



# Investigating the Impact of Recycling Incentive Schemes

Full Report

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*About Serco*

Serco is a UK owned and based FTSE250 company. We work as a service partner and provider to Local Government delivering high performing public services helping them to improve efficiency, lower costs and deliver transformational change.

*About Eunomia*

Eunomia is an influential UK-based environmental consultancy with a focus on waste and energy issues. We provide advice and support to public and private sector clients, including helping local authorities to design, commission and manage high-performing waste collection services.

*Acknowledgements*

This research relied on time and data from officers from local authorities and key individuals from private sector organisations. Thank you for your assistance with this research.

*Disclaimer*

Eunomia Research & Consulting has taken due care in the preparation of this report to ensure that all facts and analysis presented are as accurate as possible within the scope of the project. However no guarantee is provided in respect of the information presented, and Eunomia Research & Consulting is not responsible for decisions or actions taken on the basis of the content of this report.



## Forward by Serco

This piece of work was commissioned by Serco for our customers and colleagues in Local Government. It is testament to their thirst for knowledge, professionalism and commitment that we decided to embark on this journey over 12 months ago.

The current financial climate for Local Government is challenging. And within this backdrop Local Government both wants and needs the information and evidence base to make good decisions.

With their £2m investment in the Reward and Recognition (R&R) fund the Government has provided funding for those authorities seeking to invest in and make the case for recycling incentives.

There has to date been no proper examination or scrutiny of their performance, nor debate as to their ability to contribute towards our local and national recycling goals.

Serco has no vested interests in the incentive schemes debate. We are not pro or anti and nor do we seek to support, judge or criticise government policy.

As a waste and streetscene services partner we share a common optimism with and support Local Authorities up and down the country who are investing in recycling incentives as a means to drive up recycling rates.

With the academic rigour and analysis of Eunomia and support from both CWM and Defra in this report we seek to make sense of a complex picture in an objective, honest and transparent way.

This work sets out to answer some very simple questions. For the first time combining the evaluation of scheme impacts with public opinion data from Serco's own public consultation programmes. The work also goes beyond these shores drawing on a broader body of learning and evidence about what does and doesn't work elsewhere.

With this new report we are taking important 'first steps' in understanding the impacts of UK recycling incentive schemes.

We very much hope it is useful to all those in Local Government with whom we work and share a common commitment to furthering our collective knowledge and to making better and more informed decisions.



Mike Boulton  
Managing Director  
Serco Direct Services



Robin Davies  
Development Director  
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## Forward by CIWM

CIWM welcomes this piece of research commissioned by SERCO and undertaken by Eunomia, it is both timely and topical.

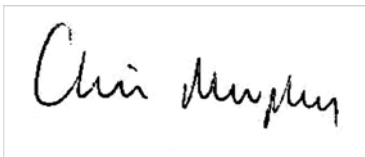
As pressures build on Local Government to deliver ever more demanding targets against a backdrop of reducing budgets and austerity agendas this work will provide a valuable contribution to the discussion of opportunities to meet those two demands.

Government are looking for Councils to develop and implement incentives to encourage behaviour change particularly in the waste and recycling sectors. There are good examples and case studies of how this can be achieved, many of which are reviewed in this document.

In order to implement such initiatives Local Authorities need to understand the cost, impacts and benefits of incentives. The evaluation, analysis and results contained here will make a valuable contribution to the debate and go a long way to filling the information vacuum.

There is much for us to learn about incentives in this sector and at present we are only scratching the surface. We need objective reports like this to inform decision makers so that they can see the options and decide what is right for their residents and their particular circumstances.

I look forward to this piece of work having a significant effect on how we view and implement incentives in the future.



Deputy Chief Executive

Chartered Institution of Wastes Management



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# 1.0 Introduction

Over the last 15 years there has been a massive investment in the waste and recycling collection services provided to householders and for many years the national household waste recycling rate improved consistently. In the last year, however, recycling performance has plateaued. With landfill tax continuing to rise and with authorities under ever tighter cost pressures, there's a greater need than ever to understand how to maximise the performance of the collection systems that we currently have.

It is timely therefore to look at the various available incentives that exist to promote better recycling performance and to evaluate the contribution that they might make.

Financial incentives fall broadly into two categories:

1. **Rewards** or payments made to encourage people to recycle more (or dispose of less). These rewards take various forms and are structured in different ways. Typically:
  - a. vouchers can be given directly to a householder in respect of their recycling performance (or reduced generation of residual waste);
  - b. rewards can be returned to the whole community in return for the aggregate recycling performance of the residents within that community. Rewards might for example take the form of additional school or playground equipment; and
  - c. vouchers or deposits can be paid to individuals putting recyclable material – typically packaging material – into a Reverse Vending Machine or via a manual take-back system.
2. **Charges** for the disposal of residual waste based on either the volume, weight or collection frequency of the waste are also widely used to incentivise better recycling performance (although not in the UK).

This report seeks to consider both types.

## 1.1 Context: A Short History of Recycling Incentives in the UK

Rewards and charges have both been considered in the UK over many years.

In 2001 the GLA piloted reward schemes and in 2002 The Mayor's Waste Strategy for London<sup>1</sup>, recommended that “financial rewards should be used to increase participation [in recycling schemes]”. The Strategy also spoke in favourable terms about the potential use of charges.

In 2002 the Cabinet Office Strategy Unit produced an influential report ‘Waste not, Want not’ looking at UK waste management and recommended (amongst much else) that local authorities should be given the power to take forward household incentive and charging schemes.<sup>2</sup> Interestingly this report also suggested reviewing “[...] new measures to encourage reuse, such as deposit-refund schemes and designing civic amenity sites for re-use.”

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<sup>1</sup> Greater London Authority (2003) *Rethinking rubbish in London: the Mayor's municipal waste management strategy*, 2003, [http://legacy.london.gov.uk/mayor/strategies/waste/docs/wastestrat\\_all.pdf](http://legacy.london.gov.uk/mayor/strategies/waste/docs/wastestrat_all.pdf)

<sup>2</sup> Strategy Unit (2002) *Waste Not, Want Not: A Strategy for Tackling the Waste Problem in England*, December 2002

Defra issued a formal response to the Strategy Unit in March 2003 which was non-committal but recognised that incentives, both rewards and charges, might have a place within the policy framework.<sup>3</sup>

In 2005 a Eunomia report to Defra looked at existing UK reward schemes<sup>4</sup> and later that year Defra announced a fund to support local authorities to pilot reward schemes. AEA Technology produced a post-trial evaluation report in 2006 which was inconclusive regarding the benefits of this type of scheme.<sup>5</sup>

By 2007 the debate had moved on and the sector – industry, local government and central government - was increasingly coming to the view that Pay As You Throw (PAYT) offered the best prospect of cost-effectively incentivising residents to reduce their set-out of residual waste and increase recycling. Defra's Waste Strategy for England 2007<sup>6</sup> noted that the LGA and the Lyons Inquiry<sup>7</sup> had both called for the introduction of variable charging for residual waste, with residents paying on the basis of the quantity of waste that they set-out.

Waste Strategy 2007 went on to set out the government's intention "to legislate to remove the ban on local authorities introducing [...] financial incentives for waste prevention and recycling." Defra was clear that any such schemes should be 'revenue neutral' and not result in a higher total tax take.

In 2008 The Climate Change Act made amendments to the Environmental Protection Act 1990, allowing for pilot schemes to be set-up in five areas<sup>8</sup> but by this time the policy debate had become a public debate and the tenor of this debate had become hostile to the introduction of charges.

During 2007 and 2008 a series of articles had appeared in both the Telegraph and Daily Mail, quoting the then shadow local government minister Eric Pickles, and which were critical of local waste collection services and policies. In these articles, the shadow minister expressed concerns regarding 'unfair bin fins', reduced frequency refuse collection and the possibility of new 'bin taxes'.

In 2008 the New Local Government Network (NLGN) published a report "Time to Waste" which discussed incentives and recommended that community-based rewards should be adopted.<sup>9</sup> In a press release launching the report Chris Leslie, Director of the NLGN, talked of wanting to see households being given positive incentives rather than being "persecuted by

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<sup>3</sup> DEFRA (2003) *Government response to Strategy Unit report 'Waste not, Want not'*, [http://archive.defra.gov.uk/environment/waste/strategy/review/documents/strategyunit\\_response.pdf](http://archive.defra.gov.uk/environment/waste/strategy/review/documents/strategyunit_response.pdf)

<sup>4</sup> Eunomia (2005) Household Waste Incentive Schemes: Case Study Report for Defra, March 2005.

<sup>5</sup> AEAT (2006) Evaluation of the Household Waste Incentives Pilot Scheme, Final Report to Defra (Waste Strategy Division), July 2006.

<sup>6</sup> DEFRA (2007) *Waste Strategy for England 2007* <http://archive.defra.gov.uk/environment/waste/strategy/strategy07/documents/waste07-strategy.pdf>

<sup>7</sup> The Lyons Inquiry was set up at the request of the Chancellor and the Deputy Prime Minister in 2004 to review the functions and funding of Local Government. Relevant documents and reports can be accessed at: <http://www.lyonsinquiry.org.uk/>

<sup>8</sup> Climate Change Act 2008, sections 71 – 75, [http://www.legislation.gov.uk/ukpga/2008/27/pdfs/ukpga\\_20080027\\_en.pdf](http://www.legislation.gov.uk/ukpga/2008/27/pdfs/ukpga_20080027_en.pdf)

<sup>9</sup> New Local Government Network (2008) Time to Waste: Tackling the landfill challenge, May 2008, <http://www.nlgn.org.uk/public/wp-content/uploads/time-to-waste.pdf>

individual fines”. Chris Leslie was previously Gordon Brown’s campaign manager when the Labour party elected him as leader, and therefore Prime Minister, in 2007.

Where very recently there had been a balanced and evidence-based policy debate regarding the benefits of charging for residual waste, now the option was being roundly criticised in populist terms and without reference to the evidence from politicians of both major parties.

Without national political support and under threat of criticism from the national press, no Local Authority applied to set-up a pilot charging scheme under the Climate Change Act, although only a year earlier the LGA had been calling for local government to have this right.

The Localism Act 2012 subsequently revoked the relevant clauses of the Climate Change Act and the opportunity to introduce charge-based incentives was withdrawn.

Throughout this ongoing debate around PAYT, deposit-refund systems received very little public and political attention and have acquired a relatively neutral political opinion. Having been mentioned in the influential report ‘Waste not, Want not’ as an alternative incentive to encourage reuse, some further research was undertaken. However, the political view had changed very little when this message was restated in the Defra Packaging Strategy of 2009.<sup>10</sup>

Since then, Eunomia’s research for the Campaign for Protection of Rural England (CPRE) on the costs and benefits of such schemes was launched in 2011, and whilst this has not led to any direct action in England, Scotland have recently (February 2013) seen the launch of several trial schemes to test how container deposits and reverse vending systems may work in the Scottish context.

Meanwhile, following in the footsteps of Ken Livingstone’s scheme of a decade earlier, the new government, elected in 2010 and the Communities and Local Government Minister Eric Pickles had committed themselves to the principle of reward-based schemes. In 2011 Defra’s Reward and Recognition Fund was launched to pilot the impact of reward schemes on public participation in recycling services and waste and recycling arisings.

## 1.2 Scope

The performance of authorities who have received funding under the Defra Reward and Recognition Fund is being studied by Brook Lyndhurst under contract to Defra and an interim report was published in December 2013<sup>11</sup>. There is no further need for us to look at those authorities or their schemes here.

Instead, this report aims to complement the work of the Brook Lyndhurst study and consider the performance of reward schemes which have not been Defra-funded. The intention is that the Brook Lyndhurst report for Defra and this report for Serco, taken together, will look at all schemes, both within and without the Defra scheme, to provide the best possible picture of the cost and environmental performance of *all* current recycling reward schemes. To this end, we have collaborated with Brook Lyndhurst (with Defra’s knowledge and approval) to

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<sup>10</sup> Defra (2009) Making the Most of Packaging: A Strategy for a Low-carbon Economy, June 2009

<sup>11</sup> Defra (2013) Evaluation of the Waste Reward and Recognition Fund EV0530, Report to Defra by Brook Lyndhurst, Published December 2013. Available from: <http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=0&ProjectID=17989>

ensure that the methodology used for scheme evaluation for this report aligns with that used by Brook Lyndhurst.

As well as looking at current trials and schemes, we review the literature to draw on lessons from previous trials. We hope, therefore, after 12 years of incentive scheme trials to be able to provide the most definitive possible review of the schemes’ efficacy, their cost-benefit and to be able to identify the success factors.

As well as household reward schemes, we also look at:

- The performance of Deposit Refund Schemes;
- The evidence for the success of Charging or Pay As You Throw taken from other countries; and
- Certain other options for incentivising better recycling and lower residual waste generation, both financial and practical, which *are* (or which may be) available under current UK law.

## 2.0 Structure

This section provides an overview of the report structure.

Table 1: Structure

Summary	
<b>Section 3.0: UK Reward Schemes</b>	
Section 3.2	Literature review covering UK reward schemes and international reward scheme experience
Section 3.4	The first phase of the research involved defining which schemes were within scope. It had already been decided that Defra Reward and Recognition Funded schemes were outside scope. This section Summarises and describes those UK reward schemes within scope of the research
Section 3.5	Data analysis was undertaken to respond to the following research questions: <ul style="list-style-type: none"> <li>➤ What is Residents’ Perceived Impact of UK Reward Schemes?</li> <li>➤ What’s the Likely Impact on Landfill Diversion and Recycling Tonnage?</li> <li>➤ Which Scheme Types are Most Effective?</li> <li>➤ Are Reward Schemes Good Value for Money?</li> <li>➤ How do Recycling Incentive Schemes Impact on Contamination?</li> </ul>
<b>Section 4.0: Deposit-refund systems</b>	
This section reviews international experience of deposit-refund systems. Data set obtained was critically reviewed before being compiled for analysis. Where possible, the international literature review sought to cover the following areas: <ul style="list-style-type: none"> <li>➤ Scheme information;</li> <li>➤ Effects on recycling;</li> <li>➤ Knock-on impacts;</li> <li>➤ Costs of implementation;</li> <li>➤ Cost-savings.</li> </ul>	
<b>Section 5.0: Pay as you throw</b>	
This section reviews international experience of pay as you throw systems covering the same areas as noted above in Section 4.0.	

## Section 6.0: 'Pay as you throw' in the UK

This sections sets out a new area of research leading to the development of an alternative kerbside collection system approach.

## Section 7.0: Conclusions

# 3.0 UK Reward Schemes

## 3.1 UK Context

As described in Section 1.0, there has been a supportive political climate for reward schemes in the UK over the last decade, with trials having been run in 2006 and now ongoing trials which are currently being reported alongside this study. This keen interest has led to there being several key reports exploring the impacts of financial recycling rewards in the UK context. With regards to investigating the impact of such schemes, the conclusions tend to paint the same picture; rewards *can* be a useful tool to authorities that wish to enhance the performance of their waste collection service, increase participation in recycling, increase recycling tonnages collected or reduce residual waste. However, the lack of data required to clearly demonstrate potential impacts means that significant conclusions regarding the impact of recycling reward schemes in the UK cannot be made. To some degree, this questions the strength of the political support which rewards have received, and are currently receiving.

Further afield there is evidence associated with reward scheme implementation which is covered below in Section 3.3.

## 3.2 UK: Review of Current Literature

Throughout the last decade or so, recycling reward schemes have been the focus of several key reports, which examine a range of different types of rewards and assess their strengths and weaknesses.

AEAT undertook desk based research and market testing in their 2003 report to the Scottish Executive, in order to determine specific recommendations for the implementation of recycling reward schemes in Scotland.<sup>12</sup> A range of rewards were researched encompassing voluntary and financial schemes, considering both 'stick' and 'carrot' type rewards. Through researching a number of case studies, the report identified several core themes central to implementing recycling reward schemes:

- **Lifestyle attribute:** reward schemes need to appeal to the wider lifestyle attributes of the target audience, e.g. attitudes, opinions and interests beyond waste issues;
- **Infrastructure:** reward schemes need to have the appropriate facilities and support mechanism in place e.g. collection scheme, bring sites and recycling centres. In addition, clear 'how to' information needs to be provided;
- **Stakeholders:** use of stakeholders will help provide endorsement, extend the reward scheme reach and maintain momentum; and

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<sup>12</sup> AEAT (2003) *Incentives for Householders to Change their Waste Practices*, Final Report produced for the Scottish Executive, May 2003.

- **Voluntary action:** positive feedback provided on consequences of action serves to encourage further commitment rather than use of fiscal reward which were not universally accepted.

Whilst the outcome of this research focused on developing a strategic framework and action plan for local authorities to use when implementing a reward scheme, the core themes identified are still relevant to bear in mind when considering the impact and effectiveness of recycling reward schemes.

In 2005 Eunomia undertook a study for Defra, reporting on the implementation of household waste incentive schemes.<sup>13</sup> The aim of the report was to shed more light on the application of specific incentive schemes for household waste. On the basis of case studies, the report provided an assessment of the success criteria, including the risks and drawbacks associated with incentive schemes, and how these can be mitigated, in addition to the circumstances in which local authorities might wish to use different types of schemes. Each detailed case study considered the following factors: scheme design, effects of the scheme, costs and revenues, key successes and limiting factors.

Overall conclusions included:

- The voluntary incentive schemes appear to be a good technique for raising awareness of recycling activities but do little in themselves to improve performance through the incentive offered. They can be useful to promote new recycling services yet since the incentive is of minor consequence to most residents, it should be appreciated that the incentive is merely an awareness raising device and the cost of these promotions have to be carefully minded; and
- People seem to be more responsive to schemes where they strive to keep the money already in their pocket rather than attempting to win some cash reward (for themselves or a charitable cause). Hence financial penalty schemes are likely to have greater effect than financial incentive schemes.

Another report by AEAT, produced in 2006, evaluates the household waste incentive pilot scheme implemented by Defra during 2005/06.<sup>14</sup> Key findings of significant importance were identified, including:

- The actual costs of offering a financial incentive are relatively low compared to the comparative costs of promotion, monitoring and evaluation;
- The majority (81%) of trials reviewed had a positive, attributable impact in raising awareness through offering an incentive. Creating an awareness of the incentive being offered is clearly vital to achieving a motivation to action in the target audience and generating a tangible improvement in performance;
- Just over half (57%) of pilot trials had a positive, attributable impact increasing the tonnage of recyclables collected. The magnitude of these impacts however varied widely from small trials that yielded a few tonnes of additional recyclables or

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<sup>13</sup> Eunomia (2005) *Household Waste Incentive Schemes: Case Study Report for Defra*, March 2005.

<sup>14</sup> AEAT (2006) *Evaluation of the Household Waste Incentives Pilot Scheme*, Final Report to Defra (Waste Strategy Division), July 2006.

compostables, to those that helped achieve increases of around 15% to recycle tonnages collection across a complete collection authority;

- Difficulties in eliminating the potential impacts of largely uncontrollable, external factors have caused a significant degree of difficulty in being able to accurately determine the specific impacts directly attributable to the offer of an incentive.

The report concludes that incentives can be a useful tool for authorities that wish to enhance the performance of their waste collection service. With regards to local authorities wishing to implement a recycling incentive scheme, the report advises that there is no 'one size fits all' ideal solution; the authority must first and foremost consider the barriers to recycling that it needs to address. The best solution may actually be to introduce a service or infrastructure change, rather than offering an incentive alone. The study states that incentives should be seen as a means of maximising the efficiency of the waste management infrastructure and service provision that is already available to householders.

A significant point made by the AEAT 2006 report is that the assessment of the trials suggests that the critical success factors to achieving an impact from an incentive scheme are those associated with the actual management of the scheme (including stakeholder commitment, ownership, finance, project management and communications), rather than 'environmental' or situational factors, such as geographical location, local index of deprivation or existing recycling rates. The data from the pilot programme did not demonstrate a direct correlation between the degree of impact of the trials and these latter factors.

The most recent report in the public domain featuring financial incentives was published by the London Councils in 2012.<sup>15</sup> This report identifies best practice case studies '*helping London recycle more*', however the content is more informative than analytical of the impact associated with each scheme identified.

The London Assembly published the findings from the Environment Committee inquiry in May 2011, which investigated the value of financial incentive schemes in boosting recycling rates in London.<sup>16</sup> This report evaluates the merits of the Recyclebank model of rewarding recycling using four key indicators (impact on recycling rates, costs, public perception and tackling London specific challenges). In spite of the specific geographical focus of this report, it provides useful information on the subject of incentives.

The evidence for the London Assembly report shows that compulsory and reward-based schemes have helped boost recycling rates. However the report acknowledges that the schemes were introduced alongside service changes and a detailed communications strategy. Therefore, untangling the impact of the different components of the scheme is challenging. This limitation in the data, along with time restrictions on available data for reward-based schemes, makes it difficult to understand the true impact of the schemes on recycling performance and behavioural attitudes.

In conclusion to the report, the Environment Committee questions whether the focus on re-incentivising individual to recycle is appropriate. From the evidence received, the Committee concludes that it may be more appropriate to provide continuous education and communication to residents. This can help with maintaining momentum and individual

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<sup>15</sup> London Councils (2012) *Helping London Recycle More: Best Practice Case Studies*, May 2012.

<sup>16</sup> London Assembly Environment Committee (2011) *Carrots and Sticks: A review of waste financial reward and compulsory recycling schemes*, May 2011.

interest in recycling and other forms of sustainable waste management, the ultimate aim being to minimise waste. One of the Committee's concluding comments is that in the longer term further investigation should be undertaken into how individuals might be incentivised to reduce the amount of waste they produce.

### 3.3 International: Review of Current Literature

Recyclebank<sup>17</sup> run a major incentive scheme in the US and although primarily a waste minimisation organisation also provide incentives encouraging behaviour change across a range of environmental issues, such as energy, water and consumer habits. After registering with Recyclebank, account holders can earn points which can be exchanged for offers and discounts across a variety of products, including food, books and magazines, travel vouchers, and beauty products from over 3,000 local and national businesses. It is typical for householder to pay a monthly fee under this scheme in the US.

The scheme operates on a dual basis of incentivising and educating, as users can earn smaller numbers of points from engaging in short informative online courses or quizzes, as well as earning larger numbers of points by engaging in longer term activities such as recording their recycling behaviour. Points are also granted for simply pledging to make behaviour changes, with the educational materials serving to offer support in this regard.

In terms of incentives to kerbside recycling, the Home Recycling Scheme is Recyclebank's leading incentive. Through this scheme, recycling rates are monitored through tonnage measurements provided by communities or haulers, with collective weights then being converted to points and shared between those recycling in the community. Residents can report to Recyclebank either online or via telephone.

Recyclebank has been reported (in 2011) to run rewards for recycling programs in up to 30 U.S. states.<sup>18</sup> Recent media coverage (since early 2013) has presented a picture of decline in this market with Houston, Knoxville, Oak Ridge, Alcoa and Cincinnati all being known to have pulled out of the scheme. Conversely, a study undertaken in the US in 2006 found that more than 7,100 communities have PAYT in place and some, but 'very few', have cancelled the PAYT schemes.<sup>19</sup>

The media coverage of this is varied in level of detail and difficult to scrutinise for accuracy. A summary of the coverage is shown below in Table 2. In two instances part of the reason for the decision was associated with the change in the Recyclebank policy which was moving from an individual household incentive to a community wide incentive. The financial saving associated with stopping the scheme was also a theme, with savings being typically directed towards either improving the current service or making the service more widely available. In one instance a City official mentioned their lack of belief in the impact the system is having and in other City an official cited their disappointment with levels of participation.

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<sup>17</sup> <https://www.recyclebank.com>

<sup>18</sup> <http://3blmedia.com/theCSRfeed/Goodwill-Industries%C2%AE-Houston-Partners-Recyclebank-Offer-Discounts-Donors>

<sup>19</sup> Skumatz, L, Freeman, D.J., D'Souza, D. & Bement, D. (2011) *Recycling Incentives: Part 2*, Published in Resource Recycling, March 2011.

Table 2: US Cities Stopping the Recyclebank Scheme

City	Annual Cost	Cost per Household per Year	Participation	Reason for Discontinuing Scheme
Knoxville <sup>20</sup>	\$90k	\$4.50	10,000 out of 20,000 (50%) households signed up. ~3,000 utilised the scheme	<ul style="list-style-type: none"> <li>➤ move from an individual household reward to a community-based rewards' program.</li> <li>➤ City official opinion that the scheme is not making an impact.</li> </ul>
Houston <sup>21</sup>	\$567k	\$5.40	35,000 out of 105,000 (33%) households signed up.	<ul style="list-style-type: none"> <li>➤ To use money saved to expand current collection service.</li> </ul>
Oak Ridge <sup>22</sup>	\$124k			
Alcoa <sup>23</sup>				<ul style="list-style-type: none"> <li>➤ move from an individual household reward to a community-based rewards' program.</li> <li>➤ Resident survey results showed support for discontinuation of scheme.</li> </ul>
Cincinnati <sup>24</sup>				<ul style="list-style-type: none"> <li>➤ City officials say participation rates were disappointing</li> </ul>

AUS study<sup>25</sup> comparing the cost and tonnage impact of recycling incentives, including PAYT, recycling credits and Recyclebank reward schemes concludes: “Initial information – which would certainly benefit from having data available from more Recyclebank communities that

<sup>20</sup> <http://www.knoxnews.com/news/2013/apr/24/city-announces-end-to-recycling-incentive/?print=1>

<sup>21</sup> <http://resource-recycling.com/node/3903>

<sup>22</sup> <http://www.knoxnews.com/news/2013/apr/24/city-announces-end-to-recycling-incentive/?print=1>

<sup>23</sup> <http://www.knoxviews.com/node/20046>

<sup>24</sup> <http://wvxu.org/post/cincinnati-ends-recyclebank-program>

<sup>25</sup> Skumatz, L., Freeman, D.J., D'Souza, D. & Bement, D. (2011) *Recycling Incentives: Part 1 & 2*, Published in Resource Recycling, March & April 2011.

could be analysed by third parties – indicates that costs per ton are considerably higher for the RB [Recyclebank] programme than for either PAYT or recycling credit programs”.

Insufficient data is made available via this study in order to fully scrutinise this analysis, and there are some concerns with the detail of the approach but this unlikely to impact on this general overall message.

The cost data included in this study for Recyclebank schemes was hard to access and highly variable due to the range of cost options and levels of service offered by Recyclebank. It is useful to note the following variation that was recorded in this study.

“Arrangements for payment can vary based on whether RB retains the value of recyclables, or shares landfill savings. We identified a few pilot programs that were run with no payments to RB; other communities paid between \$0.30 and \$2 per household, per month for the more limited package, and others paid \$3-4 per household, per month total for packages with additional services. These costs are passed through to the households in one form or another. In some locations, RB appears to have arranged for more complicated deals that include shared savings from reduced disposal tip fee payments, arrangements on material value, or other contract provisions. Contracts seem to range from three, five and even ten years in length. Several communities have deals solely based on shared landfill savings, with the share going to Recyclebank decreasing over time in some cases. In one the shared savings (50%) kick in if baseline tons of recycling are exceeded; in another, it appears to be based on a landfill baseline (which could potentially invoke with a recession). We have seen five-to-seven year contracts in these cases. In another example, the community may exit the contract after one year but must pay off the bins.”

Two really interesting points were noted in this research favour of Recyclebank schemes. Firstly, Recyclebank’s ability to make recycling “exciting and appealing to residents that might otherwise not want to recycle”. Secondly, the alternative of PAYT “seems to take the highest degree of political will to implement initially, compared to other programs”. Further examples of international reward schemes are described in Appendix A1.0.

### 3.4 Schemes within Scope

The first phase of the research involved defining which schemes were within scope. It had already been decided that Defra Reward and Recognition Funded (RRF) schemes were outside scope. The long list of schemes that were shortlisted is presented in Appendix A3.0, with the final short-listed schemes presented in the following sections. Additional detail about these schemes is shown in Appendix A3.2. Schemes removed from the long list were done so for the following reasons:

- The scheme has recently been rolled-out or not yet implemented, therefore it is too early for data to have been collated;
- The scheme was run several years ago, key contacts or data no longer exist;
- Due to timing of the research, the authority was unable to participate in the research.

### 3.4.1 London Borough of Bexley

Table 3: Scheme Details Summary - London Borough of Bexley

Key Information	Scheme Details
Timescale	September 2011 - present (ongoing)
Scheme aim (behavioural focus)	To incentivise residents to reduce the amount of rubbish they send for disposal by reducing, reusing and recycling their waste
Reward type and distribution	Points for individuals or local charities
Reward value	400 Green Points are equivalent to £1
Target audience	Households
Participation in scheme	20%
Geographical coverage	18,000 flats out of 91,000 households
Collection system	Communal bins
Frequency of collection	Weekly
Key participating organisations	Green Rewards, LWARB, Serco, Gallions Housing Association, Trust Thamesmead, Furniture Bank, EnviroComms, Resource Waste Advisory Group

### 3.4.2 Sandwell Metropolitan Borough Council

Table 4: Scheme Details Summary - Sandwell Metropolitan Borough Council

Key Information	Scheme Details
Timescale	April 2013 - April 2015
Scheme aim (behavioural focus)	Increase recycling rates
Reward type and distribution	Cash for community groups and schools
Reward value	Up to £2,000 per community group or school
Target audience	Households and community groups / schools
Participation in scheme	30 community groups registered
Geographical coverage	120,000 households (whole borough)
Collection system	Kerbside collection, wheeled bins
Frequency of collection	Residual and recycling weekly, garden fortnightly

Key participating organisations	Serco, Sandwell MBC
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### 3.4.3 London Borough of Ealing

Table 5: Scheme Details Summary - London Borough of Ealing

Key Information	Scheme Details
Timescale	November 2010 - May 2011
Scheme aim (behavioural focus)	To encourage changes in resident behaviour, in order to increase the amount of materials recycled and to divert more waste from landfill
Reward type and distribution	Cash for best performing and most improved wards (recycling participation rates)
Reward value	£20,000 each for four wards: the best performing ward and the three most improved wards (in terms of recycling participation rates)
Target audience	Households and the wider community
Participation in scheme	66%
Geographical coverage	127,000 households (whole borough)
Collection system	Kerbside collection and communal bins
Frequency of collection	Weekly
Key participating organisations	London Borough of Ealing

### 3.4.4 Calderdale Council

Table 6: Scheme Details Summary - Calderdale Council

Key Information	Scheme Details
Timescale	June - August 2007
Scheme aim (behavioural focus)	To drive an increase in recycling participation in the Mixenden and Ovenden wards
Reward type and distribution	For households: prize draw every week For the community: cash prize at the end of the scheme For the collection crew: cash prize at the end of the scheme

Reward value	Households: £100 prize draw Community: £2,000 first prize, £1,000 second prize Collection crew: £100 prize
Target audience	Community and households
Participation in scheme	Unknown
Geographical coverage	Approximately 10,000 households
Collection system	Kerbside
Frequency of collection	Weekly
Key participating organisations	Calderdale Council, A&P

### 3.4.5 Recyclebank Schemes

Table 7: Scheme Details Summary - London Borough of Lambeth

Key Information	Scheme Details
Timescale	May 2011 - present (ongoing)
Scheme aim (behavioural focus)	Increase awareness of recycling in multi-occupancy dwellings or flats where residents do not have their own recycling bin
Reward type and distribution	Points to convert into vouchers which can be redeemed in local and national retailers, or donated to local charities or schools.
Reward value	200 points are equivalent to £1
Target audience	Households (with shared recycling containers, mostly flats)
Participation in scheme	16%
Geographical coverage	52,000 flats out of 118,000 households
Collection system	Communal bins
Frequency of collection	Weekly
Key participation organisations	London Borough of Lambeth, Veolia, Recyclebank

**Table 8: Scheme Details Summary - Royal Borough of Windsor and Maidenhead**

Key Information	Scheme Details
Timescale	June 2010 - present (ongoing)
Scheme aim (behavioural focus)	Increase recycling
Reward type and distribution	Points to convert into vouchers which can be redeemed in local and national retailers, or donated to local charities or schools.
Reward value	Unknown
Target audience	Households
Participation in scheme	71%
Geographical coverage	60,000 households
Collection system	Kerbside
Frequency of collection	Weekly
Key participating organisations	Royal Borough of Windsor and Maidenhead, Veolia, Recyclebank

**Table 9: Scheme Details Summary - Wokingham Borough Council**

Key Information	Scheme Details
Timescale	April 2012 - present (ongoing)
Scheme aim (behavioural focus)	Increase recycling
Reward type and distribution	Points to convert into vouchers which can be redeemed in local and national retailers, or donated to local charities or schools.
Reward value	Unknown
Target audience	Households
Participation in scheme	36%
Geographical coverage	59,000 households
Collection system	Kerbside
Frequency of collection	Weekly

Key participating organisations	Wokingham Borough Council, Veolia, Recyclebank
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**Table 10: Scheme Details Summary - Halton Borough Council**

Key Information	Scheme Details
Timescale	August 2010 - present (ongoing)
Scheme aim (behavioural focus)	Increase recycling
Reward type and distribution	Points to convert into vouchers which can be redeemed in local and national retailers, or donated to local charities or schools.
Reward value	Unknown
Target audience	Households
Participation in scheme	
Geographical coverage	42,000 households out of 49,000 households
Collection system	Kerbside
Frequency of collection	Fortnightly
Key participating organisations	Halton Borough Council, Veolia, Recyclebank

### 3.4.6 Caerphilly County Borough Council

**Table 11: Scheme Details Summary - Caerphilly County Borough Council**

Key Information	Scheme Details
Timescale	2003 - 2004
Scheme aim (behavioural focus)	Increase the participation rates to ensure that all the rounds have a high average participation rate
Reward type and distribution	Monthly and annual rewards: cash prize draw
Reward value	£50 prize draw per month £500 prize draw annually Small car prize draw annually
Target audience	Households
Participation in scheme	Unknown

Geographical coverage	48,000 households (whole borough)
Collection system	Kerbside
Frequency of collection	Fortnightly
Key participating organisations	Caerphilly CBC

### 3.4.7 Dudley Metropolitan Borough Council

Table 12: Scheme Details Summary - Dudley Metropolitan Borough Council

Key Information	Scheme Details
Timescale	August 2013 - present (ongoing)
Scheme aim (behavioural focus)	Increase the participation rates to ensure that all the rounds have a high average participation rate
Reward type and distribution	Cash reward for individuals
Reward value	Up to £40,000 worth rewards available online, using a trust based system for rewarding individuals
Target audience	Households
Participation in scheme	Unknown
Geographical coverage	115,000 households (whole borough)
Collection system	Kerbside
Frequency of collection	Fortnightly
Key participating organisations	Dudley MBC

### 3.4.8 Nuneaton, Bedworth and North Warwickshire

Table 13: Scheme Details Summary - Nuneaton, Bedworth and North Warwickshire

Key Information	Scheme Details
Timescale	December 2010 - January 2011 (8 weeks)
Scheme aim (behavioural focus)	Encourage participation in recycling
Reward type and distribution	Weekly prize draw for households that present their recycling on the correct day

Reward value	£50 (in vouchers) prize draw
Target audience	Households
Participation in scheme	Unknown
Geographical coverage	Approximately 14,000 households out of 75,000 households
Collection system	Kerbside
Frequency of collection	Fortnightly
Key participating organisations	Nuneaton and Bedworth Borough Council and North Warwickshire Borough Council, prizes donated by local companies

### 3.4.9 Ainsworth & Parkinson (A&P) Recycling Rewards for Schools

Table 14: Scheme Details Summary – A&P Bath and North East Somerset Council

Key Information	Scheme Details
Timescale	February - July 2013
Scheme aim (behavioural focus)	To increase recycling levels throughout the authority, and raise the profile of recycling to young children, parents and householders.
Reward type and distribution	Pupils are given books of pledges to circulate to their family and friends and bring back to school. Each month, the school forwards the pledges to A&P and the number of pledges are counted and translated into points. If the amount of recycling in the area concerned increases for that particular month, the value of the points increases.
Reward value	Value of pledges depends on amount of recycling in the area
Target audience	Households and the wider community
Participation in scheme	54 out of 65 primary schools collected and submitted pledges Total number of 6,264 pledges (8% participation rate from eligible households)
Geographical coverage	73,000 households

Collection system	Kerbside
Frequency of collection	Weekly
Key participating organisations	Bath and North East Somerset Council, A&P

Table 15: Scheme Details Summary – A&P Calderdale Council

Key Information	Scheme Details
Timescale	March 2005 - March 2007
Scheme aim (behavioural focus)	To increase recycling levels throughout the authority, and raise the profile of recycling to young children, parents and householders.
Reward type and distribution	Pupils are given books of pledges to circulate to their family and friends and bring back to school. Each month, the school forwards the pledges to A&P and the number of pledges are counted and translated into points. If the amount of recycling in the area concerned increases for that particular month, the value of the points increases.
Reward value	Value of pledges depends on amount of recycling in the area
Target audience	Households and the wider community
Participation in scheme	75 out of 87 schools collected and submitted pledges
Geographical coverage	83,000 households
Collection system	Kerbside
Frequency of collection	Weekly
Key participating organisations	Calderdale Council, A&P

Table 16: Scheme Details Summary – A&P Cumbria County Council

Key Information	Scheme Details
Timescale	November 2005 - July 2008
Scheme aim (behavioural focus)	To increase recycling levels throughout the authority, and raise the profile of recycling to young children, parents and householders.

Reward type and distribution	Pupils are given books of pledges to circulate to their family and friends and bring back to school. Each month, the school forwards the pledges to A&P and the number of pledges are counted and translated into points. If the amount of recycling in the area concerned increases for that particular month, the value of the points increases.
Reward value	Value of pledges depends on amount of recycling in the area
Target audience	Households and the wider community
Participation in scheme	Unknown
Geographical coverage	215,000 households
Collection system	Kerbside
Frequency of collection	Fortnightly
Key participating organisations	Cumbria County Council, A&P

Table 17: Scheme Details Summary – A&P Durham County Council

Key Information	Scheme Details
Timescale	October 2005 - March 2006
Scheme aim (behavioural focus)	To increase recycling levels throughout the authority, and raise the profile of recycling to young children, parents and householders.
Reward type and distribution	Pupils are given books of pledges to circulate to their family and friends and bring back to school. Each month, the school forwards the pledges to A&P and the number of pledges are counted and translated into points. If the amount of recycling in the area concerned increases for that particular month, the value of the points increases.
Reward value	Value of pledges depends on amount of recycling in the area
Target audience	Households and the wider community
Participation in scheme	Unknown
Geographical coverage	211,000 households

Collection system	Kerbside
Frequency of collection	Fortnightly
Key participating organisations	Durham County Council, A&P

Table 18: Scheme Details Summary – A&P Hyndburn Borough Council

Key Information	Scheme Details
Timescale	March 2003 - June 2007
Scheme aim (behavioural focus)	To increase recycling levels throughout the authority, and raise the profile of recycling to young children, parents and householders.
Reward type and distribution	Pupils are given books of pledges to circulate to their family and friends and bring back to school. Each month, the school forwards the pledges to A&P and the number of pledges are counted and translated into points. If the amount of recycling in the area concerned increases for that particular month, the value of the points increases.
Reward value	Value of pledges depends on amount of recycling in the area
Target audience	Households and the wider community
Participation in scheme	Unknown
Geographical coverage	33,000 households
Collection system	Kerbside
Frequency of collection	Fortnightly
Key participating organisations	Hyndburn Borough Council, A&P

## 3.5 Data Analysis

Reward schemes have been a key topic for industry discussions over recent years. This section sets out some of the discussions points raised by the industry, and on the basis of the research each question is addressed. Key messages in response to each of the questions are shown in summary boxes.

### 3.5.1 Approach

- **Evaluation framework:** Eunomia adopted Brook Lyndhurst's comprehensive evaluation framework which is underlying the approach to the research across both studies. As the framework was developed ahead of the data collection and analysis there are

some areas which have required adaptation, but these are relatively minor and have been discussed between consultancies. Both organisations are satisfied that the framework provides a consistent basis for the evaluation. The evaluation framework is shown in Appendix A2.1.

- **Secondary data:** Online research was undertaken to collate background scheme information which is available in the public domain. As part of this collected information about the incentive scheme, how it looks to the public and how it works in practice. We also collected information about the current collection scheme and any changes to it that had been made, as changes would impact on the analysis.
- **Primary data:** Using an interview pro-forma, key contacts were identified and interviews held with both private scheme operators and local authorities. As part of this interview several data requests were made specifically for performance and cost data, resident survey data and communications materials. These requests which were typically followed up with phone calls and emails.

### 3.5.2 What's the Likely Impact on Landfill Diversion and Recycling Tonnage?

An authority introducing a recycling reward scheme will hope to see residual tonnages reduce and recycling tonnages increase. To test this we have looked at the data. The dataset is limited for several reasons:

1. When authorities have rolled out a *major* service change, such as a new kerbside collection system alongside the recycling reward scheme, tonnage data cannot be used. It's not possible to identify what part of any performance uplift relates to the offer of the reward; and
2. Authorities don't always take a methodical and data led approach to monitoring the impact of a new reward scheme. Where monitoring data is not available, public Waste Data Flow data has been used. Because this data is only available on a whole authority basis, it can only be applied to the analysis of incentive schemes which have been rolled out incentive across the whole of an authority area. Schemes which haven't been specifically monitored and which have only been rolled-out on a trial basis to a small part of the borough can't easily be tested.

These constraints mean that we have been able to consider the tonnage performance impacts of reward schemes in five authorities.

The tonnage impact of each scheme was calculated simply by looking at the percentage change between the material tonnages collected both before and after the reward scheme was introduced. Further details of the approach are set out in Appendix A2.3. The results are shown in Figure 1.

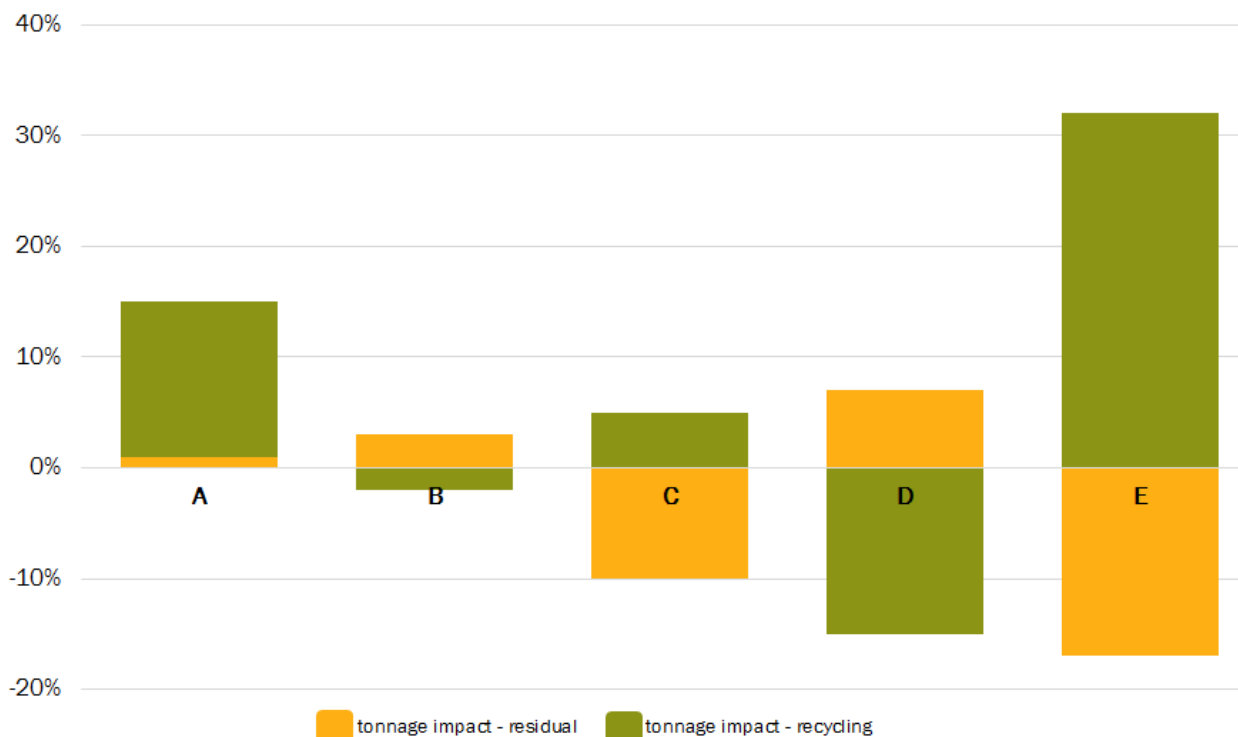
The results of the analysis show that three of the five schemes saw an *increase* in residual tonnage impact (as opposed to the hoped for decrease). These increases are at least relatively low (1%, 3% and 7% increase in tonnages in the year following the introduction of the reward). In the two schemes where a decrease in residual waste is seen, the changes are more significant with a reduction of 10% and 17%.

There was a positive impact on recycling tonnages in three out of five authorities following the introduction of the reward scheme. But again the picture is mixed and two authorities saw a decrease in recycling tonnages following scheme introduction. For one of these authorities the decline was fairly significant.

Authority 'E' which saw an increase in recycling tonnages and a decrease in residual was

nearly excluded from the analysis because of changes that it made to its kerbside collection services at the same point at which the incentive scheme was introduced. It was retained within the analysis because these changes were relatively minor. It is likely however, that some proportion of the tonnage impacts seen for this authority are attributable to the change in service (and accompanying roll-out publicity) and can't be wholly attributed to the recycling reward scheme.

Figure 1: Impact of schemes on residual and recycling tonnages



One needs to remember, of course, that numerous other factors will also affect authorities' service performance. To account for and understand the extent of wider changes, for example the economy's impact on waste trends and consumer patterns of consumption, we carried out a benchmarking exercise.

'Nearest Neighbour' analysis was used to identify benchmark authorities that share key similarities (economic and demographic) with each of the authorities for which we have good pre- and post-reward scheme performance data. Benchmark authorities were only included within our analysis if their collection service had remained unchanged during the period under consideration. The performance of the reward scheme authorities was then compared to the performance changes seen in each of the relevant benchmark authorities (further details on the approach taken to benchmarking are described in Appendix A2.5). The results of this are shown in Figure 2 and Figure 3.

For schemes A, C and D we have both tonnage data for the scheme and have been able to benchmark this against other similar authorities.

➤ Scheme A

- The increase in recycling in the scheme area (Scheme A is not authority-wide) is much greater than either the increase seen in the rest of the authority or in the two benchmarks.

- Although residual waste arisings increased in the reward scheme area, slightly greater increases were seen in the rest of the authority and in the benchmark authorities.
- The reward scheme appears to have achieved the desired effect.
- Scheme C:
  - Although scheme performance data is available, it does not match published WDF data. This discrepancy has been questioned but is not understood. Monitoring data shows that recycling tonnages have increased more than most benchmarks but not quite as much as the best performing benchmark authority. When looking at WDF data, the authority's recycling performance is close to the top of the range compared to the four available benchmark authorities with one performing better and three performing worse. Variation in recycling performance increases across the benchmark authorities is considerable.
  - The discrepancy between scheme and publicly available data is far more marked when looking at residual waste.
    - Scheme performance data supplied by the authority shows a significant fall in residual waste tonnages whilst benchmark authorities either saw a smaller drop in residual waste tonnages or an increase.
    - Published Waste Data Flow data, on the other hand, shows that the authority saw a greater *increase* in total residual waste arisings following scheme introduction than was seen in any other benchmark authority area.
  - If one relies on the data that the authority uses to evaluate the impact of the reward scheme, the scheme appears to have had a positive effect. If, on the other hand, one uses the data which the authority has entered into Waste Data Flow, the scheme appears either to have had no effect or a negative effect.
- Scheme D:
  - For this authority, the period following the introduction of the scheme saw a significant *drop* in recycling tonnages. Benchmark authorities also saw performance declines but these falls were smaller.
  - When looking at residual waste, the authority saw a 7% increase in its arisings following the introduction of the reward scheme. Benchmark authorities saw decreases during the same period.
  - The best that can be said about the impact of the reward scheme in authority 'D' is that it was either ineffective or that its effects were masked by other factors impacting on performance. The data would also support a more pessimistic interpretation: that the scheme has had a negative effect.

Figure 2: Benchmarked Schemes: Recycling Tonnages

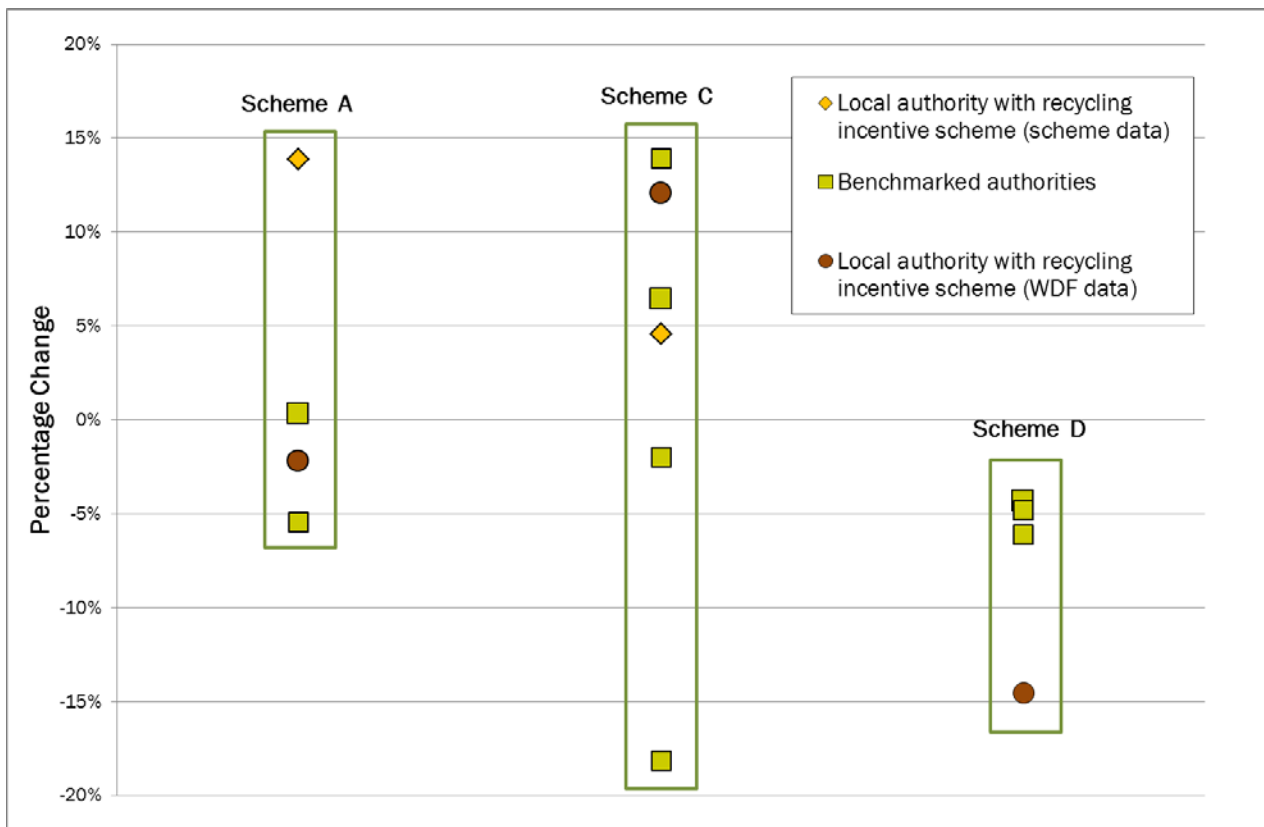
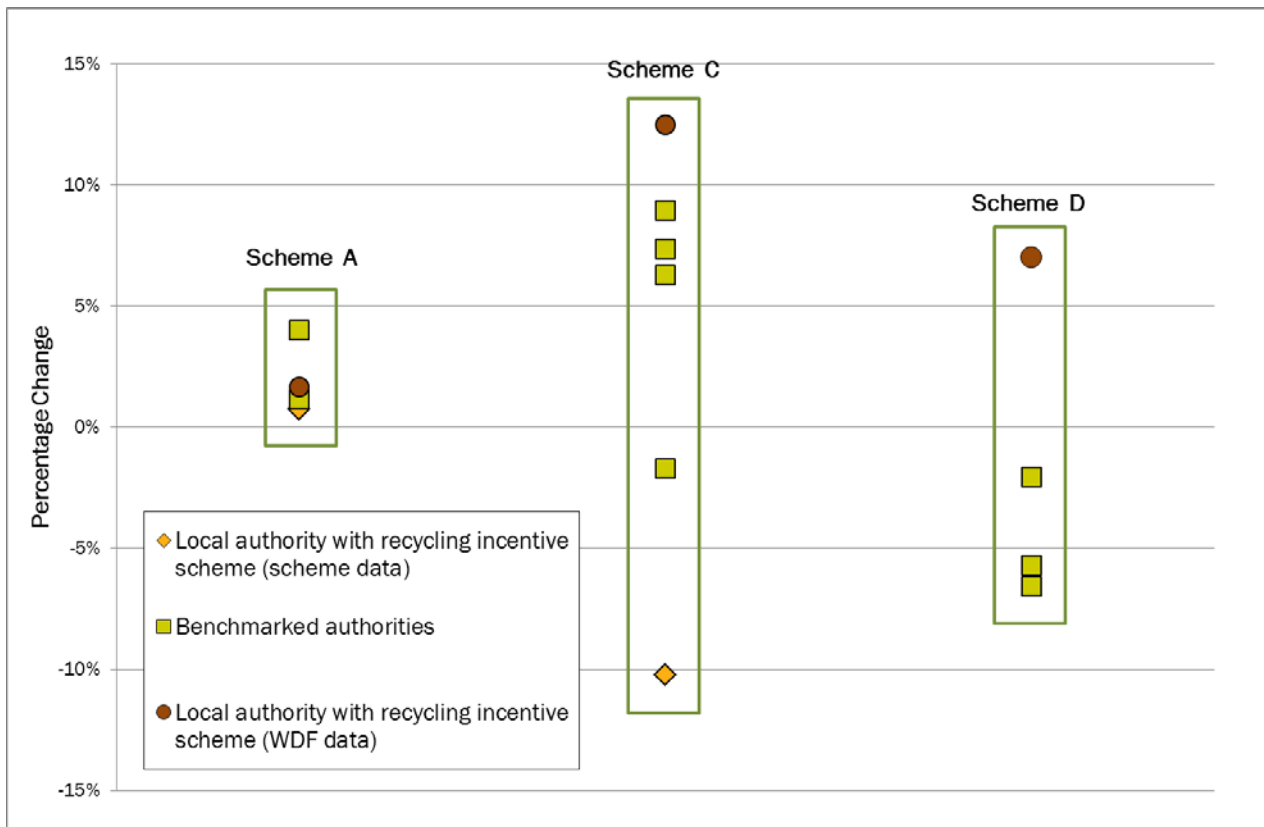


Figure 3: Benchmarked Schemes: Residual Tonnages



In summary, Nearest Neighbour analysis shows that some of the apparent performance gains achieved in reward scheme areas are not attributable to the impact of the scheme but relate to other factors such as potentially changing patterns of consumption and disposal. The underlying drivers of patterns of waste and recycling arisings remain complicated and this continues to be an area which merits good and detailed research.

### **What impact do reward schemes have on residual waste and recycling tonnages?**

Across the incentive schemes that we studied we found:

- Authorities with recycling incentive schemes recorded an average **8% increase in recycling** performance.
- This was accompanied by an average **3% reduction** in landfill.
- There was wide variability in the performance of different schemes. **40% of schemes** showed **BOTH** increased recycling **AND** reduced landfill.

Many authorities within the scope of this work had either changed their collection method or not collected good performance data leaving a sample of five authorities. Based on this group of five authorities it appears the evidence for recycling reward schemes' impact on collected tonnage is mixed.

#### **3.5.3 What do Residents Think about Reward Schemes?**

Residents' surveys for four authorities' has been collected over time by Serco (in up to 8 survey 'waves'). This is a significant source of new information regarding resident attitudes and expectations regarding such schemes and an important contribution to the debate.

For three out of four of the authority surveys the focus was on whether residents felt community or individual rewards might have a greater impact.

In all three of these surveys, when residents were asked how likely they would be to recycle more than they currently do (with questions associated with personal and community reward schemes), results showed:

- Regardless of the reward type (personal or community), the majority of respondents claimed they already recycle as much as possible;
- It is not possible to see a clear change in responses after scheme implementation; and
- Whilst a greater proportion of householders are 'very likely' to recycle more when offered an individual reward, a greater proportion of householders are 'fairly likely' to recycle more when offered a community reward. There is no clear pattern in terms of reward type preference.

In addition when asked how likely residents would be to recycle more than they currently do, the results implied that a service change would have more impact in terms of changing behaviour than a reward scheme.

For the fourth authority, individual rewards were compared with residents' response to door-stepping. The response categories were different for this survey and cannot therefore be compared with the other survey responses:

- The majority of residents (on average 52% over the seven survey waves) said they had not heard of the reward scheme; and
- The second highest response for those residents responding was to say the scheme had not impacted on their behaviour (average of 41% respondents over the seven

survey waves).

A proper approach to sampling was taken to ensure a demographically representative population was surveyed. This approach helps to overcome common issues with this survey type, so that those who are most interested in the subject are not over-surveyed thus skewing results. The issues which cannot be overcome through sampling are those around self-reporting of behaviour: when a resident reports that they have not been impacted by the introduction of a survey, there is no way to test whether or not this is accurate. Nonetheless, this is the strongest available dataset which we are aware of which tests resident responses to incentive schemes.

### **What do residents think about reward schemes?**

Survey data from five different local authorities across a statistically robust sample of residents was analysed in relation to the likely impacts of incentive schemes. This showed:

- **25% of residents** say that **recycling incentives would encourage them to recycle more** with **75% suggest they are already recycling as much as they can.**

The majority of residents' report that recycling reward schemes won't affect their behaviour and the majority believe they already recycle as much as they can.

Whilst there are issues with relying too heavily on self-reporting of behaviour change, this evidence is the most comprehensive dataset regarding the subject of reward schemes and is an important contribution to the debate.

### **3.5.4 Which Scheme Types are Most Effective?**

Given that various different types of scheme have been proposed and rolled-out, we have tried to consider which scheme designs might be most effective. Where a paucity of data limits our analysis, we have drawn upon anecdotal evidence to help round out the picture.

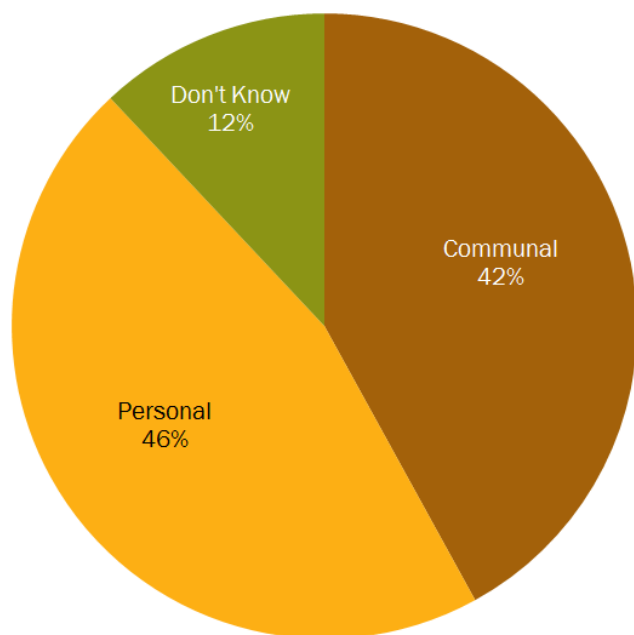
#### **3.5.4.1 Community Rewards vs. Household Rewards**

Recycling rewards may be distributed either to individual households or aggregated to reward a wider community (village, ward, school etc.). The various schemes were divided into these categories and their tonnage performance considered to investigate whether one type of scheme or another performed better.

The available data didn't show one type of scheme performing better than the other meaning that we can't conclude whether community or household rewards are more effective.

This finding aligns with the residents survey results which showed that whilst a greater proportion of householders are 'very likely' to recycle more when incentivised to recycle by an individual reward, a greater proportion of householders are 'fairly likely' to be incentivised to recycle more by a community reward. There is no clear pattern in terms of reward type preference. Survey findings are summarised in Figure 5.

Figure 4:- With which type of incentive scheme are you likely to recycle more? (base = 1,000)



Anecdotal evidence from officer interviews suggests that if taking a community reward approach then using known community boundaries is important. For example, wards are administrative boundaries and residents do not easily relate to these.

#### 3.5.4.2 Other Scheme Characteristics

We looked to try and identify trends in the relative performance of the various schemes which might relate to one or other scheme design characteristics:

- Reward aim: some schemes focus on trying to promote an increase in recycling whereas other focus on trying to reduce residual waste;
- Reward type: for some schemes residents are guaranteed a reward (in vouchers or cash), whilst other schemes reward residents for increased recycling by entering them in a prize draw; and
- Scheme delivery: whilst some schemes are independent and are run either by the local authority and/or their waste collection contractor, whilst other schemes are professionally established and offered to authorities as packaged services including those run by Recyclebank and Local Green Points.

In none of these categories was there any identifiable trend to suggest that different scheme designs reliably affect scheme performance. This may simply be because we had insufficient data in order for any clear trend to emerge or it might just relate to the fact that reward schemes in general have limited and uncertain effect.

Anecdotal feedback from officers suggests that locally based rewards (e.g. vouchers for local businesses) can provide an effective method for local authorities to positively engage with local businesses and support the local economy.

The impact of the quality of the various schemes' design and delivery is not something we were able to test. One might reasonably expect that the quality of the design and management of the schemes *would* be important in determining their performance but

'quality' is subjective in this context and not easily tested.

### 3.5.4.3 Scheme Impact by Level of Communications

The data collected regarding scheme communications is shown in Figure 5. We haven't attempted the difficult and highly subjective task of ranking the *quality* of the scheme communication and promotional work. We have however been able to reach a view as to how *comprehensive* the approach has been by simply counting the various types of communication channel which have been used (more channels is taken crudely to indicate a more comprehensive approach).

Figure 5: Approach to Communications

Communications Type	Local Authority Scheme Reference															
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Door-stepping	■															
Bin stickers/ signage	■	■														
Pamphlets (one off distribution)		■	■	■	■	■	■		■	■	■		■	■		■
Emails/ e-bulletins (regular distribution)	■			■	■	■	■				■		■			
Newsletter/ paper bulletin (regular distribution)	■		■	■	■	■	■			■	■					■
Lamp post posters		■	■								■					
Other posters			■							■	■	■	■	■	■	■
Website	■		■	■	■	■	■	■	■		■	■	■	■	■	■
Local media coverage	■	■		■	■	■	■		■							
Social media									■							
Trade press	■	■	■	■	■	■	■									
Road shows / events			■	■	■	■	■		■	■		■	■	■	■	■
Press release		■		■	■	■	■		■	■	■	■	■	■	■	■
School visit		■		■	■	■	■		■		■	■	■	■	■	■
Community forums		■		■	■	■	■			■	■					

Where communication or promotional work has been done which doesn't relate exclusively to the reward scheme, where service changes are also being communicated for instance, then this is not counted as contributing to reward scheme promotion.

Most of the authorities we considered took a fairly comprehensive approach to communicating the launch of their reward scheme. During interviews officers explained how even on a limited budget, there are numerous options for low-cost or free exposure.

As the research progressed the following query arose:

- *Is there a possibility that those participating in the schemes would have changed their behaviour as a result of effective communications and without the reward?*
  - *If so, could a targeted approach provide best value?*

Encouraging people to participate is, in principle, linked to effective communications. Schemes which are well promoted and managed are likely to have better impacts. Across the board, communications campaigns have been of a high standard, and generally a comprehensive approach has been noted. There are no specific trends between level of communications and level of scheme participation using the data available. However Defra's work to develop guidance on how a scheme should be structured and promoted is likely to be useful.

Anecdotal evidence drawn from interviews and other industry representatives suggests a fairly strong consensus that reward schemes create an excellent opportunity to promote their recycling services and behaviour change in a new and interesting way. This opportunity does not rely on the design of the scheme. Many respondents also shared the view that they felt

the communications work relating to the scheme was perhaps the most important part of the scheme and might be almost wholly responsible for driving any performance gains.

#### 3.5.4.4 Scheme Area Rural-Urban Classification

As well as looking at the specifics of scheme design, analysis was also carried out to group the schemes according to the rural-urban classification of the authority/ area in which the scheme was implemented. The grouping is based on the ONS rurality categories used in the CIPFA nearest neighbour analysis.

It was interesting to test whether populations from different rural-urban classification areas might engage with the various schemes to differing extents. However there were no identifiable trends with scheme impact relating to the rurality of the target population.

#### Which scheme types are most effective?

There are a variety of different types of reward schemes available to Local Authorities. Our analysis considered which of these were most likely to have positive impacts and found:

- There was **little difference in the overall preference between personal and communal incentive schemes** with personal incentives being consistently marginally favoured as their preferred option.
- **Comprehensive marketing communications** were noted across all of the schemes we looked regardless of scheme effectiveness.

The data analysis therefore does not show variation in scheme performance relating either to scheme design or target population. There are two main possible conclusions to draw from this.

- The lack of data impedes effective analysis. Under this view one might conclude that with a far larger number of schemes, clear trends in performance might emerge.
- Schemes impacts are limited and design features don't tend to make much difference to how strongly they incentivise performance. One variant of this view might hold that the impacts of schemes relate more strongly to how well they are promoted than anything else.

#### 3.5.5 Are there Other Ways to Achieve a more Significant Impact?

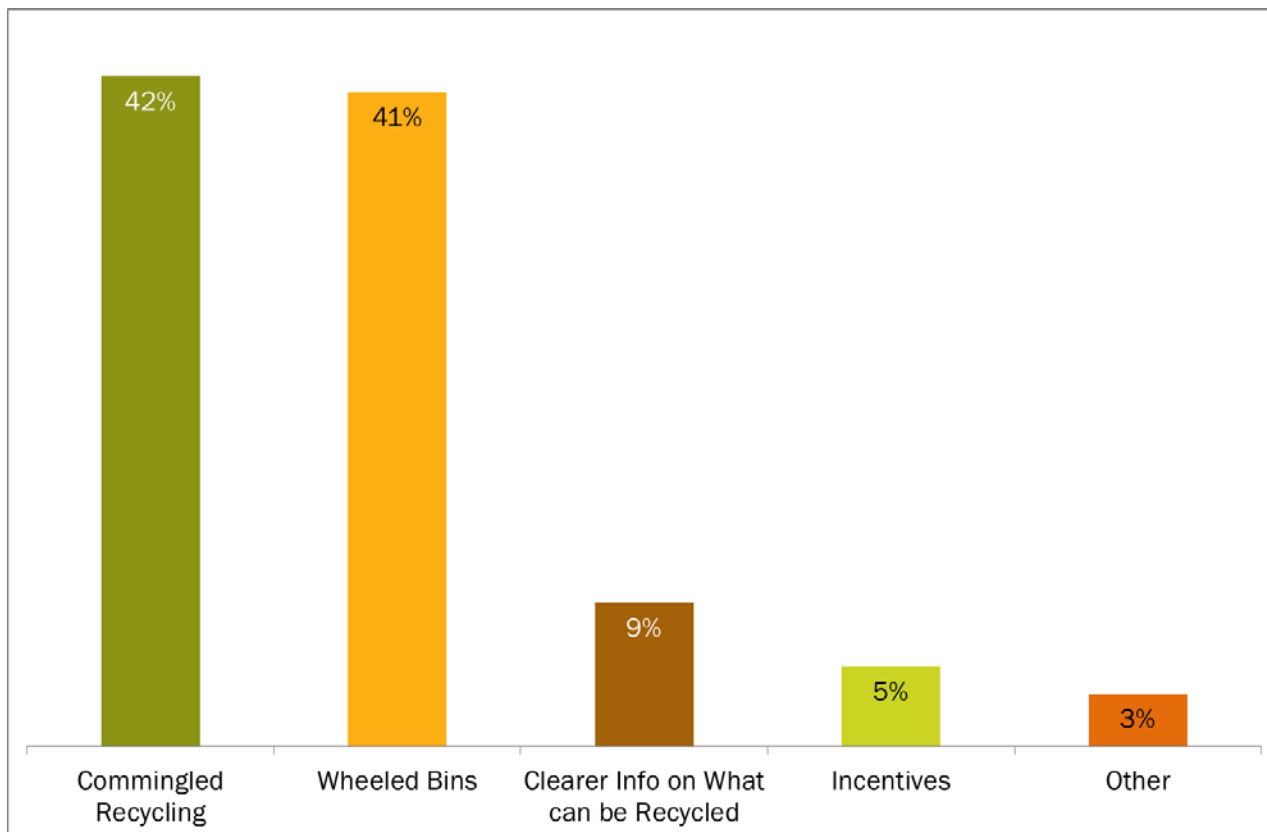
##### 3.5.5.1 Resident Feedback

Serco's consultation programmes regularly test resident preference and the likely impacts of recycling incentives set against a number of different service changes and policy options that a local authority may consider.

Whilst survey responses need to be treated cautiously, residents report a number of other services changes that they believe will have a greater impact on their recycling behaviours.

- Residents report that **commingled recycling** and **wheeled bins** will increase their willingness to recycle (where these don't exist).
- **Better Marketing Communications** and **Incentives rank** as less likely to encourage residents to recycle more with 9% and 5% respectively.

Figure 6:- Which of the following would make you recycle more? (base = 700)



It is outside the scope of this work and is therefore not our intention to discuss the relative merits of different collection systems, which has been done extensively elsewhere, only to illustrate residents' expectations regarding the likely impact of incentive schemes on changing their behaviour, *relative* to other service changes and promotional measures.

As well as looking at what service users *say* will affect their recycling behaviour, we are also able to look at the data to see how residents actually respond in the next section.

### 3.5.5.2 Review of Available Data

Given the possibility that reward schemes don't strongly incentivise resident participation in recycling collection services and therefore the tonnage performance of these services, it is worth considering whether there are better ways to drive up recycling. It's beyond the scope of this report to carry out a comprehensive review of all of the different approaches one might take to improving the performance of an existing scheme, but we have looked at one alternative approach that UK authorities are taking.

Many authorities are attempting to restrict residual waste arisings by the simple measure of restricting the capacity of residual waste which is accepted. Whilst reducing the size of residents' waste bins is not an incentive scheme as such, it is a system which is actively in use in the UK and therefore thought to provide an interesting comparator. In addition, data associated with the various approaches taken to 'residual squeeze' is publicly available and amenable to easy analysis.

The comparison between the impact of reward schemes and 'residual squeeze' service changes is graphically displayed in Figure 7 and Figure 8. This analysis is based on WDF data for authorities which have reduced the capacity of the residual waste bins they provide to residents (the most common approach has been to move from an unrestricted sack-based

collection system to 180L bins). The schemes we have considered have not implemented any other service changes in the same period. The data has not been performance benchmarked and trends in overall arisings have not been reviewed. As such, the analysis is somewhat more simplistic than that undertaken for reward scheme evaluation.

Figure 7 and Figure 8 both show that residual squeeze policies lead to a reduction in residual tonnages and an increase in recycling tonnages. The trend is marked relative to the smaller and more mixed picture shown for authorities who have introduced reward schemes.

Figure 7: Impact of schemes on residual tonnages

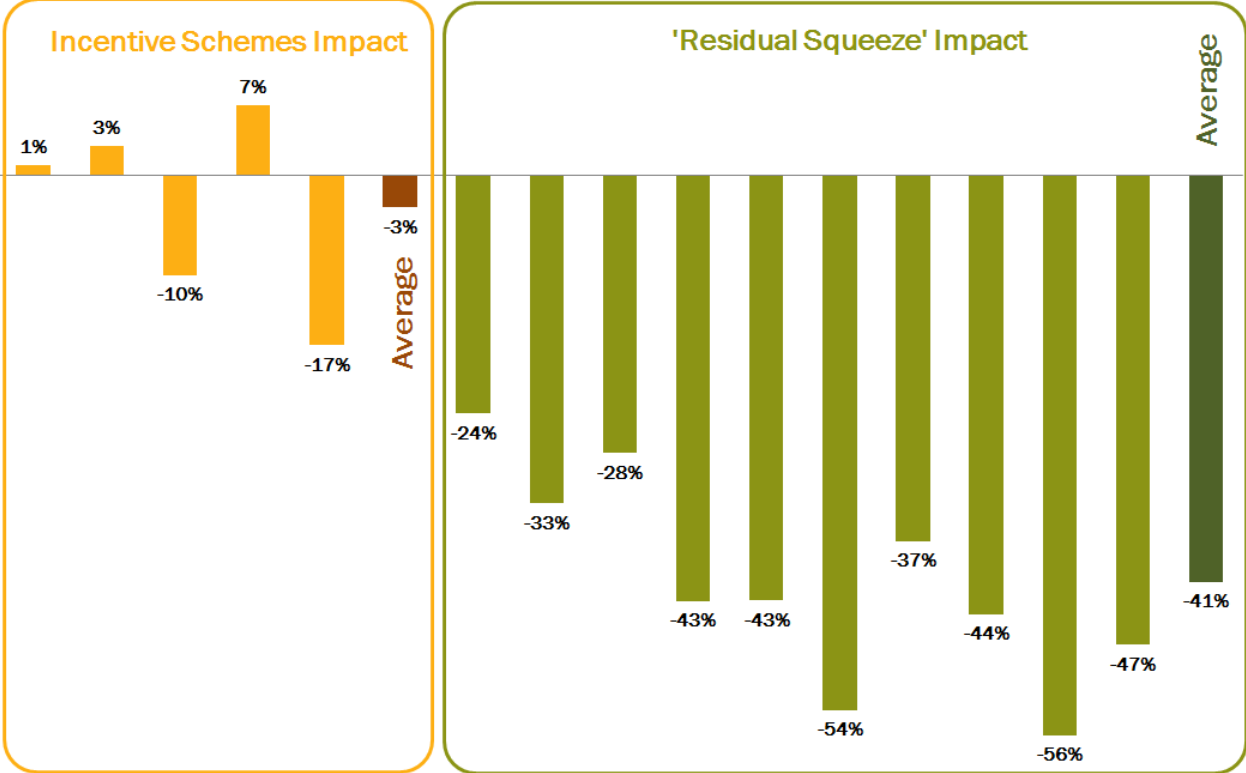
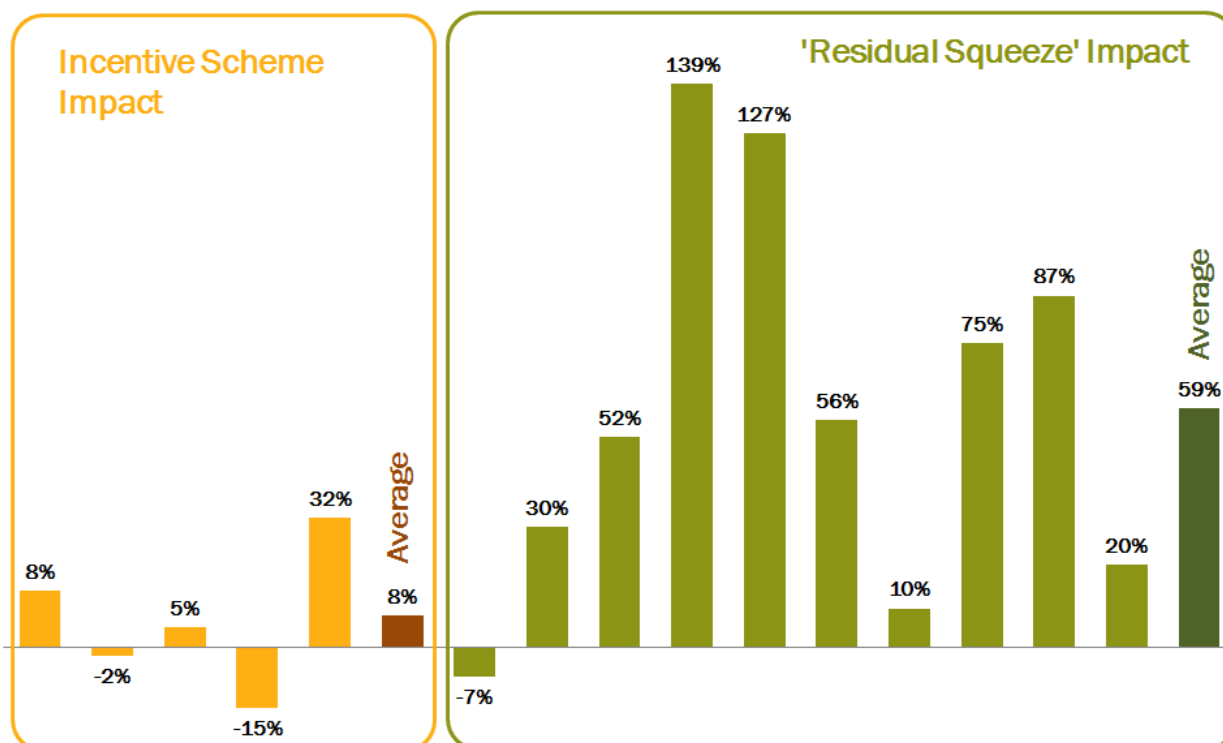


Figure 8: Impact of schemes on recycling tonnages



**Are there other ways to achieve a more significant impact?**

Authorities who introduce residual capacity restrictions tend, fairly reliably, to achieve much greater tonnage performance impacts than authorities which introduce reward schemes. We haven't sought to carry out an exhausting evaluation of the various approaches which might also drive performance gains but one might also consider the impact of door-stepping and/or other communication campaigns, the introduction of increased capacity for recycling services and the change in frequency of collection of the various streams.

The analysis shows, however, that there is at least one way to achieve a more significant impact on the recycling and waste performance of collection schemes than can be achieved through offering rewards.

**3.5.6 Are Reward Schemes Good Value for Money?**

Perhaps the most important question when introducing a reward scheme is whether or not it offers good value for money. Will the cost of the scheme be justified by the reduced cost of residual waste disposal and the increased material sale value (where recycle generates an income). The approach we've taken looks at these variables: scheme cost, disposal costs and recycle revenues. A detailed description of the approach we've taken to this analysis is set out in Appendix A2.4.

The range of cost saving achieved per household per year for the various schemes we've looked at is presented in the following chart. We've divided the various schemes into price categories:

- cheap (£ = <£1.00 / household / year);
- moderate cost (££ = £1 - £2.00 / household / year); and
- expensive (£££ = >=£2 / household / year).

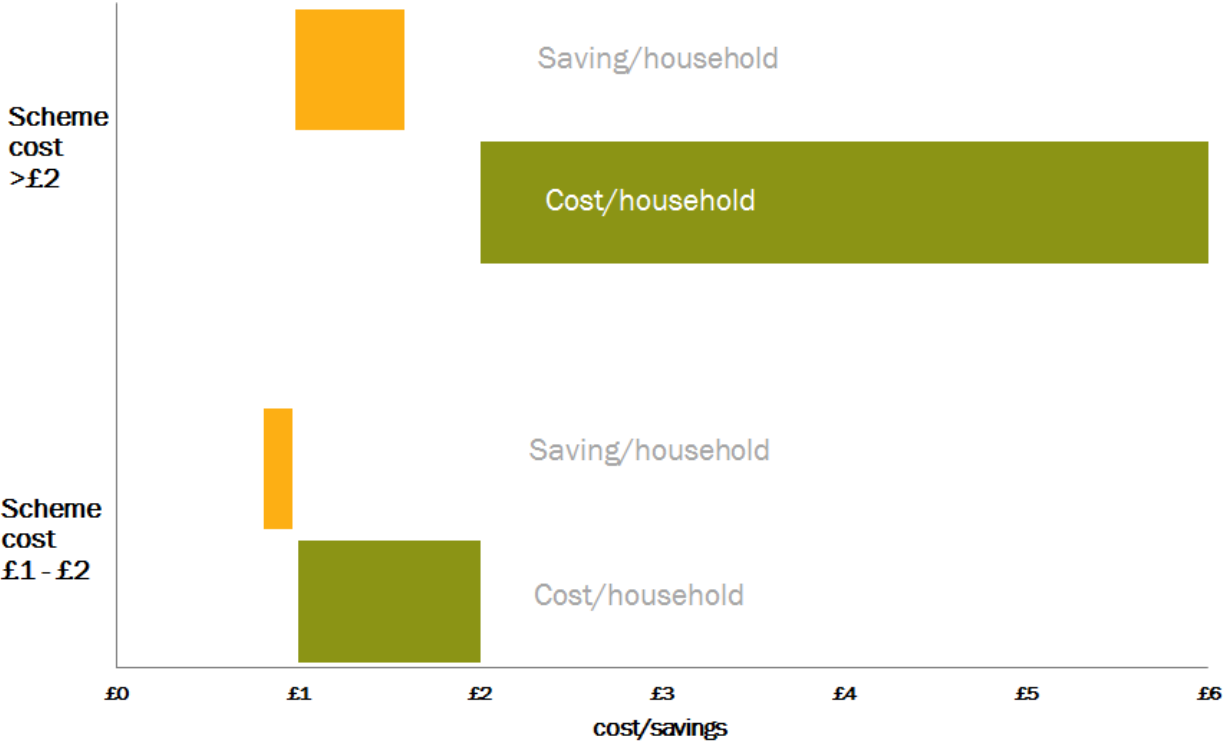
Overlapping cost and savings bars for any given scheme would show that the cost of the scheme is equal to, or being offset by the savings being generated and that the scheme is cost justified without reference to other arguments.

Figure 9 shows that the best performing schemes in the mid-range cost category. The best of the mid-range schemes deliver savings which nearly justify the costs of the cheapest of the schemes in this cost category. More expensive mid-range schemes and lower performance are further from being cost justified.

The cost case is weaker still for the higher scheme cost category (£££ = £>2 per household per year) which shows the cost savings being smaller still that the scheme set up and management costs.

There was no available data for authorities with the cheapest schemes which explains why there is no bar in the chart to represent schemes with costs of less than £1/household/year (the low cost category).

Figure 9: Reward Scheme Value for Money



**Are Reward Schemes Good Value for Money?**

As part of this analysis we have banded the cost of the different incentive schemes being evaluated into three cost bands low, medium and high in accordance with the scheme costs of operation per participating household.

- **For medium cost schemes, costing £1.00-£2.00** per participating household, the cost of introducing such schemes come closest to being justified and recouped in diversion savings and recycling income.
- **For high cost schemes, costing >£2.00** per participating household the investment in incentives schemes is unlikely to be recouped in diversion schemes and recycling income.

From the data that we have been able to properly review and analyse, reward schemes do not appear to offer a positive return on investment. The best performing of the moderate schemes have the best prospects of recouping their costs.

### 3.5.7 Do recycling reward schemes lead to increased rates of contamination?

Some industry commentators have expressed concern that reward schemes might incentivise the wrong types of behaviour, leading for instance to increased contamination. If a resident receives a reward based on the weight of his recycling bin, does he not become more inclined to put heavy contaminants into the bin?

We have not been able to identify any schemes which have collected contamination data before and after the introduction of a reward scheme and we haven't therefore been able to properly analyse the question.

During the course of this research however and otherwise, we have not been made aware of even any anecdotal evidence to support the idea that reward schemes encourage increased contamination.

Not all rewards of course are based on weight but are based on participation. These schemes don't create even any credible theoretical risk of increased contamination. For weight-based schemes, because the rewards are actually relatively small and are capped, they are fairly unlikely to incentivise mis-use of the system in all but a very small minority of cases.

#### Do recycling reward schemes lead to increased rates of contamination?

There is no evidence, either data led or anecdotal, to support the hypothesis that offering a reward might incentivise increased contamination.

## 4.0 Deposit-refund Systems

Deposit-refund systems (DRSs) have been around for a long time; in some countries they have been operating for over 40 years. Consequentially, there is now a wide body of literature from which to draw evidence.

DRSs provide an economic incentive, in the form of a deposit or 'surcharge', to recycle.<sup>26</sup> When purchasing a product, the consumer pays a deposit on top of the product cost. Upon finishing the product, the consumer will have the deposit reimbursed if they return the product to be recycled. Drinks containers are the most common target of DRSs.

Upon their inception, the emphasis of such schemes centred on litter reduction and a desire to encourage the re-use of containers. However, evidence of significantly improved recycling rates as a consequence of their implementation has led to a shift in focus.

Eunomia has undertaken two significant projects on deposit-refund systems in the UK context. Although a small number of reports on deposit-refund schemes have been published since Eunomia undertook its last major piece of research in 2011, after reviewing these reports we have found that they draw on the same primary data sources as the Eunomia

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<sup>26</sup> The OECD has defined the scheme as follows: 'A deposit-refund system is the surcharge on the price of potentially polluting products. When pollution is avoided by returning the products or their residuals, a refund of the surcharge is granted.' OECD (2001) *Glossary of Statistical Terms: Deposit-Refund System*, Date Accessed: 28 June 2011, <http://stats.oecd.org/glossary/detail.asp?ID=594>

work, and in many cases reference the Eunomia report.<sup>2728</sup> We are confident therefore that the data presented in the appendices and the rest this section is the most up to date available.

## 4.1 UK Context

Historically, DRSs have been implemented in the UK, mainly throughout the 1970s, but very few remain ongoing today. Literature reveals that they have been re-visited several times since then. For example, in the Strategy Unit's review of waste strategy in 2002, it was suggested that:<sup>29</sup>

*Action is needed in the following five areas to put the right long term economic and regulatory framework in place: [..]*

*[..] new measures to encourage reuse, such as deposit-refund schemes and designing civic amenity sites for re-use;*

As a result of this research was undertaken by Oakdene Hollins<sup>30</sup> and subsequently ERM.<sup>31</sup> Neither report presented a clear evidence base with regards to the potential costs and benefits of implementation of such a system in the UK. Despite this, the same message is restated in the later Defra Packaging Strategy of 2009.<sup>32</sup> In this document the narrative draws on system costs, but despite rigorous research, the evidence for such figures was made clear.

In 2011 Eunomia was commissioned by CPRE to undertake research into the costs and benefits of DRSs. In summarising the current situation at that time we said:<sup>33</sup>

*"The apparently established line that alternatives to deposit refunds could achieve the same or better results at lower cost than a deposit scheme remains to be clearly demonstrated. Although it is suggested, in the previous Minister's response, that the past Government retained an open mind on this matter, the ease with which its mind seems to have been closed contrasts with this avowed openness. The view of ERM, and the opinions subsequently expressed by Defra and its Ministers, appears to lack any firm basis."*

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<sup>27</sup> *Container Deposit Legislation in Ireland, A proposed deposit and refund scheme.* Stacy Weisfeld July 2012. Report for Voice of Irish Concern for the Environment (VOICE) <http://voiceireland.org/wp-content/uploads/2013/07/bottle-bill-final-July-2012.pdf>

<sup>28</sup> *Deposit Return Systems for Packaging: Applying International Experience to the UK.* David Fitzsimons, Dr Peter Lee and Stephen Slater. November 2010. Report for Defra. [http://www.oakdenehollins.co.uk/media/998/Deposit\\_Returns\\_2005.pdf](http://www.oakdenehollins.co.uk/media/998/Deposit_Returns_2005.pdf)

<sup>29</sup> Strategy Unit (2002) *Waste Not, Want Not: A Strategy for Tackling the Waste Problem in England*, December 2002.

<sup>30</sup> Oakdene Hollins (2004) *Deposit Return Systems for Packaging: Applying International Experience to the UK*, report prepared for Defra, December 2004

<sup>31</sup> ERM (2008) *Review of Packaging Deposits System for the UK*, Final Report to Defra, December 2008.

<sup>32</sup> Defra (2009) *Making the Most of Packaging: A Strategy for a Low-carbon Economy*, June 2009

<sup>33</sup> Eunomia R&C (2010) *Have We Got the Bottle? Implementing a Deposit Refund Scheme in the UK*, Report to the CPRE, Available: <http://www.cpre.org.uk/resources/energy-and-waste/litter-and-fly-tipping/item/1917-have-we-got-the-bottle>

Findings from this study present a compelling case in favour of a DRS in the UK for PET bottles, glass bottles and aluminium and steel cans (with the option to include plastic bottles and beverage cartons to be considered). The report concludes:

*“The combined overall cost benefit analysis indicates that, even with the additional costs incurred in the running of the DRS, there is a high likelihood of a significant net benefit to society. The influence of the reduction in disamenity associated with litter appears to be particularly strong. Although there is some uncertainty regarding the magnitude of this, the suggestion is that if households experience a level of disamenity of the order £16 or so for the removal of 80% or so of beverage related litter, then the system makes sense from the perspective of society.*

*To conclude, the modelling indicates that the introduction of a DRS in the UK is:*

- a) Likely to cost around £84 million per annum to set up if well designed;*
- b) Likely to cost around £700 million per annum to run (net of revenues);*
- c) Unlikely to introduce very significant costs to producers. Even at 90% return rates, in our modelling, the unclaimed deposits fund around 70% of system costs;*
- d) Likely to generate savings to local authorities (and hence, to reduce the burden of taxation) by around £160 million;*
- e) Likely to deliver strong environmental benefits in terms of:
  - i. reduced greenhouse gas emissions and air pollutants, mainly from increased recycling, in the region of £69 million; and*
  - ii. additional benefits associated with the reduction in the disamenity associated with litter, potentially in the region of £1.2 billion.”**

It is important to highlight that the basis for this overall cost-benefit analysis finding is that it includes a significant disamenity cost associated with litter. This does need to be considered when interpreting the results – the health warning is therefore that whilst the modelling does demonstrate a compelling case the practicality of implementing this policy as per the modelling is untested. A further study goes on to develop an economic argument based on the extent of job creation through the implementation of such a system in the UK context. <sup>34</sup>

## 4.2 DRS Evidence

A summary table of a range of different countries’ experiences with DRSs is provided in Appendix A4.1. This details when each scheme was introduced, which containers are targeted, the capture rate and level of deposit.

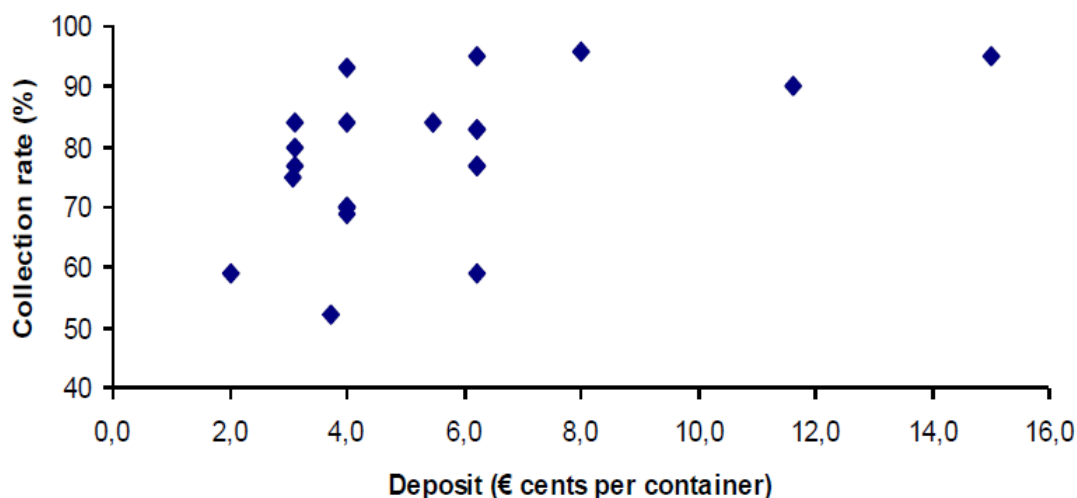
### 4.2.1 Level of Deposit

As shown in Appendix A4.1 the deposit per container varies with container type, size and country. As would be expected under economic theory, there is some evidence to suggest that deposit schemes’ return rates increase as the deposit increases, thus leading to an enhanced incentive to return the container. This relationship is shown in Figure 10.

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<sup>34</sup> Eunomia R&C (2011) *From waste to work: the potential for a deposit refund system to create jobs in the UK*, Report to the CPRE, Available: <http://www.cpre.org.uk/resources/energy-and-waste/litter-and-fly-tipping/item/2359-from-waste-to-work>

Figure 10: Return Percentages of One Way and Refillable Beverages



Source: System operators, Container Recycling Institute, Data from 1997-2002

#### 4.2.2 Effects on Recycling

In order to determine the effect of DRSs on recycling rates, an indication of ‘before’ and ‘after’ recycling performance is required. To some extent, this is made difficult by the absence of data of a usable form. However, where data is available there is a clear correlation between the implementation of DRSs and increased rates of recycling, with resultant recycling rates often cited as being higher than 80%. Whilst some of the studies are dated, they present indicative results that are still relevant in the context of national waste policy today.

In particular, good data is available for the US, where in some states DRSs have been in place for over 30 years. According to the US Container Recycling Institute, in 1999 beverage container recycling rates were far higher (72% on average by weight) in states with DRSs than those without (28% recycling rate).<sup>35</sup> Furthermore, the research also shows that the numbers of containers recovered per capita were far higher in the deposit states.

It is important to recognise here that the nature of the take-back system in deposit-refund schemes generally lends itself to the delivery of higher quality materials from the waste stream which has particular relevance for the UK in the context of ongoing issues around the quality of materials extracted for recycling.

#### 4.2.3 Knock-on Impacts of DRS

Also of interest is the performance of deposit schemes in the context of wider recycling systems. In Sweden, for example, between 2003 and 2005 the recycling rate for plastic packaging (not under the deposit scheme) increased from 17% to 30%. In the same period, recycling rates for PET (under the deposit scheme) increased from 77% to 82%. This alone does not tell us much as it should be recognised that PET bottles are readily recyclable.

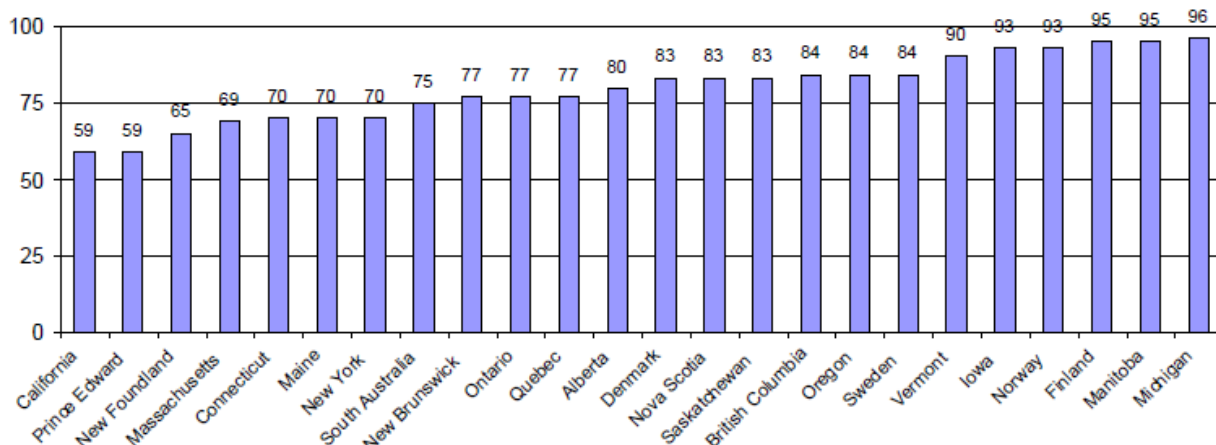
Perhaps more telling, however, is the performance in respect of metals in Sweden. Metal packaging recycling rates were around 65% in 2004-2005, but the recycling rate for

<sup>35</sup> <http://www.bottlebill.org>

aluminium under the deposit system was 85% to 86% in the years 2002 to 2007. Similarly, in Germany recycling rates in 2005 (two years after the scheme’s inception) for plastics, tinfoil, aluminium and glass were 50%, 85%, 76% and 79% respectively.

Reported collection rates under DRSs have been consistently high. Figure 11 shows collection rates achieved in 2002 across a wide range of deposit schemes. This shows that very few countries see low rates of return, with some jurisdictions achieving close to 100% return rates.

Figure 11 : Collection Rates (%) for Non-refillable Containers in DRSs (2002)



Note: Figures based on data collected from system operators, data from 2002

Source: Wolfgang Ringel (2008) Introduction on Deposit, Scottish Government Litter Summit, Edinburgh 26<sup>th</sup> November 2008.

Also of interest is the level of material quality achieved through deposit-refund schemes, which side step the issues of contamination faced by kerbside collection systems. For example, a U.S. study has reported that the largest user of secondary PET sources 90% of this material from states operating DRSs for this reason.<sup>36</sup>

### 4.3 Impact of Legislative Context

Taiwan is an interesting example as it differs from the European and American context because the deposit-refund scheme started without any other producer responsibility systems in place. Recycling rates started from a lower base at 41% in 1991. By 1992, the PET recycling rate had jumped to 80%.<sup>37</sup>

The scheme then ran into problems with manufacturers not registering with the scheme, under-reporting production, and not paying fees so that the fund ran into a deficit and had to reduce the refund from around US\$0.06 to around US\$0.02. However, recycling rates

<sup>36</sup> NCEE (2001), *The United States Experience with Economic Incentives for Protecting the Environment*, January 2001

<sup>37</sup> D. O'Connor (1996), *Applying Economic Instruments In Developing Countries: From Theory To Implementation*, Report for the OECD Development Centre, May 1996 [web.idrc.ca/uploads/user-S/10536145810ACF2AE.pdf](http://web.idrc.ca/uploads/user-S/10536145810ACF2AE.pdf)

continue to be high, reaching 100% and remaining there (which does, however, suggest that there continues to be some under-reporting of production).

#### 4.4 Costs

The cost of implementing deposit-refund schemes is a particularly murky area for analysis. Ultimately, the review of evidence in the area of 'costs' highlights a degree of polarisation in the debate concerning whether beverage packaging should be collected through deposit refunds or through separate collection systems.

Some studies have indicated that deposit systems are more cost-effective than other methods of reducing waste disposal, such as traditional forms of regulations, recycling subsidies, or advance disposal fees (ADF). A study by Palmer et al. concluded that a 10% reduction in waste disposal would cost \$45 per tonne of waste reduced under a deposit system, compared to \$85 per tonne under advance disposal fees and \$98 per ton under recycling subsidies.<sup>38</sup> The study, however, noted that the relatively high administrative costs of a real world deposit-refund system could outweigh these cost savings.

Evidence on such 'real world' administrative costs of DRS is sparse, with clear comparisons between schemes hindered by differing scheme structures and study methodologies. Traditional schemes, such as in Massachusetts, that require retailers to pay refunds to consumers, sort containers by brand name and store containers until bottlers collect them, are likely to be the most expensive to administer. Ackerman et al. found that this deposit/refund system costs 2.3 cents per container, which corresponds to approximately \$320/ton for a typical steel can.<sup>39</sup> Other designs for deposit/refunds may result in lower average admin costs, such as California's scheme which has administrative costs of only 0.2 cents per container, or \$28/ton for steel cans.

One study, by the BDA Group, sought to examine which collection system might be the best, and under what conditions.<sup>40</sup> The study considered the influence of the deposit-refund scheme on the costs of operating recycling services. Undertaken in Australia, it suggested that deposit schemes (referred to here as 'Container Deposits Systems' were much the most expensive option for recovering containers, at a cost of over \$1,400 per tonne of packaging material recovered (see Figure 12).

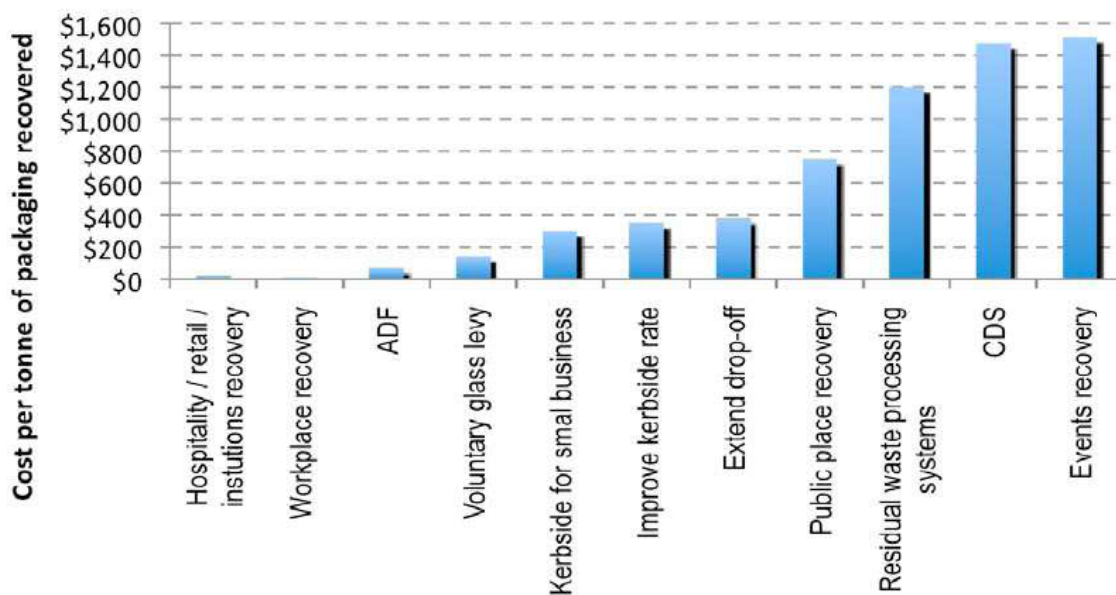
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<sup>38</sup> K. Palmer, H. Sigman and M. Walls (1997) The Cost of Reducing Municipal Solid Waste, *Journal of Environmental Economics and Management* 33, 128-50.

<sup>39</sup> Frank Ackerman, Dmitri Cavander, John Stutz, and Brian Zuckerman (1995) Preliminary Analysis: The Costs and Benefits of Bottle Bills, Draft report to U.S. EPA/Office of Solid Waste and Emergency Response, Boston, Mass.: Tellus Institute.

<sup>40</sup> BDA Group (2009) Beverage Container Investigation, Report for the EPHC beverage Container Working Group, March 2009.

Figure 12: Economic Cost per Tonne of Packaging Recovered under each Option



Source: BDA Group (2009) Beverage Container Investigation, Report for the EPHC beverage Container Working Group, March 2009.

#### 4.5 Summary: What are the Costs and Benefits of the DRS Approach?

There is a strong evidence base around the positive impact that implementation of a DRS has on recycling rates, with resultant recycling rates often cited as being higher than 80%. There are supplementary benefits to this including improved material quality and evidence to suggest that recycling rates for materials outside scope of the DRS can also improve.

What's much less decisive is the evidence of system costs, around which there is a degree of polarisation over views.

Whilst the UK administration has remained relatively open to such a policy, they have also been of the opinion that better value options for increasing recycling do exist.

With key players in the packaging industry being so firmly against such a system, this would require a strong political will and drive in order to reach UK-wide implementation. Eight trials are currently underway in Scotland, being managed by Zero Waste Scotland. As a result of which Scotland's Environment Secretary announced in August 2013 that a feasibility of a nation-wide DRS will be looked at.<sup>41</sup>

### 5.0 Pay As You Throw

Pay As You Throw (PAYT) schemes have been operating across the US and Europe for several years. PAYT charging schemes, sometimes called Direct and Variable Rate (DVR) schemes, charge users for the quantity of waste set out for collection. PAYT schemes are prevalent through Europe and the US and can take a variety of forms:

<sup>41</sup> [http://www.resource.uk.com/article/Latest/Zero\\_Waste\\_Scotland\\_launches\\_litter\\_poll-3543#.Ul65ndKmiSo](http://www.resource.uk.com/article/Latest/Zero_Waste_Scotland_launches_litter_poll-3543#.Ul65ndKmiSo)

- Volume-based schemes: under these schemes, typically, households are asked at the beginning of a particular year to say which sized bin they would like to use. The charge is then related to the size of bin used. These schemes are popular in the US, and have been popular in the past in Europe. It would seem, however, that there has been some move away from this type of system in favour of other variants (see below) in some countries;
- Frequency-based schemes: these schemes are based upon the frequency of service provided to the household. Two possibilities exist:
  - The household subscribes for a particular service frequency; or
  - Either tags, or electronic chips, are used to record when bins are emptied following their being presented in a specific way. This approach is increasingly common, and is widely used in the Netherlands and Belgium, as well as in part of Germany.
- Sack-based schemes: sack-based schemes are also volume based schemes. However, since the space available for refuse is not 'fixed', as with the volume-based bin schemes, there is a stronger incentive to reduce waste and recycle more.
- Weight-based schemes: in these schemes, bins are usually equipped with a transponder which is read by software on the collection vehicle as the bin is loaded. The bin is weighed when it is loaded on the vehicle.

These schemes are sometimes used in combination.

The following sections, based on a desktop evaluation of available literature, assess the success of PAYT schemes in respect to rates of recycling and the costs associated with their implementation. Case studies of PAYT schemes are detailed in A5.0.

## 5.1 UK Context

As described in Section 1.0, in the UK, the option to introduce PAYT trials was presented to local authorities through the previous government's Waste Strategy (2007). This strategy demonstrably supports PAYT systems as it stated: "to legislate to remove the ban on local authorities introducing [...] financial incentives for waste prevention and recycling." Defra was clear that any such schemes should be 'revenue neutral' and not result in a higher total tax take.

It was around the time of the trial launch that some sections of the media attacked the idea of PAYT, presenting it as a 'bin tax'. Such reports have led to privacy fears about the 'big brother' use of microchips in bins.

Following this series of press articles no trials were implemented and the policy's political support began to dwindle. The Coalition Government have now repealed the legislation, with reference to their preference for rewarding people over penalising people. Existing legislation forbids local authorities in England from introducing PAYT.<sup>42</sup>

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<sup>42</sup> Localism Act 2012

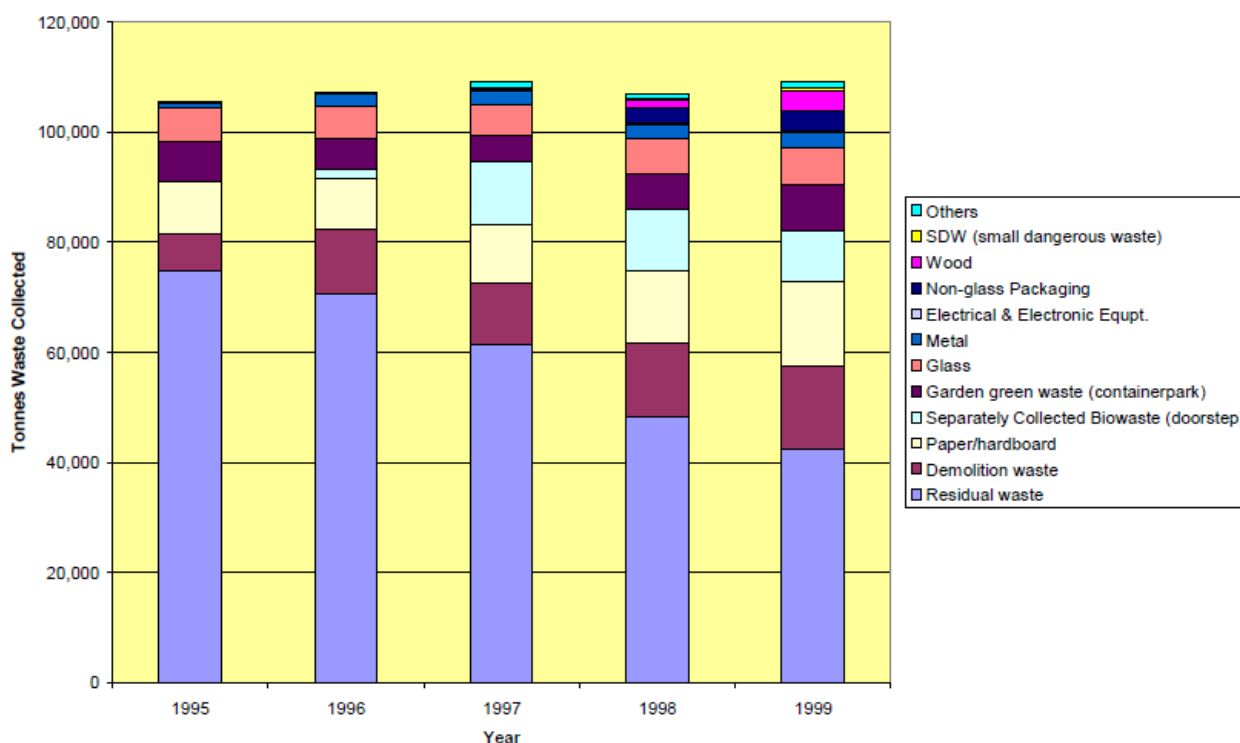
## 5.2 Effects on Recycling

The effects of charging on recycling are widely documented as they are relatively easy to measure. They broadly portray the efficacy of PAYT schemes at dramatically increasing recycling rates in various countries. Weight and frequency-based schemes have shown the best results in terms of waste reduction and increased recycling rates.

Of particular interest is a study into the Belgian experience of Ghent and Destelbergen.

Figure 13 shows improvements made in separate collection due both to improvements in provision of recycling services and also the introduction of charging in 1998. This trend is commonly observed following the introduction of charging schemes.

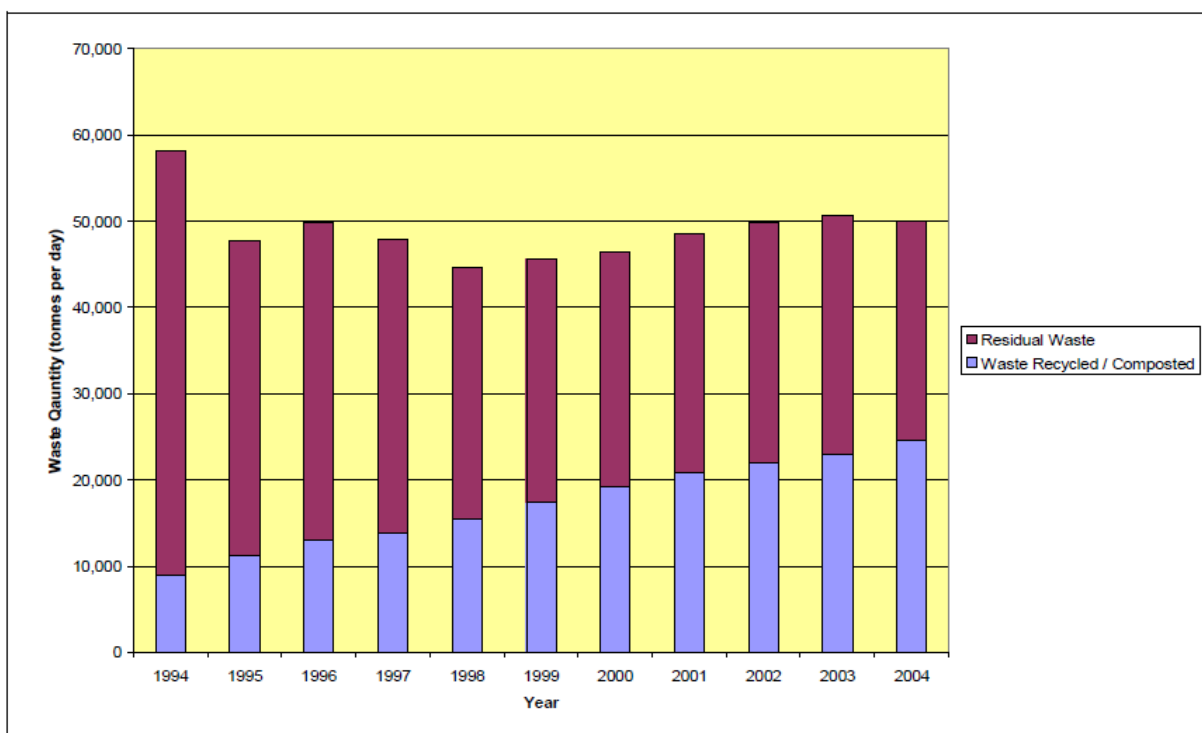
Figure 13: Evolution of Waste and Recycling in Ghent and Destelbergen



Source: Hogg, D. (2006) Impact of Unit-based Waste Collection Charges. Referred to within this report as 'the OECD charging review'. ENV/EPOC/WGWPR(2005)10/FINAL, Paris: OECD.

Korea became the first country to introduce a mandatory DVR scheme country wide when, in 1995, the Volume-Based Waste Fee (VBWF) was introduced. Headline results from the VBWF have been impressive: the amount of waste recycled or composted has increased from approximately 15% in 1994 to nearly 50% in 2004. The quantity of waste recycled has increased by over 250%.

Figure 14: Effects of Volume-Based Waste Fee in Korea



Source: Korea Environmental Policy Bulletin, Update Version of Issue 1, Volume 1, January 2006.

With regard to the impact of different charging and collection structures, a general assumption may be made that the order of ranking for both recycling and waste prevention is likely to be as follows (with the charging system with the greatest effect listed first):

- Weight (including biowaste) and frequency based (including biowaste);
- Sack based (including biowaste);
- Weight based (excl biowaste);
- Frequency based;
- Sack based (refuse only)
- Volume Based

Figure 15: Performance of Different Waste Systems in Denmark

	Residual Waste (kg/inhab)	Paper and Card	Glass	Total	(Increase in) Paper Captures	(Increase in) Glass Captures
<b>Weight-based</b>	325	108	38	471	71%	87%
Reference	729	67	34	830	41%	77%
Difference	-404	41	4	-359	(+30%)	(+10%)
Difference in %	-55%	61%	12%	<b>-43%</b>	(+73%)	(+13%)
<b>Volume-based</b>	552	104	40	696	61%	89%
Reference	660	76	30	766	44%	67%
Difference	-108	28	10	-70	17%	22%
Difference in %	-16%	37%	33%	<b>-9%</b>	(+39%)	(+33%)

Source: Tønning (2000)

Research published by the Danish EPA, summarised in Figure 15, suggests that weight-based systems deliver the strongest effect both in terms of the reduction in collected waste and in terms of the increase in recycling.<sup>43</sup> However, whilst the results of this study look impressive, the research did not include 'whole system' waste. In other words, the waste could simply be simply moving through different routes in the system, such as Civic Amenity sites.

Dutch studies looking at data from the Netherlands Waste Management Council (AOO) for 1998, 1999 and 2000 support the findings from Denmark and the ranking of charging systems. It found that:

- Weight-based schemes reduce total waste by 38%;
- Sack-based schemes with charges also placed on compostable waste reduce total waste by 36%. Where compostable waste is not charged for, the reduction in total waste is 14% (the difference in the two is reflected mainly in the quantity of material collected separately from the kerbside);
- The frequency based system delivers a reduction in total waste of 21 %; and
- The volume based bin system delivers a reduction in total waste of 6%.<sup>44, 45</sup>

This data suggests that the approach to the charging of garden waste is also important, and these high results are probably indicative of the Netherlands experience where garden waste had previously been collected free of charge (so giving greater scope for reduction).

### 5.3 Costs Of Implementation

Costs of implementing schemes depend upon the nature of the scheme itself (sackbased, frequency-based, weight-based, etc.). They also depend upon the nature of the scheme already in place. This is especially true with respect to payment, or 'billing' for waste generated. Key set up costs include:

- Informing communities;
- Equipping containers as necessary;
- Equipping vehicles as necessary;
- Billing software;
- Arranging for sale of sacks as necessary;
- Introducing teams to check up on fly-tipping; and
- Service lines to deal with start-up queries.

Establishing a new billing system, where the pre-existing situation is a collection of revenue through flat-rate charging, can take up a significant part of the set-up cost. In such situations, prior to pay-by-use being introduced, waste related fees would have been included as part of a wider charge on services provided by, or on behalf of the public sector.

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<sup>43</sup> K. Tønning (2000) Fordele og ulemper ved gebyrdifferentierede indsamlingssystemer for husholdningsaffald, Teknologisk Institut, Miljøprojekt 576, Report for the Danish EPA

<sup>44</sup> E. Dijkgraaf and R. Gradus (2003) Cost Savings of Unit-Based Pricing of Household waste, the case of the Netherlands. Research Memorandum 0209, OCFEB, Erasmus University, Rotterdam.

<sup>45</sup> E. Dijkgraaf and R. Gradus (2004) Cost Savings in Unit-based Pricing of Household Waste: The Case of The Netherlands, Resource and Energy Economics, Vol.26 (2004) 353-71 (note, the former paper is somewhat more extensive in its treatment).

A report published by Defra assesses the costs associated with a broad implementation of charging schemes across England. Key figures are shown in Figure 16. These suggest that sack-based schemes are the least costly to introduce, whilst frequency-based and weight-based systems are almost three times more expensive.<sup>46</sup>

It should be noted that these costs were modelling costs (based on researched itemised costs) for partial (71%) roll out of a range of different charging schemes across England. What is not shown in the headline table is the cost benefit of universal roll out of one or other particular charging approach in any particular local authority. Further analysis revealed that the net cost/benefit per charged household could result in an annual saving of almost £12 per household.

Indeed, such annual savings have been experienced abroad. In Germany, for example, after changing to the pay per-volume system, the county Gießen has saved costs estimated at €1.3 million per year.<sup>47</sup> Here, the investment costs for the county to implement the scheme were outweighed by the reduction in the quantities of residual waste, and constraint on total waste.

Figure 16: Key Costs for Introduction of Charging Schemes

		Sack-based	Bin Volume- based	Frequency- based	Weight- based
	<i>Unit Price</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
<b>CAPITAL ITEMS</b>					
<i>Fleet management software</i>	£5,000			1	1
<i>Scanners</i>	£1,500			2	2
<i>Delivery and Scanning of Bins 65</i>	£65,000			1	1
<i>Startup Call Centre 25 700hrs 8400 up to 30</i>	£30,000	1	1	1	1
<i>Start up Info</i>	£100,000	1	1	1	1
<i>Bin changes (averaged over 10 years)</i>			£0.17		
<b>Annualised Capital Cost per hhld</b>		£0.49	£0.66	£0.77	£0.77
<b>OPERATING COSTS</b>					
<i>Additional Staff for Implementation / queries</i>	£24,000	2	2	2	2
<i>Additional Monitoring of Fly-tips</i>	£50,000	1	1	1	1
<b>Annual Cost per hhld</b>		£1.96	£1.96	£1.96	£1.96
<b>TOTAL COST PER HHL D (before billing)</b>		£2.45	£2.62	£2.73	£2.73
<b>Billing Costs (per hhld)</b>		1p per sack sales revenue to vendors	£5.08	£5.60	£5.60
<b>TOTAL COST PER HHL D (after billing)</b>		Approx £3.00	£7.70	£8.33	£8.33

Source: Hogg, D., Wilson, D., Gibbs, A., Astley, M., Papineschi, J. (2006) Modelling the Impact of Household Charging for Waste in England, Final Report to Defra.

<sup>46</sup> Source: Hogg, D., Wilson, D., Gibbs, A., Astley, M., Papineschi, J. (2006) Modelling the Impact of Household Charging for Waste in England, Final Report to Defra

<sup>47</sup> EUWD from 23.08.2005, p. 11.

## 5.4 Summary: What are the Costs and Benefits of PAYT?

Despite widespread implementation, UK local authorities are currently legally restricted from implementing a PAYT system. A review of the background leading to this current viewpoint suggests that the government were strongly influenced by specific media and public opinion.

In fact, a review of evidence demonstrates the strength of the impact of PAYT – both from an environmental and financial perspective.

The effects of charging on recycling are widely documented as they are relatively easy to measure. They broadly portray the efficacy of PAYT schemes at dramatically increasing recycling rates in various countries. Weight and frequency-based schemes have shown the best results in terms of waste reduction and increased recycling rates.

The case study evidence from a German system (in the county Gießen) shows how the investment costs for the county to implement the scheme were outweighed by the reduction in the quantities of residual waste, and constraint on total waste.

PAYT is a compelling policy with demonstrably positive financial and environmental impacts that is currently unavailable as a tool to UK local authorities.

## 6.0 'Pay As You Throw' in the UK

Although local authorities are not permitted to charge for residual waste collection, authorities have sought to create cost disincentives that *are* within the law. Although these authorities have argued that residents are not being charged for either the collection or disposal of waste (which is not legal) and that these schemes are not therefore PAYT, they have the same effect and are the closest thing to PAYT found in the UK.

There may be other opportunities, also within the law, to increase the costs of residual waste collection to the residents who put out the most waste.

### 6.1 Existing UK Implementation of 'PAYT'

The legal position regarding authorities' rights to trade in services is complicated and described across a number of pieces of primary legislation.

The position with respect to charges for collection of household waste is apparently more straight-forward and is set out in Section 45 of the Environment Protection Act 1990 (EPA) which imposes a duty on local authorities to collect and dispose of household waste. Article 45 (3) of the EPA proscribes charging saying 'No charge shall be made for the collection of household waste except in cases prescribed by the Secretary of State'.

There is however to still be some room for interpretation as described in general terms, *and without the aid of legal advice*, below.

Article 46 (1) of the EPA states:

*'Where a waste collection authority has a duty [...] to arrange for the collection of household waste from any premises, the authority may, by notice served on him, require the occupier to place the waste for collection in receptacles of a kind and number specified.'*

Article 46 (2) continues:

*'The kind and number of the receptacles required under subsection (1) above to be used shall be such only as are reasonable...'*

Article 46 (3) says:

*'In making requirements under subsection (1) above the authority may, as respects the provision of the receptacles- [..]*

*(b) propose that they be provided, if the occupier agrees, by the authority on payment by him of such a single payment or such periodical payments as he agrees with the authority..'*

Whilst the collection and disposal of waste cannot be chargeable, the legislation is clear that the authority can require residents to put out their waste in containers of a certain type and number as long as that containment is 'reasonable' taken to mean generally sufficient. If by exception residents need extra capacity for their residual waste and these containers are not available from any other source other than the council – perhaps because the authority requires the resident to use a certain type and colour of refuse sack – then the authority may charge for their provision.

Since 2005 Eden Borough Council has provided households with up to five residents with two free sacks a week (different provisions exist for larger households and specific other situations). Residual waste is only collected from these sacks which are blue and clearly identifiable. If residents want more capacity, then they can buy additional sacks at a cost of £1.30 / sack.

Similarly, since 2011 Wokingham Borough Council has provided residents with 80 free sacks per year (also blue). If residents require additional and are not from large households, then these are available to buy from the council at a cost of £4 for a roll of ten.

These services have no doubt been introduced for a variety of reasons but they have the clear effect of creating a reasonably tight limit on the amount of waste that residents can dispose of free of charge and, above this threshold, levy a charge for the extra volume of waste that a service user sets out. In effect, this is a form of PAYT.

Whether or not this approach is legal has been a matter of some debate and in April 2011 Defra and CLG issued a letter to all local authorities warning against the introduction of 'backdoor bin charging'.<sup>48</sup> The letter was public and fairly unequivocal, perhaps as a result of ministerial steer, saying:

*"councils cannot introduce 'backdoor' bin charging for mainstream waste collections or waste disposal. Such stealth taxes are not legal and are contrary to the policy direction of the new Government."*

The situation is however more complex and ambiguous than this implies, as is revealed by a package of information released under Freedom of Information (FoI).<sup>49</sup> The FoI information comprises internal Defra communications and letters; emails between Defra and DCLG officials; and emails between Wokingham and Eden councils. All of it relates to the issue at hand and shows that the Defra / DCLG 'backdoor bin charging' letter had its genesis in a meeting between Carolyn Spelman and Eric Pickles at which the planned service change in Wokingham was discussed.

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<sup>48</sup> Defra-CLG Letter to all Local Authority Chief Executives

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/6265/1884691.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6265/1884691.pdf)

<sup>49</sup> Internal Defra and Defra and Local Authority Correspondence

<https://www.whatdotheyknow.com/request/88900/response/240047/attach/4/EIR%204300%20items%20released.pdf>

Given that the situation has never been tested in court, the position remains somewhat ambiguous. It is revealing however that following from both the public and private communications with central government, both Wokingham and Eden have opted respectively to introduce and retain their restricted residual waste policies.

It is worth noting also, that a handful of other authorities around the country have similar policies in place.

## 6.2 Possible Future Implementation of PAYT in the UK

Our view is that there may be other approaches to the effective implementation of PAYT in the UK.

Whilst authorities are required to provide for the collection of household residual waste free of charge, there is no obligation to provide these collections at any specified frequency. It is for this reason authorities find themselves pressured and incentivised by central government, but not compelled, to offer weekly collections.

Given this flexibility and developing cost pressures some authorities have started to consider their options for still *less* frequent collections. Eunomia is aware of a number of authorities which are considering monthly residual waste collections and Cardiff has recently announced a public consultation which will look at this issue (amongst others) directly.

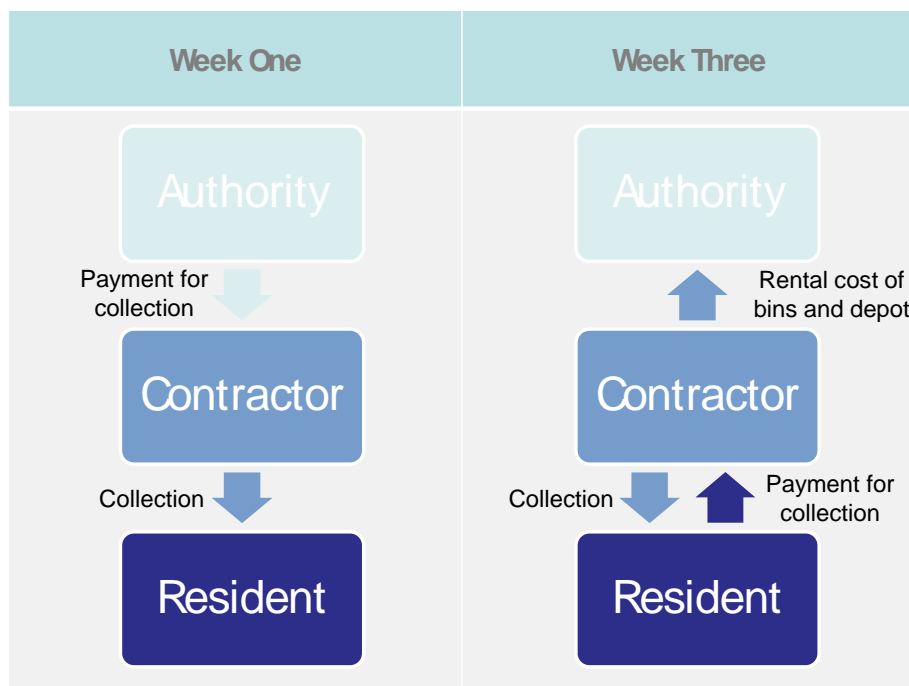
Although waste data shows that authorities with fortnightly residual collections tend to perform better (with lower residual arisings and better recycling rates) than authorities with weekly collections, it appears that much of the impact derives from the capacity that the authority provides for residual waste. A 240L bin collected fortnightly is equivalent in practice to a 120L bin collected weekly.

Clearly, unless Cardiff or any other authority considering a move to monthly collections simultaneously roll-out much larger bins, which is obviously unlikely, then monthly collections constitute both a frequency change and an effective capacity change. As such they are likely to have a positive impact on residents' waste behaviours and stimulate higher levels of recycling.

Our view would be that a monthly collection of residual waste is only viable if good and frequent (weekly) recycling and food waste services are also available. With these in place residents will have sufficient capacity for all of their materials if they use the various services provided to them properly.

None the less, one might expect that if the collection of residual waste was to become monthly, there may at that point be some demand from some residents for more frequent collections and that this demand might be met by a private contractor. It would be sensible for any local authority considering such a change to anticipate this and prepare accordingly. We envisage a scenario where public and private sectors collaborate to offer a good recycling service and a sufficient residual waste service free of charge, as part of the council's services, with 'top-up' residual collections provided by a contractor working with the authority's knowledge and agreement. These top-up collections would be chargeable as illustrated in Figure 17.

Figure 17: Public / private residual waste collection



Under such an arrangement, residents would continue to receive a good and sufficient service free of charge, albeit one which created reasonable pressures in terms of bin capacity to recycle to the highest possible levels.

For residents unprepared to recycle, other options would remain in place but which would require them to make fair payment for the removal of their excess waste. Where residents chose to opt-in to receive fortnightly collection of residual waste, they might under this arrangement be able to continue to use their authority-supplied bins with collections made in authority-liveried vehicles. The service would appear seamless although with payment required for additional collections.

The authority would expect to receive a consideration from the contractor for the use of bins and vehicles, thus taking an additional financial benefit from reducing the frequency of its residual waste collection.

There are various issues that might complicate the introduction of such a service including both political/reputational and operational (on both council and contractor side).

None the less it appears to us that if such an arrangement is practicable and legal, it would be preferable to a situation in which multiple private sector operators vied with each other to provide top-up collections. It also has various advantages by creating an increased practical (bin capacity) incentive to recycle, a financial incentive to recycle, the prospect of reduced costs for the authority, new revenues for the authority and a potential source of new revenues for their contractor.

## 7.0 Conclusions

### 7.1 UK Reward Schemes

This review has been undertaken using the most up-to-date evidence available. Whilst it has not been possible to compile a *comprehensive* dataset for each scheme, elements of the evaluation framework have been completed for each of the schemes within scope of this

research.

Ultimately, there is not a huge evidence base. Firstly, that is associated with the relatively limited level of scheme implementation across the UK. Secondly, there is a very high number of changing and interacting variables associated with each scheme. In other words, the term 'reward schemes' covers a large spectrum so comparing like-for-like is challenging.

Setting the data challenges to one side, this research has sought to understand the key messages associated with the use of reward schemes based on the available evidence base. What we have presented here is therefore the very latest results on the subject of rewards, an area which has received a great level of attention in the industry over recent years.

The residents' view is that they believe they are already recycling what they can. **The residents' view on how their behaviour may change as a result of reward schemes implies a limited impact.**

Residents' views are to some degree reflected by the tonnage impact data. Based on a small sample it appears that the impact on residual waste arisings is varied and whilst recycling rates are seen to increase (for three out of the five authorities), when compared to benchmark authorities without incentive schemes the data picture becomes much less clear.

One would expect that if reward schemes had a reliable and strong impact, the data picture would be much clearer.

There is no data to demonstrate the long-term impacts of incentive schemes.

Whilst patterns of improved performance across various schemes are difficult to identify, what *is* clear is that some well performing reward schemes have been identified, which perform positively (in one instance relative to benchmark authorities).

It has not been possible to clearly establish *why* this variance in performance exists in terms of the reward scheme's design although the evaluation framework sought to achieve this. A whole range of scheme types were tested to see if, as a category, some were more successful (in terms of tonnage and participation impact) than others. No pattern emerged which might relate to the relatively limited aggregate impact of the schemes considered.

The quality of the scheme management is a characteristic which has not been tested. One view might be that those with more reward scheme experience, and/or those with a commercial outlook on the scheme, may run better performing schemes generally. Testing 'quality' is subjective and isn't something we have considered. Any proposed work by Defra to develop guidance on how a scheme should be structured is likely to be useful to local authorities in this context.

**Ultimately, schemes are seen to vary in terms of the impact that they have and this analysis has not revealed any particular patterns as a means of explaining this variance.** Even under circumstances where data was more forthcoming in quantity and of a higher quality (greater degree of consistency) there is some doubt over whether this would alter the above finding. **There is no strong recommendation for further research on this basis.**

To date, no schemes have been reviewed that have collected compositional data therefore it has not been possible to undertake compositional analysis in order to provide an indication of potential contamination. Anecdotally, no known issues of increased contamination have been reported. **However, it is possible that there may be a level of reward which is sufficient to influence contamination.**

Value for money is unproven although some of the cheaper schemes are closer to offering cost benefits through reduced disposal costs and increased material revenues. Furthermore,

most schemes appear, from the incomplete data available to us, to cost more to operate than the evaluated benefits they deliver.

**A number of officers felt that reward schemes create an excellent opportunity to promote their recycling services and behaviour change in a new and interesting way.** This implies that allocating a relatively low budget to the reward scheme and a relatively greater budget to communications is sensible. This would allow for the running of an effective behaviour change communications campaign. Good communications guidance is available and following it will be vital on outcomes with or without a reward scheme.<sup>50</sup>

It was also suggested (but by only one officer) that working with local businesses to provide rewards was seen as a positive step for a local authority – they are seen as assisting to boost the local economy and developed good relationships with local business people.

There are a range of options available to authorities to improve the performance of kerbside collection schemes (e.g. communications, containment capacity, service design). We have looked at the impacts of constraining the capacity of residual waste containment as one example of an alternative approach to promoting recycling performance. Certain of these alternative service design approaches have a strong and demonstrable impact on performance, which greatly exceed the observed impact of the reward schemes we have reviewed, which are more variable and limited. **Reward schemes should be evaluated against other investments and changes which are more clearly demonstrated to deliver performance gains.**

More data is required before definitive conclusions can be drawn and it is welcome that more evidence will be produced by Defra's funding of the Reward and Recognition programme. Our expectation at this stage however, based on this work and a review of the literature is that longer studies of larger numbers of authorities will likely reveal a similarly mixed picture.

Reward schemes have been trialled and studied in 2001 by the London Mayor, studied in 2005/06 by Defra and are being trialled and studied again. None of these trials have led to the subsequent widespread roll-out of reward schemes. Reward schemes have been rolled-out overseas, particularly in the United States, but many of these have been later withdrawn, in part because of poor cost-justification.

Until the Defra study is complete, and only if the data at that point reveals an unequivocal and reliably positive impact, our view is that authorities and their contractors may wish to defer any plans they might have to introduce new incentive schemes.

## 7.2 International Incentive Schemes and Alternative Mechanisms

Carefully evaluating UK recycling rewards alongside other options is fundamental in order to understand if other tools could be as effective or more effective at a comparable or lower cost.

### 7.2.1 Deposit Refund Schemes

The case studies explored in this review portray deposit-refund systems and pay as you throw schemes as being broadly positive measures with tangible effects on recycling rates.

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<sup>50</sup> WRAP (2011) *Increasing Recycling Through Effective Communications*.

Where data is available there is a clear correlation between the implementation of DRSs and increased rates of recycling, with resultant recycling rates often cited as being higher than 80%. Whilst some of the studies are dated, they present indicative results that are still relevant in the context of national waste policy today.

In particular, good data is available for the US, where in some states DRSs have been in place for over 30 years. According to the US Container Recycling Institute, in 1999 beverage container recycling rates were far higher (72% on average by weight) in states with DRSs than those without (28% recycling rate).<sup>51</sup> Furthermore, the research also shows that the numbers of containers recovered per capita were far higher in the deposit states.

### 7.2.2 Pay As You Throw

The effects of PAYT schemes are well documented and point to an impressive increase in recycling rates, as well as overall waste prevention. Research suggests that weight and frequency-based schemes are the most effective, with volume-based initiatives bringing up the rear. Costs of initiating a PAYT scheme strongly depends on the type of scheme in question, the most significant overhead being the development of a new billing system. Defra have suggested that the total cost of implementing such a scheme would be in the vicinity of £3.00 to £8.33 / household, after billing. There is good and widespread evidence which shows however that upfront investment costs are likely to be outweighed by the savings made from the reduction of overall waste tonnage generated.

### 7.2.3 Availability of Alternative Incentive Schemes in a UK Context

Whilst there is strong evidence showing the positive impact of PAYT and DRSs, current legal and practical operational constraints mean that these schemes are of largely theoretical interest to UK local authorities.

Whilst DRSs are legal they require a complex administrative system and national cooperation which would require strong political support.

Some authorities have taken an approach whereby they charge for the collection of larger volumes of household residual waste alongside their normal and free (at the point of service) collections. Under these schemes, residents can buy additional sacks if they wish to set out larger quantities of residual waste.

If the trend to less frequent residual waste collection continues, which is in effect equivalent to a reduction in capacity and has the impact of reducing residual waste set-out, then we might expect to see councils providing only monthly collections as part of their normal service. Some authorities are already considering this.

If this were to happen we might expect to see private sector providers offering top-up residual waste collections creating a PAYT system outside the public sector. There are models that can be envisaged where the authority might want to facilitate the provision of these private sector services for the practical benefit of their residents and where the authority might take a payment from the contractor for doing so.

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<sup>51</sup> <http://www.bottlebill.org>

## APPENDICES

## A1.0 International Reward Schemes

### A1.1 Recycling Perks

Recycling Perks<sup>52</sup> operates on a similar model to Recyclebank, but on a more local scale. The essential premise of recording recycling behaviour in exchange for points is the same, but the incentive schemes are addressed specifically within the 8 participating U.S. cities, with rewards coming from local businesses rather than also national brands. The engagement of local businesses is secured by providing them with free advertising and increased customer numbers in exchange for offering discounts or offers as rewards under the scheme.

An additional element to the Recycling Perks scheme is that scheme members receive invitations to activity days and events through participation in which they can earn extra points whilst further benefiting the local community.

### A1.2 Recycle Smart Bin Inspection Scheme

Environmental education company Recycle Smart ran a scheme in which residents could receive a \$10 gift card in exchange for recycling correctly. A team was employed to perform a weekly check of the recycling bins of all those residents signing up for the scheme.<sup>53</sup>

As an additional incentive, households with their bins in order were eligible for inclusion in a prize draw to win \$1000.

### A1.3 Singapore Schemes

The Jurong district of the island of Singapore plays host to a scheme allowing residents to claim incentives for recycling by taking their sorted materials to one of five collection stations throughout the area. The program is run by waste firm Colex as part of Singapore's National Recycling Program.<sup>54</sup>

Recyclables include paper, glass, aluminium, plastic and textiles, and are either exchanged for small cash sums (between 5 and 50 cents per kilograms depending on the material), or vouchers which can be put towards the purchase of food items.

Another waste service provider run scheme in Singapore is Veolia's GRIN (Grow Your Recycling Incentives Now) scheme<sup>55</sup>. This scheme works on a points system, with one point being granted for every kilogram of recycling collected (with a minimum requirement of 3 kilograms). Points can be redeemed at participating local businesses.

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<sup>52</sup> <http://www.recyclingperks.com/>

<sup>53</sup> *Ashfield Council signs up to new RecycleSmart scheme to be trialled in Haberfield*, Sharple, S, the Telegraph, July 2013 <http://www.dailytelegraph.com.au/newslocal/inner-west/ashfield-council-signs-up-to-new-recyclesmart-scheme-to-be-trialled-in-haberfield/story-fngr8h4f-1226683106120>

<sup>54</sup> <http://www.zerowastesg.com/tag/cash-for-trash/>

<sup>55</sup> *Recycling incentive schemes yet to gain widespread support*, Chua, G, Wild Singapore, July 2013 <http://wildsingaporenews.blogspot.co.uk/2013/07/recycling-incentive-schemes-yet-to-gain.html#.Ujxw5j-Jqno>

Points are allocated to either households or housing blocks, with the distribution remaining fair due to the fact that housing blocks should produce proportionally more recycling, and therefore generate more points. Monitoring of materials collected occurs through chips implanted in bins.

#### A1.4 Mexico City Vegetable Incentive Scheme

Mexico City is host to a government scheme in which recyclable materials are taken to a monthly vegetable market in return for vouchers which can be exchanged for the produce.<sup>56</sup>

The market has proved highly popular amongst residents, with around 12 tonnes of material being collected each time. In fact, recent success has seen many recyclers leaving disappointed, with demand exceeding the numbers of vegetables available as incentives.

The scheme is intended primarily as an educational and engagement project, the idea being that residents become accustomed to sorting their waste and thinking of it as a resource.

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<sup>56</sup> *Mexicans flock to recycle plastic bottles in exchange for food vouchers*, Tuckman, J, the Guardian, July 2013, <http://www.theguardian.com/world/2013/jul/18/recycling-popular-mexicans-food-vouchers>

## A2.0 Methodology

### A2.1 Evaluation Framework

Table 19: Scheme Typology and Delivery

Behavioural focus	Prevent	Reduce
		Repair
	Reuse	Donate
		Buy reused
	Recycle	Prepare for reuse
		Recycle more
Recycle correctly		
Type of intervention	Reward	Vouchers
		Charity donations
		Points
		Cash
		Discounts
		Community based
		Prize draw/ competition
	Recognition	Feedback on behaviour
		Thank-you
		Information on benefits
	Mechanism	Weight based
		Competition based
	Incentive type	Value
		Duration
	Defra Intervention category	Community/ group rewards
		On the go recycling
		Housing association
		Furniture re-use organisation
		Individual feedback
		Individual rewards
Individual rewards (no commercial partners yet)		
Prize draw scheme		
Collection system/ context details	Type	Kerbside
		Bring bank
		On the go
	Frequency of collection	
	Provision of receptacles	
Any service changes throughout intervention		
Audience	Contextual factors	Size
		Socio-demographics
		Local index of deprivation
		Defra environmental segmentation
		WRAP committed recycler metrics
		Housing type (e.g. flats, houses of multiple occupancy)
		Location
		Moments of change
	Target audience	Individual
		Household
		Community
		Organisation
Delivery	Who	Role of business
		Local Authority
		Community organisation
		Partnership
	How? Using which tools/ activities?	Print/ comms material
		Adverts
		Website
		Events
		Infrastructure
Toolkits		

Table 20: Qualitative inputs and assessment - how will these be monitored

Delivery critical factors	Scheme management	
	Partners	
	Process	
	Skills and capacity	
	Communications	
	Delivery against objectives	
Behaviour change critical factors	Motivation	
	Experience	
	Understanding	
	Response	
	Diffusion	
	Spillover into other behaviours	Positive
Wider community impacts	Social capital	
	Community cohesion	
	Neighbouring areas/ beyond immediate community	
Barriers (including how these could be overcome and their impact)	Individual	
	Social	
	External	

Table 21: Quantitative inputs and impacts - how will these be measured?

Financial cost inputs	Defra funding	
	Additional funding	
	Opportunity costs	
	Capital items	
	Revenue costs	
	M&E costs	
	Rewards/ prizes	
	Communications	
	Training	
	In-kind contributions	
	Cost savings (e.g. avoided landfill tax)	
Tonnes in standard units (i.e. kg per participating household)	Recycling tonnages	
	Re-use tonnages	
	Residual tonnages	
Usage monitoring	Existing recycling/ re-use rates	
	Participation rate	
	Set out rate	
	Claimed waste behavioural and attitudinal change (e.g.	Type of change
		Extent of change
		Sustainability of change (beyond evaluation timescale)
Customer satisfaction		
Material capture	Capture rates	
	Contaminated loads	
	Compositional change/ analysis	
Other	Media profile	
	Carbon savings	

### Implications

- Scaling up
- Replication
- Transferability of lessons learned
- Sustainability (beyond evaluation timescale)
- Evidence gaps (how could these be addressed)

### Fund process:

- Motivation for bidding
- Evaluation process
- Fund administration
  - Timetable
  - Bidder selection and support
  - Reporting requirements

How can the quality of evidence be improved?

- Robustness of approach
  - Validity
  - Reliability
  - Objectivity
  - Credibility
- Qualitative data
  - Additionality
  - Attribution
  - Fit for purpose
- Quantitative data
  - Lack of bias
  - Accuracy
  - Consistency
  - Magnitude of effect
- Assessment
  - Expert involvement
  - SWOT analysis
  - Experienced researchers

Key research objectives:

1. Understand and measure the impact of the RRF pilots on improving waste behaviours
2. Understand and measure the take-up of the RRF schemes, and how participation varies across the different pilot schemes and audience groups
3. Understand the barriers to take-up of the RRF schemes by the target audiences
4. Identify the critical factors which make the RRF schemes successful
5. Assess the effectiveness and cost effectiveness of the RRF schemes
6. Compare and contrast the effectiveness of the different projects' intervention methodologies and approaches - identify which approaches are more successful at delivering change and why
7. Identify where is there potential for scaling up and replication of projects on a wider scale
8. Learn lessons about the impact of the projects to share with other organisations
9. Identify implications and evidence gaps to help inform the funding of any further pilot schemes

## A2.2 Usage Monitoring

There are two key figures to look at when considering usage monitoring; these are described in sections A2.2.1 and A2.2.2 below.

### A2.2.1 Participation in the Recycling Incentive Scheme

Participation in the recycling incentive scheme is the number of households that have taken part in the scheme as a percentage of the total number of households targeted by the scheme. This provides a key indicator of how 'popular' or 'attractive' the scheme is to

the residents. However, this information is only available where the relevant authority or organisation operating the scheme has recorded and publicised the information. The majority of incentive schemes for which we have received a sufficient amount of data include scheme participation information. Participation is used as a key indicator in Section 3.5.

### A2.2.2 Change Participation in the Kerbside Collection Service

Participation in the kerbside collection service is different to participation in the recycling incentive scheme, as the kerbside collection service would typically cover all or the majority of households in the authority, whereas the incentive scheme may only cover a small area, such as a ward, or a certain type of housing, such as high rise flats.

Participation in the kerbside collection service is a measure of the number of households taking part in the recycling collection from the kerbside provided by the local authority on typically a weekly or fortnightly basis, as a proportion of the total number of households that receive the kerbside collection service. In theory, a successful recycling incentive scheme could have an impact on participation in the kerbside collection service across the whole authority.

This potential impact could be observed by looking at the percentage change in participation rates between a period before introduction of the recycling incentive scheme, and the same period a year later (after the scheme has been implemented). However, obtaining this information depends on whether the local authority records participation data; not all authorities do. Unfortunately, only two out of the seven authorities for which we have received sufficient data monitor participation in their kerbside collection services. Due to the lack of data for this metric, we are unable to investigate this further in the data analysis.

## A2.3 Tonnage Data

One of the key types of information considered when investigating the impact of recycling incentive schemes is tonnage data. There are two main approaches to comparing before and after scheme implementation:

1. One approach to doing this is to set-up a pilot area and a control area within the same local authority. This ensures data covering the same time frame can be compared, and controls for service changes. However, there is only one instance of where this has occurred.
2. The second approach is to compare data for the area in which the scheme has been implemented from the same time of year, before and after implementation. Using this approach assumes that no kerbside collection system changes have been implemented, and where this is the case data has either not been included, or known issues with the data are highlighted. This approach also does not account for changes which would have happened over time due to external factors (i.e. not the kerbside collection system or the incentive scheme, but e.g. economic climate). In order to account for these external changes a benchmarking approach has been taken.

It is also worth noting that for schemes not rolled out on a borough wide basis, receipt of tonnage data was dependent on scheme providers collecting and sharing this information, as WasteDataFlow (WDF) would be unsuitable.

Where possible, tonnage data for both residual waste and recyclable materials was obtained directly from the relevant authority or organisation. Where detailed information

was not available from the authority/organisation, data was obtained from WasteDataFlow. Data was collected from two distinct periods; one quarter before the introduction of the scheme, and the same quarter a year later, after the scheme had been fully implemented. The reason for looking at data from the same quarter one year apart is to avoid the seasonal differences between waste arisings in different quarters.

## A2.4 Costs

### A2.4.1 Cost-saving Calculation

[Residual waste avoided (tonnes) x median landfill gate fee including landfill tax (£/tonne)]

+ [Increase in recycling (tonnes) x income for materials (£/tonne)]

**Residual waste avoided:** the difference between pre-scheme and post scheme residual tonnages (looking at the same financial quarter before and after introduction of scheme e.g. if scheme started in October 2012 we would look at pre tonnage for Jul-Sep 2011 and Jul-Sep 2012).

**Median landfill gate fee including landfill tax:** taken from the Gate Fees Report 2012/ 13

**Increase in recycling:** the difference between the pre-scheme and post-scheme recycling tonnages (looking at the same financial quarter, as described above for residual waste avoided)

**Income for materials:** we have worked out lower and upper limits based on

- a) *Lower limit:* based on the median MRF gate fee taken from the Gate Fees Report 2012/ 13
- b) *Upper limit:* based on material composition taken from the WDF Guidance Note 15 (see Type 2 in Figure 5, page 7 of 11: [http://www.wastedataflow.org/documents/guidancenotes/Specific/GN15\\_Recording\\_Co-mingled\\_Materials\\_1.0d.pdf](http://www.wastedataflow.org/documents/guidancenotes/Specific/GN15_Recording_Co-mingled_Materials_1.0d.pdf)) and material prices from the WRAP MPR for the same timeframe in which Gate Fees data was collected (November – January 2012/ 13).

These cost savings cover the change in costs/savings of residual disposal and recycling treatment/ sale. They do not account for changes to collection costs. Finally, they assume no additional cost savings for any side waste which may have been impacted upon.

### A2.4.2 Cost of Scheme

For those schemes being managed by external delivery organisations in particular, cost data is considered to be commercially sensitive and must be presented with this in mind. In order to understand key patterns data has been both anonymised and categorised.

- Costs per household/ year
  - Up to £1 → £
  - £1.00 - £2.00 → ££
  - More than £2.00 → £££
- Costs by scheme

## A2.5 Nearest Neighbour Analysis

The CIPFANearest Neighbours (NN) Model<sup>57</sup> attempts to adopt a scientific approach to measuring the similarity between authorities, taking into account a range of variables that have an impact on demographic profile and the likely demand on different services. Originally developed in the late 1990s, and recognised by local and central government, the model has been used to compile family groupings for the Audit Commission's value for money profile. It is generally accepted as a robust method of determining comparable authorities.

The model allows for each variable to be switched on or off independently, thus allowing only the selection of variables that are likely to be relevant to the compositions and yield of recyclables. The variables selected include those that are most likely to take social demography into account and are related to deprivation, age profile, rurality, household size and ethnic profile. A full list of the parameters selected is as follows:

- % of population aged 0 to 17
- % of population aged 85 plus
- % of population of working age
- Enumeration district-based density
- Enumeration district sparsity
- Tax base per head of population
- % unemployment
- % foreign visitor nights
- % domestic visitor nights
- Shops per 1000 population
- Housing benefit caseload (weighted)
- % income support claimants
- % of people born outside UK, EC, Commonwealth or USA
- % of households with more than 1 person per room
- % of households with less than 4 rooms
- % of households in purpose built flats rented from LA or HA
- % of persons in lower social classes
- Standard morbidity ratio for all persons
- Non domestic rateable value per head of population
- % of properties in bands A to D
- % of properties in bands E to H
- Area costs adjustment
- % ethnic minorities
- Indices of multiple deprivation

In carrying out such analysis there is always a trade-off between comparing only very similar authorities and having enough data to be of any use. Eunomia's general approach is primarily to reduce the comparative data set from all English Authorities through the

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<sup>57</sup> <http://www.cipfastats.net/resources/nearestneighbours/profile.asp?view=select&dataset=england>

exclusion of authorities for which comparison is meaningless, rather than producing a group of perfect compatriots. As such, it is important to reiterate that the benchmarking results should only be used as a general guide.

## A3.0 Background Data

### A3.1 Long-list of Schemes

Figure A: 1 presents the long list of schemes that was developed through secondary research. The key in Figure A: 2 shows the coding system used which indicates why schemes have been excluded from scope, and schemes within scope.

Figure A: 1 Key

✘	Scheme recently started or not yet implemented therefore too early for data
✓	Included in scope
✘	Old scheme with lack of data
✘	Unable to participate in the research

Figure A 2: Long list of Schemes

Local Authority Scheme	
Barnet	x
Bath & North East Somerset (A&P)	✓
Bedford	x
Bexley	✓
Bournemouth	x
Brent	x
Caerphilly	x
Calderdale (A&P)	✓
Cornwall	x
Coventry	x
Cumbria (A&P)	✓
Dudley	✓
Durham (A&P)	✓
Ealing	✓
Gwynedd	✓
Halton (Recyclebank)	✓
Havering	x
Hyndburn (A&P)	x
Lambeth (Recyclebank)	✓
Lewes	x
Lewisham	x
Luton	x
Manchester City	✓
Merton	x
North Tyneside	x
Nottingham	x
Nuneaton Bedworth and North Warwickshire	✓
Oxfordshire Waste Partnership	x
Perth & Kinross	x
Portsmouth	x
Sandwell	✓
Scotland (ZWS) DRS	x
South Holland	x
Southampton	x
Southend-on-Sea	x
Sunderland	x
Swansea	x
Vale of Glamorgan	✓
Waltham Forest	✓
Windsor & Maidenhead (Recyclebank)	✓
Wokingham (Recyclebank)	✓
Wolverhampton	x

## A3.2 Short-listed Scheme Descriptions

### A3.2.1 London Borough of Bexley

The London Borough of Bexley was the first local authority in the UK to introduce the Local Green Points scheme, whereby residents are incentivised to reduce the amount of rubbish they send for disposal through the allocation of points which can be redeemed for a range of products and experiences approved by an independent Sustainability Advisory Panel. The scheme is specifically for residents of flats in Bexley.

Residents are encouraged to reduce, reuse and recycle their waste, with residual waste and recycling measured quarterly at a neighbourhood level and Green Points distributed evenly throughout neighbourhoods to those households with scheme accounts subject to an improvement in performance.

There are over 1,000 options for redeeming points, with the offers available including iTunes, fashion, books and CDs and family days out. Alternatively, points can be donated to three local charity projects selected by following an open competition by a community leaders panel: Trees for Cities, MyBnk, and Thamesmead Youth Voice (a Thamesmead Trust project). Recent research in Thamesmead showed a preference for community rewards over individual household rewards, and Thamesmead Trust are an important partner in the channelling of community involvement and benefit.

In addition to Green Points earned as a reward for performance improvements, the scheme also provides a programme of specifically local incentives to householder engagement. When a resident activates their account they receive a London Green Points card and key fob which can be used to access offers and discounts from local independent cafes, hairdressing salons, and other high street retailers across Bexley.

Branded as London Green Points Bexley, the council is partnered in the scheme by Local Green Points and the Gallions Housing Association, Furniture Bank, Serco, Green Rewards and Envirocomms, with extra support coming from the London Waste and Recycling Board through its Flats Recycling Programme, and a grant from the DCLG Weekly Collection Support Scheme fund.

The scheme was initially introduced in September 2011, when it was limited to 2,000 flats owned by Gallions Housing Association in East Thamesmead, an area of particularly high social deprivation, with an additional objective of the scheme being to reduce the high levels of fly-tipping within the area. As of summer 2012 the scheme rolled out to all 16,000 purpose built flats across Bexley.

#### Communications

Prior to the scheme's initial launch in the Thamesmead areas, all properties were sent a letter explaining the scheme in addition to the hosting of promotional fun days, doorstep visits and signage above flat waste chutes. These promotions could be easily focussed as the scheme covered a relatively small area.

Once the scheme rolled out, all households received a discount card and introduction letter, meaning that householders did not necessarily need to sign up to the scheme to receive the benefits. This oversight noted for the subsequent further roll out, and in the second instance cards were only provided upon joining the scheme. Furthermore, subsequent user feedback from the first phase indicated that initial correspondence was too content heavy. Door to door visits have not taken place since 2006/07, and a new round is set to take place in Autumn 2013.

The scheme is well suited to online use, with short monthly email updates in addition to quarterly eNewsletters and ePoints statements providing a useful feedback loop to resident. Those without online accounts receive an annual paper Green Points statement. The ratio of online to offline account holders is approximately 3:2.

The scheme has received favourable coverage in both the local and specialist waste press.

### A3.2.2 Sandwell Metropolitan Borough Council

Sandwell's Go Green reward scheme, the primary aim of which is to increase recycling rates, is co-designed by Sandwell Council and their contractor Serco, with funding for the scheme also coming from Serco in addition to money provided through a Government grant. A complimentary aim is to reduce residual arisings as a result of increased recycling.

Under the scheme, the recycling efforts of individual households are rewarded by money invested into local community groups and schools, who can receive payments of up to £2000. Community groups can apply for the rewards directly, whereas schools must apply through a third sector partner, local environmental charity Litter Watch. Furthermore, individuals can make applications on behalf of community groups.

The scheme started in April 2013 and will run for two years, during which time all areas of Sandwell will get the chance to take part. The 24 wards of Sandwell (averaging 5000 households) are monitored in discrete phases of 4 months per 6 wards, during which time recycling tonnage data is collected. Certain wards—such as the more affluent—have been earmarked as especially likely to benefit from the scheme.

#### Communications

The wards included in each phase of the scheme are targeted in a month long promotional campaign prior to the commencement of monitoring. Residents are informed that their catchment area is about to be monitored and where they can register their interest with community groups; information is distributed door to door via pamphlets in addition to wider measures including local media coverage and public signage. Towards the end of each phase bins are stickered to reinforce the message.

Serco has also been engaged in yearlong promotion of recycling throughout the borough, focusing especially on food waste collections and the removal of recyclables from the residual stream. In the specific promotion of the Go Green scheme, Serco have attended local community forums and volunteer groups in the hope of engaging community groups and festival events in the borough have targeted for scheme promotion.

Litter Watch have led school engagement through a campaign of visits and talks.

Collection tonnage data has not as yet been released to residents, but when it is communications are planned to focus on positive reinforcement, highlighted boroughs that have performed well rather than reprimanding those that have not.

### A3.2.3 London Borough of Ealing

From November 2010 to April 2011 Ealing Council ran a Recycling Reward Incentive Scheme in which the 23 electoral wards of Ealing competed against each other to win funding for environmental improvements to their area.

The ward with the highest proportion of households recycling and the three wards showing the greatest improvements in recycling participation were each rewarded

£20,000 in an effort to maximise use of the available recycling services and reduce the amount of waste sent to landfill. By rewarding wards for improved performance the scheme maximised participation by ensuring that all wards had a chance of winning.

A baseline survey of recycling participation in all wards was carried out in September 2010; a second round of monitoring took place in April 2011 and the two sets of results were compared to establish the winning wards.

Local ward forums were held to determine uses for the prize money, in line with the community participation ethos central to the competitive nature of the scheme. By focussing on participation, the scheme was able to effectively encourage waste minimisation.

## **Communications**

The scheme was promoted in a comprehensive communications campaign from November 2010 to March 2011, consisting of regular features in the local press, banners and posters in public places, newsletters distributed to council and community buildings, a monthly magazine, and road shows to the major town centres in each borough.

Communications were sustained for the full period of the scheme and aimed at creating a specific campaign identity.

### **A3.2.4 Calderdale Council**

The Mixenden vs. Ovenden Recycling Challenge was a competition based scheme which utilised the long standing rivalry between two low performing Calderdale communities to drive an increase in recycling participation. From June to August 2007, kerbside set out rates were measured across two communities, with each competing against the other to achieve pre-set recycling levels.

Volunteers from two community groups representing Mixenden and Ovenden were recruited to help co-ordinate what was in fact a friendly competition in the hope that the momentum established would carry on stimulating increased recycling activity following the competition's close.

Under the scheme three levels of incentive were introduced:

1. Each week, all those households putting out their recycling were eligible for inclusion in a prize draw, with two households from Ovenden and one household from Mixenden receiving a cash sum of £100;
2. First prize in the competition was £2000 to the winning community group for investment in a community initiative of their choice. A runner up prize of £1000 was also given to the losing community. The only stipulation was that to be eligible for the prize money the community had to achieve a minimum recycling target set at the start of the initiative; and
3. A £100 prize was also offered to the collection crew that achieved the greatest increase in recycling over the campaign period.

## **Communications**

Specific marketing materials including leaflets, posters and a dedicated Mixenden vs. Ovenden Recycling Challenge website were designed and produced to support the two community groups in their efforts to drum up support from residents. As ongoing promotion, updated recycling figures were displayed weekly on posters around the

communities and regularly on the web site. A second leaflet was distributed mid campaign to bolster participation and interest for the final run. Press releases were also produced mid and at the end of the campaign.

#### A3.2.5 Caerphilly County Borough Council

Caerphilly Council ran an incentive scheme whereby householders who frequently recycled were eligible for inclusion in a prize draw. Participation rates were recorded by way of a tick sheet completed by collection crews, with three different incentives rewarding different levels of participation.

1. Six monthly prizes of up to £50 in value were available every month to those households on each round with a full participation rate.
2. Long term recycling habits were encouraged through an annual draw, the eligibility for which was having participated in at least 22 of the possible 26 collections; this allowed for holiday periods and was counted as 100% participation for the purpose of the scheme. A prize of £500 was available for each collection round.
3. A prize of a small car was drawn at the end of each year as an overall incentive prize, and was available to all those households from all collection rounds who had achieved a 100% participation rate that year.

Another scheme was run to promote paper recycling in 24 schools across the borough in partnership with the collection service provider Excel Industries. In addition to regular visits from recycling officers to enforce a message of waste minimisation, £100 per term was awarded to the school with the best recycling performance, with tonnages calculated at an average weight per pupil.

#### Communications

Winners of the household prize draw were notified by post, with the results also published on the Council's website.

Communications for the schools scheme were undertaken during the visits from recycling officers. The results of the scheme were published in a newsletter sent to all schools and also on the Council's website.

#### A3.2.6 Dudley Metropolitan Borough Council

As of August 2013, Dudley has introduced a reward scheme which provides residents with access online offers in return for their pledging to be 'cleaner and greener'. Once pledges have been made online, residents are given codes for deals and offers throughout the borough, such as free entrance for a child at Dudley Zoo.

The initial purpose of the scheme was to strengthen Dudley's bid for the DCLG Weekly Collection Support Scheme fund, as the inclusion of an incentive measure was thought to be politically attractive to the Conservative administration, who had previously expressed interest in incentives. The Council proposed that a relatively small amount of the overall grant (£40,000) would be spent on trialling a scheme in a limited area of 11,000 households. However, subsequent to a change of administration in Dudley, and having secured the grant, the catchment area for the scheme was expanded to 115,000 households.

The scheme essentially works on trust, as there is no monitoring in place to check whether pledges have kept their word, and the scheme lacks any mechanism rewarding increased environmental performance. Initially, plans had been made to monitor the

weights of collection vehicles, but this measure was not considered economically viable following the expansion of the scheme to include the extra households.

Concomitant to the operation of the scheme, Dudley is also rolling out a new kerbside sort recycling collection service, and the scheme has a complimentary purpose in acting as a cost efficient and effective way of communicating this new service change to residents. However, the parallel nature of the two roll outs means that it is very hard to disentangle any increases in recycling performance that might have come about as a result of the scheme from performance changes related to the introduction of the new collection service.

The involvement of local business and attractions in the provision of the incentives also had the added benefit of supporting the local economy.

### **Communications**

The scheme has been backed by a comprehensive promotional campaign. Fittingly, given the online basis of the venture, online communications have been utilised, from the Council webpage to Facebook and Twitter. Printed communications have included inclusions in the local press and a high quality booklet distributed to residents. Face to face engagement has also been conducted through briefing sessions and events.

Communications have also targeted local businesses in order to increase their participation in providing incentives.

#### **A.3.2.7 Nuneaton, Bedworth and North Warwickshire**

Over an eight week period during the winter of 2010/ 11, Nuneaton and Bedworth Borough Council, and North Warwickshire Borough Council ran a simple, low cost scheme aimed at encouraging recycling participation called the Red Box Lottery. Under the scheme, all households putting their recycling bin out for collection on any given week were entered into a free prize draw to win a voucher worth £50, donated by a local company.

### **Communications**

Promotions for the scheme were led by a series of road shows throughout the area in locations such as supermarkets, town markets, car parks and leisure centres. In addition to promoting the incentive scheme, these road shows served to reinforce previous promotional work carried out for the roll out of a new collection scheme (two-stream collection of containers and fibres).

Schools in historically low performing areas were targeted and assemblies given to educate those younger residents between the ages of 6 and 11 in matters of waste prevention. Leaflets were also delivered directly to 14,000 households in these areas.

Talks were held to engage a number of community groups, including the Rotary Club, Older People's Forum, and a mother and toddler group.

Promotion for Nuneaton included the novel measure of releases to the local press focussing on a different recyclable material each as well as naming the latest winner. Local resident newsletters also carried information on the scheme.

#### **A.3.2.8 Ainsworth and Parkinson Schemes**

Marketing firm Ainsworth and Parkinson (A&P) have devised an award winning scheme aimed at raising the profile of recycling amongst young children, parents and

householders and increasing recycling levels throughout local authorities.

Schools provide children with books in which they record pledges made by family and friends to recycle more, and which are then sent on to A&P. The pledges are translated into points which can be spent on school equipment such as computers, printers, cameras, and musical and sports equipment. Furthermore, performance value is added to the scheme through a mechanism whereby the points gained from pledges made in any month increase in value if recycling performance increases in that month.

A&P manage the administration of all prizes, points and regular communications, and have creative control over the design of all campaign materials including the campaign website.

A&P Recycling Rewards for Schools schemes have been rolled out in a number of local authorities, which are considered in turn below.

### **Bath and North East Somerset Council**

Bath and North East Somerset Council (BANES) ran a 6 month long A&P scheme from February to July 2013, using money received from the DCLG Weekly Collections Support Scheme fund. All of BANES' primary and special schools were targeted, with 54 out of a possible 65 participating, and 6,264 households submitting pledges.

In addition to parents being asked to nominate the schools of their own children as the beneficiaries of the reward points, family friends making pledges were asked to nominate a school which they wished to benefit.

Aside from the immediate objective of raising recycling levels throughout the local authority area, the scheme had the further aims of engaging primary children on issues relating to waste and recycling, and providing a stimulus to encourage in-school activity on these topics.

Children were given a series of small personal rewards to incentivise their participation in the scheme, with silicone finger and wrist bands given for achieving pledge targets, and the top performing child in each school given a snap on watch. It was felt that householders did not need supplementary motivation for participation beyond that of supporting a child, since as in most cases pledgees were personal friends or relations of the child's parents.

Campaign materials included the pledge book and slips, a teacher guidance pack and posters for schools. A campaign website was developed to show a monthly points table for schools to view their own points as well as others. Press releases, promotional photographs and short pieces publicising the scheme were included in the Council's quarterly magazine.

Schools were contacted by telephone to arrange visits where possible to explain the detail of the campaign and encourage sign up, and assemblies promoting the scheme were delivered by A&P to some schools, with Council staff joining in with these where time allowed.

April 2013—the first month of the scheme—was a 'double points' month to help stimulate early activity in schools. Following this, A&P kept in regular contact with the schools to help maintain levels of pupil participation.

To help maximise uptake during the final month of June 2013, A&P sent out personalised letters to all pupils who had taken part in the scheme up to that point

containing further messages restating the importance of recycling at home. The campaign ran until the end of the school term in July.

### **Calderdale Council**

Calderdale operated an A&P scheme from November 2005—January 2006 as part of wider Recycling Participation and Awareness Campaign funded by WRAP, with funding for the schools scheme totalling £100,000.

82 of a possible 87 schools took part in the scheme, gaining pledges from 24,522 households, equating to approximately 28% of the 88,000 households in the Calderdale area. According to A&P, 50% of households making pledges to recycle had kept their promise and done so.

### **Cumbria County Council**

Cumbria ran an A&P scheme as part of a general drive to increase its recycling performance, and supported by Defra funding. Recycling Rewards for Schools was considered an additional incentive to help jump start non-recycling households into action.

During the three years over which the campaign ran in Cumbria, around 72,000 households made a pledge to recycle, with a total of 235 schools over 6,000 pupils actively participating in the scheme.

### **Durham County Council**

Durham's A&P scheme, which ran from October 2005 to March 2006, saw participation from over 1,800 pupils coming from 158 primary schools securing recycling pledges from almost 9000 households within the local authority area.

Points were exchanged for equipment from a Recycling Rewards catalogue, including such items as a digital camera (350 points) and a computer (5,750 points). Prizes were also available to individual pupils, including free entry to a local amusement park.

Residents making a pledge were provided with the additional incentive of eligibility for inclusion into a free prize draw to win locally produced hampers. i

School children collecting pledges were given extra incentives in the way of medals for reaching pledge targets, with a prize of a portable MP3 player for the top performer in each school.

## A4.0 Deposit-refund Systems Case Studies

### A4.1 Experience with Deposit-refund Schemes in Other Countries / States

DRSs are also prevalent in the US: eleven states have a legal deposit on bottle and cans for beer and soft drinks, the majority of which were introduced in the 1970s and 1980s. Six states also have deposits on mineral water containers. Deposits are made mandatory through the State's 'bottle bills' and range from 2.5¢ to 15¢ per container.<sup>58</sup> Similarly, DRSs for containers are also in place in most Canadian provinces.<sup>59</sup>

Country	System	Year of Intro	Containers Covered	Capture Rate*	Deposit	Redemption Site	Driver	Reference
Austria	Law to make deposit regulatory	1992	PET bottles (non-refillables excluded)	30% PET 60% Cans	\$0.40		Government	<a href="http://www.BottleBill.org">www.BottleBill.org</a>
Belgium	Containers taxed \$0.52 per litre unless they have deposit.	1993	Beer, soda and soft drinks containers		\$0.12 <50cl \$0.24 >50cl		Government	<a href="http://www.BottleBill.org">www.BottleBill.org</a>
Croatia	Deposit-return plus 'incentive fee' to be paid by producer if 50% refill isn't met (5% paid still, if target is met).	2005	Glass, PET and metal containers for beer, soft drinks, water, wine and spirits.				Government	EUROPEN Report 2007
Denmark	Packaging Law. All beer and soft drinks must be sold in refillable bottles. Metal banned until 2002. Regulatory deposit for imported glass/plastic	1989 (amended 1991)	Beer and soft drinks containers. Deposits on some wine and spirit bottles dependent on retailer.	93% PET 93% Glass 84% Alu. Overall	\$0.27 <99cl \$0.78 >99cl Tax \$0.14-0.33		Government	<a href="http://www.BottleBill.org">www.BottleBill.org</a> VOICE report 2012

<sup>58</sup> <http://www.bottlebill.org>

<sup>59</sup> Eunomia (2002), *Maximising Recycling Rates, Tackling Residuals*, Report for Friends of the Earth, [http://www.foe.co.uk/resource/reports/maximising\\_recycling\\_rates\\_report.pdf](http://www.foe.co.uk/resource/reports/maximising_recycling_rates_report.pdf)

Country	System	Year of Intro	Containers Covered	Capture Rate*	Deposit	Redemption Site	Driver	Reference
	containers. Ecotax also.			90%				
Estonia	Deposit-return	2004	Beer, low alcohol drinks, carbonated/ non-carbonated soft drinks, water, juice, cider and perry.		Glass 1.0 kroon (refill and NRB) Metal and PET < 0.5 l 0.5 kroons PET > 0.5 l 1 kroon	Retailers	Government	EUROPEN Report 2007
Finland	Tax on beverage containers Exemption from tax only if part of refillable deposit scheme.	1970s 1990	One-way beer and soft drink containers	One-way containers 75%, refillables 95-98% 89% PET 98% Glass 92% Alu.	Non-refillables \$0.11 \$0.45 for larger sizes Tax \$0.24 beer \$0.47 plastic \$0.71 glass	8,000 sites	Government	<a href="http://www.ymparisto.fi/download.asp?contentid=16253&amp;lan=EN">http://www.ymparisto.fi/download.asp?contentid=16253&amp;lan=EN</a> VOICE report 2012
Germany	Einwegpfand Deposit on one-way a standard amount, deposit on refillables manufacturer dependent, not legally specified, though tend to be similar.	2003	Not containers for wine, fruit juice or spirits	Quota- Glass 90% Alu. 90% Plastic 80%	Glass refillable- Beer €0.08 Soft drink €0.15 (many prices, not all listed)		Manufacturers	<a href="http://www.bookrags.com/Container_deposit_legislation">http://www.bookrags.com/Container_deposit_legislation</a>
Hungary	Tax linked to market share quotas.	2005	Beer, low-alcohol drinks, wine, mineral water, carbonated and non-carbonated soft drinks.	Quota- Beer 67% Low alcohol 28% Wine 20%				
Iceland	Tax on non-refillable containers.	2008	Non-refillable glass, steel, aluminium and plastic.					

Country	System	Year of Intro	Containers Covered	Capture Rate*	Deposit	Redemption Site	Driver	Reference
Kiribati	Special Fund Act 2004	2004	Aluminium cans and PET drinks bottles		\$0.05 (\$0.04 returned)	Kaoki Mange operating centres.		<a href="http://www.BottleBill.org">www.BottleBill.org</a>
Malta	Previous ban of non-glass beverage containers, lifted							
Mexico	Higher tax on non-refillable bottles and cans.							
Fed. States of Micronesia	(Deposit-return) Kosrae Recycling Program	1991 (amended 2006)	Currently only aluminium cans, but glass and plastic expected to be added soon.	20,000 cans per day	\$0.06 (\$0.05 back)	Kosrae Island Resource Management Authority (KIRMA) sites		<a href="http://www.BottleBill.org">www.BottleBill.org</a>
Netherlands	Agreement deposits	1993	Soft drinks and water in one-way and refillable glass and PET containers	Refillable glass 98% Refillable PET 99%	PET and glass: \$0.16 <5l \$0.72 >5l		Industry	<a href="http://www.BottleBill.org">www.BottleBill.org</a>
Norway	Deposit on containers and tax dependent on return rate. Refillables only exempt if 95% return rate is achieved. Retailers (on site >25m <sup>2</sup> ) selling non-refillables, must also sell similar products in refillable.	1994	Most drinks excluding milk, vegetable juices and water	Wine/spirits 60% Beer 98% Soft drinks 98% 81% PET 91% Alu.	\$0.16 <5l \$0.40 >5l (+Tax inversely proportional to return rate, but if above 95% no tax)	Over 9000 establishments in the country, plus 3000 deposit machines where receipt is given	Tax is government driven, but recycling fee in place is retailer driven	<a href="http://www.BottleBill.org">www.BottleBill.org</a> VOICE report 2012
Peru	Deposit on some bottles		620ml size beer bottles					
Portugal	Fillers must ensure quotas met Retailers must sell		Quotas- Beer 80%					

Country	System	Year of Intro	Containers Covered	Capture Rate*	Deposit	Redemption Site	Driver	Reference
	refillables for all non-refillables sold.		Wine (with certain exceptions) 65% Soft drinks 30%					
South Africa	Deposit return system, voluntary i.e. manufacturer driven, not Government.	Around 1948	Approx. 75% beer, 45% soft drinks and some wine and spirits bottles		Between 8-15% of product cost (or 0.5-1% if wine/spirit)		Manufacturer	
Spain				Return overall 87% Reuse beer 57%				<a href="http://www.cerveceros.org/">http://www.cerveceros.org/</a>
Sweden	Law requires rate of 90% recycling of aluminium cans, or complete ban. Industry implemented deposit system to avoid this. PET introduced later as well. deposit	Deposit on one-way containers- 1984 for cans.  1994 for PET (refillables already in place)	Aluminium cans and PET law. Deposit now on most beverage containers.	40% PET 45% Glass 91% Alu.	Voluntary Cans \$0.07 Refillable PET \$0.56 One-way PET \$0.14-0.24		Law government driven. Standard bottle and deposit brewer/bottler driven.	<a href="http://www.BottleBill.org">www.BottleBill.org</a> <a href="http://en.wikipedia.org/wiki/Container_deposit_legislation">http://en.wikipedia.org/wiki/Container_deposit_legislation</a> VOICE report 2012
Switzerland	Deposits required on all refillable drinks containers except cans, which have a voluntary tax of \$0.04.	1990	All above a certain weight (currently all!)	Refillable glass 95-98% Refillable PET 70%	Ref. glass \$0.16<6l \$0.40 >6l  Ref and one-way PET \$0.40>1.5l		Government	<a href="http://www.BottleBill.org">www.BottleBill.org</a>

Country	System	Year of Intro	Containers Covered	Capture Rate*	Deposit	Redemption Site	Driver	Reference
South Australia	Container Deposit Legislation- deposit required on almost all drinks containers, with onus on manufacturer/ wholesaler to ensure convenient system in place for deposit of container/ refunds for customers.	1975  (integrated into Environment Protection Act in 1993)	Most included except wine (unless in plastic bottle), milk, pure fruit juice or flavoured milk >1l.	85% non-refillable glass 84% cans 74% PET	\$0.10 if refillable to retailer (rare) \$0.05 if refillable to collection depot (99.9% done this way)	Mostly collection depots, though some store refillables.	Government legislation with manufacturer/ wholesaler responsibility	<a href="http://www.BottleBill.org">www.BottleBill.org</a>
Canada- Alberta	All containers sold in Alberta (including imports) must be registered through the Beverage Container Management Board (BCMB).	1972	All beverage containers regulatory except milk, which is under a voluntary scheme	Overall 82%	\$0.05 <11 \$0.20 >11 Beer \$0.10	215 independent depots and 78 retail outlets (for beer bottles and cans only)	Initially government, until 1997 when it was turned over to private sector	<a href="http://www.BottleBill.org">www.BottleBill.org</a>
Canada- British Columbia	All containers must be refillable, and none collected can be landfilled or incinerated. Beer separate system, though still under legislation.	1970	All beverage containers except milk, soya milk, infant formulas, dietary or meal supplements, or other milk substitutes.	Unclear	Non-alcoholic \$0.05 <11 \$0.10 > 11 Alcoholic (not incl. beer) \$0.10 < 11 \$0.20 >11 Beer \$1.2 per dozen	Depots or retailers (all retailers obliged to take back as much as they sell). Beer back to retailer.	Industry	<a href="http://www.BottleBill.org">www.BottleBill.org</a>
Canada- Manitoba	Beverage producers given option of setting up deposit-return system, or adding a 2 cent per container levy. Only beer producers choose the former.	1995	Beer containers only	Refillable beer 95.5% Domestic beer 74% Glass 34% Overall	\$0.10	Retailer	Opportunity government driven, implementation producer driven	<a href="http://www.BottleBill.org">www.BottleBill.org</a>

Country	System	Year of Intro	Containers Covered	Capture Rate*	Deposit	Redemption Site	Driver	Reference
				residential 31%				
Canada- New Brunswick	Deposits paid on all containers (bar milk), but whilst full paid back on refillables, only half paid back on non-refillables.	1992 (revised 1999)	All except milk	Overall 81%	<500ml \$0.10 >500ml \$0.20	89 depots around the province.	Industry	<a href="http://www.BottleBill.org">www.BottleBill.org</a>
Canada- Newfoundla nd	Half-back system, with manufacturers prohibited from selling containers other than recyclable or refillable for selected products. Beer operated separately, run by brewers. Only have to refund when customer buying (1 for 1), otherwise negotiable.	1997	Beverage containers smaller than 5l, excluding milk, dietary supplements and medicine.	Overall 68%	Non-alcoholic \$0.08 (\$0.04 back)  Alcoholic (excluding beer) \$0.20 (\$0.10 back)  Beer varies -full refund when same number of beer bought as empties returned.	'Green Depots' run as businesses. Beer returned to certain retail outlets.	Government, but brewers for beer system.	<a href="http://www.BottleBill.org">www.BottleBill.org</a>
Canada- Northwest Territory	Deposit-return system, with additional handling charges for different products/ materials in container.	2005	All beverage containers except milk.	Very new system, so no certain figures yet. Approx. 72%	Wine or spirit \$0.25  Other \$0.10 Plus additional \$0.05- 0.10 handling fee	18 government depots or 26 community depots.		<a href="http://www.BottleBill.org">www.BottleBill.org</a>
Canada- Nova Scotia	Half-back deposit system. Full refund on refillables, half on non-refillables.		All beverage containers except milk.	Overall 83%	Non-alcoholic \$0.10  Alc. refillable  <1l \$0.10 >1l \$0.20  Alc. non-refillable  <500ml \$0.10 >500ml \$0.20	83 province- wide depots.	RRFB-Resource Recovery Fund Board  Government and industry.	<a href="http://www.BottleBill.org">www.BottleBill.org</a>

Country	System	Year of Intro	Containers Covered	Capture Rate*	Deposit	Redemption Site	Driver	Reference
Canada-Ontario	Deposit-return system on alcoholic drinks containers only. Use of 'Industry Standard Bottle'.		Alcoholic drinks containers	Beer 94%, Other alcohols 77.5%	Containers up to 630ml, or metal containers up to 1l \$0.10 Over those sizes \$0.20	Beer store only	Brewers	<a href="http://www.BottleBill.org">www.BottleBill.org</a>
Canada-Prince Edward Island	Non-refillable drinks containers for beer or soft drinks banned since 1977. Wine may have half-back system in place.	1977 ban, 1984 deposit	Soft drinks and alcoholic drinks. Wine may be included.	Overall 81%	Non-al <500ml \$0.15 500ml-1l \$0.30 >1l \$0.70 Alc. \$1.20 per dozen, or \$.07 each	Mainly retailers (inc. supermarkets and convenience stores), also 15 depots		<a href="http://www.BottleBill.org">www.BottleBill.org</a>
Canada-Quebec	Return-to-retail deposit system, with industry required to fund kerbside collection for containers not part of the system.		All beer and soft drinks containers (not juice, water and iced tea)	Non-refillables Soft drinks containers 67%, Non-refillables beer containers, 74%	Soft drinks and beer cans \$0.05 Beer bottles \$0.10 Beer bottles and soft drinks >450ml \$0.20	Retailers (including depanneurs - small convenience stores not usually included in Canada).		<a href="http://www.BottleBill.org">www.BottleBill.org</a>
Canada-Saskatchewan	Deposit-return system plus environmental handling charge (EHC) for non-refillable containers, for recycling, and beer bottle deposit system for refillables.	1973- Litter Control Regulations (unclear, appears the deposit system introduced to this in 1998)	All beverage containers apart from milk (under voluntary system).	Overall 87%	Deposits vary widely for diff. materials and sizes Non-ref. glass \$0.40-1.00 Metal cans \$0.10-0.20	Beer bottles can only receive full refund if returned to 10 specific sites, but can be returned for less at retailers. Other returns at 71 SARCON site	Government	<a href="http://www.BottleBill.org">www.BottleBill.org</a> <a href="http://www.sarcsarcan.ca/sarcan/faqs.php">http://www.sarcsarcan.ca/sarcan/faqs.php</a>

Country	System	Year of Intro	Containers Covered	Capture Rate*	Deposit	Redemption Site	Driver	Reference
Canada-Yukon	No kerbside collection. Deposit-return system, with 'recycling club' for children offering 'prizes' as well as refund if certain numbers reached. Refillables not charged recycling fund fee, all others are.	1998	All beverage containers except milk.	Refillable Overall 89%	D=deposit, R=refund Liquor ref. D=\$0.10 R=\$0.10 Liquor non <500ml D=\$0.15 R=\$0.10 >500ml D=\$0.35 R=\$0.25	22 depots or four Liquor Commission outlets	Government	<a href="http://www.BottleBill.org">www.BottleBill.org</a>
USA-California	California Beverage Container Recycling and Litter Reduction Act Deposit-return system on non-refillable containers	1987 (Expanded 2000 to include all non-carbonated and non-alcoholic drinks excluding milk.)	Non-refillable drinks containers, inc. beer, spirits, carbonated, fruit drinks and some vegetable juices. Not milk.	Overall 88%	Under 24oz \$0.05 Over 24oz \$0.10	Redemption centres (not retailers)		<a href="http://www.BottleBill.org">www.BottleBill.org</a>
USA-Connecticut	Beverage Container Deposit and Redemption Law Deposit-return system.	1980	Beer, malt, soft drinks and mineral water.	Not recorded. In 2004 CRI estimated recycling rate to be similar to Massachusetts of 69%	\$0.05	Redemption centres, or retailers (but only for brands / products they sell).		<a href="http://www.BottleBill.org">www.BottleBill.org</a> <a href="http://www.cga.ct.gov/2005/rpt/2005-R-0836.htm">http://www.cga.ct.gov/2005/rpt/2005-R-0836.htm</a>

Country	System	Year of Intro	Containers Covered	Capture Rate*	Deposit	Redemption Site	Driver	Reference
USA-Delaware	Beverage Container Legislation Deposit-return system	1982 Wholesale 1983 Retail	All non-aluminium beer, malt, carbonated, mineral water and soda water containers less than 2 quarts (approx. 1.9L).	Not recorded.	\$0.05	Retail stores, but only for brands they sell.		<a href="http://www.BottleBill.org">www.BottleBill.org</a>
USA-Hawaii	Deposit Beverage Container Law Deposit-return system	2002	All beverage containers excluding milk and dairy derived products, except tea and coffee or liquor containers.	79% for 2009	\$0.05	Redemption centres or retailers (if not within 2 miles of red. centre in highly pop. areas, or if under 5,000sq ft of retail space)	Government	<a href="http://www.BottleBill.org">www.BottleBill.org</a>
USA-Iowa	Beverage Container Deposit Law  Deposit-return system. Deposit containers banned from landfill in 1990.	1979	Beer, soft drinks, soda water, mineral water, wine, liquor and wine coolers.	86%	Not less than \$0.05	Redemption centres or retailers (who can refuse if they have an agreement with former).		<a href="http://www.BottleBill.org">www.BottleBill.org</a>
USA- Maine Maine	Refillable Beverage Container Law Deposit-return system	1978	Beer, soft drink, wine cooler, mineral water. Expanded to include wine, liquor, water and non-alcoholic drinks in 1989.	Not recorded.	Wine and liquor \$0.15 Other \$0.05	Redemption centres or retailers (who can refuse if they have an agreement with former).		<a href="http://www.BottleBill.org">www.BottleBill.org</a>
USA- Massachusetts	Beverage Container Recovery Law Deposit-return system	1983	Beer, soft drinks and carbonated water.	71% in 2010	\$0.05	Any retail establishment that sells the container.		<a href="http://www.BottleBill.org">www.BottleBill.org</a>
USA- Michigan	Michigan Beverage Container Act Deposit-return system	1978	Beer, soft drinks, carbonated and mineral water. Wine coolers and canned cocktails in 1988.	96%	\$0.10	Retail stores		<a href="http://www.BottleBill.org">www.BottleBill.org</a>

Country	System	Year of Intro	Containers Covered	Capture Rate*	Deposit	Redemption Site	Driver	Reference
USA- New York	New York State Refillable Container Law Deposit-return system	1983	Beer and other malt drinks, carbonated soft drinks, wine coolers, mineral and soda waters.	Overall 67%	Minimum of \$0.05	Retail stores and redemption centres.		<a href="http://www.BottleBill.org">www.BottleBill.org</a>
USA- Oregon	The Beverage Container Act  Deposit-return system Only US deposit law with no handling fee.	1972	Beer, malt, carbonated soft drinks, mineral and soda water and (as of 2009) water and flavoured water. Bottles and cans under 3L	Overall 84%	Standardized refill bottles \$0.02 Non-standardized and non-refillable \$0.05	Retail stores.		<a href="http://www.BottleBill.org">www.BottleBill.org</a>
USA- Vermont	Beverage Container Law Deposit-return system	1973	Beer, soft drinks, malt, soda and mineral water, mixed wine and liquor (added 1987).	Data not published	Liquor above 50ml \$0.15 Other \$0.05	Retail stores and redemption centres.		<a href="http://www.BottleBill.org">www.BottleBill.org</a>

*Source: Oakdene Hollins (2008) Refillable Glass Beverage Container Systems in the UK, Report for WRAP, 26 June 2008. Figures have been updated where new data has been available.*

*The report notes that capture rate includes containers returned for recycling as well as refilling. Separate figures were not so readily available. Unless specifically listed as something else, the monetary unit is American dollars. The only exception is Canada where the Canadian dollar is used.*

*Percentages given for US capture rates are taken from various sources, often telephone conversations by the Bottle Bill researchers. For more detailed references see [www.BottleBill.org](http://www.BottleBill.org)*

## A4.2 Contestants of Deposit-refund Schemes

Some claim, despite the evidence presented above, that recycling rates do not increase under deposit schemes. However, those who suggest this usually do so on the basis of reviewing recycling rates for *all* packaging. For example, EUROPEN, argues: <sup>60</sup>

*There are no compensating benefits with regard to an overall improvement in recycling performance. The Perchards report showed that overall recycling rates in Member States with deposit systems are not higher than those of comparable EU countries where there are no special arrangements for beverage containers.*

The problem here is that the 'Perchards Report' referred to in the text looked at rates for all packaging in seeking to make this point. Deposits do not apply to all packaging (a point that is frequently made to downplay the potential impact of deposits on total recycling rates).

Perchards themselves state: <sup>61</sup>

*It is certainly true that deposit systems for non-refillable beverage containers can achieve higher recycling rates for the beverage containers affected than when these containers are handled through general recycling systems. However European experience shows that deposit systems do not achieve a higher recycling rate for all packaging of a given material, because beverage containers represent too small a proportion of the total tonnage of that packaging material. Drinks containers typically represent only about 10% of all packaging and the recycling rate for beverage containers in general recycling systems is likely to be higher than the recycling rate for all packaging of the same materials.*

They then allude to the performance of Belgium in respect of the recycling of *all* packaging even though this is clearly not a good comparator for reasons which the previous extract makes clear (the targeted materials – beverage containers – are a relatively small fraction of packaging). In particular, the largest fraction of the packaging stream is *always* paper and card, which is also an easy, and relatively low cost, material to recycle.

In the UK, Alupro, the aluminium industry's trade body, says 98% of English households have kerbside collections of aluminium cans, but capture rates can be anywhere between 30% and 70%.<sup>62</sup> The 'cans-only' recycling rate is estimated to be 52% in 2008.<sup>63</sup> Therefore, even with a 'free to the consumer' system (in terms of marginal cost), and a very widespread coverage, the capture rate is still much less than is seen in the deposit-refund scheme countries. This may be partly a reflection of the fact that 35% of aluminium cans are consumed away from home, in the workplace, and at sports, leisure and travel locations, according to Alupro. However, such a waste stream is one

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<sup>60</sup> EUROPEN (2007) *Economic Instruments in Packaging and Packaging Waste Policy*, Brussels: EUROPEN.

<sup>61</sup> G. Bevington (2008) *A Deposit and Refund Scheme in Ireland*, Report commissioned by Repak Ltd., September 2008.

<sup>62</sup> Ends Report (2009) *Defra Report Rejects the case for Bottle Deposits*, January 2009  
[http://www.endsreport.com/index.cfm?action=report.article&articleID=20119&q=deposit%20refund&boolean\\_mode=all](http://www.endsreport.com/index.cfm?action=report.article&articleID=20119&q=deposit%20refund&boolean_mode=all)

<sup>63</sup> Alupro website, <http://www.alupro.org.uk/facts%20and%20figures.htm>, accessed May 2009.

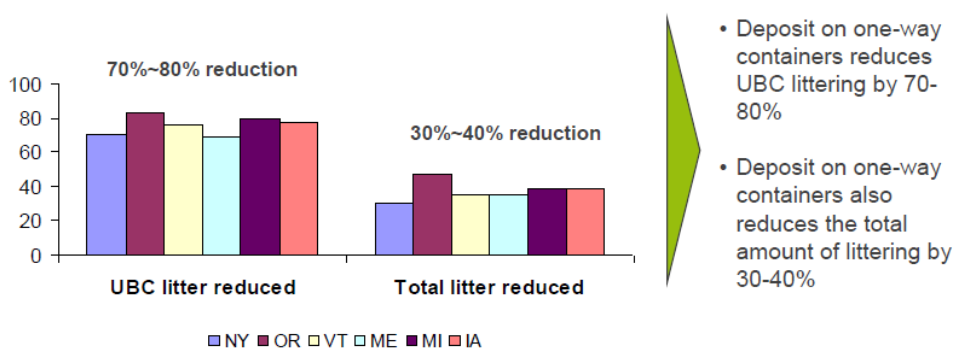
which deposit refund schemes may be well suited to dealing with since such containers are less likely to arise as litter where deposit systems are in place

### A4.3 Other Effects: Impacts on Littering

There is a growing body of evidence to suggest that deposit refund policies can reduce litter, as was the original intention behind introducing these schemes. The potential for deposit systems to be effective in reducing littering has a very plausible rationale - if the deposit is significant, then if the consumer does decide to litter, the possibility exists that someone else will pick up the container to redeem the deposit.

The Container Recycling Institute suggested significant reductions in littering following introduction of deposits in some US states (see Figure 18). The effects on used beverage containers (UBCs) and on total litter are shown as being between 70-80% and 30-40%, respectively. It must be said, however, that all studies of this nature suffer in terms of the lack of clarity about the metric used to measure the contribution of beverage containers to total litter.

Figure 18: Reduction in Littering in US States linked to Deposit Refund Schemes



Source: Container Recycling Institute, USA

In jurisdictions such as Hawaii, where the prevalence of beverage containers in litter has been a motivation for the scheme, the problem also extends to pollution of the sea. One report from the State of Hawaii shows how beverage containers have changed in terms of their prevalence in litter (debris) over time.<sup>64</sup> Note that the DRS was introduced in 2002.

Figure 19: Number of Debris found during Cleanup

Beverage Container Type	2003	2004	2005	2006	2007
Glass Bottles	7,687	11,362	7,194	5,759	5,008
Plastic Bottles	5,246	5,215	3,824	4,799	2,965
Metal Cans	4,946	6,894	3,518	3,959	2,932

<sup>64</sup> State Of Hawaii Department Of Health (2008) Pursuant To Sections 342g-102.5(H), 342g-114.5(B), And 342g-123, Hawaii Revised Statutes, Requiring The Department Of Health To Give A Report On The Activities Of The Deposit Beverage Container Program, Report To The Twenty-Fifth Legislature State Of Hawaii 2009, November 2008

<b>Total</b>	<b>17,879</b>	<b>23,471</b>	<b>14,430</b>	<b>14,517</b>	<b>10,905</b>
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Source: State Of Hawaii Department Of Health (2008) Pursuant To Sections 342g-102.5(H), 342g-114.5(B), And 342g-123, Hawaii Revised Statutes, Requiring The Department Of Health To Give A Report On The Activities Of The Deposit Beverage Container Program, Report To The Twenty-Fifth Legislature State Of Hawaii 2009, November 2008

Further interesting evidence of the effects of deposits on littering comes from Denmark. Here, there is a prominent cross-border trade in alcohol owing to the differences in excise duties between the countries each year, The Danish Society for Nature Conservation, the largest nature conservation and environmental organisation in Denmark, conducts a litter clean-up campaign. What is most intriguing about these campaigns is the proportion of littered cans which do not carry a deposit, because they are imported from Germany from areas specifically exempted from the German deposit system. A short summary of the main results concerning beverage cans since 2008 from the “Clean Up Denmark” campaigns is given below:

- 2008: 154,400 cans, of this only 7,800 with a paid Danish deposit;
- 2009: 153,000 cans, of this only 10,000 with a paid Danish deposit; and
- 2010: 197,000 cans, of this only 7,800 with a paid Danish deposit.

The data indicates that the vast majority of cans which are found in litter are those which bear no deposit. The suggestion appears to be that the deposit system has a significant bearing upon whether cans are littered or not, as there is a greater incentive to return the container rather than discard it.

## A5.0 Pay as you Throw Case Studies

Some examples of how the PAYT approach is implemented in different countries is given below.

### Denmark

In Denmark, municipalities (local councils) are responsible for managing all waste, including municipal waste generated in their territories. Responsibilities include collection, transport, sorting, storage, composting, recycling, incineration, treatment and disposal of waste.

Pursuant to the Environmental Protection Act, municipalities can determine a fee that covers the costs of planning, establishing, operating and administrating waste collection schemes, and of establishing and operating waste processing and disposal facilities, the collection and registration of information, and advance payment of planned investments in the field of waste management. As such, in almost all municipalities, the costs of waste management are fully covered by fees.

Waste fees are typically collected on the same bill as the real estate tax. Earlier in this decade, just 6 of the 275 municipalities were presenting a separate bill.<sup>65</sup>

Of the municipalities that have a differentiated waste fee, most have a weight-based payment system, a few have volume-based payment system. Approximately 10% of

Danish municipalities have weight-based schemes for household and small company/institution waste. The first scheme was introduced in 1991 in Tinglev municipality.

All the municipalities that have introduced a weight-based collection scheme are small or medium-sized rural municipalities with few multi-storey buildings. Other municipalities charge an additional fixed fee if the amount of waste set out by a household exceeds the amount on which the fee is calculated (e.g. two bags instead of one).

### Italy

The National Waste Management Act (Decree 22/97, also called the Ronchi Decree) in Italy delegates the responsibility for organising the collection, transport and disposal of municipal and comparable waste to municipalities (Article 21). Municipal tasks mandated by Decree 22/97 include:

- Organization of collection of MSW and its transportation to treatment and disposal facilities. This can be done also in association with other municipalities;

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<sup>65</sup> Eunomia (2003) To Charge or Not to Charge? Final report to IWM (EB). Referred to hereafter as the 'IWM charging review'.

- Choosing collection schemes and tools most suited to achieve the targets mandated by the Decree (e.g. doorstep collection, road containers, civic amenity sites, etc.)
- The assessment of contributions for the MSW tax; this includes specific parameters to be defined for each category (type of dwelling, commercial activity, etc) and tax savings for households with low incomes or belonging to particular categories (e.g. with a single person, or doing home composting, etc).

The municipality has to consider any guidance or guidelines issued by Institutions at higher levels (districts, provinces, etc.), though adherence to such guidelines is not compulsory; in particular, the strategies defined by the Waste Management Plan issued by the region and/or the province have to be considered.

Before 1999, all businesses and citizens in Italy paid a waste management levy (typically based on the size and type of property) related to the overall cost of waste management but unrelated to the individual quantities of waste produced. This meant cross-subsidisation of high waste producing households by low waste producers, as well as subsidisation of household produced waste by businesses.

Along with the Ronchi Decree, the Decree of the President of the Republic 158/1999 provides the basis for a new system of waste management charging based upon 'pay by-use' systems. It was the Ronchi Decree which first gave voice to the principle of pay-by-use, but although the Decree contains this as a general principle, it is the later Decree which provides for implementation details. It was intended that as of January 2008, all municipalities would be operating a variable charge system constituting two parts:

- A fixed portion determined by the basic components of the service, particularly investment and depreciation;
- A variable portion linked to the quantity of waste produced, service provided, and management costs, in order to ensure full coverage of investment and operational costs.

Further simplified details on fee structuring from the legislation are given below:

Type of user	Terms for determining the fee		Reduction
	Fixed portion	Variable portion	Variable portion
Household	Area and factor relative to the size of the household	Quantity of waste produced and factor relative to the size of the household	Participation in sorting schemes
Non-household	Area and waste production factor per activity	Quantity of waste produced and production factor per activity	Waste intended for recovery

Source: *The IWM charging review: Eunomia (2003) To Charge or Not to Charge? Final report to IWM(EB)*

It may also be noted that collection of dry recyclables is partially subsidised by the producer responsibility organisation, the National Association of Packaging Producers (CONAD). Each municipality receives financial support proportional to the quantity and quality for materials collected, though this typically only partially covers the collection costs for these materials.

## United States

In the United States, the role of state government is to develop plans and standards, while local government implements solid waste policy. Thus, individual states and municipalities typically develop municipal solid waste (MSW) management plans within which direct charging systems can be proposed and consulted upon. As such, charging systems in the U.S. have evolved over time. In the past, markets for waste were highly decentralised (with householders taking waste to dumps). Once it was decided to run more formalized collection operations, two main routes were followed: a) an equivalent to a local authority run collection service, accompanied by local authority billing, and b) a contract / franchise approach, the key difference being that in the latter the contractor / franchisee (not the municipality) was responsible for billing households.<sup>66</sup>

Municipalities have been able to pass ordinances asking households to 'hire their own company', and although examples of this competitive model (similar to the approaches in Ireland) still exist, a single collector is now the norm.

The number of municipalities using PAYT schemes in the US stands at more than 6,000, covering a population of 50 million. Pay-per-bin and pay-per-bag schemes are the most commonly used, though weight based systems have seen increasing prevalence (27 communities in the state of Maine alone by 2006).<sup>67 68</sup>

## Korea

Korea became the first country to introduce a mandatory DVR scheme country wide when, in 1995, the volume-based waste fee (VBWF) was introduced. The VBWF is essentially a pay-per-sack scheme under which households are required to place residual waste in pre-paid sacks whilst recyclables are collected free of charge. Charges are also levied on the collection of bulky wastes.

In recent years, the country has introduced free food waste collections for households, having commenced collections for larger producers of food waste (such

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<sup>66</sup> Thomas Kinnaman and Don Fullerton (1999) The Economics of Solid Waste Management, NBER Working Paper 7326, Massachusetts, August 1999.

<sup>67</sup> Lisa Skumatz (2002) Variable Rate or 'Pay-as-you-throw' Waste Management: Answers to Frequently Asked Questions, Los Angeles: Reason Foundation, July 2002.

<sup>68</sup> Jan Canterbury, Sue Eisenfeld (2006) The Rise and . . . Rise of Pay-As-You-Throw, MSW Management, Elements, [www.mswmanagement.com/elements-2006/waste-managementchallenges.aspx](http://www.mswmanagement.com/elements-2006/waste-managementchallenges.aspx).

as restaurants) in 1997. In 2005, the landfilling of kitchen waste from households was banned.