the residual refuse collection, using a separate vehicle (Figure 12). The reasoning behind this is that it is easier for householders to remember one collection day for everything, than to remember a separate collection day for dry recyclables in addition to the collection day for residual refuse. Alternate weekly collections are becoming more popular however, with the number of households on alternate weekly collection that include plastic bottles having increased by 1,520,100 households (increase of 108%) since last year to almost 3 million.

Alternate weekly collections also achieve a higher performance than collections that are not integrated with the residual refuse collection. The confidence interval is greater for alternate weekly collections though, meaning that average performance ranges could be between 6.22 and 11.57 kg/household/annum. Even so, alternate weekly collections are shown to be statistically significantly higher performing than other collections at a 90% confidence interval. As a greater number of alternate weekly schemes become established, the dataset on which these calculations are based will increase and narrow the confidence intervals to provide a more accurate measure of performance. Such systems maximise the efficient use of resources and minimise service costs of refuse and recycling operations.

Figure 12: Dry recyclables kerbside scheme relationship to residual refuse collection

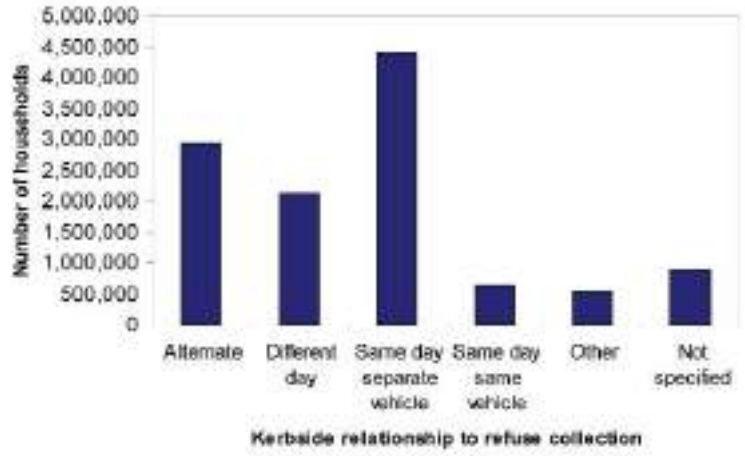
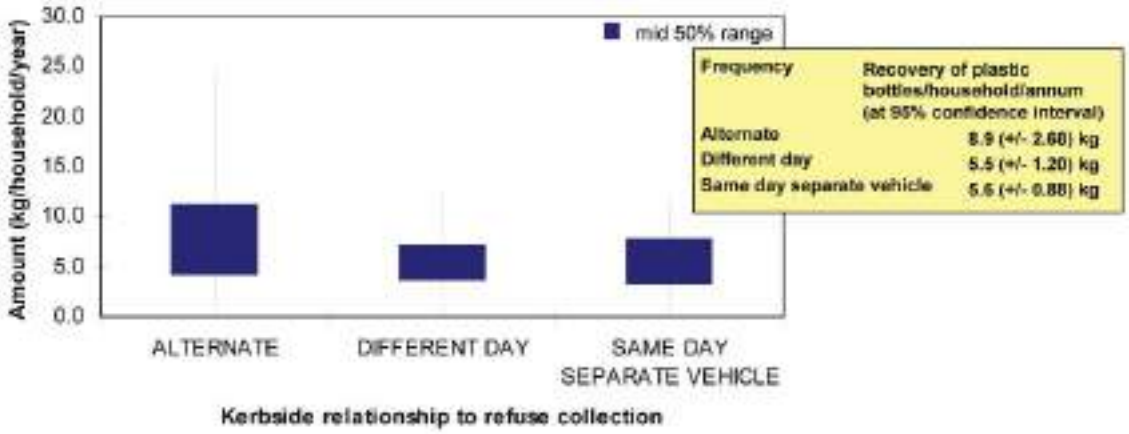


Figure 13: Kerbside bottle recovery performance by relationship to refuse collection



7.4 Expenditure

It can prove difficult for local authorities to separate out the cost of plastic bottle recycling through kerbside collections, as these are typically collected alongside other materials. Recycling managers were therefore asked for their views on including plastic bottles in recyclables collections and the value of doing so. These issues are discussed in the next section of this report, which addresses perceptions of plastic bottle recycling.

8 Perceptions of plastic bottle recycling

Local authority perceptions of plastic bottle recycling are helpful to establish the value of recycling plastic bottles and barriers to implementation. This information is useful for local authorities considering the introduction of a plastic bottle collection. It is also useful to organisations wishing to encourage plastic bottle recycling, helping to identify key messages and areas where action may be required.

8.1 Value of plastic bottle recycling

Local authority recycling managers that operate a plastic bottle recycling scheme were asked 'Overall, how would you rate the value of your current plastic bottle collection scheme?' They were requested to select just one of the listed options. Figures 14 and 15 show the results for WDA's and WCA's/Unitary authorities; 26 and 253 responses were received respectively.

Figure 14: Value of plastic bottle recycling (WDA)

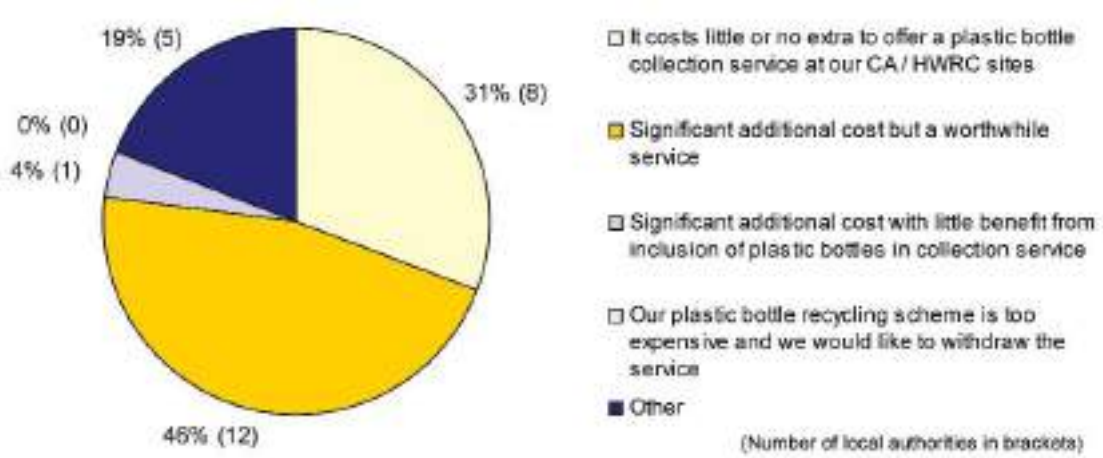
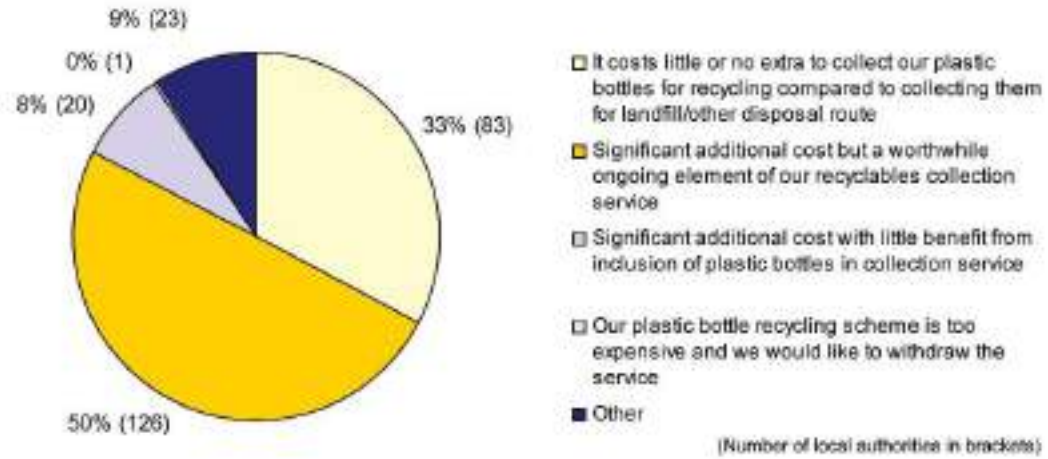


Figure 15: Value of plastic bottle recycling (WCA/Unitary)



Responses from WDA's refer to collections through CA/Household Waste Recycling Centres, whereas responses from WCA's/Unitary authorities refer to both bring and kerbside collections.

The responses were very positive, with 31% of WDA's and 33% of WCA's/Unitary authorities indicating that it costs little or no extra to collect plastic bottles for recycling compared to collecting them for landfill/other disposal route. This reinforces evidence that plastic bottle recycling can be achieved cost effectively.

A further 46% and 50% of WDA's and WCA's/Unitary authorities respectively indicated that, while they collected plastics at a significant additional cost, it was a worthwhile ongoing element of their recyclables collection service. Only 1 WDA and 20 (8%) WCA's/Unitary authorities indicated there was little additional benefit from the inclusion of plastic bottles and only one local authority stated that they wished to withdraw the service.

8.2 Factors that prevent a plastic bottle collection scheme being established

Recycling managers not currently operating a plastic bottle recycling scheme were asked to rank the three most important factors for this, from the following options:

- Existing waste/recyclables collection contract is inflexible, making it difficult to add plastic bottles
- Insufficient information available on plastic recycling
- No suitable local baling/handling facility (e.g. MRF)
- Not convinced of environmental benefit
- Have costed scheme and it is too expensive
- Difficult to add plastics due to use of kerbside sort vehicles - not enough compartments available
- Not confident in market outlets for collected plastic bottles
- There is little political interest in plastic recycling within council
- Currently focussing on heavier materials to hit recycling targets
- Lack of available skills and/or time to plan/implement scheme
- Other

90 responses were received and the results are shown in Figure 16.

The four most important reasons given for not recycling plastic bottles were, in order of priority:

- Focussing on heavier materials to hit weight based recycling targets (35%)
- Cost: A scheme has been costed and viewed as too expensive (22%)
- Difficult to add plastics due to use of kerbside sort vehicles - not enough compartments available (16%)
- No suitable local baling/handling facility (e.g. MRF) (12%)

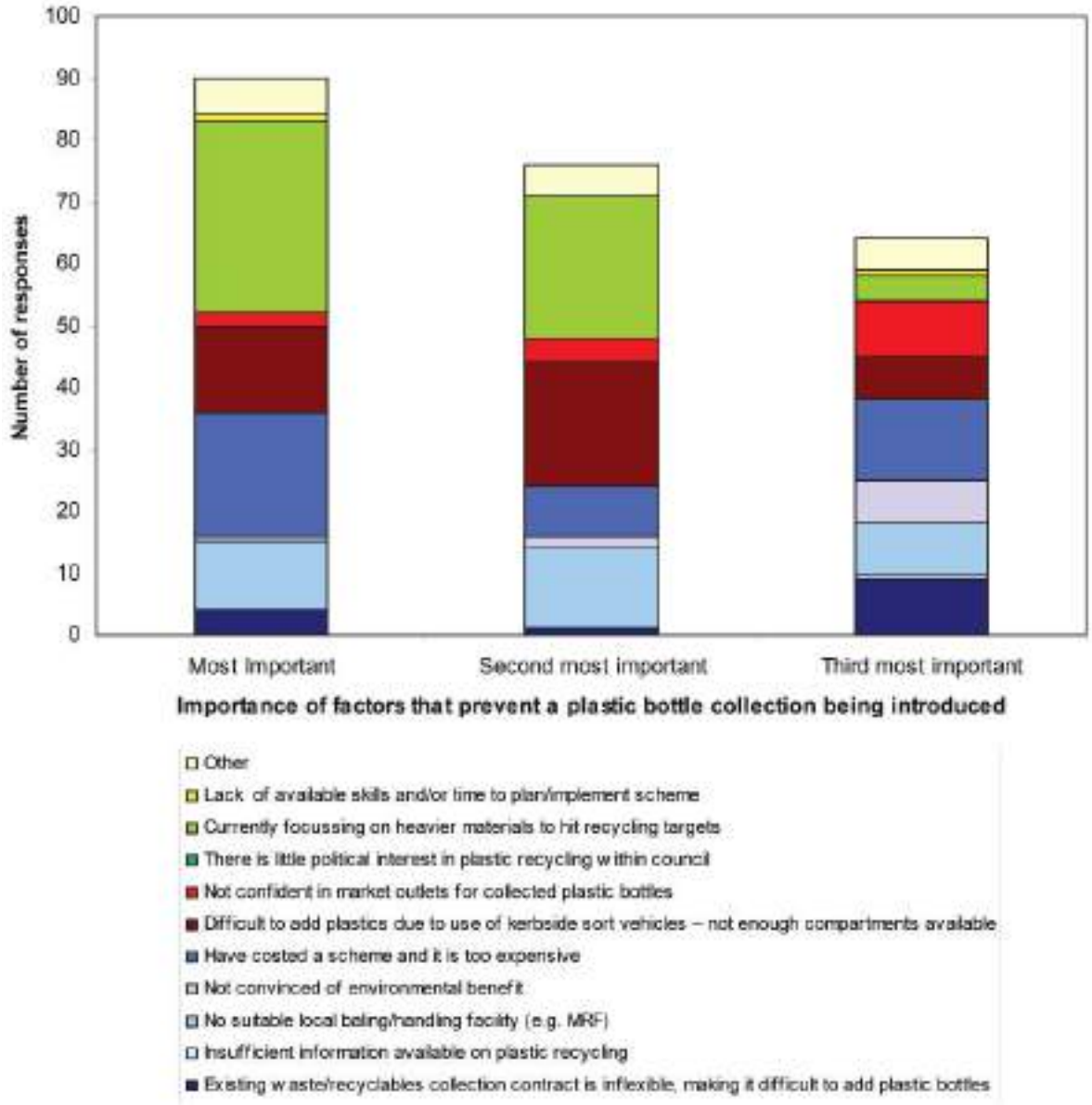
Responses from the 2005 survey:

- Cost: A scheme has been costed and viewed as too expensive (26%)
- Focussing on heavier materials to hit weight based recycling targets (22%)
- The use of kerbside sort vehicles with limited compartments prohibits the inclusion of plastic bottles (19%)
- No local baling/handling facility (15%)

As can be seen, the four most important reasons given for not collecting plastic bottles for recycling are the same as last year, although a greater proportion of local authorities appear to be more concerned with hitting weight-based targets than with the cost of including plastic bottles in their collections.

These same four reasons were also ranked one through to four, by other local authorities, as the second in importance, although a wider range of responses was received for the third most important reason.

Figure 16: Factors that prevent a plastic bottle collection scheme being introduced



The following can be concluded:

- Weight based recycling targets are restricting the expansion of plastic bottles and potentially other lightweight high volume items from being recycled. These valuable items therefore continue to take up limited landfill space
- Although a greater number of local authorities are now including plastic bottles in their recyclables collections, further work may be required to demonstrate how plastics can be recycled cost effectively
- Consideration of the implications of adding plastic bottles to selected collection and handling infrastructure at a later date is important to ensure future collections can be implemented efficiently. This is particularly the case where sort at kerbside vehicles are used
- Existing baling/handling infrastructure in the UK requires further assessment and potential expansion

9 Planned developments

The potential growth of the UK plastic bottle recycling infrastructure can be assessed through feedback from recycling managers. The reported planned developments can be used to analyse growth within both bring and kerbside systems (Figures Figure 17 & Figure 18). The continual year on year growth of plastic recycling schemes is strengthened by the availability of increased Government funding for recycling, improved technologies and statutory or national targets.

There are currently 11.5 million households receiving a kerbside collection of recyclables in the UK. This is a 36% increase since the end of 2004 and represents 47% of UK households. The provision of bottle recycling within kerbside collections is set to exceed 13.5 million households during 2007. This will represent 55% of UK households.

Figure 17: UK kerbside scheme coverage over time including planned growth

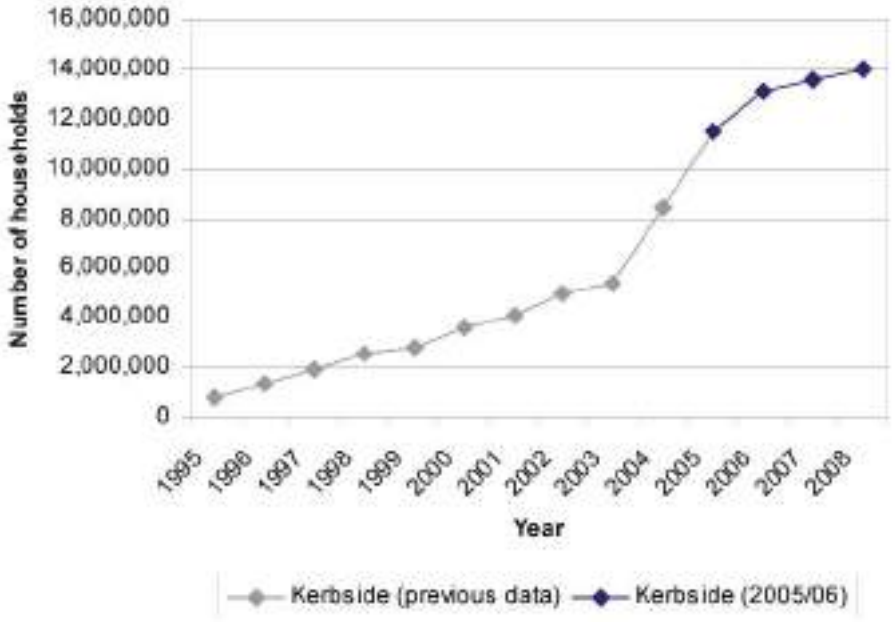
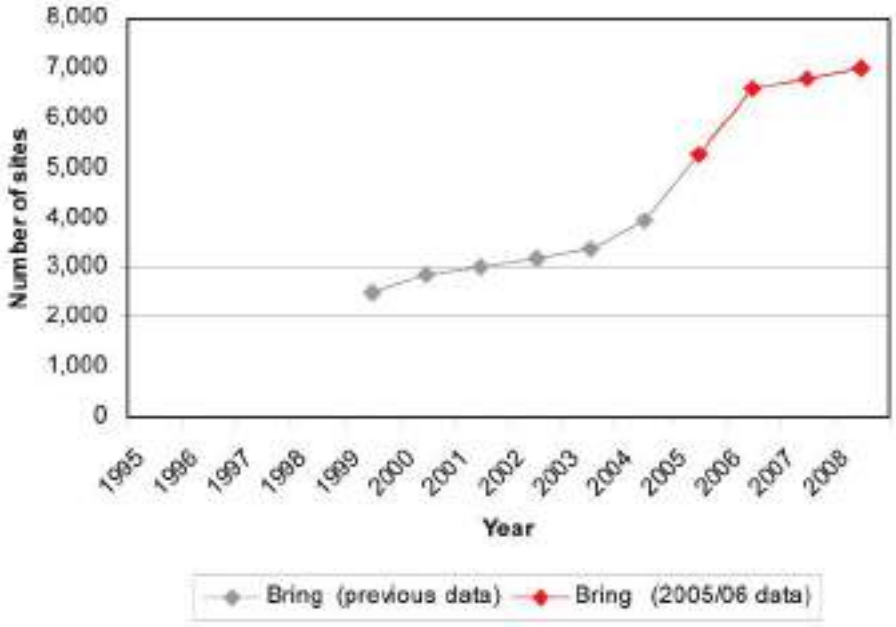


Figure 18: UK bring scheme coverage over time including planned growth



It is anticipated that actual plastic bottle recycling activity will be greater than the reported projections[6].

The number of bring sites has also risen to 5,283 sites across the UK, a 35% increase since the end of 2004. The plans again suggest a continued rise in bring facilities over the next year as new sites and schemes are developed, with a total of approximately 6,700 sites expected to be operational by the end of 2007.

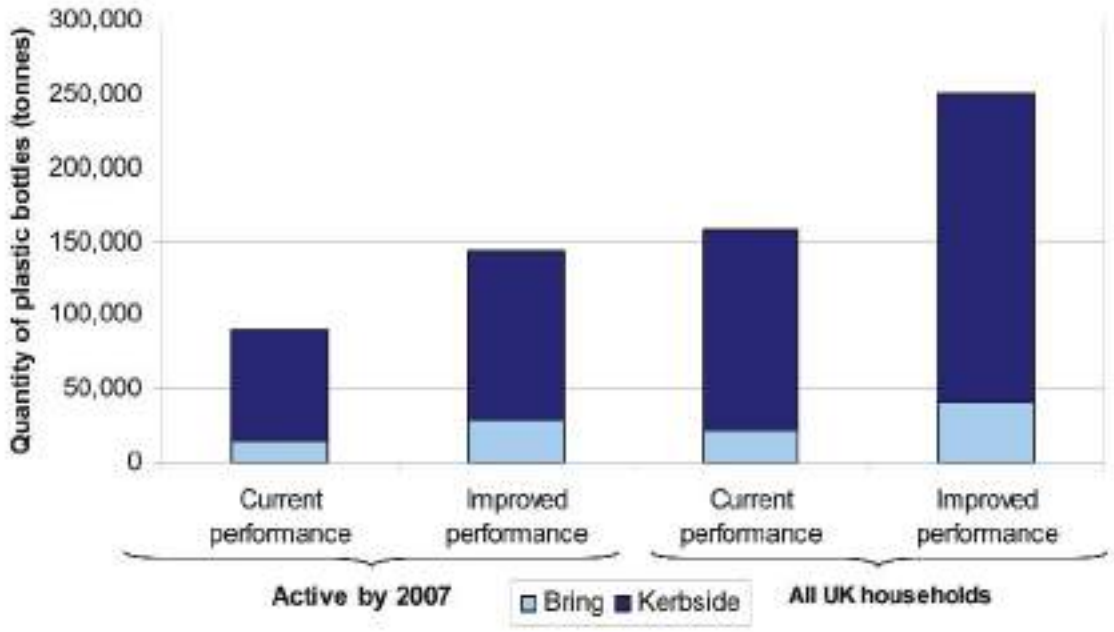
Both kerbside and bring system infrastructure will be improved during 2006, and this is reflected in the enhanced tonnage recovery estimates (Figure 1).

[6]Scheme coverage and recovery level predictions for plastic bottles within the previous four WRAP and Recoup UK plastic bottle recycling surveys have typically outperformed reported expectations by at least 5-10%.

10 The potential of plastic bottle recycling

It has already been identified that there are wide variations in performance of current collection schemes, and that there is the potential to significantly improve performance of the existing infrastructure. Figure 19 highlights the potential collection levels that could be realistically achieved by the adoption of bring and kerbside schemes across the UK, based on current and improved levels of performance. This highlights the importance of a comprehensive infrastructure for plastic bottle recycling and reinforces the advantage of extensive, well promoted kerbside collections in improving recycling and maximising recycling opportunities.

Figure 19: Potential scenarios for UK plastic bottle recycling



From Figure 19 it can be assumed that approximately 90,000 tonnes of plastic bottles will be collected through the current planned activities by the end of 2007. The majority of this material will be recovered through the kerbside systems.

If both schemes achieved good performance levels with bring activity recovering 1.65kg per household per annum, and kerbside collecting 8.5kg per household per annum, a total recovery of 145,000 tonnes of bottles may be achievable from the planned infrastructure. These increased performance levels are based on the 75% quartile from the bring and kerbside data sets respectively.

The performance level will also be dependant on greater communications and improved convenience for the householder. At this level of performance, planned activity could generate close to 30% recycling of plastic bottles in the UK household waste stream by the end of 2007.

11 Other household plastics

Not only is there great demand from members of the public for plastic bottle recycling facilities, but there is also a demand for facilities to recycle other household plastics such as carrier bags, packaging film, tubs and trays, plant pots, expanded polystyrene and so on.

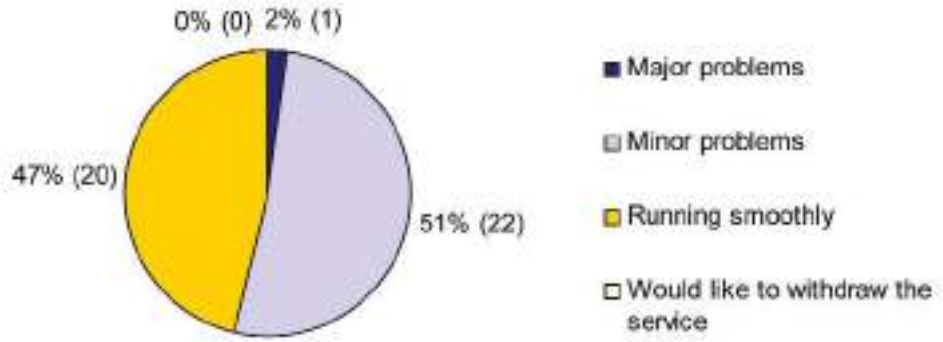
Currently 55 local authorities (just over 10%) stated that they actively collect plastics other than bottles from households. Table 4 shows the number of local authorities that collect each category of plastics. As can be seen they all collect plastic bottles, with food tubs & trays and carrier bags being the next most popular plastic items for collection.

Table 4: Number of local authorities that offer a recyclables collection for plastics other than bottles

	Items included in dry recyclables collection						
	Plastic bottles	Food tubs and trays	Carrier bags	Packaging films	Plant pots	EPS	Other dense plastics
Bring	17	10	14	4	2	1	1
Kerbside	24	16	15	6	3	0	0
Bring & kerbside	14	11	7	4	2	0	0
Total	55	37	36	14	7	1	1

A majority of local authorities that stated they collect other household plastics for recycling indicated that they had few or no problems with the scheme (Figure 20). The main concerns related to operational and logistical aspects such as handling and transporting the large volumes of material.

Figure 20: How well collection schemes for other household plastics operate



If this is the case, then it could be questioned why more local authorities aren't collecting other plastic items from households in addition to bottles. Local authorities not offering collection facilities for other household plastics were asked to rank the three most important factors for this, from the following options:

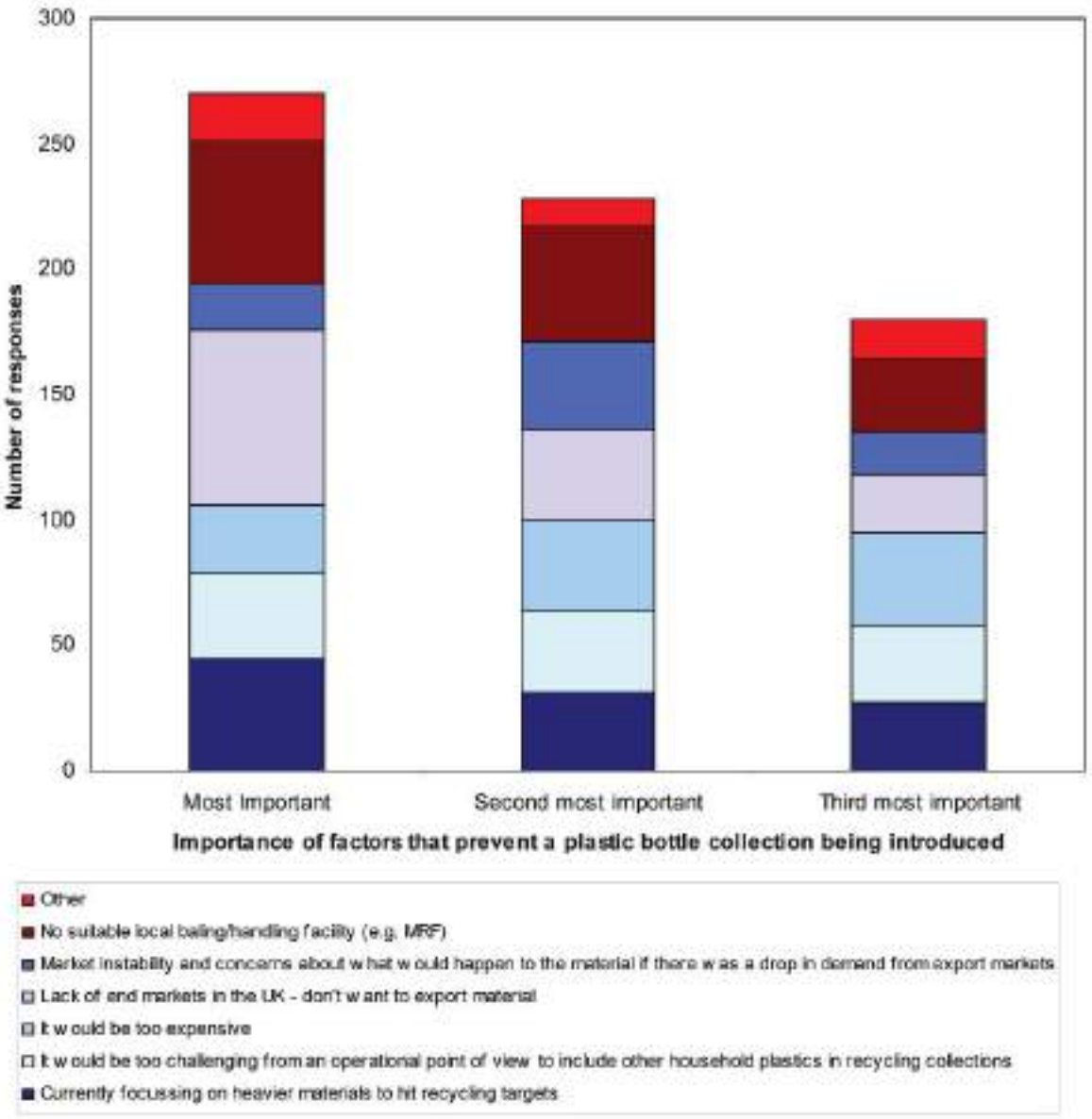
- Currently focussing on heavier materials to hit recycling targets
- It would be too challenging from an operational point of view to include other household plastics in recycling collections
- It would be too expensive
- Lack of end markets in the UK - don't want to export material
- Market instability and concerns about what would happen to the material if there was a drop in demand from export markets

- No suitable local baling/handling facility (e.g. MRF)
- Other

270 responses were received and the results are shown in Figure 21.

As can be seen there was a wide range of responses, although those seen as most important were a lack of UK markets for the material and that there was no suitable local baling/handling facility (e.g. MRF).

Figure 21: Factors that prevent a collection scheme being introduced for other household plastics



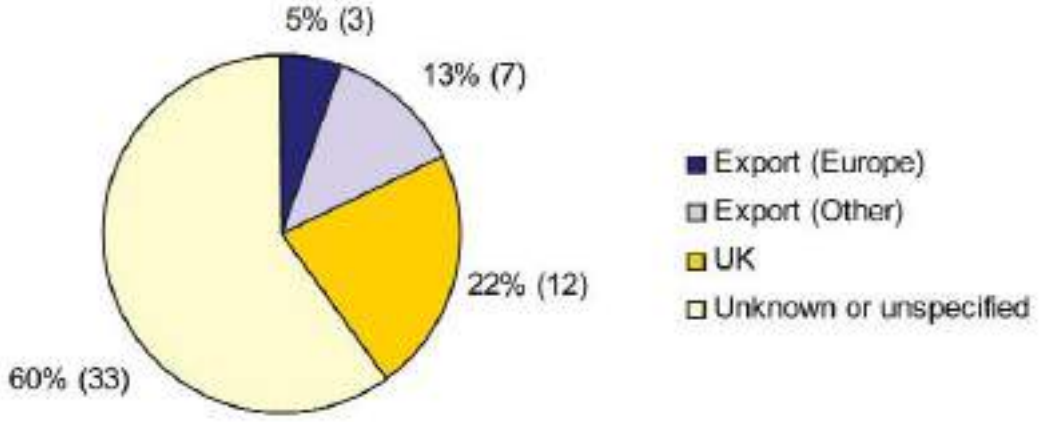
If there are no UK markets for mixed plastics this raises the question of where those local authorities that are collecting these items are sending them for recycling.

Figure 22 shows the response to this question.

As can be seen a large majority either didn't know or didn't specify where the material was going. Twelve of the local authorities stated that they were sending the material to a UK market. There are markets in the UK for plastic carrier bags and potential markets for sorted plastic pots and tubs from domestic sources, but no known markets for mixed plastic packaging.

It is probable that until the market for mixed plastic packing is better developed and understood and a UK market becomes available that the number of local authorities collecting this material will remain comparatively low. Work will also be required to demonstrate to local authorities that mixed plastic packaging is worth collecting for recycling and can be collected without causing operational issues. It is recommended that case study work be undertaken to further assess those local authorities that are currently collecting other household plastics for recycling in order to progress this.

Figure 22: Markets for other household plastics



12 Conclusion

Many factors will influence the current and future collection of plastic bottles for recycling. Currently 86% of local authorities operate some form of collection scheme for plastic bottles, ranging from one or two bring sites through to comprehensive kerbside coverage. These schemes between them however are currently capturing 17% of bottles consumed through the household wastestream.

There is a clear need therefore to focus on good practice and the removal of scheme inefficiencies to optimise current systems, in addition to working towards the removal of barriers to, and encouraging the implementation of, new schemes. There is an indication that a greater improvement in recovery rates can be achieved through the improvement of scheme performance, rather than extending plastic bottle recycling scheme coverage.

Survey results demonstrate that it is important to continue to:

- Move emphasis towards kerbside systems, which on average outperform bring schemes by 4:1
- Increase the performance of existing kerbside schemes
- Provide local authorities with the information required to achieve sustainable, cost effective plastic bottle recycling. It is particularly important to highlight the fact that purchasing sort-at-kerbside vehicles without full consideration of potential future changes can limit the versatility of the collection and the materials that can be collected
- Review baling/handling infrastructure in the UK and assess the potential to encourage expansion where necessary
- Communicate to members of the public which plastic items are suitable for recycling and why plastics other than bottles should not currently be placed in recycling receptacles unless specifically requested
- Encourage the provision of suitable alternatives to households unable to participate in kerbside such as tenement properties - work in this area is being taken forward, with a greater number of local authorities trialing recycling schemes from this type of property
- Review development in mixed plastic collection and provide fuller guidance in the area

Much work has been undertake in the past year to address the above points, hence the noticeable increase in both the number of local authorities including plastic bottles in their recyclables collections and in the quantity of bottles being diverted from the residual wastestream for recycling. It is important that this work is continued if further improvements are to be seen.

With regard to the recycling of other household plastics, 55 local authorities (just over 10%) stated that they were collecting plastics other than bottles. These plastics included various combinations of carrier bags, packaging film, tubs and trays, plant pots, expanded polystyrene and other dense plastics. These local authorities indicated that they had few or no problems with their schemes, yet few of them knew, or chose to state, where the material was being sent for recycling.

It is probable that until the market for mixed plastic packing is better developed and understood and a UK market becomes available that the number of local authorities collecting this material will remain comparatively low. Work will also be required to demonstrate to local authorities that mixed plastic packaging is worth collecting for recycling and can be collected without causing operational issues. It is recommended that case study work be undertaken to further assess those local authorities that are currently collecting other household plastics for recycling in order to progress this.