Options and Feasibility of a European Refund System for Metal Beverage Cans

Final Report
Appendix 1: Member State Reports

Authors:
Dominic Hogg
Tim Elliott
Simon Croasdell
Ann Ballinger
Leila Bendali
Thomas Vergunst
Chris Cullen

16th November 2011
Contents

1.0 Austria (AT) .......................................................................................................................... 2
  1.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans .......... 2
  1.2 Fees Paid by Obligated Parties ......................................................................................... 3
  1.3 Recycling Rate for Metal Cans ......................................................................................... 3
  1.4 Proportion of Total Recovery Costs Covered by Fees ...................................................... 4

2.0 Belgium (BE) ....................................................................................................................... 5
  2.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans ....... 5
  2.2 Fees Paid by Obligated Parties ......................................................................................... 6
  2.3 Recycling Rate for Metal Cans ......................................................................................... 6
  2.4 Proportion of Total Recovery Costs Covered by Fees ...................................................... 7

3.0 Bulgaria (BG) ...................................................................................................................... 8
  3.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans ....... 8
  3.2 Fees Paid by Obligated Parties ......................................................................................... 9
  3.3 Recycling Rate for Metal Cans .........................................................................................10
  3.4 Proportion of Total Recovery Costs Covered by Fees .................................................... 11

4.0 Cyprus (CY) .........................................................................................................................12
  4.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans ...... 12
  4.2 Fees Paid by Obligated Parties .........................................................................................13
  4.3 Recycling Rate for Metal Cans .........................................................................................14
  4.4 Proportion of Total Recovery Costs Covered by Fees .................................................... 15

5.0 Czech Republic (CZ) ...........................................................................................................16
  5.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans ...... 16
  5.2 Fees Paid by Obligated Parties .........................................................................................17
  5.3 Recycling Rate for Metal Cans .........................................................................................17
  5.4 Proportion of Total Recovery Costs Covered by Fees .................................................... 18

6.0 Denmark (DK) .....................................................................................................................19
  6.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans ...... 19
  6.2 Fees Paid by Obligated Parties .........................................................................................20
  6.3 Recycling Rate for Metal Cans .........................................................................................20
  6.4 Proportion of Total Recovery Costs Covered by Fees .................................................... 21

7.0 Estonia (EE) .........................................................................................................................22
  7.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans ...... 22
  7.2 Fees Paid by Obligated Parties .........................................................................................23
  7.3 Recycling Rate for Metal Cans .........................................................................................24
7.4 Proportion of Total Recovery Costs Covered by Fees .................................................. 24

8.0 Finland (FI) ..................................................................................................................... 26
  8.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans .... 26
  8.2 Fees Paid by Obligated Parties .................................................................................. 27
  8.3 Recycling Rate for Metal Cans .................................................................................. 27
  8.4 Proportion of Total Recovery Costs Covered by Fees .............................................. 28

9.0 France (FR) ..................................................................................................................... 29
  9.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans .... 29
  9.2 Fees Paid by Obligated Parties .................................................................................. 30
  9.3 Recycling Rate for Metal Cans .................................................................................. 31
  9.4 Proportion of Total Recovery Costs Covered by Fees .............................................. 32

10.0 Germany (DE) .............................................................................................................. 33
   10.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans ... 33
   10.2 Fees Paid by Obligated Parties ................................................................................ 34
   10.3 Recycling Rate for Metal Cans ................................................................................ 35
   10.4 Proportion of Total Recovery Costs Covered by Fees ............................................ 35

11.0 Greece (EL) ................................................................................................................... 36
   11.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans ... 36
   11.2 Fees Paid by Obligated Parties ................................................................................ 37
   11.3 Recycling Rate for Metal Cans ................................................................................ 38
   11.4 Proportion of Total Recovery Costs Covered by Fees ............................................ 38

12.0 Hungary (HU) .............................................................................................................. 39
   12.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans ... 39
   12.2 Fees Paid by Obligated Parties ................................................................................ 40
   12.3 Recycling Rate for Metal Cans ................................................................................ 40
   12.4 Proportion of Total Recovery Costs Covered by Fees ............................................ 42

13.0 Ireland (IE) ................................................................................................................... 43
   13.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans ... 43
   13.2 Fees Paid by Obligated Parties ................................................................................ 43
   13.3 Recycling Rate for Metal Cans ................................................................................ 44
   13.4 Proportion of Total Recovery Costs Covered by Fees ............................................ 45

14.0 Italy (IT) ......................................................................................................................... 46
   14.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans ... 46
   14.2 Fees Paid by Obligated Parties ................................................................................ 46
   14.3 Recycling Rate for Metal Cans ................................................................................ 47
   14.4 Proportion of Total Recovery Costs Covered by Fees ............................................ 48
15.0 Latvia (LV) .................................................................................................................. 49
  15.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans ..49
  15.2 Fees Paid by Obligated Parties ................................................................................. 51
  15.3 Recycling Rate for Metal Cans .................................................................................. 51
  15.4 Proportion of Total Recovery Costs Covered by Fees ............................................. 51
16.0 Lithuania (LT) ............................................................................................................. 52
  16.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans ..52
  16.2 Fees Paid by Obligated Parties ................................................................................. 53
  16.3 Recycling Rate for Metal Cans .................................................................................. 54
  16.4 Proportion of Total Recovery Costs Covered by Fees ............................................. 54
17.0 Luxembourg (LU) ...................................................................................................... 56
  17.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans ..56
  17.2 Fees Paid by Obligated Parties ................................................................................. 56
  17.3 Recycling Rate for Metal Cans .................................................................................. 57
  17.4 Proportion of Total Recovery Costs Covered by Fees ............................................. 57
18.0 Malta (MT) .................................................................................................................. 58
  18.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans ..58
  18.2 Fees Paid by Obligated Parties ................................................................................. 59
  18.3 Recycling Rate for Metal Cans .................................................................................. 59
  18.4 Proportion of Total Recovery Costs Covered by Fees ............................................. 60
19.0 The Netherlands (NL) ............................................................................................... 61
  19.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans ..61
  19.2 Fees Paid by Obligated Parties ................................................................................. 62
  19.3 Recycling Rate for Metal Cans .................................................................................. 62
  19.4 Proportion of Total Recovery Costs Covered by Fees ............................................. 63
20.0 Poland (PL) ................................................................................................................. 64
  20.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans ..64
  20.2 Fees Paid by Obligated Parties ................................................................................. 66
  20.3 Recycling Rate for Metal Cans .................................................................................. 66
  20.4 Proportion of Total Recovery Costs Covered by Fees ............................................. 67
21.0 Portugal (PT) ............................................................................................................. 68
  21.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans ..68
  21.2 Fees Paid by Obligated Parties ................................................................................. 69
  21.3 Recycling Rate for Metal Cans .................................................................................. 69
  21.4 Proportion of Total Recovery Costs Covered by Fees ............................................. 70
22.0 Romania (RO) ........................................................................................................... 71
22.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans ... 71
22.2 Fees Paid by Obligated Parties ........................................................................ 72
22.3 Recycling Rate for Metal Cans ........................................................................ 73
22.4 Proportion of Total Recovery Costs Covered by Fees .................................... 73

23.0 Slovakia (SK) .................................................................................................. 74
23.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans ... 74
23.2 Fees Paid by Obligated Parties ........................................................................ 75
23.3 Recycling Rate for Metal Cans ........................................................................ 76
23.4 Proportion of Total Recovery Costs Covered by Fees .................................... 76

24.0 Slovenia (SI) .................................................................................................. 77
24.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans ... 77
24.2 Fees Paid by Obligated Parties ........................................................................ 78
24.3 Recycling Rate for Metal Cans ........................................................................ 79
24.4 Proportion of Total Recovery Costs Covered by Fees .................................... 79

25.0 Spain (ES) .................................................................................................... 80
25.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans ... 80
25.2 Fees Paid by Obligated Parties ........................................................................ 81
25.3 Recycling Rate for Metal Cans ........................................................................ 82
25.4 Proportion of Total Recovery Costs Covered by Fees .................................... 83

26.0 Sweden (SE) .................................................................................................. 84
26.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans ... 84
26.2 Fees Paid by Obligated Parties ........................................................................ 85
26.3 Recycling Rate for Metal Cans ........................................................................ 86
26.4 Proportion of Total Recovery Costs Covered by Fees .................................... 87

27.0 United Kingdom (UK) ...................................................................................... 88
27.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans ... 88
27.2 Fees Paid by Obligated Parties ........................................................................ 89
27.3 Recycling Rate for Metal Cans ........................................................................ 90
27.4 Proportion of Total Recovery Costs Covered by Fees .................................... 91
Introduction

In this Appendix short reports on each Member State are given to provide evidence for the comparative analysis of collection systems for metal beverage cans. The systems are briefly described, and then information on the fees paid by obligation parties and the estimated performance of the system (in terms of just metal cans) is given. Finally, some comment is provided regarding the proportion of total recovery of metal cans that is covered by the fees; this is to indicate whether the PRO fees would represent the full costs of recovery, and therefore be comparable with other Member States, or not. Ideally data on the actual costs of operating the systems would be available. However, there is very limited data available in the Member States, and of course many of the collection systems are private companies who may not want to make such costs publically available.

Thus the approach taken to consider costs, was to focus on the PRO fees (or equivalent) and clearly indicate whether they related to the full costs of recovery or not. For most Member States the cost of collecting privately imported cans, and the cost of managing the cans in the residual waste collection systems, is not funded by producers. We note this here in the pre-amble rather than make the point for each Member State. Thus in reality there are very few cases, if any, where the full costs of managing all metal cans in a Member State are met by producer funding alone.

In relation to the recycling rate data we also note the following points:

1) We have sought to adjust reported recycling rates to take into account of privately imported and exported cans where possible (e.g. exclude them from the numerator and denominator in the recycling rate calculation). This is to give a more accurate representation of the efficiency of different system types;

2) Where data is not disaggregated to the level of metal cans only, we have used data from the European Aluminium Association’s annual reporting or aggregated figures for metal packaging that are reported to Eurostat.
1.0 Austria (AT)

1.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans

Figure 1-1 gives a schematic overview of the collection and recycling system for packaging waste in Austria.

Figure 1-1: Description of Collection and Recycling System for Packaging in Austria

Every packaging producer/packer/retailer who sells packed products has to either collect it themselves, or pay a license fee to an authorised organization that will meet the obligations of the Packaging Ordinance on their behalf. Today there are six authorised collection and recycling organizations for packaging waste in Austria.¹ There are different systems for household and non-household packaging. The ARA AG is the only System for all household packaging (except for beverage composite cardboards, which is the exclusive responsibility of Getränke Verbundkarton).

For metal packaging from households there is a capacity threshold of 3 litres – i.e. cans with a volume of over 3 litres are not required to be collected by this system. However, nearly 99% of all beverage cans are smaller than 3 litres; thus, for this type of packaging the ARA AG is the only relevant organization (cans with a capacity of 3 or more litres generally belong to the non-household system). Metal packaging is mostly collected through a bring-system, and is based on use of collection containers with blue tops. In Austria there are about 50,000 (December 2009) containers for the collection of metal-packaging.² After collection, the

¹ List of collecting and recycling organizations:
http://umwelt.lebensministerium.at/filemanager/download/62334

metals are separated in sorting plants into ferrous and non-ferrous metals (predominantly aluminium). The collection, sorting and transfer to reprocessors is carried out by contractors who are paid by the ARA-System.

1.1.1 Additional Recovery Routes for Metal Cans

In Austria, residual waste sorting plants and municipal waste incinerators also act as processes to recover metal packaging wastes.

1.2 Fees Paid by Obligated Parties

Every producer/packer/retailer has to pay a certain amount of money for each kilogram of packaging that they place on the market. The amount depends on the material, and if it is for household or non-household use.

Table 1-1 lists currently valid license fees for the ARA system, and those for the previous year to show the change in fees. Fees to the ARA system have slowly decreased over the last 10 years.

Table 1-1: Austria: License Fees for Packaging Material (2010 & 2011)

<table>
<thead>
<tr>
<th>Packaging materials</th>
<th>2010 (€/tonne)</th>
<th>2011 (€/tonne)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A) from households</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ferrous metals small &lt; 3 l</td>
<td>270</td>
<td>270</td>
</tr>
<tr>
<td>Ferrous metals large &gt; 3 l (+ metal straps)</td>
<td>130</td>
<td>130</td>
</tr>
<tr>
<td>Aluminium</td>
<td>500</td>
<td>450</td>
</tr>
</tbody>
</table>

Source: ARA Tarifübersicht (tariff overview) 2011

For small steel packaging the 2011 license fee is 270 € per tonne, and for aluminium the fee is 450 € per tonne. However, it is not possible to get the costs only for beverage cans, because they are only a small part of the entire system (which includes cans for food, etc.).

1.3 Recycling Rate for Metal Cans

The European Aluminium Association (EEA) provides an estimate for can recycling as 50% for 2009.³

From the data in Table 1-2 and Table 1-3, additional estimates for (2007) are made in the following way:

- Market Input of beverage cans (including Imports):
  - 11,576 tonnes per year (aluminium and steel cans) from 5,176 tonnes separate collection and 2,000 tonnes ferrous metal beverage packaging and 4,400 tonnes aluminium beverage packaging in residual waste.

- Quantity of separate collection:

5,176 tonnes per year (aluminium and steel cans);

Degree of separate collection:
- 45% over all;

Capture rates of cans from residual waste:
- 80% for steel cans;
- 25% for aluminium cans;

Degree of total recycling (separate collection and separation)
- 68% over all
  - 59% for aluminium
  - 89% for steel

The best estimate for can recycling is therefore 45% source segregated and 68% including residual waste sorting (RWS).

Table 1-2: Collection and treatment of beverage packaging in Austria 2007

<table>
<thead>
<tr>
<th>Beverage packaging</th>
<th>Separate collection (tonnes)</th>
<th>Recycling/Treatment (tonnes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beverage cans</td>
<td>5,176</td>
<td>5,176</td>
</tr>
</tbody>
</table>


Table 1-3: Amount of Packing in Residual Waste in Austria in 2007

<table>
<thead>
<tr>
<th>Fraction</th>
<th>Gross weight¹ (tonnes)</th>
<th>Percentage net (weight %)</th>
<th>Net weight (tonnes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beverage packaging</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ferrous metal</td>
<td>2,500</td>
<td>79</td>
<td>2,000</td>
</tr>
<tr>
<td>Aluminium</td>
<td>5,700</td>
<td>77</td>
<td>4,400</td>
</tr>
</tbody>
</table>

Notes: 1. Gross weights include adherences as well as product contents remaining in the packaging.


1.4 Proportion of Total Recovery Costs Covered by Fees

The ARA fee covers all costs of the separate collection system including collection, sorting, recycling, costs for containers, cleaning as well as supporting information to all households. However, beverage cans are also collected through residual waste sorting systems, and from the extraction of metals from bottom ash. The PRO fee does not cover the costs of managing cans which are left in residual waste, and hence, does not support, financially, these recovery routes. Consequently, the fees do not cover the full cost of all recycling of metal cans in Austria, let alone, the costs of managing all cans (whether recycled, or left in residual waste).

---

¹ Austrian MoE (2008), Restmengenziele (residual target amounts) 2007, p45
http://www.umweltnet.at/filemanager/download/45277
2.0 Belgium (BE)

2.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans

In Belgium, two PROs exist, one dealing with household packaging (Fost Plus), the other, with non-household packaging (Val-i-Pak). Where household packaging is concerned, in Belgium, municipalities group together as intermunicipalities to provide waste management services. They are responsible for dealing with waste in their area and typically sign a standard five year agreement with the PRO scheme Fost Plus, which has approximately 5,400 members, representing about 92% of the household packaging placed onto the Belgian market. They can either use their own collection organisation, or contract out this activity to a waste management company (through a tender process managed by the intermunicipality and supervised by Fost Plus). There is roughly a 50/50 split between those collecting themselves and those contracting out. Intermunicipalities that choose not to collect the waste themselves consult the market using a standardised tender book, written by Fost Plus. This ensures that the requirements and expectations of service delivery are equally met across Belgium. Fost Plus and the intermunicipality make a joint decision as to which waste management company to use.

As part of the agreement, Fost Plus provides the intermunicipalities with specifications for collection and sorting, including quality criteria. It also provides an administrative monitoring system (ProFost) which allows individual trucks to be monitored and the location of waste to be known at all times.

Fost Plus collects three household packaging waste streams;

- glass is collected in a bring system (one container per 1,000 inhabitants, colour separated),
- paper and cardboard is collected together with printed paper in a kerbside collection (once per month),
- PMD (Plastic bottles and flasks, Metal packaging, and Drinks cartons) is collected in a kerbside collection (twice per month).

Fost Plus also uses bring sites (container parks) as a collection method. In recent years the share of household packaging waste collected in container parks has reached a ceiling (around 15%).

2.1.1 Additional Recovery Routes for Metal Cans

Metal cans can also be extracted from any residual waste sorting plants, or extracted from incinerator bottom ash.

---


2.2 Fees Paid by Obligated Parties

Parties responsible for household packaging that join Fost Plus make a yearly declaration of the weight, type and quantity of packaging they put on the Belgian market. They then pay a fee depending on the material and the weight of that material placed onto the market.

Essential in the cooperation between Fost Plus and the intermunicipal utility organisations is the idea that none of the costs for the collection of packaging waste should be borne by the public purse. Even if public infrastructure is used for the collection of the waste, the costs have to be paid by the producers of the packaging material via Fost Plus. In order to guarantee this principle, the IVCIE guards the application of realistic costs for the use of this infrastructure, e.g. for the use of civic amenity sites or public waste collection rounds.

Fost Plus pays the full cost of collection (including for packaging in residual waste) and sorting and receives the proceeds from the sale of recycled materials. The net cost is financed by its member companies. Yearly Green Dot fees are calculated which are applied to the packaging declared by the members. Table 2-1 gives the Green Dot rates for relevant materials over the last 4 years.

Table 2-1: Fost Plus Green Dot Rates 2008 – 2011 (€ per tonne)

<table>
<thead>
<tr>
<th>Material</th>
<th>2008 (€/tonne)</th>
<th>2009 (€/tonne)</th>
<th>2010 (€/tonne)</th>
<th>2011 (€/tonne)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>18.80</td>
<td>25.30</td>
<td>37.60</td>
<td>62.10</td>
</tr>
<tr>
<td>Aluminium</td>
<td>33.90</td>
<td>36.90</td>
<td>137.90</td>
<td>182.60</td>
</tr>
</tbody>
</table>


2.3 Recycling Rate for Metal Cans

The Interregional Packaging Commission (IVCIE) holds the packaging waste data for all of Belgium. This includes data from Fost Plus (for household packaging waste), Val-I-Pac (for commercial packaging waste) and others (those who don’t report to either Fost Plus or Val-I-Pac). The overall rate for metal packaging in 2008 was estimated as 94%.\(^7\)

The European Aluminium Association calculated the recycling rate of aluminium beverage cans in 2007 to be 91%. For both 2008 and 2009 they calculated the rate to be 93%.\(^8\),\(^9\),\(^10\)

The World Steel Association gave a recycling rate of steel cans of 93% for Belgium in 2007, which was the highest of their calculated rates in Europe. It must be taken into account that this figure does not pertain solely to beverage cans, but is


for all can types (including food cans). As a breakdown of steel packaging is not available a steel beverage can recycling rate cannot be calculated (though clearly, such a high percentage overall would probably indicate a similarly high rate for beverage cans alone.\textsuperscript{11} We have used the EAA figure of 93\% for the best estimate of metal beverage can recycling rate in Belgium.

### 2.4 Proportion of Total Recovery Costs Covered by Fees

The specific aim of the Fost Plus system is to cover the full costs of collecting packaging wastes. The vast majority of metal cans are likely to be covered by Fost Plus, and all relevant costs, including collection and sorting, and including also the costs of managing packaging waste left in residual waste, are included in the calculation of the fees. Thus the fees cover all the costs of the packaging waste system, net of revenue from material sales.

\textsuperscript{11} World Steel Association (2009) \textit{Global steel can recycling rate reaches highest level}, Accessed 16 March 2011, \url{http://www.worldsteel.org/climatechange/?page=3&subpage=11}
3.0 Bulgaria (BG)

3.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans

Separate packaging waste collection was introduced in Bulgaria in 2003, with projects in four municipalities approved in 2006 (co-financed by the Enterprise for Management of Environmental Activities). Where separate collection is taking place, it is done through either kerbside collection systems (with contracts organised by the Municipalities) or bring sites. It is estimated that 4.5 million people were covered by selective collection in 2007 (about 60%), but the origin or accuracy of this figure is not clear.\(^\text{12}\)

Private packaging waste collection organisations operate in Bulgaria under contracts with local municipalities. These organisations can operate different types of household collection. For example, EcoBulpack provides each household with a yellow container for paper, plastic and metal packaging (up to a 120l capacity) encouraging people to separate their waste, whereas Ecopack provides kerbside collection with coloured plastic bags (as opposed to containers) (see Figure 3-1)\(^\text{13,14}\)

Figure 3-1: Bring Site Collection Bins and Kerbside Collection with Plastic Bags (Ecopack)

Bring sites with a three bin collection system, blue for paper packaging, yellow for plastic and metal and green for glass are also provided near commercial points, schools and hotels and on main streets.

---


3.1.1 Additional Recovery Routes for Metal Cans

In addition, the informal waste management sector in Bulgaria is significant. In 2003 the Ministry of Environment and Water estimated that roughly 10,000 people are scavenging rubbish bins and landfills to collect and sell recyclable materials.\(^{15}\)

It is estimated that scavengers make a substantial contribution toward the recovery targets, for example over 60% of recycled paper and plastics.\(^{16}\) The role of scavengers and buy back centres is shown in Figure 3-2.

**Figure 3-2: The Role of Informal Waste Pickers (Referred to as Scavengers) and Buy-Back Centres**


3.2 Fees Paid by Obligated Parties

Table 3-1 gives the fees that producers/importers pay Ecopack Bulgaria to undertake to achieve the targets of recovery and recycling laid down in the packaging waste legislation, and which arise as a result of the products being placed by the producer/importer on the market in Bulgaria. This can be paid in three ways – as an annual fee, a recovery fee or single annual recovery fee. Ecopack Bulgaria, like all the Bulgarian packaging recovery organisations, is a non-profit organisation. National state packaging taxes (payable unless part of a compliance scheme) are much greater than the producer responsibility organisation fees; this incentivises enrolment with such organisations. Up to the end of 2009, all the Bulgarian packaging recovery organisations charged the same fees, set through a voluntary agreement drafted by the Ministry of Environment and Water, but this arrangement has effectively been dissolved and


---

Appendix 1 to Final Report
the different organisations now compete on price. Fees charged by the other packaging recovery organisations in Bulgaria were not available.

Table 3-1: Ecopack Tariff for Determination of Unit Recovery Fees

<table>
<thead>
<tr>
<th>Material</th>
<th>Unit Fee 2010 (€/tonne)</th>
<th>Unit Fee 2011 (€/tonne)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>23</td>
<td>41</td>
</tr>
<tr>
<td>Aluminium</td>
<td>92</td>
<td>144</td>
</tr>
</tbody>
</table>


3.3 Recycling Rate for Metal Cans

Detailed data on metal beverage cans and recycling rates are limited for Bulgaria. Packaging data is available for the broad category of metal only, hence further breakdown into aluminium and steel is not available. Even if this was available it would not possible to confirm what proportion of these packaging materials represent metal beverage cans.

Table 3-2 gives the metal packaging data for 2005 to 2009. This data appears suspect as the recycling rate for metal packaging goes from 0.1% in 2005 to 65% in 2008. It is hard to imagine such a change over only 3 years in practice, leading us to the conclusion that this data either contains errors or there is incomplete reporting of the data.

Table 3-2: Metal Packaging Waste Bulgaria (2004 – 2009)

<table>
<thead>
<tr>
<th></th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Recycled</td>
<td>27%</td>
<td>0.1%</td>
<td>6%</td>
<td>0.2%</td>
<td>65%</td>
<td>50%</td>
</tr>
</tbody>
</table>


The European Aluminium Association calculated the Romanian & Bulgarian recycling rate for aluminium beverage cans to be 34% in 2008 and 2009. However it is not known if this rate is really representative for Bulgaria and also as this rate was calculated using extrapolative methods its accuracy cannot be guaranteed.17

The split between aluminium beverage cans and steel beverage cans is unknown, as is the proportion of beverage cans in the reported packaging metals. Hence it is not possible to calculate a recycling rate for beverage cans in Bulgaria. However it would be expected that due to the low levels of selective waste collection that the overall recycling rate of beverage cans would be well below the European average. In the absence of better data, the EEA combined Romania and Bulgaria figure of 34% has been assumed to be the best estimate. Evidently, the difficulties in obtaining quality data are exacerbated by the role played by the informal sector.

3.4 Proportion of Total Recovery Costs Covered by Fees

As the coverage of the selective collection systems is not comprehensive, a high recycling rate is probably not achieved, and due to the influence of the informal sector, the PRO fees indicated above probably do not cover a high proportion of the costs of collecting metal beverage cans in Bulgaria (although equally, if the recycling rate is low, then the costs of supporting this activity alone are likely to be low when spread across all the packaging placed on the market).
4.0 Cyprus (CY)

4.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans

Organisations which are legally obliged to collect their packaging materials can do so by means of an individual Alternative Management System (AMS) or, alternatively, through a collective Alternative Management System. Green Dot Cyprus is the only collective waste management scheme licensed by the Ministry of Agriculture, Natural Resources and the Environment.

Green Dot Cyprus began its operation for industrial and commercial facilities in September 2006 and for households in February 2007. The program serves almost 85% of the population. The operation of this collective system is based on the collective management scheme “Fost Plus”, which has been in place for some years in Belgium (see 2.0). Glass is collected at bring sites located at central points, such as supermarkets and restaurants. There are weekly kerbside collections for plastic, metals, and tetra packs. These items are placed in specific sacks (PMD sacks) or in a blue bins in the case of apartment blocks. Bi-monthly kerbside collections are also provided to households for paper, cardboard and cartons. All dry recyclables are transferred to sorting plants for sorting, shredding, pressing and bailing.18

Household dry recyclables are therefore collected separately in three streams:

1) Paper stream: dry cardboard boxes, paper containers/packaging, newspapers, magazines, office paper, and advertising leaflets;

2) Glass stream: glass bottles/jars, and other glass packaging of all colours; and

3) PMD stream (Plastics, Metals and Drink Cartons): PET, PE and HDPE plastic bottles, flasks, aluminium and steel packaging, and composite drink packages (e.g. tetrapak).

In highly populated areas on the island, the paper and PMD streams are collected at the kerbside; while glass is collected at centrally located bring sites.19 In tourist areas all three streams are collected via bring sites. Each recycling point consists of two brown bins for paper, two blue bins for PMD and one green bell-shaped bin for glass.

Green Dot Cyprus does not collect, sort or treat packaging waste, but instead outsources these operations to competent public or private operators. In many

---


cases collections are completed by municipalities who in turn receive funding for their efforts.20

4.1.1 Additional Recovery Routes for Metal Cans

Cans for Kids is a registered charity which was formed in 1990 to organise the collection and recycling of aluminium beverage cans in Cyprus.21 The charity uses its own infrastructure to collect, compact and bale aluminium beverage cans. Cans are collected via specific bring banks and compacted upon collection to maximise collection capacities. Since its inception in 1990 more than 22 million cans have been collected. Cans for Kids collects and recycles approximately 10% of all the used beverage cans recycled on the island.22 As a means of encouraging individuals to recycle their cans, Cans for Kids has decided to use some of the proceeds from the sale of their cans to purchase medical equipment for Cyprus’ central paediatric hospital.23, 24

4.2 Fees Paid by Obligated Parties

The collection of all streams is undertaken by private companies who are paid by Green Dot Cyprus. Green Dot Cyprus covers 80% of the fees and claims back the remaining 20% from municipalities. Green Dot Cyprus itself is funded by its various members and shareholders, both of whom are liable to pay annual membership fees and an amount based on the weight and the type of packaging material they place on the market every year. These material based fees are shown in Table 4-1. The operational cost of the system is covered through the fees that companies who sell packaged products pay to Green Dot Cyprus. Companies add the cost of these fees to their products, thereby transferring the cost of collection to consumers.25

At the end of February each year all members and shareholders have to declare and provide evidence on the quantity of material they placed on the market over the preceding year.

---


22 Personal communication with Rosie Charalambous, Vice President of Cans for Kids; see also: Cans for Kids (2011) Home Page, http://www.cansforkids.org/

23 At present over 250,000 € worth of equipment has been donated to the Makarios Hospital in Nicosia through donations, sponsorship and the efforts of Cans for Kids - see: www.charity-charities.org/Cyprus-charities/Nicosia-1619623.html

24 Personal communication with Rosie Charalambous - Vice President of Cans for Kids.

Table 4-1: Material Based Fees Payable to Green Dot Cyprus (2010-2011)

<table>
<thead>
<tr>
<th>Material</th>
<th>€/tonne</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household packaging</td>
<td></td>
</tr>
<tr>
<td>Metal</td>
<td>95.39</td>
</tr>
<tr>
<td>Aluminium</td>
<td>21.38</td>
</tr>
</tbody>
</table>


Participation in the system requires that all members pay a financial contribution according to the weights and the types of packaging placed on the market in the previous year (the value of these contributions in 2010 and 2011 are shown in Table 4-1).

4.3 Recycling Rate for Metal Cans

2009 data on packaging waste from Eurostat indicates that out of the 5,662 tonnes of metal packaging placed on the market, 5,547 (or 97.97%) were exported from Cyprus for recycling. However, according to Green Dot Cyprus, the organisation recycled 460 tonnes of aluminium packaging in 2010 (up from 122 tonnes in 2008 and 310 tonnes in 2009). The tonnages includes all municipal and commercial/industrial aluminium packaging waste, such as beverage cans, sprays, etc, but according to Green Dot Cyprus, beverage cans constitute the largest percentage of aluminium packaging. The figure for 2009 (310 tonnes) is significantly lower than the total metal packaging wastes collected for recycling, but much of the collected packaging material is not expected to be metal beverage cans.

Data on the number of cans placed on the market in Cyprus was not available, but an average per capita consumption figure for the EU-27 was used in combination with the population of Cyprus and an average figure of 14.5 grams for the weight of an aluminium can. This approach estimates a total generation figure of around 900 tonnes per annum – this approach is clearly subject to some uncertainty, as there are numerous reasons why the consumption of canned beverages would be different from the average EU-27 figure (e.g. the impact of tourism). If accurate, this approach would give a figure of around 50% recycling for cans.

The European Aluminium Association presented the recycling rate for aluminium beverage cans in Cyprus to be 70 % in 2009 – the source of the data was the Green Dot System. However, this recycling rate could not be found in the publicly available data presented by the system on its website, and thus could not be

27 Personal communication with Kyriakos Parpounas, General Manager of Green Dot Cyprus
verified. The published figure of 70% was used as the best estimate, although it is recognised that this might be a high estimate.

4.4 Proportion of Total Recovery Costs Covered by Fees

It is clear that the full costs are not covered by the PRO fees as 20% of the collection cost is funded by the municipality. In addition, the Cans for Kids scheme is not covered by this fee. The fees do not, therefore, represent the total cost of recovery of metal beverage cans in Cyprus.
5.0 Czech Republic (CZ)

5.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans

The Act on Packaging regulates the activity of a “Green Dot” firm, i.e. an authorized packaging recovery organisation and regulates establishing the conditions for the award of the relevant authorization from the MoE. EKO-KOM, which was founded in 1997, is the main such organisation operating in the Czech Republic.

The main partners of EKO-KOM in the provision of collection and recovery of packaging waste are the municipalities. They operate integrated systems, meaning that packaging and non-packaging components are collected in the same container. EKO-KOM partners operate over 80% of the collection systems in the Czech Packaging market. The remaining 20% are amounts placed on the market by operators who ensure the recovery system of packaging waste individually. Those operators produce mainly industrial packaging which is not intended for sale to consumers.

However, the quantity of metal beverage cans metals placed onto the market is very limited. PET is commonly used for soft-drinks, with cans mainly limited to the energy-drinks market segment, and glass is mostly used for beer. The total quantity of beverage cans in 2009 was 230 million, with 140 million for beer. For this reason, separate collection of metal packaging waste is carried out only by some municipalities, and the total amount of collected metal packaging is considered to be small. EKO-KOM calculates the amount of the refund to municipalities by the proportion of packaging waste in the separately collected waste fraction.

Table 5-1: Share of Packaging in Separately Collected Waste (valid from 1.1.2010)

<table>
<thead>
<tr>
<th>Material</th>
<th>Proportion of Packaging (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper</td>
<td>25</td>
</tr>
<tr>
<td>Plastics</td>
<td>87</td>
</tr>
<tr>
<td>Glass (transparent, coloured)</td>
<td>99</td>
</tr>
<tr>
<td>Metals</td>
<td>6</td>
</tr>
<tr>
<td>Beverage cartons</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: EKO-KOM

---


As can be clearly seen from Table 5-1 the share of metal packaging in the metals waste stream, is considerably lower than for the other material types.

### 5.1.1 Additional Recovery Routes for Metal Cans

Metal containers are recovered in three currently operating MSW incineration plants where the ferrous fraction is separated from the bottom ash. Metal waste is also collected at collection points where citizens can hand over recoverable municipal waste components for which no container system is provided (as e.g. hazardous waste, bulky waste, W.E.E. etc.). Sorted packaging waste and metal components coming from there are also included in the register of EKO-KOM.

### 5.2 Fees Paid by Obligated Parties

Every producer/packer/retailer has to pay a certain amount of money for each kilogram of packaging which they bring into the market to the authorized packaging recovery organization, EKO-KOM, for providing the take-back and recovery system. As in other countries the payments differ between the various packaging materials, and depend on whether it is for “final” (sales) packaging, group packaging, transport packaging, or industrial packaging.

Table 5-2 lists currently valid license fees (including the values for the previous two quarters, fees are apparently set on a biannual basis). Fees for group and transport packaging are not shown.

**Table 5-2: Czech Republic: License Fees for One Kilogram of Packaging Material; IV 2010/I 2011 and II 2011 onward, in €/tonne**

<table>
<thead>
<tr>
<th>Packaging materials (Sales Packaging)</th>
<th>01.10.2010 – 31.03.2011</th>
<th>since 01.04.2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metals Fe</td>
<td>61.4</td>
<td>65.2</td>
</tr>
<tr>
<td>Metals Al</td>
<td>81.8</td>
<td>86.8</td>
</tr>
<tr>
<td>Metals above 5 l</td>
<td>27.3</td>
<td>29.0</td>
</tr>
</tbody>
</table>

Source: EKO-KOM current tariff overview 2011 www.ekokom.cz/en/clients/fees including a download for the last two quarters to be found at the same website under “Soubory ke stažení”

### 5.3 Recycling Rate for Metal Cans

EKO-KOM reports the total quantity of aluminium packaging waste placed on the market is around 8 - 9,000 tonnes per annum. According to a study conducted in 2007, the production of aluminium beverage cans (which are the majority in the Czech Republic) is about 3,000 tonnes annually (however, it is suggested by PRO Europe in personal communication that many of these cans are exported on domestic flights).

---


The total amount of separately collected cans is estimated by the MoE to only be 3 to 5% of the total quantity sold.\(^{34}\) However, additional metal cans are captured from bottom ash through the three municipal waste incinerators which incinerated around 17% of municipal waste in 2010 – although no data on the quantities captured was available.

Table 5-3 shows the development of packaging waste recycling (both from households and industry). The recycling rate for all metal packaging is around 56%. EKO-KOM claimed a 64% metal packaging recycling in 2010, but given the low proportion of metal packaging in separately collected waste, this is unlikely to reflect the capture of metal beverage cans.

Table 5-3: Czech Republic: Development of the Total Recycling Rate of Packaging Waste

<table>
<thead>
<tr>
<th>Year</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010(^{4})</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aluminium</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>29.6</td>
<td>30.8</td>
<td>23.7</td>
<td>19.6</td>
<td>-</td>
</tr>
<tr>
<td>Steel</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>50.6</td>
<td>60.8</td>
<td>47.0</td>
<td>59.4</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>37.3</td>
<td>35.0</td>
<td>33.9</td>
<td>47.1</td>
<td>55.6</td>
<td>42.9</td>
<td>52.0</td>
<td>56.0</td>
</tr>
</tbody>
</table>

Note:
1. Preliminary data. Metal packaging figure updated according to personal communication with Joachim Quoden, PRO Europe, 17/10/2011

Source: www.mzp.cz/cz/souhmne_udaje_obaly

However, a high proportion of cans produced in the Czech Republic are aluminium, implying that the aluminium recycling rate shown in Table 5-3, at around 20%, is perhaps more likely to reflect the capture of metal beverage cans than the figure for steel or all recycling.

5.4 Proportion of Total Recovery Costs Covered by Fees

There is only limited separate collection infrastructure for metal cans in the Czech Republic. Moreover, it appears more common for cans to be extracted from the bottom ash of the municipal waste incinerators which operate in the country. Thus the fees would not seem not to cover the full cost of recovery for metal cans in this Member State.

\(^{34}\) Information from personal communication with Ladislav Trylč, Czech MoE.
6.0 Denmark (DK)

6.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans

Denmark has had legislation requiring beverage containers to be included in deposit refund systems since the early 1980s. In 2002, new legislation was introduced establishing a single deposit refund system (DRS). All beverages sold had to be included in a DRS regardless of whether they were refillable or disposable.\(^{35}\)

The Danish Environmental Protection Agency (Miljøstyrelsen) granted Dansk Retursystem the exclusive right to operate a DRS for disposable beverage containers in Denmark.\(^{36}\) Dansk Retursystem is a private non-profit organisation that is tasked with the management of the DRS and with the collection, and recycling of disposable beverage containers, i.e. disposable metal cans and plastic bottles. The 2002 legislation states that metal cans placed on the market must be included in the approved DRS operated by Dansk Retursystem. Each and every beverage product packaged in a disposable container must be registered with the system in order to be sold in Denmark.

The tasks and functions of Dansk Retursystem include:

- The collection of disposable beverage containers included in the deposit refund system;
- Reimbursing member companies for deposits paid on the containers; and
- Paying grocery stores a handling fee for the sorting of refillable beverage containers returned to breweries, manufacturers, etc.

There are over 13,000 shops, restaurants, cafes, etc, that accept the return of disposable beverage containers, as well as almost 2,900 Reverse Vending Machines (RVMs) located around the country.

6.1.1 Additional Recovery Routes for Metal Cans

Municipalities are responsible for the collection of the majority of waste streams in Denmark. Bring systems / igloos and recycling centres are the main mechanisms for collecting waste materials. These systems enable the collection of metal food cans and the like, and can also be utilised for metal beverage cans, including those not sold on the domestic market.

In addition there are high levels of energy recovery at municipal waste incinerators. Metals from the bottom ash are captured for recycling.\(^{37}\)

---

\(^{35}\) Danish Ministry of the Environment (2002) Statutory Order No. 713 of 24\(^{\text{th}}\) August 2002 on Deposits and Collection etc. of Packaging for Beer and Certain Soft Drinks.

\(^{36}\) Dansk Retursystem, Accessed 12\(^{\text{th}}\) March 2011, [http://www.dansk-retursystem.dk](http://www.dansk-retursystem.dk)

\(^{37}\) Personal communication with the Danish Aluminium Association.
6.2 Fees Paid by Obligated Parties

The fees charged to member companies depend on a number of factors, primarily on the total volume of containers sold in the previous year, and the expectation of the following year’s sales. The fees are also dependent on the quantity, and composition of the beverage containers that they place on the market. The composition of a beverage container takes into account its size and its material type. There are a range of fees charged depending on the size and material type of a container. For example, if a company is selling beverages in aluminium cans with a container volume of 500ml, then the following fees apply: 38

- Collection Fee: 10.70 øre per [0.5l] aluminium can (€0.0143)
- Collection Fee: 21.70 øre per [0.5l] steel can (€0.0297)
- Logistics Fee: 0.00 øre per unit

An annual review is undertaken to set the fees for the following year. Approval from the Ministry of the Environment is required before the fees come into effect.

Deposits levied on typical (<1 litre) beverage cans are 1 DKK, or around €0.13, per container.

6.3 Recycling Rate for Metal Cans

In 2009 there were around 380 million cans placed on the market in Denmark. All of these cans are required by law to be included in the deposit refund system, Dansk Retursystem. 39 In 2009 Dansk Retursystem claims a return rate of 85% for disposable metal cans. The rate reported for 2010 was 86%. 40 Dansk Retursystem has to meet a 95% return rate by 2013, in order to achieve the target set out in national legislation. 41, 42, 43

Denmark recovers a large proportion of its waste through recycling, biological treatment and energy from waste facilities. 44 Overall certain packaging waste streams achieve very high recycling rates, as detailed in Table 6-1. Annually the recycling rate for aluminium packaging is estimated at greater than 100%. Rather than representing a major calculation error, this is an indication of the scale of

______________________________

40 Personal communication with Anne-Mette Lysemose, Danish Environmental Protection Agency, October 2011.
41 Dansk Retursystem, EMAIL SENDER, March 2011
42 Dansk Retursystem (2010), System i tal [System Figures], May 2010, http://www.dansk-retursystem.dk/media(413,1030)/Systemet_i_tal_2009_2.pdf
43 Ministry for the Environment, Statutory Order No. 634 of 19th June 2008 – Order on deposits and collection, June 2008
private importation of aluminium packaging, primarily in the form of metal beverage cans. If recycling rates are calculated based on amounts of aluminium packaging placed on the market in Denmark, then if large amounts of waste arise from imports, the possibility arises that the figure will exceed 100%.

Table 6-1: Packaging Waste Recycling Rates (2008)

<table>
<thead>
<tr>
<th>Household Waste</th>
<th>Recycling Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>71</td>
</tr>
<tr>
<td>Aluminium</td>
<td>113</td>
</tr>
</tbody>
</table>


As the deposit system covers all metal beverage cans placed on the market, the figures from Dansk Retursystem were used as the best estimate recycling rate (86%).

6.4 Proportion of Total Recovery Costs Covered by Fees

The fees paid to Dansk Retursystem relate to a large proportion of the total recovery costs, but of course, unredeemed deposits fund the collection of empty containers also, so the fees themselves do not represent the full cost of recovery. On the other hand, the full cost of the recycling of the deposit packaging is born by the producers and consumers in combination.

The fees do not cover the costs of managing waste packaging from privately imported cans. These cans, as is clear from the table above, are likely to contribute a high proportion of the total aluminium packaging recycling rate in Denmark. Indeed, to the extent that the figures are accurate, they must account for a high proportion as it is only by virtue of privately imported goods that the calculated recycling rates can exceed 100%. These cans are collected (and the costs of management are paid for) by the municipalities in Denmark, as is the cost of litter collection and residual waste collection and treatment.
7.0 Estonia (EE)

7.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans

In Estonia, both the deposit refund scheme and container collection systems are used for collection of packaging waste from households. There are currently 4 accredited PROs for packaging waste management in Estonia.

The primary collection system for metal beverage cans is a deposit refund system (DRS). Mandatory deposit legislation (Packaging Act) was passed in 2004 and entered into force on 1st May 2005. The deposit scheme covers both refillable packaging (glass, plastic) and non-refillable packaging (glass, plastic and metal) of beer, low ethanol alcoholic beverages, cider, perry and soft drinks.

Eesti Pandipakend OÜ (EPP) is an accredited deposit organisation/PRO established to organise the nation-wide collection and recovery of packaging subject to the payment of a deposit. It is the single operator of the deposit refund scheme in Estonia. EPP was established on the initiative of beverage producers and importers to implement, administer and operate the deposit refund system in Estonia. To ensure the right balance between the different associations, all of the shareholders hold an equal share in the EPP. Such a structure is important from the perspective of competition law.

All producers (fillers and importers) of beverages subject to deposit are obliged to join EPP in order to distribute their products legally in Estonia. In 2010, after five years of operation, more than 150 producers and importers have joined the EPP deposit scheme. Collection of deposit packaging takes place from approximately 1,200 locations (shops, supermarkets, hotels, restaurants). Over 500 locations are equipped with reverse vending machines (RVMs) that collect around 90% of all deposit packaging returned. All packages covered by the deposit scheme have to be marked with an identification label that is added either to the label of a product, or as a security sticker on a package. The level of the mandatory deposit for metal cans is presented in Table 7-1.

Table 7-1: Levels of the Mandatory Deposit on Beverage Packaging in Estonia

<table>
<thead>
<tr>
<th>Type of packaging</th>
<th>Volume</th>
<th>Marking on label</th>
<th>Deposit, €</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disposable metal packaging</td>
<td>All volumes</td>
<td>C</td>
<td>0.06</td>
</tr>
</tbody>
</table>

Source: *Regulation of the Estonian Minister of Environment, 6th December 2010*

The packaging managed under the deposit system is also identified by the EAN code, i.e. bar code. Bar codes must correspond to the international standards of the EAN International (EAN-13, EAN-8) or the Uniform Code Council and deposit organisation guidelines. Importers may use the existing EAN code of the product.

7.1.1 Additional Recovery Routes for Metal Cans

Other packaging in the household waste stream is collected via the container based collection systems operated by three accredited PROs. As a rule, a
packaging waste collection points (bring site) have a separate container for paper and cardboard, and for mixed packaging waste.

The collection and recovery of packaging in the commercial and industrial waste streams is organised by the companies via individual contracts with the waste management companies or agreements with PROs.

7.2 Fees Paid by Obligated Parties

The deposit scheme operated by the Eesti Pandipakend is financed mainly by fees paid by producers (fillers and importers), unredeemed deposits and income received from the sales of collected materials.

When joining the deposit scheme producers have to pay a one-off enrolment fee of 31.96 € to the EPP. In addition, a registration fee is to be paid for the registration of beverage package in the Packaging Register of the EPP which is 28.76 EUR per each package type.

A producer submits monthly sales reports to the EPP. On the basis of these reports, the EPP submits to a producer an invoice for deposits and administration fees. The administration fees are fixed amounts for each packaging unit of each type of packaging. This amount varies according to the material, rates of return and costs of handling.

In 2011, the EPP administration fees are the following:

- Unique EAN code plastic up to 0.5 litres – 0.012 €/packaging.
- Standard EAN code plastic up to 0.5 litres – 0.017 €/packaging.
- Unique EAN code plastic more than 0.5 litres – 0.012 €/packaging.
- Standard EAN code plastic more than 0.5 litres – 0.017 €/pack.
- Unique EAN code glass – 0.012 €/pack.
- Standard EAN code glass- 0.017 €/pack.
- Metal packaging- 0 €/pack.

When a producer sells soft drinks, beer, cider, perry, low-ethanol alcoholic beverages to retailers in Estonia, the price of the beverages includes the deposit related to the beverage packaging concerned. Retailers recover the amount of the deposit from customers (or end users) to whom they sell the products. When customers return beverage containers (either to a shop or supermarket of the EPP system where it is accepted either manually or by RVM) he/she has the right to recover the full amount of deposit paid for the package.

When the used beverage containers have been returned to the shops and supermarkets, either through RVMs or manually, they are transported (organised and financed by EPP) to the counting centre of EPP, where they are registered, counted and sorted. On the basis of this registration, EPP pays the refund back to retailers.

EPP pays all retailers a handling fee to cover the direct costs related to take-back and handling of non-refillable deposit packaging. The rate of handling fee is a fixed amount for each returned packaging unit of each type of packaging. This amount depends on the manner of accepting returned packages (manually or automatically by RVMs):
Unredeemed deposits, and the income from the sales of the packaging material, are used to finance the EPP activities and investments of the deposit scheme.

7.3 Recycling Rate for Metal Cans

The deposit system in Estonia has proven to be an effective measure in addressing away-from-home consumption and recovery of beverage packaging waste. The current performance level of the Estonian deposit refund in terms of return rate is presented in Table 7-2. It is estimated that up 1 % of metal cans are steel cans, with the rest being aluminium.\textsuperscript{45}

Table 7-2: Return Rates for Non-refillable Deposit Packaging (2006-2009)

<table>
<thead>
<tr>
<th>Packaging</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>Recovery rates for obtaining exemption from excise duty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal cans</td>
<td>47</td>
<td>48</td>
<td>58</td>
<td>59</td>
<td>50</td>
</tr>
</tbody>
</table>

Source: Eesti Pandipakend (2011) personal communication with the representative of EPP, February 2011

A total of 114.5 million metal beverage cans were sold in Estonia in 2009 of which 63.1 million cans were returned for recycling.\textsuperscript{46} The associated return rate of metal beverage cans was thus 59 %, which compared to other types of deposit packaging is low (91% for glass and 96% for plastic bottles). The reason for this low rate for metal cans is that a significant amount of alcoholic beverages in metal cans are taken by individuals from Estonia to Finland which, due to tax levels in Finland, has one of the highest alcohol prices in Europe. The number of cans exported to Finland and other countries is believed to be over 25 million per annum (>25% of cans placed on the market). Accounting for the cans exported to Finland would mean the return rate of cans that remain in the country (assuming exported cans are not returned) could be around 85%. As stated above, glass return rates stand at 91%, and plastic bottle return rate 96% in Estonia (very little border trade occurs in these materials). Given the influence of the private export of cans, we use the figure of 85% as a best estimate for the recycling performance of the DRS.

7.4 Proportion of Total Recovery Costs Covered by Fees

Due to the proportion of cans purchased by Finnish consumers (approx. 25%), and not returned to EPP, there are fewer cans to manage but increased revenue

\textsuperscript{45} Personal communication with the representative of EPP (Eesti Pandipakend OÜ), February 2011

\textsuperscript{46} Ibid.
from the unredeemed deposits. As a result, there are no administration / collection fees levied on producers placing cans on the market in Estonia. Thus, clearly, the fees do not represent the costs of recovering cans through the deposit in Estonia. However, the system is effectively funded by producers and consumers in combination.
8.0 Finland (FI)

8.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans

Finland has been reusing beverage containers since the early 20th Century. Currently, there exist a number of different deposit refund systems. Each system is different depending on the type of beverage container in use, and whether they are refillable or recyclable. In order to set up a deposit refund system, permission must be sought from the Ministry of the Environment. The systems must also achieve, at a minimum, the targets set out in the legislation on return systems for certain beverage containers:

- Recycling of disposable metal beverage containers: 90%

Suomen Palautuspakkaus Oy (PALPA) is the primary recycling system for disposable beverage containers, i.e. metal cans and plastic bottles. The system is owned by the retail trade and the breweries. PALPA began the deposit refund system for metal cans in 1996 and this was extended to include plastic bottles in 2008. There are also a number of closed systems operated by the private sector, e.g. that operated by Lidl.

Consumers are incentivised to return empty beverage containers by the inclusion of a deposit value in the original price paid. When the consumer returns the empty container to a participating retailer or Reverse Vending Machine (RVM), the deposit is refunded in full. Firms that utilise the PALPA system must pay the appropriate level of fees associated with the quantity and type of beverage containers placed on the market. For a product to be included in the system it must be registered with PALPA. Every registered product must then meet the required labelling requirements. Metal cans have the following labelling requirements:

- The text “PANTTI – PANT 0,15€” must appear twice on the top area of the can; and
- The container must also have a marking displaying the type of material the container is made of.

All types of containers must have a barcode that meets the specified dimensions and orientation to ensure compatibility with the system. PALPA has nationwide coverage with a large number of participating shops, restaurants, as well as a considerable number of Reverse Vending Machines (RVMs), as detailed in Table 8-1 below. In 2008, 95% all returned products in the system were returned via RVMs.

---


48 Jan Rehnberg (2010) Nordic Deposit Analysis – Analysis of the requirements for a joint Nordic deposit system for beverage containers, Report for the Nordic Council
### Table 8-1: The Number of Recycling Points in the PALPA Deposit Refund System

<table>
<thead>
<tr>
<th>Collection Point</th>
<th>Number of Collection Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retail Trade Recycling Points</td>
<td>5,815</td>
</tr>
<tr>
<td>Food Service Industry Recycling Points</td>
<td>8,758</td>
</tr>
<tr>
<td>RVMs</td>
<td>c. 4,000</td>
</tr>
</tbody>
</table>


#### 8.1.1 Additional Recovery Routes for Metal Cans

Metal cans may also be recovered through ‘on street’ recycling points, and from metals extracted from municipal waste incinerator bottom ash.

#### 8.2 Fees Paid by Obligated Parties

PALPA is a non-profit organisation that is funded through membership fees from companies whose products are included in the system. Companies pay an initial registration fee to become a member of the system. Further fees are then paid to PALPA to cover the costs of operating the system and refunding deposits to retailers. The level of these fees paid depends on the quantity and composition of beverage containers placed on the market.

The joining fee for PALPA depends on whether the company wishes to join both the can and bottle deposit refund systems. Each system has a separate joining fee of €7,600. A company may opt to pay an annual fee of €1,500 for 5 years instead of the initial membership fee. Upon joining PALPA, a member company must deposit a bank security or financial guarantee, the value of which is based on the volume that the producer/importer expects to sell. Each product that a company intends to place on the market, and to be included in the deposit refund system, must also be registered with PALPA. A fee of €350 is charged for each product that requires registration in the system.

The fees based on the quantity and type of beverage containers placed on the market, which are used to cover the actual costs of collecting, sorting and recycling the beverage containers, are shown in Table 8-2.

#### 8.3 Recycling Rate for Metal Cans

The Finnish Federation of the Brewing and Soft Drinks Industry estimates that approximately 43 million litres of beer, cider and long drinks were privately imported into Finland in 2009. If the entirety of these imports were in metal cans, the quantity could range from 86 million to 131 million cans depending on the
size of can, i.e. 500 ml or 330 ml respectively. For 2010, we are informed that around 25 to 35 million cans come to Finland from Estonia, 100 million from Sweden (mostly on the ferries) or from tax free areas, and 15 million from elsewhere. We are informed that these cans (whether recycled or not) are not included in the return rates quoted by PALPA that follow.

Table 8-3: Return Rates for Finland's PALPA Deposit Scheme (2009)

<table>
<thead>
<tr>
<th>Container Type</th>
<th>Return Rate 2009</th>
<th>Return Rate 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal Beverage Cans</td>
<td>92%</td>
<td>94%</td>
</tr>
<tr>
<td>Plastic Bottles</td>
<td>89%</td>
<td>90%</td>
</tr>
</tbody>
</table>


PALPA reported that in 2010, the system achieved a return rate of 94% for metal cans, which is higher than the government target of 90% as set out in the legislation. This figure has been used as the best estimate recycling rate.

8.4 Proportion of Total Recovery Costs Covered by Fees

The fees paid by producers do cover a large proportion of the total cost of recovery in Finland. Recycling rates are high, and do not include a significant proportion of privately imported cans (which are not financed). Moreover, due to the high return rates (94% for 2010) the revenue from unredeemed deposits is low, so a greater proportion of the actual cost of collection and recycling is funded directly by the fees paid for by producers than for other DRSs. Producers do not, however, fund the collection and recycling of privately imported cans.

---

9.0 France (FR)

9.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans

In France the recovery of beverage packaging is promoted through extended producer responsibility legislation for household packaging waste (initially formalised on the 1st April 1992 with the publication of Decree No. 92-377). The largest organisation, which also covers metal packaging, Eco-Emballages, was formed in the autumn of 1992 in response to the packaging legislation passed by the French Government. Some months later, in February 1993, Adelphe was formed to support members in the wine and spirits industries. The two companies are private non-profit organisations, they work closely together and their combined efforts cover almost all of the packaging that enters the household waste stream.\(^{50}\)

Members of the two schemes are entitled to place the Green Dot logo on their packaging material. Adelphe uses the Green Dot logo through a sub-license from Eco-Emballages. The Green Dot logo is reportedly present on 95% of all packaging materials and acts to provide assurances that the product can be separately collected for recycling by municipalities across France (either via drop-off centres/civic amenity sites or via kerbside collection services).

At present approximately 30% of municipal waste by weight is collected via drop-off centres and only about 20% is separately collected at the kerbside.\(^{51}\) Between 1996 and 2007 it is reported that the number of drop-off centres increased from 1,438 to 4,400 (with 2,856 in 2001 and 4000 in 2005).\(^{52}\)

Eco-Emballages’ 2007 annual report suggests the following infrastructure with regards to the collection of the packaging materials was in place across France:

- ‘245,400 container bins for voluntary drop-off;
- Approximately 6.7 million receptacles for selective wastes; and
- Approximately 3,500 separate waste collection vehicles’.\(^{53}\)

\(^{50}\) Pro Europe (2011) France: Eco-Emballages, Accessed 22nd August 2011, [www.pro-e.org/France1.htm](http://www.pro-e.org/France1.htm)


\(^{52}\) Ibid.

9.1.1 Additional Recovery Routes for Metal Cans

Metal beverage cans could also be recovered through residual waste sorting plants, or though bottom ash from municipal waste incinerators.

9.2 Fees Paid by Obligated Parties

In 2010 Eco-Emballages and Adelphe had a combined membership of 22,271 – which together represented some 50,300 companies – who paid a total of €518 million euros in fees (an average of 0.6 € cents per packaging unit placed on the market). The fees for the producer responsibility scheme run by Eco-Emballages are set to increase in January 2012 in order to improve recovery and recycling operations, and to ensure that the charging scheme is more equitable.

The fees charged for placing packaging materials on the market are based on a two-tier charging system. Members are charged based on: 1) the weight and the type of the packaging material placed on the market; and 2) an amount for each packaging unit which is capped at 0.15 eurocents. The current rates for 2011 and the new proposed rates for 2012 are summarised in Table 9-1 for metal packaging items only.

Table 9-1: Contribution Based on Type of Packaging Material

<table>
<thead>
<tr>
<th></th>
<th>2011 (€/tonne)</th>
<th>2012 (€/tonne)</th>
<th>Percentage Increase (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>30.2</td>
<td>31.5</td>
<td>4.50</td>
</tr>
<tr>
<td>Aluminium</td>
<td>60.6</td>
<td>92.8</td>
<td>53</td>
</tr>
</tbody>
</table>

Source: Eco-Emballages

The unit fee is essentially equal to the weight-based fee up to the point it reaches the aforementioned cap. For example, the current fee system operates in the following way:

- If the weight and material specific fee is ≥ 0.15 eurocents / kg (150 € per tonne) then the total fee for a piece of packaging = fee by weight (€ per kg or / tonne) + fee per pack capped at 0.15 eurocents;
- If the weight and material specific fee is < 0.15 eurocents / kg then the total fee for a piece of packaging = fee by weight (€ per kg or / tonne) × 2.

Of the fees which are generated the vast majority (92%) are paid to local authorities for the collection and sorting of packaging materials. Municipalities are paid in accordance with the amount and quality of separately collected materials that they collect. According to Pro Europe:

‘Eco-Emballages signs six-year contracts with local authorities that have, or will, set up a separate collection system and supports them

---

financially, through subsidies calculated according to the quantity of material sorted’.56

Our understanding is that the system is designed not to cover the full cost of packaging collection and recycling, but the costs over and above the costs of residual waste collection and management.

9.3 Recycling Rate for Metal Cans

Data on metal beverage cans – that is, recycling rates and units placed on the market – comes from disparate sources. The total quantities of steel and aluminium packaging arising and recycled in France, are reported to Eurostat.57 In 2008, 51% and 62% of all aluminium and steel packaging was recycled, respectively. Total recycling of all metals was 56%. The data tables from which these date were extracted reported that no aluminium or steel was exported for processing abroad. However, these figures will also include packaging items that are not beverage cans.

Eco-Emballages report that in 2010 it recovered the following proportions of metal materials which were registered through the scheme:

- Steel: 116%;
- Aluminium: 36%.

The greater than 100% rate for steel is most likely due to the fact that steel items which do not contain the Green Dot logo are also being included in the collection and recycling schemes; for example, imported tinned foods and steel beverage cans, as well as metal packaging from those who choose not to be members. In addition, we understand that recycling rates are calculated using the contracted tonnages of the PRO schemes, thus as empty packaging placed on the market by packers not in the scheme is collected, then the denominator is lower than it should be, thus recycling rates are inflated and can rise above 100%. This gives little confidence to these reported figures.

According to the European Aluminium Association the recycling rate for aluminium beverage cans increased from 40% in 2006 and 2007 to 51% in 2009 (these data are based on estimates from the Green Dot scheme).58, 59, 60 Given the above data it would appear that perhaps up to half of all aluminium beverage cans are being recycled in France, and a high proportion of steel cans arising

through household consumption. The best estimate rate used was for all metal packaging - 56%.

9.4 Proportion of Total Recovery Costs Covered by Fees

The proportion of total recovery costs covered by the producer fees is difficult to ascertain due to the uncertainties in the data on the recycling of metal beverage cans. It does appear as though the fees are directly funding the main collection systems which, perhaps, collect up to half of the market share of metal cans. Thus the fees may cover a reasonable proportion of the total recovery costs for metal beverage cans.
10.0 Germany (DE)

10.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans

The 1991 packaging ordinance set a limit of 72% refillable containers. When levels fell below this rate, container deposit legislation brought in at the start of 2003 required a mandatory deposit of between 25 and 30 cents on all beers, soft drinks and mineral waters sold in one-way packaging. The mandatory deposit is applied to product types, of which a large number are sold in metal cans. Deutsche Pfandsystem GmbH (DPG) is the organisation which sets the rules for operation, and organises deposit clearing between all participating institutions. Figure 10-1 shows the key material, data and financial flows in the German deposit system.

Figure 10-1: Flows of Material, Data and Money in DPG

---

The single packaging items either are taken back via automatic reverse vending machines or registered in so called “counting centres” after loose collection. DPG has a large degree of competition in-built. Producers can sign-up to a number of clearing organisations that compete on service offering and price, as long as certain minimum requirements are met. This makes understanding the material and financial flows more difficult than for the other DRSs, as there is no central organisation that controls or reports on ‘fees’ and recycling rates etc.

10.1.1 Additional Recovery Routes for Metal Cans

Metal cans not returned through DPG can be captured for recycling through the collection systems operated by producer responsibility schemes operating in Germany. These systems organise the area-wide collection close to final consumers as well as subsequent recycling of the used packaging. The services for collection and sorting are contracted out to the public or private sector by regular tenders.

The largest operator (with a market share slightly above 50 %) is DSD GmbH. As DSD runs the only collection system approved for household packaging, any other operator – if collecting from households – has to use their system. Some packaging materials, of which metals are included, are collected in bags (“Der Gelbe Sack” = Yellow Bag, refer to Figure 10-2) or (usually yellow) containers (typical volume of the latter: 240 l). In some rural areas (predominantly Bavaria) packaging is organised in ‘bring systems’ via municipal waste recycling centres.

Figure 10-2: Germany: Typical Collection of Packaging (plastic, metal) in “Yellow Bags”

Source: www.pbase.com/jansouman/typically_german

In addition, metal cans can be captured through residual waste plants that incorporate sorting technology (for example, MBT plants) or at municipal waste incinerators.

10.2 Fees Paid by Obligated Parties

In financial terms the deposit system is completely run by the distributors of one-way packaging. The cost for the take-back (investment in and operation of automatic reverse vending machines) and the collection are counterweighed by, unredeemed deposits and earnings for selling the materials. The only fees paid by
obligated parties are to DPG for administrative purposes. Fees are levied on all actors in the value chain, with some being ‘one-off’ and others annual. The one-off fees are levied on the following actors:

- Initial distributor;
- Deposit account holder;
- Refund Claimants (Retailers); and
- Collectors.

Annual fees payable to DPG for the maintenance of the container database are given in Table 10-1.

Table 10-1: Annual DPG Fees - GTIN-registration fee each plus VAT

<table>
<thead>
<tr>
<th>Number DPG packages (pieces) per GTIN (Registration fee for the provision of a relevant amount of clusters as defined in section 7.3 of the Conditions of Participation)</th>
<th>Charge in Euro</th>
</tr>
</thead>
<tbody>
<tr>
<td>For labels with DPG marked packaging up to 0.1 million packages per year</td>
<td>80</td>
</tr>
<tr>
<td>Up to and including 0.8 million DPG marked packages per year</td>
<td>150</td>
</tr>
<tr>
<td>More than 0.8 million up to and including 2 million DPG marked packages per year</td>
<td>500</td>
</tr>
<tr>
<td>More than 2 million up to and including 50 million DPG marked packages per year</td>
<td>8500</td>
</tr>
<tr>
<td>More than 50 million GPG marked packages per year</td>
<td>33,000</td>
</tr>
</tbody>
</table>

10.3 Recycling Rate for Metal Cans

There is no central source for a recycling rate figure achieved by the deposit system. Figures for the return rate for metal cans, through the DRS, are reported at around 95%. This has been used as the best estimate recycling rate.

10.4 Proportion of Total Recovery Costs Covered by Fees

The financing structure for the system is different for producers in Germany, as they are responsible for implementing collection systems through service providers. Producers pay service providers for collection and clearing, and these do fund the collection of the majority of the cans in Germany, thus the implied producer fees do cover a high proportion of the costs of collection and recycling of metal beverage cans in this Member State.

---

63 TOMRA (2011) Mehr Getränkedosen Sollen Recycelt Warden [More Beverage Cans Should be Recycled], Press Release
11.0 Greece (EL)

11.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans

In Greece, a number of systems have been developed for the recovery of packaging waste. These organisations are approved by NOAMPOW, the National Organisation for Alternative Management of Packaging and Other Waste. The main organisation which covers metal beverage containers is the Collective Alternative Management System, or CAMS-RECYCLING, operated by HERRCo S.A..

HERRCo S.A. was founded in December 2001 by private firms who, either supply packaged products to the Greek market, or manufacture different packaging items. The system has developed four major fields of activity to recover packaging materials:

- Blue bins project;
- Professional premises project;
- Industrial and commercial projects; and
- Other projects.

The Blue bins project for the collection of municipal packaging wastes, would be the main system through which empty metal beverage containers would be collected, as most of this type of packaging waste is generated by households. Specifically, this project aims to develop the blue recycling bin network which allows for the collection of paper, plastic, glass, aluminium and steel through a bring based system of large blue bins. This system is available to the general public for household waste only – i.e. not for commercial waste. As part of this project HERRCo has to fund and develop a network of blue bins in cooperation with local authorities (local authorities are ultimately responsible for the collection of the materials). All recovered materials are sent to about 28 Recycling Sorting Plants, either partially or wholly funded by HERRCo, where the recyclable materials are separated and forwarded for recycling. Today, the actions undertaken by HERRCo have made it possible for 8.1 million residents throughout Greece to participate in recycling (about 75% of the population).

11.1.1 Additional Recovery Routes for Metal Cans

In addition, to HERRCo there are two other main systems through which metal beverage cans may be captured:

- Collective system for rewarding alternative packaging management “Rewarding Recycling” (this scheme provides receipts which can be used to make purchases in shops or donations to social causes);\(^6\)

Private system for the alternative management of packaging waste of A.B. Vassilopoulos S.A. (this scheme provides both cash and receipts which can be used to make donations to social causes).

As well as the above schemes, the collection of beverage cans is also carried out by poor/marginalised social groups. It is estimated that these individuals collect approximately 35% of all used beverage cans and sell them directly to recycling centers and/or reprocessors.

11.2 Fees Paid by Obligated Parties

The collective system is financed by fillers and importers of packaged goods. The HERRCo system uses these revenues to fund the recycling projects outlined above.\(^{65}\)

The financial flow in the system includes the following:

- Financial contribution paid by the participants (obligated packaging organisations);
- Fees paid by the HERRCo to NOAMPOW;
- Fees paid by HERRCo to the municipalities; and
- Economic support from the Ministry of Environment, Energy and Climate.

The funds remaining are used to support the alternative packaging management schemes.

Members of the alternative packaging management system HERRCo must make a financial contribution to the organisation. Members are charged on the basis of a number of criteria, in particular the volume and weight of packaging, the amount of waste, the pollution load and other factors.

The total fee for each item of packaging consists of two parts, the fixed fee, which is 0.04 eurocent per unit of packaging (that is per sales unit or per item of packaging) and the weight-based fee, which is different for each packaging material.\(^{66}\)

Table 11-1: Financial Contribution Paid by Participants to HERRCo

<table>
<thead>
<tr>
<th>Contributions (eurocents/unit)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed contribution</td>
<td>0.04</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Contributions by weight (€/tonne)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminium</td>
</tr>
<tr>
<td>Steel</td>
</tr>
</tbody>
</table>


\(^{66}\) Ibid.
11.3 Recycling Rate for Metal Cans

Some information on the quantities of packaging wastes generated, recycled and recovered is available from the Ministry of Agriculture, Natural Resources and the Environment and EUROSTAT. In 2008, the recycling of aluminium and steel packaging wastes was 34% and 46% respectively. ELVAL is one of the largest aluminium recycling companies in Greece. It has created an Aluminium Can Recycling Centre (CANAL) in Athens that has been operating since 2003. HERRCo cooperates with CANAL and sends a proportion of metal beverage cans to their facility (CANAL recycles only aluminium beverage cans and purchases used cans for 1.20€ per kg). In 2010, the quantity of recycled aluminium cans recycled was 854 tonnes.

According to personal communication with Mr Evripidis Dimou, who is the Director at the Procurement Management Department of HERRCo, the proportion of the total quantity of packaging waste recycled under HERRCo accounted for by aluminium packaging waste (mainly, aluminium cans) was 4.5% in 2010. This equates to around 18 thousand tonnes.

The proportion of total packaging collected by the ‘Rewarding Recycling’ and A.B. Vassilopoulos S.A. private system, is around 25% of that collected by HERRCo, but the contribution of metal beverage cans is not known. In addition, the Greek Aluminium Association estimates that 35% of the total quantity of aluminium cans are collected through the informal sector.

The variation and potential inconsistency in the data (which may be explained through unknown factors) makes it very difficult to determine a figure for metal beverage can recycling. The Eurostat data suggests that it may be quite low (34% for aluminium), but in relation to the estimate of total metal beverage cans placed on the market, the rate could be much higher. The figure of 34% was used as the best estimate recycling rate.

11.4 Proportion of Total Recovery Costs Covered by Fees

The fees paid to the main collection organisation fund part of the blue bin system which municipalities run to capture packaging from households. The proportion that is funded is not fully understood, but it is believed to be less than 100% for packaging in general. In addition, there are other collection organisations recovering cans, not least the informal sector. The recycling rate is uncertain, however is unlikely to be very high, so the proportion of total recovery costs covered by the fees is not expected to be significant.

---


68 Personal communication with Evripidi Dimou, Director at the Procurement Management at HERRCo.
12.0 Hungary (HU)

12.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans

ÖKO-Pannon Nonprofit Kft. coordinates the separate collection and recovery of household, industrial and commercial waste at the national level. ÖKO-Pannon Nonprofit PLC was founded by producers of packaged products and manufacturers of packaging materials in order to fulfil their common obligations as stipulated by the legislation on packaging. The majority of the organisation’s income is used to cover the costs of operating separate waste collection schemes and educational programs. Öko-Pannon funds a bring-system with 5,080 collection points for packaging materials, which reportedly serves 5 million people (50% of the population). The organisation has formed contracts with 71 waste collection companies, involving 913 municipalities and 2,800 members.Öko-Pannon, although the largest (covering nearly 70% of the packaging material placed on the market), is not the only coordinating organisation in Hungary (other examples include Öko-Pack, Öko-Ferr, and Recyclomed).

12.1.1 Additional Recovery Routes for Metal Cans

Returpack was founded in 2006 at the request of the Association of Hungarian Brewers. The aim was to set up a system for the collection and the recycling of aluminium beverage cans. Returpack begun to collect aluminium cans from the larger retailers using Reverse Vending Machines (RVM) in 2010. The RVM collects the cans and gives back 2 HUF per can in return (€0.007). According to the CEO of Returpack, a significant proportion of cans are recovered by informal collectors.

71 Conversion calculated on 17.10.2011.
12.2 Fees Paid by Obligated Parties

The fees charged by Öko-Pannon in 2011, under the Green Dot system, are given in Table 12-1.

Table 12-1: Green Dot Fees applied by Öko-Pannon (2011)

<table>
<thead>
<tr>
<th>Material type</th>
<th>Fee (HUF/kg)</th>
<th>Fee (€/kg) ¹</th>
<th>Fee (€/tonne)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminium</td>
<td>6.0</td>
<td>0.020</td>
<td>20</td>
</tr>
<tr>
<td>Aluminium beverage can</td>
<td>6.6</td>
<td>0.022</td>
<td>22</td>
</tr>
<tr>
<td>Other metal</td>
<td>3.4</td>
<td>0.012</td>
<td>12</td>
</tr>
</tbody>
</table>

Note: ¹ Conversion calculated on 17.10.2011


12.3 Recycling Rate for Metal Cans

Table 12-2 shows the recycling rates achieved by Öko-Pannon within their collection system in 2009.

Table 12-2: Recycling rates achieved within the Öko-Pannon system (2009)

<table>
<thead>
<tr>
<th>Waste type</th>
<th>Obligatory</th>
<th>Achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total recovery rate</td>
<td>53%</td>
<td>57.00%</td>
</tr>
<tr>
<td>Aluminium</td>
<td>27%</td>
<td>31.42%</td>
</tr>
<tr>
<td>Metal (iron)</td>
<td>50%</td>
<td>68.76%</td>
</tr>
</tbody>
</table>


The figures given in Table 12-2 relate to all metal packaging, however. The proportion of aluminium cans to steel cans in Hungary is very high, thus the recycling rate for aluminium (~31%) should be considered as representative of a recycling rate for beverage containers. The European Aluminium Association
Appendix 1 to Final Report

(EAA) calculated the Hungarian recycling rate for aluminium beverage cans to be 41% in 2008.\(^{72}\)

According to the Canadean database the total number of beverage cans put on the market in Hungary in 2009 was 625 million (this figure does not include the private trade in beverage cans brought into the country).\(^{73}\) Taking an estimate of the size of the cans, the total weight would be around 10,500 tonnes. Data from László Duma, CEO of Returpack Kft, indicated that the total quantity of aluminium beverage cans placed on the market in 2008 was 12,000 tonnes.\(^{74}\)

In 2008 the Őko-Pannon system collected 4,182 tonnes of cans.\(^{75}\) Out of the 4,182 tonnes of collected aluminium packaging, 778 tonnes were aluminium beverage cans; from this amount 416 tonnes came from industry, while 362 tonnes came from households.\(^{76}\) Based on the information provided by the largest aluminium beverage can recycling NGO, ÉAI Magyarország Nonprofit Kft, aluminium beverage can production and recycling tonnages are as given in Table 12-3.

Table 12-3: Aluminium Beverage Cans Production and Recycling in Hungary (2008)

<table>
<thead>
<tr>
<th></th>
<th>On the market for final consumption (tonnes)</th>
<th>Recycled [tonnes (%)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminium beverage cans (licensed quantities at the 4 coord.companies- Őko-Pannon, Őko-Pack, Őko-Ferr, Recyclomed)</td>
<td>11,432</td>
<td>935 (8.21%)</td>
</tr>
</tbody>
</table>

Source: Personal communication with Ms. Erzsébet J.Zs., Chairman, of ÉAI, 20.02.2011.

At present Returpack reportedly collects 300 tonnes of beverage cans, with a further 1,000 tonnes coming from their RVMs in Tesco stores. Combining this figure with the average collected from the 4 coordinating companies, and using an average figure from the sources quoted above for the total quantity of metal beverage cans placed on the market, the recycling rate for aluminium beverage cans can be calculated at around 20%. However, the effect of informal collections might not be included in this estimate. Thus the range of recycling rates that have been estimated for metal beverage can recycling in Hungary, is likely to be somewhere between 20 and 42%. The EAA figure of 42% was used as the best estimate recycling rate.

---


\(^{74}\) Personal communication with Mr. László Duma, Returpack

\(^{75}\) Ibid.

\(^{76}\) Szelektív.hu (2009) 10 éve gyűjtjük szelektíven az alumínium italdobozokat, [http://szelektiv.blogter.hu/365591/ezust_szinu_arany](http://szelektiv.blogter.hu/365591/ezust_szinu_arany)
12.4 Proportion of Total Recovery Costs Covered by Fees

The recycling rate and proportion of the population that receives selective collection in Hungary is low, and there could be a high proportion of collected material that comes through the unpaid informal sector. Thus the proportion of total collection costs that is likely to be covered by the PRO fees is low.
13.0 Ireland (IE)

13.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans

Household recycling in Ireland is collected and sorted either by private contractors or by local authorities, in kerbside, civic amenity and bring systems. There is competition in the market with private contractors competing with the local authorities for market share in the household waste sector.

The compliance scheme, run by Repak, contributes financially to the collection and sorting of packaging. Repak is an industry funded organisation whose aim it is to facilitate and increase packaging recycling. Based on the principle of producer responsibility, Repak was established to help businesses meet their legal obligations to fund the recovery and recycling of the packaging on the goods or services they supply, as set out in the Waste Management (Packaging) Regulations 2007.77

Repak reported that in 2008 the tonnage of domestic recycling through kerbside systems overtook the bring tonnage (bring banks and recycling centres) for the first time.78 A typical kerbside collection comprises a green bin for dry recyclates in addition to the black refuse bin. Kerbside collection for households is typically undertaken either by local authorities or the private sector. Commercial packaging is collected by private contractors.

Producers of packaging waste that do not choose to join Repak are required to accept or collect back packaging waste, providing well publicised facilities for this.

13.1.1 Additional Recovery Routes for Metal Cans

Additional recovery routes for metal beverage cans in Ireland may be through MBT plants and waste incineration. The proportion of residual treated in these ways is likely to grow in the near future.

13.2 Fees Paid by Obligated Parties

Packaging collection is carried out by local authorities and private contractors, and the funds that Repak collect on behalf of its members are distributed amongst these parties in proportion to how much they collect, and what type of infrastructure is used for the collection (for example, there are higher rates for materials collected at kerbside than through bring schemes). In 2009, Repak disbursed 28.9 € million, 77% of which went to cover domestic recycling.


expenditure and 23% on commercial (tonnage recovered was 33% domestic and 67% commercial).\textsuperscript{79}

Repak’s fee structure comprises participation fees and material specific fees, as shown in Table 13-1 and Table 13-2. New joiners are also obliged to pay back-dated fees at the rate they would have paid into Repak unless they have evidence of self-compliance or were not classed as major producers.

Table 13-1: Repak 2010 Fee Structure

<table>
<thead>
<tr>
<th>Activity in Supply chain</th>
<th>€/tonne</th>
<th>Fee Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material Manufacturer</td>
<td>2.05</td>
<td>Participation Fee</td>
</tr>
<tr>
<td>Converter</td>
<td>2.05</td>
<td>Participation Fee</td>
</tr>
<tr>
<td>Brandholder/Importer</td>
<td>See below</td>
<td>Material Specific Fee</td>
</tr>
<tr>
<td>Distributor</td>
<td>2.05</td>
<td>Participation Fee</td>
</tr>
<tr>
<td>Retailer</td>
<td>4.10</td>
<td>Participation Fee</td>
</tr>
</tbody>
</table>

Table 13-2: Repak 2010 Material Specific Fees

<table>
<thead>
<tr>
<th>Material</th>
<th>Cost €/tonne</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminium</td>
<td>83.62</td>
</tr>
<tr>
<td>Steel</td>
<td>78.51</td>
</tr>
</tbody>
</table>

13.3 Recycling Rate for Metal Cans

There are approximately 510 million beverage cans sold in Ireland per annum.\textsuperscript{80} Information provided by Alupro Ireland suggests that all beverage cans sold in Ireland (with the exception of some that may be imported across the border with Northern Ireland) are aluminium.\textsuperscript{81} This translates to approximately 8,000 tonnes of cans put onto the market per year. This also agrees with Alupro Ireland’s assessment of the weight of cans put onto the market. Repak’s estimate for aluminium put on the market is 11,500 tonnes, of which 70% comprises cans (moving towards 60%, as foil food trays and fast food containers become more prevalent). Hence, this is also aligned with the 8,000 tonnes figure for cans.

Table 13-3 shows the performance of packaging recovery in Ireland in 2009, as reported by the Environmental Protection Agency of Ireland. The aluminium quantity managed figure is higher than the Repak estimate of 11,500 tonnes, and it is thought that the majority of the difference is due to household foil being counted by the EPA in its waste characterisation but not by Repak.\textsuperscript{82} Foil packaging is not collected in Ireland and so it is assumed that the majority of the recycled aluminium packaging is beverage cans – the remaining potentially being food trays. Using the estimate for total placed on the market (8,000), and the...


\textsuperscript{81} Based on personal communication with Alupro Ireland, March 2011.

\textsuperscript{82} Personal communication with Alupro Ireland, March 2011.
quantity recycled (4,535) then the implied recycling rate would be around 57% - this is assuming that the majority of the aluminium fraction is indeed just beverage cans.

Table 13-3: Packaging Recovery in Ireland (2009)

<table>
<thead>
<tr>
<th>Material</th>
<th>Quantity managed (t)</th>
<th>Quantity recovered (t)</th>
<th>National recovery rate (%)</th>
<th>Quantity recycled (t)</th>
<th>National recycling rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ferrous</td>
<td>39,547</td>
<td>25,580</td>
<td>64.7</td>
<td>25,580</td>
<td>64.7</td>
</tr>
<tr>
<td>Aluminium</td>
<td>12,970</td>
<td>4,535</td>
<td>35</td>
<td>4,535</td>
<td>35</td>
</tr>
<tr>
<td>Other Metals</td>
<td>691</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>


Alupro Ireland calculates the can recycling rate at 41%, using an average 2007/8 figure for recycling tonnage. In addition, the EAA (extrapolation for cans) figure for 2009 is 47%.

There is a range of possible estimates for the recycling of metal beverage cans in Ireland. However, none of the sources are fully robust so there is not a high degree of confidence in the figures. Considering the data presented above, currently, the recycling rate could be around the 50% mark.

13.4 Proportion of Total Recovery Costs Covered by Fees

Anecdotal evidence from an OLAM Briefing presentation for the CCMA Environment Committee suggests that the green bin recycling services cost the four Dublin local authorities 27 € million per annum in 2006. This includes the costs associated with collecting, transporting, segregating, processing, shipping and marketing etc. It goes on to state that Repak only contributes €1 million, while the sale of the processed product collected from households generates approximately 500,000 €. A significant cost, therefore, is attributable just to providing the collection services, and is not paid for by the producer responsibility scheme for packaging.

14.0 Italy (IT)

14.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans

CONAI (the National Packaging Consortium – a green dot member) was founded in 1997 by Decree 22/97 in the context of transposition of the European Packaging and Packaging Waste Directive 94/62/EC. CONAI was entrusted with the task to manage and guarantee the recovery and the recycling of packaging waste in Italy.

The CONAI model is based on the principle of “shared responsibility” which assumes the cooperation of all participants involved in waste management. All companies, users, producers and fillers, take responsibility for environmental packaging management, principally through enrolment in CONAI. Producers not adopting an autonomous management system must organise packaging recycling and recovery operations through the CONAI system. A mix of kerbside and bring collection systems is found across the Italian Municipalities, which enables the collection of empty metal beverage containers.

CONAI has an Agreement with the National Association of Italian Municipalities (ANCI), which was designed with the goal to guarantee the consistent increase of separated waste collection in Italy. The new agreement, valid for five years starting from 2009, involves 7,000 municipalities and 50 million citizens. As with past agreements, the municipalities are financially compensated, based on the quantity and quality of packaging waste delivered to CONAI.84

14.1.1 Additional Recovery Routes for Metal Cans

Additional recovery of metal cans could be achieved through residual waste sorting at MBT facilities, or at municipal waste incinerators.

14.2 Fees Paid by Obligated Parties

In Italy, the costs of managing packaging waste must be shared between the producers and users of such waste through payment of a levy to CONAI. This levy is calculated for each type of packaging material according to the quantity and quality of packaging waste recovered or recycled, and is aimed at supporting the costs of separate collection, recycling and recovery of primary packaging waste. Accordingly, this results in a surcharge for the final consumer, in accordance with the “polluter pays” principle.

Municipal waste collection & treatment is funded through a combination of payments from CONAI (CONAI signs an agreement with municipalities fixing a negotiated price) and waste collection charges levied upon local residents. The financing of the system is described in Figure 14-1.

Figure 14-1: Main Economic Flows within the Italian Municipal Waste Management System in 2009 (€ million)


Table 3-1 gives the fees that producers pay CONAI according to the type and weight of packaging material put on the market.

Table 14-1: Environmental Contribution for Packaging CONAI (2011)

<table>
<thead>
<tr>
<th>Material</th>
<th>Fee (€/tonne)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>31.00</td>
</tr>
<tr>
<td>Aluminium</td>
<td>52.00</td>
</tr>
</tbody>
</table>


14.3 Recycling Rate for Metal Cans

Detailed data on metal beverage cans and recycling rates are limited for Italy; packaging data, however, is available for packaging recycling in the broad categories of steel packaging and aluminium packaging. Overall packaging recycling figures for 2008 showed a recycling rate of almost 70% for steel packaging and 58% for aluminium packaging.
Table 14-2: Recycling Targets and Results (2008)

<table>
<thead>
<tr>
<th>Packaging Material</th>
<th>Recycling (%)</th>
<th>Achievement ('000 tonnes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>69.6</td>
<td>374</td>
</tr>
<tr>
<td>Aluminium</td>
<td>58.0</td>
<td>38</td>
</tr>
<tr>
<td>Total Metal Packaging</td>
<td>68.3</td>
<td>412</td>
</tr>
</tbody>
</table>


14.4 Proportion of Total Recovery Costs Covered by Fees

Figure 14-1 indicates that CONAI contribute 430 € million to support municipal waste management, but that the separate collection of materials requires 960 € million. Some of this, however, may be related to separate collection of non-packaging materials such as newsprint and biowaste. It is difficult to say, therefore, to what extent the CONAI payments support the costs of separate collection and recycling of packaging.
15.0 Latvia (LV)

15.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans

In Latvia, local authorities are obliged to organise the collection, sorting and treatment of municipal waste (including from private households, commercial and industrial sector). Collection and sorting of municipal waste can be delegated to a municipally-owned company or contracted out to private waste management companies. The cost of municipal waste collection and treatment is borne by waste producers (householders and businesses) via the service fees of waste management companies.

However, meeting the targets set out in the Packaging Directive is the responsibility of the producers of packaging. In practice, PROs act like an intermediary – they contract waste management collection companies to collect the specific amount and type of packaging waste material (depending on the reports from their clients and the required target per material type) and to deliver/sell it to the recycling companies. However it is a responsibility of PROs to ensure certain coverage of collection points in the territory of Latvia. This is usually done by signing contracts with the owners of the collection points (private companies, municipal waste management companies, regional waste management centres). Usually PROs have to pay the money for maintenance and use of the collection points established by the municipalities.

In Latvia, a natural resource tax is in place, covering packaging, but PROs and their co-contractors can be exempted from this. Currently there are three PROs in Latvia that have signed a management contract with state institutions and gained exemptions from the Natural Resource Tax on packaging for their co-contractors: SIA Zaļā josta, AS Zaļais punkts (Green dot Latvia), and SIA Zaļais centrs. SIA Zaļā josta and AS Zaļais punkts cover most of the market (91.7% of producers’ generated packaging volumes in 2008). Ten companies operate individual packaging recovery schemes.

85 The regulations require collection points to be established to collect the packaging waste (from households) in all waste management regions of Latvia (10 in total), and these collection points must be located in not less than 50 cities/towns/villages with the number of inhabitants over 2,000; other collection points must be distributed across the cities/towns/villages and not located all in the same place.


In practice, packaging from households is mainly collected via two stream bring systems (this can sometimes be single stream collection). A set of two or three containers can be found at the waste collection points (WCP) or household waste recycling centres (HWRC). Typically, the separate collection system involves paper/cardboard and plastic waste, and sometimes glass waste. The coverage of separate collection containers (i.e. the availability and the number of containers per material type) can vary from one local authority to another. Metal waste is usually not collected separately, except for North Vidzeme region (Ziemeļvidzeme), where all recyclables are collected in sack-based system. The segregated materials are picked up by separate vehicles or vehicles with separate sections.

Bring sites for flats (multi-apartment houses) are usually located in a common place for several houses and used both for collection of refuse waste and recyclables. Kerbside collection systems are mainly used for residual waste from individual houses, and recyclables are also collected by bring systems. The North Vidzeme (Ziemeļvidzeme) region, comprising 8.2% of Latvian population, operates a sack-based kerbside collection for recyclables from individual houses.\(^90\) It should be noted that there is a great variety of collection methods of packaging waste among different waste management regions and local authorities. The collection system is fragmented and different containers are used in different municipalities.

There is no official reliable data on the coverage of separate collection schemes in Latvia. However, since the beginning of 2010 the Latvian Ministry of Environment has set the requirement for PROs to maintain specified levels of coverage of separate collection in the whole Latvia\(^91\):

- PROs should ensure waste packaging collection from households in all 10 waste management regions and establish at least one HWRC in not less than 50 settlements with more than 2000 inhabitants of the given region, so that each HWRC is located in a separate settlement of the given region;
- PROs should ensure separated packaging waste collection in the bring sites and HWRCs according to the approved regional waste management plans (if these facilities do not already exist the PRO should help establish them).

15.1.1 Additional Recovery Routes for Metal Cans

Commercial and industrial packaging waste is collected by waste management companies, via individual contracts with the waste producers. Sometimes companies take care of their packaging themselves and sell it directly to specialised companies, usually the intermediaries operating in the recyclables market.

In addition, those with low incomes often collect metal waste, including packaging, and deliver it to the scrap collection points directly as a means of generating funds.

---

\(^90\) SIA ZAAO, Accessed 28\(^{th}\) February 2011, [http://www.zaaao.lv](http://www.zaaao.lv)

\(^91\) Cabinet of Ministers Regulation No 1293 (2009) Procedures for exemption from Natural resource tax for packaging and disposable tableware and accessories.
15.2 Fees Paid by Obligated Parties

The packaging producers pay fees by material type directly to the registered producer responsibility organisation (PRO). In Latvia, the 2 biggest PROs (SIA Zaļā josta and AS Zaļais punkts) together cover 91.7% of the market in 2008 (i.e. producers’ generated packaging volumes). Both PROs have similar fees for companies, but AS Zaļais punkts is slightly more expensive (see Table 15-1). The rates of natural resource tax that are avoided by signing up to the PRO scheme are also shown.

Table 15-1: The Fees of Main Latvian PROs in 2008 and Tax Rates (per tonne of Packaging Placed onto the Market)

<table>
<thead>
<tr>
<th>Material type</th>
<th>Zajais punksts (Green dot)</th>
<th>Zālā josta (Green Belt)</th>
<th>Rates of natural resource tax</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LVL</td>
<td>€</td>
<td>LVL</td>
</tr>
<tr>
<td>Metal</td>
<td>48.00</td>
<td>68.30</td>
<td>46.00</td>
</tr>
</tbody>
</table>


15.3 Recycling Rate for Metal Cans

Canadean estimates the total number of beverage cans put on the market in Latvia in 2009 to be around 120 million units and the total weight of beverage can packaging placed onto the market in 2009 was 1,815 tonnes.92 However another estimate of the number of cans from Price Waterhouse Coopers suggests a figure of 60 million units in 2008.93

The only data available on the quantities of beverage cans recycled comes from the EAA which estimates 38% recycling in 2009, with the comment “Green dot scheme + industry report for cans only”. It has not been possible to corroborate the source or accuracy of this data with the Green Dot Scheme.

15.4 Proportion of Total Recovery Costs Covered by Fees

There is no reliable research on the actual costs of collecting packaging waste (or recyclables) from households in Latvia. Some calculations have been done for a single municipality; however these are not applicable to the whole country.94 Latvian legislation does not distinguish between household, commercial or industrial packaging. As a result, the packaging is collected from different sources and the collection from end-consumers is weaker in the sense that priority is given to clean, large volumes from the commercial or industrial sources. Thus the fees do not fully cover the costs that fall on the municipalities for the collection of consumer packaging.

---


93 Price Waterhouse Coopers (2008) Iepakojuma depoži ta siste mas iesvešanas aspektu anali ze un priekšnosacī jumu izstrādājā sūlā pudele m, PET pudele m un ska rdnē m (Analysis and conditions for implementation of deposit refund system for glass bottles, PET bottles and cans), Final Report for Latvian Ministry of Environment.

94 Personal communication Latvian Waste Management Association (LASA), February 2011.
16.0 Lithuania (LT)

16.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans

In Lithuania, local authorities organise the collection, sorting and treatment of municipal waste from private households, commercial and industrial sector. Collection and sorting of municipal waste can be delegated to a municipality owned company or contracted out to private sector. Non-municipal waste is managed through a direct relationship between the waste producer and a waste management company.

The cost of municipal waste collection and treatment is borne by waste producers via earmarked municipal taxes on waste management, or service fees of waste management companies. There are 2 licensed producer responsibility organisations (PROs) for packaging waste management (VšĮ Žaliasis taškas and Gamintojų ir Importuotojų Asociacija) in Lithuania, but their share of recovered packaging waste was only 17.3 percent in 2009.

Packaging from households is mainly collected via bring systems for recyclables. A set of three containers (mainly igloos) can be found at each bring site (or container park), waste collection point (WCP) or household waste recycling centre (HWRC) organised by the local authorities (see below for further description): a blue container for wastepaper, a green container for glass waste and a yellow container for plastic waste. Metal waste is collected commingled with either plastic or glass waste. Packaging waste is generally collected as part of a range of recyclables. The segregated materials are picked up by separate vehicles or vehicles with separate sections.

Bring sites for flats (multi-apartment houses) are usually located near parking places and used both for collection of residual waste and recyclables from several houses. Kerbside systems are used for refuse collection from individual houses, so usually bring sites in such areas are used for collection of recyclables only. On average in Lithuania one bring site is available per 430 inhabitants. Some local authorities have started pilots for kerbside collection of recyclables in sacks.

The delivery of waste collection services to households is either carried out by a municipal company or outsourced to private waste management companies. The contracts for these services are typically for 3 years with a possibility for extension.

Currently there are 46 HWRCs established in 30 municipalities (coverage – 50 % of municipalities) where the public can dispose of recyclables and other specific waste (e.g. WEEE, hazardous, green or bulky waste). By 2012, 70 HWRCs will be established to meet a national requirement to have at least one HWRC in each

______________________________

municipality. Some municipalities have also established WCPs (a smaller scale HWRC without personnel; in total there are 156 WCPs in Lithuania).96

16.1.1 Additional Recovery Routes for Metal Cans

There is also a private initiative to collect metal cans, PET and disposable glass bottles for cash. There are 14 such waste collection points near larger supermarkets in Vilnius and 4 points in Kaunas.97 Initially these collection points, owned by a private company UAB Ekstara, were established as return points for refillables.

Households can also sell metal cans to local scrap dealers. According to the Register of Waste Management Companies, there are 234 scrap dealers in Lithuania.98

Segregated litter bins are not common in Lithuania. The vast majority of litter bins are still for refuse only. Collection of refuse from litter bins, as well as street sweepings, is organised and paid for by local authorities.

Packaging in the commercial and industrial waste streams is collected by waste management companies, via individual contracts with the waste producers. These contracts are normally for a single year or less.

16.2 Fees Paid by Obligated Parties

Producers (packers) and importers can choose to pay Taxes for Environmental Pollution by Packaging Waste or the accredited reprocessors/exporters (directly or indirectly via PROs or waste management companies) for evidence notes (certificates). Revenue from Environmental Pollution Taxes is earmarked for the Product and Packaging Waste Management Programme administered by the Lithuanian Ministry of Environment. The Programme financed the purchase of 19.5 thousand containers for Local Authorities and public awareness campaigns. Thus producers (packers) and importers indirectly provide some support for the Local Authorities’ collection of packaging waste via the Taxes paid to the Product and Packaging Waste Management Programme.

Licensed PROs (VšĮ Žaliasis taškas and Gamintojų ir Importuotojų Asociacija) set fixed fees for all members based on packaging material. These fees cover administrative overheads, public awareness costs and costs for evidence notes (certificates). Table 16-1 shows the development of PROs fees for producers (packers) and importers for recovery of a tonne of packaging waste by material. However, these fees do not reflect actual costs of packaging waste collection and treatment.

There is no direct ongoing financial support for Local Authorities which organise collection of household waste (including packaging waste), although as mentioned above, the tax revenues associated with the packaging outside the PRO system have been used to help develop infrastructure. In addition, the costs

________________________________________

96 Ibid.
they incur for collection services may be influenced by income from evidence notes (certificates). Thus households cover the rest of the costs of municipal waste collection and treatment to Local Authorities via municipal taxes on waste management (57% of Local Authorities) or to waste management companies via service fees (43% of Local Authorities) depending on the financing system.

Table 16.1: PROs fees for Recovery of a Tonne of Packaging Waste (2009 – 2011)

<table>
<thead>
<tr>
<th>Material</th>
<th>Producer responsibility organisation</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal</td>
<td>VšĮ Žaliasis taškas</td>
<td>n.d.</td>
<td>52</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>Gamintojų ir Importuotojų Asociacija</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


16.3 Recycling Rate for Metal Cans

A private company Ekstara (cash for cans system) reported that 3 million aluminium cans (or 47 tonnes) were collected via 8 waste collection points in Vilnius in 2009 and 5 million cans (or 80 tonnes) were collected via 14 waste collection points in Vilnius and 4 waste collection points in Kaunas in 2010.99 A private company Ekobaze reported that 28 tonnes of metal cans were sorted from residual municipal waste at Vilnius landfill and 7.7 tonnes at Utena landfill (in 4 months) in 2010.100 In total these two companies collected and sent for recycling approx. 5% of the total beverage cans put onto the Lithuanian market.

Metal cans are also collected in the ‘whole metal’ stream via local scrap dealers; however there are no data available about the quantities of metal cans collected in this way.

There are no data available on the quantities of beverage cans collected via bring sites, WCPs or HWRCs. The total reported recycling rate for all metal packaging in 2009 was 63%,101 However, the EAA estimates the aluminium can recycling rate in the country for 2009 to be just 38%. The latter figure has been used as the best estimate recycling rate for metal beverage cans.

16.4 Proportion of Total Recovery Costs Covered by Fees

There is no direct support from producers (packers) and importers built into the system for local authority collection of packaging waste, and as a large proportion of metal beverage cans are expected to be collected through household systems, the proportion of recovery costs covered by the fees of the PRO schemes is low. Moreover, the total coverage of the PRO schemes is limited, and the collection of lowest cost waste streams (these being the bulk commercial ones rather than end

---

99 Personal communication with Ekstara, February 2011
100 Personal communication with Ekobaze, February 2011
user) is encouraged in a target-led system such as in Lithuania, meaning the fees relate more to the secondary and tertiary packaging. However, on 22\textsuperscript{nd} December 2011 the Law on Waste Management and the Law on Packaging Waste Management was updated to strengthen the role of PROs and to ensure direct support for development of household collection systems. From 2013, producers (of packaging) and importers will have only two options: (1) to pay a Tax for Environmental Pollution by Packaging Waste; or (2) to join a licensed PRO (there is no individual responsibility left). Licensed PRO's are required to sign agreements with all local authorities concerning organisation and financing of packaging waste collection from municipal waste stream.
17.0 Luxembourg (LU)

17.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans

The Grand Duchy’s ordinance on the installation, organisation and administration of recycling centres for the collection and separation of various materials from household waste and bulky waste published in 1993 stipulates that each municipality has either to run their own recycling centre, or to ensure a guaranteed waste separation system in an equivalent way. Municipalities are free to organise their own system, or to join together to create larger units – thus three “solid waste syndicates” developed based on the inter-municipal structures.

Luxembourg also runs a classic producer responsibility system for household packaging – the national system operator’s webpage (www.valorlux.lu) reads:

“VALORLUX gets its income from the Green Dot contributions paid by all participating members depending on the volume, weight and composition of the packaging they place on the market and on the complexity of the recycling process related to the packaging in question. The sale of collected materials represents another source of income, but nevertheless remains marginal. ... VALORLUX limits its selective collection to household packaging waste and similar waste, i.e. to those packages designed to be sold to private individuals and that mainly end in the municipal waste collection system. ... Non-household packaging is not in the field of VALORLUX activities.”

According to Valorlux’s definition, ‘households’ also includes schools, the capital’s train station, certain cinemas and campsites.

VALORLUX runs a door-to-door collection system similar to the “yellow bag” system installed in Germany (see Section 0), as well as running 22 recycling centres. About 80 % of the population is covered by to the door-to-door collection system (named “blue bag” in Luxembourg, and its content PMC which stands for plastic bottles, metal packaging, beverage cartons). Via the “blue bag” collection all recovered beverage cans are collected.

17.1.1 Additional Recovery Routes for Metal Cans

Two thirds of Luxembourg's population are connected to a thermal treatment plant (with energy recovery), one third to two sanitary landfills. Thus some metal cans could be captured at the incinerator facilities.

17.2 Fees Paid by Obligated Parties

Table 17-1 and Figure 17-1 depict the development of license fees charged in Luxembourg on packaging materials over the last decade.

---

102 Règlement grand-ducal du 1er décembre 1993 relatif à l'aménagement et à la gestion des parcs à conteneurs destinés à la collecte sélective de différentes fractions des déchets ménagers, encombrants ou assimilés, http://www.legilux.public.lu/rgl/1993/A/1744/1.pdf
Table 17-1: Luxembourg: License fees in € per Kilogram of Packaging Material

<table>
<thead>
<tr>
<th>Packaging materials</th>
<th>2001 (€/kg)</th>
<th>2011 (€/kg)</th>
<th>2011 (€/tonne)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A) from households</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steel</td>
<td>0.058</td>
<td>0.0225</td>
<td>22.5</td>
</tr>
<tr>
<td>Aluminium</td>
<td>0.1599</td>
<td>0.1485</td>
<td>148.5</td>
</tr>
</tbody>
</table>


Figure 17-1: Luxembourg: License fees in € for one kilogram of packaging material: 2000 – 2011

17.3 Recycling Rate for Metal Cans

Data from Eurostat indicates in 2008, there were 5,785 tonnes of metallic packaging wastes placed on the market and 4,595 tonnes were recycled. This implies a recycling rate of 80%. No estimates for the recycling specifically of metal beverage cans were found.

17.4 Proportion of Total Recovery Costs Covered by Fees

If the overall metallic packaging recycling rate reflects the recycling of metal beverage cans alone, then a relatively high proportion is being recycled. The PRO fees relate to the sole system used to collect metal cans, and the coverage is high. It seems quite likely that most of the costs of collection and recycling are covered by the fees being charged.
18.0 Malta (MT)

18.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans

In Malta, a commingled kerbside collection scheme was introduced in 2008. The sack-based system collects paper, plastic bottles and metals from the householder, with glass being separately collected through the country’s network of bring sites (as at December 2008 there were 218 sites across the islands).

It is not clear whether all householders on the island are served by the kerbside scheme in 2011.

Responsibility for the organisation of the recycling schemes currently in operation for both the household and commercial / industrial waste streams lies with the producer responsibility (PR) contractor. Two such contractors now compete for business on Malta:

- Green Dot or Greenpak started operating on the island in 2004. Greenpak was the first such contractor to operate on the island. It also appears to be the main organisation promoting the sack-based household kerbside collection service; and
- Green.mt - a subsidiary of GRTU – has over 1,300 members and now operates bring sites from 30 Local Councils in Malta and 11 Local Councils in Gozo.

The Maltese government also has its own waste services contractor – WasteServ - a private limited company which is intended to be used only in the event that no private contractor is available to provide the appropriate services. In the past, WasteServ has also offered collection services to organisations such as schools, although these are now increasingly operated by Greenpak and Green.mt. Currently WasteServ operates the only Materials Recycling Facility (used to separate the collected commingled dry recyclables) on Malta which is located at the Sant’Antnin Waste Treatment Plant; Greenpak and Green.mt are obliged to pay WasteServ for the use of this facility.

---


In the case of the household kerbside collection, local authorities are required to register with either Green MT or Greenpak who then organise the collection on their behalf through engagement with the waste carrier or collector. Businesses contract directly with Green.mt or Greenpak for residual waste and recycling collection services.

18.1.1 Additional Recovery Routes for Metal Cans

Some segregated litter bins are in place on beaches. At present there is no further recovery of metals through the residual treatment system.

18.2 Fees Paid by Obligated Parties

Businesses producing packaging waste are exempt from the Eco-contribution (a packaging tax) if the recycling scheme to which they join reaches its waste recovery targets, the target currently being set at 60%. Packaging producers are otherwise liable to pay the Eco-contribution on the amount of packaging waste they put onto the market (although it should be noted that not all packaging is covered by the legislation). Legal Notice 277 of 2006 implies that the producers of the packaging are responsible for meeting the costs of the collection of that packaging through their payments to the designated producer responsibility organisations.\(^\text{108}\)

The Greenpak and Green.mt recycling schemes therefore charge their members fees to use the recycling service, and to collect waste from both households and commercial enterprises. Whilst Greenpak’s fees to its members are publicly available, those of Green.mt are not. Greenpak’s fees are presented in Table 18-1. As can be seen, the fees payable are differentiated according to whether the material is likely to arise in the household waste stream or not. The fees imply higher costs for household collection.

Table 18-1: Membership Fees – Greenpak

<table>
<thead>
<tr>
<th>Material</th>
<th>Fees €/tonne (excluding VAT)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Consumer packaging</td>
</tr>
<tr>
<td></td>
<td>(household waste collection)</td>
</tr>
<tr>
<td>Steel</td>
<td>133.00</td>
</tr>
<tr>
<td>Aluminium</td>
<td>61.75</td>
</tr>
</tbody>
</table>

Note: There is a minimum charge of €150


18.3 Recycling Rate for Metal Cans

The country’s waste management strategy suggested a recycling rate in 2007 of 22%, although the basis for this estimate is unclear and no breakdown of the

capture rates by material type was provided.\textsuperscript{109} Very little data is available with regard to either the amounts of packaging waste produced and recovered for recycling or the composition of waste packaging on Malta.

The Maltese National Audit Office (NAO) confirms that the producers’ packaging recycling performance is difficult to gauge as recent national waste composition surveys have not been undertaken.\textsuperscript{110} Although waste surveys were undertaken in 2009 and 2010, these did not yield meaningful results because the waste sample was not undertaken appropriately. Moreover, Eurostat’s 2011 data release confirms that Malta did not supply any data to the Commission for 2009.\textsuperscript{111} Thus no recycling rate for metal beverage cans could be obtained at all for Malta.

18.4 Proportion of Total Recovery Costs Covered by Fees

No detailed information is available with regard to the costs of the waste collection system and the extent to which this cost is recouped by the charges levied against waste producers. The information that is available, however, suggests that the system is not being administered in such a way as to allow for its full costs to be recovered.

The NAO suggests that the Eco- Contribution levied at packaging producers is generally higher than the recycling cost per item.\textsuperscript{112} Another NAO report suggests that in 2009, only about 18 percent of the producer population subject to the packaging waste obligations was paying some form of Eco- Contribution (there appears to be no data available with regard to the tonnage of packaging put onto market by these producers).

The recycling schemes for household packaging waste, are required to be funded by the PRO scheme, however. The proportion of costs covered by fees, however, cannot be confidently stated.


\textsuperscript{110} National Audit Office Malta (2010) Performance Audit: Implementing Producer Responsibility for Packaging Waste in Malta


\textsuperscript{112} Ibid.
19.0 The Netherlands (NL)

19.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans

In the Netherlands, household waste collection, including separation of recyclable materials, is the statutory responsibility of the municipalities, and may be carried out by in-house services or contractors.

The Packaging Decree was signed in March 2005 and replaced the earlier packaging covenants. The Decree was a form of producer responsibility legislation that laid out the responsibilities of packaging producers, which were to take measures to promote the reduction in weight and harmfulness of packaging, and to ensure that target percentages of materials were recovered by separate collection (or collection and subsequent separation). In response to this, business set up Nedvang (‘Netherlands from waste to value’) which is the organisation that receives the financial contributions from members, and disburses funds to the municipalities that carry out the separate collections of packaging waste.

Currently, however, there is no separate collection system for metal beverage cans. Metal is separated from residual waste in waste to energy plants in both pre- and post-combustion treatment steps. The technology used at these plants has developed to the extent that it is suggested that high levels of metals recycling can be delivered (around 85%). The facilities tend to be very large – for example the AEB’s Amsterdam facility, built in 2007, burns 1.4 million tonnes of waste a year.\textsuperscript{113} Three of the thirteen energy to waste plants in the Netherlands use pre-combustion separation, and the rest separate metals from the combustion residue. With pre-combustion separation, it is claimed that over 95% of steel and 80% of aluminium cans can be recovered, whilst post-combustion separation yields 80% and 50%, respectively.\textsuperscript{114}

Partly because of this system, and partly due to the prevalence of waste to energy as the residual waste treatment technology, steel is the predominant metal in beverage cans for domestic consumption, with around 90% of the metal packaging market share.\textsuperscript{115} Aluminium cans are mostly put on the export market (e.g. by Heineken).\textsuperscript{116}

Canadean data shows that over 3.2 billion cans were put onto the market in 2009. This equates to approximately 40,000 tonnes for a 90% to 10% steel to aluminium mix. Additional Recovery Routes for Metal Cans

\textsuperscript{116} Personal communication with Maarten Labberton, European Aluminium Association
No additional recovery routes for metal beverages cans were found – all metal is sent with the residual waste to energy from waste plants.

19.2 Fees Paid by Obligated Parties

Metal cans are not separately collected in the Netherlands, so no fees are paid by producers through Nedvang to municipalities for this. However, funds are generated by a packaging tax. The packaging tax is a set of material-specific rates charged per kilogram of packaging. All companies that put more than 15 tonnes of packaging onto the market per year are obliged to pay the tax. The packaging tax in 2008 had different rates for primary, as opposed to secondary/tertiary packaging. This was dropped in 2009 in favour of a single rate for all packaging of a certain material (and a general rate, which is applicable where a breakdown of materials is difficult, for example for composite packaging).\(^{117}\)

**Table 19-1: Packaging Tax Rates (2009)**

<table>
<thead>
<tr>
<th>Material</th>
<th>Tax Rate (€/tonne)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminium</td>
<td>876.60</td>
</tr>
<tr>
<td>Other metals</td>
<td>141.60</td>
</tr>
<tr>
<td>General rate</td>
<td>500.00</td>
</tr>
</tbody>
</table>


Commercial as well as household packaging is subject to the tax, and Nedvang administer the financial flows for both.

The revenue from the packaging tax is directed to a waste fund. The total value of this fund is around 115 € million per annum. Nedvang and the Association of Dutch Municipalities (VNG) negotiate a set of per tonne payments to be made from the waste fund for collection. These payments to the municipalities are subdivided by material and in some cases include sums per inhabitant served (such as communications costs for plastic packaging collections).\(^{118}\) The data to support the distribution of monies from the waste fund is collated and audited by Nedvang.

19.3 Recycling Rate for Metal Cans

The performance in 2009 of packaging recycling is shown in Table 19-2.

---

\(^{117}\) Nedvang (n/a), Accessed February 2011, http://www.nedvang.nl/Bedrijven/Verpakkingenbelasting


Appendix 1 to Final Report
Table 19-2: Packaging Recycling Performance (2009)

<table>
<thead>
<tr>
<th>Packaging Material</th>
<th>Marketed packaging (kt)</th>
<th>Recycled packaging (kt)</th>
<th>NL recycling achieved (%)</th>
<th>NL target (%)</th>
<th>EC target (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal</td>
<td>172</td>
<td>151</td>
<td>88</td>
<td>85</td>
<td>50</td>
</tr>
<tr>
<td>Total</td>
<td>2528.5</td>
<td>1895</td>
<td>75</td>
<td>60</td>
<td>55</td>
</tr>
</tbody>
</table>


The European Aluminium Association estimate that the rate of recycling for aluminium cans is 85%. As the metal packaging recycling rate in 2009 is 88%, it is assumed that the rate of recycling of steel cans is 88%. The latter figure is used as the best estimate recycling rate.

19.4 Proportion of Total Recovery Costs Covered by Fees

Despite the high recycling rate, it is not known how the fees (or in this case the packaging tax) is distributed to municipalities, and whether this money ultimately covers the costs of pre- and post-combustion sorting processes at the municipal waste incinerators. Thus it is not possible to indicate the proportion of total recovery costs that are covered by the fees.
20.0 Poland (PL)

20.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans

The Packaging Directive was transposed into Polish Legislation in January 2002, in the Act on the Responsibilities of Enterprises for the Management of Selected Wastes and on Product and Deposit Fees and the Act on Management of Packaging and Packaging Waste. These regulations apply to entrepreneurs (waste producers) and it gives them three options to fulfil their duties:

1. take full responsibility for the obligation and collect and deliver the relevant used packaging directly to a processing facility;
2. pay a product charge to the account of the Province Marshall Office (regional self-government). Funds collected through the Product Charge, are distributed to municipalities for separate collections of household waste; or
3. outsource the obligation to a relevant recovery organisation. Three of the largest recovery organisations in Poland are Eko-Pak, Rekopol and PSR.

Figure 20-1: Options for Entrepreneurs to Fulfil their Responsibility to Recycle


Estimates made in 2002 by the Ministry of Environment showed that about 30% of the population had separate waste collection available to them. Eurostat estimated that in 2004 approximately 243,000 tonnes of waste was collected in a selective manner which equates to about 2% of the total quantity of municipal waste generated (or about 2.5% of the total quantity of collected municipal waste). No reliable current data on selective collection coverage was found, also
little information was available on the selective collection systems that are in place.  

20.1.1 Additional Recovery Routes for Metal Cans

While selective packaging collection does take place in Poland, the majority of aluminium packaging collected for recycling is collected privately by households, who collect used beverage cans and sell them to scrap dealers. Hence the system for the recycling of aluminium beverage cans is driven by the inherent value of the aluminium. The scrap management system was set up and organised by Polish can makers.  

There are two organisations/projects in Poland involved in aluminium can recycling:

- **Recal (Foundation for Recovery of Aluminium Beverage Cans)**
  Recal was formed in 1995 as an initiative of drink cans' producers: Continental Can Poland (now Ball Packaging Europe Radomsko) and the PLM AB Malmö (Rexam) as well as five manufacturers of aluminium: Alcan, Aluminium Company of America, Pechiney Rhenalu, Reynolds (Aluminium), the Deutschland and VAW Aluminium. Currently the Foundation's activities are supported by Ball Packaging Europe Radomsko, the European Association of Aluminium, National Environmental Protection and Water Management Fund as well as Recan. Recal promotes consumers’ awareness of the benefits of beverage can recycling and offers advisory and educational services; and

- **Recan**
  Recan was set up in 2004 and is a wholly owned subsidiary of Ball Packaging Europe. Recan is developing recycling centres where used beverage cans are sorted, compressed to briquettes and returned to the can production cycle. The centres cooperate with waste management companies, local scrap metal dealers, supermarkets, shopping centres, petrol stations and other local facilities to provide a network of collection points that ensure consumers have a close-at-hand facility to which they can return used beverage cans. Recan co-operates closely with Recal.

---


20.2 Fees Paid by Obligated Parties

Funds collected from entrepreneurs are eventually transferred to municipalities, in proportion to the amount of packaging waste directed to recovery and recycling in the municipality. With funds from the product charge, municipalities are expected to organise selective waste collection in their area. Remaining funds are used to finance actions associated with waste recovery and recycling, as well as to provide instruction on selective collection and recycling of packaging waste. There is no clear data on the way in which municipal waste management operations are financed.

Rekopol (one of the main packaging recovery organisations) co-operates with municipalities in Poland. Rekopol offers them financial support to develop local selective collection of packaging waste. This support takes the form of an allowance per tonne of specific recyclable packaging material collected and transferred to recycling. Rekopol supports the cost of collection and sorting and receives the proceeds from the sale of recycled materials. The net cost is financed by its member companies. Yearly Green Dot fees are calculated which are applied to the packaging declared by the members. Table 20-1 gives Rekopol’s fees for 2011.

Table 20-1: Rekopol Fees Payable by Producers (2011)

<table>
<thead>
<tr>
<th>Material</th>
<th>(£/tonne)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel/tinplate</td>
<td>10.00</td>
</tr>
<tr>
<td>Aluminium</td>
<td>30.00</td>
</tr>
</tbody>
</table>


20.3 Recycling Rate for Metal Cans

Although the Eurostat data in Table 20-2 gives a breakdown of metal into aluminium and steel, it was not possible to estimate the contribution of beverage cans.

Table 20-2: Eurostat Packaging Data (2008)

<table>
<thead>
<tr>
<th>Material</th>
<th>Packaging waste generated (tonnes)</th>
<th>Material Recycling (tonnes)</th>
<th>Other Forms of Recycling (tonnes)</th>
<th>Recycling rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metals (Total)</td>
<td>248,597</td>
<td>93,323</td>
<td>0</td>
<td>38</td>
</tr>
<tr>
<td>Aluminium</td>
<td>81,412</td>
<td>49,264</td>
<td>0</td>
<td>61</td>
</tr>
<tr>
<td>Steel</td>
<td>167,185</td>
<td>44,059</td>
<td>0</td>
<td>26</td>
</tr>
</tbody>
</table>


With regard to recycling and recovery of beverage cans the European aluminium Association (EAA) calculated the Polish recycling rate for aluminium beverage cans to be 67% in 2008. Figure 20-2 shows Recal figures for recovery of
aluminium beverage cans in Poland from 1995 to 2008, which align with the EAA figure.\textsuperscript{124}

Figure 20-2: Recovery of Aluminium Cans in Poland (1995 – 2008)

\begin{center}
\includegraphics[width=\textwidth]{aluminium_cans_recovery.png}
\end{center}


A recycling rate for steel beverage cans cannot be obtained but as steel represents a low proportion of the total can production in Poland, the recycling rate for aluminium beverage cans of 67\% (in 2007) is used as the best estimate if a recycling rate for beverage cans in Poland.

\section*{20.4 Proportion of Total Recovery Costs Covered by Fees}

It is not clear what proportion of the costs of recycling packaging are covered by producer fees, but in general, it would appear to be low. Not only is there considerable informal collection, but much of the more formal collection is supported by organisations such as Recan and Recal, which are ultimately owned and funded by can producers. However, no information about the financing of their schemes was available. Thus the fees of the PRO seem unlikely to cover a significant proportion of the costs of collecting metal beverage cans for recycling in Poland.

\textsuperscript{124} European Aluminium Association (2009) \textit{Aluminium Used Beverage Can Recycling Results}, Europe 2008.
21.0 Portugal (PT)

21.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans

In Portugal, taking part in an integrated system for packaging waste is compulsory both for household, and commercial and industrial waste (under Decree-Law 366-A/97). Packaging waste is mainly managed by Sociedade Ponto Verde (SPV), which provides different schemes for urban and non-urban waste.

Waste management at Sociedade Ponto Verde is based on two management models, one for household packaging waste and the other for commercial and industrial packaging waste (called eXtra Urbano). With regards to household packaging waste (where a large proportion of the metal beverage cans will be captured), Sociedade Ponto Verde forms partnerships with municipal waste authorities or their contractors (SMAUT), who manage the separate collection and sorting of packaging waste on their behalf. Sociedade Ponto Verde itself is not directly responsible for setting up, maintaining, or collecting drop-off containers and other equipment for selective packaging waste collection.

Collected packaging waste is sent for recycling through partnerships with pre-qualified recyclers. The main collection systems for municipal packaging waste are bring systems and household recycling centres. In addition, there are also 330,278 inhabitants (i.e. 3.1% of the population) who are served with door-to-door collection schemes. Table 21-1 shows the number of each system in operation in 2009. At this point 92% of the population was covered by the selective collection systems.

Table 21-1: Infrastructure for the Collection and Sorting of Household Packaging Waste in Portugal (2009)

<table>
<thead>
<tr>
<th>Collection System</th>
<th>Number of facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bring sites (Ecopontos)</td>
<td>36,449</td>
</tr>
<tr>
<td>Household recycling centres (Ecocentros)</td>
<td>199</td>
</tr>
<tr>
<td>Packaging sorting plants</td>
<td>31</td>
</tr>
<tr>
<td>Household door-to-door collections</td>
<td>330,278 inhabitants</td>
</tr>
</tbody>
</table>


21.1.1 Additional Recovery Routes for Metal Cans

Household packaging waste sent for recycling also comes from materials separated out during the pre-treatment of residual waste and those recovered from incineration ashes.

---

125 Sistemas Municipais aderentes ao Ponto Verde.
Under the "eXtra urbano" model, commercial and industrial waste producers use the "eXtra urbano" network. Partnerships are set up with waste management operators (WMOs), who are responsible for selective collection, sorting and sending for recycling commercial and industrial packaging waste produced by industrial and commercial and service companies. Waste producers choose the WMO (waste management operator) with which they want to work.

In order to fulfil the legal requirements for industrial and commercial waste, Sociedade Ponto Verde also created a subsystem called VERDORECA. In 2009, 83% of all HORECA (HOtels, REstaurants and CAtering) commercial activities were part of VERDORECA.\(^\text{128}\)

### 21.2 Fees Paid by Obligated Parties

Fees paid by filler companies or importers of packaged products are divided into household packaging and industrial products. The fees depend on the material used for packaging and on the type of packaging - i.e. primary (metal beverage cans), secondary and tertiary packaging (Table 21-2).

**Table 21-2: Fees Paid by Producers of Packaging to Sociedade Ponto Verde (2011)**

<table>
<thead>
<tr>
<th>Material type</th>
<th>Type of packaging</th>
<th>Primary (€/t)</th>
<th>Secondary (€/t)</th>
<th>Tertiary (€/t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>Primary</td>
<td>96</td>
<td>41.7</td>
<td>24.4</td>
</tr>
<tr>
<td></td>
<td>Secondary</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aluminium</td>
<td>Primary</td>
<td>164.4</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Secondary</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note: These fees do not include VAT.*

*Source: Sociedade Ponto Verde, [www.pontoverde.pt](http://www.pontoverde.pt)*

### 21.3 Recycling Rate for Metal Cans

Table 21-3 shows the quantity of steel and aluminium packaging recovered via separate collection services, pre-treatment/processing of residual waste, and from incineration ashes. From this table it is evident that a large proportion of steel and aluminium packaging is recovered from incineration ashes, although the approach to apportioning the metal recovered to ‘metal packaging’ is not clear.
Table 21-3: Metal Packaging Recovery in Portugal (2009)

<table>
<thead>
<tr>
<th>Recovery by Sources (tonnes)</th>
<th>Steel</th>
<th>Aluminium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Separate collection of packaging waste</td>
<td>5,649.4</td>
<td>268.3</td>
</tr>
<tr>
<td>Residual waste treatment</td>
<td>2,225.8</td>
<td>40.8</td>
</tr>
<tr>
<td>Incineration ash</td>
<td>7,497.1</td>
<td>567.8</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>15,372</strong></td>
<td><strong>876.9</strong></td>
</tr>
</tbody>
</table>


It is possible to determine Sociedade Ponto Verde’s recycling rate by comparing data from household packaging registered under Sociedade Ponto Verde’s Green Dot scheme with recovery amounts of each material. The recycling rates are shown in Table 21-4. These are the best estimates for metal beverage can recycling that could be obtained.

Table 21-4: Household Packaging Recovery Rates for Packaging Materials Collected under Sociedade Ponto Verde’s Green Dot scheme (2009)

<table>
<thead>
<tr>
<th>Recovery rates by materials (%)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>29.82</td>
<td></td>
</tr>
<tr>
<td>Aluminium</td>
<td>10.08</td>
<td></td>
</tr>
</tbody>
</table>


21.4 Proportion of Total Recovery Costs Covered by Fees

The amount of packaging declared to Sociedade Ponto Verde in 2009 corresponds to a subscription rate of 67% of the estimated packaging placed on the Portuguese market (1,690,140 tonnes)\(^{129}\). According to Ponto Verde, most of the non-subscribed packages are industrial. Thus the majority of the packaging should be covered by Sociedade Ponto Verde. The proportion of the costs of recycling covered by the fees paid by Sociedade Ponto Verde is not known.

22.0 Romania (RO)

22.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans

Governmental Decision 621/2005, amended by Governmental Decision 1872/2006 regarding packaging and packaging waste management, transposed the Packaging Directive into Romanian law. This introduced producer responsibility and stipulates packaging recovery targets (with annual targets being set to 2013). The 2011 national law on producer responsibility published in the Official Journal of Romania includes an obligation (albeit somewhat loose) for local authorities to collaborate with Producer Responsibility bodies. Economic operators can either recover their own packaging or transfer the responsibility to an authorised economic operator. If economic operators fail to meet the annual objectives for packaging and packaging waste recovery and recycling, they must contribute to an Environmental Fund (500 €/tonne packaging introduced on the Market).

In 2004, ECO ROM AMBALAJE became the first company to be selected and authorised to take over the specific responsibility for achieving annual recycling and recovery objectives for economic operators placing packaging on the market. Since then, others have also been authorised, such as INTERSEROH, ECOLOGIC 3 R, SC SOTA GRUP21 SRL and SC ECO-X SRL.

Not all of the population in Romania is covered by waste collection services. The European Environment Agency estimates that the national coverage of public cleaning services is approximately 50% (80% in urban areas and 10% in rural areas).\(^\text{130}\) In an interview, Mircea Matei (President of the National Authority for Regulation of Community Services) stated that only 74% benefit from public sanitation services, and in rural areas, only 43% of people have an organised sanitation service (i.e. collection of mixed residual waste).\(^\text{131}\) Although it is not clear what the exact coverage of waste collection services is in Romania, it can be concluded that it is not currently complete, and it is far from complete in rural areas.

With regard to selective collection, one source states that selective collection accounted for only 2% of the total quantity of municipal waste generated in Romania in 2006.\(^\text{132}\) It is expected that selective collection has increased since 2006 – ECO ROM AMBALAJE (amongst the other organisations) have increased


the coverage of recycling provision and continue to do so. However, the extent of recent waste collections is not known. In addition, reliable national recycling data is not available since reporting requirements are yet to be well implemented. As such, there is likely to be some error in the nationally reported data (available through Eurostat). Nevertheless, it may be of interest that the reported 2009 recycled packaging quantities represent a percentage of under 5% of generated national municipal waste.

22.1.1 Additional Recovery Routes for Metal Cans

The EAA Packaging Group in cooperation with the Romanian metal packaging recycling company AMEP-Pack, with the support of the Romanian Ministry of Environment and Sustainable Development, launched a joint aluminium beverage can recycling initiative in Romania in 2007. Under this scheme consumers are able to bring their used aluminium beverage cans back to certain supermarkets. Data on the level of success of this particular campaign was not obtained, but a press release from Amep-Pack in October 2007 suggested the national recycling rate for aluminium was under 10% at that time.\(^\text{133}\)

The informal sector in Romania is also significant when considering recycling. According to a study "Economic Aspects of Activities in the Informal Sector in Waste Management" conducted in 2008 in the Romanian city of Cluj-Napoca, the informal sector recycles 10% of the total waste. The existence of (and information activities in) the informal sector are ignored in waste management planning.\(^\text{134}\)

22.2 Fees Paid by Obligated Parties

Eco Rom Ambalaje is open to all economic operators who have the obligation to recover and recycle packages introduced on the domestic market. It is responsible for recycling and recovering packages made from paper and cardboard, plastics, glass, metals and wood, both from the commercial flow and from the population. Eco-Rom Ambalaje partially finances the collection, recycling and recovery costs. Eco-Rom Ambalaje activity is financed by the contributions of licensees. All of them pay a fee based on the quantity and type of packaging material placed on the market. Table 22-1 gives the 2011 annual licence fees for various materials.

Table 22-1: Eco-Rom Fees (2011)

<table>
<thead>
<tr>
<th>Material</th>
<th>€/tonne</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>11.15</td>
</tr>
<tr>
<td>Aluminium</td>
<td>23.35</td>
</tr>
</tbody>
</table>


---


Fees for the other 4 licensed collection companies (INTERSEROH, ECOLOGIC 3 R, SC SOTA GRUP21 SRL & SC ECO-X SRL) were not available.

22.3 Recycling Rate for Metal Cans

Table 22-2 gives the packaging data for Romania in 2008. In 2008 there was almost twice as much steel packaging on the market as aluminium, although the proportion of beverage cans in this is not known.

Table 22-2: Packaging Data (2008)

<table>
<thead>
<tr>
<th>Material</th>
<th>Total Packaging on the Market 2008 (tonnes)</th>
<th>% of Total Packaging</th>
<th>Packaging Recovered (tonnes)</th>
<th>% of Packaging Recovered</th>
<th>Packaging Recycled (tonnes)</th>
<th>% of Packaging Recycled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminium</td>
<td>25,600</td>
<td>2</td>
<td>3,400</td>
<td>13</td>
<td>3,400</td>
<td>13</td>
</tr>
<tr>
<td>Steel</td>
<td>50,100</td>
<td>4</td>
<td>35,200</td>
<td>70</td>
<td>35,200</td>
<td>70</td>
</tr>
<tr>
<td>Total Metal</td>
<td>75,700</td>
<td>7</td>
<td>38,600</td>
<td>51</td>
<td>38,600</td>
<td>51</td>
</tr>
</tbody>
</table>


With regard to recycling and recovery of beverage cans, the European Aluminium Association (EAA) calculated the Romanian (& Bulgarian) recycling rate for aluminium beverage cans to be 34 % in 2008. However this rate was calculated using extrapolative methods so its accuracy cannot be guaranteed. 135

The split between aluminium beverage cans and steel beverage cans is unknown, as is the proportion of beverage cans in the reported quantity of metal packaging. Hence it is not possible to calculate a recycling rate for beverage cans in Romania. However it would be assumed that due to the suspected low levels of selective waste collection that the overall recycling rate of beverage cans would be somewhat below the European average.

22.4 Proportion of Total Recovery Costs Covered by Fees

Given the low level of selective collection in Romania, and the significance of the informal sector, it is unlikely that the fees charged by Eco-Rom, or any of the other PROs, reflect a high proportion of the actual costs of recovery of metal beverage cans in Romania. Nevertheless, the costs of the existing systems are unlikely to be high at present since the EcoRom approach is solely based on the bring system (and competitor approaches are likely to follow suit).

23.0 Slovakia (SK)

23.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans

The waste sector in Slovakia underwent major transformation in 2001 with the publication of the Waste Act No. 223/2001 Coll. This act marked the initial phase of streamlining the Slovak Republic’s waste legislation so that it was aligned with the obligations laid out under various EU Directives on waste. Despite significant legislative efforts to promote improved management of waste nationally, recycling rates remain low and data reporting on beverage can arisings and recycling rates is poor. In 2008 Slovakia sent 83% of municipal waste to landfill, 10% was incinerated, 5% composted and only 3% recycled (an estimated 328 kg of municipal waste is produced per capita).136

Section 7 of the Waste Act of 2001 made provision for the development of a Recycling Fund, which was tasked with developing the recovery and recycling of waste materials across Slovakia. The Fund receives payments from persons placing specific materials onto the Slovak market - metal packaging materials being one of them – and reimburses companies / organisations / municipalities for recovering and recycling these materials. The continuance of the Fund is now under review and it seems likely that the national government will close the Fund in the not too distant future.137

The recovery of metal packaging materials has also been occurring under the national Packaging Regulations. These regulations require that persons involved in producing or placing packaging materials on the market recovery/recycle a set percentage of the material (55% by 2012, the lower end recommended by the EU Packaging Directive). Two third-party organisations (Envi-Pack and NATUR-PACK) have been set up to help companies achieve these targets through charging members a set rate per unit of weight of material placed on the market. Envi-Pack, operating under Pro Europe, was the first organisation set up to provide a certified collection/recovery service, and this was subsequently followed NATUR-PACK, which now also offers a similar service.138, 139

Under the Packaging Regulations any individual, legal person, or company who either a) uses packaging materials, or b) markets products using packaging materials, has to register with the Ministry of Environment and ensure that their...
packaging wastes are recovered and recycled (if less than 200kg are placed in circulation annually the regulations do not apply). Producers and distributors of packaging material can either carry out their own collection/recovery operations or pass on the responsibility to a third party. The latter option seems to have been widely taken up and most users of packaging material now meet their collection/recycling obligations through registered third parties who then also become responsible for advertising and informing consumers about how packaging materials can be collected.

No further details on the nature of the systems that have been put in place, that may collect metal beverage cans, were gathered.

23.1.1 Additional Recovery Routes for Metal Cans

Some metal cans may be recovered through the municipal waste incinerators, but no other additional recovery routes were found.

23.2 Fees Paid by Obligated Parties

Envi-Pak charges clients who are producing, importing or selling packaging material an initial joining fee, followed by a set charge for each unit of material processed. The joining fee is based on the size of the organisation, with three options being available:

1) 500 € for companies who place more than 700 tonnes of packaging material on the market annually;
2) 250 € for 100 to 700 tonnes; and
3) 125 € for companies processing less than 100 tonnes annually.

Once registered the organisation pays 27.50 € for every tonne of metal packaging placed on the market.

As an alternative scheme NATUR-PACK does not charge an initial joining fee, but charges slightly higher rates for each tonne of material placed on the market by its members. The 2011 rates for metal packaging items are listed below:

- Aluminium: 39.83 € per tonne; and
- Steel: 25.56 € per tonne.

The NATUR-PACK system has the advantage of differentiating between aluminium and steel and charging a lower fee for steel.

---


142 An extensive list of the organisations/companies providing collection and recycling services can be found at http://obaly.sazp.sk

143 Pro Europe (no date given), Envi-Pak: Financing, Date Accessed: 7 Mar. 2011, www.pro-e.org/Financing_Slovakia.html

23.3 Recycling Rate for Metal Cans

Data on the recycling of metallic packaging materials is given in Table 23-1 below.

Table 23-1: Packaging Waste Recycling/Recovery Rates in Slovakia for the period 2005 to 2008

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminium</td>
<td>20</td>
<td>35</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Steel</td>
<td>45</td>
<td>25</td>
<td>89</td>
<td>n/a</td>
</tr>
<tr>
<td>Total</td>
<td>41</td>
<td>28</td>
<td>77</td>
<td>56</td>
</tr>
</tbody>
</table>


The recycling/recovery rates in Table 23-1 appear suspect as they change significantly from year to year. For example, the recycling of steel packaging materials is reported to have changed from 45% in 2005, to 25% in 2006 and then up to 89% in 2007. Such large swings would be difficult to imagine in practice and, thus, there appear to be significant errors in the data or incomplete reporting by organisations involved in recycling. The contribution specifically of metal beverage cans is also undetermined. The figure for all metal packaging (56%) was used as the best estimate for metal beverage cans recycling.

23.4 Proportion of Total Recovery Costs Covered by Fees

Little detail on the exact setup, organisation and financing of collection systems for metal beverage cans could be found. The data on metal recycling does not appear robust, nor is there any detail on the recycling of metal beverage cans alone. Thus it is very difficult to determine the contribution the producer fees make to the total cost of recovering metal beverage cans in Slovakia.
24.0 Slovenia (SI)

24.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans

The main legislation governing the capture and recycling of metal beverage cans in Slovenia is the packaging regulations which have come into force over the last decade. This legislation specifies a producer-responsibility scheme and provides the producers/importers of packaging/packed goods with the following options (under the regulations only producers/importers which annually place more than 15,000 kg of packaging on the market are obliged to take part):

- For non-municipal packaging waste the producer/importer can either join a registered third party organisation, who will fulfil their obligations on their behalf, or develop an individual system (if the latter option is chosen the company must obtain a license from Environmental Agency of the Republic of Slovenia, EARS);
- For municipal packaging waste the producer/importer must join a third party organisation which will take over their responsibilities.

At present four companies are licensed by EARS to meet the obligations on behalf of packaging organisations:

1) SLOPAK d.o.o.;
2) INTERSEROH d.o.o.;
3) EKODIN d.o.o.; and
4) SUROVINA d.d.

In practice, packaging in the household waste stream is collected by kerbside recycling services, via bring sites, and/or via household waste recycling centres. Bring schemes appear to be the more common approach for household packaging, with refuse often collected from the doorstep, though kerbside collections are becoming more prevalent. The 2001 Government Order on the management of municipal waste requires municipalities to install one eco-point (bring site) for the collection of dry recyclables per 500 inhabitants. The latest evidence suggests that there are now 12,109 collection points, or one per 167 inhabitants. These bring sites are managed and paid for by municipalities – or their sub-contractors – and occasionally funding is received through the producer responsibility schemes set up to manage packaging.

At each eco-point, there are three for the collection of various dry recyclables. The three streams which can be collected are:

1) Mixed packaging waste: including beverage cans;
2) Paper and cardboard; and
3) Glass.
Household packaging waste is collected by local public services responsible for municipal waste and transported to waste management companies. Since the current system of separate collection of packaging waste via collection centres has not achieved sufficient capture rates, an increasing number of municipalities in Slovenia have begun introducing a ‘yellow bag’ system.

As part of the yellow bag scheme households can dispose of mixed packaging waste (excluding glass) into a single bag, which is place out for collection on the kerbside alongside a household’s residual waste. Recent research in Slovenia has shown that the ‘yellow bag’ system makes it possible to collect 3-times more municipal packaging waste per person than collection centre system; in this way, it has been show that it is possible to collect at least 35 kg of municipal packaging waste per person per year.\(^{145}\)

24.1.1 Additional Recovery Routes for Metal Cans

There may be some additional recovery of metal packaging from the (currently) small number of residual waste treatment facilities in Slovenia.

24.2 Fees Paid by Obligated Parties

Packaging fees are collected per each tonne of metal packaging put on the market. They are used to pay the sorting and baling service which is performed by privately owned subcontractors of Slopak. The cost of collection itself is covered by the end user, but if the end user is the household, then packaging fees are used also to cover 100 % of the cost of transport from the collection centre of public waste company to the sorter. Note that producers do not fund the collection itself. If the end user is industry then the packaging fees are used to subsidise the transport costs that arise from transporting the metal packaging from the backyards of the industry to the sorter. The level of support is very low (around 10 %), with the balance of cost covered by the end user.\(^{146}\)

All four companies responsible for coordinating the collection of packaging materials in Slovenia were contacted for details on their charging structures. Unfortunately, it was only possible to get charging details for SLOPAK and these are shown in Table 24-1.

Table 24-1: Fees Charged by SLOPAK for Placing Packaging on the Market (2010)

<table>
<thead>
<tr>
<th>Packaging Material</th>
<th>€/tonne</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metals</td>
<td>79</td>
</tr>
</tbody>
</table>


\(^{146}\) Source of information for this paragraph – Personal Communication: Joachim Quoden (PRO Europe) 17/10/2011.
24.3 Recycling Rate for Metal Cans

At present it appears as if no data exists on the recycling rates for metal beverage cans. Instead, the only widely reported figures are for metal packaging as a whole and, as such, it is these figures which are outlined below.

According to data from Eurostat, in 2008, the recovery of metal packaging was only at 21.4%, less than half of the national target of 50% required by 2012. The PRO scheme SLOPAK’s 2009 figures, indicated that approximately 160,000 tonnes of packaging were placed on the market out of which approximately 92,000 tonnes were recycled and/or recovered – 58.6% (figures have not been published for the other coordination organisations, however SLOPAK covers up to 75% of the metal packaging placed on the market). For metal packaging only, the recycling rate achieved was 26.1%.

Table 24-2: SLOPAK Figures on Packaging Placed on the Slovenian Market and Packaging Waste Recovered and Recycled (2009)

<table>
<thead>
<tr>
<th>Material</th>
<th>Quantity of packaging placed on the market (tonnes)</th>
<th>Packaging waste collected (tonnes)</th>
<th>Tonnes recycled and recovered</th>
<th>Rate of recycling and recovery (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal</td>
<td>12,111</td>
<td>3,330</td>
<td>3,164</td>
<td>26.1</td>
</tr>
</tbody>
</table>


The European Aluminium Association estimated a figure of 50%, described as ‘Green dot scheme, estimate for cans only’. This figure appears high in relation to the recycling rates for metal packaging reported by Eurostat and the PRO scheme. The EAA have indicated that the estimate is for cans only, but note that without knowing how the estimate is derived it is not possible to be highly confident in this figure. Moreover, the collection systems in Slovenia are still developing, thus it is unlikely for the recycling of metal beverage cans to be higher than that for metal packaging alone. Thus we have used the SLOPAK figure of 26% as the best estimate recycling rate for metal beverage cans.

24.4 Proportion of Total Recovery Costs Covered by Fees

The proportion of the costs of collection of packaging that is covered by fees paid to the PRO organisations is not well understood, but as indicated above, it seems to be low. The PROs do not pay anything for collection, only for handling post-collection. In principle, these activities should generate revenue (i.e., have a negative cost) rather than implying the need for support from producers.

---

25.0 Spain (ES)

25.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans

In Spain, there are two main integrated systems for the collection of packaging waste: one for glass (Ecovidrio) and one for light weight packaging Ecoembalajes España (Ecoembes). Since the collection of cans is included in lightweight packaging this report will henceforth refer only to this fraction of packaging waste.

Ecoembes is a non-profit limited company (2009 turnover was €405.31 million).\textsuperscript{148} It was founded in 1996 and includes more than 12,100 companies. Shareholders are formed by 57 companies which include all sectors involved in the packaging cycle. It deals with two types of packaging collection schemes: municipal waste collection systems and complementary collection systems; however, in addition to these, there are a few other systems in operation – all systems are described below.

Municipal Waste Collection is undertaken by local authorities or their subcontractors. According to Ecoembes, 45.73 million people were covered by the selective collection of packaging waste in 2010, which represents 97.29% of the Spanish population.\textsuperscript{149} The system is based around variants on the ‘bring system’ concept. Table 25-1 shows the population covered by different types of collection systems.

Table 25-1: Population Covered by Different Types of Packaging Collection Systems in Spain (2010)

<table>
<thead>
<tr>
<th>Collection System</th>
<th>% of population served</th>
</tr>
</thead>
<tbody>
<tr>
<td>Igloos</td>
<td>35.31%</td>
</tr>
<tr>
<td>Side-loading containers(^1)</td>
<td>33.61%</td>
</tr>
<tr>
<td>Rear-loading containers(^1)</td>
<td>21.28%</td>
</tr>
<tr>
<td>Other (underground containers, door to door, pneumatic collection)</td>
<td>9.8%</td>
</tr>
</tbody>
</table>

Notes: 1. Side-loading containers are those containers that are collected and emptied laterally to a vehicle, whereas rear-loading containers are loaded onto the back of the vehicles. The former are becoming increasingly popular as side-loading containers can be loaded automatically by the driver of the collection vehicle.


---

\textsuperscript{148} Ecoembalajes España (2010) Informe anual y cuentas anuales

25.1.1 Additional Recovery Routes for Metal Cans

There are a number of additional recovery routes for metal cans in Spain. Complementary collection is done by means of agreements between Ecoembes and other organisations, such as football teams, airports, prisons, etc. In this case, organisations commit themselves to separate waste inside their facilities and Ecoembes carries out the collection, usually indirectly through an agent.

There is also a specific collection system for beverage cans consisting of a special compacting container, which can collect up to 2,000 cans at any one time (the volume of cans can be reduced by up to 80%). As of 2011 there were approximately 500 of these units installed in Spain, mainly in the region of Catalonia. The amount of cans collected each year reportedly ranges between 20 to 25 tonnes.\footnote{150 Blipvert (personal communication).}

Treatment of residual waste is becoming more common in Spain, although most of residual waste is still directly landfilled or incinerated. Incineration accounts for approximately 9.5% of waste treatment in Spain.\footnote{151 Ministerio de Medio Ambiente, y Medio Rural y Marino (2011) El medio ambiente y el medio rural y marino en España 2010, Accessed 21st October 2011, http://www.marm.es/es/ministerio/servicios-generales/publicaciones/memoria2010_cap.aspx} Currently there are 10 incineration plants in the country, with a total capacity of 2.1 million tonnes of waste.\footnote{152 Ibid. The Integrated National Waste Plan (PNIR) considers an increase of this capacity to up to 2.7 million tonnes for 2012. However, several regions have presented waste plans that would lead to a maximum total capacity of 3.5 million tonnes.} Metal packaging recovered from incinerators includes pre-treatment of waste and bottom ash recovery (slags).

Data ARPAL and Ecoacero indicate that there is not one clear route for the collection of metal packaging in Spain.\footnote{153 ARPAL (2010) Estudio sobre la recuperación de envases de aluminio. http://www.aluminio.org/reciclar_datos_recuperacion.php; Ecoacero (2010), La tasa de reciclado de los envases de acero domésticos alcanza el 76,5% en 2009, Press Release, www.ecoacero.com/Ecoacero%20%20Nota%20prensa%20reciclado%202009.pdf} Thus it is difficult to give a strong indication as to what is the primary collection system for metal beverage cans, and what are the more marginal routes.

25.2 Fees Paid by Obligated Parties

Local authorities pay the contractors and receive some financial compensation from Ecoembes. This compensation depends on the agreement to which the municipality is subject to (there is no ‘standard’). Payments include a variable amount that depends on the quantity of waste collected, and the type of collection scheme used, as well as the effectiveness of the system (measured in kg collected per available container capacity). The financial flow to public authorities derived from these contracts was 364.6 € million in 2009, which represents 89.31% of Ecoembes' annual budget.\footnote{154 Ecoembalajes España (2010) Informe anual y cuentas anuales.} For fillers, the amount they pay to Ecoembes depends on the weight of packaging that they place on the
market. The fees that fillers are liable to pay to Ecoembes are provided in Table 25-2.


<table>
<thead>
<tr>
<th>Material</th>
<th>Fee (€/tonne)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>85</td>
</tr>
<tr>
<td>Aluminium</td>
<td>102</td>
</tr>
</tbody>
</table>


25.3 Recycling Rate for Metal Cans

As indicated above, there are multiple collection routes for metal beverage cans in Spain. La Asociación de Latas de Bebidas suggest that the estimated contribution of different collection routes for steel and aluminium is available for where aluminium and steel cans are recycled, as shown in Table 25-3. The assumption is that beverage cans are collected in the same proportions as the whole of the steel and aluminium waste streams. The data would suggest that a large proportion (especially of steel, which the majority of the cans are made of in Spain) is captured through residual waste treatments after the limited level of upstream segregation has occurred.

Table 25-3: Origin of Steel and Aluminium Can Recycling in Spain (2010)

<table>
<thead>
<tr>
<th></th>
<th>Origin of recycled steel cans (%)</th>
<th>Origin of recycled aluminium cans (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incinerators</td>
<td>15</td>
<td>13</td>
</tr>
<tr>
<td>MSW Plants</td>
<td>43</td>
<td>24</td>
</tr>
<tr>
<td>Selective collection</td>
<td>28</td>
<td>20</td>
</tr>
<tr>
<td>Traditional recoverers</td>
<td>14</td>
<td>43</td>
</tr>
</tbody>
</table>

Source: La Asociación de Latas de Bebidas (2011) Las Latas de Bebidas y el Medio Ambiente (Beverage Cans and the Environment), Study of the Association of Beverage Cans [of Spain and Portugal]: part of Beverage Can Makers Europe (BCME), Sept 2011. In Spanish. www.latasdebebidas.org/Medio_Ambiente.pdf

The figures for recycling of metal packaging reported to Eurostat are as follows:

- Aluminium: 32.4%
- Steel: 77.2%
- Total: 71.3%

According to ARPAL, Spain recovered 61.2% of used aluminium cans in 2010. The report by La Asociación de Latas de Bebidas also claims that the total recycling

---

155 Law 11/1997 establishes that fillers and traders of packaged products (or, when the latter are not identifiable, the economic operator responsible of putting packaged products into the market) must participate in an integrated system.

156 Although Ecoembes is responsible for light weight packaging and Ecovidrio for glass packaging, both can charge fees for all kinds of packaging, in order to make it easier for fillers that use several types of packaging materials. Once fees are charged, Ecoembes transfers to Ecovidrio the amount corresponding to glass packaging and vice versa.
rate for metal beverage cans is 76.5%, the same as for the whole metallic packaging waste stream. It has not been possible to ascertain whether the recycling of metal beverage cans alone is the same as the total, due to limited data that is available, but this figure is used as the best estimate recycling rate.

25.4 Proportion of Total Recovery Costs Covered by Fees

One report was found which provided a cost breakdown for the separate collection of light packaging in Madrid, which suggests that Ecoembes contributes 16.4% of the total cost of the separate collection and processing of light packaging. A difficulty with the existing system is that contracts with municipalities are numerous and non-transparent. Hence, some municipalities may fare better than others. Given that a large proportion of the cans are collected by traditional or small scale recoverers, or through residual waste sorting systems, however, the proportion of the total costs of recycling of metal packaging that are covered by the fees would be expected to be considerably less than 100%.

26.0 Sweden (SE)

26.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans

Returpack is the main deposit refund system operating in Sweden for disposable beverage containers, i.e. metal beverage cans and plastic (PET) bottles. In response to legislation, the system was established in 1984 for the recycling of metal beverage cans, and was extended to include plastic bottles for beverages in 1994.

Legislation introduced in 2005 now requires that all disposable beverage containers sold in Sweden (with a few exceptions noted below) must be included in an approved deposit refund system. Therefore, every disposable metal beverage can and plastic beverage container sold in Sweden must be included in an approved deposit refund system, though with exemptions for a few types of beverage.

Each beverage container that is sold includes a deposit in the price paid by the consumer. This deposit is refunded to the consumer when the empty container is returned to a retailer (any retailer selling beverage containers must accept returns) or to one of the many reverse vending machines (RVMs). The empty containers are then collected for recycling with the raw material used to manufacture new cans and bottles.

The level of deposit paid on the container depends on the material used. The deposit on a metal beverage can of any size is 1 SEK, or around 0.11 €.\footnote{RETURPACK (2011) Welcome to Returpack, Accessed 16th February 2011, www.returpack.se/welcome-to-returpack/; Exchange Rate: 1 SEK – 0.113312 EUR on 11/03/2011}

Returpack’s system is nationwide and has a large number of active retailers and RVMs.

- Approximately 7,200 active customers (c.15,000 customers registered in the system), includes supermarkets, convenience stores, restaurants, etc.; and
- Over 5,200 active RVMs.

For a product to be included in the system, the producer or importer must first register themselves with Returpack. The product must then be registered as well. For inclusion in the system, a product must meet a number of requirements regarding its size and dimensions. When the product is being sold to a consumer it must have the correct label stating that the product is a part of the Returpack system and must display the deposit paid on the container.

The deposit symbols must meet Returpack’s minimum requirements, i.e. a minimum size of 10mm x 15mm. The product’s barcode must also meet the specifications laid out by Returpack in order to achieve compatibility with the
Appendix 1 to Final Report

RVMs. If a company cannot design the symbol onto the packaging as required, the company must add adhesive labels, these can be ordered from Returpack.

26.1.1 Additional Recovery Routes for Metal Cans

In response to the producer responsibility legislation a number of different organisations were set up by the private sector to manage the collection and recycling of their packaging waste. In 2007, the majority of these organisations joined together to form “Forpacknings & Tidnings Insamlingen” (FTI).159 This reorganisation resulted in FTI managing the nationwide collection system for packaging waste. Metal cans can be recovered though this collection system also, although for domestic purchases no deposit would be paid back.

In addition, the majority of residual waste is directed through municipal waste incinerators, and so metal cans can also be collected from the incinerator bottom ash.

26.2 Fees Paid by Obligated Parties

The Returpack system is the main deposit refund system in place to handle the collection and recycling of almost all disposable beverage containers.

The system is financed by charging fees to participating companies. An annual membership fee is charged to all participating companies regardless of the quantity of products placed on the market.

For a product to be included in the scheme the producer or importer must first register themselves with Returpack which involves an annual membership fee of SEK 10,000, or around 1,100 €. Unique bar codes need to be purchased through third party organisations; fees for a bar code are thought to typically start from 195 €.160 With 135 importers / breweries registering with Returpack and 250 unique barcodes registered, these costs per can onto the market (0.02 euro cent per can) are negligible in relation to overall system costs.

There are a range of different fees that are then paid to Returpack depending on the quantity and type of beverage containers placed on the market, i.e. the deposit fee, administration fee and sorting fee, as outlined in Table 26-1.

---

159 Forpacknings & Tidnings Insamlingen (n/a) Välkommen till FTI, Accessed 10th March 2011, http://www.ftiab.se/

Table 26-1: Returpack Beverage Container Fees

<table>
<thead>
<tr>
<th>Beverage Container</th>
<th>Container Size</th>
<th>Consumer Deposit (SEK)</th>
<th>Relevant Fees (SEK)</th>
<th>Total (SEK)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal Can (Alu)</td>
<td>-</td>
<td>1</td>
<td>0.89</td>
<td>0.89</td>
</tr>
<tr>
<td>Metal Can (Steel)</td>
<td>-</td>
<td>1</td>
<td>0.89 0.25</td>
<td>1.14</td>
</tr>
</tbody>
</table>

Note: Currency Exchange Rate: 1 SEK = 0.109182 EUR, 20th June 2011, www.xe.com


The ‘Sorting’ and ‘Admin’ fees are designed to help cover the costs of managing the system, mainly the collection, transport, and sorting of the empty beverage containers, as well as the cost of the administering the system.

26.3 Recycling Rate for Metal Cans

Canadean data suggests a total of 1,114 million metal beverage cans were sold in Sweden in 2009. The majority of these are included in the Returpack deposit refund system. Official statistics suggest that the Returpack system had a return rate of 85% for cans in 2003, which has grown over the years to achieve a national recycling rate of 91% in 2008, as shown in the table below. This data would suggest that the government target of 90% as set out in the legislation is being surpassed.

Table 26-2: Recycling of Beverage Containers in Sweden (2008)

<table>
<thead>
<tr>
<th>Type of Packaging</th>
<th>Placed on the Market (tonnes)</th>
<th>Recycling (tonnes)</th>
<th>Recycling Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal Beverage Cans</td>
<td>17,169</td>
<td>15,622</td>
<td>91</td>
</tr>
</tbody>
</table>


However, detailed data has been provided by Returpack on recycling performance in Sweden. This is shown in Table 26-3. The data shows how imported cans can distort the figures if not accounted for correctly. If the total number of cans recycled in Sweden is divided by the official number of cans (those with deposits) sold within the country then a figure close to 90% recycling is generated. However, with imports excluded from the numerator in the calculation, the true rate of recycling for the Returpack system is around 75%.

---

Table 26-3: Beverage Can Consumption and Recycling in Sweden

<table>
<thead>
<tr>
<th>Numbers of cans in millions</th>
<th>2007</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cans sold onto Swedish market (included in Returpack)</td>
<td>1,069</td>
<td>1,114</td>
</tr>
<tr>
<td>Imported cans</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>Returpack recycling, deposit reclaimed</td>
<td>782</td>
<td>824</td>
</tr>
<tr>
<td>Private imports recycled through RVMs</td>
<td>45</td>
<td>55</td>
</tr>
<tr>
<td>Private imports recycled through other recycling systems FTI</td>
<td>116</td>
<td>96\textsuperscript{1}</td>
</tr>
<tr>
<td>Deposit cans recycled through other recycling systems</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Private imports not recycled</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>Domestic return / recycling rate for deposit cans</td>
<td>74.3%</td>
<td>74.8%</td>
</tr>
<tr>
<td>Recycling rate with recycled imported cans added to numerator</td>
<td>89.3%</td>
<td>87.5%</td>
</tr>
</tbody>
</table>

\textit{Note: 1. The data for cans recycled in 2010 through the FTI collection systems does not identify the split between deposit and non-deposit cans. For this analysis we assume that 10\% are deposit cans, based on the sorting analysis conducted prior to 2007.}

Source: Data provided by Returpack

26.4 Proportion of Total Recovery Costs Covered by Fees

There is a relatively high recycling rate for cans in Sweden. However, the fact that the return rate is only around 75\% results in a relatively significant revenue from the unredeemed deposits. The unredeemed deposits reduce the extent to which the producers have to fund the system themselves. Producers and consumers do, however, between them, fund 100\% of the costs of the recycling activity.
27.0 United Kingdom (UK)

27.1 Responsible Organisation / Primary System for Collecting Metal Beverage Cans

Packaging in the household waste stream is collected either by kerbside recycling services organised by the local authorities, or via bring systems (for example located in shop or pub car parks), or via household waste recycling centres (organised by the local authorities). There are growing efforts to recycle cans using compartmentalised litter bins (so called ‘recycling on the go’ schemes).

Packaging is generally collected as part of a range of recyclables. Therefore, for example, cardboard and paper packaging is often found mingled with non-packaging paper such as newspaper and periodicals. Some waste streams are particular to packaging. For example, household aluminium is comprised almost completely of packaging (although there could be a range of types, from beverage cans to aerosols to foils).

Increasingly, the UK local authorities have resorted to kerbside recycling schemes. There is a wide variety of local authority recycling scheme designs in the UK for household packaging collection, depending on local authority and type of district (urban, suburban or rural). Wheeled bins, plastic boxes, or polythene bags are used as containers for recyclable materials. The materials may be segregated at the kerbside (tipped into separate containers on the vehicle) or may be collected in either one or two streams to be later sorted in a materials recovery facility (MRF).

The delivery of waste collection services to households is either carried out by local authority in-house teams or outsourced to waste management companies. The contracts for these services vary, but are typically for 7 years.

In terms of individual materials, coverage by kerbside schemes is variable. For example, 95% of local authorities collect aluminium at the kerbside, but only 70% collect glass at the kerbside. Authorities without kerbside glass collections typically rely on bring systems for recycling.

27.1.1 Additional Recovery Routes for Metal Cans

For consumer packaging discarded away from home, segregated litter bins are becoming more common, in particular to support metal can recycling, as up to 30% of aluminium cans are consumed ‘on the go’. However, the vast majority of litter bins are still for refuse only. In addition, metal cans are being recovered from residual waste treatment plants, such as MBT facilities or incinerators.

---


163 Ibid.
27.2 Fees Paid by Obligated Parties

The UK scheme is rather unique. It is based around a system of tradable compliance credits. The compliance credits are of two types, the Packaging Recovery Note (PRN), and the Packaging Export Recovery Note (PERN), the latter being for material reprocessed outside the UK, the former for material domestically reprocessed. The credit is generated at the time the material is actually reprocessed, and it is reprocessors who ‘generate’ PRNs and PERNs.

Responsibility for recycling and recovering packaging is spread across the packaging chain, with differing levels of responsibility depending upon where in the chain a given company sits. In essence, however, the obligation to demonstrate the recycling and recovery of packaging is linked to the quantity of packaging placed on the market, and the position the company occupies in the packaging chain (whether packaging producer, filler, distributor, retailer, etc.). Companies discharge their obligations through one of a number of compliance schemes, of which there are more than 20. The compliance scheme becomes legally responsible for acquiring the required number of PRNs / PERNs to demonstrate that it has discharged the obligations of its scheme members. The obligated company pays the compliance scheme, with the payment set commercially, but likely influenced by the cost of acquiring the PRNs and PERNs.

The scheme offers little or no direct financial support (some offer some means of support) for Local Authorities which organise and pay for the collection systems used to recycle household waste (including packaging waste). The only way that local authorities may benefit is if the PRN and PERN value is significant, and translates into increased material prices (though even here, not all local authorities benefit from improved material revenues since this depends on how their collection contract is structured).

The prices of PRNs per tonne of material varies depending upon the balance of supply of, and demand for, evidence. Prices are shown in Figure 27-1. The two peaks in PRN/PERN prices shown illustrate the response of the market both to demand and to supply variations. In 2005, the demand was high as UK business targets (set on the packaging obligation under the Packaging Regulations) were barely met for the year in glass (53% recycling against the 55% target), steel (51% recycling against the 55% target) and aluminium (28% recycling against the 28% target); note, however, that the targets only apply to obligated entities not for all UK waste. In 2009, the steel PRN/PERN price peaked in response to a lack of supply of PRN/PERNs as Corus reduced their steel reprocessing operations in the UK, shutting plants in response to a global slowdown in the demand for steel. In other words, falling demand for material leads to reduced supply (generation of) PRN/PERNs, so increasing their value.
To be comparable with data from other countries it is preferable to consider calculated fees per tonne of material placed onto the market, acknowledging that this will be a fairly imprecise measure. Taking the 3 year average PRN prices from Figure 27-1 and multiplying by the 2008 material recycling rate data gives

<table>
<thead>
<tr>
<th>Calculated from average PRN figures over 3 years to 2010 and 2008 material recycling rates</th>
<th>£/tonne</th>
<th>€/tonne</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminium</td>
<td>£17</td>
<td>21 €</td>
</tr>
<tr>
<td>Steel</td>
<td>£16</td>
<td>19 €</td>
</tr>
</tbody>
</table>

Note: Currency Exchange Rate: 1 GBP = 1.21264 EUR, 8th January 2012, www.xe.com

27.3 Recycling Rate for Metal Cans

The total number of beverage cans put on the market in the UK in 2009 was 8.1 billion (although this figure does not include the private trade in beverage cans brought into the country). 164 The split of these cans between aluminium and steel is regarded as commercially sensitive, and this is a key element of the calculation of a recycling rate. Alupro assert that 97,000 tonnes of aluminium beverage cans were put on the market in 2008. 165 Given the relative pack weights of aluminium (17g per can) and steel (35g per can), this would mean that around 70% of beverage cans put on the market were aluminium (this is relatively close to the 2009 EAA data of 78% of beverage cans being aluminium). 166
The median weight of recycled cans collected in the UK in 2009 was 8.4 Kg per household.\textsuperscript{167} There is no split made in the Waste Data Flow data (that was the basis of the Resource Futures report for WRAP) between beverage cans and other metal packaging, or between steel and aluminium. From experience, we can say that aluminium cans comprise around 20\% by weight of all 'mixed cans'. We can assume that all aluminium cans in the recycling stream are beverage cans (the number of aerosols and other packaging will be negligible) and 30\% of steel cans are beverage cans.\textsuperscript{168} This equates to 3.7 Kg of beverage cans per household, or a total of 97,000 tonnes. Bring sites, household waste recycling centres and recycled material from litter bins added another 4,700 tonnes bringing the total recycled to 101,700 tonnes.\textsuperscript{169} This gives us a recycling rate for metal beverage cans of 56\%. This is split down to 48\% for aluminium and 65\% for steel.

### 27.4 Proportion of Total Recovery Costs Covered by Fees

Collection of lowest cost waste streams (these being the bulk commercial ones rather than end user) are encouraged in a target led system such as this, especially where the targets are not as tight as they could be (in Belgium the overall recycling target is 80\% and recovery is higher still). There is no direct support built into the system for local authority collection of packaging waste, as there is in some other member states' implementations of the Packaging Directive. There is some sense in ensuring commercial packaging waste is well managed - arisings are higher compared to household waste, and much of the waste is either already or easily segregated so it is easier to find a market for it. However, the local authority managed collection system is more expensive (per tonne) than in the industrial sector; as such, the system tends to favour collection of non-household over household packaging.

Because the majority of the collection of metal beverage cans occurs through household waste collection services, and because these services are not significantly supported, financially, by the PRN/PERN system, then the proportion of total costs of recycling and recovery covered by producers (equivalent of producer fees) is low, and especially low in years where the recycling targets barely change. In such years, PRN prices tend to fall to very low values since the demand for evidence is always deemed likely to be below the level of supply.

\textsuperscript{167} Resource Futures (2010), \textit{Analysis of Kerbside Dry Recycling Performance in the UK in 2008/9}, Report for WRAP, September 2010, \url{http://www.wrap.org.uk/downloads/EVA143-000_Kerbside_Dry_Benchmarking_UK_08-09_Report_FINAL_for_publication_V2_1.9d2b94b7.8168.pdf}

\textsuperscript{168} Eunomia (2010) ibid.

\textsuperscript{169} Eunomia (2010) ibid.