

# STRIVE

## Report Series No.9

# A Nationwide Review of Pay-By-Use (PBU) Domestic Waste Collection Charges in Ireland

## STRIVE

Environmental Protection  
Agency Programme

2007-2013

# Environmental Protection Agency

The Environmental Protection Agency (EPA) is a statutory body responsible for protecting the environment in Ireland. We regulate and police activities that might otherwise cause pollution. We ensure there is solid information on environmental trends so that necessary actions are taken. Our priorities are protecting the Irish environment and ensuring that development is sustainable.

The EPA is an independent public body established in July 1993 under the Environmental Protection Agency Act, 1992. Its sponsor in Government is the Department of the Environment, Heritage and Local Government.

## OUR RESPONSIBILITIES

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We license the following to ensure that their emissions do not endanger human health or harm the environment:

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- the contained use and controlled release of Genetically Modified Organisms (GMOs);
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- Office of Climate, Licensing and Resource Use
- Office of Environmental Enforcement
- Office of Environmental Assessment
- Office of Communications and Corporate Services

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- úsáid faoi shrian agus scaoileadh smachtaithe Orgánach Géinathraithe (GMO);
- mór-áiseanna stórais peitreal.

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- Taighde ar shaincheisteanna comhshaoil a chomhordú (cosúil le caighdeán aer agus uisce, athrú aeráide, bithéagsúlacht, teicneolaíochtaí comhshaoil).

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- Plean Náisiúnta Bainistíochta um Dramhaíl Ghuaiseach a fhorbairt chun dramhaíl ghuaiseach a sheachaint agus a bhainistiú.

### STRUCHTÚR NA GNÍOMHAIREACHTA

Bunaíodh an Gníomhaireacht i 1993 chun comhshaoil na hÉireann a chosaint. Tá an eagraíocht á bhainistiú ag Bord lánaímseartha, ar a bhfuil Príomhstíurthóir agus ceithre Stíurthóir.

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- An Oifig Cumarsáide agus Seirbhísí Corparáide

Tá Coiste Comhairleach ag an nGníomhaireacht le cabhrú léi. Tá dáréag ball air agus tagann siad le chéile cúpla uair in aghaidh na bliana le plé a dhéanamh ar cheisteanna ar ábhar inní iad agus le comhairle a thabhairt don Bhord.

**EPA STRIVE Programme 2007–2013**

# **A Nationwide Review of Pay-By-Use (PBU) Domestic Waste Collection Charges in Ireland**

**(2005-WRM-MS-33-M1)**

## **Case Study Report**

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by

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## Acronyms

CAS	civic amenity sites
DoEHLG	Department of the Environment, Health and Local Government
EPA	Environmental Protection Agency
ESRI	Economic and Social Research Institute
PBU	pay by use
WEEE	Waste Electrical and Electronic Equipment Directive
WMA	Waste Management Act



# Executive Summary

From 2006 to 2008 this study, 'A Nationwide Review of Pay-By-Use (PBU) Domestic Waste Collection Charges in Ireland', investigated the implementation of PBU domestic waste charges in Ireland in order to discern their impact on domestic waste-management activities such as waste presentation, waste recycling and illegal waste diversion. The research was conducted through two phases: (i) Stage 1, a nationwide local authority survey, from May to September 2006 and (ii) Stage 2, a case study stage, from August to December 2007. This report outlines the findings of the case study stage and follows on from the interim report, which reported the findings of the nationwide survey.

While answering many questions on the implementation of PBU, the first stage of the research (the nationwide survey) was unable to provide detailed answers to questions on the impacts of PBU. The second stage of the research (the case studies) aimed to address both several of the areas unanswered by the nationwide survey, and examine several additional areas raised by local authority responses to this first stage.

Four main issues were selected for investigation during the case study stage:

- 1 the impact of various PBU systems on householders waste-presentation rates;<sup>1</sup>
- 2 waste-presentation rates for landfill under different levels of access to a kerbside recycling service;
- 3 the relationship between PBU domestic waste charges and illegal domestic waste diversion; and
- 4 the role of the private waste collector in domestic waste collection in Ireland.

These issues were examined through studies conducted in two local authority case studies (a Cork County Council

case study and a Dublin Waste Management Region case study) and with a selection of six private waste collectors. Quantitative information gathered from the interviews was analysed using SPSS, and qualitative information was analysed using descriptive and conceptual coding techniques to identify the key issues raised by interviewees. Descriptive coding categorises the data under headings based on the topics respondents were asked to speak on, whereas conceptual coding develops new categories based on additional data that were revealed during the interviews.

The key findings from the case study stage are:

- **Impact of PBU system on domestic waste-presentation rates** – Two local authorities with equal access to kerbside recycling,<sup>2</sup> but with different PBU systems implemented, were studied to compare the effectiveness of pay-by-weight with tag-based<sup>3</sup> on household waste-presentation rates to landfill. The analysis revealed that from the year prior to PBU to the year subsequent to PBU introduction, under the weight system waste presentation to landfill decreased by 49%, whereas under the tag system presentation decreased by 23%. A further study area that moved from a tag system to a weight system realised initial decreases of 19% followed by a further decrease of 8% upon implementation of a weight-based PBU charge. These figures indicate that pay-by-weight may be more effective in reducing landfill waste-presentation rates in householders than tag-based.

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<sup>2</sup> A service whereby waste collectors collect certain recyclable materials directly from households. This removes the need for householders to go to CAS or bring banks to recycle many items.

<sup>3</sup> Stage 1 of the research identified three main forms of PBU in use in Ireland: Volume-based, tag-based and pay-by-weight. Volume-based involves householders paying annually for waste based on the volume of the wheelie bin they select to use. Tag-based involves householders buying a bin tag to attach to their bin for collections and therefore paying each time they require their waste to be collected. pay-by-weight involves householders being charged by their waste collector based on the weight of waste they present for collection.

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<sup>1</sup> The waste-presentation rate is the weight of waste presented by householders for delivery to landfill by waste collectors.

- **Impact of kerbside recycling on domestic waste-presentation rates** – In an area with kerbside recycling and an area without kerbside recycling there was a 33% difference in overall reductions in waste to landfill from the year prior to pay-by-weight to the latest figures available, 2007. Households with the kerbside recycling service experienced the greater reduction. Both areas had moved from a flat-rate system to a pay-by-weight system, the only difference being access to a kerbside recycling service. This 33% difference between areas in the reduction under a pay-by-weight system indicates that the presence of a kerbside recycling service has a large part to play in achieving reductions in household waste to landfill.

In several areas, data was available to allow limited investigation into the possible destinations of waste diverted from landfill; source reduction; recycling and illegal waste diversion.

- **Impact of PBU on source reduction** – The case study stage allowed for a preliminary examination of the impact of PBU charges on domestic source reduction. Source reduction involves householders reducing the overall amount of waste they produce through changes to their shopping habits. Two waste-management areas which had moved from a flat-rate system to a PBU system provided data suitable for analysis. One of these areas uses pay-by-weight, and the other area uses tag-based. Within the pay-by-weight waste-management area a 16% decrease in the total amount of waste managed by the local authority was experienced and within the tag-based area a 20% decrease in the total amount of waste managed by the local authority was witnessed. These figures indicate that both the tag and weight forms of PBU may be effective in prompting source reduction in householders; however, it is not possible to determine whether these decreases were achieved through source reduction behaviour, as householders may have alternatively selected to illegally dispose of their waste.
- **Impact of PBU on recycling** – Two of the waste-management areas studied had a kerbside recycling service available to the majority of householders before the local authority implemented PBU charges. In one area, analysis of kerbside recycling figures reveals that during the 2003–2007 study period householders with a kerbside recycling service have only increased the amount placed out for recycling by 9% on average. In addition, in the year tag-based was implemented and householders reduced their landfill waste presentation by 23%, the amount presented for recycling *decreased* by 4%. These findings indicate that households did not select to divert their waste through increasing use of the kerbside recycling service. However, although kerbside recycling levels did not increase significantly on introduction of PBU, data was available to investigate the impact of the charges upon total diversion using county council civic amenity sites<sup>4</sup> (CAS), bring banks<sup>5</sup> and two bin collections, the kerbside recycling bin and the pilot organic bin. Taking these diversion options together, the analysis reveals that on average during the study period households increased the amount of waste diverted via these routes by 100%, indicating a large level of participation in recycling. In the second area studied in the year pay-by-weight charges began, householders reduced their landfill waste presentation by 49% and the amount of recycling placed in householder recycling bins increased by 25%.

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<sup>4</sup> Civic amenity sites (CAS) are facilities that accept a wide range of recyclable materials. Many CAS also accept landfill waste.

<sup>5</sup> Bring banks are facilities that accept a small number of materials for recycling. Glass and food tins are commonly accepted materials at bring banks.

- **Impact of PBU on illegal diversion** – Investigation into the impact of PBU on illegal diversion in the first stage of the study focused on changes in the number of reported incidents. This relies on reporting levels and so may actually reflect changes in public awareness rather than real changes in illegal dumping activity. The case study stage examined illegal dumping in the two local authority case study areas (Cork County Council and the Dublin Waste Management Region) following the implementation of PBU charges. By interviewing 30 people working in many different roles, a picture was built up of experiences of illegal dumping. Interviewees were asked whether they have witnessed changes in illegal diversion levels over time, and what factors they felt influenced these changes. The interviews revealed that the majority of respondents felt that levels of illegal waste diversion have increased. The most commonly cited reason for these increases was the introduction of PBU domestic waste charges. The second most commonly provided reason was an increase in the amount of rental properties in the area. Based on the responses provided by the interviewees, PBU can be considered a contributing factor in increasing illegal domestic waste diversion at least in the early stages of implementation.
- **The role of private collectors** – The number and influence of private collectors in the domestic waste-collection market was identified in the first stage of the research. At the time of the nationwide survey, domestic waste services were provided by both local authority and private collectors in 41% of county/city councils throughout Ireland. One aim of the case study stage was to examine the relationships between local authorities and private waste collectors, and to gather the views of private collectors on PBU. Interviews revealed a high degree of competition between local authorities and private waste collectors, with both parties claiming that the absence of a level playing field places the other side at an advantage. Local authorities referred to the private collectors' profit motive encouraging private collectors to use environmentally less effective PBU systems to 'cherry pick' customers and to not offer low-income customers a fees waiver. On the other hand, private collectors referred to the conflicting roles of local authorities as waste regulators and collectors. In particular, private collectors felt local authority grants from the Environment Fund<sup>6</sup> were unfair. Both local authorities and private waste collectors were generally supportive of the proposed introduction of an independent waste regulator, feeling that this might help remove the current level of inequality. However, the local authorities interviewed also expressed a preference for local authority ownership of waste regulation, with private collectors applying for permits using a competitive tendering process.

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<sup>6</sup> Revenue from the landfill levy and the plastic shopping bag charge are paid into an Environment Fund. Monies from the Environment Fund are used for many environmental initiatives, including providing financial assistance for the implementation of waste-management plans and assistance with waste recovery and prevention activities.





# 1 Introduction

The first stage of the research 'A Nationwide Review of Pay-by-use (PBU) Domestic Waste Collection Charges in Ireland' was a nationwide survey of each local authority with the aim of determining methods of PBU implementation nationwide and the impacts of PBU charges on waste to landfill, recycling and illegal waste diversion. All waste collectors in Ireland were required to move from a flat-rate charge to a PBU charge by 1 January 2005. Under a flat-rate charge, householders were charged a set annual waste-collection fee – regardless of the amount of waste they placed out for collection. Under a PBU charge, householders are charged based on the amount of waste they place out for landfill collection, with higher charges for greater volumes or weights of waste presented. The results from this first stage indicate that PBU charges have reduced waste presented for landfill by householders. The research revealed that average waste-presentation rates in most local authorities *without* PBU charges have increased over time, with a 10.8% increase in average kilogrammes of waste presented for landfill per person from 2003 to 2004. Whereas over the same period, local authorities *with* PBU charges have seen a 2.6% decrease in average kilogrammes of waste presented for landfill per person. In addition, in local authorities with PBU charges there was a further 0.9% decrease in average waste presentation from 2004 to 2005, resulting in a 3.5% decrease overall from 2003 to 2005.

As more and more local authorities move from flat-rate charges to PBU charges there is an overall nationwide trend of decreasing waste-presentation rates year on year. Although these figures have to be read in the light of increasing recycling infrastructure they suggest that PBU charges have influenced waste-presentation rates in Ireland on a nationwide level. However, it was not possible to determine the relationships between PBU charges and recycling, or the impacts of the various PBU systems in the nationwide study. In addition, it was not

possible to determine the impact of PBU charges on illegal waste diversion. Exact figures are hard to establish in this area as many local authorities do not have detailed or comprehensive monitoring and management systems for illegal waste-diversion activities. Interviews with local authority waste-enforcement officers in the first stage of the research revealed a general perception that overall there has been an increase in the number of waste incidents reported to the local authorities. Nonetheless, officers were keen to point out that this may not be solely related to the introduction of PBU charges, stressing the role played by increased environmental awareness and shifting social values that can contribute to a greater reporting of illegal activity. More details on findings of Stage 1 can be seen in the interim report for this research, published by the EPA (O'Callaghan-Platt and Davies, 2007).

While answering many questions on the implementation of PBU, this first stage of research was unable to provide detailed answers to questions about the impacts of PBU. Stage 2 of the research – the case studies – therefore aimed to address unanswered questions from Stage 1 of the research and respond to additional issues raised by the survey. Four main areas of research were selected for investigation during this second stage:

- 1 the impact of various PBU systems on householders' waste-presentation rates;
- 2 waste-presentation rates for landfill under differing levels of access to a kerbside recycling service;
- 3 the relationship between PBU domestic waste charges and illegal domestic waste diversion; and
- 4 the role of the private waste collector in domestic waste collection in Ireland.

## **1.1 Impact of Various PBU Systems on Household's Waste-Presentation Rates**

Stage 1 found that the majority of local authorities in Ireland have more than one type of PBU system operating within their area. Furthermore, the research revealed the variability in charges and recycling services. For example, one town may be charged for their waste under a weight-based system with an annual service charge of €120, a weight charge of 22 cent per kg and a free monthly kerbside recycling service. A household in another town may be charged under a tag-based system with no service charge, a tag charge of €6.50 and a fortnightly kerbside recycling service at €4 a collection. As some PBU systems are considered more effective than others in terms of reducing waste placed out for landfill collection, this mixed use of PBU systems across Ireland may be responsible for the relatively small decrease in waste-presentation rates nationally compared to decreases found in other international studies. Based on this, the impacts of two types of PBU system was one of the areas selected for further study in the case study stage.

To compare the impacts of two of the PBU systems in use in Ireland, a waste-management region within which one local authority uses pay-by-weight and another local authority uses a tag-based system when charging householders for their waste collection was selected as a case study. A second local authority case study was selected to compare the waste-presentation rates of householders within one PBU system but with differing levels of access to a kerbside recycling service.

## **1.2 Waste Presentation Rates for Landfill under Differing Levels of Access to a Kerbside Recycling Service**

A second area selected for study was the impact of household access to kerbside recycling services on household waste presentation rates for landfill. Recycling is promoted to householders as a means of reducing the amount of waste to landfill yet many households are

not offered a kerbside recycling service and instead are required to travel to CAS and bring bags to recycle their waste. The absence of a kerbside recycling service may discourage households from recycling and result in a greater weight of waste presented in the landfill bin, than the weight of waste presented for landfill in households with a kerbside recycling service. To examine whether this assertion is true a second local authority case study was selected to compare the waste presentation rates of householders within one PBU system but with differing levels of access to a kerbside recycling service.

## **1.3 Relationship between PBU Domestic Waste Charges and Illegal Domestic Waste Diversion**

A third area of study undertaken in the case study stage was the impact of PBU charges on illegal domestic waste diversion. It is widely assumed that PBU charges will encourage people to minimise their costs by reducing waste and increasing recycling. However, another possibility is that people will instead resort to illegal diversion of waste. Forms of illegal waste diversion include littering; fly-tipping;<sup>7</sup> backyard burning; charitable dumping; dumping in commercial waste bins; and the dumping of non-recyclable waste in recycling bins (Miranda and Bynum, 2002).

The potential for undesirable diversion of waste constitutes a persistent criticism of PBU pricing. Nonetheless, there is very little hard empirical evidence that such behaviour takes place following the introduction of PBU charges. The nationwide study used numbers of reported incidents of illegal waste diversion as an indicator of the impacts of PBU on illegal waste diversion. However, owing to increased public awareness and changing recording systems, the findings from the first stage of the research were inconclusive as to the impacts of PBU on illegal waste diversion. This topic was selected as an area for further study in the second stage of the research. Interviews were conducted with litter wardens, tidy towns committees, charity shops, recycling centre managers, GAA clubs and

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<sup>7</sup> Fly-tipping is a term used for the illegal dumping of waste – for example, bags of waste dumped down country lanes or urban side streets.

business associations in the two local authority case study areas. By interviewing people in many different roles in an area a picture was built up of the areas overall experience of illegal dumping.

#### **1.4 Role of Private Waste Collector in Domestic Waste Collection in Ireland**

The fourth key area of research undertaken in the case study stage was the role of private waste collectors in the domestic waste-management sector in Ireland. Stage 1 found that private waste collectors were present in 94% of the counties in Ireland, and in 41% of cases local authorities and private collectors operate within the same county. Owing to the prevalence of private collectors in the market, and to the unusual position of private collectors competing with the same organisations that issue their

waste-collection permits (the local authorities), the role of private collectors in the waste-management sector was selected as an important area for further research. Six private waste collectors were selected for interview and, along with interviewees from the two local authority case study areas, were questioned on the introduction of PBU by private collectors; the private waste collector–local authority relationship; the permitting system; and their thoughts on the future of waste collection and regulation nationwide.

This report on the case study stage of the research is divided into the following sections: methodology, analysis, and conclusion and recommendations. Section 2 outlines the methodology of the case study; Sections 3–6 present an analysis of the four key issues identified above. Finally, Sections 7 and 8 provide a summary, recommendations and conclusions to the whole study.

## 2 Methodology

From August to November 2007, three case studies were conducted: two local authority case studies areas (Cork County Council and the Dublin Waste Management Region) and one case study of private waste collectors. As outlined in Section 1, the case studies covered four main areas of study: (i) PBU systems; (ii) kerbside recycling; (iii) illegal waste diversion, and (iv) the role of private waste collectors.

The aim of the first local authority case study was to examine the impact of kerbside recycling on waste-presentation rates. This looked at waste-presentation levels in areas of one local authority that had kerbside recycling services and areas that did not. The aim of the second local authority case study was to examine the impacts of two PBU charging systems – pay-by-weight and tag-a-bin – in terms of household waste-presentation rates. In addition, the impact of PBU on illegal waste diversion and local authority relationships with private collectors was examined in both local authority case studies. The case study of private waste collectors was undertaken to examine their views of PBU and their relationships with local authorities.<sup>8</sup>

The case study method of research combined models used in Bauer and Miranda (1996) and Miranda and Bynum (2002). Bauer and Miranda (1996) conducted structured interviews with city authorities, private waste contractors and recycling centre managers to determine the waste disposal and recycling levels experienced in areas using PBU waste-collection charges. Miranda and Bynum (2002) investigated the effect of user-based charges on illegal waste diversions, such as illegal dumping, and interviewed city authorities, recycling centre managers, street management personnel, small businesses and charitable organisations to determine the level of illegal dumping in areas using PBU waste-collection charges.

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<sup>8</sup> See Appendices 1 and 3 for the full list of questions set to interviewees in the local authority and private waste collector case studies.

### 2.1 Interviews

Local authority respondents were sent an email outlining the project, explaining why their local authority was selected as a case study, and requesting them to participate in an interview. If the respondent had not replied to the email within two to three days, they were contacted by telephone.

- Cork County Council interviewees included waste services officers for the three waste-management areas, and an officer from the finance department.
- Dublin Waste Management Region interviewees included the Director of Waste Services, the Head of Finance and the Senior Engineer in Dun Laoghaire–Rathdown County Council, and the Senior Executive Engineer in Fingal County Council.
- In addition, 30 organisations/people across the two local authority case studies were interviewed about illegal waste diversion. Respondents were made up of litter wardens, charitable organisations, business associations, Tidy Towns Committees, GAA clubs and recycling centre managers.
- Six private waste-collection companies were interviewed about PBU. Collection companies were identified from the responses to the nationwide survey in Stage 1 of the research. The companies were selected to include operators collecting from across different areas of the country, so that 23 counties are covered by the six companies interviewed. In addition, a range of large-, medium- and small-sized companies using a range of different PBU systems were interviewed. All companies were contacted first by email, which was then followed up by a phone call. Five of the interviews were conducted face to face; the sixth interviewee selected to respond to the questions via email.

- Company 1: A large company operating in seven local authorities and offering a volume-based system with aspects of pay-by-weight.
- Company 2: A large company operating in eight local authorities and offering a volume-based system.
- Company 3: A large company operating in ten local authorities and offering volume-based, tag-based and weight-based systems.
- Company 4: A medium-sized company operating in four local authorities and offering a volume-based system with aspects of pay-by-weight.
- Company 5: A medium-sized company operating in two local authorities and offering a volume-based system and a tag-based system.
- Company 6: A small company operating in one local authority and offering a tag-based system.

## **2.2 Analysis**

Interviews were recorded and transcribed. Quantitative data was analysed using SPSS, qualitative data was analysed using descriptive and conceptual coding in order to identify the key issues raised by interviewees. Descriptive coding categorises the data under headings based on the topics respondents were asked to speak on, whereas conceptual coding develops new categories based on additional data that were revealed during the interviews (Bryman and Burgess, 1994).

## **3 Analysis: The Impact of Kerbside Recycling on Waste Presentation Rates**

### **3.1 Introduction to the Cork County Council Case Study**

The main aim of this case study was to determine the impact of kerbside recycling on waste-presentation rates. Cork County Council was selected as a case study because the local authority offers one form of waste charging (using a pay-by-weight system) throughout its functional area, yet offers different levels of access to recycling services in different areas.

Within Cork County Council there are three separate waste-management divisions: (i) North, (ii) South and (iii) West Cork. Pay-by-weight was introduced on separate dates in the different divisions: for West Cork in January 2003, North Cork in February 2004, and South Cork in January 2005. Since the introduction of pay-by-weight charging the county council has also provided a kerbside recycling service to many of its customers. At the time of the questionnaire response (summer 2006), kerbside recycling service was available to 100% of local authority customers in South Cork and it was in the process of being phased in across North Cork. The local authority planned to offer kerbside recycling to customers in West Cork by the end of 2006/beginning of 2007. However, at the time of the case study in August 2007 kerbside recycling was being introduced to households of West Cork.

To examine the impact of kerbside recycling on waste-presentation rates under a pay-by-weight collection system, waste-collection data<sup>9</sup> for each of the three areas and details of the number of county council customers in each area were combined to develop waste-presentation rates per household for each of the three areas. In theory, it might be expected that the waste-presentation rate for landfill would be lowest in South Cork and highest in West Cork, based on their access to recycling services.

The study also looked at the amount of household waste collected in the year prior to and subsequent to the implementation of kerbside recycling in South Cork and North Cork. This was to allow an analysis of the impact of the recycling service within each separate waste-management area. Where waste-collection data was available for earlier years, the study examined household waste presentation before and after the implementation of pay-by-weight in order to determine the impact of the pay-by-weight system itself.

In summary, the main aim of the case study was to compare waste-presentation rates in areas with and without access to kerbside recycling. Furthermore, waste-presentation rates prior to and subsequent to pay-by-weight charging and waste-presentation rates prior to and subsequent to kerbside recycling were examined where available.

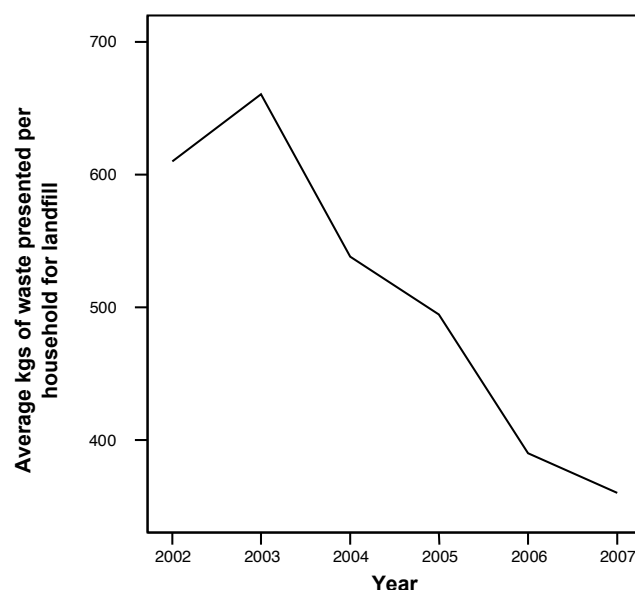
### **3.2 Waste Management Area 1: North Cork**

#### ***3.2.1 Impact of pay-by-weight and Kerbside Recycling on Household Landfill Waste Presentation***

Pay-by-weight domestic waste charges were introduced in the North Cork waste-management area of Cork County Council in February 2004. Before this, a tag-based charging system that was begun in the early 1990s was in place: householders could present waste in bags, dustbins or wheelie bins, using one tag per bag and two tags per wheelie bin. Under this system, household waste-presentation rates were climbing. From 2002 to 2003, presentation rates increased by 8% and rose from an average of 609 kg per household in 2002 to 660 kg in 2003 (see Graph 3.1).

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<sup>9</sup> Tonnes of household waste collected.



**Graph 3.1: Change in average kilogrammes of waste presented for landfill per household, North Cork, 2002–2007.**

From 2003 (under a tag-based system) to 2004 (under the PBU [weight] system), there was a 19% decrease in waste presentation. It seems likely that the introduction of pay-by-weight prompted this drop and presentation rates continued to decrease the following year (from 2004 to 2005) by a further 8%, despite no change in service. pay-by-weight is considered a more effective system than tag-systems in terms of reducing waste placed out for landfill collection. The further decrease seen from 2004 to 2005 may be as a result of growing householder familiarity with the new system and waste-diversion options. Segregating waste for recycling may also have become normalised in the year following the introduction of pay-by-weight, resulting in greater efficiencies in diverting waste from landfill.

Kerbside recycling was introduced to all households in the summer of 2006. From 2005 to 2006 there was a 21% decrease in waste-presentation rate. Nonetheless, it is important to note that for half of 2006 householders did not have kerbside recycling and so the decrease may have been even greater over a full-year period. In 2007 all householders had a kerbside recycling service for the entire year. Over the period from 2005 when there was no kerbside recycling service to 2007 when all households had a kerbside recycling service, there was a 27% decrease in waste presented for landfill by householders.

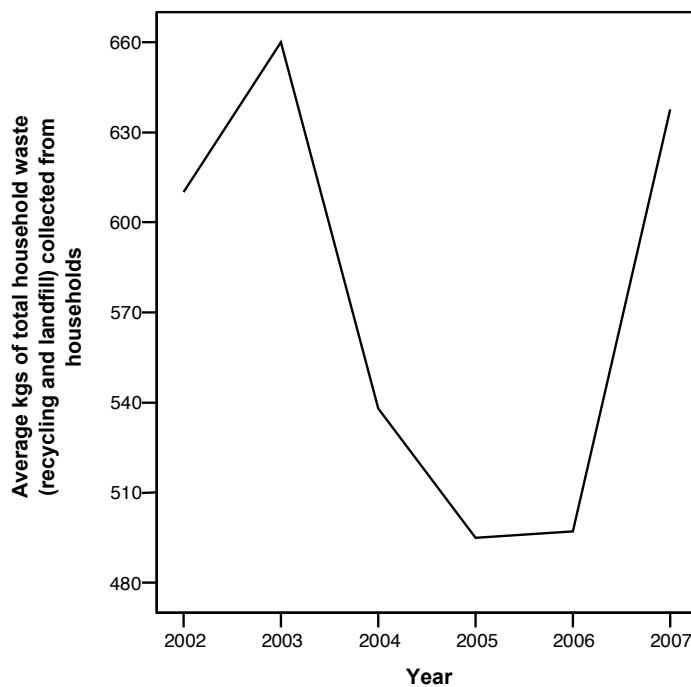
Based on this, the actual decrease in presentation rates on the onset of kerbside recycling fell between 21% and 27%.

It appears that whereas pay-by-weight had the initial impact of reducing waste for landfill by 19%, the reduction in waste from under a tag-based system in 2003 to pay-by-weight without kerbside recycling in 2005 was 25%. This illustrated that pay-by-weight is an effective tool for waste diversion even in the absence of kerbside recycling, at least initially. Kerbside recycling and pay-by-weight had the combined impact of reducing waste for landfill by between 21% and 27%. Overall, there has been a massive 41% decrease from presentation levels under a tag-based system in 2003 to pay-by-weight with kerbside recycling in 2007.

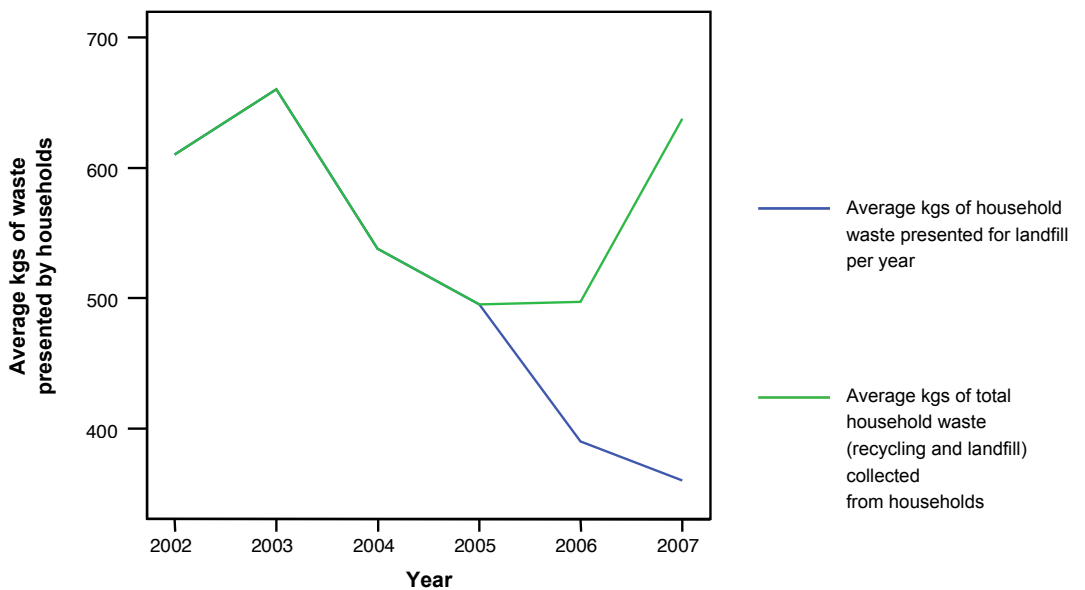
### **3.2.2 *Directions of Householder Diversion of Waste from Landfill***

pay-by-weight and kerbside recycling have succeeded in reducing household waste to landfill, but questions remain as to how these waste-management measures have affected overall household waste production. Has pay-by-weight been successful at promoting source reduction behaviour in households? Graph 3.2 presents the total waste collected from households from 2002 to 2007 by Cork County Council (both in the landfill bin and the





**Graph 3.2: Change in tonnes of total waste presented by households (both for landfill and recycling), North Cork, 2002–2007.**



**Graph 3.3: Change in tonnes of waste presented for landfill by households, 2002–2007 alongside change in tonnes of total waste presented by households (both for landfill and recycling), North Cork, 2002–2007.**

recyclables bin). Since prior to 2006 there was only one bin collection, the landfill bin, in North Cork, the section of the graph covering 2002 to 2005 mirrors Graph 3.1 waste to landfill. Graph 3.3 then plots both household waste collected for landfill and total household waste collected against each other and demonstrates the divergence between the two waste streams from 2006 when kerbside recycling began.

As outlined above, waste collected from households was increasing prior to pay-by-weight charges. When pay-by-weight began the amount of waste collected from households decreased significantly in the following years, by 25% as described earlier. Once the pay-by-weight charges were introduced it is clear that householders reduced the amount of waste they placed in their landfill bin in order to reduce their waste bills. What is less clear is what

they selected to do with the 25% of household waste that was no longer being placed in the landfill bin, as kerbside recycling was not an option for householders at the time.

There are several possibilities available to households without a kerbside recycling service when selecting to divert waste from their landfill bin: source reduction; recycling at local CAS; composting of organic waste; and illegal waste-diversion methods, such as backyard burning and fly-tipping. In terms of environmental impact, source reduction is considered the preferred waste-management option. This means that householders reduce the overall amount of waste they produce through changes to their shopping habits – such as buying items with less packaging, donating unwanted items or repairing broken items rather than disposing of them. This waste-management option not only reduces waste to landfill but also does not require the energy, materials and other resources that are used when recycling items or when new items are produced.

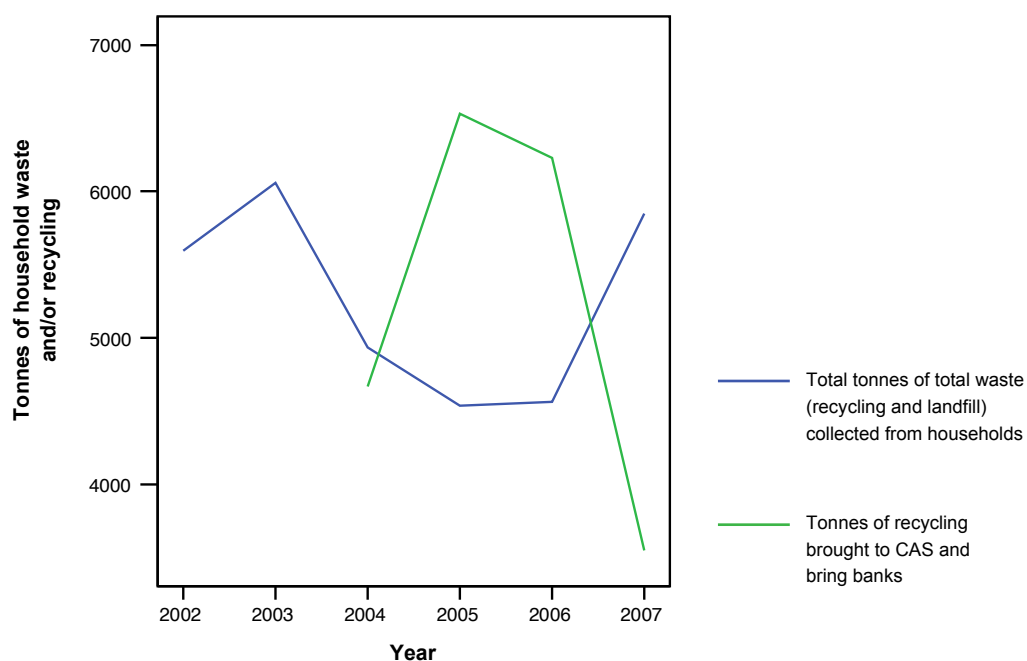
When pay-by-weight was implemented there was a 25% decrease in total waste collected from householders. After this initial drop, the weight of total waste collected began to rise very slightly as kerbside recycling began to be rolled out in mid-2006. Once kerbside recycling became available to all households in 2007 there was a sudden 28% increase in the amount of total waste presented by households. Of the waste collected in 2007, 56% of the total waste was presented in black bins for landfill, and 44% in green bins for recycling. As it is improbable that households began producing substantially greater weights of waste once they had access to kerbside recycling this suggests that significant source reduction did not occur within this pay-by-weight system. Consequently, although waste presented for landfill dropped on implementation of pay-by-weight, total household waste production did not alter to a great extent. Overall, in 2007, the average weight of waste collected in total from households was only 4% lower than in the year prior to pay-by-weight (2003). The waste absent from the figures could have been diverted by householders taking waste to CAS, composting or by illegal diversion, but significant source reduction did not occur.

Interviews with litter wardens, Tidy Towns Committees<sup>10</sup> and others have found that, anecdotally at least, illegal diversion activities have *increased* since pay-by-weight began. In addition, research conducted into the pay-by-weight pilot study in Cork County Council (ESRI, 2006) found that 42% of households chose to burn their household waste in either fireplaces or their gardens. These findings indicate that illegal diversion may be a waste-diversion option used by many households to reduce waste placed in their landfill bin. As composting is an activity taken by householders in their own garden without using outside organisations, figures are not available for the amount of waste diverted to composting in the North Cork region.

Figures for recycling levels in local CAS and bring sites were gathered to determine what volume of the missing waste was diverted to recycling. Unfortunately, figures prior to 2004 were not available, preventing an analysis of the impact of the 19% decrease in waste to landfill seen from 2003 to 2004 on changes in levels of recycling brought to CAS and bring sites by householders. However, in the following year, 2004 to 2005, there was a further 8% decrease in waste-presentation rates for landfill as reported above, whereas there was a 40% increase in recyclable waste brought to CAS and bring sites, resulting in an increase in total waste (landfilled and recycled) during this period. Following this large increase in recyclables to CAS and bring banks, this diversion leveled off from 2005 to 2006 and then subsequently decreased by 43% from 2006 to 2007, when all households had access to a kerbside recycling service (see Graph 3.4). These findings highlight further that source reduction did not occur under the pay-by-weight system, householders appear to not only have diverted waste from landfill to recycling, but had in fact increased the amount of waste they were producing overall for the 2005 and 2006 period. Taking all figures, waste presented for landfill, waste recycled at CAS/bring banks, and waste presented as kerbside recycling, into consideration, householders in the North Cork waste-management area predominately selected to recycle the waste they diverted from landfill under a pay-by-weight system.

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<sup>10</sup> Tidy Towns Committees oversee an area's entry into the long-standing national Tidy Towns competition, which is organised by the Department of the Environment, Heritage and Local Government. The competition involves participating towns being rated on all aspects of their local environment, including litter control, and competing for the title of 'Ireland's Tidiest Town'.



**Graph 3.4: Change in tonnes of total waste presented by households (both for landfill and recycling), 2002–2007, alongside change in recyclables to CAS and bring banks, North Cork, 2004–2007.**

### 3.2.3 Summary

The move from a tag-based PBU system to a weight-based PBU system decreased the amount of waste householders placed out for collection in their landfill bin. The introduction of a kerbside recycling service further reduced the amount of waste placed in the landfill bin. In the period between introduction of pay-by-weight and the introduction of the kerbside recycling service, households selected to divert waste from their landfill bin by recycling at local bring banks and CAS. Source reduction did not occur under this pay-by-weight system.

## 3.3 Waste Management Area 2: West Cork

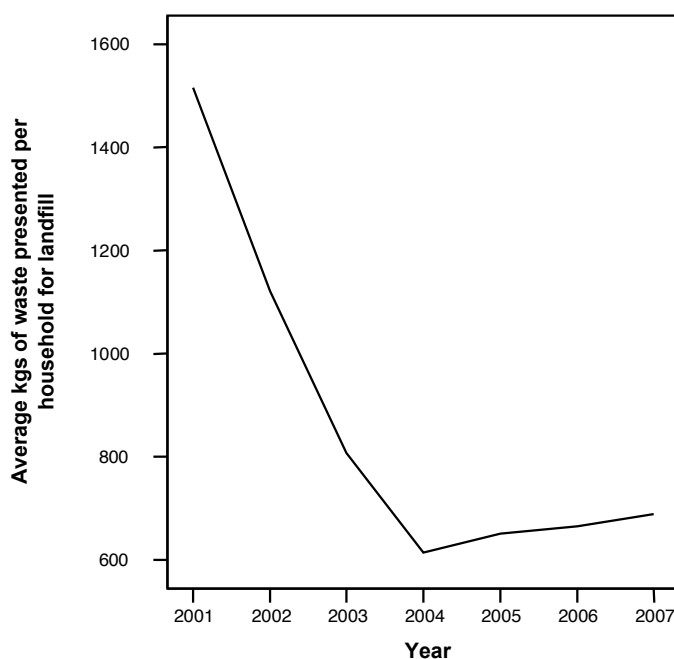
pay-by-weight domestic waste charges were introduced in the West Cork waste-management area of Cork County Council in January 2003. Prior to the use of pay-by-weight, a flat-rate charging system was in place. The introduction of pay-by-weight prompted an initial 28% decrease in waste presentation for landfill from 2002 to 2003. This decrease was followed by a further 21% reduction in presentation rates in the following year, 2004, despite no change in service. Following this reduction presentation

rates then began to increase again, with a 26% increase from 2004 to 2007. Owing to this increase, overall within the period of pay-by-weight use waste presented for landfill decreased by only 0.5% from 2003 to 2007. These figures are illustrated in Graph 3.5 below.

West Cork experienced a continued increase in waste-presentation rates from 2006 to 2007, with a 9% increase in waste presented for landfill. Kerbside recycling services were provided to all householders from September 2007 on. Because householders were able to avail of this service for only the final three to four months of 2007, this may explain the apparent lack of impact kerbside recycling has made upon the 2007 waste-presentation figures (see Graph 3.5).

### 3.3.1 Directions of Householder Diversion of Waste from Landfill

Figures for recyclables to CAS and bring-banks centres were requested to determine how much of the diverted waste was sent for recycling by householders. The figures revealed that recyclables to CAS and bring banks have increased by a massive 579% from 2003 (the year prior to PBU) to 2007. Nonetheless, over this period both the



**Graph 3.5: Change in average kilogrammes of waste presented for landfill per household, West Cork, 2001–2007.**

number of CAS and bring banks had increased in the area (2002 through 2004 was the main period during which the bring bank network was expanded), and the number of materials accepted for recycling had increased. For example, in 2003 only 1 waste stream – glass – was accepted for recycling, whereas in 2007, this had increased to 13 recyclable waste streams.<sup>11</sup> On this basis, it was not possible to determine how pay-by-weight affected waste to recycling. However, in the years immediately following the introduction of pay-by-weight householders did not have the option of recycling their diverted waste as the facilities to do so were not available. Householders could have only selected source reduction or illegal diversion to account for the 28% reduction in waste presented for landfill in the year immediately following the introduction of pay-by-weight.

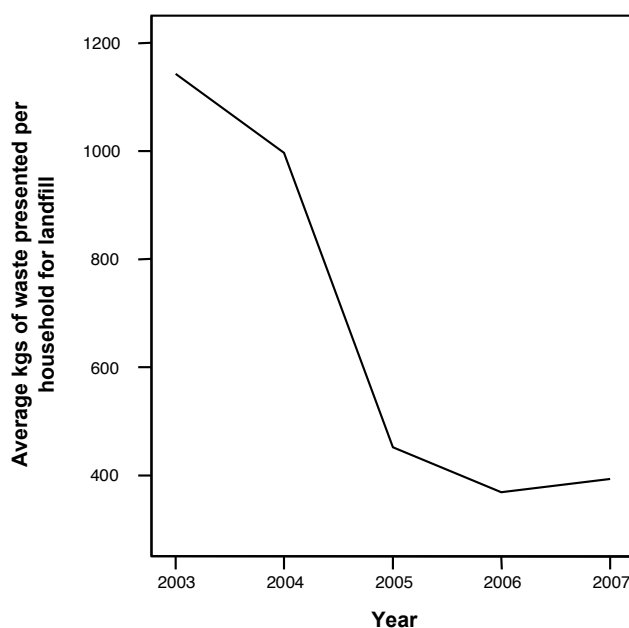
### 3.3.2 Summary

The initial experiences of West Cork appear to demonstrate that pay-by-weight is an effective tool for waste diversion even in the absence of kerbside recycling.

However, perhaps this is only the case in the short term. The experiences of West Cork show that over time, without further measures such as kerbside recycling being implemented, householders begin to increase their waste-presentation rates to landfill again. When a new cost is introduced, householders respond to this by changing their behaviour to reduce the impact of this new charge, but over time this cost becomes normalised and householders may begin to revert to previous patterns. In addition, it is possible that although waste was diverted from landfill it may instead have been illegally diverted by householders, at least initially, in the absence of a sufficient recycling infrastructure.

On the whole, even without kerbside recycling, the pay-by-weight system appears to have been successful in reducing household waste to landfill in the West Cork waste-management area. The total reduction in waste to landfill recorded in West Cork from the year prior to pay-by-weight, 2002, to the latest figures available, 2007, was 28%. However, in the two years preceding pay-by-weight, household waste-presentation rates were already decreasing, with a reduction of 26% witnessed from 2001 to 2002. The cause of this reduction is not evident, but

<sup>11</sup> The 13 waste streams accepted for recycling were: batteries, cans, glass, green waste, light tubes, oils, paint, paper, cardboard, plastic, scrap metal, timber, and objects covered by WEEE.



**Graph 3.6: Change in average kilogrammes of waste presented for landfill per household in South Cork, 2003–2007.**

may possibly have resulted from increased environmental awareness and increased numbers of recycling facilities provided in the local area, e.g. bring banks.

### **3.4 Waste Management Area 3: South Cork**

#### **3.4.1 *Impact of Pay-by-weight and Kerbside Recycling on Household Landfill Waste Presentation***

pay-by-weight domestic waste charges were introduced in the South Cork waste-management region in January 2005. Prior to pay-by-weight households were charged using a flat rate. Under this flat-rate system, in the two years preceding pay-by-weight, average waste presentation per household was already decreasing. From 2003 to 2004 average presentation fell by 13%. On implementation of pay-by-weight in 2005 waste presentation decreased by a further 55%. Kerbside recycling was phased in throughout 2005 and in 2006 this service was made available to all households. There was an 18% decrease in waste-presentation rate from 2005 to 2006 when kerbside recycling became universally available. Nonetheless, from 2006 to 2007 waste-presentation rates began to rise, with an increase of 7%. Despite this, the presentation rates are

still well below the amounts presented prior to kerbside recycling (452 kg versus 394 kg: see Graph 3.6).

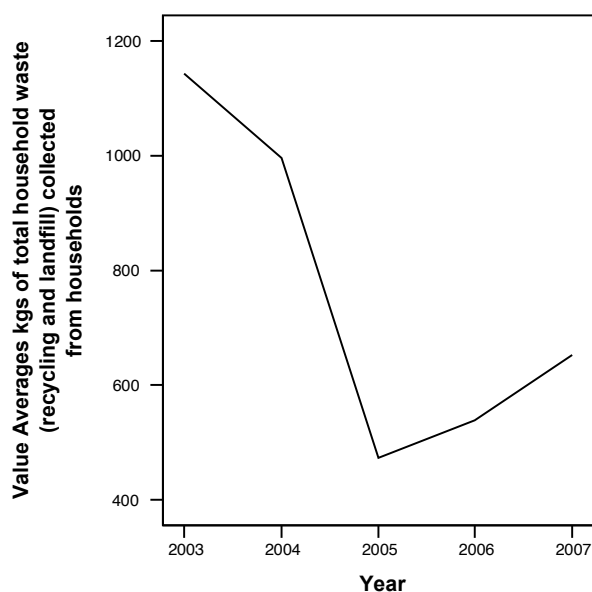
#### **3.4.2 *Directions of Householder Diversion of Waste from Landfill***

The South Cork waste-management area has experienced large decreases in waste presented by householders for landfill collection by the county council. This section examines the directions of the waste diverted from landfill. Graph 3.7 presents the total waste collected from households from 2003 to 2007 by Cork County Council (both in the landfill bin and the recyclables bin). As prior to 2006 there was only one bin collection (the landfill bin) for 81% of households in South Cork, the section of the graph covering 2003 to 2005 mirrors Graph 3.6 (waste to landfill). Graph 3.8 then plots both household waste collected for landfill and total household waste collected against each other and demonstrates the divergence between the two waste streams from 2006 when kerbside recycling became available universally.

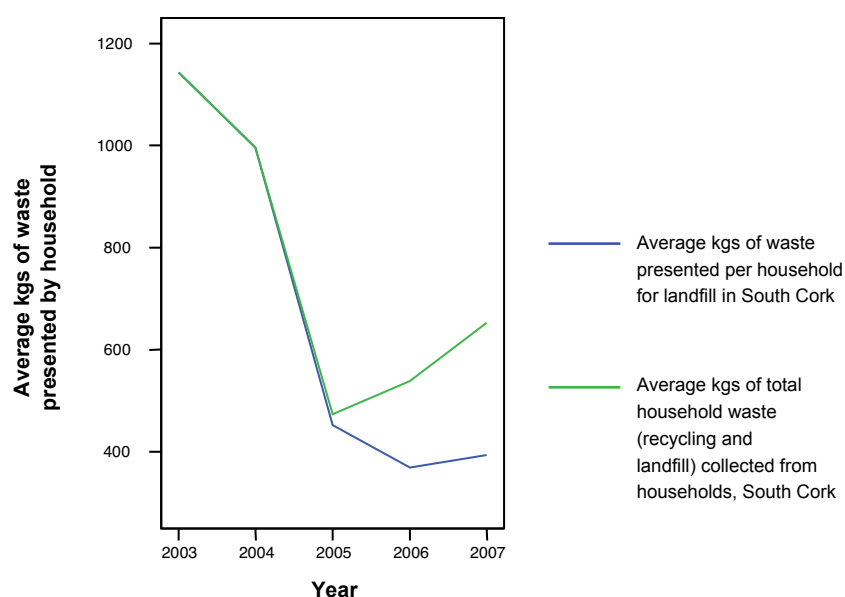
When pay-by-weight was implemented in 2005 there was a 55% decrease in landfill waste collected from householders, and a 53% decrease in total waste collected from householders, as kerbside recycling was

rolled out to 19% of householders throughout 2005. Once kerbside recycling became available to all households in 2006 there was a 14% increase in the amount of total waste presented by households. Overall, using the latest figures available (2007), the average weight of waste collected per household was 34.5% lower than in the year prior to pay-by-weight (2003). This reduction in total waste per household managed by the county council could

stem from a number of factors. Source reduction is one possibility: householders may have chosen to reduce the amount of waste they produce to lower their waste bills. On the other hand, it is also possible that householders increased recycling at CAS and bring banks or participated in illegal waste activities and continued to dispose of their waste using these methods even when kerbside recycling became available.



**Graph 3.7: Change in tonnes of total waste presented by households (both for landfill and recycling), South Cork, 2003–2007.**



**Graph 3.8: Change in tonnes of waste presented for landfill by households, 2003–2007 alongside change in tonnes of total waste presented by households (both for landfill and recycling), South Cork, 2003–2007.**

### **3.4.3 Summary**

The move from a flat-rate system to a weight-based PBU system decreased the amount of waste householders placed out for collection in their landfill bin significantly. The introduction of a kerbside recycling service reduced further the amount of waste placed in the landfill bin. However, waste-presentation rates began to climb again despite the presence of a kerbside recycling service. An increase in presentation rates within a pay-by-weight system is not only confined to systems without a kerbside recycling service, as considered in the West Cork analysis. It appears that householders may begin to revert to previous patterns of behaviour even when given both reasons to divert waste from landfill (PBU charges), and convenient alternative avenues for their waste (kerbside recycling). On a positive note, householders may have engaged in source reduction as a method of reducing their waste charges. Overall, the use of a pay-by-weight system combined with a kerbside recycling service was very successful in reducing household waste to landfill in the South Cork waste-management area; the total reduction in waste to landfill recorded in South Cork from the year prior to pay-by-weight, 2004, to the latest figures available, 2007, was 61%.

## **3.5 Impact of Kerbside Recycling on Waste-presentation Rates**

One outstanding question from Stage 1 was whether access to kerbside recycling services reduced waste-presentation rates to landfill. In 2007 both North and South Cork had full kerbside collection coverage for the entire year, whereas kerbside collections were only available to households for three to four months of 2007 in West Cork. If 2007 is taken in isolation, waste-presentation rates in North and South Cork (360 kg and 394kg respectively) are much lower than waste-presentation rates in West Cork (888 kg). These figures would appear to support the prediction of lower waste-presentation rates in the area with kerbside recycling. Nonetheless, further analysis reveals a more nuanced picture. When the waste-presentation rates for the three areas are examined in greater detail, taking into account all the years for which

we have data, it is evident that the three areas came from different starting points (see Table 3.1).

Looking back to the year prior to pay-by-weight in each waste-management area (2002 in West Cork, 2003 in North Cork, and 2004 in South Cork) West Cork clearly had a higher average waste-presentation rate per household (at 1,677 kg) than South Cork (with 660 kg) and North Cork (with 996 kg). Taking these varied starting points into account, variations in 2007 presentation rates cannot be considered a result of differences in access to recycling facilities, as West Cork always had a substantially higher waste-presentation rate than the other waste-management areas. Instead, comparison of the percentage reductions experienced in each area from the onset of pay-by-weight to the latest figures available, 2007, is more appropriate.

In North Cork the total reduction in waste to landfill recorded from the year prior to pay-by-weight to the latest figures available, 2007, was 41%, and in South Cork the reduction was 61%, whereas this figure for West Cork was 28%.

There is a 13% difference between North and West Cork in overall reductions in waste to landfill, with one area having a kerbside recycling service and the other not – indicating that kerbside recycling services might not affect waste to landfill reductions too significantly. However, whereas West Cork came from a starting point with a flat-rate charge, North Cork's figure represents a move from a tag-based system of charging to a pay-by-weight system. Although figures are not available to calculate the change in presentation rates when North Cork moved from a flat-rate to a tag system it is likely that decreases did occur and on this basis householders in this area had already reduced their waste significantly prior to pay-by-weight. This move from one PBU system to another would result in smaller decreases in waste-presentation rates than a move from a flat-rate system to a pay-by-weight system: therefore, the figures for North Cork's percentage reductions are not comparable with West Cork's.

There is a 33% difference between South and West Cork in overall reductions in waste to landfill with South Cork realising the greater reduction. Both areas moved from



**Table 3.1: Average kilograms of waste presented by households in the three Cork County Council waste-management areas, 2001–2007**

Year	Average kg waste presented by households in West Cork	Average kg waste presented by households in North Cork	Average kg waste presented by households in South Cork
2001	1,677 (flat rate)		
2002	1,240 (flat rate)	610 (under PBU [tag])	
2003	893 (PBU [weight] with no kerbside recycling)	660 (under PBU [tag])	1,143 (flat rate)
2004	702 (PBU [weight] with no kerbside recycling)	538 (PBU [weight] with no kerbside recycling)	996 (flat rate)
2005	783 (PBU [weight] with no kerbside recycling)	495 (PBU [weight] with no kerbside recycling)	452 (PBU [weight] and majority of households with no kerbside recycling)
2006	818 (PBU [weight] with no kerbside recycling)	390 (kerbside recycling introduced in summer of this year)	369 (PBU [weight] with kerbside recycling)
2007	888 (PBU [weight] with kerbside recycling for final 3–4 months of the year)	360 (PBU [weight] with kerbside recycling)	394 (PBU [weight] with kerbside recycling)

a flat-rate system to a pay-by-weight system, the only difference being access to a kerbside recycling service. This 33% difference in reduction under a pay-by-weight system indicates that presence of a kerbside recycling service has a large part to play in achieving reductions in household waste to landfill.

Nonetheless, as outlined in Section 3.4 householders may begin to revert to previous patterns of behaviour – even in the presence of a pay-by-weight and kerbside recycling service. It is possible that, in the longer term, waste

presented in the landfill bin by households may rise again as paying for waste produced becomes more accepted as an additional household cost and householders become less concerned about keeping the waste bill down. However, it is likely that any increases would be small. On the other hand, the segregation and recycling of waste may also become normalised and households may begin to segregate waste habitually, leading to increased rates of recycling in households with a kerbside service, as their recycling efficiency increases.

## **4 Analysis: The Impact of PBU System on Waste-presentation Rates**

### **4.1 Introduction to the Dublin Waste Management Region Case Study**

The main aim of this case study was to determine what impact different PBU systems have on waste-presentation rates. Unfortunately, no local authority using more than one system was able to provide waste-presentation figures under each system it used; on this basis it was not possible to compare the impact of different PBU systems within one local authority area. Instead, waste-presentation figures for two different PBU systems used by local authorities within one waste-management region were compared. Using the Dublin Waste Management Region as a case study, it was possible to determine the relative impacts of a pay-by-weight and a tag-based system on domestic waste-presentation rates in the presence of access to a kerbside recycling service. The case study compared the impacts of a pay-by-weight system in Dun Laoghaire–Rathdown County Council to the impacts of a tag-based system in Fingal County Council.

### **4.2 Pay-By-Weight in Dun Laoghaire–Rathdown**

In January 2005 the majority of households in Dun Laoghaire–Rathdown were moved from a flat-rate domestic waste charge to a pay-by-weight charging system. pay-by-weight was selected as the preferred mechanism within a PBU framework following debate within the local authority and a pay-by-weight pilot study.

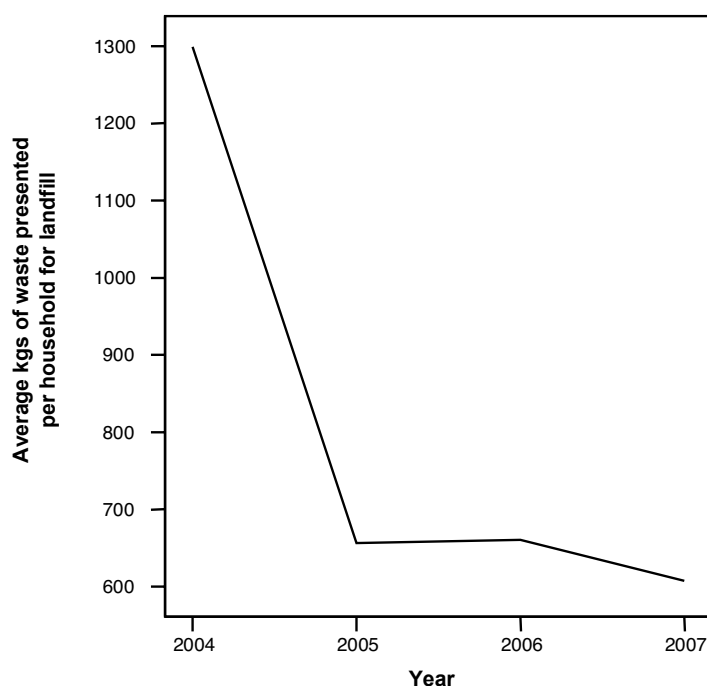
Under the flat rate, households were charged €300 per annum for waste-collection services (2004). Under pay-by-weight householders were charged an €80 annual standing charge, a €4 lift charge and 25 cent per kilogramme of waste placed out for collection. The pay-by-weight charges were selected to create the greatest incentives to customers to reduce waste, while covering the local authority's operating costs. On this basis, the

county council decided to set a low standing charge and a higher lift and weight charge. Under this new system, householders paid €240 on average in 2005, and €260 in 2006 per year for their waste collection; €40–60 less than under the flat-rate system. In addition to reducing the average householder's waste-collection bill, pay-by-weight is also cheaper for the local authority to run than the flat-rate system. The pay-by-weight system reduced the frequency that householders placed their waste out for collection, allowing the local authority to rationalise their waste-collection service, reducing the number of routes necessary from 15 to 11 routes. One interviewee stated that:

... from a financial point of view it's probably slightly more expensive I would say to run it [a domestic waste-collection service] with a flat charge, because you can't reduce your outgoings, because there is not incentive for people to present every fortnight or whatever, so our costs are going to stay high, but the income will probably stay high to match it. It's going to be more expensive [to run a flat charge], but we'd probably end up passing the costs on to the customer anyway, so from our point of view you could say 'what of it'. But the pay-by-weight would result in a cheaper cost for us, which would be reflected in a lower income to us as well, and obviously the environment gets the benefit as well. The costs are down but the income is also down, but that's a cost for the customer, so their costs are down.

#### ***4.2.1 Impact of pay-by-weight and Kerbside Recycling on Household Landfill Waste Presentation***

In the two years immediately prior to the introduction of PBU charges, waste presented by householders for landfill had decreased by 7% (from 2003 to 2004). On implementation of PBU, average householder waste-



**Graph 4.1: Change in average kilogrammes of waste presented for landfill per pay-by-weight household in Dun Laoghaire–Rathdown, 2004–2007.**

presentation weights to landfill fell by 50%, indicating that PBU charges prompted a significant change in householder waste-management behaviour. In the years immediately after PBU was introduced, waste presentation for landfill fell by a further 7%. Overall, from a flat-rate system with kerbside recycling in 2004 to the latest available figures for pay-by-weight with kerbside recycling in 2007, there has been a decrease in waste presented by householders for landfill of 53%, with the majority of this reduction occurring with PBU introduction (see Graph 4.1).

#### **4.2.2 *Directions of Householder Diversion of Waste from Household Landfill Collection***

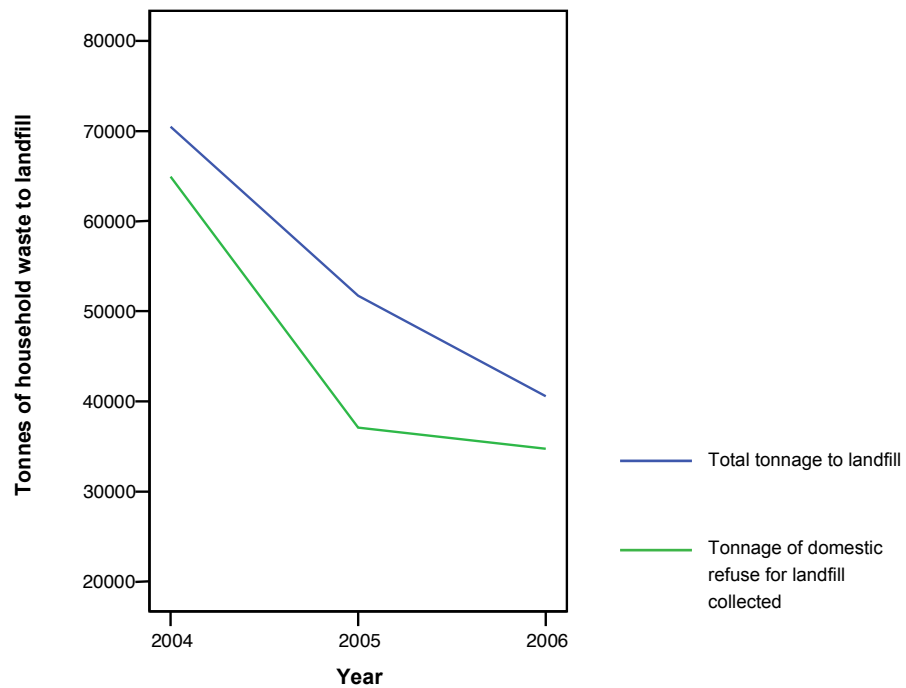
Because all Dun Laoghaire–Rathdown households have had a kerbside recycling service since the early 2000s, they have had access to convenient recycling facilities while under a flat-rate system. Therefore, it is interesting that when pay-by-weight charges began, the amount of recycling placed in householder recycling bins increased by 25%. This indicates that householders provided with recycling facilities may not choose to maximise recycling without a financial incentive. As pay-by-weight prompted a 50% decrease in waste placed in household landfill bins and a 25% increase in recycling placed in household

recycling bins, it is worth exploring where the remaining 25% of waste was diverted to.

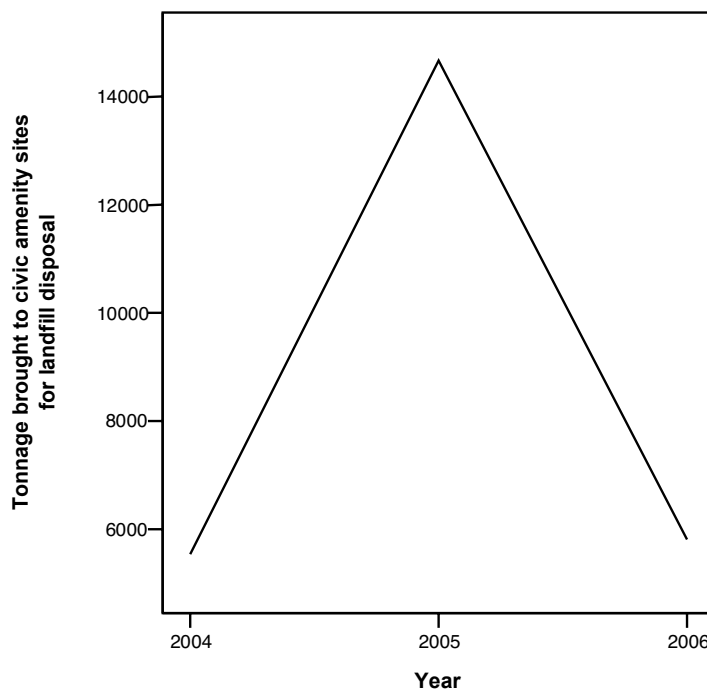
Despite a 50% decrease in the weight of waste for landfill collected from households on introduction of PBU, there was only a 27% decrease in total domestic waste sent to landfill from Dun Laoghaire–Rathdown for the same period (see Graph 4.2). This 23% gap between waste to landfill and waste collected from households for landfill may be explained by householders discontinuing their waste-collection service and taking their waste directly to the county council's CAS, which accepts domestic waste for landfilling.

The amount of domestic waste taken directly to CAS by householders for disposal to landfill has fluctuated greatly from 2004 to 2006. When PBU charges were introduced in 2005 there was a 165% increase in the weight of waste brought directly to CAS. However, the following year saw a 60% decrease in waste brought directly to CAS. Overall, from 2004 to 2006, there was only a 5% increase in waste brought directly to CAS (see Graph 4.3).

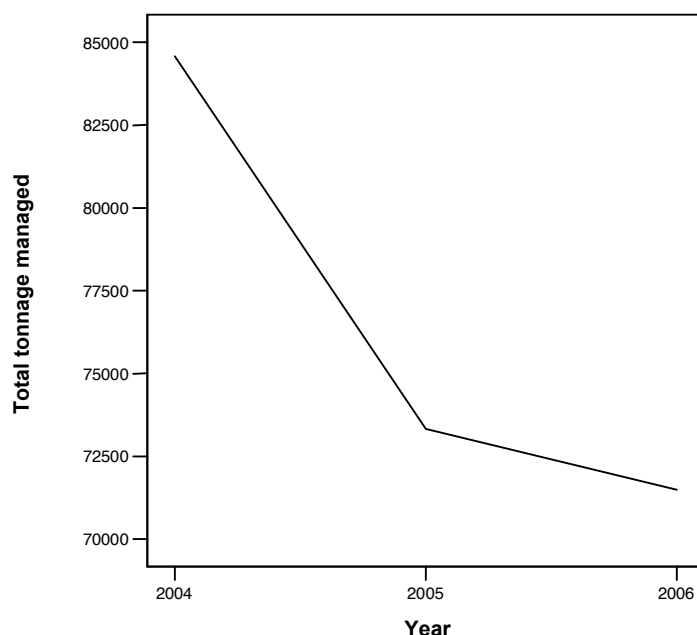
Only 2% of households selected to opt out of an official waste-collection service on introduction of PBU charges.



**Graph 4.2: Tonnes of domestic waste for landfill collected directly from households, 2003–2006, and total tonnes of domestic waste to landfill from 2004–2006, Dun Laoghaire–Rathdown.**



**Graph 4.3: Tonnes of domestic waste brought to CAS for disposal to landfill, 2004–2006, Dun Laoghaire–Rathdown.**



**Graph 4.4: Change in total domestic waste managed by Dun Laoghaire–Rathdown County Council, 2004–2006.**

It is not advantageous to householders to discontinue their waste service as householders without a service are still required to pay a €80 standing charge. The local authority stated that:

... anyone who isn't with an authorised contractor has to pay us a standing charge, even if they've opted out of our grey bin [landfill service] service. They still must pay the standing charge because we take the view that they're using our recycling facilities, our civic centres, and if we don't bill them with a standing charge then it means that our grey service is funding their recycling facilities for them.

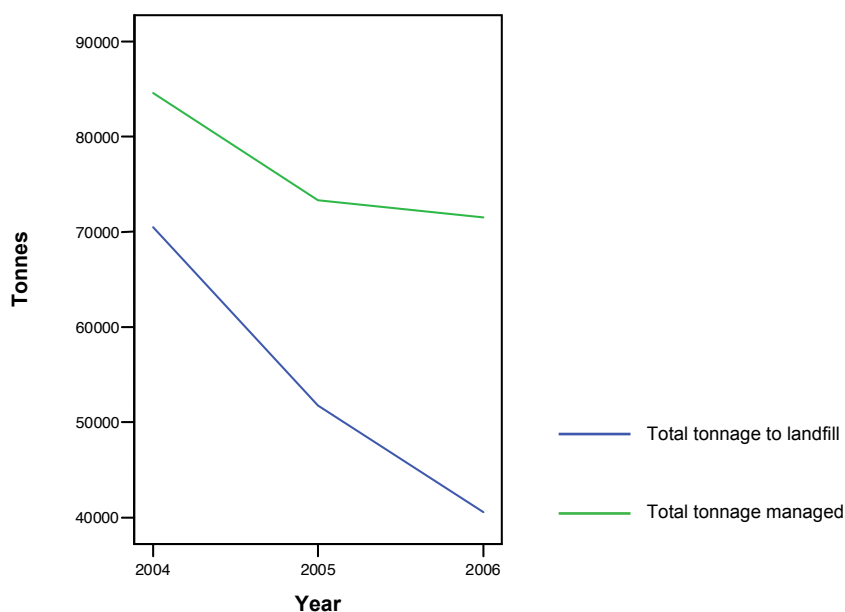
Initially, however, it may have worked out cheaper for households to take their waste to the CAS for landfilling as instead of paying per kilogramme of waste householders were charged by the car load, and the cost per car load was just €5. This was subsequently increased in 2006 to €20. This price change has reduced the attractiveness of opting out of the council's service and has decreased CAS figures.

In addition to reducing household waste to landfill successfully Dun Laoghaire–Rathdown has found that PBU charges may have prompted source reduction

behaviour in householders. When PBU charges were introduced, there was a 13% reduction in total domestic waste managed by the county council (with no decrease in customers). In the years immediately after PBU began this source reduction continued with a further 3% reduction in total managed waste from 2005 to 2006. Overall, from 2004 to 2006 there has been a 16% reduction in total waste managed (see Graph 4.4).

When questioned on the decrease in amount of waste managed by the county council, the local authority stated that they feel source reduction is the main factor responsible for these decreases.

... ten thousand tons have disappeared altogether, and the population has been relatively stable over this time ... I mean okay there were increases in back-yard burning, there were increases in stuff going to the mountains or whatever, but not ten thousand tons worth, a couple of hundred tons worth, nothing significant ... now there maybe sort of waste tourism. Maybe people are going to South Dublin with their waste or other recycling centres or whatever, but again it's not a lot, and there has been an increase over the years in the use of composters, which is sort of hidden



**Graph 4.5: Total tonnage to landfill and total tonnage managed, 2004–2006.**

in there, and maybe hiring skips and not putting stuff through the domestic bin, things like that, but those are the figures, those are the audited figures . . .

Graph 4.5 illustrates the changes in both waste to landfill and the total tonnage of waste managed by Dun Laoghaire–Rathdown County Council from 2004 to 2006, with little decreases in numbers of customers.

#### **4.2.3 Summary**

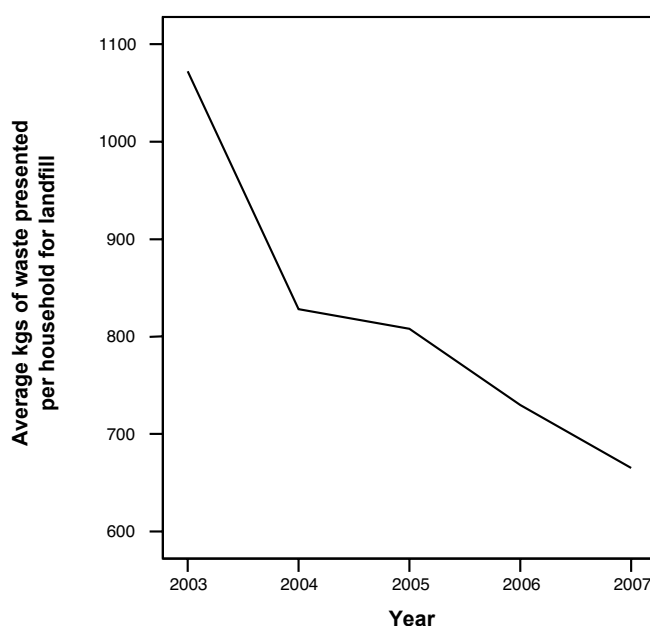
The move from a flat-rate system with a kerbside recycling service to a weight-based PBU system with a kerbside recycling service decreased the amount of waste householders placed out for collection in their landfill bin. The following year, waste-presentation rates remained stable, and then decreased slightly again from 2006 to 2007. The introduction of the charges prompted an increase in the amount of waste diverted for kerbside recycling. Nonetheless, initially much of the waste diverted from the landfill bin was instead taken directly to landfill by householders, undermining the use of the pay-by-weight system. This form of diversion was subsequently addressed and now the local authority believes that source reduction is largely responsible for the large reductions seen in the total amount of waste managed by the county council.

### **4.3 Tag-a-bin in Fingal County Council**

Pay-by-use charges were introduced in Fingal County Council in March 2002. Prior to this, householders were not charged for waste collection. Fingal County Council now uses a tag-a-bin system. At the time of the study there was no standing charge for the local authority's collection service; however, a service charge has been introduced to pay for service expansion. Customers are required to attach a bin tag to their wheelie bin for collection (tags are available in shops, at €8 per tag for a 240-litre bin, and €4 [2007] per tag for a 140-litre bin). The local authority selected tag-a-bin as they believe it is a fair system that abides by the 'polluter pays' principle.<sup>12</sup> When selecting a charge per tag the council took into account that charges were being introduced in the area for the first time and with this in mind chose a price it considered 'fair and acceptable'.

It should be noted that although tag-a-bin began in 2002 many householders within the local authority refused to pay the new charges and owing to the legal situation at the time Fingal County Council was required to collect the

<sup>12</sup> The 'polluter pays' principle ensures that the individual or organisation that produces pollution (this includes waste) is held responsible for it. In the case of waste management this means the producer of waste (the polluter) is charged based on the amount of waste (pollution) they generate.



**Graph 4.5: Change in average kilogrammes of waste presented for landfill per household in Fingal County Council, 2003–2007.**

waste of householders that withheld payment. Changes to legislation in 2003 in the Protection of the Environment Act (DoEHLG, 2003) permitted local authorities to cease waste collection to households for non-payment of domestic waste charges. In this respect, although charges were introduced in Fingal County Council in early 2002 they were only actually implemented in practice in 2004, the year following the change in legislation.

#### **4.3.1 Impact of Tag-a-Bin and Kerbside Recycling on Household Landfill Waste Presentation**

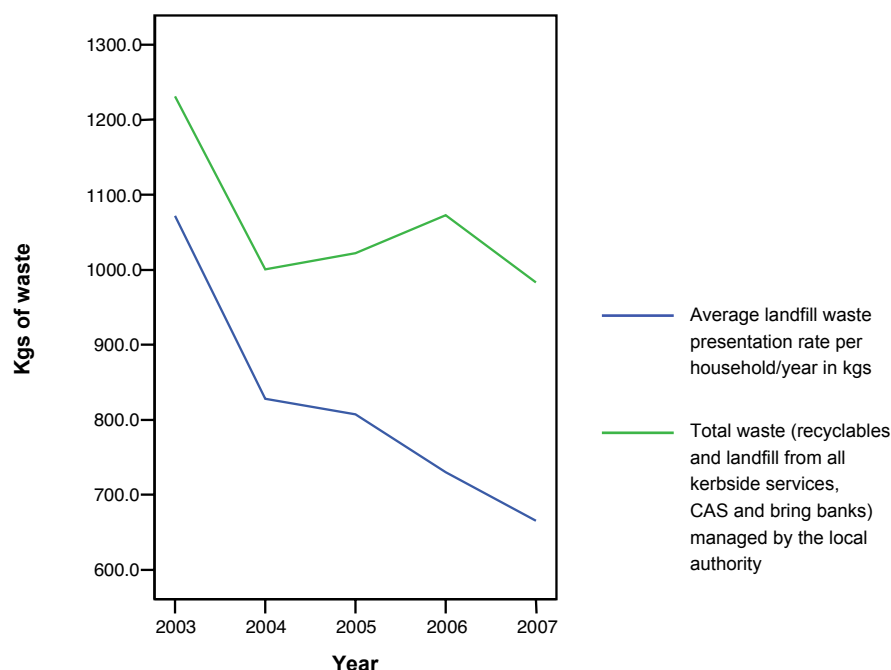
Figures for 2003 through 2007 were provided for the study. Owing to the inability of the county council to enforce collection only on the basis of tag-a-bin use until 2004 decreases in average landfill waste-presentation rates on introduction of tag-a-bin can be measured from 2003, when the tag system was in place in name only, to 2004, when the tag system was implemented fully. Using these figures Fingal County Council experienced a 23% reduction in average household landfill waste presented upon implementation of a tag-a-bin system. In the years immediately after tag-a-bin was implemented, waste presentation for landfill fell by a further 21%. Overall, from 2003 to 2007, there has been a decrease in waste

presented by householders for landfill of 38%, with the majority of this reduction occurring with the introduction of PBU and its on going use (see Graph 4.6).

#### ***Directions of Householder Diversion of Waste from Landfill***

Fingal County Council offers a kerbside recycling service to the majority of householders (93% in 2007). This has increased from 75% in 2003, through 82%, 88% and 93%, in 2004, 2005, and 2006 respectively. This greater access to kerbside recycling may have enabled householders to reduce the amount of waste placed in their landfill bin. However, analysis of kerbside recycling figures reveals that during the 2003–2007 study period householders with this service have increased the amount placed out for recycling by only 9% on average. In addition, in 2004, the year householders reduced their landfill waste presentation by 23%, the amount presented for recycling also actually decreased by 4%. These findings indicate that households did not select to divert their waste through increasing use of the kerbside recycling service. Taking all forms of diversion from landfill available through the local authority into account reveals a more positive picture. The county council offers householders several alternatives to landfill disposal, including kerbside recycling, CAS and





**Graph 4.7: Average kg/household presented to landfill and total managed, 2003–2007.**

bring banks, and since 2005 a pilot organic bin service has been available to a limited number of customers. Taking these diversion options together, the analysis reveals that during the study period on average households increased the amount of waste diverted via these routes by 100%, indicating a large level of participation in recycling.

The total weight of domestic waste (landfill, recyclable and organic) managed by the local authority decreased by 20% from 2003 to 2007, with householders producing on average 1,230 kg in 2003 and 983 kg in 2007 (Graph 4.6). This reduction in total waste presented by householders to the local authority for disposal/recycling may have been achieved either through source-reduction behaviour or increased illegal waste-diversion activity.

#### **4.3.3 Summary**

On enforcement of tag-a-bin charges waste-presentation rates for landfill decreased. Householders did not select to significantly increase the waste placed into their kerbside recycling service, and instead diverted much of their waste through recycling at a combination of both the kerbside and at CAS and bring banks. The total amount of waste managed by the local authority has decreased since PBU began; this may be as a result of either source reduction or increased illegal waste diversion.

#### **4.4 Impact of PBU System on Waste-presentation Rates**

Does the system of PBU selected for use in an area have an impact upon reductions achieved in waste-presentation rates for landfill? Both Fingal County Council and Dun Laoghaire–Rathdown County Council have full kerbside recycling collection coverage, but Fingal uses a tag-a-bin system of waste charging whereas Dun Laoghaire–Rathdown uses a pay-by-weight system. If 2007 is taken in isolation, waste-presentation rates in Fingal County Council (665 kg) are similar to waste-presentation rates in Dun Laoghaire–Rathdown (608 kg). These figures suggest that both pay-by-weight and tag-a-bin have the effect of reducing waste to landfill to a similar level. Looking back to the year prior to PBU in each waste-management area (2003 in Fingal and 2004 in Dun Laoghaire-Rathdown) Fingal had a slightly lower average waste-presentation rate per household (at 1,072 kg) than Dun Laoghaire–Rathdown (with 1,299 kg).

Looking at figures in terms of percentage reductions reveals that in Dun Laoghaire–Rathdown the total reduction in waste to landfill recorded from the year prior to pay-by-weight to the latest figures available, 2007, was 53%, whereas this figure for Fingal, using tag-a-

bin, was 38%. There is a 15% difference between Dun Laoghaire–Rathdown and Fingal in overall reductions in waste to landfill. Householders in both areas have equal access to a kerbside recycling service. This 15% difference in reduction under a pay-by-weight and tag-a-

bin system indicates that the form of PBU charges offered to householders has a large part to play in achieving reductions in household waste to landfill, and suggests that pay-by-weight may be a more effective system for achieving national landfill targets.

**Table 4.1: Comparison of average kilograms of waste presented by households in Dun Laoghaire–Rathdown with those presented in Fingal, 2003–2007**

Year	Average kilograms of waste presented by households in Fingal	Average kilograms of waste presented by households in Dun Laoghaire-Rathdown
2003	1072 (essentially flat rate)	Figures not available
2004	828 (year tag-a-bin was enforced)	1,299 (flat rate)
2005	808	656 (year PBU [weight] began)
2006	730	660
2007	665	608

## 5 Analysis: The Impact of PBU on Illegal Waste Diversion

### 5.1 Introduction

In the international literature illegal waste diversion was proposed as an unwanted by-product of PBU (Bauer and Miranda, 1996; Fullerton and Kinnaman, 1996; Miranda and Aldy, 1998; Miranda and Bynum, 2002). The Stage 1 survey research proved inconclusive because of a lack of accurate and comparable data nationwide. It was therefore decided to explore further the relationship between PBU and illegal diversion through in-depth case studies.

Interviews with local authority waste-enforcement officers in the survey phase (Stage 1) of the study revealed a

general perception that there has been an increase in the number of waste incidents reported to the local authorities following PBU (O'Callaghan-Platt and Davies, 2007). Nonetheless, waste-enforcement officers pointed out that this rise may not have been related solely to the introduction of PBU charges, stressing the role played by increased environmental awareness and shifting social values that can contribute to a greater reporting of illegal activity. The survey focused on changes in the number of *reported incidents*, which may actually reflect changes in public awareness and local authority recording methods than actual changes in illegal dumping activity.

**Table 5.1: Illegal waste-diversion interviewees**

Category	Number interviewed	Reason for interview	Change in illegal dumping
<b>1. Waste</b>			
a) Litter wardens	4	Patrolling for litter on a full-time basis allows litter wardens to note any changes in illegal dumping.	3 of 4 – experienced increases. 1 of 4 – levels have remained stable.
b) Tidy Towns Committees	8	Committee members clean up their town on a regular basis and in many cases have been doing so for many years. On this basis they will be very conscious of any changes in the amount of illegal dumping found in the town over the years.	All interviewees have experienced an increase.
c) Recycling centre managers	2	Recycling centre managers may have experienced contamination of recycling bins or dumping around the bins.	Levels have remained stable in both recycling centres.
<b>2. Business</b>			
a) Charity shops	10	Charity shops have been highlighted in the literature as a possible recipient of household waste under a PBU charging system.	4 of 10 – experienced increases. 2 of 10 – experienced decreases. 1 of 10 – levels have remained stable. 1 of 10 – unsure. 2 of 10 – recently opened.
b) Business associations	3	Business Associations represent many businesses within a town and may be able to provide an overview of businesses' overall experiences of illegal dumping.	2 of 3 – experienced increases. 1 of 3 – levels have remained stable.
c) GAA clubs	3	The majority of towns have a GAA club, which is commonly located centrally and easily accessible to the public, and so possibly a target for illegal dumping.	2 of 3 – experienced increases. 1 of 3 – levels have remained stable.

To build up a picture of illegal dumping since the introduction of PBU, the case study stage (Stage 2) examines more closely the experiences of people in many different roles in the local authority areas. Interviewees were asked whether or not they have experienced changes in the level of illegal waste diversion in their area over time and, if so, what they felt were the reasons for these changes in illegal waste levels. Table 5.1 details the participants in the study and their experiences of illegal waste diversion.

## **5.2 Changes in Levels of Illegal Domestic Waste Diversion Over Time**

Respondents were asked whether they had experienced any changes in levels of illegal domestic waste diversion over the time they have been in their current position as litter warden, member of Tidy Town Committee, etc. In response, 19 of the 30 interviewees said that illegal domestic waste diversion has increased over time.<sup>13</sup> Only 2 respondents felt that illegal diversion has decreased while 6 felt that the level of illegal dumping had remained stable overtime. Of the remaining 3 interviewees, 2 were unable to comment on changes over time as they were newcomers to the area, and 1 interviewee was unsure whether or not there had been a change in dumping levels. The interviewees' responses have been grouped according to whether or not respondents have a direct link to waste-management issues, with recycling centres, litter wardens and Tidy Towns Committees falling under the heading of waste organisations, and charity shops, GAA clubs and business associations falling under the heading of local businesses.

### **5.2.1 Waste Organisations**

- a) Recycling centres: Two recycling centre managers were interviewed; both recycling centres felt that levels of illegal dumping have remained stable since they have opened for business.

At the recycling area you'd have a certain amount of people bringing the wrong things into the wrong receptacles and things like that, and sometime the lads see people just leaving a bag and walking away. It doesn't happen a huge amount. We thought at first that we might have a bit of dumping outside the gate at night, you know when we close, you just throw a bag of rubbish, very rarely, once every three or four months there might be a bag outside there. (Recycling centre 1)

- b) Litter wardens: Across the case studies four litter wardens were interviewed, two from both the Cork County Council Region and the Dublin Waste Management Region. Three of the litter wardens felt that levels of domestic illegal diversion have increased: 'It has increased a massive amount. On a day-to-day basis, most of the work is tied up with household waste now' (Litter warden 1). The fourth interviewee felt that levels have remained stable, for the past two years, although the area did experience a temporary increase following the introduction of PBU, saying:

Originally we had a bad problem with dumping of all types of waste, about 8 years or so ago. It was a lot of work but it actually got better. Then the charges came in and it increased again, but it's now stabilised. (Litter warden 2)

- c) Tidy Towns Committees: All Tidy Towns Committees interviewed have witnessed an increase in illegal waste diversion in their town over time. Many respondents said that illegal dumping has only become a problem in their town in recent years, and did not occur at all before this point. The main forms of illegal diversion encountered by Tidy Towns Committees are dumping in public litter bins and fly-tipping on the outskirts of towns. In many cases, interviewees mentioned that the council has removed public bins in order to prevent households using them as domestic bins: however, respondents feel that this only increases dumping in more discreet areas, making the culprits harder to catch, and also negatively affects the amount of

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<sup>13</sup> In preference to asking interviewees whether they had experienced a change in illegal diversion following the introduction of PBU charges, interviewees were asked about changes 'over time' to avoid suggesting PBU as a possible cause of illegal diversion.

general litter in an area. Tidy Towns Committees conduct regular town clean-ups and in many cases open bags of dumped waste to establish the identity of the fly-tipper.

### **5.2.2 Local Businesses**

- a) Charity shops: Charity shops can experience two main forms of illegal waste diversion: (i) donations of items that are unsuitable for resale, such as soiled clothes, and (ii) donations of actual household waste, such as old food cans. In the first category, four charity shops have experienced an increase in donations of unsuitable items. As reported by one international charity:

I'd say 65–70% of the donations are unsuitable, dirty. You wouldn't believe the things people bring, dirty shoes, with muck on them, dirty clothes. The standards of cleanliness in the Irish have gone a way down. We spend two or more hours every Thursday night sorting through the dirt to put new clothes out in the shop. It's a waste of time. (Oxfam)

Several of the charity shop respondents provided approximate percentages of the amount of unsuitable items received as donations: these varied significantly – from between 25% and 75%. This variance in donation quality was also experienced in research conducted in the United States (Miranda and Bynum, 2002) where they found that two charities in Michigan, the Salvation Army and Goodwill, dispose of 25% and 50% respectively of donations.

In contrast, two charity shops have found a decrease in the amount of unsuitable donations received. A longstanding charity shop said 'overall donations have increased but unsuitable donations have decreased. There is now a higher standard of donated items than in the past' (St Vincent de Paul [SVP]). One shop found that the level of unsuitable donations had remained

stable over time. It is interesting to note that the level of unsuitable items received varied by area, with some towns experiencing less illegal diversion activity than others. Of the remaining three charities, two had only recently opened and so were unable to comment, and the third was unsure whether or not there had been any changes in quality of donations.

In relation to the second category (donations of household waste), half of the shops said they had received household waste, and in some cases this occurs on a regular basis. One interviewee stated that 'this ['donations' of bags of household waste] occurs about two or three times a month. Bags of dirty nappies etc.' (Mrs Quinn's). However, for two of the shops, donations of household waste are rare; indeed, one shop reported a recent decrease in these kinds of donation, with one interviewee saying 'it used to be more common. People would hand in a bag which they would say is full of clothes, under the top layer of clothes there would be a lot of rubbish' (Irish Wheelchair Association).

Respondents were concerned over a perceived lack of respect for charity shops, with interviewees saying 'people are using charity shops as dumping grounds' (Barnardos), and 'the amount of rubbish we were getting was ridiculous, [people are] just trying to dispose of old things and have no respect for charity shops' (Irish Wheelchair Association). Several interviewees felt saddened by the public's mistreatment of charities. Nonetheless, several respondents felt that people were simply misguided when donating unsuitable items, with donors honestly feeling that the items were of a suitable and saleable quality. In the case of 'donations' of household waste, a few respondents felt that this only occurred by accident, that donors may have picked up the wrong bags accidentally – however, the majority considered it a conscious act.

- b) GAA clubs: Two of the three GAA clubs had experienced illegal dumping since PBU charges began, in both clubs household waste was found dumped in club bins. In one club, bags of domestic waste have also been thrown over the walls and into the grounds. PBU charges were considered responsible for the increases in dumping, with respondents stating 'people are using our area to dump refuse to save themselves the local authority refuse charges' (GAA club 1), and 'there was no dumping in the GAA before pay-by-weight, [now] about once a month bags are dumped on the pitch, because they don't want to pay for the waste' (GAA club 2).
- c) Business associations: Three business associations were interviewed. Representing businesses in their local area, they reported on whether or not these businesses have experienced increases in illegal waste diversion. Two of the business associations said that local businesses had found an increase in illegal dumping since the introduction of PBU: 'You do find bags left on the streets and outside business premises. These bags are not tagged or anything and so they won't be collected and so the business premises have to take the "flak" for it' (Business association 1). The third business association said that the issue of illegal dumping had not been raised with the association and on this basis they assume that it is not a problem for local businesses.

This data reveals that the increases in the numbers of illegal waste-diversion incidents as reported to local authorities by members of the public (see Section 5.1) reflected increases in the illegal diversion of domestic waste as witnessed by actors within communities. The following section examines the factors interviewees felt influenced these changes in illegal diversion.

## **5.3 Factors Influencing Changes in Levels of Illegal Domestic Waste Diversion**

### ***5.3.1 Factors Increasing Illegal Domestic Waste Diversion***

The 19 interviewees that had experienced an increase in illegal diversion were asked what they felt was driving this increase. In 14 cases PBU was cited as a reason for increased levels of illegal domestic waste diversion. As one respondent said, 'it [illegal dumping] has increased in the last while because since people had to pay for waste they'd dump it' (Tidy Towns Committee 5). Although PBU was the most commonly cited reason for increased illegal diversion, the study did not provide any strong evidence for increased illegal activity on the introduction of these charges; 11 of the interviewees did not experience increases in illegal diversion although PBU was implemented in their areas, and 5 of the 19 respondents that experienced increases in illegal diversion did not attribute this to PBU charges. This finding – that just less than half of the 30 interviewees experienced increases in illegal diversion with the introduction of PBU charges – does little to remedy the inconclusive nature of the literature on PBU and illegal waste diversion.

Nonetheless, actual increases in illegal diversion on the introduction of PBU may have been greater than those witnessed by respondents taking part in the study as, excluding litter wardens, the interviewees are all based in urban areas, which may experience less illegal dumping than rural areas. Several interviewees held the opinion that people may select to dump bags of household waste down country lanes or in bogs rather than in towns, as they are less likely to be seen or to have the waste examined for evidence tracing it back to its owner. Moreover, the majority of respondents would not be affected by backyard burning, which may well be one of the more prevalent forms of illegal waste diversion in Ireland. Research into the pay-by-weight pilot study conducted in West Cork (ESRI, 2006) found that 42% of the households surveyed as part of the research used backyard burning as a form of waste disposal. As backyard burning was not a

relevant topic to respondents such as the charity shops, Tidy Towns Committees, GAA clubs, recycling centres or business organisations, this form of illegal diversion was not represented in the study.

While PBU was by far the most frequently cited cause of illegal diversion, it was not the only driver identified in contributing to illegal waste diversion. The second most commonly given reason was the rising number of rental properties. Seven interviewees linked rising rental properties with increased illegal activity. The reasons given for this correlation were varied. Interviewees referred to a lack of service for rental properties, with one respondent saying: 'It's the rental properties ... the landlord doesn't make arrangements for their waste. There's nothing to show that all flats and houses have a waste collection' (Tidy Towns Committee 3). The absence of organised waste collection from rental properties may mean that tenants use illegal waste diversion as a way of disposing of their household waste. In addition, presumed differences in cultures of waste were cited as a possible reason for illegal diversion from rental properties: 'there are a lot of people now of other nationalities living in rented accommodation that would not get rid of their waste properly' (Tidy Towns Committee 5).

Five of the respondents that cited renters as a source of illegal dumping were Tidy Towns Committees, one was a litter warden and the other a business association.<sup>14</sup> In all cases, the respondent had based this belief on evidence found within bags of dumped household waste in their area – either directly by their organisation or indirectly through discussions with litter wardens.

The other reasons given by interviewees for increased dumping were laziness and an eagerness to get rid of unwanted items. Interviewees noted that 'people are just trying to get rid of it [waste] ... you'll always get the odd few trying to slip in things' (Gorta). Laziness associated with a lack of nearby recycling facilities was also linked to illegal diversion, with several respondents mentioning

that it is easier for people to dump waste instead of taking them to a CAS: 'I don't know whether it's laziness or not . . . I suppose it saves them going to the dump, it's easier to drop them in here' (Oxfam), and 'it's easier to dump in the local pitch than drive 25 minutes and pay' (Tidy Towns Committee 3).

According to the responses provided by the respondents, PBU can be considered a contributing factor in increasing illegal domestic waste diversion. Nevertheless, it should be noted that the comments reported here are not backed up with quantifiable statistics and therefore remain anecdotal to some extent. More sophisticated systems of monitoring to demonstrate objectively changes in illegal behaviour are needed and before the sources of illegal behaviour can be highlighted and then tackled.

#### ***Factors Decreasing Illegal Domestic Waste Diversion***

The study identified five key factors that prompted reductions in illegal waste diversion. In many cases, several methods were used in conjunction with each other:

- 1 enforcing of littering by-laws;
- 2 changing usual practices to prevent illegal diversion;
- 3 increasing access to recycling facilities;
- 4 increasing affordability of waste-collection services;
- 5 increasing environmental awareness.

Although only two respondents stated that they had experienced a decrease in illegal dumping, many of the interviewees that reported an initial increase in illegal dumping also mentioned a subsequent decrease over time. Six respondents found that following an initial increase when PBU charges began, illegal dumping began to decrease afterwards. The point in time that illegal diversion began to decrease varied based on the reasons for this subsequent decrease. A combination of factors has worked to decrease illegal dumping in these instances.

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<sup>14</sup> Many of the people interviewed for the research were representing charity shops: this category of interviewees would not necessarily know whether or not unsuitable donations were received from renters, as this would not be of concern to them.

### ***Enforcing Littering By-laws***

According to several respondents, actions taken by the Town Council produced reductions in levels of illegal waste diversion experienced. Searching for identification evidence in dumped waste and fining accordingly appeared to have the desired effect of deterring would be dumpers, with one interviewee saying:

Initially after pay-by-weight was introduced it was a major problem, but the town foreman opened up the bags and looked for id, like letters, to see who had dumped the waste. The Council would then write to the person who had dumped the waste and sometimes fined them. The problem is minute now. (Tidy Towns Committee 1)

Partnership between various members of the local community and the council was also highlighted as one of the methods used by interviewees to tackle illegal activity. One respondent noted that 'the Tidy Towns [Committee] works hand in hand with the Council. We help each other. We find the problem and then the Council fine people and work on the legislation side of things' (Tidy Towns Committee 1). However, other interviewees have commented on a decrease in personal identifiers present in dumped waste. People are more aware of moves to kerb illegal dumping and are careful to ensure all letters and any other items that could potentially link the waste to them is removed from the bags. The concern was raised that 'once-off' dumpers were more likely to leave evidence and get caught than frequent dumpers who may be more aware of enforcement methods.

Identifying and targeting hot spots of illegal activity was a method used in one town. Rental properties were identified as a significant source of illegal diversion through evidence found in dumped bags of waste. This identification prompted a change in landlords' level of responsibility. A respondent said:

The biggest problem was people in flats and apartments. They were the worst, the tidy towns committee has gone through the bags with the council. They [the Council] got onto the landlords of

the apartments and have made them responsible for their tenants. Now the landlords pay for their tenants' bins. (Tidy Towns Committee 3)

While illegal diversion from rental properties is considered a problem in many of the studied areas, this move was implemented in only one such area.

Greater detail and monitoring was also used to help increase enforcement. Tidy Towns Committees increased town clean-ups to tackle the increase in illegal dumping, and opened bags of dumped waste to retrieve any personal data on the dumper. One business association also gathered evidence from waste dumped illegally on the premises of local businesses to enable the culprits to be caught. The business association said 'I must say it [illegal diversion] has decreased in the last 12 months but we [the business association] took action. We engaged the Gardaí and council. We took photographic and other evidence to the Gardaí and the council' (Business association 2). However, one litter warden pointed out that only urban areas are in the fortunate position of having regular clean-ups:

With towns, they are cleaned up every day, there is a cleaning service in every town. And then there are competitions, like the tidy towns, so that helps. They don't have this in the country areas. (Litter warden 3)

### ***Changing Usual Practices to Prevent Illegal Diversion***

In many cases, simple changes to usual practices reduced illegal diversion experienced by businesses and households. In the charity shop sector two shops have taken action and seen subsequent decreases in the amount of unsuitable items and household waste received. In contrast to many charity shops which are often concerned with causing offence and scaring away potential donations, both shops have introduced policies of checking all items donated before accepting them for resale. One charity shop said:

We simply tell people we can't sell that. We do the best we can to keep out the rubbish but you have to be subtle. We take any clothes though because



we get money for them when we recycle them. But people come in with boxes of bric a brac, we look through them and are just politely tell people that we won't be able to sell them. (Women's Aid)

The other shop has gone a step further and has made each staff member responsible for the donations he or she accepts. If the donations are not suitable for either resale or recycling the staff member is required to dispose of the items themselves.

Both businesses and households have reduced the amount of illegal diversion they experience by making changes to their bins – such as placing them out for collection and placing locks on them. These methods, although simple, were quite effective at reducing their experiences of illegal dumping. One respondent said 'it [illegal dumping] is not a problem any more since we put the locks on the bins' (GAA club 1).

### ***Increasing Access to Recycling Facilities***

In addition to greater enforcement of littering by-laws and penalties for illegal behaviour, interviewees also felt that the introduction of kerbside recycling and the opening of CAS had prompted decreases in illegal diversion. Interviewees witnessed a large difference in levels of illegal activity once households were able to access recycling facilities. Respondents noted that 'it took two years from when PBU was introduced to get door to door recycling bins. When these came in it improved an awful lot' (Tidy Towns Committee 2) and 'the recycling centre opening made a huge difference, people can take their waste there now. It [illegal dumping] is not a problem anymore' (Tidy Towns Committee 1).

### ***Increasing Affordability of Waste-Collection Services***

Increasing affordability of waste-collection services was identified as encouraging reductions in illegal diversion by one respondent. In this case, increased competition between waste collectors in an area resulted in a choice of PBU systems and charges and led to increased participation in formal waste-collection services in the

area. Householders that had opted out of the local authority waste-collection service became customers of a new company that began operating in the locality, as they felt it offered a more affordable waste-collection system than the system offered by the local authority. This interviewee said:

A crowd separate to the county council started tag-a-bag. This helped as people not willing to pay for a bin would do this. When they started it was only 50 cent a bag, now its 2.50 euro. Still people would be more willing to pay this than pay for a bin. (Tidy Towns Committee 2)

### ***Increasing Environmental Awareness***

In two cases, respondents felt that public awareness of environmental concern had increased and with this waste charges had become more acceptable to householders. It was felt that recycling had become part of people's normal routine, resulting in reduced levels of illegal diversion. One interviewee referred to the role of the media in increasing awareness:

It's [illegal dumping] not as bad as it was initially; it has kind of dipped back down to low key dumping [levels prior to PBU]. It's the mindset of people. It's in the media a lot now, litter and the environment. People have got their heads around it. They have got used to having to pay. There was resistance initially but now people have got used to recycling. (Tidy Towns Committee 8)

The use of one or more of the five methods outlined above has had a valuable impact upon levels of illegal diversion in the areas implemented. Following the changes made within the various communities interviewed, several respondents spoke of the significant decreases in illegal activity witnessed, with one respondent saying 'at the start of PBW [pay-by-weight], the first six months, it was very bad, dumping everywhere. PBW [pay-by-weight] is now in the third year and it has improved immensely' (Tidy Towns Committee 2).

## **6 Analysis: The Role of Private Waste Collectors in the Domestic Waste-management Sector**

### **6.1 Introduction**

The first stage of the research revealed that in 2006, on average, five waste collectors operated a domestic waste collection service within each local authority functional area; 94% of local authorities had private domestic waste collectors operating within the county/city; and 41% of local authorities had a combination of both private and public collectors within their functional area. To investigate the collector's experiences of this mixed collection of waste, each of the nine interviewees (three local authorities and six private collectors) were asked to summarise their relationship with the local authority/private collectors. In addition, respondents were questioned on requirements within waste-collection permits, and their opinions on the possible establishment of an independent waste regulator. These areas of research were considered particularly relevant for study in light of the proposed changes to the Dublin Waste Management Plan, with a move towards competitive tendering of private waste-collection permits in the region, and the 2006 Department of Environment, Heritage and Local Government consultation paper on the regulation of the waste-management sector (DoEHLG, 2006). The interviews aimed to gauge the feelings of waste collectors on the levels of competition they are currently operating in, and the local authorities' responses to rising numbers of private collectors.

### **6.2 Waste-collection Permits**

Under the terms of the permits, private waste collectors are required to provide a kerbside recycling service to their customers. Aside from this, no further requirements in terms of service to customers are placed on the collectors. Private waste collectors are free to select a PBU system, and free to set charges for use within their selected system.

According to one local authority, domestic waste-collection companies are required to fulfil the following criteria to be granted a permit from the local authority:

- 1 Their applications must comply in full with waste collection and disposal regulations.
- 2 They must own their vehicles or have them on long-term leases.
- 3 They must be fully insured.
- 4 They must have confirmed and agreed legal outlets for the waste collected.

A second local authority interviewee stated that permits are issued by the local authority, with extensive conditions and compliance is audited by a dedicated enforcement team. Nonetheless, the range of reasons allowable for refusal of permit applications is very limited and interviews suggested that even a prior conviction may not be deemed a reason for refusal. Although collectors are not restricted in which systems they can use, the types of PBU charges suitable for use are suggested by the local authority. The charges to householders are not specified in the permits and the impact of the charging system used by the company (for example, on low socioeconomic households) is not taken into consideration when issuing permits.

Several private collector interviewees stated that the number of requirements present within waste-collection permits should not be increased as it would interfere with competition. However, several interviewees (both private and public) feel that permits should specify a minimum and maximum frequency of waste collection allowable. In the second category, two respondents were concerned that in an area with several competing waste collectors each collector will offer to collect household waste, recycling and brown bins more and more frequently in a bid to win customers, resulting in several collections a week in one street. They feel that the emissions and cost incurred from

driving a large number of waste trucks around an area would outweigh the benefits of the additional recycling and brown bin collections.

Three respondents referred to the desirability – or not – of increased waste-collection regulations, such as a requirement for all collectors to operate within a prescribed PBU system. One interviewee from a public body noted that at this stage there is probably enough information available for a decision to be made on which system is most successful in terms of customer satisfaction, environmental gain, and ease of administration; another feels that an advantage of establishing a required system is that it would create a level playing field for all collectors. However, this respondent remarked that it would be hard to know which system to select, and pointed to back-tracking on pay-by-weight in some European cities. Another interviewee (from a private organisation) feels that one system does not automatically suit all situations, and that instead the market should be allowed to decide.

Two of the local authorities interviewed are within the Dublin Waste Management Region, which has recently made changes to its 2005–2010 waste-management plan. These changes state that domestic waste will be carried out either by the Dublin local authorities or that the local authorities will use a public tendering method to select private collectors. Following this change to the waste-management plan, the collection permits for over 100 private waste-collection companies will be reviewed. Several of the private collectors interviewed referred to this move, stating concern that permit conditions will be tightened in the future to favour local authorities, or that permits to private collectors may be revoked when it suits the issuing authority. One respondent said:

The local authority [Dublin City Council], they issued a permit, they're actually threatening that they can introduce certain conditions in their permit, but yet it would favour them, it would actually favour the competition in their perspective, because they're collecting as well. (Interviewee 2)

Cork County Council's response to perceived problems with the implementation of PBU by private waste collectors is to shift ownership of waste collection in Ireland into the hands of local authorities, as is the case in the United Kingdom. Nonetheless, a move towards a UK model is highly unlikely in Ireland under a neo-liberal agenda with a focus on increased privatisation. The local authority was also keenly following the permitting changes occurring in the Dublin region, with one interviewee saying:

Authorities nationally are watching the Dublin Waste Management Plan cases and looking at the extent to which waste collection can be controlled. Until such time as responsibility for public service obligations (waiver, bring sites etc. and awareness) and the achievement of EU targets is properly assigned and rewarded, local authorities continue to have reservations about the motives of the private sector and their potential for delivering on Landfill Directive targets.

According to one local authority respondent, the lack of legislation on PBU charging for domestic waste collection needs to be rectified, as PBU is not being implemented by all collectors, and many collectors use a pay-by-volume system, which cannot be considered a PBU system. The local authority respondent called for proof of waste diversion to be required, and for a strengthening of the link between the Waste Management Plan and the Collection Permit, questioning the lack of enforcement cases taken nationally regarding this matter. The respondent felt that 'there is a need to ensure like for like systems' and that the 'power to direct waste needs to be established/confirmed or otherwise at EU Courts level or such other appropriate legal level'.

## **6.3 Local Authority and Private Waste Collector Competition in the Domestic Waste-management Sector**

### **6.3.1 *Perceptions of Local Authority/Private Waste Collector Competitors***

When Stage 1 of the survey found that 41% of local authorities had a combination of local authority and private waste collectors operating within their functional areas, of the local authorities' dual role as regulator and competitor and the increasing presence of private collection companies within the domestic waste-management sector were identified as potential sources of conflict. To investigate this, respondents were questioned on their relationship with private collectors/local authorities.

Interviews with both local authorities and private waste collectors revealed a high level of competition between the two, with collectors in direct competition with local authorities/private collectors both reporting tension in their relationship. The main source of this tension is the perception held by both local authorities and private collectors that they do not operate on a level playing field, to the advantage of the other.

Private collectors operating in areas where local authorities had withdrawn from the domestic waste-collection market reported a good relationship with local authorities. However, when competing with local authorities for customers, private waste collectors spoke negatively about their relationship, reacting to the local authority's joint role as collector and regulator. One collector said that 'it's a very tangled incestuous type relationship and it can be tedious, it can be really tedious' (Interviewee 1), with another stating bluntly that 'they [the local authority] don't know what they're talking about' (Interviewee 6). Private collectors feel that local authorities have an unfair advantage over private collectors, with interviewees frequently referring to their belief that both local authorities and private collectors operate in the same market yet local authorities receive grants, are tax exempt and do not have to apply for waste permits. One respondent said:

My biggest problem is our county council is my competition, they're gamekeeper come poacher. They're grant-aided [the local authority], they get subsidies to everything, they're VAT exempt, I have to pay the VAT. I sell an €8 tag, I have the VAT, I get only €7.05. They sell their tags for €8 they don't have to pay the VAT, it's not a level playing field, and I'm a business, they're a business. (Interviewee 6)

Both local authorities and private collectors are competing as businesses for market share. Private collectors feel that because they are also waste regulators local authorities may choose to deny or alter permits to private collectors if they feel that private collectors are taking too great a share of the market. One interviewee noted: 'They [the local authority] could turn around, if you were competing with them, and say we're not renewing your permit' (Interviewee 2). These perceptions lead to discussions of the need for an independent waste regulator, reported in Section 6.4.

Several common concerns were raised by the local authorities interviewed as part of Stage 2 when asked about their relationships with private waste collectors. The local authorities interviewed were concerned over their perceptions of an absence of a level playing field, to the advantage of private collectors, and private collectors' 'cherry pick ing' of customers. Local authorities and private waste collectors are driven by different motivating factors. The local authorities stated that they have public service obligations and are obliged to fulfil environmental and social responsibilities, such as the 'polluter pays principle', under Local Government Acts, whereas they feel that many private collectors are motivated solely by profit, 'free-riding' on waste infrastructures provided by local authorities, and with no apparent concern with regard to the quantities of waste presented by the domestic sector or the impact of their charges on householders.

A source of this perceived inequality surrounds customers of private collectors' use of local authority-provided waste-related infrastructure. One local authority expressed a sense of injustice as customers of private waste collectors benefit from services that are established and

operated by the local authority and funded in part through the local authority's own waste-collection customers. These services include provision of CAS, bring banks, enforcement of illegal waste diversion and environmental education programmes.

We [the local authority] will provide the civic amenity sites, we'll provide the bring banks and they [the private collectors] don't. Their householders are using these facilities as much as our householders but they don't have to pay anything. (Local Authority 2)

Another local authority asserted that they are driven by delivering a public and environmental service and they contend that private waste collectors are exploiting a lack of strict PBU requirements and offering an inferior service:

It is the case that what concerns the private sector operator is to maximise the number of customers and revenue. Our PBU system not only encourages reduced quantities of waste being presented for disposal, but consequentially it reduces the revenue of a waste collector. The county council is willing to take the risk of revenue loss to achieve the reduction in waste presentation. Private sector collectors may not be willing to do so. (Local Authority 1)

The local authorities feel that private collectors and local authority collectors do not operate on a level playing field, to the advantage of private waste collectors. Both the differing motives for waste collection and the infrastructural issues contribute to this perceived inequality. However, this finding conflicts with private waste collectors' experiences, both as outlined above and in the 2007 report 'Waste Policy, Planning and Regulation in Ireland' (Eunomia, 2007). This reported on private collectors' opinions, agreeing that private collectors and local authorities do not operate on a level playing field, but from their perspective this is to the local authorities' advantage. The reasons provided in the 2007 report for this perceived local authority advantage mirror the thoughts of the private collectors interviewed during the case studies and reported above.

A second source of concern for local authorities was the perception of 'cherry picking' of customers by private collectors. The local authorities feel that private collectors; reasoning when selecting a system to implement and areas to work in is: 'more waste equals more revenue'. On this basis, private collectors select to win over customers that are large waste producers within densely populated areas:

The private sector we feel are only interested in increased waste generation and the maximisation of profits. The Council is concerned that private sector operators will simply cherry pick and serve the densely populated areas only. (Local authority 1)

Rural, sparsely populated areas are costly to collect waste from; a truck travelling many miles down narrow roads may not collect waste from enough households to make the collection financially viable. Private collection companies are seen to offer their services to households in densely populated areas only, where a high return for collection is guaranteed. Nonetheless, they are within their rights to do so and such behaviour is to be expected from private companies. As households in densely populated areas are targeted by private companies and leave the local authority collection service, the local authority is left to collect from the rural sparsely populated areas. However, this is not the case, as under the Waste Management Act 1996, local authorities are only required to collect waste where it is economically viable to do so: 'Each local authority shall collect, or arrange for the collection of, household waste within its functional area unless the estimated costs of the collection of the waste concerned by the local authority would, in the opinion of the authority, be unreasonably high' (Section 33, WMA, DoEHLG, 1996). Local authorities do not always collect from rural areas; an EPA study found that in 2003 21% of households in Ireland were either not served by or not availing of a waste-collection service (EPA, 2005).

One local authority felt that the charging structures offered by private collectors encouraged the households that produce high quantities of waste to switch from the local authority service to the private service: 'They successfully

attracted all the heavy users of the service. So they have sort of cherrypicked the heavyweights and the good payer' (Local Authority 2).

Another area of concern for local authorities is the potential impact of multiple waste collectors operating on one neighbourhood on householders – in terms of noise, the environment, and emissions from numerous trucks in one area.

### **6.3.2 Impact of Competition on Service Provision**

Economic theory proposes that increased competition leads to improved services and decreased prices for consumers in order to win customers. Private sector involvement in the Irish domestic waste-management sector was encouraged by the Department of Environment's 1998 policy document *Changing Our Ways* (DoEHLG, 1998) and currently in much of the country there is open competition between waste collectors. The case studies examined whether or not this system resulted in better services and prices for householders in the areas studied. Examples of both positive and negative outcomes of competition in the waste sector were uncovered, with some respondents experiencing improvements in levels of service on the onset of increased competition, and others finding all competitors in an area instead selected to offer the same services and service prices to householders.

One local authority admits that private collectors have won over customers by meeting and improving upon the local authority's service; offering reduced costs for collection; and by offering an improved collection service. One interviewee noted:

Well it's very simple winning over, we will collect your waste for 20% less than what the county council collects it, and they have given people the same pay-by-weight scenario, so it's 20% off our standing charge, 20% off our lift charge and 20% off our weight charge. And \*\*\*\*\* came in with 30%, so 30% off our weight, 30% off our lift and 30% off our standing charge. (Local Authority 2)

It's purely on cost that they [private collection companies] have attracted customers, some on service as well I suppose in fairness, some people would have felt that our service wasn't what it should be, like whether they had missed collections or whatever ... but essentially it's costing has made people move. (Local authority 2)

In addition, respondents acknowledged that the presence of private collectors in the market has had the effect of improving the local authority's waste-collection service when possible.

Both of them [private collectors] have matched our system: they started off by providing an improved service, a fortnightly collection of the green bin, which we [the local authority] have since matched, and they also were collecting plastics in the green bin, which we have also matched. Now they're suggesting they'll collect glass in the green bin, which we won't match, we don't have the facility to run that through our recycling plant. (Local Authority 2)

A second example of a positive impact of increased competition was uncovered during the illegal diversion interviews. In one town the entry of a new collector, offering a different system of charging to the local authority system, prompted households that had previously selected to opt out of the local authority collection service and disposed of their waste illegally to become customers of the new collection company. In this case a choice of service had positive impacts upon the environment.

Nonetheless, in many cases the presence of competition in the domestic waste sector has not resulted in improved service levels, choice of systems or decreased prices for householders. The interviews revealed that in some cases waste collectors match their service and prices to those used by competing collectors within the area. This is particularly the case with selection of PBU system. Two respondents currently using a tag-based system spoke of their preference for a weight-based system but feel unable to move to such a system as all their competitors use tags. They feel that customers are familiar with a certain

system and were unwilling to change from this as they felt householders may instead chose to switch to a different service provider that offers the system and price structure they were accustomed to. Interviewees stated that 'It's difficult to actually introduce a weight system when everybody else is a usage system' (Interviewee 2), and 'You see the people were used to it [a tag system], so how else was I to compete' (Interviewee 6). One respondent noted that everyone in the area used a tag system, and when one company moved into the area with a pay-by-weight system, people did not use this collector as they viewed the system as more expensive.

Competition does not automatically result in decreased costs for the customer either. When discussing collectors' reasons for setting a price, one interviewee spoke of the need to hold to the local authority's charges because, as a small company, he could not afford to beat these prices and would not be able to charge more than the local authority charge as he would lose customers: 'That's what was being charged already ... they're €8, we're €8' (Interviewee 6).

Several interviewees (both public and private) mentioned prices offered by collectors when they move into a new area. It was generally believed that new collectors offered potential customers a lower collection charge than the existing companies to attract customers, often advertising their prices alongside the prices of existing collectors. However, once the new company had secured collection routes in the area and had forced the previous collector off the routes the waste-collection charges would then rise to match the charges offered by the other waste collectors in the area. Households eligible for a fee waiver under a local authority collection are not offered waivers by private collection companies and local authorities raised concerns that in using these low price offers private collectors may negatively impact upon low income households. Once the majority of households on a route switch to an alternative provider the local authority is forced to discontinue a service on that route, leaving low-income householders with no choice but to take up the service available to them

without a waiver,<sup>15</sup> or to dispose of their waste illegally. These cases highlight that the presence of competition in an area does not necessarily result in cheaper waste-collection services to households, and indeed may impose much higher costs on waiver-eligible households.

These finding were reflected in the statement by the National Competition Authority that found that the market for waste collection in Ireland is not working well for consumers (Forfas, 2006). Furthermore, a report commissioned by Greenstar (Eunomia, 2007) found that competition in Ireland led to increased cost to householders and may limit the development of services offered.

## **6.4 Waste Regulation**

In 2006 the DoEHLG consultation paper 'Regulation of the Waste Management Sector' (DoEHLG, 2006) proposed the establishment of an independent waste regulator in Ireland following recommendations made by the Indecon report 'Review of Local Government Financing' (Indecon, 2006) in March 2006. Regulation of the waste-management sector was proposed owing to a number of concerns – such as the conflicting role of local authorities as both regulators and competitors and the increasing consolidation in the waste industry, resulting in monopolies which may lead to increased charges and loss of choice for the consumer. The consultation paper established a number of key questions on the possible role of this regulator, questions included whether regulation should be in the form of governmental regulation, industry self regulation or performance-based regulation; whether a regulator should issue, renew, enforce and revoke waste permits; and whether a regulator should determine an appropriate waste charging structure and impose a public service obligation. All interviewees were asked for their opinions on the proposed independent waste regulator.

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<sup>15</sup> Waiver schemes for waste collection costs are available to low-income customers of local authority waste-collection services. Schemes vary between local authorities but commonly under a PBU charging system eligible householders are not required to pay the set standing charge for waste collection, and instead are only charged based on the volume/weight of waste they present for collection.

The majority of the respondents, both from the public and private sector, were in favour of an independent regulator. Nonetheless, several interviewees felt more information on the role of the regulator was needed before support could be given. As detailed in Section 6.3 all interviewees felt that both private and public waste collectors do not operate on a level playing field, to the advantage of the other, and would support a move towards this. Many respondents felt that an independent regulator may provide a set of rules that would apply equally to all waste collectors, both public and private. One interviewee said:

... what we want is order, order in the market, I mean whatever the rules are we will work to them, just at the moment the rules just seem to be wide open and there is a disorderly market as such ... (Local Authority 2)

Private collector interviewees were generally in favour of the establishment of regulations that would take regulatory powers out of the hands of local authorities and create an equal status for all waste collectors operating in the market.

Well it's like Aer Lingus and Aer Rianta, like Aer Lingus you know can't control the airports, like the airports are a separate authority, the same thing like, whoever issues the permits shouldn't be collecting the waste. It would be independent [a waste regulator], a level playing field ... (Interviewee 2)

Another respondent referred to problems encountered by multiple bodies having control of waste permitting, as in the present situation, stating a preference for one organisation to fulfil this role.

There is a lack of consistency across the country in how they [local authorities] implement permits. If the regulator were to take that in hand and help the industry achieve certain consistencies and provide a level of service [I would be in favour of that]. (Interviewee 1)

Competition issues raised in the consultation document 'Regulation of the Waste Management Sector' (DoEHLG, 2006) were commented upon by the private sector interviewees as a reason for the introduction of a waste

regulator. The private collector respondents referred to several areas of concern to the private sector that were highlighted in this consultation document; the main areas mentioned were that private collectors require waste-collection permits whereas local authorities do not, and that whereas local authorities get financial help from the Environment Fund for their waste infrastructure projects, private collectors do not.

However, interviewees had several reservations on the potential powers granted to the proposed regulator. One aim of the waste regulator as set out in the consultation paper was to protect the customers from increasingly high waste-collection costs. One private waste collector was concerned that a waste regulator might have powers to regulate the price of waste-collection charges issued to customers.

The same respondent also advocated the use of performance-based regulations over prescription of a certain system for use by the waste regulator. The interviewee stated that PBU is not necessarily the only way to achieve national landfill and recycling targets and that any regulations should focus on the outcomes gained by collectors in place of dictating use of PBU systems:

[Policy makers] sitting in an office in D2<sup>16</sup> in the government buildings think PBU as a financial instrument is great without seeing the practicality of it, it's the easiest thing for them not to have to think, to follow the rules blindly, and not see that industry within obviously defined parameters are actually achieving the aims but in a slightly different route or in a manner that essentially the market has created rather than the regulator, the market will create it quicker than any regulator will in terms of achieving those aims. (Interviewee 1)

This interviewee pointed out that they have succeeded in reducing waste-presentation rates through simple changes to their system – such as reducing the frequency of landfill bin collections and increasing the frequency of recycling bin collections, stressing that any regulation should focus on outputs rather than inputs. A second

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<sup>16</sup> D2 is a postcode/ZIP code in Dublin.



respondent also voiced a preference for performance-based regulation. This respondent focused on future possible requirements for waste collectors to provide a separate organic waste collection – a brown bin – to householders. The respondent stated that provision of such a service would be highly costly as a special truck is required. In addition, brown bins may not be presented regularly but collectors would still be required to drive around areas in case bins are placed out for collection, adding to the collector's costs. The interviewee currently segregates organic waste from the waste presented by householders in their landfill bin; in doing so, the company removes the organic stream from going to landfill yet does not incur the cost of providing a brown bin collection<sup>17</sup>. In this manner, companies could achieve desired waste-management goals without the methods for doing so being prescribed. This form of regulation was also raised as a possibility in the consultation document.

## **6.5 Summary**

Both local authorities and private waste collectors perceive that the other has the advantage. Local authorities felt that they do not have the power to control private collectors, whereas private collectors felt that local authorities may change the conditions of the permits or refuse to renew them, to suit the local authority. Local authorities felt that private collectors structured their charges in order to gain the greatest profit; private collectors felt that local authorities have an unfair advantage with access to grants. The perception of the absence of a level playing field that favours the competitors held by both local authority collectors and private waste collectors highlights the need for the establishment of an independent waste regulator.

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<sup>17</sup> It should be noted however that organic waste collected in this manner may not be of a suitable quality for composting owing to possible contamination worries from its proximity to mixed household waste. The EU plans to define quality standards for compost, to enable the development of markets for compost.

## 7 Summary and Conclusions of Case Study Analysis

Four main issues were selected for investigation during Stage 2:

- 1 the impact of various PBU systems on householders waste-presentation rates;
- 2 waste-presentation rates for landfill within differing levels of access to a kerbside recycling service;
- 3 the relationship between PBU domestic waste charges and illegal domestic waste diversion; and
- 4 the role of the private waste collector in domestic waste collection in Ireland.

The key findings from Stage 2 are:

- **Impact of PBU system on domestic waste-presentation rates** – Two local authorities with equal access to kerbside recycling, but with different PBU systems implemented, were studied to compare the effectiveness of both pay-by-weight with tag-based on household waste-presentation rates to landfill. The analysis revealed that from the year prior to PBU to the year subsequent to PBU introduction, under the weight system waste presentation to landfill decreased by 50%, whereas under the tag system presentation decreased by 23%. A further study area selected to move from a tag system to a weight system and realised initial decreases of 19% followed by a further decrease of 8% upon implementation of a weight-based PBU charge. These figures indicate that pay-by-weight may be more effective in reducing landfill waste-presentation rates in householders than tag-based.
- **Impact of kerbside recycling on domestic waste-presentation rates** – In an area with kerbside recycling and an area without kerbside recycling there was a 33% difference in overall reductions in waste to landfill from the year prior to pay-by-weight to the latest figures available, 2007. Households with the kerbside

recycling service experienced the greater reduction. Both areas moved from a flat-rate system to a pay-by-weight system, the only difference being access to a kerbside recycling service. This 33% difference in reduction under a pay-by-weight system indicates that presence of a kerbside recycling service has a large part to play in achieving reductions in household waste to landfill.

In several areas data was available to allow limited investigation into the possible destinations of the waste diverted from landfill; source reduction; recycling and illegal waste diversion.

- **Impact of PBU on source reduction** – Stage 2 allowed a very limited examination of the impact of PBU charges on domestic source reduction. Source reduction involves householders reducing the overall amount of waste they produce through changes to their shopping habits. Two waste-management areas which had moved from a flat-rate system to a PBU system provided data suitable for analysis. One of these areas uses pay-by-weight, and the other area uses tag-based. Within the pay-by-weight waste-management area a 16% decrease in the total amount of waste managed by the local authority was experienced and within the tag-based area a 20% decrease in the total amount of waste managed by the local authority was witnessed. These figures indicate that both the tag and weight forms of PBU may be effective in prompting source reduction in householders. However, it is not possible to determine whether these decreases were achieved through source reduction behaviour, as householders may have alternatively selected to compost or dispose of their waste illegally.
- **Impact of PBU on recycling** – Two of the waste-management areas studied had a kerbside recycling

service available to the majority of householders before the local authority implemented PBU charges. In one area analysis of kerbside recycling figures reveals that during the 2003–2007 study period householders with a kerbside recycling service have only increased the amount placed out for recycling by 9% on average. In addition, in the year tag-based was implemented and householders reduced their landfill waste presentation by 23%, the amount presented for recycling also decreased by 4%. These findings indicate that households did not select to divert their waste through increasing use of the kerbside recycling service. Nonetheless, although kerbside recycling levels did not increase significantly on introduction of PBU, data was available to investigate the impact of the charges upon total diversion using county council CAS, bring banks and two bin collections, the kerbside recycling bin and the pilot organic bin. Taking these diversion options together, the analysis reveals that during the study period on average households increased the amount of waste diverted in via these routes by 100%, indicating a large level of participation in recycling. In the second area studied in the year pay-by-weight charges began and householders reduced their landfill waste presentation by 49%, the amount of recycling placed in householder recycling bins increased by 25%.

- **Impact of PBU on illegal diversion** – Investigation into the impact of PBU on illegal diversion in the first stage of the study focused on changes in the number of reported incidents. This relies on reporting levels and so may actually reflect public awareness changes rather than real changes in illegal dumping activity. Stage 2 examined illegal dumping in the two local authority case study areas (Cork County Council and the Dublin Waste Management Region) following the implementation of PBU charges. By interviewing 30 people in total in many different roles, a picture was built up of experiences of illegal dumping. Respondents were asked whether they have witnessed changes in illegal diversion levels over time, and what factors

they felt influenced these changes. The interviews revealed that the majority of respondents felt levels of illegal waste diversion have increased. The most commonly cited reason for these increases was the introduction of PBU domestic waste charges. The second most commonly cited reason was an increase in the amount of rental properties in the area. Based on the responses provided by the interviewees, PBU can be considered a contributing factor in increasing illegal domestic waste diversion.

- **The role of the private collectors** – The number and influence of private collectors in the domestic waste-collection market was identified in the first stage of the research. At the time of the nationwide survey domestic waste collection services were provided by both the local authority and private collectors in 41% of county/city councils throughout Ireland. One aim of the Stage 2 was to examine the relationships between local authorities and private waste collectors, and to gather the views of private collectors on PBU. Interviews revealed a high degree of competition between local authorities and private waste collectors, with both parties claiming that the absence of a level playing field places gave the other side an advantage. Local authorities referred to the private collectors' profit motive encouraging private collectors to use environmentally less effective PBU systems to cherry-pick customers, and to not offer low-income customers a fees waiver. On the other hand, private collectors referred to the conflicting roles of local authorities as waste regulators and collectors. In particular, private collectors saw local authority grants from the Environment Fund as unfair. Both local authorities and private waste collectors were generally supportive of the proposed introduction of an independent waste regulator, feeling that this might help remove the level of inequality that currently exists. However, the local authorities interviewed also expressed a preference for local authority ownership of waste regulation, with private collectors applying for permits using a competitive tendering process.

## **8 Overall Conclusions to the Study: ‘A Nationwide Review of Pay-By-Use (PBU) Domestic Waste Collection Charges in Ireland’**

The findings of the study, both the nationwide survey (Stage 1) and the case studies (Stage 2), lead to several conclusions on PBU domestic waste charges in Ireland, which may be useful in informing future policy.

### **8.1 PBU Domestic Waste Charges and Waste to Landfill**

- On a nationwide level there has been a general decrease in the amount of waste produced in cases where PBU has been introduced, whereas those areas without PBU systems have seen an increase in average rates of waste presentation:
  - Under a pay-by-weight system, case study areas reported reductions in domestic waste-presentation rates of between 28% and 61% from the year prior to PBU to the most recent figures available, 2007.
  - Under a tag-a-bin system, there has been a decrease in waste presented by householders for landfill of 38% in the tag case study area, from the year prior to enforcement of PBU to the most recent figures available, 2007.
  - pay-by-weight is more effective at reducing household waste to landfill than tag-based.
  - The nationwide survey (Stage 1) found that pay-by-weight was only in use in 15% of local authorities, whereas tag-based is in use in 82% of local authorities in the country.

Limited international research has been undertaken into pay-by-weight, as it is the least common form of PBU. However, research into a pay-by-weight system in The Netherlands found that three years after the implementation of pay-by-weight waste to incineration had reduced by 56% compared to the weight of waste to incineration prior to pay-by-weight (Linderhof et al., 2001).

Three Irish waste-management areas examined in Stage 2 had moved from a flat rate to pay-by-weight charge, and the average reduction experienced by the three in waste presented for landfill was 47%. This figure represents decreases in waste to landfill between three to five years after its initial implementation, similar to the case reported in the literature. This reduction is comparable to decreases experienced in The Netherlands. Within Ireland, two pay-by-weight pilot studies conducted prior to the nationwide adoption of PBU charges experienced decreases of 30–45% in the weight of waste presented in the year following implementation of the PBU charging system (Dunne, 2004; Dunne, 2005; ESRI, 2006). These reductions in waste were on the whole slightly smaller than the reductions found in the case study areas examined as part of the nationwide survey (Stage 1) reported here. In the year immediately following the introduction of PBU charges, the three case study regions that moved from a flat rate to pay-by-weight, experienced decreases of 28%, 50% and 55%.

The international literature on tag-based has found reductions of between 20 and 50% in the volume of waste presented for landfill under this system (Miranda and Aldy, 1998). However, owing to compaction of waste large decreases in the *weights* of waste to landfill may not have occurred, with one study observing a 37% reduction in volume of waste but only a 14% reduction in weight of waste on the introduction of tag-based (Fullerton and Kinnaman, 1996). The tag-based system examined in the Irish case study experienced an initial 23% decrease in the weight of waste presented. The Irish case study area reported greater success under a tag-based system, despite sharing a comparable level of access to recycling facilities with the case study reported in the literature. How tag-based performed in the longer term was not presented in the literature.

## **8.2 PBU Domestic Waste Charges and Recycling**

- PBU charges have increased householder levels of recycling:
  - There has been improvement in levels of recycling in the time period following the introduction of PBU although this increase is often a continuation of a general trend that was occurring before PBU was introduced (and it has also occurred in locations where PBU has not been introduced). Recycling behaviour is influenced by other developments such as improved recycling infrastructure and changing public attitudes towards recycling activities.
  - Stage 2 revealed that in one waste-management area with a long-running kerbside recycling service householders increased the amount of recycling placed in householder recycling bins by 25% on average, when pay-by-weight charges began. A second waste-management area found that when taking recycling at kerbside, CAS and bring banks, and waste to an organic bin collection together, from the year prior to PBU to 2007, on average households increased the amount of waste diverted via these routes by 100%, indicating a large level of participation in recycling.
- PBU charges are more effective in the presence of a kerbside recycling service:
  - In the absence of a kerbside recycling service pay-by-weight is an effective tool for waste reduction in its own right, with one waste-management area without kerbside recycling producing reductions in waste to landfill of 39% overall.
  - However, pay-by-weight is much more effective in the presence of a kerbside recycling service, with case study areas using these together experiencing reductions of 53% and 61% in weight of domestic waste to landfill, from the year prior to PBU to the most recent figures available, 2007.

- The nationwide survey (Stage 1) found that the only local authority which does not have a kerbside recycling service has the fifth highest waste-presentation rate per person in the country, and the local authority with the lowest rate of waste presentation per person offers recycling collection on a weekly basis throughout its functional area.
- Based on these findings, the expansion of the kerbside recycling service by waste collectors to cover all households would result in greater success in reducing waste to landfill on a nationwide level.

International research into the impact of PBU charges on recycling found that user fees increase the probability that a household recycles frequently (Hong et al., 1993; Sterner and Bartelings, 1999; Bauer and Miranda, 1996; Miranda and Aldy, 1998; Linderhof et al., 2001; Ferrara and Missios, 2005). Areas with a kerbside recycling service experienced the largest gains in household recycling, with recorded increases of between 30 and 70%. The impact of PBU on recycling levels found in the international literature exceeds the experiences of the two Irish case study locations, which only experienced 9% and 25% increases in kerbside recycling levels.

Research into the impact of access to recycling services on waste to landfill within a PBU system was not examined directly in the literature review. However, Miranda and Aldy (1998) found large differences in the decreases experienced in waste to landfill under PBU in the communities they studied; they attributed these variations to differences in access to recycling facilities. The area with a 50% decrease in landfilled waste was automatically provided with a kerbside recycling collection, whereas households in the area with a 22% decrease in landfilled waste were required to request a kerbside recycling collection. The Irish case study areas with kerbside recycling services experienced decreases in waste to landfill by 53% and 61%, both higher than those reported in the literature, this may be as the Irish case study areas used pay-by-weight, whereas the areas used in the literature used volume-based.

### **8.3 PBU Domestic Waste Charges and Illegal Waste Diversion**

- PBU was identified as a contributing factor in increasing levels of illegal waste diversion.
- Several factors were felt by interviewees to reduce illegal diversion, including partnership between various members of communities and the council, identifying and targeting 'hot spots' of illegal activity (including targeting groups of people responsible), increasing access to recycling facilities, and providing low-cost waste-collection services.
- While illegal diversion has been mooted as an unwanted by-product of PBU the systems for monitoring such activities frequently lack sophistication, making the evaluation of this claim difficult. The sporadic, unpredictable and illicit nature of such behaviour makes the development of a monitoring system difficult and a time- and resource-intensive investment. The development of such monitoring systems could lead to both a better understanding of the actual occurrence of such events and also act as a deterrent for such behaviour.

The literature on the impact of PBU on illegal waste diversion is mixed. Studies, such as those by Bauer and Miranda (1996), Miranda and Aldy (1998) and Miranda and Bynum (2002) find in their study of case study communities that although undesirable diversion was experienced to some extent everywhere, the level of undesirable diversion experienced by PBU communities was no higher than in communities using a flat-rate charge. Whereas others, such as Fullerton and Kinnaman (1996) estimated that households in their case study community may have increased illegal dumping by almost as much as they increased recycling on implementation of pay-by-use charges. The Irish finding in the case study stage, that just less than half of the 30 interviewees experienced increases in illegal diversion with the introduction of PBU charges, does little to remedy the inconclusive nature of the literature on PBU and illegal waste diversion.

### **8.4 Competition and Regulation in the Irish Domestic Waste Management Sector**

- The current situation of open competition in the domestic waste-management market may not be beneficial to householders or national landfill targets:
  - Competition is not pushing the price of domestic waste collection down in the majority of cases.
  - Competition is not providing a choice of systems for householders or prompting collectors to select the most environmentally effective system.
  - Nonetheless, consolidation of smaller companies resulting in fewer but larger companies may be more detrimental, potentially leading to increased prices and poorer service levels for the householder as monopolies form across the country.
  - Use of competitive tendering for waste-collection contracts may result in improved service levels, and be preferable to the current open competition system.
- The current levels of regulation in the domestic waste sector do not ensure best service provision for householders and have left both public and private waste collectors perceiving that they are in a less advantageous position than the other:
  - The current regulations allow large variations in waste-collection charges and levels of service offered to households across the country.
  - Low-income households are at a disadvantage under the current regulations. Private collectors do not offer waivers, and customers may be charged over €500 per year for waste-collection services. Low-income households may select to opt out of a collection service and illegally divert their waste in the absence of a waiver scheme.
  - Public and private waste collectors both feel the absence of a level playing field.
  - The establishment of an independent waste regulator may assist both householders, local

authorities and private waste collectors, through setting uniform service standards and creating a level playing field for all waste collectors.

## **8.5 Information**

- The adoption of different systems of PBU (and in some cases non-adoption) by different collectors (public and private) both within and across local authority boundaries makes the evaluation of system effectiveness difficult at a local authority level: analysis at a collector level is more appropriate.
- Current systems of information collection for waste-related activities, such as illegal diversion, recycling and waste presented, are dispersed and fragmented. As a result, it is difficult to compare the data collected across locations. In addition, data can be incomplete due to the retention of information by private sector collectors claiming that it is commercially sensitive, or because of a lack of monitoring, such as with illegal waste activities.

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## **Appendix 1 – Questions for Local Authority Interviewees**

### ***Waste disposal:***

Local authorities will be asked for information on the:

- i. Tonnes of waste for landfill collected from households by the local authority, for as many years as possible
- ii. Number of households in the local authority collection service, for each year.

### ***Waste diversion/Recycling:***

To determine the impact of PBU on recycling questions on this topic will be directed towards the Director of Waste Services and the managers of recycling centres in the local authorities. Local authorities will be asked for information on the:

- i. Tonnes of recycling collected from households by the local authority for each year since a kerbside recycling service began.
- ii. Number of households in the local authority's kerbside recycling service for each year since the service began.
- iii. Tonnes of recycling collected at CAS and bring banks, for as many years as possible.

### ***Waste reduction:***

To determine the impact of PBU on overall residential waste generation (i.e.: impact of PBU on source reduction) questions on this topic will be directed towards the Director of Waste Services in the local authorities. Local authorities will be asked for information on the:

- i. Tonnes of waste collected from households, both recyclable and non-recyclable, in the local authority for each year where data exists.
- ii. Population of the local authority's functional area.

### ***Public education programmes:***

Questions on public education will be directed towards the Environmental Awareness Officers in the local authorities. The Environmental Awareness Officers will be asked for information on:

- i. The public education in place
- ii. The focus of education (recycling? Composting? Source reduction?)
- iii. The advice sought when planning education
- iv. The template used when developing education programme
- v. The cost of public education service, cost of education programme overall and per capita
- vi. Whether expenditure on education temporarily increases when a new programme is introduced, for example kerbside recycling?
- vii. The perceived success of public education
- h) The difficulties with the education programme (e.g. people reached, languages required etc)

### ***Service to multi-unit complexes:***

Questions on this topic will be directed towards the Director of Waste Services and the Environmental Awareness Officers in the local authorities. The Directors of Waste Services and the Environmental Awareness Officers will be asked for information on:

- i. The provision of PBU systems for residents of multi-unit complexes
- ii. The design of these PBU systems if they exist
- iii. The success of these systems
- iv. The problems with these systems
- v. The basis of success/problems
- vi. Any future plans for implementing PBU for multi-unit residents

***PBU and low socioeconomic groups (impact of PBU on low socioeconomic groups plus Low income participation):***

Questions on this topic will be directed towards the Director of Waste Services, Environmental Awareness Officers and the Head of Finance in the local authorities. Questions will include:

- i. Do you feel that PBU domestic waste charges are advantageous or disadvantageous to low socioeconomic households?
- ii. Waiver - Number of households with a waste charges waiver? Is this waiver only available to households using the local authority waste-collection service or are households with a private collection service also entitled to waiver status?
- iii. Since the introduction of PBU charges have households chosen to discontinue their waste-collection service, instead selecting to dispose of their household waste independently? If so, is this phenomenon more prevalent in more disadvantaged areas of the local authority or not?

***Customer base stability:***

Questions on this topic will be directed towards the Director of Waste Services in the local authorities. Questions will include:

- i. Competition between different collectors, including local authority collection and private collection.
- ii. Stability of customer base within local authority; has number of customers with local authority reduced over time?
- iii. Have customers moved to private collectors? If so, why?
- iv. Does local authority have enough customers to make collection service feasible?
- v. Where does the local authority think the future lies in waste collection, private, public or both?
- vi. How do the local authorities react to the current competition situation? Do they wish to retain their market share or are they happy to give up areas to private companies, keeping in mind that local authorities are only obliged to collect waste where private companies do not collect it.

***Relationship with domestic waste-collection permit holders:***

Questions on this topic will be directed towards the Director of Waste Services in the local authorities. Questions will include:

- i. What criteria are domestic waste-collection companies required to fulfil to be granted a permit from the local authority?
- ii. Are types of PBU charges suitable for use within the area specified in the permits?
- iii. Are the charges to the householders (i.e. charge per kg etc) specified in the permits?
- iv. Are the impacts of the charging system used by the company on low socioeconomic households taken into consideration when selecting permit holders?
- v. Do many waste companies vie for permits within the local authority's functional area?
- vi. Is it the case that any waste-management company that applies will be granted a permit providing they fulfil very basic criteria e.g. ability to collect and dispose of waste, no past offences listed against them? Or, are there enough waste-management companies looking for the permits that the local authority can be more selective?
- vii. What is the local authority's opinion on the possible introduction of an independent waste regulator?

***Financial implications of PBU for local authority:***

Questions on this topic will be directed towards the Head of Finance in the local authorities. The Heads of Finance will be asked for information on the:

- i. Cost of setting up system (new collection trucks in pay-by-weight systems, staff training, public education etc)
- ii. Cost of running system;
  - Cost of collecting waste
  - Added administration costs (in case of pay-by-weight extra expense involved in billing householders, in case of bag or tag based charges expenses required to 'track bag and tag sales, monitor bag and tag inventories, distribute bags and tags to area merchants, and collect bag and tag revenues' Bauer and Miranda (1996))

- Cost of collecting kerbside recycling
- Cost of CAS
- Also indirect costs such as prevention of illegal diversion activity possibly associated with PBU charges

- iii. Comparison of flat charge and PBU charges in terms of running cost to the local authority
- iv. Charge to public, how local authority developed a price per kg/bag (to cover running costs? Other reasons?)
- v. Does the local authority feel this charge is set at a correct level?

***History of waste charging and collection in Local Authority:***

Questions on this topic will be directed towards the Environmental Awareness Officers in the local authorities. Questions on the year PBU waste charging was implemented in the local authority, the PBU system used and the system of charging prior to PBU were asked in the extensive questionnaire. Questions relating to the history of waste charging and waste collection in the local authority in the intensive study will include:

- i. System of charging householders for domestic waste prior to PBU?
- ii. Cost of waste collection to householders prior to PBU?
- iii. Public reaction in local authority's functional area to waste charges prior to PBU?
- iv. Public reaction in local authority's functional area to the introduction of PBU domestic waste charges?
- v. Measures taken to ease the transition to PBU charges?

***General perspective on PBU charges in domestic waste management:***

Questions on this topic will be directed towards all interviewees. Questions will include:

- i. Do you feel that PBU domestic waste charges are the correct mechanism for reducing domestic waste to landfill? If not, what method would you suggest?
- ii. What success do you think PBU domestic waste charges will have in tackling Ireland's waste problem?
- iii. Do you feel that PBU domestic waste charges are being implemented correctly in the country?
- iv. Should waste-management legislation contain more requirements with regards to PBU charges? I.e. type of PBU system to be implemented by the collector
- v. Should waste permits for private waste-collection companies contain more requirements with regards to PBU charges? I.e. type of PBU system to be implemented by the collector.
- vi. What are your thoughts on the different systems of PBU charges; volume-based, tag-based and weight-based? What do you see as the pros and cons of each system?

## **Appendix 2 – Questions for Illegal Waste Diversion Interviewees**

### ***Questions for recycling centres:***

- i. Has the recycling centre experienced any illegal dumping on its grounds?
- ii. Has the recycling centre experienced much contamination of recycling bins?
- iii. If so, has this increased or decreased over time?
- iv. If the recycling centre was open prior to (year PBU was introduced), was there an increase in illegal dumping noted at this time?
- v. Have you had to take any measures to deter dumping/bin contamination?
- vi. If so, what measures were taken?

### ***Questions for charity shops:***

- i. Has the charity shop experienced donations unsuitable for resale?
- ii. Has the charity shop experienced any 'donations' of plain household waste?
- iii. If so, has this increased or decreased over time?
- iv. Why do you think it has increased/decreased?
- v. Have you seen any changes in the number of unsuitable donations since PBU was introduced?
- vi. Have you had to take any measures to deter unsuitable donations?
- vii. If so, what measures were taken?

### ***Questions for tidy towns' committees:***

- i. Has the tidy town organisation experienced bags of household waste illegally dumped in the town?
- ii. If so, has the dumping of bags of household waste increased or decreased over time?
- iii. What do you think has prompted this increase/decrease?
- iv. When PBU domestic waste charges were introduced did the tidy towns' organisation find any change in the amount of illegal dumping of household waste?

- v. Would you consider the illegal dumping of household waste a significant or minor problem in your town?
- vi. Does the tidy towns' organisation follow up any incidents of illegal dumping?
- vii. What measures have been taken in your town to tackle the illegal dumping of household waste?

### ***Questions for business associations:***

- i. Have local businesses reported experiencing any dumping of household waste in the business bins?
- ii. If so, has this increased or decreased over time?
- iii. Why do you think it has increased/decreased?
- iv. Have your members seen any changes in the number of incidents of dumping since PBU was introduced?
- v. Have your members had to take any measures to deter illegal diversion?
- vi. If so, what measures were taken?

### ***Questions for GAA clubs:***

- i. Have you experienced any dumping of household waste in the GAA bins or any dumping in the grounds?
- ii. If so, has this increased or decreased over time?
- iii. Why do you think it has increased/decreased?
- iv. Have you seen any changes in the number of incidents of dumping since PBU was introduced?
- v. Have you had to take any measures to deter dumping?
- vi. If so, what measures were taken?

### ***Questions for litter wardens:***

- i. Has illegal waste diversion in your area of operation increased or decreased over time?
- ii. Why do you think it has increased/decreased?
- iii. Have you seen any changes in the number of incidents of illegal diversion since PBU was introduced?

## **Appendix 3 – Questions for Private Waste Companies**

### ***Basic information about waste collection by (company name):***

- 1 Where does the company operate?
- 2 Does the company operate in more than one local authority?
- 3 How many houses does (company name) serve? Would the company be considered small, medium or large?
- 4 What system/systems of charging does (company name) use (i.e. tag, weight, bin size)?
- 5 What year did this system start?
- 6 Prior to this what system did (company name) use?

### ***General perspective on PBU charges in waste management:***

- 7 Does (company name) feel that PBU domestic waste charges are the correct mechanism for reducing domestic waste to landfill? If not, what method would (company name) suggest?
- 8 What success does (company name) think PBU domestic waste charges will have in tackling Ireland's waste problem?
- 9 Does (company name) feel that PBU domestic waste charges are being implemented correctly in the country?
- 10 Should waste permits contain more requirements with regards to PBU charges? i.e. type of PBU system to be implemented by the collector. Why/why not?
- 11 What are (company name) thoughts on the different systems of PBU charges; volume-based, tag-based and weight-based? What does the company see as the pros and cons of each system?

### ***Systems of charging for waste collection:***

- 12 Why did (company name) select the system of domestic waste charging in place in (names of areas they operate in)?
- 13 Did the company seek advice when selecting a system?
- 14 Did the company look at other companies or local authorities experiences when selecting a system?
- 15 If the company offers more than one system to householders, why did (company name) choose to offer numerous systems within their areas of operation?
- 16 How has the PBU ruling affected the charging structure used by (company name) since January 2005? How does the charging system used by the company differ since the requirement to use PBU?
- 17 If the PBU ruling has not affected the charging structure, why has it not?

### ***Charges issued to customers for waste collection:***

- 18 Why did (company name) choose the charges issued to householders (i.e. cent per kg/euro per tag)?

### ***Provision of kerbside recycling services:***

- 19 Does (company name) offer a kerbside recycling service to customers? Is this service offered to all customers?
- 20 Does (company name) charge householders for kerbside recycling?
- 21 When did the recycling service start? At this point in time was it available to all customers or only on certain routes?
- 22 Has the number of materials collected in the recyclables bin changed overtime?
- 23 Has the average amount of recyclables per household changed overtime?

***Experience of PBU:***

- 24 Did (company name) have any difficulty with implementing PBU charges?
- 25 Is (company name) satisfied with the impact of their PBU charges to date? If so, in what way is (company name) satisfied/dissatisfied?
- 26 Has the use of a PBU charge reduced waste to landfill by the households you serve?
- 27 What would have been the average kg/year collected from households prior to PBU, and what is the average kg/year currently?
- 28 Do you feel there has been a change in waste produced by householders overall, i.e. including both waste for landfill and waste for

***Local authority issues:***

- 29 Was the use of a PBU system part of the waste permit(s) issued by the local authority? If so, is this a recent permit requirement?
- 30 Was the use of a *specific type of PBU system* part of the waste permit(s) issued by the local authority? If so, is this a recent permit requirement?

- 31 Are charges issued to householders restricted in any way by local authority waste permits?
- 32 Was the provision of a kerbside recycling service part of the waste permit(s) issued by the local authority? If so, is this a recent permit requirement?
- 33 Does (company name) charge householders for kerbside recycling? If so/if not, was this a waste permit requirement?
- 34 Do waste permits dictate which recyclable materials (company name) collects from customers?
- 35 How would you summarise your relationship with the local authorities you operate within?

***Other:***

- 36 What does (company name) think of the possible establishment of an independent waste regulator?
- 37 What does (company name) think would be the pros and cons of the presence of an independent waste regulator?

### **Science, Technology, Research and Innovation for the Environment (STRIVE) 2007-2013**

The Science, Technology, Research and Innovation for the Environment (STRIVE) programme covers the period 2007 to 2013.

The programme comprises three key measures: Sustainable Development, Cleaner Production and Environmental Technologies, and A Healthy Environment; together with two supporting measures: EPA Environmental Research Centre (ERC) and Capacity & Capability Building. The seven principal thematic areas for the programme are Climate Change; Waste, Resource Management and Chemicals; Water Quality and the Aquatic Environment; Air Quality, Atmospheric Deposition and Noise; Impacts on Biodiversity; Soils and Land-use; and Socio-economic Considerations. In addition, other emerging issues will be addressed as the need arises.

The funding for the programme (approximately €100 million) comes from the Environmental Research Sub-Programme of the National Development Plan (NDP), the Inter-Departmental Committee for the Strategy for Science, Technology and Innovation (IDC-SSTI); and EPA core funding and co-funding by economic sectors.

The EPA has a statutory role to co-ordinate environmental research in Ireland and is organising and administering the STRIVE programme on behalf of the Department of the Environment, Heritage and Local Government.