FACTSHEET ON POST CONSUMER PLASTICS ARISING IN SCOTLAND

REMADE Scotland aims to quantify post consumer plastics and the potential for plastics recycling in Scotland. This fact sheet considers the potential for recycling post consumer waste plastic bottles and the associated environmental and financial benefits.
Post consumer waste plastic bottles contribute up to 10% of the payload volume in refuse collection vehicles, and their removal for recycling can therefore improve efficiencies (by reducing the amount of dead space). The sale of plastic bottles could generate £6.5 million for Scottish Local Authorities. Demand for recycled plastics is high because manufacturers recognise the advantages of working with a material that has a lower energy requirement than virgin feedstock.

BACKGROUND

REMADE Scotland is a £2 million partnership between public and private sector to stimulate, develop and strengthen markets for recyclates in Scotland, focusing on initiatives that support the following priority materials: glass, paper and pulp, organics, wood, plastics, and waste electronic and electrical equipment.

This fact-sheet quantifies the amount of potentially recyclable plastic waste in the Scottish municipal solid waste (MSW) stream and establishes baseline data against which to compare future MSW plastics recycling performance. It also highlights the advantages of plastics recycling for local authorities and waste management companies in Scotland.

PLASTICS RECYCLING

'Plastics' is the popular name given to a wide family of polymers, developed primarily during the second half of the twentieth century. The popularity of plastics is primarily due to their flexible and lightweight characteristics, which offer many advantages in terms of packaging and transporting goods and products to end-users and consumers.

Using recycled plastics to replace virgin feedstock in product manufacturing has numerous environmental and financial benefits.

The focus is on MSW rather than commercial and industrial waste (CIW) plastic because MSW arising and composition data is relatively available and is

not necessarily deemed to be commercially sensitive. Another reason for focusing on plastics from MSW rather than CIW is that they are a comparatively untapped resource with well established markets. CIW plastics are generally 'cleaner' and less contaminated, and therefore more cost effectively recycled by operators collecting directly from source.

Within MSW management, emphasis is often placed on recovering plastic bottles for recycling because:

- Plastic bottles are easily identifiable (segregating bottles for recycling is more cost effective than segregating other smaller plastic items) and
- Markets for post consumer plastics are well established, and recycling plastic bottles can generate additional revenue for waste collection/recycling operations.

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PLASTICS ARISINGS

Annually, Scotland's population of 5.1 million people generate approximately 2,181,000 tonnes of MSW[1], of which roughly 10% are plastics. Figure 1 shows the average MSW composition as determined by the National Household Waste Analysis Project[2]. Plastics arisings in MSW are roughly split 55% dense plastics and 46% plastic film; that is, 159,000 tonnes and 140,000 tonnes respectively. This equates to roughly 31kg of dense plastic and 27kg of plastic film per person per year.

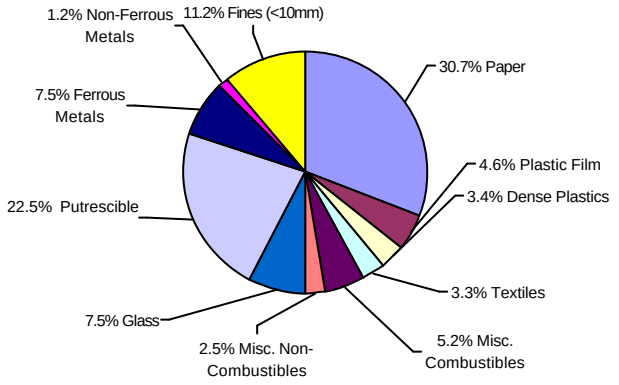

Figure 1. Average MSW composition (according to NHWAP data, which is based on a variety of data from nationally representative socio-economic groups).

For the purposes of recycling, a more detailed understanding of the potential available is required. As mentioned earlier, the generic term 'plastic' is used to refer to a wide family of polymers with unique properties and characteristics. The integrity of these properties and characteristics may be compromised if contaminated by different polymers or other materials. Hence, to maximise the revenue earning potential of any plastic recycling scheme, it is imperative that the material is not only collected as cleanly as possible, but also accurately identified to reduce the amount of cross contamination.

With this in mind, the material generally falling in the above two categories of plastic further classified as PET, HDPE, and PVC bottles (for dense plastics) and refuse sacks or carrier bags (for plastic film), as shown in Table 1.

Material	Average % Weight of total MSW
Refuse Sacks	0.70
Carrier Bags	1.15
PET Clear Bottles	1.11
PET Coloured Bottles	0.23
HDPE Natural Bottles	0.71
HDPE Coloured Bottles	0.5
PVC Clear Bottles	0.08
PVC Coloured Bottles	0.02

Table 1. Average proportion of total MSW weight that is readily identifiable plastics (data compiled by RECOUP).

Table 2 illustrates the potential of material in Scottish MSW available for recycling. This was derived from total Scottish MSW arisings and data in Table 1.

Material	Arisings in Scottish
Refuse Sacks (Plastic Film)	15,000
Carrier Bags (Plastic Film)	38,600
PET Clear Bottles	24,000
PET Coloured Bottles	5,000
HDPE Natural Bottles	15,500
HDPE Coloured Bottles	11,000
PVC Clear Bottles	1,700
PVC Coloured Bottles	400

Table 2. Estimate of annual arisings for easily identifiable plastic arising in Scottish MSW.

BENEFITS OF RECYCLING PLASTICS

The characteristics that make plastic such a popular packaging material can also pose challenges to schemes collecting post consumer plastic for recycling.

However, post consumer plastics recycling schemes generally focus on bottle recycling because they contain comparatively large amounts of material that is easily identifiable.

Post consumer plastic bottles occupy large volumes

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of space in relation to their weight, and can occupy in excess of 10% of the payload volume of refuse collection vehicles. The removal of post consumer plastic bottles from MSW will not only result in improvements of refuse collection vehicle utilisation (payload efficiency)[3].

Replacing virgin plastics with recycled post consumer is an attractive proposition to manufacturers of plastic goods because of reduced energy consumption. This, together with improving the product's environmental credentials creates an attractive market for post consumer plastic bottles. Table 3 shows the price ranges for some types of post consumer plastic bottles. Diverting post consumer plastic bottles away from landfill may therefore become a source of revenue rather than a cost for a waste collection operation.

In Scotland, 23 out of 32 local authorities provide their populations with the opportunity to recycle waste plastic bottles. In 2001 these schemes collected 215 tonnes of plastic, substantially less than 1% of the potential available Table 2. If this potential was fully explored, the sale of post consumer plastic bottles could generate in excess of £6.5 million for Scottish Local Authorities. Further savings from improvements in waste management operations and avoided costs (such as landfill tax) could be generated.

Polymer Type	Average Price (£/tonne)
PET	120 (+/- 50)
HDPE	120 (+/- 50)

Table 3 Average price for main plastic bottle polymers (data provided by RECOUP).

Other types of polymers can also be found in MSW, but are not usually included in recycling schemes due to the difficulty in accurately identifying them and their susceptibility to contamination.

The exception is plastic films, which although easily identifiable are not usually recycled because the products (e.g. carrier bags and refuse sacks) are susceptible to a high degree of contamination, which requires a greater effort to clean for recycling. These two factors may make recycling of plastic films quite challenging, and the price for any material collected for recycling will be strongly linked to its condition and level of contamination.

FURTHER READING

[1] SEPA (2001) Waste Data Digest. Stirling (ISBN 1-901322-18-1).

[2] DoE (1992) National Household Waste Analysis Project. HMSO. London.

[3] Simmons, A. (2000) Affordable Plastic Recycling? Analysis and review of collection, sorting, reprocessing and end-market issues and economics. RECOUP, Peterborough. http://www.recoup.org

ACKNOWLEDGEMENTS

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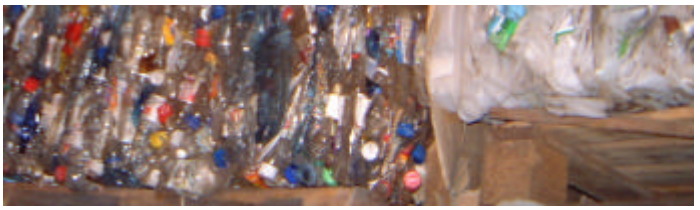

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