Campaign to Protect Rural England
Standing up for your countryside

From waste to work: the potential for a deposit refund system to create jobs in the UK

Report prepared for the Campaign to Protect Rural England

Dr Dominic Hogg, Dr Debbie Fletcher, Maxine von Eye, Kate Mulcahy, Timothy Elliott

From waste to work: the potential for a deposit refund system to create jobs in the UK

Dr Dominic Hogg, Dr Debbie Fletcher,
Maxine von Eye, Kate Mulcahy, Timothy Elliott

July 2011

Campaign to Protect Rural England
128 Southwark Street
London
SE1 0SW
United Kingdom
Tel: +44 (0)20 7981 2800
Fax: +44 (0)20 7981 2899
Web: www.cpre.org.uk

Eunomia Research & Consulting Ltd
37 Queen Square
Bristol
BS1 4QS
United Kingdom
Tel: +44 (0)117 917 2250
Fax: +44 (0)871 714 2942
Web: www.eunomia.co.uk

Campaign to Protect Rural England
Standing up for your countryside

CPRE Campaign to Protect Rural England

CPRE fights for a better future for England's unique, essential and precious countryside. From giving parish councils expert advice on planning issues to influencing national and European policies, we work to protect and enhance the countryside. We believe a beautiful, thriving countryside is important for everyone, no matter where they live. Nationally, we don't own land or represent any special interests. Our members are united in their love for England's landscapes and rural communities, and stand up for the countryside, so it can continue to sustain, enchant and inspire future generations.

CPRE's *Stop the Drop campaign* is working to stop the blight of litter and fly-tipping on our countryside, cities, waterways, towns and villages.

CPRE is a company limited by guarantee, registered in England, number 4302973

Registered charity number: 1089685

eunomia
research & consulting

EUNOMIA Research and Consulting

Eunomia is an environmental consultancy that supports positive change. Our clients, from both government and the private sector, turn to us for policy development and analysis, service design and review, technology and market assessment, regulatory compliance and project management.

Policy Development
Our commitment to environmental issues dates back to well before these concerns were prominent in the national political debate. Now as then, Eunomia seeks to lead the way in policy formulation and implementation. We are able to marry perspectives from science, economics, politics and social science to bring forward practical proposals with the potential to deliver cost-effective benefits. We are recognised as leaders not only in understanding the direction of waste and energy policy, but in determining its trajectory through commissions for Defra, DECC, Renewable Fuels Agency and the Committee on Climate Change.

Local Government
Our technical skills, commercial experience and local government know-how mean our clients turn to us when they want to achieve high recycling rates and high levels of resident satisfaction as cost effectively as possible. In recent years we have worked with over 100 local authorities, supporting them with contract procurements, partnership development, service efficiency reviews and service design.

Private
We act on behalf of a range of organisations operating in the waste and energy sectors, including financial institutions, utilities, property companies and technology providers. Eunomia is recognised as a leader in understanding the direction and trajectory of environmental policy. We are therefore able to provide key insight to ensure that our clients are one step ahead and can make key commercial decisions quickly and effectively.

Foreword

Sometimes good ideas can miss their moment because the right environment doesn't exist in which they can flourish.

At the Campaign to Protect Rural England (CPRE), our 85 years of campaigning and policy experience mean we know that some good ideas don't miss their moment; they merely take a while to come to fruition.

With regard to deposit refund systems – an idea so good that it can save local councils money, create thousands of jobs across the UK, reduce litter and increase recycling – I have wondered what it is that has kept this sensible, effective and, ultimately, fair system from becoming a reality to date.

Whilst other countries have introduced a deposit system and subsequently enjoyed the many environmental, social and economic benefits it delivers, the prospect of a UK-wide deposit refund system appears to have suffered from a combination of political lethargy and persuasive lobbying by a powerful opposition busy protecting its interests, as well as a persistent insistence by civil servants on the superiority of 'alternative measures' (however unspecified and mysterious these may be) and, in recent years, a general sense of there being bigger, more important issues than drinks containers languishing in landfill or lying strewn across rural and urban landscapes.

However, I believe the environment is changing. Not that any of the stumbling blocks I mentioned above don't still exist, but that the statement 'the case for deposits is yet to be made' is becoming harder and harder to defend.

In 2010, CPRE published the first cost benefit analysis of a UK-wide deposit refund system. It provided proof that the scheme would reduce the financial burden on local councils and shift some of the responsibility for dealing with packaging waste to its producers.

It showed there would be an associated environmental benefit from reduced greenhouse gas emissions and air pollution. The scheme also presents the opportunity for recycling levels for drinks containers to be as high as 90%. Naturally, this is all compelling evidence.

This new report builds on the findings of that research and investigates another economic and social benefit that can be derived from a deposit scheme – the potential for that scheme to create jobs. As this report shows, the potential is significant, geographically balanced and timely.

Recently, the Government announced that we must make people aware of the value of what they throw away. It questioned why we are burying valuable materials like glass, plastic and aluminium. It has stated its ambitions to achieve zero waste and become the greenest government ever.

All of which begs one question – how?

I would suggest that a deposit refund scheme is an excellent addition to the range of initiatives that must be deployed to ensure we achieve these ambitions. And, as this research shows, there are many thousands of people who could be gainfully employed in making those ambitions a reality.

Bill Bryson
President
Campaign to Protect Rural England

Executive Summary

In the recent *Have We Got the Bottle?* report for the Campaign to Protect Rural England (CPRE), Eunomia examined the potential costs and benefits of the set up and operation of a deposit refund system (DRS) in the UK.[1] The cost of labour was included as a key component of the financial costs associated with the introduction of a DRS. In order to avoid any double-counting in relation to the financial impacts of changes in employment, the number of jobs resulting from the introduction of the DRS was excluded from the core outputs presented in the cost-benefit analysis (CBA) modelling in the original study. However, given the current economic situation, any impact on the number of jobs, either negative or positive, might be considered of interest in understanding the wider impacts of the introduction of a DRS in the UK. Eunomia is pleased, therefore, to present this additional report to CPRE which specifically examines the impacts of introducing a DRS on the number, type and location of jobs involved in the collection and processing of beverage containers.

In the original study a DRS model was designed which targeted the collection of non-refillable beverage containers (plastic bottles made from PET (Polyethylene Terepthalate), metal cans and glass bottles). The stakeholders considered within the model were the producers and importers of beverages, any retailers which sell beverages in the UK, all consumers who purchase beverages in the UK, a central system responsible for administering the DRS, and organisations involved with the collection and sorting of waste containers. The system design was based on similar principles to the systems which exist in the Nordic countries (Dansk Retursystem, Norsk Resirk, Returpack and Palpa).

The study also used logistics modelling to understand how the costs of existing household waste collections change when a DRS is put in place, and considered the wider savings that might be incurred from a reduction in beverage container material requiring collection at bring sites, household waste recycling centres (HWRCs), via commercial waste collections, and from litter bins and street sweeping.

Finally, the report also considered the potential environmental benefits associated with an increase in material collection resulting from the introduction of the DRS, and the potential savings derived from removing litter from the environment. The monetised environmental benefits were combined into an overall CBA model along with the costs derived from introducing a DRS and the resultant reduction in costs of existing services.

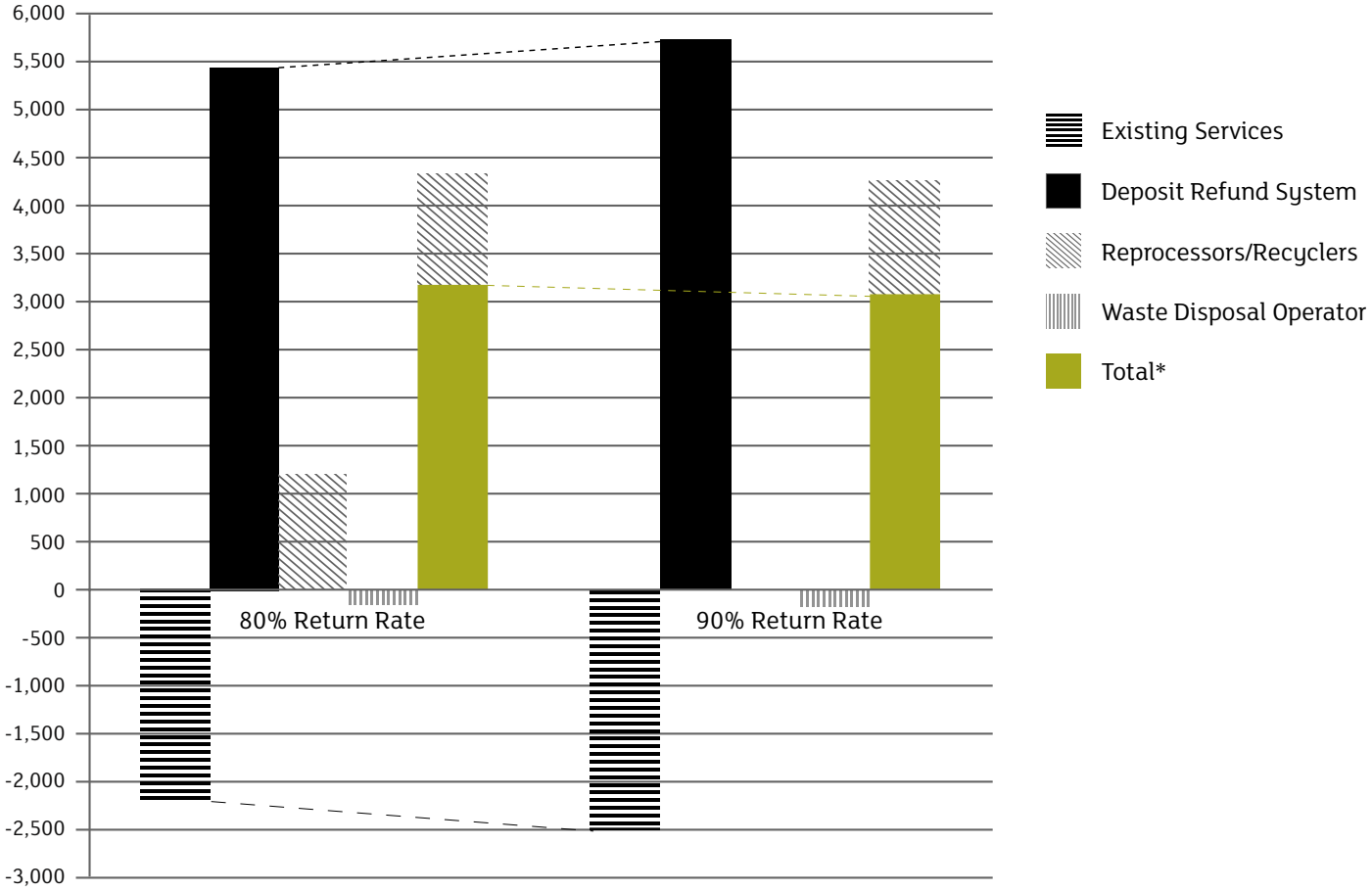
In order to analyse the employment impacts resulting from the introduction of a DRS in the UK, we extracted relevant data from the original CBA modelling. We also widened the scope of this study to cover the potential labour impacts on the recycling/reprocessing industry, which would also benefit from increased throughput of beverage container materials from the DRS. In addition, we looked at the associated reduction in labour requirement in current waste treatment/ disposal operations that would occur if more material was diverted from disposal into recycling. Following on from the original modelling and using the return rates referenced within it, we examined the potential labour impacts for two scenarios: one where the DRS results in an 80% return rate of deposit-bearing containers, and the other where it results in a 90% return rate.

Based on the combination of quantitative and qualitative data from the CBA and wider research, the overall impact of the introduction of a DRS on employment is summarised in Figure 1. If we assume that all additional reprocessing jobs are created in the UK and are thus included in the overall labour impacts, the introduction of a DRS leads to a 4,248 to 4,292 increase in full-time equivalent (FTE) posts, with a higher net increase in jobs from the 80% compared to the 90% return rate scenario. The 80% return rate results in a smaller reduction in the amount of material needing to be collected through existing kerbside collection services and thus there are a lower number of job losses in those services. Although the DRS itself creates fewer jobs in the 80% return rate scenario, this is not as significant as the reduction in job losses through existing collection services; hence the 80% return rate results in a higher net increase in jobs overall compared to the 90% return rate scenario.

Even without the inclusion of any FTE posts from reprocessing, there remains an overall increase in FTEs ranging from 3,062 to 3,156 for the 90% and 80% return rate scenarios respectively. The majority of jobs created are at a similar skill level to the existing jobs, though there is perhaps a slight increase in the total number of higher skilled jobs. One hundred jobs are created in the central administrative system in database/accounting work, modelled at a higher wage and as a desk-based job rather than a front-line collection services job. Between 353 to 393 higher-paid maintenance/engineering jobs are modelled as being required for the counting centres, where automated counting machines are used to count and register used beverage containers that have been collected manually.
In contrast, there is only a 64 to 78 FTE reduction in the number of higher-paid supervisor staff from the existing collection services.

[1] *Eunomia Research & Consulting (2010) Have We Got the Bottle? Implementing a Deposit Refund System in the UK, Report for the Campaign to Protect Rural England (CPRE), September 2010*

Figure 1. Overall Impact of the Introduction of a DRS on Employment (number of full-time equivalent posts)



*Note the solid total bar illustrates the total FTEs without any job creation in the UK reprocessing sector. The shaded part of the bar illustrates the additional FTE posts that would be created if we assume all new reprocessing jobs are created in the UK.

In relation to the potential location of the jobs, the DRS model is based on a relatively decentralised system, with, for example, a significant number of counting centres located locally in order to optimise logistics. A significant number of regional jobs would also be created in the retail sector and in the collection and transport logistics required for pick-ups from the retailers. The reduction in jobs in the existing services would also be spread across the UK. Given the desk-based jobs in the central system, this may be located in only one or several locations across the UK, and might be targeted to an area of higher unemployment. The central system team would be likely to benefit further financially from co-locating with one of the 100 larger counting centres due to shared overheads. Reprocessing jobs would be likely to be focused in a small number of locations, either near to or at existing reprocessing sites, or new manufacturing plants.

It is unclear as to whether there would be a shift in service provision between the voluntary, private and public sectors, though it was noted that more private sector involvement would be likely in the delivery of the DRS, with the responsibility taken away from the public sector that no longer has to collect as much material at the kerbside.

From the combination of existing modelling and further research, the overall effect of the introduction of a DRS in the UK is projected to lead to an increase in the number of jobs available by between 3,000 and 4,300 FTEs. The difference depends on whether or not reprocessing jobs are included. There would also be an overall increase in the number of higher-skilled jobs.

The introduction of a DRS will therefore lead to an increase in green economy-based jobs.

Contents

1.0 ▪ Introduction

In the recent *Have We Got the Bottle?* report for the Campaign to Protect Rural England (CPRE), Eunomia examined the potential costs and benefits of the set up and operation of a deposit refund system (DRS) in the UK.[2] The cost of labour was included as a key component of the financial costs associated with the introduction of a DRS. The modelling also accounted for the reduction in the cost of labour (and other costs) affecting kerbside waste collection services.

In order to avoid any double-counting in relation to the financial impacts of changes in employment, the number of jobs resulting from the introduction of the DRS was excluded from the core outputs presented in cost-benefit analysis (CBA). However, given the current economic situation, any impact on the number of jobs, either negative or positive, might be considered of interest in understanding the wider impacts of the introduction of a DRS in the UK.

Eunomia is pleased, therefore, to present this additional report to CPRE which specifically examines the impacts of introducing a DRS on the number, type and location of jobs involved in the collection and processing of beverage containers.

2.0 ▪ Methodology

In order to analyse the employment impacts resulting from the introduction of a DRS in the UK, we first extracted relevant data from the original CBA modelling. Full details of the modelling approach can be found in the *Have We Got the Bottle?* report.[2] Only those elements and assumptions that are considered most relevant to the number and type of jobs are detailed in this report.

Data was extracted from two key elements of the original modelling in order to examine the employment impacts associated with introducing a DRS. Essentially, these were as follows:

- The savings (and associated reduction in employment) from the existing household and commercial waste collection services that collect fewer, or no, beverage containers following the introduction of a DRS; and
- The costs (or increase in employment) associated with the introduction of the DRS itself.

The scope of the original study covered all key stakeholders except for the recycling/reprocessing industry, which would also benefit from increased throughput of beverage container materials from the DRS. In order to provide a complete picture in terms of employment, wider research was thus also undertaken into the relationship between increased recycling and job creation in the recycling/reprocessing industry. In addition, consideration was also given to wider employment issues such as the proportion of skilled, as compared to unskilled, labour; permanent, as compared to temporary, jobs; the location of jobs; and whether those jobs could or would be delivered by public, private or voluntary organisations.

2.1 Scope

In examining the employment impacts from the introduction of a DRS, only 'on-going' operational jobs for both the existing collection systems and DRS were considered in scope. Jobs associated with the initial set-up of the DRS were not considered, as the impact would be of a temporary nature rather than exerting a longer-term impact. In addition to those jobs originally modelled as part of the existing collection services and the DRS itself, jobs associated with recycling/reprocessing and waste treatment and disposal operations in the UK were also included in scope for the purposes of this analysis. Finally, the scope also considered the indirect 'multiplier effects' that might be derived from an increase in jobs and hence in spend in other areas outside waste services, and the resultant impact this might also have on employment.

[2] *Eunomia Research & Consulting (2010) Have We Got the Bottle? Implementing a Deposit Refund System in the UK, Report for the Campaign to Protect Rural England (CPRE), September 2010*

3.0 ▪ Data Extracted from Existing Research

This section examines each component of both the existing collection systems and the DRS, where all or part of the financial cost or saving relates to a change in the number of employees delivering the various aspects of the service under consideration. The key assumptions used in relation to changes in the numbers of employees are presented alongside the data subsequently extracted from the CBA model. Data are provided for both the parallel and complementary DRS scenarios, which are defined as follows:

- A complementary system, which means beverage containers are no longer collected at the kerbside, modelled with a 90% return rate into the DRS.
- A parallel system, where the household kerbside systems for beverage containers target the same range of materials that are covered by the DRS, modelled at an 80% return rate into the DRS.

In our modelling, the parallel system had the assumed effect that some people would continue to place containers in their household recycling or refuse collection, even though they had paid the deposit, on the premise that the convenience factor outweighs the financial loss implied by forgoing the deposit, at least for some individuals. With this in mind the overall return rate for the system was set at 80%, 10% less than where no return could be made at the kerbside (i.e. complementary system). It was, however, noted that, given the size of the deposit, the local authority itself would be likely to implement measures to separate out the beverage containers in the parallel kerbside scheme and claim back the deposits as an income stream. This would result in the convergence of the two systems towards the same return rate.

Essentially, the return rate is the only difference driving the costs (and associated employment impacts) of the two systems. Even in the complementary system, the compartments for glass, metals and plastics in kerbside sort collection schemes would still be required for the collection of non-beverage and non-deposit containers; the only difference would be the amount of material requiring collection, and thus the fill rate of the compartments. In turn, the fill rate drives the numbers of vehicles and hence staff that are required. Henceforth, we thus refer to the parallel system as the '80% return rate' scenario, and the complementary system as the '90% return rate' scenario.

3.1 Creation of Jobs in the Deposit Refund System

In order to establish the number of jobs that would be created from the introduction of the DRS, this section examines each element of the system in turn, drawing out the key assumptions and the resulting number of jobs that are created.

3.1.1 Retailers

In the CBA, we assumed that the additional handling and collection of containers from retail outlets would demand labour time, and therefore additional costs would be incurred by the retailer. The two main activities requiring additional labour are:

1) The take back of containers from customers, the placing of containers in storage locations and daily cleaning of RVMs; and
2) Facilitating the pick-up of containers by the contracted logistics company.

The cost calculations in the model were based on a number of key labour-related assumptions. For those retailers using reverse vending machines (RVMs), an average was taken of two calculation approaches as follows:

Approach 1

- The time required to empty an RVM and clean it is 30 minutes per day.
- There are 36,020 retailers with RVMs (100% of all supermarkets, 70% of medium stores, 10% of convenience stores and 5% of food retailers).

Approach 2

- Each customer returns an average of 15 containers in one go;
- It takes 10 seconds for the retailer to process the receipt and reimburse the customer with the monetary value of the accumulated deposits;
- Each 'average sized' RVM has a storage capacity of 800 containers;
- The time taken to empty the RVM when it is full and undertake a daily clean of each RVM is 30 minutes.
- This secondary approach values the time taken for the shop assistant to both process receipts and empty and clean machines.

Where manual take-back of containers was assumed, the labour costs were associated with the additional time required to collect the containers from the customer, pay the deposit, and place the containers in the designated storage area. Operational experience from existing systems shows that most retailers will have an intermediate storage bag close to the cashier. When it is full, the bag will be sealed and taken to the storage area.

The additional employment generated by the take back and receipt of containers at stores opting for manual take back was modelled as being dependent upon two assumptions:

a) The time taken to deal with the returned containers; and

b) Whether or not this additional time was likely to lead to additional outlays on staffing.

In respect of the latter issue, it seems unlikely that all stores would employ additional staff to deal with the containers, or indeed, that the activity would be purely 'additional' to the existing working day. To ensure that the assumptions were aligned with previous work on costs, the assumptions made were as follows:

a) 100% of medium stores and 75% of convenience stores were assumed to require actual additional resource to undertake the manual collections, rather than being able to absorb this additional work within existing resources (the requirement for additional staffing is more likely at the larger of these stores, with assumed greater volume of take-back); and

b) The time taken for the cashier to accept an average of 15 containers and store them was estimated at 100 seconds.

It was considered that some of the smaller retailers, such as corner shops, kiosks, and cafes, would not receive a high enough volume of containers to warrant paying the joining fee for the DRS and would thus have to deposit the containers at local take-back points to redeem the deposits.
We calculated the cost to these retailers based on each retailer having to make a trip to local take-back points every fourteen days, taking 30 minutes to deposit the containers on every trip.

Labour costs were also considered in relation to facilitating the pickup of containers from the contracted logistics company. In implementing a DRS, there would potentially need to be three main avenues of collection services for the retailer: one for refuse, one for beverage containers, and one for other recyclable materials. Although it is assumed that the volume and hence frequency of refuse and dry recycling collections would be reduced alongside the deposit system, the overall labour cost is assumed to be higher, given that staff would have to set out waste for collection on three separate occasions. Hence, an additional labour cost of five minutes per container pickup was included in the calculations, with estimates also made for the number of pickups required per week for each of the main retail categories.

Further details of the assumptions used in modelling the costs associated with the retailers' activities can be found in Appendix A.3.2 of the *Have We Got the Bottle*? report.
The calculated number of additional retailer hours required per week is presented in Table 1 and is converted into additional FTEs in the retail sector in Table 2. Based on these modelled figures, which are a direct reflection of the retailer system costs in the CBA, an additional 9,810 to 10,446 FTE posts would be created through the need to accept beverage containers at retail stores.

***Table 1**. Number of Additional Retailer Hours of Work Required per Week*

	80% DRS Return Rate	90% DRS Return Rate
RVM Emptying and Cleaning	131,621	138,621
Manual Customer Take-Back Processing	140,699	155,382
Retailers Outside Deposit System	42,504	42,504
Assisting with Container Collection (Back of Store)	21,873	21,873

Table 2. Modelled Additional Retailer FTEs Required

	80% DRS Return Rate	90% DRS Return Rate
RVM Take-Back Emptying and Cleaning	3,833	4,041
Manual Customer Take-Back Processing	4,101	4,529
Retailers Outside Deposit System	1,239	1,239
Assisting with Container Collection (Back of Store)	638	638
Total	**9,811**	**10,446**

It could be argued, however, that the figures in Table 2 over-estimate the number of jobs that would actually be created in the retail sector as a result of the introduction of a DRS. We have already assumed that only medium stores and 75% of convenience stores would require actual additional resource to process manual collections. It might be argued that this assumption should be reduced further, with only medium stores and supermarkets assumed to require any actual additional resource to process either manual or automated take back of containers. If we use this assumption, the current costs of this element in the CBA model might be considered an over-estimate of the costs that would actually be incurred by retailers.

As illustrated in Table 3, the 'adjusted' number of FTE posts created is much lower, resulting in an additional 1,546 to 1,672 FTEs required in the retail sector (depending on the overall return rate for the system). It should be noted, for the purposes of providing a conservative approach, the data in Table 3 is expressed in FTEs; in reality, greater actual numbers of employment might be derived in the retail sector from the introduction of a DRS, as it is likely that some of the posts would be part-time rather than full-time.

Table 3. 'Adjusted' Additional Retailer FTEs Required

	80% Return Rate	90% Return Rate
RVM Take-Back Emptying and Cleaning	1,529	1,653
Manual Customer Take-Back Processing	17	19
Retailers Outside Deposit System	0	0
Assisting with Container Collection (Back of Store)	0	0
Total	**1,546**	**1,672**

3.1.2 Central System

For staffing costs associated with the central administrative system for the DRS, we based the potential number of staff on discussions with Palpa (Finland). We assumed a total headcount of 120 people, with higher average salaries for the more technical staff than for the customer services advisors.[5] The number of staff was assumed to be the same irrespective of the return rate of containers into the system. The number of FTEs required for the central system is presented in Table 4.

[5] *Personal communication with Pasi Nurminen from Palpa, Finland, August 2010*

Table 4. Number of FTEs Required to Administer the Central System

Item	Assumption
Number of Database/Accounting FTEs	**100**
Average Salary + On-costs (@ 25%)	£37.5k
Number of Customer Services Advisors (FTEs)	**20**
Average Salary + On-costs (@ 25%)	£25k

3.1.3 Producers

The CBA model assumes that there would be no creation of jobs for on-going operations of producers within the DRS. Costs to the producers were calculated for the initial set-up of the system, to account for the inclusion of each product in the database (additional administrative tasks) and the need to change the labelling of the products, but no on-going additional costs were assumed. There might be some additional on-going burden to producers in the form of administration of the deposits and the provision of figures to the DRS of the number of products placed on the market, but it was assumed that such tasks would be absorbed within current administrative jobs which already include the need to register each product and to monitor sales.

3.1.4 Collection and Transport Logistics

The main principles in modelling the collection and transport logistics for the deposit-bearing containers collected through the retailer were:

- Backhauling using existing logistics networks is common practice for larger retailers (e.g. supermarkets);
- Containers from smaller outlets are collected by logistics contractors using curtain-side, or back lift, lorries, in the range of 7.5 to 18 tonnes; and
- Containers are transported directly to recyclers, or to counting centres for clearing.

The number of FTEs required in the collection and transport of containers relates directly to the number of vehicles, which were calculated based on logistics assumptions around the number of pickups required by various retailer categories per week, the bulk densities of the collected containers, and the different collection logistics for urban compared to rural areas. The calculations resulted in the number of vehicle days required in order to collect the tonnage of containers. This number was then multiplied by the costs associated with each vehicle per day (including labour at an hourly rate, with the driver working a 9.5 hour day) to give a total cost of collection and transport. Full details of the assumptions used are provided in Appendix A.3.2 of the *Have We Got the Bottle?'* report.

The number of vehicle days required to collect the annual tonnage of containers in the system was subsequently calculated at 490,703. The CBA model assumed no difference in vehicle days for the 80% compared to the 90% scenario, as collections were based on a standard number of pick-ups for the various categories of retailer. The following logic was applied to determine the number of FTE posts required for the DRS collection and transport logistics:

- It is assumed that each vehicle is crewed as driver only;
- The number of collection days per vehicle is assumed to be 312 days per annum (based on collections occurring six days a week);
- However, each driver only works 220 days per annum (five day working week, plus holidays and sickness coverage);
- 1.4 FTEs are therefore required per vehicle to undertake the number of collection days required per annum;
- This figure is subsequently multiplied by the number of vehicles required to determine the number of driver FTEs.

It should be noted that, should collections be required over seven days (equating to 363 collection days per vehicle per annum), the outcome would remain the same, as although the total number of vehicles required would be less, the number of staff required to cover the collection days required for each vehicle would be greater, leading to the same overall number of FTEs being required.

The collection and transport logistics for the DRS would create an additional 2,230 FTE posts (see Table 5).

Table 5. Number of FTEs for DRS Collection and Transport Logistics

Item	Assumption
Number of 'Vehicle Days' Required per Annum	490,703
Number of Collection Days per Annum	312
Number of Vehicles Required to Undertake Collections per Annum	1,573
Number of Driver Working Days per Annum (5 day working week)	220
Number of Drivers Required to Deliver Number of Collection Days per Annum	1.4
Total FTEs Required	**2,230**

3.1.5 Counting Centres

A counting machine is an automated machine which, simply put, counts and registers used beverage containers that have been collected manually by an individual retailer.

The system design and costs that formed part of the original CBA modelling were constructed by Anker-Andersen – a supplier of high-speed counting machines (HLZ) - which is based in Denmark.[6] The specification of the system was to be able to process the 15 billion containers returned manually to stores around the UK. The key assumptions in relation to labour associated with operating the counting centres were as follows:

- There would be between 97 and 107 centralised counting centres, each with two high-speed machines, located around the UK. These would most likely service areas of higher population around cities and large towns;
- There would also be around 334 to 370 smaller scale local counting centres distributed around areas of lower population density;
- The centralised counting centres would be operated on a three shift basis, and regional centres on a one shift basis;[7]
- Each centralised centre requires two machines, each regional centre only one;
- Each machine takes one hour to be cleaned each day, with an additional three hours of labour time per day assigned to the maintenance of each machine. The cleaning and maintenance is undertaken on 300 days each year; and
- It should be noted that the costs of those FTEs associated with checking the machines were calculated at a greater hourly rate than the actual operating jobs.

Table 6 and Table 7 summarise the number of FTEs involved in the operating of and checking/maintenance of the counting centre machines respectively. The overall number of FTEs involved in operating the counting centres was calculated at between 1,206 and 1,334 FTEs (depending on the return rate for the system). It was also calculated that an additional 355 to 393 FTE posts would be required to deliver the higher-paid maintenance jobs.

[6] *http://www.anker-andersen.com/*

[7] *This allows a greater capacity at the introduction of the system, as centres will be able to operate on a higher shift pattern. The experience from Germany was that many stores initially operated manual take back whilst RVMs were being installed.*

Table 6. *Operating FTEs in Counting Centres*

	80% Return Rate	90% Return Rate
Centralised Counting Centres		
Number of Facilities	97	107
Number of FTEs per Facility	9	9
Total Number of FTEs	873	963
Regional Counting Centres		
Number of Facilities	334	370
Number of FTEs per Facility	1	1
Total Number of FTEs	334	370
Overall Number of FTEs	**1,207**	**1,333**

Table 7. *Cleaning/Maintenance Technicians Required for Counting Centres*

	80% Return Rate	90% Return Rate
Number Hours Required per Machine per Day	4 h	4 h
Number Machines	528	584
Total Hours Required per Annum	633,498	701,128
Total Number FTEs	**355**	**393**

3.2 Impact on Jobs in Existing Collection Systems

As stated in our previous report, one of the key elements missing in the majority of existing studies on DRSs is the reduction in costs (and hence also in employment) associated with fewer containers having to be collected through the existing collection routes. One of the key components of the CBA model was therefore the inclusion of all relevant costs and savings, particularly the change in costs associated with household kerbside collection systems.

3.2.1 Kerbside Collection Systems

Eunomia's proprietary waste collection model, Hermes, was used to investigate the effect of implementing a DRS in the UK on kerbside collection systems. Hermes is a sophisticated spreadsheet-based tool that allows a wide range of local authority specific and collection scheme specific variables to be modelled. It calculates the numbers of staff and vehicles used in delivering the service for households based on the amount of waste to be collected, and on other key characteristics such as population density, types of property, distance between properties, participation in the service, distance to tip etc. Full details of the modelling approach used are provided in the Appendix of the *Have We Got the Bottle?* report.[2]

The model assumes the following in relation to staffing levels:

- There is one supervisor required for every seven vehicles;
- All vehicles are modelled as requiring one driver plus two loaders;
- The introduction of a DRS results in a reduction in beverage containers in both the dry recycling and the residual waste collection streams. Consequently, a reduction in vehicles (and hence in staff) is modelled in both the dry recycling and the residual waste kerbside collection systems across the UK; and
- Staff requirements associated with the separate collection of food waste in both co-mingled and two stream systems are not included in the modelling, because these would not vary with the implementation of a DRS.

Table 8 summarises the number of full-time equivalent staff (FTEs) required for the household kerbside collection services in the baseline (no DRS) compared to the FTEs required following the introduction of a DRS. At an 80% return rate of beverage containers into the DRS, there is an overall reduction of 1,183 FTEs across the UK, comprising 54 fewer supervisors, 376 drivers and 753 loaders compared to the baseline. At a higher return rate of 90%, the additional material removed from the kerbside system results in a further 277 job losses overall, bringing the total reduction in employment to 1,460.

Table 8. *Number of Full-Time Equivalent Staff (FTEs) Required for Household Kerbside Dry Recycling and Residual Waste Collection Services*

	Baseline	80% DRS Return Rate		90% DRS Return Rate	
	FTEs Required	FTEs Required	Difference from Baseline	FTEs Required	Difference from Baseline
Drivers	7,349	6,972	-376	6,884	-464
Loaders	14,698	13,945	-753	13,769	-929
Supervisors	1,050	996	-54	983	-66
Total	**23,096**	**21,913**	**-1,183**	**21,637**	**-1,460**

3.2.2 Other Existing Services

Costs for other services that would be impacted by the introduction of a DRS were also modelled, though at a less detailed level. Calculations were based on the cost per tonne to deliver each service, derived from sources which do not necessarily go into detail as to how those costs were calculated.

The following cost elements were considered in the modelling:

- Collection of containers through bring sites;
- Collection of containers through Household Waste Recycling Centres (HWRCs);
- Commercial waste recycling / refuse collection; and
- Collection of containers from on-street litter bins and through street sweeping.

Given the high-level nature of the modelling in this area, we have applied the following assumptions in order to derive an estimate of the reduction in jobs that would occur due to the reduction in the tonnage of beverage containers collected through each of these services:

- The reduction in costs associated with bring site collections is derived from the reduction in the frequency of collections required to service each bring bank, and hence in the total number of vehicles and staff required to do the collections. The model assumes that bring site collections will be serviced by either a driver, or a driver plus one loader. The proportionate reduction in FTEs is calculated based on the change in tonnage at bring sites compared to the change in tonnage from household kerbside dry recycling and residual waste collections. It is assumed thatsupervisors are not included in the cost per tonne value provided, being instead included in the household kerbside collection calculations.
- The same logic is applied for commercial waste, but in this case, supervisors are included in the calculations, with one supervisor for every seven drivers.
- The cost per tonne for HWRCs does not include a reduction in FTEs associated with the running of HWRCs, as the number of staff employed is predominantly related to the size of site, and any reduction in FTEs would be likely to be absorbed via other tasks on site such as increased WEEE separation and ensuring maximum separation of all waste streams.
- For litter bin emptying, the disposal cost per tonne is first deducted from the total cost to obtain an overall collection cost per tonne. A cost of 5% is then deducted for overheads and to cover any vehicle costs. The remaining cost, assumed to be the costs associated with staff, is subsequently divided by an average salary of £22k (including on-costs) to determine the reduction in the number of FTEs associated with litter bin emptying.
- For street sweeping, a similar approach is applied to that of litter bin emptying. The costs of disposal and overheads are deducted from the costs of collection. An additional 10% reduction in collection costs is also calculated to account for the mechanical vehicle costs, with an assumed 50:50 ratio for mechanical sweepers to manual labour. The remaining cost, assumed to be the costs associated with staff collecting from litter bins, is subsequently divided by an average salary of £22k (including on-costs) to determine the reduction in the number of FTEs associated with street sweeping.

Table 9 illustrates the estimated reduction in the number of FTEs required for collection from bring sites, HWRCs, commercial waste, and for litter bin emptying and street sweeping. The total reduction associated with these services is calculated at 971 to 1,072 FTEs, depending on whether the DRS generates an 80% or 90% return rate respectively.

Table 9. *Reduction in FTEs Required for Other Existing Collection Services*

Service	80% DRS Return Rate	90% DRS Return Rate
Bring Sites	-49 drivers 0 to -49 loaders	-60 drivers 0 to -60 loaders
Commercial Waste	-10 supervisors -133 drivers 0 to -133 loaders	-12 supervisors -164 drivers 0 to -164 loaders
HWRCs	0	0
Litter Bins	-181	-191
Street Sweeping	-507	-533
TOTAL*	**-971**	**-1,072**

*Notes
Assumes 50% driver only, 50% driver plus one for bring site and commercial waste operations.

4.0 ▪ Additional Research

Section 3.0 has presented the quantitative employment data obtained from the CBA modelling undertaken to examine the impacts of the introduction of a DRS in the UK. The modelling did not, however, include the potential impacts of increased recycling of beverage containers on jobs in the recycler/reprocessor sector or in the packaging industry. In this section we thus explore the wider literature available on job creation in relation to increased recycling. Specifically, the review considers the impact on jobs in the reprocessing industry of the implementation of a DRS in the UK.

4.1 Quality of Data

Literature that is specifically focussed on the effect of DRSs on employment at reprocessing plants is somewhat sparse. It is, however, assumed that more generic studies concerning the effects of increased recycling rates on employment will bear some relevance to the effect of DRSs in terms of reprocessor capacity, on the basis that increases in material throughput at reprocessing plants will have a similar effect on employment requirements regardless of where the material comes from. Accordingly, such studies are considered as part of this review.

Although there are a number of studies available which consider the potential for increased recycling rates to create jobs, there are many gaps in data availability and inconsistencies in methodology which make it difficult to directly compare the figures generated and to apply them to the reprocessing industry in a meaningful way. Where data is available, much of it is not sufficiently detailed to encompass a breakdown of the types of job that would be created if more material was recycled, or the stages in the recycling process at which the jobs would arise.

The available data is limited by the narrowness of the studies undertaken (for example, interviews with only a few reprocessing plants or applicability to one region only), and the age of the data. The fact that the relationship between recycling and employment is generally expressed as a simple ratio between annual throughput and number of FTEs required to process it, to give an annual tonnage handled per FTE, means that increases in efficiency which may arise as a result of increased material throughput, and whether or not the facility has additional unused capacity, are not taken into account. In addition, the type of jobs that would be required should throughput change (for example, how many more administrative staff would be required if throughput increased) are not considered in the available literature.

4.2 Data Available

An investigation by Waste Watch (1999) estimated the number of FTEs required to process 1,000 tonnes of various material types.[8] The report acknowledges the limitations of the study, in that 'waste management data collection is not refined enough to classify employment information according to waste treatment types'.[9] The figures used in the study were thus based on interviews with waste management companies undertaken in 1997.

The study reports that in 1997, a total of 9,765 FTEs were engaged in reprocessing (with the majority of these FTEs based in paper processing). In interviews with six UK glass reprocessors, it was established that 160 FTEs were required to process 511,000 tonnes of glass in the UK, equivalent to 3,200 tonnes of glass reprocessed per FTE per annum. Interviews were undertaken at one aluminium reprocessing plant (Novelis in Warrington (formerly Alcan)) from which it was established that 75 FTEs were employed to process the 150,000 tonnes of aluminium, equating to 2000 tonnes per FTE per annum. Interviews with four plastics reprocessors established an average reprocessing volume per FTE per annum of 143 tonnes, based on 70 employees processing 10,000 tonnes of post-consumer plastic. 90% of the material processed by the plastics reprocessors was of commercial origin, and so the number of employees engaged in processing the consumer-only element had to be estimated based on total tonnages processed.

Using figures from the Waste Watch report, a 2004 report by the Local Economy Policy Unit (LEPU) at London South Bank University, estimates that within London, for every 1000 tonnes of waste recycled, six jobs would be created across the whole waste sector.[10] The study attempts to break down the figures into material streams, estimating that for every 1,000 tonnes of glass reprocessed, 0.42 jobs would be created in glass reprocessing. However, the report does not estimate figures for aluminium and plastic as it is focussed on jobs created in London only, and at the time of writing there were no plastics or aluminium processing plants in the area.

A report by Cascadia (2009) considered the impact of increased recycling rates on employment in the three cities of Baltimore, Washington DC and Richmond in the US (using data which originates from a Ph.D. thesis by Seldman (2006), from the Institute for Local Self Reliance in Washington). [11, 12] The report estimates that 'glass product manufacturers' require 26 jobs per 10,000 tonnes processed, and 'plastic product manufacturers' require 93 jobs per 10,000 tonnes processed. The term 'product manufacturer' is not exactly defined in the report, but the context suggests that reprocessing plants would be included in this category. Unfortunately, based on the information provided, it is not possible to separate the jobs required for reprocessing from other possible new product manufacturing jobs that might be included in this category. The data are, however, more recent than other data sources available and, it could be argued, cover the wider impacts of increased recycling on both reprocessing and additional manufacture.

Friends of the Earth (2010) has used the LEPU and Cascadia data to estimate increases in employment associated with various projected increases in recycling rates in the UK (and also across Europe).[13] The report takes the lowest estimates used in the LEPU and Cascadia reports to estimate the number of employees required to both collect and subsequently reprocess/recycle various materials. Accordingly, Friends of the Earth estimates that 0.75 FTEs are required per 1,000 tonnes of glass, 9.3 FTEs per 1,000 tonnes of plastic, 5.4 FTEs per 1,000 tonnes of iron and steel, and 11 FTEs per 1,000 tonnes of aluminium. These figures comprise both the collection and reprocessing stages of the process.

One study was found which has looked at the impact of a DRS on the number of reprocessing jobs. The study, undertaken in 2008, considered the employment impacts of the British Columbia Beverage Container Stewardship Programme, which collects glass, plastic and aluminium beverage containers, and the Beer Container Stewardship programme which collects empty beer cans and bottles (though the latter is focused on refillables).[14] In 2007 the Beverage Container Stewardship Programme collected around 76,000 tonnes of material – including 57,000 tonnes of glass, 11,000 tonnes of plastics and 5,000 tonnes of aluminium. The report estimates that 20 FTEs were required for the processing of these materials, an equivalent of 3,800 tonnes per FTE per annum.

8 *Waste Watch (1999) Jobs from Waste: Employment Opportunities in Recycling*

9 *Waste Watch (1999) Jobs from Waste: Employment Opportunities in Recycling, page 4*

10 *LEPU (2004) Jobs from Recycling: Report on Stage II of the Research, London South Bank University*

11 *Cascadia Consulting Group (2009) Recycling and Economic Development: A Review of Existing Literature on Job Creation, Capital Investment and Tax Revenues*

12 *Seldman, N (2006) Recycling Means Business. Ph.D. Institute for Local Reliance, Waste to Wealth Program, http://www.ilsr.org/recycling/recyclingmeansbusiness.html*

13 *Friends of the Earth (2010) More jobs, less waste: Potential for Job Creation through Higher Rates of Recycling in the UK and the EU, September 2010*

14 *Gardner Pinfold Consulting (2008) Economic Impacts of the BC Recycling Regulation, Prepared for the Ministry of Environment, British Columbia, Canada, 31 August 2008*

A number of the studies considered appear to start with a basic expectation that increased recycling rates will give rise to an increase in employment, as illustrated by the report by LEPU which states that:

> *"it is generally assumed that reprocessing and recycling are more labour intensive methods of dealing with waste than landfill. Given this, together with the continuing rise in total waste arisings, it is reasonable to expect employment across the whole waste management spectrum to rise."* [15]

Some data appears to support this theory. Drawing from data from waste management company ECT (now May Gurney), Waste Watch (1999) reported that for every 10 FTEs employed in recycling, one FTE was lost in disposal.[16] Similarly, the Cascadia report (quoting Goldman/CIWMB, 2001) suggested that for every 100 jobs created in processing and manufacturing of recyclable materials, 13 jobs were lost in corresponding up and down stream industries.[17] However, LEPU noted that the extent of job loss or gain will be influenced by the efficiency with which the various tasks associated with collecting, sorting, transporting, reprocessing and recycling are carried out.[18] Friends of the Earth (2010) notes that:

> *'although none of the available studies is directly comparable (definitions of the recycling sector and methodologies having evolved as issues emerged during industry critiques of early studies), they have consistently shown that per tonne of material processed, recycling provides approximately ten times more jobs than landfilling and incineration.'* [19]

It should be noted however, that not everyone shares the same view. One US study suggests that implementing a DRS for beverage containers in Florida would have no long term impact on employment at all. The report states:

"Opponents of a BCDRS [Beverage Container Deposit Refund System] are likely to claim it will cost jobs, particularly in the beverage industry. Proponents are likely to claim it will boost jobs, especially in the recycling sector. The simple truth is that in the long run, the labor market adjusts according to demographics so that everyone who wants work at prevailing wages gets a job. Since a BCDRS does not change the age structure of the population, preferences about working versus other options (like leisure, retirement, or being a stay at home parent), or improve the efficiency with which the economy is able to match workers quickly to the jobs they are best suited for, it will have no net impact on the number of jobs in the long run". [20]

This is less a comment on the DRS, and reflects, instead, a particular perspective on labour markets. This view is commonly held by economists, and tends to rest on an assumption of full employment, which is not the situation prevailing today in the UK; the unemployed today might not be especially interested in the assumed capacity of labour markets to adjust over the long-run, and they might be especially scathing of the view that *'everyone who wants work at prevailing wages gets a job'.*

Notwithstanding this view, it seems, on balance, likely that there is a net direct increase in jobs associated with increased recycling occasioned by the DRS. The potential increase in reprocessing jobs as more material is collected through the DRS is discussed below. Overall, there appears to be limited data available on the employment impacts of existing DRSs. We would hope that any future DRS introduction worldwide might consider an *ex-ante* and *ex-poste* assessment to include the number of jobs lost and created as a result of the DRS.

As this section illustrates, most studies that have examined the labour impacts associated with recycling have focused only on the direct impacts, i.e. jobs that would be created in that sector alone. However, the US Recycling Information study also sought to estimate the indirect effects of recycling, i.e. the knock-on effect in stimulating other parts of the economy due to increased spending power resulting from an increase in jobs in the recycling sector.[21]

Table 10 shows the multipliers used for recycling and re-use in the US study relative to those from other industries. It seems likely that consideration of indirect and induced effects might increase the total impact on employment by something of the order of 50 to 100% (and this may still be a conservative estimate). The Beck study suggests the impact on overall economic receipts (as opposed to employment) may be even greater. In order to provide a conservative approach, only the direct labour impacts are quantified in this report. However, the wider indirect effects should also be borne in mind by the reader in analysing the overall labour impacts of the DRS.

[15] *LEPU (2004) Jobs from Recycling: Report on Stage II of the Research, London South Bank University, page 18*

[16] *Waste Watch (1999) Jobs from Waste: Employment Opportunities in Recycling, page 6*

[17] *Cascadia Consulting Group (2009) Recycling and Economic Development: A Review of Existing Literature on Job Creation, Capital Investment and Tax Revenues, page 9*

[18] *LEPU (2004) Jobs from recycling: Report on Stage II of the Research, London South Bank University, page 21*

[19] *Friends of the Earth (2010) More jobs, less waste: Potential for Job Creation through Higher Rates of Recycling in the UK and the EU, September 2010, page 15*

[20] *Economic Analysis Program, Florida Bureau of Economic and Business Research (2011) Analysis of a Florida Beverage Container Deposit Refund System, University of Florida, 15 March 2011, page 15*

[21] *R. W. Beck Inc. (2001) US Recycling Information Study, Final Report to the National Recycling Coalition*

Table 10.
Comparison of Recycling and Re-use Multipliers with Other Industry Multipliers

	Output		Jobs		Personal Income		Value Added	
	Type I	Type II	Type I	Type II	Type I	Type II	Type I	Type II
Recycling and Reuse	1.70	2.36	2.18	3.55	2.33	3.56	2.43	3.82
Agriculture	1.90	2.82	1.51	2.11	2.01	3.29	2.08	3.42
Mining	1.54	2.31	1.97	3.93	1.63	2.66	1.46	2.20
Construction	1.90	3.02	1.84	3.16	1.84	3.01	2.17	3.93
Manufacturing	1.97	2.90	2.65	4.87	2.30	3.78	2.39	4.04
Transportation, Communications, & Utilities	1.56	2.41	1.87	3.54	1.69	2.80	1.55	2.43
Wholesale Trade	1.44	2.41	1.57	2.91	1.44	2.37	1.38	2.26
Retail Trade	1.34	2.37	1.13	1.59	1.24	2.02	1.25	2.08
Financial, Insurance, & Real Estate	1.38	1.98	1.67	3.01	1.57	2.60	1.33	1.83
Services	1.51	2.79	1.31	2.17	1.35	2.21	1.46	2.70
Government	1.14	2.51	1.06	1.88	1.06	1.72	1.08	2.01

Notes

Source: R. W. Beck Inc. (2001) US Recycling Information Study, Final Report to the National Recycling Coalition

Type I = value of direct and indirect transactions relative to direct transactions

Type II = value of direct, indirect and induced transactions relative to direct transactions

4.3 Projected Impact on Reprocessing Jobs

Whilst taking into consideration the limitations of the data as set out in the introduction to this section, several studies can nonetheless be used to make some considered projections about the number of FTEs required to reprocess the extra material generated by a DRS.

We present both a worst-case and best-case scenario in relation to reprocessing jobs, driven by whether or not it can be assumed that the projected number of jobs created in the reprocessing sector happen in the UK or abroad. There is currently a significant amount of reprocessing of UK material that happens both within the UK and in other countries, and it is difficult to predict what the industry's response might be to the extra and higher quality material generated by a DRS. An argument might be made that by increasing the quality of materials collected in the DRS, the jobs created would be more likely to be UK based. However, it might also be argued that these higher quality materials would simply displace other material which is currently being imported for processing, and thus that any jobs created would fall outside the UK. We thus assume that in the worst-case scenario, all the jobs created in the reprocessing industry fall outside the UK, and that the number of reprocessing jobs created in the UK is zero.

In calculating the best-case scenario of the number of jobs that might be derived through increased recycling, the number of FTEs per 1,000 tonnes of glass processing is based on the more conservative UK-wide Waste Watch estimate, rather than the LEPU figure. If it is assumed that 0.3 FTEs are required to process 1,000 tonnes of glass, 126 employees would be required to process the 420,000 extra tonnes of glass generated in the 80% return rate scenario, and 127.5 FTEs would be required to reprocess the 425,000 extra tonnes of glass generated in the 90% return rate scenario.

It should be noted that we have also calculated the total jobs available according to the type of glass; the UK currently exports the majority of its green and brown glass for reprocessing abroad, whilst it imports clear glass. It might therefore be argued that only additional clear glass would be likely to lead to an increase in jobs in the UK (though in turn it might be argued that at least some of the additional tonnage collected would simply offset that which is currently imported). We have estimated that the total upper limit of jobs created in the UK as a result of increased glass recycling would be in the region of 35% of the total projected by Waste Watch. We have also assumed that there would be an increase in processing efficiency over time, and have thus reduced the number of jobs created by an additional 20% to try to account for this. A total of 35 additional FTEs is thus projected as being generated from increased glass recycling from the introduction of the DRS (see Table 11).

The Waste Watch figures also allow us to make some projections in relation to aluminium. Based on a need for 0.5 FTEs per 1,000 tonnes, the 80% return rate scenario would require 32 extra FTEs, and the 90% return rate scenario would require 38 extra FTEs. Again, accounting for a 20% reduction in the requirement for additional FTEs associated with increased processing efficiency over time, the projected increase in FTEs is between 26 to 30, depending on the return rate achieved (see Table 11).

In relation to plastics (although note that PET bottles are not separately identified), the Cascadia study and the Waste Watch study suggest 9.3 and 7 FTEs per 1,000 tonnes respectively. Based on the lower estimate of 7 FTEs per 1,000 tonnes, the extra FTEs required in the 80% scenario would be 1,344; in the 90% scenario, an extra 1,400 FTEs would be required. In assuming that there would be an increase in processing efficiency over time, we have again reduced the number of jobs created by an additional 20%.
The projected increase in jobs associated with plastics reprocessing is thus calculated at between 1,075 and 1,120 FTEs. Figures relating to the number of FTEs required for the processing of steel cans were not available in any of the studies.

The total combined best-case scenario for the number of reprocessing jobs created as a result of the additional material collected through the DRS is between 1,136 and 1,186 FTEs.

Table 11. *Best-Case Scenario Additional FTE Posts Created in the Materials Reprocessing Sector*

			Projected Number FTE Posts Created	
Material	**Data Source**	**Assumptions**	**80% Return Rate**	**90% Return Rate**
Glass	Waste Watch	• 0.3 FTEs/ 1000 tonnes glass • Approx. 35% clear – UK jobs • 20% efficiency saving	35	36
Metals (Al.)	Waste Watch	• 0.5 FTEs/ 1000 tonnes aluminium • 20% efficiency saving	26	30
Plastics	Cascadia and Waste Watch	• 7 FTEs/ 1000 tonnes plastics • 20% efficiency saving	1,075	1,120
All Materials (Best-Case Estimate)			**1,136**	**1,186**

4.4 Job Losses in the Waste Treatment/ Disposal Sector

Although increases in material throughput at reprocessing plants may lead to the creation of jobs in the recycling sector, the diversion of material away from residual waste treatment and disposal facilities will also result in a reduction in the labour required for these facilities. As noted previously, in drawing on data from waste management company ECT (now May Gurney), Waste Watch (1999) reported that for every 10 FTEs employed in recycling, one FTE was lost in disposal.[22] Similarly, the Cascadia report (quoting Goldman/ CIWMB, 2001) suggested that for every 100 jobs created in processing and manufacturing of recyclable materials, 13 jobs were lost in corresponding up and down stream industries.[23] The Cascadia figure is used here to provide a slightly more conservative approach, as it projects a higher number of job losses per recycling job created. Based on the best-case projected increase in reprocessing FTEs (Table 11), the introduction of a DRS would result in a reduction of 148 FTE posts in waste treatment/disposal in the 80% return rate scenario, and a reduction of 154 FTE posts in the 90% scenario.

5.0 ▪ Pulling it all Together

Based on the combination of quantitative and qualitative data from the CBA and wider research, the overall impact of the introduction of a DRS on employment is presented in Table 12 and Table 13 for the 80% and 90% return rate scenarios respectively, and is summarised for both scenarios in Figure 2. Both the worst-case and best-case scenarios are presented for reprocessing jobs, to illustrate their impact on the overall number of FTEs.

If we assume that the reprocessing jobs calculated are UK jobs and are thus included in the overall labour impacts, the effect of the introduction of a DRS in the UK is to lead to a 4,248 to 4,292 increase in FTEs, with a higher net increase in jobs from the 80% compared to the 90% return rate scenario. The 80% return rate results in a smaller reduction in the amount of material needing to be collected through existing kerbside collection services and thus there are a lower number of job losses in those services. Although the DRS itself creates fewer jobs in the 80% return rate scenario, this is not as significant as the reduction in job losses through existing collection services; hence the 80% return rate results in a higher net increase in jobs overall compared to the 90% return rate scenario.

Even without the inclusion of any FTE posts from reprocessing, there remains an overall increase in FTEs ranging from 3,062 to 3,156 for the 90% and 80% return rate scenarios respectively. The majority of jobs created are at a similar skill level to the existing jobs, though there is perhaps a slight increase in the total number of higher skilled jobs. One hundred jobs are created in the central system in database/accounting work, modelled at a higher wage (£37.5k average) and as a desk-based job rather than a front-line collection services job. Between 353 to 393 higher-paid maintenance/engineering jobs are modelled as being required for the counting centres. In contrast, there is only a 64 to 78 FTE reduction in the number of higher-paid supervisor staff from the existing collection services.

[22] *Waste Watch (1999) Jobs from Waste: Employment Opportunities in Recycling, page 6*

[23] *Cascadia Consulting Group (2009) Recycling and Economic Development: A Review of Existing Literature on Job Creation, Capital Investment and Tax Revenues, page 9*


JCB
JCB


JCB
JCB
JCB

Table 12. *Overall Number of FTEs from Introduction of DRS – 80% Return Rate*

Area	Change in Number FTEs	Split Where Different Job Types
Existing Services		
Household Kerbside	-1,183	-54 supervisors -376 drivers -753 loaders
Bring Site/HWRCs	-74	-49 drivers -25 loaders
Commercial Collections	-210	-10 supervisors -133 drivers -67 loaders
Litter/ Street Sweeping	-688	-
DRS		
Retailer	1,546	-
Central System	120	100 database/accounting 20 customer services
Producer	0	-
Collection/ Transport	2,230	-
Counting Centres	1,562	355 maintenance 1,207 operating
Reprocessors *	0 to 1,136	
Waste Treatment/Disposal	-148	
TOTAL	**3,156 to 4,292**	

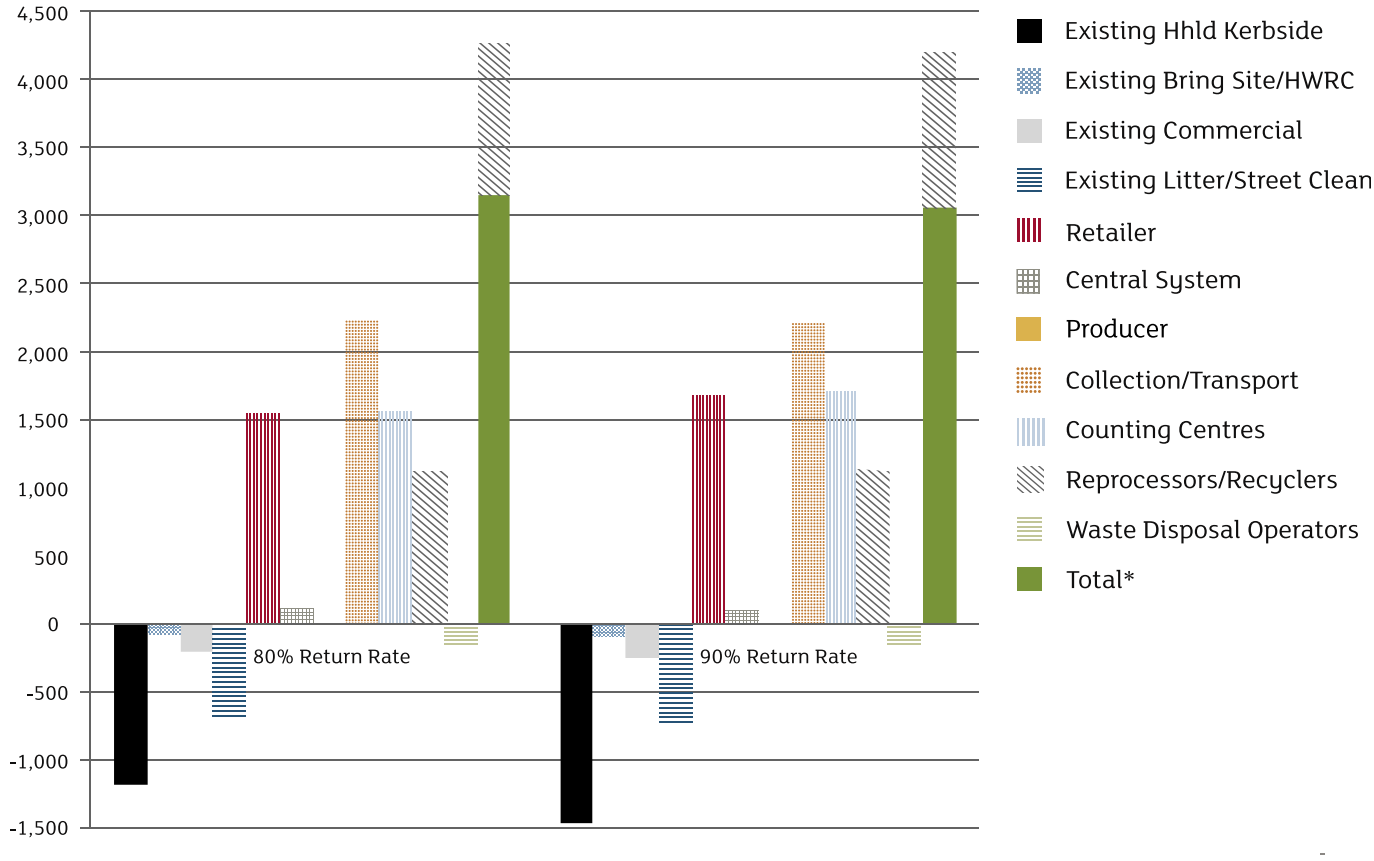
Notes
*Worst and best-case scenarios shown to illustrate the impact on the overall number of FTEs with and without the inclusion of reprocessing jobs

Table 13. *Overall Number of FTEs from Introduction of DRS – 90% Return Rate*

Area	Change in Number FTEs	Split Where Different Job Types
Existing Services		
Household Kerbside	-1,460	-66 supervisors -464 drivers -929 loaders
Bring Site/HWRCs	-90	-60 drivers -30 loaders
Commercial Collections	-258	-12 supervisors -164 drivers -82 loaders
Litter/ Street Sweeping	-724	-
DRS		
Retailer	1,672	-
Central System	120	100 database/accounting 20 customer services
Producer	0	-
Collection/ Transport	2,230	-
Counting Centres	1,726	393 maintenance 1,333 operating
Reprocessors *	0 to 1,186	
Waste Treatment/Disposal	-154	
TOTAL	**3,062 to 4,248**	

Notes
*Worst and best-case scenarios shown to illustrate the impact on the overall number of FTEs with and without the inclusion of reprocessing jobs

Figure 2. Overall Impact of the Introduction of a DRS on Employment (Number of Full-Time Equivalents)



** Note the solid total bar illustrates the total FTEs without any job creation in the UK reprocessing sector. The shaded part of the bar illustrates the additional FTE posts that would be created if we assume all new reprocessing jobs are created in the UK.*

It is difficult to draw any conclusions as to the potential location of the jobs that would be created compared to those reduced in the existing services. The DRS model is based on a relatively decentralised system, with, for example, a significant number of counting centres located reasonably locally in order to optimise logistics. A significant number of regional jobs would also be created in the retail sector and in the collection and transport logistics required for pick-ups from the retailers. The reduction in jobs in the existing services would also be spread across the UK.

The central system may, however, be in only one or several locations across the UK. Given the desk-based jobs, the central system team might be located anywhere in the UK, and could be targeted to a higher unemployment area. The team would be likely to benefit further financially from co-locating with one of the 100 larger counting centres due to shared overheads. Reprocessing jobs would be likely to be focused in a small number of locations, either near to or at existing reprocessing sites, or new manufacturing plants.

It is also worth noting that the introduction of a DRS may provide opportunities for the voluntary sector to become more involved in the delivery of the service.

In discussion with Anker-Andersen, for example, it was noted that individuals with disabilities formed part of the counting centre teams in Iceland, providing employment in a supportive controlled environment. Some of the job opportunities from the DRS may be targeted by schemes looking to get people back into employment or to employ individuals with disabilities. Although a sensitive topic, some might argue that these jobs would be paid at a lower rate (reflecting a lower skill level) than has been assumed in the labour impacts presented here. However, it might also be argued that if this were the case, we would have needed to model either a reduction in the costs (due to lower salaries) or an increase in the benefits of the DRS associated with a saving on public sector commitment regarding social support mechanisms. Thus the projected costs of the DRS would have been lower than those that have been modelled in the *Have We Got The Bottle?* study.

The reduction in jobs from existing collection services would be primarily in the private and public sectors. It would be likely that there would be more private sector involvement in the delivery of the DRS, with the responsibility taken away from the public sector that no longer has to collect as much of this material at the kerbside.

6.0 ▪ Conclusions

This report has examined the impacts of introducing a DRS on the number and type of jobs involved in the collection and processing of beverage containers. From the combination of existing modelling and further research, the overall effect of the introduction of a DRS in the UK is predicted to lead to an increase in the number of jobs available by between 3,000 and 4,300 FTEs, depending on whether or not reprocessing jobs are included, as well as resulting in an overall increase in the number of higher-skilled jobs.

The introduction of a DRS will therefore lead to an increase in green economy-based jobs.


N643
AAL

From waste to work: the potential of a deposit refund system to create jobs in the UK investigates the labour impacts of introducing a UK-wide deposit refund system for beverage containers across a number of related sectors. The report specifically examines the number of jobs that could be lost and gained, what types of jobs these would be and where these jobs could be located.

STOP the DROP
LITTER & FLY-TIPPING

CPRE
Campaign to Protect Rural England
Standing up for your countryside

eunomia
research & consulting