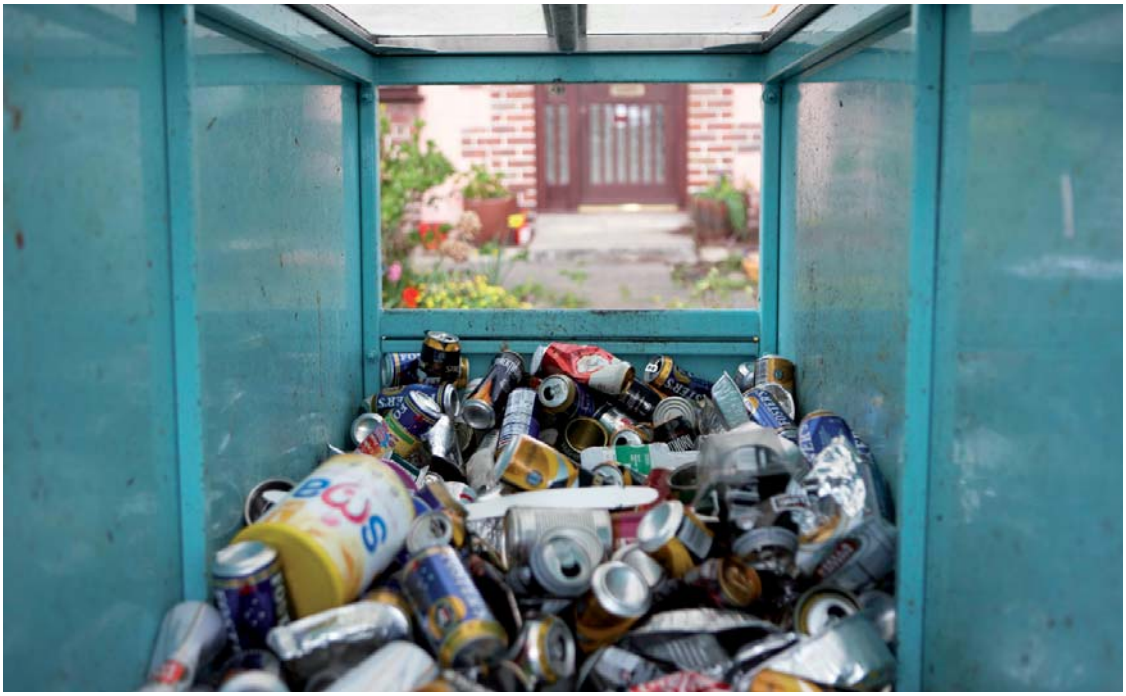
Material change for a better environment

Choosing the right recycling collection system



WRAP's role in relation to the design of recycling systems is to help practitioners by gathering and sharing knowledge and understanding about the relevant operational principles. This leaflet addresses a question which WRAP (Waste & Resources Action Programme) is often asked: which collection system is the best, in particular whether kerbside sort systems or co-mingled collections are to be preferred?

There is no simple answer, and certainly no one-size-fits-all solution. Local authorities have to make choices that are right for their local circumstances. Provision for recycling needs to be considered alongside requirements for refuse, garden and increasingly food waste and taking account of factors such as the physical characteristics of collection areas and property types.

Recognising that experience and knowledge is increasing all the time WRAP has identified some underlying principles which we believe should guide decision making.

Kerbside collection systems

Kerbside sort – involves the sorting of materials at kerbside into different compartments of a specialist collection vehicle.

Single stream co-mingled – involves the collection of materials in a single compartment vehicle with the sorting of these materials occurring at a MRF (Materials Recovery Facility).

Two stream co-mingled – residents are provided with two recycling containers and are asked to place different materials in each container, typically paper/card (fibre) in one and plastics, glass and cans (containers) in the other. These materials are kept separate but collected on one vehicle which has two chambers.

In WRAP's view, the choice of collection system should be based on:

- quality of material;
- cost efficiency;
- cost effectiveness; and
- public acceptability.

Whichever system local authorities choose they have a duty to ensure that it is operated safely. The collection of materials for recycling is a physically demanding activity carried out in a hazardous environment. In respect of the principle categories of accidents reported – slips, trips and falls and moving vehicle injuries – the exposure to risk is likely to be similar for all systems. There are some risk categories where there are differences between the systems but no system is believed to carry risks which cannot be practically managed.

Health & safety

In 2006 an ergonomic study by the Health and Safety Laboratory (HSL/2006/25) concluded that the likelihood of muscular skeletal disorders could be greater for box and sack based systems and recommended the use of wheeled bins. A later report from Centre for Health and Environment Research and Expertise (*A Health and Safety Study of Kerbside Recycling Schemes Using Boxes and Bags*) concluded that there were no significant risks in kerbside sort systems that could not be managed or controlled. For co-mingled collections there are the safety implications of sorting materials at MRFs to take into account when making decisions. In making decisions authorities can consult the latest HSE/WISH guidance: Safe Waste and Recycling Collection Services and may also wish to use the *Risk Comparator Tool (RSU/RA/07/01)* on the HSE website.

Quality

Recycling has to be done for a purpose and it is clear from the national waste strategies that recycling should be viewed as more than simply an alternative to traditional waste disposal practices.

Recycling is an integral part of the vision for the UK's Low Carbon Industrial Strategy designed to bring financial benefits for business, economic growth and job creation through improved resource efficiency. Recycling reduces the use of virgin materials and much of the energy required to extract and process raw materials.

Generally the greatest benefit is achieved by closed loop recycling where materials are put back into the same or equivalent application substituting for virgin materials. These benefits can only be achieved if the collection system delivers recyclates of sufficient quality.

Lower quality recyclates can generally only be used for lower value open loop applications. One example is container glass that has to be used as aggregate with little environmental, resource or financial benefit because it is not of a quality suitable for re-melt applications.

What is quality?

Quality means consistently delivering materials to the market place that are:

- effectively separated to meet reprocessor and end market requirements;
- in the required volumes and with security of supply; and
- at a price that sustains the market.

It is well known that the UK has become very dependent on export markets for its collected recyclates. It is less well known that in key areas e.g. paper, aluminium and certain types of glass, UK reprocessors are importing materials because sufficient material of the required quality is not available on the UK market.

WRAP believes that a healthy international market for recyclates is helpful to resource efficiency and increases the chances of closed loop recycling. However, we know that some material, which would not be of sufficient quality for UK reprocessors, finds export markets in countries where low labour costs allow further sorting before the material can be reprocessed. Where this is managed badly, media coverage of the activity has posed a significant threat to the positive perception of recycling among the public and is one of the identified barriers to recycling.

WRAP has maintained for more than two years now that kerbside sort systems which allow contamination to be filtered out at the point of collection gives the most reliable stream of quality materials.

Co-mingled collections – particularly single stream collections – face quality problems from three sources: householders putting the 'wrong' materials into the collection, compaction of the waste which breaks glass into small pieces and tends to bind materials together, and the technical and physical capacity of the MRF to separate materials in the volumes delivered to them.

Two stream co-mingled collections can reduce some of these problems by keeping fibres separate from containers and reducing the potential for materials to bind together.

WRAP is working with MRF operators to improve the quality of materials recovered by UK MRFs. Whilst it is true that considerable success is being achieved by some newer MRFs, even they are unable to deliver the levels of quality achieved by kerbside sort systems.

MRF reject rates

Reject rates for kerbside sort schemes typically are <**1%**.

Reports of MRF reject rates vary:

- The Environment Agency (2008) considers **10.8%** to be a typical average reject rate.
- Waste Data Flow 2007/08 reports total MRF rejects at **7%** (of total input by weight).
- Residue rates at MRFs involved in a WRAP study (2006) ranged widely with average reject rates in the range **12%** to **15%** (of total input by weight) and those for the most efficient MRFs in the range **2%** to **5%**.

However, these reject rates reflect only the residual material sent for disposal. Reports from UK reprocessors suggest that they send a further fraction to landfill reflecting contaminants in the material supplied to them.

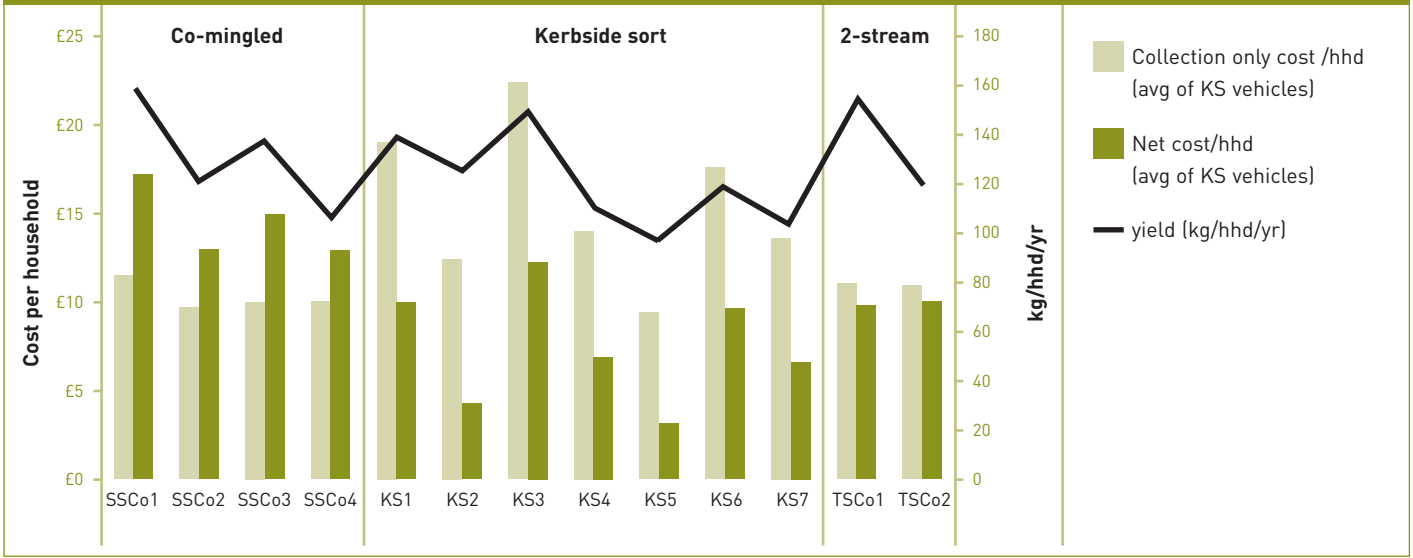
Cost efficiency

Local authorities are rightly concerned about the cost to the council taxpayer of recycling services. But it is important in comparing options that the full cost of the service should be taken into account and options are compared on a like for like basis. Kerbside sort collections often appear more expensive but the comparison should be made with co-mingled collections plus the cost of the MRF gate fee.

WRAP has modelled collection costs for different systems and the results are summarised in the graph below.

The graph shows that on a like for like basis kerbside sort systems have lower net costs than co-mingled systems. This reflects the effect of MRF gate fees and the opportunity for kerbside sort collections to sell materials direct to reprocessors. Two stream co-mingled systems have lower net costs than single stream systems reflecting lower MRF requirements and the opportunity to sell fibre streams direct to reprocessors.

Collection only cost and net cost per household



In practice the prices charged for services will not be the same as the modelled cost. The differences will reflect the appropriateness of the system specification and the effectiveness of the procurement process. The modelled costs, however, provide a better benchmark than the cost of an existing service which may be inefficient or less effective than what is now desired.

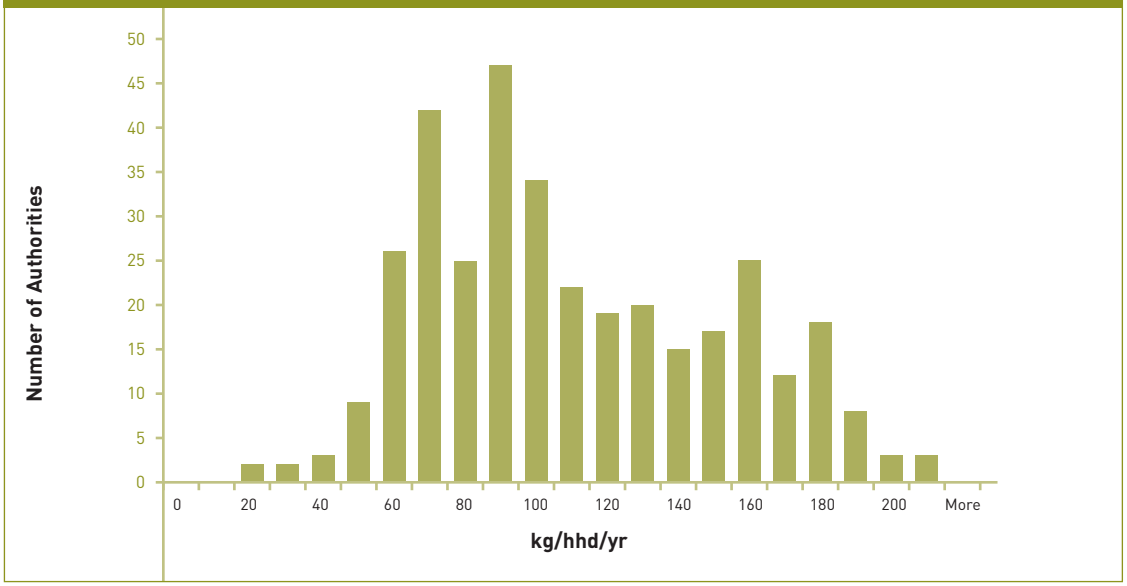
Cost effectiveness

There have been significant investments made by local authorities in recycling systems, however they are not all performing as well as they should in capturing recyclable materials. It is widely perceived that co-mingled collections are more effective at capturing material than kerbside sort schemes. A number of local authorities have reported that their recycling rates have increased dramatically following introduction of a co-mingled system. On the surface, WRAP's analysis of local authorities' WasteDataFlow returns suggests that on average co-mingled collections do attract around 36kg per household more material – most of which is paper and card. But these figures make no allowance for rejects from either the MRF or the reprocessor of wrongly sorted material.

However, local authority experiences of increased capture rates with co-mingled systems often reflect the contrast between kerbside sort systems using standard 55 litre boxes and co-mingled collections using 240 litre wheeled bins. Closer inspection of the data suggests that it is the amount of space provided for recycling and the frequency of collection of both recycling and residual waste which determines the amount of material collected. There is evidence that by providing additional containers or by more frequent collections, kerbside sort schemes can have the same effective volume for recyclates as co-mingled collections and achieve similar results.

In fact variations in the capture of materials are greater between authorities running the same types of collection than between different collection systems. This reflects a need for greater attention to performance benchmarking.

Distribution of yields for paper & card collected for recycling via kerbside schemes, England 2007/08 (352 of 354 LAs collect this material)



Public acceptability

Engaging the public in their local recycling scheme has been shown to be essential to the success of a scheme. Whichever scheme is chosen it is important that it is designed to fit the needs of the local population and the houses they live in. The type and sizes of containers can be central to this.

Separating materials

All collection systems require residents to separate their recyclables from their residual waste and place each in a designated container (box, bin or sack) and to present the container for collection on the specified collection day. Some kerbside sort and co-mingled schemes provide residents with more than one container and ask that people put different materials into each container for collection on the same day or on alternate weeks. Contrary to perception, WRAP's research indicates that the requirement to sort materials into different containers is not of great concern to householders – 87% of respondents who have to separate out different materials indicated that they do not mind that task – and all systems can be designed to limit the amount of sorting done by householders.

Householders do care about having a scheme which is understandable and properly explained. Half of households say they withhold material which may be recyclable if they are not sure about it and a third say they include material which may not be recyclable if they think it ought to be recyclable or is recycled elsewhere. Kerbside sort schemes are better able to deal with contaminants and explain errors to householders.

Householders also say that they want to know where their materials go for reprocessing to give them assurance that recycling is actually taking place. This is something which should be possible with any collection system but where marketing of the material is managed by a waste company or MRF operator provision for this should be included in contracts.

Conclusion

Ultimately, the choice of collection system remains a matter for local authorities to decide. The purpose of this leaflet is to help local authorities in making these choices by indicating what evidence is available and the conclusions we have drawn from it.

On the evidence available to WRAP, our view is that kerbside sort systems offer reliable material quality and lower net costs for council taxpayers. They are also capable of capturing the same volume of material as co-mingled schemes. There is no evidence that their operation – properly explained and justified – is unacceptable to householders and the physical evidence of sorting of materials happening at the kerbside is reassuring to sceptical residents. There appear to be no unmanageable health and safety considerations. Because of our priority for quality materials as a way to improve resource efficiency, WRAP believes that kerbside sort collections should be preferred where they are practical and should be in the majority of local authority areas.

Where there are practical and operational barriers to kerbside sorting, two stream co-mingled collections have significant advantages over single stream collections, mainly through improved material quality and value as a result of keeping paper and card separate from other materials, particularly glass.

Single stream co-mingled collections may be appropriate in circumstances where the other options are impractical. These might be the densest urban areas where on-street parking and heavy traffic require fast loading without the need to return containers to the point of collection or for high density flats, transient areas and multi-occupied properties.

WRAP will of course continue to work to improve the quality of materials achieved from mechanical sorting for both single and two stream collections.

If you have any comments on the content of this leaflet, or ideas for areas of further work, please contact us at LGS@wrap.org.uk

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