National Waste Prevention Programme

National Waste Report 2006

ENVIRONMENTAL PROTECTION AGENCY
An Ghníomhaireacht um Chaomhnú Comhshaoil
PO Box 3000, Johnstown Castle, Co. Wexford, Ireland

Telephone: +353 53 916 0600 Fax: +353 53 916 0699
Email: info@epa.ie Website: www.epa.ie

LoCall 1890 33 55 99

National Waste Report 2006

Published by the Environmental Protection Agency, Ireland

Authors:

Odile Le Bolloch, Jennifer Cope, Brian Meaney and Isabelle Kurz

ISBN: 1-84095-262-8 01/08/500
Price: €20

TABLE OF CONTENTS

ACKNOWLEDGEMENTS

The cooperation of all respondents to EPA questionnaires and assistance with queries during the preparation of this report is gratefully acknowledged. We would particularly like to acknowledge the time and assistance provided by individuals in local authorities, recycling organisations and industrial enterprises. Much of the data reported here is based on reports from EPA-licensed facilities and we are indebted to our colleagues in the Office of Environmental Enforcement for their part in obtaining and verifying this information. The assistance of other EPA colleagues who helped in any way with the preparation of this report is also gratefully acknowledged.

Acknowledgement is also due to Enviros Consulting Limited, who worked on behalf of the EPA in the collection, compilation and validation of information from local authorities, recycling organisations and EPA-licensed facilities for 2006. The assistance of staff in a number of other organisations is also acknowledged, including Repak, WEEE Ireland, ERP and the Central Statistics Office.

LIST OF TERMS

Biodegradable municipal waste is waste that can undergo biological decomposition. It is typically composed of food and garden waste, wood, paper, cardboard and textiles.

Biostabilised organic waste results from the biological treatment of organic fines obtained from the mechanical treatment of residual municipal waste. It is a low-grade compost that has limited uses due to the potential for its contamination as a result of being sourced from a mixed waste stream.

Commercial waste is the waste that is produced from a number of diverse sources, including shops, offices and commercial premises, such as paper and cardboard, plastics, organics and glass etc.

Compost is produced from the biological treatment of source-separated food and garden waste from households and commercial premises.

Construction and demolition waste is all waste that arises from construction, renovation and demolition activities and all wastes mentioned in Chapter 17 of the European Waste Catalogue (EWC).

Hazardous waste is so classified because it displays properties that make it hazardous to human health or the environment.

Household waste is waste produced within the curtilage of a building or self-contained part of a building used for the purposes of living accommodation.

Industrial waste is that waste produced by industrial activity such as that of factories, mills and mines.

Inert waste is waste that does not undergo any significant physical, chemical or biological transformations. Inert waste will not dissolve, burn or otherwise physically or chemically react, biodegrade or adversely affect other matter with which it comes into contact in any way likely to give rise to environmental pollution or harm human health.

Kerbside collection is a common reference for the practice of collecting household or commercial waste directly from its source, often, though not necessarily, from the pavement or front door.

Mechanical Biological Treatment (MBT) plant combines mechanical processes to separate out recyclable materials (such as glass and metals), combustible materials and biodegradable materials, and biological biological processes to drive out moisture and biostabilise the organic-rich fraction of the mechanically treated waste. Combustible material can be used to produce refuse derived fuel (defined below).

Municipal waste comprises household waste as well as commercial, industrial and street cleansing waste which because of its nature and composition is similar to household waste.

Organic waste is food and garden waste.

Packaging is used to contain, protect and present goods. Virtually all packaging eventually becomes waste. Packaging is made from such materials as cardboard, paper, glass, plastic, steel, aluminium, wood, and composite materials such as those used in milk and juice cartons.

Refuse derived fuel (RDF) is produced from municipal waste through a number of different processes such as mechanical separation, blending and compressing to increase the fuel value of the waste. Refuse derived fuel is comprised of paper, plastic and other combustible wastes and can be combusted in an energy-from-waste plant or in an industrial furnace.

EXECUTIVE SUMMARY

The National Waste Report 2006 highlights several significant trends in waste generation and management in Ireland. It is clear from the data that the nature of waste management continues to change at a rapid pace. It is also clear that the recent and changing policy environment will drive further changes in how waste is managed. Continued momentum is required to promote the idea of waste as a potential resource. This has the potential to cause less material to be classified as waste on the one hand and for the emergence of a new model for the waste industry on the other in the marketing of resource recovery operations.

The quantity of waste being **recycled** continues to grow at a significant pace. In 2006, the quantity of municipal waste recycled increased by 18%, household waste by 14%, packaging waste by 8% and biodegradable waste by 26%. These results demonstrate that Ireland is increasingly adopting a recycling culture and that if householders and businesses are provided with the appropriate incentives and services, they will recycle. Overall **waste generation** increased in 2006 and this is best demonstrated by the large increase of 8% in the quantity of municipal waste disposed of to **landfill**. This illustrates where the implementation of waste policy should be prioritised: waste prevention (to reduce overall generation) and diversion from landfill.

Some 36% of **municipal waste** is now recycled and this exceeds for the first time the 2013 national target of 35% recycling. While the actual quantity of municipal waste recycled increased by 18%, the quantity landfilled increased by 8%. This means that the recovery rate for municipal waste only increased marginally from 34% in 2005 to 36% in 2006. It is clear that continuing strong increases in recycling and recovery remain overshadowed by increased waste generation and landfill.

In 2006, an additional 49,031 tonnes of **household waste** was recycled (an increase of 14%). However the amount of household waste going to landfill also increased, by 180,742 tonnes (15%), a reversal of the downward trend of recent years. Due to this large increase in the landfill disposal of household waste, the recycling rate for household waste is unchanged at 22%. It remains a significant challenge to achieve the national target of 50% diversion of household waste from landfill by 2013.

The quantity of **packaging waste** being recycled increased by 8% in 2006. Although impressive, this is the lowest annual increase in packaging recycling observed in many years and in all likelihood reflects the difficulty in having to continually seek new (and more expensive) sources of packaging waste. The continued good progress in recycling is however overshadowed by increased landfilling of packaging waste, and consequently the recycling rate decreased from 59% in 2005 to 57% in 2006. This is still well in excess of the 2005 target of 50% recycling and is expected to remain on track to achieve the next target of 60% recycling by 2011. It is recommended that Repak consider whether greater value for money can be obtained by working directly with its larger members (in the first instance) to reduce the use of packaging and its placing on the market. Reducing the use of packaging in the first place (particularly the more difficult to recycle packaging) will increase the packaging recycling rate even with no new recycling. It also has the potential to be cheaper in the short term than finding new sources of packaging waste to recycle.

The collection of 7.4kg of household **waste electrical and electronic equipment** per capita in 2006 substantially exceeded the 4kg collection target imposed in the EU Directive on waste electrical and electronic equipment.

Waste recycling infrastructure is improving. The recycling of waste in Ireland (other than organic waste), as opposed to export, increased by 40% in 2006 and proportionally less waste was exported for recycling in 2006

than in 2005. More wood, glass and waste electrical and electronic equipment was recycled in Ireland in 2006 than 2005. The use of local bring banks and civic amenity sites is increasing rapidly. All domestic waste collection services consist of a minimum of a two-bin collection system – i.e. for mixed residual waste and mixed dry recyclables. However, with regard to household organic (food and garden) waste collection, relatively few households have access to separate collection services, and those services that do exist are mainly operated by local authorities. It is suspected that lack of economic return is keeping the private sector out of this business area and the recent decreases in landfill gate fees combined with the lack of a ban on the landfilling of biodegradable waste may be a contributing factor to this situation.

The landfilling of **biodegradable municipal waste** increased by 9% in 2006 to 1,412,581 tonnes. Full implementation of the National Strategy for Biodegradable Waste is now increasingly urgent, given that the first target year is 2010 and the landfilling of biodegradable municipal waste must be reduced by over 450,000 tonnes by 2010. The Comptroller and Auditor General noted in his annual report for 2005 that "there is a significant risk that Ireland will fail to meet the targets set down in the Landfill Directive." He also highlighted the "possibility of EU financial penalties arising from any such failure." It is clear from the data that there is a growing risk that Ireland will not meet its first diversion-from-landfill target for biodegradable waste in 2010. It is of the greatest urgency therefore that implementation of the Strategy be comprehensively addressed at all levels and led at the national level by the Department of the Environment, Heritage and Local Government. The implementation steering group proposed in the Strategy should be put in place without further delay. The steering group should quickly ascertain the Strategy's implementation progress to date, in terms of infrastructural and service developments, and set strategic priorities for immediate attention at national and local level during 2008 and beyond. It should be noted that incineration is identified in the Strategy as a means of diverting biodegradable waste from landfill.

With increasing waste generation, and in particular increased quantities going to landfill, **new policy intervention** is recommended to divert waste, and biodegradable waste in particular, from landfill in the short term. Several tools are available that could yield early results, i.e. within one to two years. It is proposed that the landfill levy be examined with a view to making landfill more expensive. This would be expected to make economically marginal recycling activities more attractive to waste operators. It is also proposed that immediate consideration be given to imposing a national ban on the landfilling of untreated waste. Other options for diverting waste from landfill are presented in a discussion paper to be published by the EPA entitled *Hitting the Targets for Biodegradable Municipal Waste: Ten Options for Change*.

Construction and demolition waste generation increased by 13% in 2006 to an all-time high of almost 17 million tonnes, including almost 3 million tonnes of waste other than soil and stones. The data on this huge and important waste stream is poor however and reported recycling rates are down on previous years, particularly in relation to the non-soil and stones category of construction and demolition waste. New impetus is required if the construction industry is to demonstrate its progress towards the targets and objectives set out in national policy and in the industry's own voluntary initiative for the improved management of waste. The capacity of the National Construction and Demolition Waste Council to make rapid progress towards these objectives should be reviewed.

Hazardous waste generation decreased between 2004 and 2006, although a 10% increase is noted since 2001. Hazardous waste generation is dominated by industry, and in particular by the chemical and pharmaceutical sector. A Proposed National Hazardous Waste Management Plan was published by the EPA for public consultation in November 2007 and sets out a framework for a revitalised approach to hazardous waste prevention, collection and management.

In 2006, 29 **landfills** accepted municipal waste for disposal, a net reduction of three since 2005. Many of these landfills are new and have sufficient capacity to operate for many years to come. However, it may be that this new capacity is driving gate fees down and, as mentioned above, an increase in the landfill levy, allied with other policy interventions, may be appropriate to ensure that relatively low gate fees do not undermine the ongoing progress in recycling. No facilities for the incineration of municipal waste have been constructed despite there being two proposed facilities licensed to operate. Mechanical treatment of residual waste (the "M" in MBT – mechanical biological treatment) is on the increase. The subsequent biological treatment stage (the "B" in MBT) is not commonly used, and it may be that the economics of biostabilising organic fines from the mechanical treatment of residual waste are undermined by relatively low landfill gate fees, the lack of a ban on the acceptance of these untreated organic fines into landfill and the lack of outlets for biostabilised organic fines.

In conclusion, there is very good progress to report on the recycling front. However, significant problems remain on the waste disposal front. Urgent action is required in 2008 on diverting waste from landfill and on preventing further increases in gross waste generation. It is important that the recently commenced international review of waste management policy does not delay the implementation of non-contentious but essential economic, regulatory and policy instruments in this area.

1 INTRODUCTION

This National Waste Report 2006 is the latest in a series of reports that commenced in 1995 and, since 2001, is now published annually. Considerable changes are taking place in the way waste is managed in Ireland, and many of these changes are reflected in this report. Considerable changes are also evident with regard to policy and public attitudes to waste, including the continued implementation of the National Waste Prevention Programme (this Report is a project output within the Programme).

The scope of this National Waste Report is waste generation and management in the Republic of Ireland. The key waste streams covered are municipal waste (with a focus on household waste), packaging waste, biodegradable municipal waste, industrial waste, hazardous waste and construction and demolition waste. A chapter on major infrastructure is also presented. Agricultural organic waste (manure, soiled water etc.) is not covered by this report due to the lack of available updated figures for this sector.

Several data sources are used to collate the information presented in this National Waste Report, including:

- local authorities;
- licensed landfill operators;
- recycling organisations and general waste facility operators;
- hazardous waste treatment facilities.

The source of all data is indicated in the report. The co-operation of all respondent organisations is acknowledged and this report could not be produced without their providing good data.

The major findings of this National Waste Report include both positive and negative trends. The positive trend is that municipal waste recycling continues to grow at a significant pace. In 2006, the quantity of municipal waste recycled increased by 18%, household waste by 14%, packaging waste by 8% and biodegradable waste by 26%.

The negative trend is that the quantity of municipal waste disposed of to landfill increased by 8% in 2006. Landfill increased by 0.8% in 2005 after a two-year decline in 2003 and 2004. Therefore the increase in 2006 is a disappointing out-turn for the year. As the landfilling of waste had appeared to be levelling off, this sudden increase raises concern. Increased waste generation (which is closely coupled with increases in gross domestic product and personal consumption), poor segregation of waste and reduced landfill gate fees may be contributing to the increase in municipal waste disposed to landfill. This Report makes several recommendations for immediate actions that should be considered in order to quickly reverse the overall emerging trend of increasing landfill. With more and more waste now passing through transfer stations and processing facilities, there is some concern about the accuracy of the waste industry classification of municipal waste. The Environmental Protection Agency will carry out further research into this issue in 2008 to ensure that waste facility operators are classifying waste correctly and consistently.

The National Waste Report is critically dependent on good statistical data being available from the waste industry, including local authorities. Though data availability and quality is improving in many sectors, there remain serious deficiencies in others. The EPA has continued to take proactive steps to engage with and train local authorities and the wider waste industry to streamline and improve the data collection process. While local authorities have engaged positively in this regard, the EPA would encourage increased participation by the waste industry in these training sessions. The EPA actively engages with the Irish Waste Management

Association, which has provided constructive feedback on its members' views regarding the maintenance and reporting of data.

The EPA has also identified, through cross checking data and data audits, that record keeping of waste data can be quite poor. Waste organisations and local authorities can provide different versions of the same data and this points to the need for more rigorous information management systems across the industry. The EPA is committed to raising the standard of waste record keeping and further initiatives in this regard are planned for 2008.

The annual preparation of the National Waste Report is a time-limited exercise. Considerable efforts are expended on collating, verifying and analysing an entire year's data in a 12-month period such that National Waste Reports are no more than one year in arrears. Where additional or improved datasets become available after publication of Reports, recalculated data is published (for example with packaging and biodegradable municipal waste data).

The scope of the report continues to grow. In this report, for the first time, a new chapter on waste electrical and electronic equipment is presented, based on preliminary data for the management of WEEE in 2006. New sections on end-of-life vehicles and tyres will be introduced in the next report following the introduction of producer responsibility obligations for these waste streams. Transposition of the batteries directive[1] will also introduce a new waste stream to which particular attention must be paid.

Feedback on the data presented in this report and on the process of gathering it is welcome and correspondence can be addressed to the Core Prevention Team in the EPA, responsible for leading the National Waste Prevention Programme.

[1] Council Directive 2006/66/EC on batteries and accumulators.

2 THE NATIONAL WASTE PROFILE

In 2006, the total estimated generation of waste in Ireland, excluding agricultural waste, was 30,704,149 tonnes, an increase of 23% since 2004 (Table 1). In relation to agricultural waste, no updated figures were available for inclusion in this report. However, the classification of animal manures and effluent as waste was the subject of a ruling[2] by the European Court of Justice in 2006. If livestock effluent is used as soil fertiliser on clearly identified parcels of land and if its storage is limited to the needs of those spreading operations, then it can be classed as a by-product. The burden to prove a residue as non-waste falls to the producer and requires evidence of compliance with nutrient management plans and codes of practice for landspreading of organic waste.

The construction and demolition sector is the predominant waste generator followed by the mining and quarrying sector. Municipal waste accounts for 11% of total waste generated and hazardous waste accounts for 1%.

Construction and demolition waste now accounts for over half of all waste generated, up from 45% in 2004. As reported in chapter 7, there are deficiencies in the availability and quality of data available from the construction industry and the waste industry serving it. The generation of manufacturing waste decreased and now contributes just over 12% of all waste, compared to 20% in 2004. A large increase in the generation of end-of-life vehicles and scrap metal waste is reported as being largely due to an increase in market value for scrap metal.

Table 1 Total waste generation in 2006

Waste category	2006	
	Tonnes	%
Construction and demolition waste	16,819,904	54.8
Mining and quarrying waste	4,782,614	15.6
Manufacturing waste	3,818,711	12.4
Municipal waste	3,384,606	11.0
End-of-life vehicles and scrap metal[3]	744,136	2.4
Contaminated soil	406,904	1.3
Energy, gas and water supply waste	333,341	1.1
Hazardous waste	314,072	1.0
Urban wastewater sludges	59,827	0.2
Drinking water sludges (wet weight)[4]	30,047	0.1
Drinking water sludges (dry solids)[4]	9,987	0.0
Dredge spoils[5]	0	0.0
Total	**30,704,149**	**100.0**

[2] Commission of the European Communities v Kingdom of Spain 8 September 2005 (C-121/03) and Commission of the European Communities v Kingdom of Spain 8 September 2005 (C-416/02), available at www.curia.eu.int.
[3] Excludes municipal metals as these are already counted in the municipal waste stream.
[4] The quality of this dataset is poor. In 2006, eight local authorities did not report on drinking water sludges generated in their functional areas. Some local authorities reported drinking water sludge as wet weight and others as dry solids. This figure represents the best estimate available.
[5] Dredging was not carried out in 2006 at EPA-licensed operations.

3 MUNICIPAL WASTE

3.1 Generation of municipal waste

It is estimated that a total of 3,384,606 tonnes of municipal waste was generated in Ireland in 2006, an increase of 11% compared to 2005 (see Table 2 and Figure 1). In the same period, personal consumption of goods and services increased by 6%, gross domestic product (GDP) increased by 6% and there was a 2.6% increase in population[6]. In the most recent EU-wide assessment, the European Environment Agency[7] found that economic growth has proven a strong factor for waste generation and is outweighing any good results from waste prevention initiatives. Municipal waste generation in most European countries is growing and the increase is related to an increase in household consumption and higher replacement rates for many products. Figure 2 shows that since 2002 the rate of increase in municipal waste generation is closely coupled with GDP and personal consumption, while it is less closely linked to population growth.

Table 2 Municipal waste generation, 2002 to 2006

	2002 (tonnes)	2003 (tonnes)	2004 (tonnes)	2005 (tonnes)	2006 (tonnes)
Household waste[8]	1,679,068	1,704,844	1,728,154	1,746,408	[9]1,978,716
Commercial waste	975,744	1,141,264	1,202,824	1,235,629	1,327,068
Street cleansing waste	65,573	71,779	69,661	58,677	78,822
Total municipal waste	**2,720,385**	**2,917,886**	**3,000,638**	**3,040,714**	**3,384,606**
% change		7.3	2.8	1.3	11.3

(Source: landfill annual environmental reports; recycling organisations survey; local authorities)

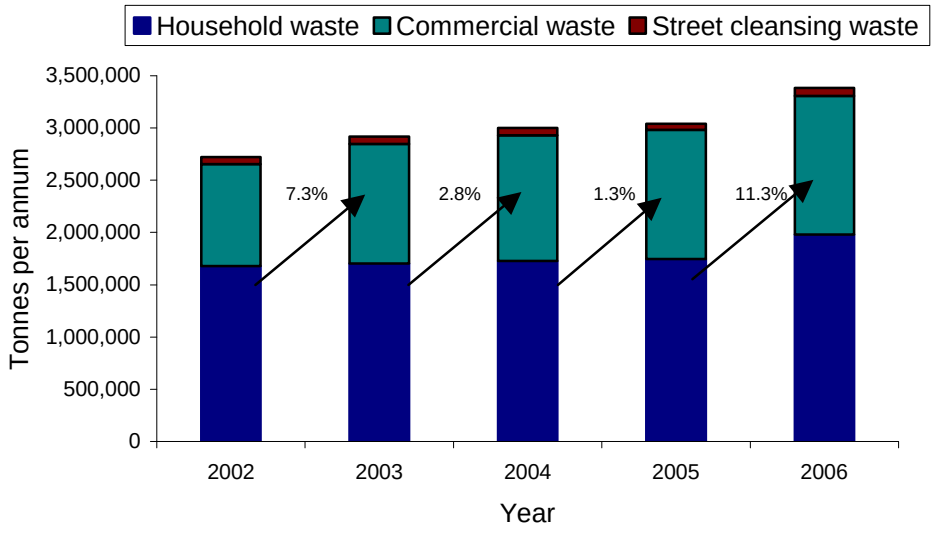

Figure 1 Trends in municipal waste generation 2002 to 2006

[6] CSO: Statistical Yearbook of Ireland, 2007
[7] Europe's Environment: The Fourth Assessment. European Environment Agency, Copenhagen, 2007. www.eea.eu.int.
[8] Includes an estimate of uncollected household waste, see page 15.
[9] Includes an estimate of 205,474 tonnes of uncollected household waste, see section 3.3 Household Waste.

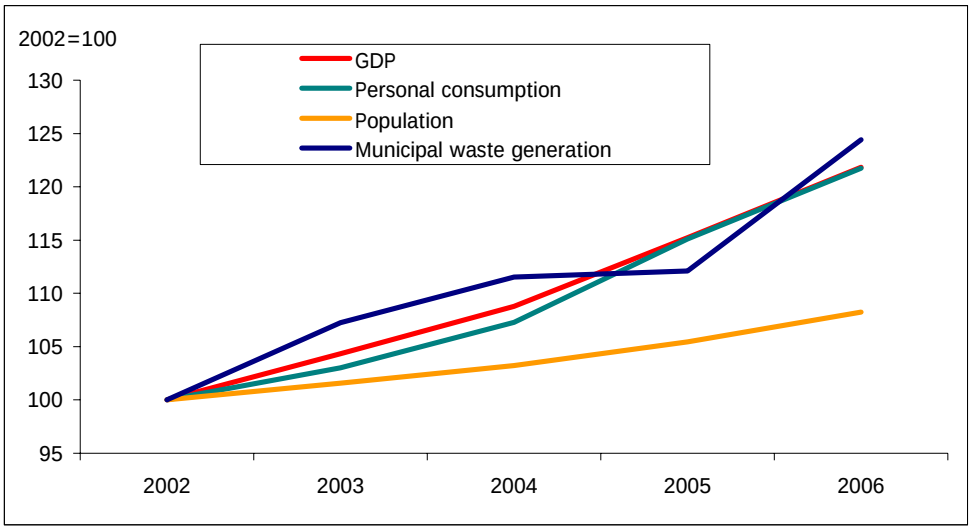

Figure 2 Municipal waste generation is closely linked to GDP and personal consumption

It should also be noted that landfill gate fees decreased in 2006, and this may have represented a driver in some regions towards increased landfilling, in preference to recycling. As the management of waste is a commercial activity for the most part, marginally profitable recycling routes may be displaced by landfill as gate fees decline. There is also anecdotal evidence of municipal waste being poorly classified, potentially leading to its being over-reported at landfill. Consistent classification of municipal waste by the waste industry is essential.

3.2 Management of municipal waste

The municipal waste dataset is based on actual quantities of waste reported by recycling organisations and licensed landfills as having been recycled or disposed of. Disposal and recovery rates are expressed as a percentage of total municipal waste actually managed, i.e. municipal waste recovered plus municipal waste landfilled. The quantity of municipal waste recovered is calculated through direct reporting from recycling organisations. The landfilling of municipal waste is reported by licensed landfill operators. In 2006, 53 site visits were carried out at recycling and waste treatment facilities to verify waste data.

Disposal and recovery rates for the various materials in the municipal waste stream are shown in Table 3. The quantity of municipal waste recovered increased by 18% (not including waste electrical and electronic equipment) in 2006. However, the reported landfill of municipal waste increased by 8% in the same period. This means that the recovery rate for municipal waste only increased marginally from 34% in 2005 to 36% in 2006. Although this recovery rate exceeds the national target of 35% recycling by 2013, it is clear that continuing strong increases in recycling and recovery remain overshadowed by increased waste generation and landfill (see Figure 3). This illustrates where the implementation of waste policy should be prioritised: waste prevention and diversion from landfill.

Table 3 Disposal and recovery of municipal waste, 2006

Material	Quantity managed (tonnes)	Quantity landfilled (tonnes)	National landfill rate (%)	Quantity recovered (tonnes)	National recovery rate (%)
Wood	219,317	15,480	7.1	203,837	92.9
Glass	164,181	59,873	36.5	104,308	63.5
Ferrous	65,285	26,697	40.9	38,588	59.1
Paper and cardboard	1,063,841	475,285	44.7	588,556	55.3
Aluminium	36,020	22,707	63.0	13,313	37.0
Plastic	327,141	263,615	80.6	63,526	19.4
Other metals	15,365	12,896	83.9	2,469	16.1
Organics	779,015	723,671	92.9	55,345	7.1
Textiles	176,474	166,623	94.4	9,851	5.6
Other[10]	253,672	213,773	84.3	39,899	15.7
Total	**3,100,310**	**1,980,618**	**63.9**	**[11]1,119,692**	**36.1**

(Source: recycling organisations survey, local authority survey, landfill annual environmental reports and EPA municipal waste composition survey)

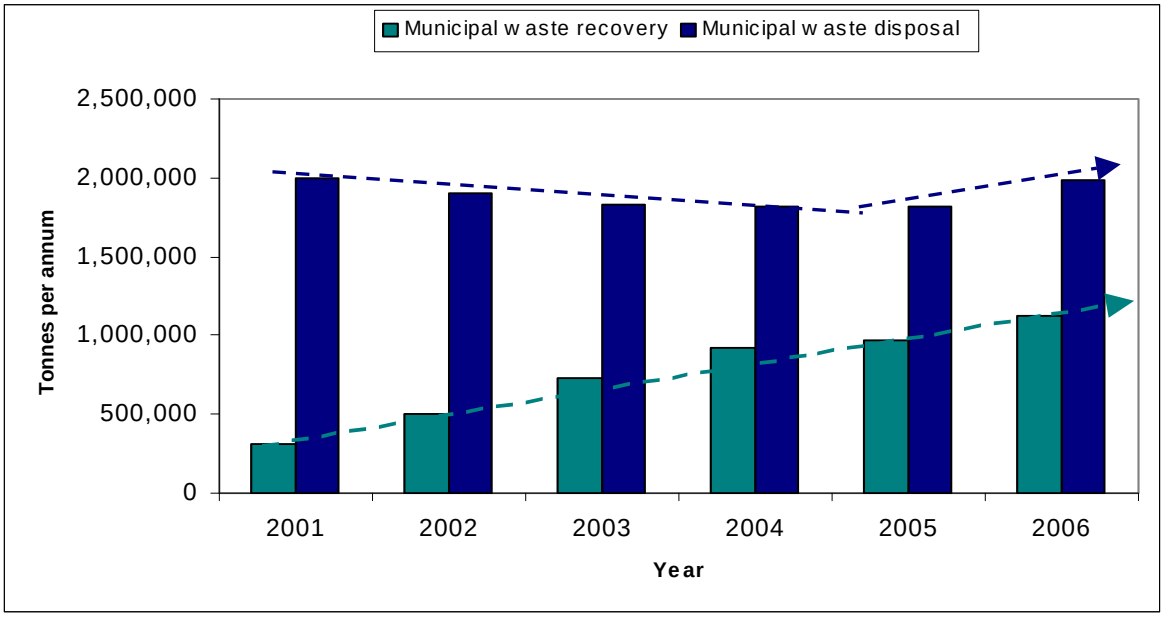

Figure 3 Trends in recovery and disposal of municipal waste

The recycling of waste in Ireland (as opposed to export) more than doubled in 2006. However, there remains a strong reliance on material recycling facilities abroad. As shown in Table 4, 530,590 tonnes of waste was recycled in Ireland, representing 25% of all waste recycling in 2006. A large increase in the recycling of glass into aggregate (a construction material) in Ireland in 2006 is noted, due principally to activities at one facility.

[10] Small batteries, cooking oil, composites and refused derived fuel. In previous years the 'other' category included tyres and lead acid batteries. However as these cannot be categorised as municipal waste they have been excluded in the 2006 figures.

[11] Waste electrical and electronic equipment (WEEE) has not been included in the municipal waste tables in 2006 due to the changes in its management. If WEEE is excluded from the 2005 figures, a recalculated 924,027 tonnes of municipal waste was recovered, resulting in a calculated increase of 21% in municipal waste recovery.

The majority of organic waste recycling takes place in Ireland, mainly at composting facilities[12]. In 2007, a *Market Development Programme for Waste Resources 2007–2011*[13] was published with a view to commencing the work of the Market Development Group. This group was originally established in 2004 in response to the growing rate of waste collected and exported for recycling. The published Programme should now be implemented without further delay by appointing staff and resources. There is an urgent need to drive forward the development of existing markets for recyclables and identify new applications and markets for recyclables in Ireland.

Table 4 Waste recycled in Ireland in 2005 and 2006, including municipal waste (not including imports)

Material	2005		2006	
	Tonnes recycled in Ireland	% recycled in Ireland (compared to total recycling of each material)	Tonnes recycled in Ireland	% recycled in Ireland (compared to total recycling of each material)
Wood	182,495	91.3	[14]230,592	92.9
Aluminium	3,530	32.2	3,761	13.8
Other Metals	3,730	16.5	3,470	13.7
Textiles	1,660	14.9	3,106	31.5
Plastic	7,828	13.3	8,409	12.3
Glass	3,736	3.9	13,492	12.6
Paper and Cardboard	[15]2,354	0.5	4,324	0.7
Ferrous Metals	3,260	0.7	1,713	0.2
Organic Waste[16]			214,484	100.0
Other[17]	16,755	50.9	47,239	74.1
Total	**225,360**	**16.4**	**530,590**	**25.0**

(Source: recycling organisations survey)

Table 5 shows that 75% of recyclable waste was exported in 2006. Some waste materials, mainly lead (from construction and demolition) and plastic, were imported into Ireland for reprocessing.

Table 6 shows the quantities of waste exported from and imported into Ireland in 2006, broken down into packaging and non-packaging streams.

Table 7 shows that the United Kingdom is the principal destination for recyclable waste. A total of 584,232 tonnes of paper was exported in 2006 for reprocessing, predominantly to the UK (37%) and to Asia (25%). A total of 789,564 tonnes of metals was exported in 2006, mainly to Spain and Portugal (47%) and to the UK (27%). Refuse derived fuel (RDF) was exported to Scandinavia and the UK in 2006. Refuse derived fuel is produced from municipal waste through a number of different processes such as mechanical separation,

[12] See Chapter 4 on biodegradable waste for further information.
[13] Market Development Programme for Waste Resources 2007–2011, available from www.environ.ie and www.envirocentre.ie
[14] Includes 83,793 tonnes reported to be used as fuel.
[15] This was reported in National Waste Report 2005 as 11,690 tonnes. During the analysis phase of the 2006 data it came to light that 9,336 tonnes of paper and cardboard waste previously reported as recovered in Ireland was misreported and so has been excluded.
[16] Compost facilities were not surveyed as part of the National Waste Report 2005. The EPA factsheet on Compost facilities estimated that 82,693 tonnes of green waste and household organic waste was composted in 2005, www.epa.ie.
[17] Waste oil, cooking oil and tyres.

blending and compressing. It can be burned in incinerators, coal power plants and cement kilns to generate energy.

Table 5 Waste recycled abroad, including municipal waste, 2005 and 2006

Material	2005		2006	
	Tonnes recycled abroad	% recycled abroad (compared to total recycling of each material)	Tonnes recycled abroad	% recycled abroad (compared to total recycling of each material)
Ferrous Metals	485,448	99.3	744,133	99.8
Paper and Cardboard	429,616	97.4	584,232	99.3
Glass	92,961	96.1	93,467	87.4
Plastic	50,859	86.7	59,834	87.7
Textiles	9,503	85.1	6,745	68.5
Other Metals	18,893	83.5	21,926	86.3
Aluminium	7,446	67.8	23,504	86.2
Wood	17,492	8.7	17,587	7.1
Organic Waste			10	0.0
WEEE[18]	16,162	99.9		
Refuse Derived Fuel[19]			27,883	100.0
Other[20]	[21]25,426	49.1	16,472	25.9
Total	**1,150,108**	**83.1**	**1,595,793**	**75.0**

(Source: recycling organisations survey)

Table 6 Export and import waste, 2006, including municipal waste

Material exported or imported for recovery	Export of segregated waste (tonnes)			Import of segregated waste (tonnes)		
	Total	Packaging waste	Non-packaging waste	Total	Packaging waste	Non-packaging waste
Ferrous Metals	744,133	25,681	718,451	2,553		2,553
Paper and Cardboard	584,232	295,618	288,614			
Glass	93,467	83,062	10,404			
Plastic	59,835	49,667	10,168	50,123	50,123	
Other Metals	21,926		21,926	20,636		20,636
Wood	17,587	11,726	5,861	592	72	520
Textiles	6,745		6,745			
Aluminium	23,504	4,226	19,278			
Refuse Derived Fuel[19]	27,883		27,883			
Other[20]	16,472	1,309	15,163			
Total	**1,595,793**	**471,290**	**1,124,503**	**73,904**	**50,195**	**23,709**

(Source: recycling organisations survey)

[18] See Chapter 6 on WEEE.
[19] Used as fuel
[20] Batteries, composites, waste oil, cooking oil, oil filters, tyres.
[21] During the analysis phase of the 2006 data it came to light that 9,264 tonnes of mixed packaging waste previously reported as recovered was in fact disposed. See chapter 5 on packaging for further details.

Table 7 Destination of recyclable waste streams, including municipal waste, exported in 2006

(all units in tonnes)

Tonnes	Paper & Paperboard	Glass	Plastic	Metals	Wood	Composites	Textiles	Batteries	Edible oils & fats	Other[22]	RDF[23]	TOTAL
UK	217,092	91,678	33,561	209,838	17,587	879	6,199	5,263	5,487	664	1,447	**589,695**
Spain/Portugal	20,568			371,662								**392,230**
Asia	148,726		4,761									**153,487**
Holland	84,890		1,374	1,460		79			986	21		**88,809**
China	54,508		17,451	236						8		**72,203**
Scandinavia						150					26,436	**26,586**
France	8,113		824									**8,936**
Belgium	3,599		1	422				1,759		138		**5,920**
Germany		1,789	184	595				115		129		**2,812**
Dubai	1,649											**1,649**
Africa							480					**480**
Unspecified	45,086		1,679	205,351		202	66			603		**252,986**
Total	**584,232**	**93,467**	**59,834**	**789,564**	**17,587**	**1,310**	**6,745**	**7,137**	**6,473**	**1,562**	**27,883**	**[24]1,595,793**

Recyclable waste is increasingly sought after as an economic resource or commodity. Clean segregated recyclable material is traded freely under EU law. It is apparent that a certain proportion of Irish recyclable waste exported to other EU countries is bulked before shipping onwards to countries within and outside the EU. According to the European Environment Agency[25] (EEA), increasing demand from Asian markets has had a stimulating effect on recycling, causing increases in world market prices for waste paper, cardboard, plastic and scrap metal. Additionally the EEA notes that European exports of waste paper and cardboard to Asia (especially to China) have almost doubled between 2000 and 2004. The amount of Irish recyclable waste exported to Asia has been increasing steadily since 2004. In 2006, almost 35% of waste paper and card exported for recycling was exported directly to Asia (including China).

[22] Oil filters, waste oil, tyres and organic waste.
[23] Refuse derived fuel, recovered as fuel.
[24] Includes recyclable waste from non-municipal sources.
[25] Europe's Environment: The Fourth Assessment. European Environment Agency, Copenhagen, 2007, www.eea.eu.int.

3.3 Household Waste

Household waste is a component part of municipal waste (Table 2). Table 8 shows that the total amount of household waste managed by local authorities and the waste industry increased by 33% since 2001. The amount of household waste recovered has increased four-fold since 2001, reflecting changes in legislation, policy and the improvement in infrastructure and waste management facilities. Figure 4 shows that the rate of increase in the quantity of household waste managed is closely linked to GDP and personal consumption of goods and services.

Table 8 Trends in household waste management

(all units in tonnes)

	2001	2002	2003	2004	2005[26]	2006
Quantity landfilled	1,254,857	1,294,061	1,231,109	1,214,908	1,198,504	1,379,246
Quantity recovered	74,887	132,602	185,753	285,872	344,964	393,995
Total	**1,329,744**	**1,426,662**	**1,416,862**	**1,500,780**	**1,543,468**	**1,773,242**

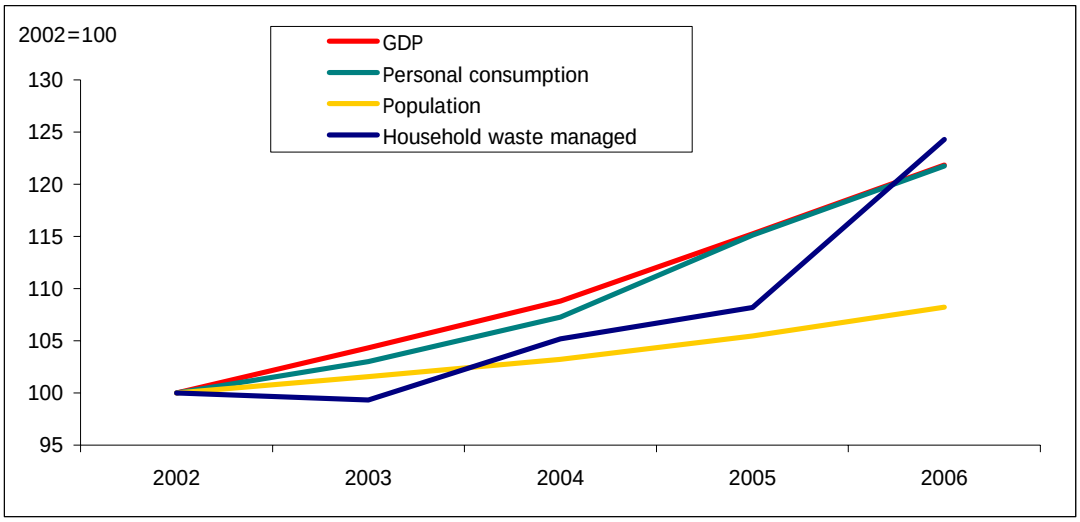

Figure 4 Household waste managed is closely linked to GDP and personal consumption

The recovery of household waste continues to increase. In 2006, an additional 49,031 tonnes (an increase of 14%) of household waste was recovered. However the amount of household waste going to landfill also increased, by 180,742 tonnes (15%), a reversal of the downward trend of recent years. An estimated 22% of household waste was recycled in 2006, as shown in Table 9. It remains a significant challenge to achieve the national target of 50% diversion of household waste from landfill by 2013[27]. This challenge will remain particularly difficult in the face of the recent decline in landfill gate fees and the issue of biodegradable and untreated waste in landfills.

[26] See Appendix F – Revision to tables from National Waste Report 2005
[27] Waste Management: Changing our Ways, 1998, Department of the Environment, Heritage and Local Government.

Table 9 Disposal and recovery rates in the household waste stream, 2006

Material	Quantity managed (tonnes)	Quantity landfilled (tonnes)	National landfill rate (%)	Quantity recovered (tonnes)	National recovery rate (%)
Glass	136,908	51,032	37.3	85,876	62.7
Wood	26,882	12,413	46.2	14,469	53.8
Paper and cardboard	450,772	264,815	58.7	185,956	41.3
Ferrous	27,124	20,689	76.3	6,435	23.7
Aluminium	24,699	19,309	78.2	5,390	21.8
Plastic	222,499	190,336	85.5	32,163	14.5
Organics	538,592	499,287	92.7	39,305	7.3
Textiles	161,078	151,717	94.2	9,361	5.8
Other metals	5,711	5,517	96.6	[28]194	3.4
Other[29]	178,977	164,130	91.7	14,847	8.3
Total	**1,773,242**	**1,379,246**	**77.8**	**[30]393,995**	**22.2**

(Source: recycling organisations survey, local authority survey, landfill annual environmental reports and EPA municipal waste composition survey)

3.3.1 Local authorities and household waste

A total of 1,398,796 tonnes of household waste was reported by local authorities as having been collected in 2006. A summary of information on household waste collection, as reported by local authorities, is shown in Appendix B. This is based on information compiled by local authorities based on annual reports from in-house collection services and private sector waste collection permit holders. It also includes estimates of home composting and uncollected household waste. The amount of waste collected at civic amenity sites and bring banks increased by 52% in 2006 (288,126 tonnes of household waste). Based on sales of compost bins, local authorities estimated that 28,810 tonnes of household waste was composted at home. An estimated 205,474 tonnes of uncollected household waste was generated. Thus the total amount of household waste generated according to local authorities' data is 1,672,313 tonnes. It is interesting to note that the mode of household waste collection appears to be changing. It is observed in many local authority areas that less waste is being collected at kerbside and more is being deposited at civic amenity sites and bring banks (see Appendix B).

As in previous years there are variances between EPA-compiled waste management data (based on the treatment of waste) and the local authority collection data (based on the collection of waste). Every year the EPA seeks to reconcile different sources by auditing respondents' data and comparing sources where more than one exist. The EPA audited six local authorities (Galway City Council and Galway, Fingal, Mayo, South Tipperary and Monaghan County Councils) in relation to the data submitted on the reported collection of the following waste streams: household waste kerbside collection, household waste deposited at bring banks and civic amenity sites, construction and demolition waste collected and recovered. The audits involved checking how data provided by collection permit holders are managed, processed and verified by the local authorities. Despite a lack of centralised filing systems in some cases, the data management systems in operation were

[28] 'Other metals' collected at civic amenity sites has not been counted as this was bulky waste and other waste made from metal which would not be typical of the household waste stream.
[29] Composites, cooking oil, small batteries and refuse derived fuel. In previous years the 'other' category included tyres and lead acid batteries. However these cannot be categorised as household waste and have been excluded in the 2006 figures.
[30] Waste electrical and electronic equipment (WEEE) has not been included in the municipal waste tables in 2006 due to the changes in its management. If you exclude WEEE from the 2005 figures 333,843 tonnes of household waste was recovered.

generally of good quality. Of some concern however is that local authorities did not in general audit or otherwise verify the 2006 dataset as provided by private sector collectors of household waste despite having been advised to do so by the EPA. There is anecdotal evidence that household waste collectors are reluctant to report household waste data to local authorities, who are their competitors in many areas. These factors reduce the confidence that the EPA can have in the data provided by local authorities.

In response to some of the issues highlighted during audits and through feedback from local authorities, the EPA will continue to endeavour to build capacity in local authorities and their waste data respondents. The EPA's annual survey of local authorities now focuses on a smaller number of waste streams, mainly on household waste collection, putting local authorities in a better position to generate a verified and audited dataset.

To ensure consistency and accuracy of the data, the EPA provided training and guidance to local authorities in compiling the annual waste survey responses for 2006. The training and guidance sets out best practice for waste data management, from the collection of raw data through to reporting to the EPA. The training has been well attended by local authorities and feedback has been positive. It is planned to provide this training on an annual basis and to update guidance as required.

3.3.2 Household waste collection

Waste collection practices differ from local authority to local authority and also within many local authority areas. Table 10 shows that in seventeen local authority areas, household waste collection services were provided wholly by the private sector in 2006, compared to 15 in 2005. Seventeen local authorities provided kerbside collection services in 2006 compared to nineteen in 2005. In 2006, 47% of household waste was collected by the private sector. The amount of waste collected at kerbside decreased by 3% in 2006. Most householders with a waste collection service are now provided with separate kerbside collection for dry recyclables and, in relatively few areas, household organic waste. The collection of mixed dry recyclables increased by 7%. It would appear that where separate collections are provided, householders will use them.

3.3.3 Civic amenity and bring bank collection facilities

The use of civic amenity sites increased by 84% in 2006; a total of 191,399 tonnes of household waste was deposited. Waste collection at bring banks rose by 14%, to a total of 96,727 tonnes in 2006. Despite the availability of separate kerbside collection services for recyclables, civic amenity sites and bring banks are increasingly important for the collection of household waste. Not all waste collected at civic amenity sites is recycled - for example 57,486 tonnes of mixed residual waste was deposited for disposal – and householders appear to be using the civic amenity sites and bring banks as another outlet for their waste. This is not surprising in the sense that householders in many parts of the country have no other option. Bring banks and civic amenity sites remain essential facilities for the collection of waste not generally accepted in kerbside collection services, for example, glass, wood, garden waste, waste electrical and electronic equipment (WEEE), batteries and household hazardous waste such as chemicals, paints and weed killers. Significant recommendations are made in relation to hazardous waste collection at civic amenity sites in the recently published Proposed National Hazardous Waste Management Plan (EPA 2007). The type and quantity of waste collected at these sites are listed in Appendix C and Appendix D.

Table 11 shows the trends on waste acceptance at bring banks and civic amenity sites from 2002 to 2006. Table 12 indicates the number of bring banks and civic amenity sites operational in each local authority area in 2006. The number of bring banks decreased in some local authority areas such as Cork County, Kildare and South Dublin. Bring banks were removed as they were proving problematic for a number of reasons such as illegal dumping, public complaints and antisocial behaviour.

Table 10 Public and privately operated kerbside collection schemes, 2006

Local authority	Mixed residual waste collection by local authority (tonnes)	Mixed residual waste collection by private operators (tonnes)	Separate waste collection by local authority (tonnes)	Separate waste collection by private operators (tonnes)
Carlow County Council	0	12,764	0	973
Cavan County Council	2,675	10,981	0	1,695
Clare County Council	0	21,433	0	4,757
Cork City Council	32,870	2,056	7,006	736
Cork County Council	20,428	26,472	5,921	9,530
Donegal County Council	0	19,995	0	2,657
Dublin City Council	148,317	4,731	22,909	137
Dun Laoghaire-Rathdown	32,105	3,361	12,744	752
Fingal County Council	62,056	3,246	14,445	159
Galway City Council	9,494	1,848	9,277	1,400
Galway County Council	0	26,175	0	10,931
Kerry County Council	12,405	8,927	3,725	2,693
Kildare County Council	20,131	26,168	4,999	5,112
Kilkenny County Council	415	11,894	270	3,241
Laois County Council	0	10,432	0	2,693
Leitrim County Council	0	4,812	0	1,000
Limerick City Council	0	12,635	0	3,007
Limerick County Council	0	19,800	0	4,588
Longford County Council	0	6,415	0	2,077
Louth County Council	0	36,157	0	4,045
Mayo County Council	19,900	9,211	0	2,010
Meath County Council	0	40,270	0	7,583
Monaghan County Council	0	11,537	0	2,130
North Tipperary County Council	0	15,472	0	3,502
Offaly County Council	0	10,599	0	2,711
Roscommon County Council	0	10,872	0	2,936
Sligo County Council	0	9,839	0	1,706
South Dublin County Council	60,270	1,031	13,817	42
South Tipperary County Council	10,075	9,152	2,931	2,495
Waterford City Council	6,778	489	6,324	0
Waterford County Council	6,864	2,399	4,460	403
Westmeath County Council	9,766	4,625	1,438	1,593
Wexford County Council	15,053	8,800	4,672	1,952
Wicklow County Council	0	26,734	0	3,552
Total	**469,603**	**431,331**	**[31]114,937**	**94,798**

[31] Includes separate collection of organic waste. See Appendix B for more detailed information.

Table 11 Bring banks and civic amenity sites, 2002 to 2006

	2002	2003	2004	2005	2006
Number of bring banks	1,636	1,692	1,824	[32]1,921	1,919
Quantity collected at bring banks (tonnes)	*35,920*	*53,001*	*76,023*	*84,980*	*96,727*
Size range of bring banks (no. of bring banks):					
No data on size			528	576	432
< 5 tonnes per annum			386	316	313
5 - 10 tonnes per annum	no data	no data	190	169	151
10 - 50 tonnes per annum			515	610	650
50 - 100 tonnes per annum			119	76	141
100 - 500 tonnes per annum			36	79	225
> 500 tonnes per annum			50	95	7
Number of civic amenity sites	49	60	69	[33]79	86
Quantity collected at civic amenity sites (tonnes)[34]	*61,197*	*47,686*	*83,562*	*104,267*	*191,399*
Size range of civic amenity sites (no. of CA Sites):					
No data on size			4	8	7
< 5 tonnes per annum			8	2	0
5 - 10 tonnes per annum			1	2	1
10 - 50 tonnes per annum	no data	no data	3	4	3
50 - 100 tonnes per annum			5	4	4
100 - 500 tonnes per annum			17	11	17
> 500 tonnes per annum			31	48	54

Table 12 Bring banks and civic amenity sites in operation, 2006

Local authority	Bring banks	Civic amenity sites
Carlow	39	3
Cavan	30	2
Clare	53	4
Cork	174	9
Cork City	40	1
Donegal	57	2
Dublin City	129	2
Dun Laoghaire-Rathdown	69	1
Fingal	79	4
Galway	91	3
Galway City	15	1
Kerry	93	5
Kildare	43	2
Kilkenny	44	1
Laois	38	1
Leitrim	39	2
Limerick	49	5

Local authority	Bring banks	Civic amenity sites
Limerick City	20	1
Longford	26	1
Louth	50	2
Mayo	88	2
Meath	23	2
Monaghan	26	1
North Tipperary	39	3
Offaly	46	3
Roscommon	39	3
Sligo	49	2
South Dublin	44	2
South Tipp	76	3
Waterford	44	3
Waterford City	21	1
Westmeath	47	2
Wexford	146	2
Wicklow	53	5
Total	**1,919**	**86**

(Source: local authority survey)

[32] Figure published in National Waste Report 2005 was 1,937. This figure was revised to 1,921. Offaly County Council - 58 bring banks revised to 48; South Tipperary County Council - 82 bring banks revised to 76.
[33] Figure published in National Waste Report 2005 was 81. This figure was revised to 79 after Kilkenny County Council provided corrected figures post publication.
[34] Some waste collected at civic amenity sites is disposed of, e.g. mixed residual waste and some hazardous waste.

3.3.4 Uncollected household waste

In most local authority areas, there are households that are not provided with, or choose not to avail of, waste collection services. Nationally, an average of 73% of households availed of a kerbside collection service in 2006, down from 76% in 2005. In some areas, participation rates are as low as 47%, while in the larger urban centres, coverage is reported to be 100%.

The waste from non-participating households (whether by choice or lack of service) is referred to as "uncollected waste". The quantity is calculated by each local authority and is adjusted to take account of local conditions such as the number of holiday or unoccupied houses, bin-sharing and the quantifiable use of alternative outlets (such as local civic amenity sites, bring banks and landfills). Using a standard methodology for each local authority area, the national estimate of "uncollected" household waste in 2006 is 205,474 tonnes (compared to 202,940 tonnes in 2005). While standardising the methodology has given a more reliable number, it remains an estimate that serves to illustrate the scale of the problem that Irish society has with the collection of household waste and the prevention of illegal disposal. Some local authorities have reported difficulties in estimating the number of households that avail of a collection service where tag-based systems are used, as tags are usually sold through third-party sellers and households may not put a bin out for collection every week.

While the issue of uncollected household waste is a serious problem, with potential environmental and public health implications, it is not correct to assume that householders without a kerbside collection service are necessarily fly tipping and burning waste. There are several other possible reasons for householders to choose not to avail of a kerbside collection service.

- In some cases dwellings are located too far away from the route of collection services on offer in the area. These householders may avail of nearby bring banks and civic amenity sites for recyclable materials and some householders have direct access to, or the use of, a local landfill facility. Leitrim County Council have waste presentation bye-laws in place that require all householders located on or close to waste routes to contract with a waste collector for the provision of a black bin (residual waste) and a green bin (mixed dry recyclables).
- Many dwellings are unoccupied for long periods of time during the year. According to the Central Statistics Office[35], there were 266,000 vacant dwellings in 2006 representing 15% of the total housing stock. Of these, 175,000 were houses, 42,000 were flats and 50,000 were classified as holiday homes. County Leitrim had the highest percentage of vacant dwellings (29.3%) while 11.7% of dwellings in Dublin City were vacant at the time of the census.
- Some local authorities have been carrying out surveys to determine how householders manage their waste. These surveys found that householders may choose to share bins with a neighbour or other family members; for example Limerick City Council found that almost 11% of households were sharing bins in 2006. In Clare this was 13.6% and in Kerry 39%.

It is without question however that some householders engage in illegal practices such as backyard burning or fly-tipping of household waste. Unknown quantities are burned in domestic fires within the home leading to environmental pollution, chimney fire risk and loss of a resource for recycling. A new approach to providing comprehensive household waste collection services, supported by ongoing enforcement activities, is required if this problem is to be eliminated.

[35] Census 2006, see www.cso.ie.

3.4 Commercial Waste

Commercial waste is a component part of municipal waste (Table 2). Disposal and recovery rates for the commercial waste stream are shown in Table 13. An estimated 1,327,068 tonnes of commercial, or non-household municipal waste, was managed in Ireland in 2006, compared to 1,235,629 tonnes in 2005, an increase of 7% (91,439 tonnes).

Table 13 Disposal and recovery in the commercial waste stream, 2006

Material	Quantity managed (tonnes)	Quantity landfilled[36] (tonnes)	National landfill rate (%)	Quantity recovered (tonnes)	National recovery rate (%)
Wood	192,435	3,067	1.6	189,368	98.4
Ferrous	38,161	6,008	15.7	32,153	84.3
Aluminium	11,320	3,397	30.0	7,923	70.0
Glass	27,273	8,841	32.4	18,432	67.6
Paper and cardboard	613,069	210,469	34.3	402,600	65.7
Plastic	104,642	73,279	70.0	31,363	30.0
Other metals	9,654	7,379	76.4	2,275	23.6
Organics	240,424	224,383	93.3	16,040	6.7
Textiles	15,396	14,906	96.8	490	3.2
Others	74,695	49,643	66.5	25,052	33.5
Total	**1,327,068**	**601,372**	**45.3**	**[37]725,697**	**54.7**

(Source: recycling organisations survey, local authority survey, landfill annual environmental reports and municipal waste composition survey)

High recovery rates are being achieved for most commercial waste streams. The 2003 Packaging Regulations[38] effectively banned the landfilling of a large proportion of available packaging waste by ensuring waste is segregated for recovery. To date there has been little attention paid to organic waste from commercial sources, reflected in the low recovery rate for this stream. Several projects supported by the EPA's National Waste Prevention Programme are focusing on biodegradable waste from the commercial sector. Commercial waste generation increased in 2006, but this increase is accounted for on the recycling side of the equation. Commercial waste recycling increased by 21% in 2006 to 725,697 tonnes compared to 600,803 tonnes in 2005.

[36] Includes 56,997 tonnes of non-process industrial waste landfilled.
[37] Waste electrical and electronic equipment (WEEE) has not been included in the municipal waste tables in 2006 due to the changes in its management and the need to separately report detailed WEEE statistics. Excluding WEEE from the 2005 figures, 590,184 tonnes of commercial waste was recovered.
[38] Waste Management (Packaging) Regulations, 2003 (S.I. No. 61 of 2003).

4 BIODEGRADABLE MUNICIPAL WASTE

Biodegradable waste is waste that can undergo biological decomposition. Biodegradable municipal waste is typically composed of food and garden waste, wood, paper, cardboard and textiles. Approximately 74% of the household and commercial waste managed in Ireland in 2006 was biodegradable. The largest fraction of biodegradable municipal waste is paper and cardboard (46%), followed by organic (food and garden) waste at 36%. It is notable that the percentage of organic waste in household and commercial bins has increased as more and more recyclable waste is diverted to the recycling bin. The presence of greater proportions of biodegradable waste in municipal waste, and the reduced frequency of bin collection (which can lead to anaerobic biodegradation in the bin), may be a cause of increased odour complaints in relation to licensed landfills.

As shown in Table 14, an estimated 2,279,550 tonnes of biodegradable municipal waste was generated in Ireland in 2006 of which 1,412,581 (62%) was landfilled. The recovery rate for biodegradable municipal waste increased to 38% in 2006, compared to 35% in 2005.

Table 14 Biodegradable municipal waste generation and management

Material	Gross quantity available (tonnes)	Quantity landfilled (tonnes)	National landfill rate (%)	Quantity recovered (tonnes)	National recovery rate (%)
Wood	219,317	15,480	7.1	203,837	92.9
Paper and cardboard	1,063,841	475,285	44.7	588,556	55.3
Organics	819,919	[39]755,194	92.1	64,725	7.9
Textiles	176,474	166,623	94.4	9,851	5.6
Total	**2,279,550**	**1,412,581**	**62.0**	**866,969**	**38.0**

Currently, there are several different routes for the management of biodegradable waste. Paper is reprocessed in paper mills (abroad), composted or used as animal bedding. Wood is reprocessed into chipboard, used as a fuel, as a filler material in composting processes, for landscaping or shredded for use as an engineering material at landfills. Cooking oils are reprocessed for use as a fuel and a small percentage are composted. Any textiles that are not suitable for re-wear are recycled into industrial cleaning rags, mattress filling and underlay for carpets. The main route for the recycling of organic (food and garden) waste is composting.

In 2006, 64,725 tonnes of organic (food and garden) waste was recycled. This comprised 40,539 tonnes of garden and park waste, 14,806 tonnes of biodegradable kitchen and canteen waste (of which 7,888 tonnes was commercial and 6,918 tonnes was household waste) and 9,381 tonnes of cooking oil. The majority of this waste was composted. In 2006, there were over 40 operational composting facilities in the Republic of Ireland. The compost produced from these facilities is used in landscaping, soil improvement and landfill cover. Research on quality standards for source-separated municipal-waste-derived compost is being carried out by Cré[40]. This work is due to be completed in 2008 and is funded by the EPA via the STRIVE research programme.

[39] Includes 31,523 tonnes of organic contaminants from non-biodegradable packaging waste (glass, plastic and ferrous metals) landfilled.
[40] Composting Association of Ireland, www.cre.ie.

Article 5 of the Landfill Directive[41] sets out targets for the diversion of biodegradable waste from landfill. The primary goal is to reduce dependence on landfill in favour of more environmentally sound alternatives. The Landfill Directive requires Member States to publish a national strategy for diverting biodegradable waste from landfill. The National Strategy for Biodegradable Waste[42] was published by the Department of the Environment, Heritage and Local Government in April 2006. The Strategy sets out measures aimed at promoting the separate collection, recovery and recycling of biodegradable waste. It proposes a variety of measures to progressively divert biodegradable municipal waste from landfill.

Ireland has availed of a four-year derogation for the first two phases of the diversion-from-landfill targets. By 2010 (deferred from 2006), Ireland is restricted to landfilling no more than 75% of the equivalent total weight of biodegradable municipal waste produced in 1995, the baseline year. This target is further reduced to 50% of the 1995 baseline by 2013 (deferred from 2009) and 35% by 2016. These targets are illustrated in Table 15. According to the Strategy, "Ireland is strongly committed to achieving the targets at the earliest possible date and efforts must now focus on achieving the necessary biodegradable municipal waste diversion from landfill in advance of the revised target dates". In 2006, the landfilling of biodegradable municipal waste increased by 9%. Full implementation of the Strategy is now increasingly urgent, given that the first target year is 2010 and the landfilling of biodegradable municipal waste must be reduced by over 450,000 tonnes by the start of 2010[43]. The Comptroller and Auditor General[44] noted in his annual report for 2005 that "there is a significant risk that Ireland will fail to meet the targets set down in the Landfill Directive." He also highlighted the "possibility of EU financial penalties arising from any such failure." It is of the greatest urgency therefore that implementation of the Strategy be comprehensively addressed at all levels and led at the national level by the Department of the Environment, Heritage and Local Government. The implementation steering group proposed in the Strategy should be put in place without further delay. The steering group should quickly ascertain the Strategy's implementation progress to date, in terms of infrastructural and service developments, and set strategic priorities for immediate attention at national and local level during 2008 and beyond. It should be noted that incineration is identified in the strategy as a means of diverting biodegradable waste from landfill.

[41] Council Directive 1999/31/EC on the landfill of waste.
[42] More information is available at www.environ.ie
[43] The target relates to the total quantity that can be landfilled during 2010, therefore the necessary diversion mechanisms to reach the 2010 target must be in place by end-2009.
[44] www.audgen.gov.ie

Table 15 Targets for biodegradable waste diversion from landfill

Baseline

		Quantity generated (tonnes)
1995		1,289,911

Targets

Target Year	Landfill Directive Target	Maximum quantity allowed to be landfilled (tonnes)
2010[45]	75% of quantity generated in 1995	967,433
2013[45]	50% of quantity generated in 1995	644,956
2016	35% of quantity generated in 1995	451,469

Current position

		Quantity landfilled (tonnes)
2004		1,304,426
2005		1,307,570
2006		1,412,581

A total of 39,305 tonnes of household organic waste was collected in 2006 compared to 27,366 tonnes in 2005. As shown in Table 16, kerbside collection schemes for organic waste were operational in nine local authority areas in 2006, down from 15[46] in 2005. The scale of these collection services varies from localised pilots to fully developed services in some areas. In 2006, some 15,597 tonnes of organic waste was collected from households via kerbside schemes, up from 14,682[47] tonnes in 2005, and the increase is spread amongst most of the local authority areas where the service is offered. The main local authority areas served with kerbside household organic waste collection in 2006 were Galway City Council, Waterford City Council, Waterford County Council and Fingal County Council. These four local authorities run their own kerbside collection services. Limited or nascent services are operated in four other local authority areas. The six local authority areas in which a 2005 service was discontinued into 2006 are all notable in that the service was provided by the private sector. The small tonnages involved would suggest that these may have been pilot kerbside collection schemes which were discontinued by the private companies and this would suggest that there is no commercial return associated with operating a kerbside organic waste collection service. It is possible that reduced landfill gate fees in 2006 contributed to this situation and an increase in the landfill levy and a national ban on the acceptance of untreated waste in landfills should be evaluated in order to provide new drivers for the diversion of biodegradable municipal waste from landfill.

[45] The Landfill Directive (1999/31/EC) allows Ireland to avail of a derogation under Article 5 of the Directive which postpones the 2006 and 2009 targets for 4 years.
[46] This was reported in the National Waste Report 2005 as 16 local authority areas. The figure was revised to 15 based on revised information provided by South Dublin County Council that there was in fact no kerbside collection scheme for household organic waste in operation in 2005.
[47] This was reported in the National Waste Report 2005 as 21,136 tonnes. This figure was adjusted based on revised information provided by South Dublin County Council (see footnote 46) and Louth County Council (revised from 1,407 tonnes to 2.1 tonnes).

Table 16 Separate collection of household organic waste

Local Authority	2005		2006	
	Separate kerbside collection of household food and garden waste (brown bins) (tonnes)		Separate kerbside collection of household food and garden waste (brown bins) (tonnes)	
	Local authority	Private operators	Local authority	Private operators
Clare County Council	0	68	0	0
Cork County Council	0	300	0	0
Dublin City Council	0	58	411	0
Dun Laoghaire-Rathdown	394	66	0	285
Fingal County Council	81	27	1,971	0
Galway City Council	5,305	123	4,987	774
Galway County Council	0	564	0	883
Kerry County Council	465	0	345	0
Kildare County Council	0	133	0	0
Limerick City Council	0	158	0	0
Limerick County Council	0	260	0	0
Louth County Council	0	2	0	0
Waterford City Council	3,647	0	3,766	0
Waterford County Council	2,150	0	2,165	0
Westmeath County Council	0	0	10	0
Wicklow County Council	0	881	0	0
Total	**12,042**	**2,640**	**13,655**	**1,942**
Household food and garden waste collected at civic amenity sites	**12,684**		**23,708**	

In 2006, there was a significant increase (87%) in the deposit of organic waste at civic amenity sites. A total of 23,708 tonnes of organic waste was deposited at civic amenity sites, compared to 12,684 tonnes in 2005. Of this, 15,587 tonnes is classified as garden waste and 8,121 tonnes as food waste. Local authorities also estimate that 28,810 tonnes of household organic waste was composted at home in 2006, based on sales of compost bins and assuming that 200kg is composted per year per compost bin.

To conclude, it is clear from the data for 2006 that there is a growing risk that Ireland will not meet its first diversion-from-landfill target for biodegradable waste in 2010, with the potential financial penalty and loss of reputation and standing in the European Union that this will bring. Implementation of the strategy should be re-energised at national level and concrete developments set in motion.

In this regard, the following items should be addressed, ideally in parallel to the review of waste management policy that commenced in late 2007:

- Landfill gate fees prices are declining, reducing the economic incentive to collect source-separated materials for composting.
    - The number of local authority areas with kerbside collection schemes for organic waste has decreased. Private sector involvement in particular is low and this may be as a result of low

landfill gate fees undermining any positive economic return on separate management of organic waste.

- As outlined elsewhere[48], the use of mechanical biological treatment is not widespread, and the separation of organic fines in 2006 was as likely to result in direct landfilling as biostabilisation, again most likely due to reduced landfill gate fees.

The use of economic and policy instruments such as increasing the landfill levy and banning untreated waste from landfill should be immediately considered as it will present the strongest possible economic signal to the private waste industry to seek alternative outlets.

- There is an increase in household organic waste accepted at civic amenity sites. Householders and commercial generators of food waste should be allowed and encouraged to use civic amenity sites to deposit this waste for composting or alternative treatment, free of charge for householders and perhaps for a nominal fee for commercial users. This service should be presented as a means of reducing pay-by-weight charges for black bin collections from either source. Local authorities should be provided with the means to address the staffing, capital and revenue implications of this recommendation.
- Hotels, restaurants, caterers, hospitals and other significant sources of food waste should be incentivised to invest in on-site food waste treatment technologies to reduce the volume and putrescibility of their waste and make it suitable for end uses or destinations other than landfill. The hotel sector in particular will be a focus for the National Waste Prevention Programme Green Business Initiative in 2008/2009.

A range of other options for diverting the organic (food and garden) fraction of biodegradable municipal waste from landfill are presented in the EPA discussion paper *Hitting the Targets for Biodegradable Municipal Waste: Ten Options for Change*[49].

[48] See Section 10.3 on Mechanical Biological Treatment.
[49] Hitting the Targets for Biodegradable Municipal Waste: Ten Options for Change, EPA, 2008, www.epa.ie.

5 PACKAGING WASTE

Packaging is used to contain, protect and present usable goods. In this sense, packaging is a means of avoiding products becoming waste during transport from factory to shop. However, virtually all packaging eventually becomes waste. Packaging is made from materials such as cardboard, paper, glass, plastic, steel, aluminium, wood, and composite materials[50] such as those used in milk and juice cartons. These are the materials that must be managed as packaging waste. Packaging waste recovery is quantified by analysing data provided by recycling organisations in Ireland and abroad that handled Irish packaging waste. The EPA liaises with Repak on an ongoing basis to cross-check the reported recovery of packaging waste.

Recycling of packaging waste increased by 8% in 2006 to 589,519 tonnes (see Table 17). Overall, the rate of growth in packaging waste recycling has been slowing since 2003, as illustrated in Figure 5. In earlier years, there was plenty of easily accessible segregated clean packaging waste available, and the 2003 Packaging Regulations undoubtedly provided significant impetus to the recycling sector. Continually accessing new sources of packaging waste is becoming more difficult and expensive. It would be expected that packaging waste recycling will continue to grow, but at modest rates. Ferrous metal packaging recycling is the only material where recycling is down on previous years. This decrease is principally due to a change in the method of calculating ferrous metal packaging recycling. The change was implemented because of inconsistencies in the application of packaging factors by the metal industry. The EPA is planning a comprehensive study of the metal recycling sector with a view to updating characterisation data and calculation factors.

Table 17 Packaging waste generation, disposal and recovery, 2006

Material	Gross quantity available (tonnes)	Quantity landfilled (tonnes)	National landfill rate (%)	Quantity recovered (tonnes) [51]	National recovery rate (%)
Wood	112,972	2,437	2.2	110,535	97.8
Paper and cardboard	398,681	102,145	25.6	296,536	74.4
Glass	154,499	58,483	37.9	96,016	62.1
Ferrous	49,246	23,086	46.9	26,160	53.1
Aluminium	15,899	11,673	73.4	4,226	26.6
Plastic	263,940	209,203	79.3	54,736	20.7
Other metals	1,633	1,633	100.0	0	0.0
Textiles	211	211	100.0	0	0.0
Others	31,391	30,082	95.8	[52]1,309	4.2
Total	**1,028,472**	**438,952**	**42.7**	**589,519**	[53]**57.3**

[50] Composite means packaging made of different materials which cannot be separated by hand, as defined in Commission Decision (97/138/EC) of 3 February 1997 establishing the formats relating to the database system pursuant to European Parliament and Council Directive 94/62/EC on packaging and packaging waste.

[51] Recovery operators reported that over 28,000 tonnes of packaging waste was used as a fuel.

[52] Composite packaging.

[53] During the analysis phase of the 2006 data it came to light that 9,264 tonnes of mixed packaging waste previously reported as recovered was in fact disposed. The 2005 packaging recovery rate was therefore revised from 59.9% to 58.9%. See Appendix F for revision to Table 18 from National Waste Report 2005.

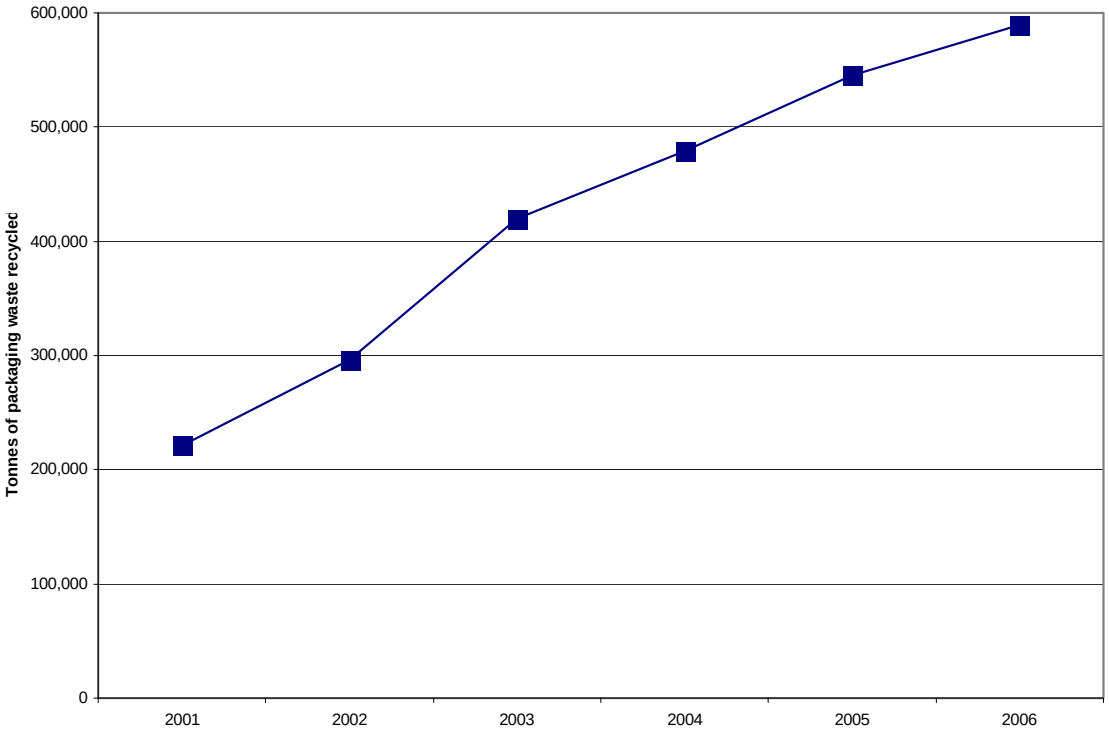

Figure 5 Growth in packaging waste recycling, 2001-2006

The increase in packaging waste recycling is overshadowed by a large increase of 15.6% in the landfill of packaging waste. This has caused the packaging waste recovery rate to decrease from 58.9% in 2005 to 57.3% in 2006[54]. The target of 50% recovery by 2005 remains exceeded and Ireland is on target to meet 60% recovery by 2011. It has been noted previously in this report that there are concerns with regard to the classification by the waste industry of municipal waste being disposed of at landfill. (Packaging is a subset of municipal waste). The EPA is committed to researching this issue in 2008 and ensuring that the landfill of waste is accurately and consistently reported. If however landfilling continues to increase even at modest levels, then the positive efforts and achievements in waste recycling will be effectively neutralised. It is clear that the growth in the use of packaging and the consequent generation of packaging waste (and its landfill) needs to be reduced.

A Repak-led Packaging Prevention Programme commenced in 2007 and is 50% funded by the Environmental Protection Agency through the National Waste Prevention Programme. The EPA recommends that this programme should be enhanced to embrace all Repak member organisations at senior management level. This programme should be long-term and adequate resources should be committed to it.

Repak has expended considerable sums of money on recycling packaging waste, and the success of these efforts (and indeed those of local authorities) are plain to see. Packaging waste recycling is strong and continues to grow. Addressing the growth in the use of packaging, as illustrated by the growth in packaging waste, should now become a new priority for Repak, as opposed to finding new, and more expensive, sources

[54] If, for the purpose of illustration, packaging landfill had remained at 2005 levels, then a packaging recycling rate of 61% would have been observed.

of packaging waste to recycle[55]. Efforts should focus on helping larger members (in the first instance) to bring about substantial and real reductions in the use of packaging. Reducing the generation side of the equation is likely to have greater long-term benefits than having recycling continually battle against increased generation. The EPA is committed, through the National Waste Prevention Programme, to providing continued technical and financial assistance to Repak in preventing packaging waste and reducing the use of packaging.

Implementing the essential requirements for packaging should form a core of Repak's activities in working with members on reducing the use of packaging, and in particular, the use of mixed-material or difficult-to-recycle packaging.

Figure 6 illustrates the position with regard to packaging recycling targets specified in the Packaging Directive. The recycling of 60% of packaging waste by the next target year of 2011 is well within reach and will be dependent as much on reducing the overall generation of packaging waste as on increasing its recycling.

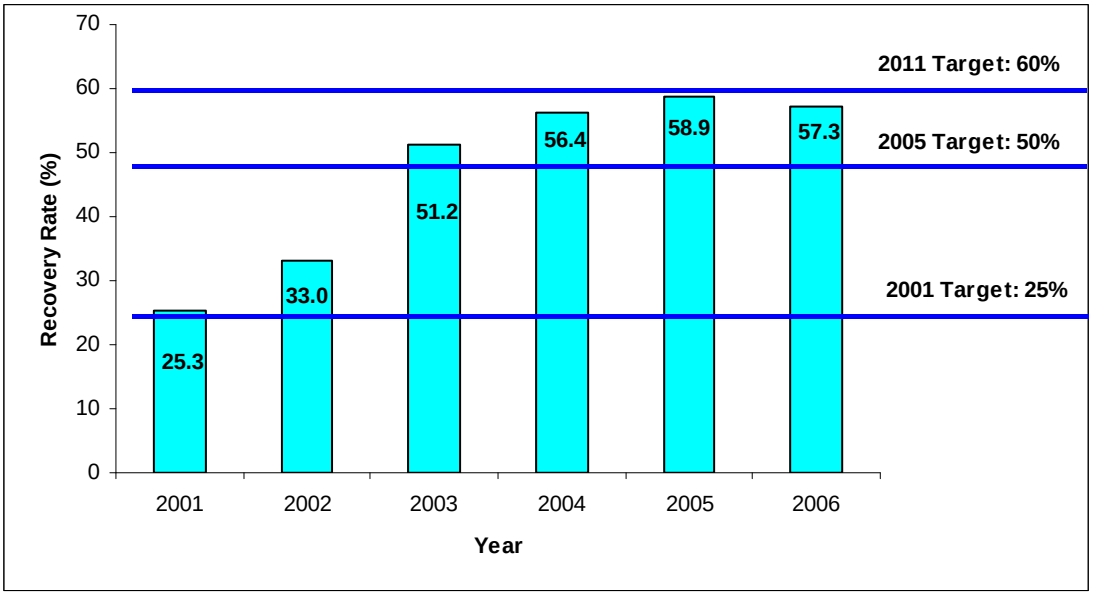

Figure 6 Recovery of packaging waste, 2001-2006, and progress towards targets

Packaging waste collected at a civic amenity site

[55] With the *de minimus* for major producers being reduced from 31 March 2008, Repak will have many new members, representing a new source of income to Repak.

6 WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT

The Directive on waste electrical and electronic equipment (WEEE Directive) [56] aims to prevent the generation of electrical and electronic waste and to promote reuse, recycling and other forms of recovery in order to reduce the quantity of WEEE landfilled or incinerated. It therefore requires the collection, recovery, reuse and recycling of WEEE. The WEEE Directive has been transposed into Irish law by the WEEE Regulations[57].

Many everyday consumer items are classified as electrical and electronic equipment such as mobile phones, computers, drills, hairdryers, as well as industrial equipment, medical devices and laboratory equipment. When these items reach their end-of-life they are defined as waste electrical and electronic equipment (WEEE). WEEE is made up of many different materials and components, some of which are hazardous.

Table 18 shows that, in 2006, 52,550 tonnes of waste electrical and electronic equipment was collected. Of this, 65% was sent for recovery in Ireland and 33% was exported to other EU countries.

Table 18 WEEE collected, sent for recovery and put into storage, 2006

	Fridges and freezers	Large household appliances[58]	TVs and other monitors	Fluorescent tubes and gas discharge lamps	Other WEEE[59]	Total WEEE
	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)	(tonnes)
Collected	6,551	23,587	6,883	419	15,110	**52,550**
Of which:						
Sent for recovery in ROI	0	21,454	5,746	270	6,826	**34,296**
Exported to EU	6,441	1,455	882	136	8,169	**17,083**
Exported to non-EU	0	585	0	0	0	**585**
Put into storage	110	93	255	13	115	**586**

Waste management infrastructure for WEEE in Ireland is developing rapidly. There are now six facilities in Ireland that recover WEEE by dismantling it into the material components and processing it into reusable raw materials. The majority of WEEE was recovered in Ireland in 2006, with the exception of all waste fridges and freezers and over half of the 'other WEEE' category, which were exported to other EU countries. The main waste facilities that process WEEE report recovery rates of approximately 83% of the materials extracted from dismantled and shredded WEEE, with an average 17% going for disposal to landfill.

According to the Directive, by 31 December 2006, Member States were obliged to achieve a separate collection rate 4 kg of household WEEE per person per year. According to the two compliance schemes[60] operating in Ireland, over 30,000 tonnes of household WEEE was collected in 2006, representing 7.4 kg per inhabitant.

Producers are required to meet various recovery, recycling and reuse targets for WEEE, calculated based on the weight of equipment collected. There are different targets for the recovery and recycling of the different

[56] Council Directive 2002/96/EC on waste electrical and electronic equipment (WEEE)
[57] Waste Management (Electrical and Electronic Equipment) Regulations, 2005 (S.I. No. 290 of 2005) and Waste Management (Waste Electrical and Electronic Equipment) Regulations, 2005 (S.I. No. 340 of 2005)
[58] For example dishwashers, washing machines, cookers
[59] For example microwaves, telephones, toys, vacuum cleaners, toasters
[60] WEEE Ireland (www.weeeireland.ie) and European Recycling Platform (www.erp-recycling.org)

categories. For large household appliances, which includes fridges and freezers, the rate of recovery must be at least 80% with component material and substance reuse and recycling a minimum of 75% by average weight by appliance. For televisions and monitors, the rate of recovery must be at least 75% and component material and substance reuse and recycling a minimum of 65% by average weight by appliance. These targets must be achieved by 31 December 2008.

This year, 2006, is the first reporting year for WEEE data as a distinct dataset. Table 18 was compiled from a number of sources including reports from waste operators, local authorities and the two compliance schemes. The data includes waste electrical and electronic equipment from civic amenity sites and retail drop-off points as well as recycling organisations. However some gaps in the data have been identified. For example, the 2006 data does not take into account the reuse, recycling and recovery of WEEE carried out at producers' premises. In addition, in some facilities waste accepted onsite as WEEE leaves the site no longer classified as WEEE but as its constituent components, making tracking the waste difficult. In the coming year, the EPA will engage with WEEE recovery operators and other relevant stakeholders to improve the reporting format and address the gaps in information.

This producer responsibility initiative has proven very successful in achieving the recycling of waste electrical and electronic equipment and diverting it from landfill. However, the increasing generation of any waste stream is of concern and it is critical that as a next step, the focus should be on preventing the generation of electrical and electronic waste in the first place and secondly promoting its reuse.

Waste electrical and electronic equipment

7 CONSTRUCTION AND DEMOLITION WASTE

The total quantity of construction and demolition waste collected in 2006, based on data reported to local authorities by the waste industry, is estimated at 16,819,904 tonnes, a 13% increase since 2005. A reported 13,365,880 tonnes was recovered and 442,567 tonnes disposed at authorised waste licensed and waste permitted facilities. The resulting discrepancy of 3,011,457 tonnes is partially accounted for below, and reflects a lack of attention being paid by operators in the waste industry to the importance of accurate and timely data.

The data on construction and demolition waste is based primarily on reports from local authorities provided to the Environmental Protection Agency. The raw data is compiled by local authorities from reports provided to them by waste collection permit holders on their collection of construction and demolition waste. The EPA provided training to local authorities in early 2007 on data management and data reporting and this was well attended. The EPA carried out data verification audits at the offices of six local authorities. Almost 25% of the reported collection of construction and demolition waste was verified during those audits. It was found that the information management systems in use by local authorities have improved compared to previous years. It was also clear that enforcement activities have increased significantly. However, limited verification checks were carried out by the local authorities on the data as reported by authorised collectors. As noted elsewhere in this report, this is a serious deficiency that undermines the EPA's confidence in the data presented in this chapter.

In order to determine the completeness and quality of the information submitted, the EPA requested that local authorities report on the number of active collectors operating in their functional areas and the number of collectors that failed to provide data reports. Reporting rates were variable, from 100% in several local authority areas to less than 50% in others. A number of local authorities concentrate their resources on obtaining reports from the larger collection permit holders. Local authorities estimate that a further 377,141 tonnes was collected by those collection permit holders that did not submit an annual environmental report. This suggests that smaller operators are more likely to be deficient in their reporting obligations to local authorities.

Local authorities also report on the treatment of construction and demolition waste at permitted facilities. A significant element of non-compliance with reporting obligations by this part of the waste industry is also noted in the local authority returns. It is estimated that the waste industry failed to report the recovery of an estimated 2,000,000 tonnes of construction and demolition waste in 2006, some 16% of the potential total amount. It is estimated that 1,725 facilities failed to report, representing some 46% of operating facilities. The waste industry's performance in this regard needs to improve substantially if data quality is to be assured in future years. Local authorities should, in a concerted manner, signal their intention not to renew permits nor provide authorisation for new permits for operators that consistently fail to comply with their permit conditions.

EPA-licensed landfills report on the recovery and disposal of construction and demolition waste at their facilities. Table 19 illustrates the reported collection, recovery and disposal of all construction and demolition waste, based on data provided via the collection permit, waste permit and waste licence systems. For the most part, construction and demolition waste is made up of soil and stones and detailed information on this fraction is presented in Table 20. A total recovery rate of 89% of soil and stones is reported (compared to 95% in 2005). The soil and stone fraction, comprising 83% of total construction and demolition waste collected, is the easiest to recover. The remainder of construction and demolition waste is made up of such materials as concrete and rubble, wood, glass, metal and plastic. Table 21 shows that a much lower recovery rate of 36% was reported for the non-soil and stones fraction of construction and demolition waste (compared to 43% in

2005). Although the 50% recycling target for 2003 set in *Changing Our Ways*[61] relates to construction and demolition waste as a whole, it is clear that the industry is failing to attain this level of recycling for the more difficult non-soil and stones fraction. It may be that better reporting of construction and demolition waste recycling data would improve this picture, however the onus is on the industry to demonstrate this. In relation to these findings, it is recommended that the National Construction and Demolition Waste Council prioritise the following issues from 2008:

- improve the data reporting rates from the waste industry serving the construction and demolition sectors;
- take responsibility for compiling data directly from the construction and demolition sector. The sector stands out as a major player in the Irish economy and society that does not comprehensively report on its waste generation and management;
- focus its efforts on the prevention and recycling of the non-soil and stones fraction of construction and demolition waste.

The *Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects* were published by the Minister for the Environment, Heritage and Local Government in 2006. The purpose of the Guidelines is to promote an integrated approach to construction and demolition waste management throughout the duration of a project. They are designed to promote sustainable development, environmental protection and optimum use of resources. The Guidelines introduce the concept of project-based waste management planning for construction and demolition waste. On foot of a recommendation made in the EPA publication, *The Nature and Extent of Unauthorised Waste Activity in Ireland* (2005), the Guidelines were given a statutory footing by the Development Management Guidelines issued by the Minister for the Environment, Heritage and Local Government in 2007 under Section 28 of the Planning and Development Act 2000. [62] Planning authorities must have regard to guidelines issued under Section 28 in performance of their functions under the Act. It is recommended that the waste management plans prepared under these guidelines be considered by the construction and demolition sector as a potential source of data on the generation and management of construction and demolition waste.

It is further recommended that the voluntary mandate of the National Construction and Demolition Waste Council be independently reviewed to ensure that this model is the best possible means of achieving the prevention, minimisation and recycling of construction and demolition waste.

Construction and demolition waste

[61] Waste Management: Changing our Ways, 1998, Department of the Environment, Heritage and Local Government.

[62] Paragraph 7.8.1 of the Development Management Guidelines, prepared under Section 28 of the Planning and Development Act 2000, specifies that "in relation to the issue of the proper management of construction and demolition waste, planning authorities should have regard to DOEHLG Circular letter WPR 7/06 and Best Practice Guidelines on the Preparation of Waste Management Plans for Construction & Demolition Projects62 or any subsequent revision of these guidelines. These documents provide guidance on how proposals with significant construction and demolition waste management issues relevant to planning should be considered in an integrated manner."

Table 19 Collection and management of construction and demolition waste, 2006

Collection (tonnes)		16,819,904
Management (tonnes)	**Recovery**	**Disposal**
Recovery at EPA licensed landfills: - cover/landscaping material - other landfill engineering purposes	2,683,422	
Disposal at EPA licensed landfills		439,843
Recovery at local authority-permitted sites	10,682,458	
Disposal at local authority-permitted sites		2,724
Total	**13,365,880**	**442,567**
	Recovery rate	**79.5%**

Table 20 Collection and management of construction and demolition waste, soil and stones, 2006

Collection of soil and stones (tonnes)		13,882,961
Management (tonnes)	**Recovery**	**Disposal**
Recovery at EPA licensed landfills: - cover/landscaping material - other landfill engineering purposes	2,224,200	
Disposal at EPA licensed landfills		433,260
Recovery at local authority-permitted sites	10,094,386	
Disposal at local authority-permitted sites		1,719
Total	**12,318,586**	**434,979**
	Recovery rate	**88.7%**

Table 21 Collection and management of construction and demolition waste, excluding soil and stones, 2006

Collection of other construction and demolition waste fractions (excluding soil and stones) (tonnes)		2,936,943
Management (tonnes)	**Recovery**	**Disposal**
Recovery at EPA licensed landfills: - cover/landscaping material - other landfill engineering purposes	459,222	
Disposal at EPA licensed landfills		6,583
Recovery at local authority-permitted sites	592,425	
Disposal at local authority-permitted sites		1,005
Total	**1,051,647**	**7,588**
	Recovery rate	**35.8%**

8 INDUSTRIAL WASTE

Industrial waste generation is estimated from information reported by a total of 432 companies - 276 integrated pollution prevention control (IPPC) licensed companies, from their annual environmental reports; and 156 non-IPPC licensed companies, by way of sample survey. A scale up methodology, based on sectoral employment levels, is employed to estimate waste generation throughout the industrial sector. Total projected[63] generation of industrial waste, including non-process industrial waste, has decreased by 4.4% from 9.6 million tonnes in 2004 to 9.2 million tonnes in 2006, as indicated in Table 22. The estimated generation of manufacturing industry waste decreased by 23% to just over 4 million tonnes. Waste from mining and quarrying activities and the supply of electricity, gas and water increased by 19%.

The ten largest non-hazardous and hazardous industrial waste categories generated in 2006 are presented in Table 23. The top ten waste categories represent 88% of all non-hazardous and 86% of all hazardous waste generation. The majority of these waste generators are regulated by the EPA under IPPC licences. Comparing the top ten lists with similar data for 2004, mining remains the predominant generator of non-hazardous waste. A significant quantity of the non-hazardous waste was tailings from Tara Mines and Anglo-American Lisheen Mine and red mud from Aughinish Alumina. Coal flyash from the ESB's Moneypoint coal-burning power station remains a significant quantity – although 55% of the flyash was recycled and used in cement manufacture in 2006. Waste from the food processing (particularly slaughtering and rendering) and timber industries continue to feature strongly. Solvents and other process wastes from the chemical and pharmaceutical sector again dominate the hazardous waste section.

In 2006, the recovery of reported industrial waste increased from 35.4% in 2004 to 37.8% (2,942,386 tonnes), as indicated in Table 24. In 2006, 80% (6,222,985 tonnes) of industrial waste was recovered or disposed of on-site - for example, landfill of tailings in the mining sector and solvent recovery or incineration in the chemical and pharmaceutical sector. A large amount of industrial waste is exported for disposal or recovery, mainly from the slaughtering and rendering sector (meat and bone meal) and the chemical and pharmaceutical sector (solvents). Details on the disposal and recovery of waste from industrial sectors are provided in Table 25. In 2006, 23 IPPC-licensed facilities managed on-site treatment operations for hazardous waste and treated 88,149 tonnes of hazardous waste. The facilities and operations are presented in Table 26.

Overall industrial waste generation has decreased since 2004. It is apparent that some industrial enterprises in the food sector, the pulp, paper and paper products sector, and the printing and publishing sector have reduced the generation of waste. While the reasons are not clear from the raw data, this suggests that many companies may now be examining their waste generation and associated costs. It is also evident that some large companies in certain sectors have closed. The quality of data remains poor however in many cases, as evident from annual environmental reports and survey responses. Greater attention needs to be paid to the obligation to accurately record waste generation and management and to using existing guidance and advice on waste quantification and monitoring.

Industries should actively participate in applying waste prevention, reduction, reuse and recycling principles and avail of opportunities provided under the National Waste Prevention Programme.

[63] A sample of 432 companies, including many of the largest industrial enterprises, make up the industry dataset. Using sectoral data available from the Central Statistics Office, a projected quantity is calculated to represent industry as a whole.

Table 22 Reported and projected generation of industrial waste, 2006 (scaled up to 100% coverage)

Sector	NACE Code	Hazardous Waste (tonnes)		Non Hazardous Waste (tonnes)		Total Industrial waste (tonnes)	
		Reported	Projected	Reported	Projected	Reported	Projected
Food	DA	2,302	2,482	785,850	1,737,955	788,152	1,740,437
Basic Metals and Fabricated Metal Products	DJ 27	14,238	14,617	1,178,888	1,193,776	1,193,126	1,208,393
Chemicals, Chemical Products and Man Made Fibres	DG	163,222	168,179	166,960	175,412	330,182	343,590
Wood and Wood Products	DD	244	420	242,009	245,819	242,253	246,239
Pulp, Paper and Paper Products; Printing, Publishing	DE	932	17,152	17,513	146,208	18,445	163,360
Other Non-Metallic Mineral Products	DI	9,777	21,156	34,468	84,216	44,245	105,372
Electrical and Optical Equipment	DL	7,757	11,760	26,372	77,110	34,129	88,870
Basic Metals and Fabricated Metal Products	DJ 28	1,829	4,685	6,948	48,693	8,777	53,379
Machinery and Equipment not elsewhere classified	DK	770	1,964	10,163	40,069	10,934	42,033
Rubber and Plastic Products	DH	1,515	1,866	8,523	22,652	10,038	24,519
Textiles	DB 17	251	281	6,438	8,097	6,689	8,378
Transport Equipment	DM 35	813	1,136	5,072	5,559	5,886	6,695
Transport Equipment	DM 34	49	197	2,215	6,472	2,264	6,669
Wearing apparel; dressing and dyeing of fur	DB 18	117	1,062	270	2,450	386	3,512
Manufacturing not elsewhere classified	DN	1,555	1,687	11,183	24,223	12,738	25,910
Sub-total manufacturing		**205,371**	**248,644**	**2,502,872**	**3,818,711**	**2,708,243**	**4,067,354**
Mining and quarrying	C	9,653	9,929	4,756,214	4,782,614	4,765,867	4,792,542
Electricity, gas and water supply	E	1,387	13,426	300,115	333,341	301,502	346,767
Total		**216,411**	**271,999**	**7,559,201**	**8,934,666**	**7,775,612**	**9,206,664**

(Source: IPPC annual environmental reports and responses to industrial survey)

Table 23 Top ten reported non-hazardous and hazardous industrial wastes in 2006[64]

EWC Code	Non-hazardous industrial waste description	Principal Source(s)	Quantity (tonnes)
01 03 06	Tailings from physical and chemical processing of metalliferous minerals	Tailings from Tara Mines	2,351,879
[65]01 03 05*	Tailings from physical and chemical processing of metalliferous minerals	Tailings from Anglo American Lisheen Mines	1,170,810
01 03 09	Red mud from alumina production	Red mud from Aughinish Alumina	1,158,940
01 01 01	Wastes from mineral metalliferous excavation	Waste Rock from Tara Mines	1,126,939
10 01 02	Coal fly ash	ESB Moneypoint	206,710
02 02 02	Animal tissue waste	Slaughtering and rendering	185,023
02 02 03	Materials unsuitable for consumption or processing	Slaughtering and rendering	160,113
03 01 99	Other wastes from wood processing and the production of panels and furniture, pulp, paper and cardboard	Wood Processors	129,402
02 07 99	Other wastes from the production of alcoholic and non-alcoholic beverages	Breweries	118,187
10 01 03	Fly ash from peat and untreated wood	Power stations	75,250
	Total		**6,683,253**

EWC Code	Hazardous industrial waste description	Principal Source(s)	Quantity (tonnes)
07 05 04*	Organic solvents, washing liquids and mother liquors	Pharmaceutical and chemical industries	88,000
07 05 03*	Organic halogenated solvents, washing liquids and mother liquors	Pharmaceutical and chemical industries	44,570
01 03 07*	Other wastes containing dangerous substances from physical and chemical processing of metalliferous minerals	Saltcake from Aughinish Alumina	13,755
07 05 01*	Aqueous washing liquids and mother liquors	Pharmaceutical and chemical industries	11,873
13 02 08*	Other engine, gear and lubricating oils	All sectors	8,253
10 11 19*	Gypsum	Waterford Crystal, Kilbarry	6,121
07 01 04*	Other organic solvents, washing liquids and mother liquors	Pharmaceutical and rubber & plastics industries	4,008
07 07 08*	Still bottoms and reaction residues	Pharmaceutical and chemical industries	3,703
07 05 13*	Solid waste containing dangerous substances	Pharmaceutical and chemical industries	3,416
06 01 01*	Sulphuric acid and sulphurous acid	Electrical and optical equipment sector	3,371
	Total		**187,069**

[64] Excludes large quantities of construction and demolition waste.
[65] Despite the use of a hazardous EWC code by the company, this waste is classified as non-hazardous.

Table 24 Reported disposal and recovery of industrial waste, 2006

Disposal or recovery operation (TFS codes)		Hazardous Waste (tonnes)	Non-hazardous waste (tonnes)	Total industrial waste (tonnes)
Landfill	D1	22,040	2,150,228	2,172,268
Land Treatment	D2	24	6,133	6,157
Impoundment	D4	18	2,356,740	2,356,758
Engineered landfill	D5	255	93,510	93,765
Release to waters	D6	0	15,561	15,561
Release to sea	D7	0	165	165
Biological Treatment	D8	1,488	10,572	12,060
Physico chemical treatment	D9	9,730	9,757	19,486
Incineration on land	D10	79,021	47,890	126,911
Blending or mixing	D13	18	2,165	2,183
Repackaging prior to disposal	D14	22	280	302
Storage prior to disposal	D15	1,427	22,076	23,503
Sub-total disposal	**D**	**114,041**	**4,715,077**	**4,829,118**
		52.7%	**62.4%**	**62.1%**
Reuse as fuel	R1	29,640	263,220	292,860
Solvent recovery	R2	50,961	1,417	52,379
Organic substance recycling	R3	3,429	257,533	260,962
Metal recovery	R4	2,241	33,428	35,669
Inorganic substance recycling	R5	678	658,526	659,204
Regeneration of acids or bases	R6	2,924	4	2,928
Recovery of components used for pollution abatement	R7	32	192	223
Recovery of components from catalysts	R8	206	57	263
Oil recovery	R9	2,331	1,159	3,490
Landspreading	R10	12	215,634	215,646
Use of residuals	R11	23	286,313	286,336
Waste exchange prior to recovery	R12	318	1,245	1,563
Storage prior to recovery	R13	8,377	1,122,486	1,130,863
Sub-total recovery	**R**	**101,173**	**2,841,214**	**2,942,386**
		46.8%	**37.6%**	**37.8%**
Unspecified	U	1,197	2,910	4,107
		0.6%	<0.1%	0.1%
Grand Total		**216,411**	**7,559,201**	**7,775,612**

(Source: IPPC annual environmental reports and responses to industrial survey)

Table 25 Reported disposal and recovery of waste in surveyed industrial sectors, 2006[66]

Sector name	NACE code	Disposal (tonnes)	Recovery (tonnes)	Unspecified (tonnes)	Total (tonnes)
Manufacturing Industry					
Basic Metals	DJ27	1,183,605	9,497	24	1,193,126
Food	DA	140,118	647,675	360	788,152
Chemicals, Chemical Products and Man Made Fibres	DG	110,741	217,674	1,767	330,182
Wood and Wood Products	DD	4,932	236,613	708	242,253
Other Non-Metallic Mineral Products	DI	26,561	17,663	21	44,245
Electrical and Optical Equipment	DL	10,245	23,879	5	34,129
Pulp, Paper and Paper Products; Printing, Publishing	DE	1,028	17,417	0	18,445
Machinery and Equipment not elsewhere classified	DK	7,188	3,723	23	10,934
Rubber and Plastic Products	DH	5,039	4,827	171	10,038
Basic Metals and Fabricated Metal Products	DJ28	2,791	5,550	436	8,777
Textiles	DB17	1,813	4,872	4	6,689
Transport Equipment	DM35	4,889	996		5,886
Transport Equipment	DM34	154	2,110		2,264
Wearing apparel; dressing and dyeing of fur	DB18	210	177	0	386
Manufacturing not elsewhere classified	DN	2,017	10,478	243	12,738
Sub-total manufacturing		**1,501,330**	**1,203,151**	**3,762**	**2,708,243**
		55.4%	**44.4%**	**0.1%**	
Mining and quarrying	C	3,144,963	1,620,860	44	4,765,867
Electricity, gas and water supply	E	182,826	118,375	301	301,502
Grand Total		**4,829,118**	**2,942,386**	**4,107**	**7,775,612**
		62.1%	**37.8%**	**0.1%**	

(Source: IPPC annual environmental reports and responses to industrial survey)

[66] Note, this is the reported quantity, not the projected 9,206,664 tonnes stated in Table 22.

Table 26 Treatment of hazardous waste on-site of generation at IPPC licensed facilities in 2006

Facility name	IPPC register number	Waste type	Operation (see below for key)	Quantity treated in 2006 (tonnes)
Aughinish Alumina	P0035-02	Saltcake (process residue) Waste oils	D1 R9	13,748 13
Arran Chemical Company	P0110-01	Solvent	R2	601
Bristol Myers Squibb	P0552-01	Solvent	D10 R2	3,060 2,632
Swords Laboratories (incinerated at sister site P0552-01)	P0014-03	Solvent	D10	2,437
Eli Lilly	P0009-03	Solvent	R2 D10	1,493 9,290
Temmeler Ireland	P0018-01	Solvent	R3 R2	587 2,280
Liebherr Container Cranes	P0146-01	Solvent	R2	4
Mallinckrodt Medical Imaging – Ireland	P0050-02	Solvent	R2 D8 D9	8,167 479 101
Pfizer Cork	P0103-01	Solvent	R2	205
Pfizer Ireland Pharmaceuticals	P0013-04	Solvent	R2	4,088
Roche Ireland	P0012-04	Solvent Solvent	R1 R3	4,159 1,628
SmithKline Beecham (Cork) Limited	P0004-02	Solvent	D10 R2	16,184 1,100
Novartis Ringaskiddy	P0006-03	Solvent, aqueous washing liquids and mother liquors, other wastes	D10 R2 R1 D9	2,153 4,212 2,042 397
Astellas Ireland	P0007-03	Solvents, aqueous washing liquids and mother liquors	D10	1,918
Cognis Ireland	P0052-01	Process distillation residues	R1	3,703
DIS Enbi Seals Ireland	P0064-01	Hydraulic oil	R9	1
Boliden Tara Mines	P0516-01	Machinery degreasing waste water	D4	18
Conoco Phillips Bantry Bay Terminals	P0419-01	Oil	R9	200
Molex Ireland	P0288-02	Plating solutions, containers	R4	69
Arch Chemicals	P0060-01	Solvent	R2	146
Edenderry Power	P0482-02	Oil	R1	15
Millipore Ireland	P0571-01	Solvent	R2	1,028
Richard Keenan & Co	P0555-01	Solvent	R2	0.5

Key to D/R codes:

D codes		**R codes**	
D1	Landfill	R1	Use as a fuel
D4	Surface impoundment	R2	Solvent recycling
D8	Biological treatment	R3	Organic substance recycling (other than solvent)
D9	Physico-chemical treatment	R4	Metal recycling
D10	Incineration	R9	Waste oil recycling

9 HAZARDOUS WASTE

Hazardous waste is so classified because it displays properties that make it dangerous or potentially harmful to human health or the environment. The largest quantity of hazardous waste is generated by Irish industry and includes such materials as industrial solvents, waste oils, industrial sludges and chemical wastes. Households, small businesses, farms and the healthcare and construction sectors also generate large quantities of hazardous waste including batteries, electrical equipment, healthcare risk waste, solvent based paint, varnish waste, sheep dip and fluorescent lamps.

The quantity of hazardous waste generated in 2006 was 284,184 tonnes, an 8% decrease since 2004 but an increase of almost 10% overall since 2001 (see Table 27). The majority of this waste is managed properly and in accordance with the law. In 2006, some 31% of hazardous waste was treated on-site of generation at IPPC-licensed facilities (see Figure 7). In descending order, this waste was subjected to incineration, solvent recycling, landfill and use as fuel. A further 21% was treated off-site in Ireland by a network of 15 authorised hazardous waste treatment facilities in Ireland, with just over half being subjected to disposal operations. The remaining 48% of Irish hazardous waste was exported for treatment and disposal abroad, mostly for thermal treatment (incineration and use as fuel), but also for metal recovery, solvent recovery and landfill.

An estimated 29,888 tonnes of hazardous waste was 'unreported' in 2006. That is, it is not recorded as having entered the formal waste management industry. The source of this waste is small business, households and farms primarily. The estimated generation of 'unreported' hazardous waste decreased by 36% since 2004, and this reduction is principally attributed to a reported reduction in the use of sheep dip (and its subsequent disposal on land).

Considerable analysis of the hazardous waste data and recommendations for improved hazardous waste management in the period 2008-2012 are presented in the Proposed National Hazardous Waste Management Plan, which is open for public consultation until 31 January 2008. There is no attempt to comprehensively repeat the analysis or recommendations in this Report.

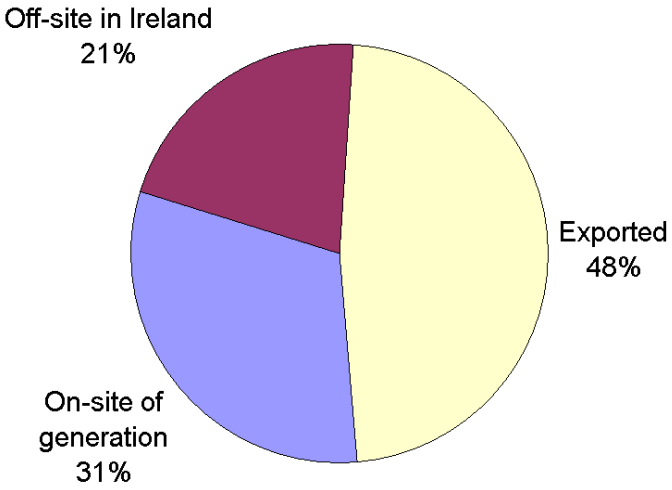

Figure 7 The location of treatment for reported hazardous waste, 2006

9.1 Reported hazardous waste

A complete statistical dataset on reported hazardous waste generation and management is now prepared every second year by the Environmental Protection Agency for the national waste report. The hazardous waste dataset is based on reports of hazardous waste treatment, and is comprised of three parts, with the data obtained from three different sources:

- on-site treatment of hazardous waste at integrated pollution prevention and control (IPPC) EPA licensed facilities – data is obtained from annual environmental reports provided by licensed facilities;
- off-site treatment of hazardous waste at authorised facilities in Ireland – data is obtained from a survey questionnaire issued to authorised facilities annually; and
- exported hazardous waste – summary data is obtained and reported annually from records of notified waste exports held by local authorities[67].

A summary of these three parts of the complete dataset (excluding contaminated soil) is presented in Table 27. Figure 8 presents the long-term trend in the location of hazardous treatment from 1996 and this clearly shows that:

- o the treatment of waste on-site at industrial facilities increased in 2006 after a decline over several years;
- o the treatment of waste off-site in Ireland at authorised facilities is increasing steadily;
- o the export of hazardous waste has been decreasing after a significant increase in exports between 1996 and 2003.

Further detail is provided in Table 28 and Table 29.

Table 27 Summary of hazardous waste management, 2001-2006

(all data in tonnes) (shaded cells indicate that data was not compiled in that year)

Category	2001	2002	2003	2004	2005	2006
On-site treatment*	95,566			86,328		88,409
Off-site treatment*	48,013			55,952		60,872
Exported*	115,366	109,545	170,678	165,498	146,811	134,904
Total	**258,945**			**307,778**		**284,184**

* Not including contaminated soil.

Note: Corrections have been made to the following data points: 2004 – export; and 2001 - off-site treatment. See Appendix G and Appendix H respectively.

[67] The export of hazardous waste was regulated by local authorities under the EU Transfrontier Shipment of Waste Regulation (259/93) until 12th July 2007. The Waste Management (Shipments of Waste) Regulations, S.I. No. 419 of 2007, implement the revised EU TFS Regulation 1013/2006 and nominated Dublin City Council as sole competent authority in respect of the export into, import from and transit of waste through Ireland from 12th July 2007. The new regulation imposes revised controls on the import, export and transit of waste, including hazardous waste.

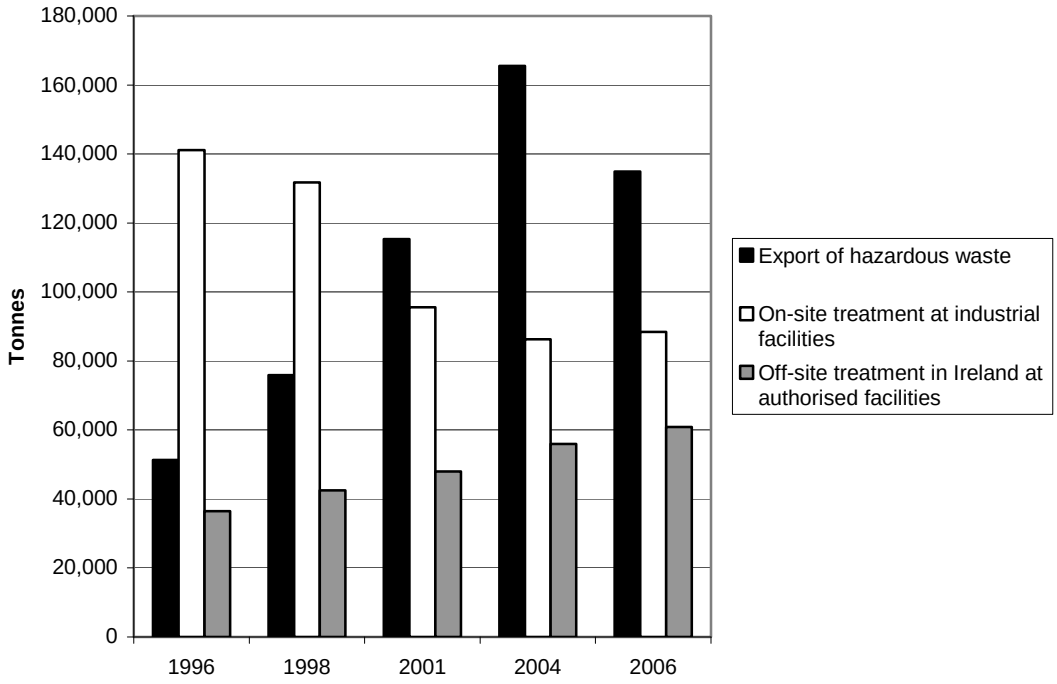

Figure 8 The location of hazardous waste treatment, 1996-2006

There are four observations to be made on this high level data. First, the overall generation of hazardous waste increased by almost 10% between 2001 and 2006, with a spike observed in 2004. Between 2004 and 2006, an 8% decrease is observed. Second, the downward trend for on-site treatment of hazardous waste, evident up to 2004, ceased in 2006 and a slight increase is evident. Third, the treatment of hazardous waste off-site in Ireland at commercial facilities increased by 17% between 2001 and 2004 and 9% between 2004 and 2006. The treatment techniques employed are relatively small in scale compared to the scale of comparable exports. This is illustrated in Table 28 - with some notable exceptions, more of each category of waste is exported than is treated in Ireland. Fourth, the reported disposal of hazardous waste decreased between 2004 and 2006 by 8% while recovery decreased by 14%.

Table 28 Location of treatment of reported hazardous waste, 2006

Category	On-site at industry (tonnes)	Off-site in Ireland (tonnes)	Exported (tonnes)	Total (tonnes)
Solvents	31,141	1,821	39,058	72,020
Solvents (halogenated, where specified)	34,985	42	9,871	44,898
Oil waste (mineral oil)	315	26,091	1,169	27,575
Industrial hazardous waste (other)	3,753	2,441	11,801	17,995
Salts and saltcake	13,748		10	13,758
Healthcare risk waste		8,111	1,520	9,631
Oily sludges	18	11,671		11,689
Lead-acid batteries			8,590	8,590
Equipment (electrical, electronic, mechanical)		*	8,528	8,528
Chemical waste (other)	0.5	1,379	2,851	4,231
Paint, ink and varnish waste (including packaging)	4	928	3,045	3,977
Acid and alkali waste	6	2,923	3,685	6,614
Asbestos waste	11	2,524	5,294	7,829
Aqueous washing liquids and mother liquors (07 __ 01*)	3,533	1,005	21,842	26,380
Solid wastes from MFSU of pharmaceuticals (07 05 13*)	589	0	6,348	6,937
Sludges and filter cakes	92	249	5,147	5,488
Batteries (small, non-lead acid)		23	346	369
Packaging (contaminated or containing residues)	90	144	881	1,115
Photographic chemical waste	1	220	1,315	1,536
Oil filters		886		886
Construction and demolition waste (hazardous)			40	40
Metal- and heavy metal-containing waste	68	42	1,597	1,707
Absorbents, wiping cloths etc. (EWC 150202)	38	0.3	843	881
Fluorescent lamps		329	79	408
Pesticides, herbicides			54	54
Laboratory and general chemical waste	14	44	176	234
Thermal treatment and combustion residues			705	705
Medicines			20	20
Municipal hazardous waste (other)		0.2	45	45
Polychlorinated biphenyls			43	43
Total	**88,409**	**60,872**	**134,904**	**284,183**

(Source: IPPC annual environmental reports; responses to industrial survey: waste licence annual environmental reports; TFS records)

* This category includes WEEE. Information on WEEE management is presented in chapter 6.

Table 29 Recovery and disposal of hazardous waste in 2006

	Disposal or recovery activity	On-site (tonnes)	Off-site (tonnes)	Exported (tonnes)	Total (tonnes)
D1	Landfill	13,748	2,524	11,685	27,957
D4	Impoundment	18		1	19
D5	Engineered landfill			498	498
D8	Biological treatment	479		1,699	2,178
D9	Physico-chemical treatment	499	31,372	1,709	33,579
D10	Incineration	35,121		47,854	82,976
D13	Blending or mixing	0		1,639	1,639
D14	Repackaging prior to disposal	22			22
D15	Storage pending disposal	150		45	195
	Sub-total disposal	**50,037**	**33,896**	**65,130**	**149,062**
R1	Use as fuel	9,919	5	14,805	24,729
R2	Solvent recovery	25,956	1,840	16,477	44,273
R3	Organic substance recovery	2,215		5,596	7,811
R4	Metal recovery	68	1,214	21,668	22,950
R5	Inorganic substance recovery			2,650	2,650
R6	Regeneration of acids and bases			2,150	2,150
R8	Recovery of components from catalysts			89	89
R9	Oil recovery	214	23,917		24,131
R12	Waste exchange			1,520	1,520
R13	Storage pending recovery			4,560	4,560
	Sub-total recovery	**38,372**	**26,976**	**69,515**	**134,863**
U	Unspecified			259	259
		88,409	**60,872**	**134,903**	**284,184**

9.1.1 On-site treatment of hazardous waste

Information on the on-site treatment of hazardous waste at Irish industry is presented in chapter 8 and Table 26.

9.1.2 Off-site treatment in Ireland of hazardous waste

A total of 15 facilities were licensed or permitted to treat hazardous waste (including six for waste electrical and electronic equipment) and were operational in 2006. The treatment of hazardous waste at these “merchant” facilities has steadily but slowly increased from 55,953 tonnes in 2004 to 60,872 tonnes in 2006 (see Table 28), not including contaminated soil. The increase includes more treatment of waste oils, oily sludges, acid/alkali waste, solvents and general chemical waste since 2004. Almost all facilities reported an increase in hazardous waste treatment volumes. In recent years, there has been considerable interest in the blending of waste solvents, and four facilities have been licensed by the EPA to blend solvents for use as fuel in cement kilns abroad (three are currently operational). Several new facilities have been authorised to treat waste electrical and electronic equipment, some of which is classified as hazardous waste.

9.1.3 Export of hazardous waste

Since 2001, over 40% of the hazardous waste generated in Ireland each year has been exported for treatment. The rate of export increased from 22% in 1996 to 47% in 2006, with a spike of 54% in 2004 (see Figure 9). The principal destination of exported hazardous waste in 2006 was Great Britain, followed in descending order by Germany, Belgium and Denmark (see Figure 10 and Table 30).

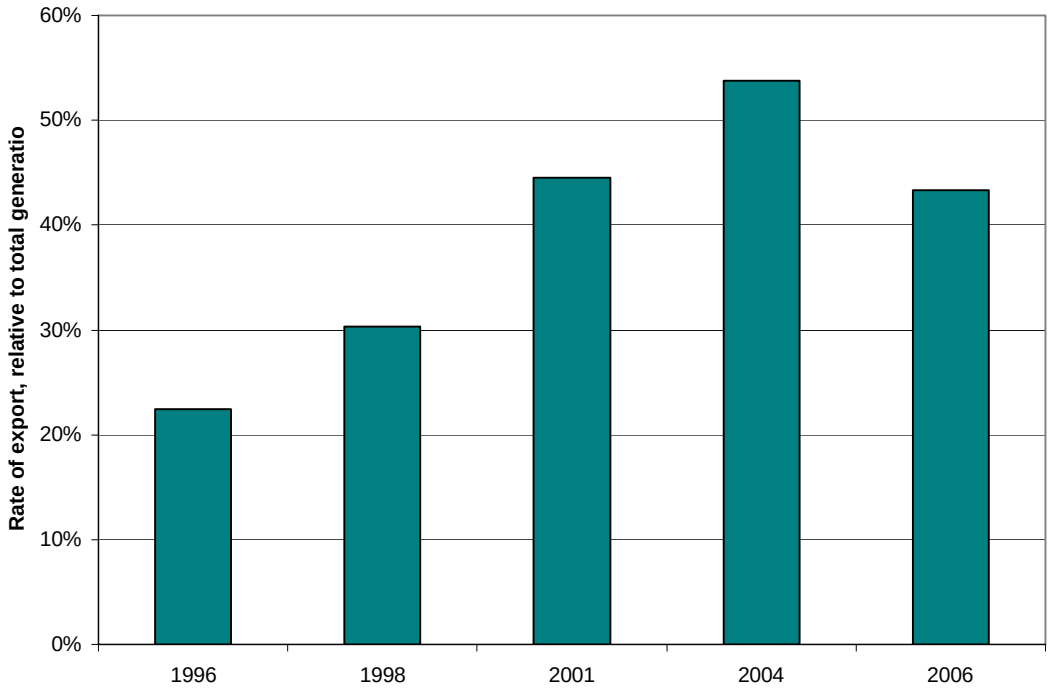

Figure 9 Rate of export of hazardous waste, 1996 to 2006

(as a ratio of exports against treatment in Ireland – not including unreported hazardous waste and not including contaminated soil)

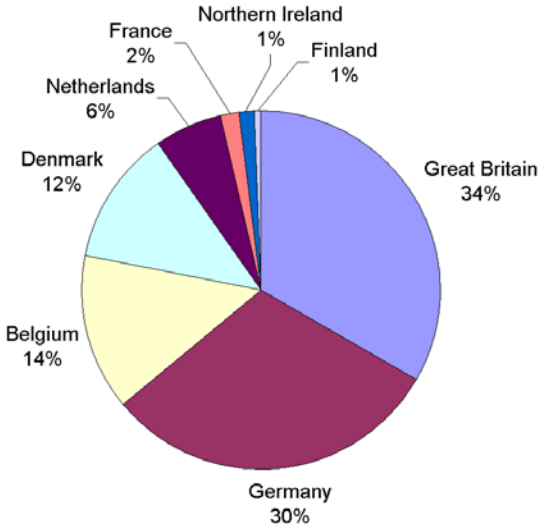

Figure 10 Destination of exported hazardous waste, 2006 (not incl. contaminated soil)

Table 30 Destination and fate of notified hazardous waste exports, excluding contaminated soil, 2006

	Disposal (tonnes)					Recovery (tonnes)					Unspecified treatment (tonnes)	Total exports	
	Landfill	Incineration	Physico-chemical treatment	Other disposal	Total disposal	Use as fuel	Solvent recovery	Metal recovery	Other recovery	Total recovery		Tonnes	%
Great Britain		4,539			4,539	6,243	15,666	12,347	6,063	40,319		44,858	33.3%
Germany	12,123	18,064	382	743	31,312	2,409	78	3,007	4,296	9,790		41,102	30.5%
Belgium		8,524	803	952	10,280	3,868		3,428	1,517	8,813		19,093	14.2%
Denmark		15,665			15,665	1,150				1,150		16,815	12.5%
Netherlands	60	519	524	1,688	2,791	291	144	57	4,602	5,093		7,885	5.8%
France		0			0		589	1,776		2,365		2,365	1.8%
Northern Ireland						844		1,035		1,879		1,879	1.4%
Finland		543			543						259	801	0.6%
Italy									89	89		89	0.1%
USA								19		19		19	0.0%
Total	**12,183**	**47,854**	**1,709**	**3,384**	**65,130**	**14,805**	**16,477**	**21,668**	**16,565**	**69,515**	**259**	**134,904**	100.0%

(Source: TFS records)

9.2 Unreported hazardous waste

An estimated 29,888 tonnes of hazardous waste were classified as unreported in 2006, that is, it was not managed by the formal hazardous waste management industry. By its definition, the undocumented fate of unreported hazardous waste means that it has the potential to have a greater environmental impact than reported hazardous waste. Some unreported waste may end up in general domestic or commercial waste, or it may be disposed of in an uncontrolled manner by burning, burying or discharge to sewer, water or ground. The characteristics and sources of unreported hazardous wastes are shown in Table 31. It is clear from the table that unreported hazardous waste is characterised by wastes that originate from numerous small-scale sources. The generation of spent sheep dip has reportedly decreased significantly in recent years and this decrease is attributed to a decrease in the number of sheep and the increased use of pour-on products in smaller flocks.

Unreported hazardous waste is estimated by two main methodologies:

- *Mass flow analysis*: There is a direct relationship between the use of certain products and the amount of hazardous waste that arises as a result of their use. Central Statistics Office data on imports and exports, combined with data on indigenous production, allowed estimates to be made of the sale of certain products and hence the likely level of waste generation. Examples are batteries and lubrication oil.
- *Examination of hazardous waste arisings in other countries*: For some sectors, no comprehensive records exist in Ireland and quantities were estimated from factors derived from international data.

Other methodologies use data from a wide variety of sources, and on specific studies carried out on certain products or hazardous waste streams.

The problem of unreported waste is exacerbated by a lack of collection facilities for hazardous waste from a diverse range of sources, mostly small scale, including households, small businesses and farms. The challenge and particular priority set out in the Proposed National Hazardous Waste Management Plan 2008-2012 is to minimise and seek to eliminate the phenomenon of unreported hazardous waste. The solution to this problem is centred on providing comprehensive collection services and infrastructure, the availability of which needs to be widely and systematically publicised. This must be backed up by consistent and intensive inspection, enforcement and reporting, supported for some waste streams by producer responsibility obligations.

Table 31 Characteristics and estimated scale of unreported hazardous waste

Hazardous waste category	Characteristics	Estimated unreported quantity in 2006 (tonnes)
Paint and ink packaging	Unused or surplus paint and ink from households, trade and industry. A poor collection infrastructure for householders and the trade contributes to the problem.	7,513
Small batteries	Certain consumer batteries are hazardous waste, such as nickel-cadmium batteries and mercury cells. These are usually mixed in with non-hazardous batteries such as alkaline batteries, so the mixtures are classified as hazardous. Very little separate collection of batteries takes place.	5,361
Other household hazardous waste	A range of hazardous wastes are put in the bin and end up in landfill. For example, household chemicals, garden chemicals, cleaning agents, medicines and other materials.	4,890
Sheep dip	Organophosphate sheep dip, while declining, is still in substantial use. Spent dip is landspread and a code of practice is provided in REPS guidance[68].	3,600
Other agricultural hazardous waste	Comprising oily wastes, animal medicines and contaminated containers and others. Waste oils and some other wastes from this sector are included in other estimates.	3,218
Fluorescent lamps	Tubes and compact fluorescent lamps (CFLs – low energy bulbs). Fluorescent lamps contain mercury.	2,267
Waste oils	Used engine and machine lubrication oil from garages, industry, DIY, maintenance etc.	2,000
Oil filters	Vehicle oil filters from the servicing of road vehicles.	362
Other office and commercial waste	A wide range of product wastes, batteries, fluorescent lamps, printer inks and toner, cleaning agents, and other wastes.	280
Solvents	From dry cleaners and other small scale commercial users.	220
Lead acid batteries	Lead is recovered from batteries for its market value, though not always at authorised outlets. Arising through unauthorised collection from garages or DIY.	177
Dental amalgam	Dental amalgam contains mercury.	0.5
Total estimated generation of unreported hazardous waste		**29,888 tonnes**

[68] *Specification for REPS planners in the Preparation of REPS 4 Plans*, Department of Agriculture and Food, undated.

9.3 Contaminated soil

The generation of contaminated soil continues to increase and in 2006, 406,904 tonnes of contaminated soil were removed from brownfield and dockland redevelopment sites for treatment.

The quantity of contaminated soil generated each year varies as it arises from the remediation and redevelopment of contaminated urban sites. Table 32 outlines contaminated soil generation, management and export since 2001. Enva's Portlaoise facility is authorised to treat up to 60,000 tonnes of contaminated soil each year. Any additional contaminated soil arising is treated on-site of generation or exported for treatment abroad. Treatment abroad can be as simple as screening to remove rubble or may involve other physical or biological processes. The post-treatment fate of exported contaminated soil includes construction use, landfill cover, landfill road construction or simply landfill disposal.

In 2006, 91% of contaminated soil was exported for treatment, with the remainder treated at Enva. Figure 11 illustrates the reported quantity and location of treatment of off-site treatment of contaminated soil since 1998.

Contaminated soil is generated incidentally to the redevelopment of some urban brownfield sites. Most notably the Dublin Docklands redevelopment has generated large quantities of contaminated soil due to the historic usage of the area. The Cork Docklands redevelopment is also expected to generate similarly large quantities. Smaller quantities arise on an ongoing basis from the redevelopment of old fuel filling stations, from minor oil leaks and other sources. The generation of this waste stream cannot be prevented – it has come about as a result of historical activities – but it can be, and generally is, managed properly.

Table 32 Management of contaminated soil, 1998-2006

	2001 (tonnes)	2004 (tonnes)	2005 (tonnes)	2006 (tonnes)
Reported off-site treatment of contaminated soil	168,579	221,137	-	406,904
Of which …				
Treatment in Ireland	8,636 (r)	14,838 (r)	-	36,872 (r)
Exported (total)	159,943	206,299	140,442	370,032
Exported to:				
Belgium	*145,192 (r)*	*22,531 (r)*		
Germany	*14,063 (r)*	*172,948 (d)*	*120,455 (d)*	*341,158(d)*
				28,570(r)
Netherlands		*10,691 (r)*		*305(r)*
Elsewhere in Europe	*742 (r)*	*126 (r)*	*19,986 (d)*	

Note: (r) = predominantly recovery or recycling; (d) = predominantly disposal.

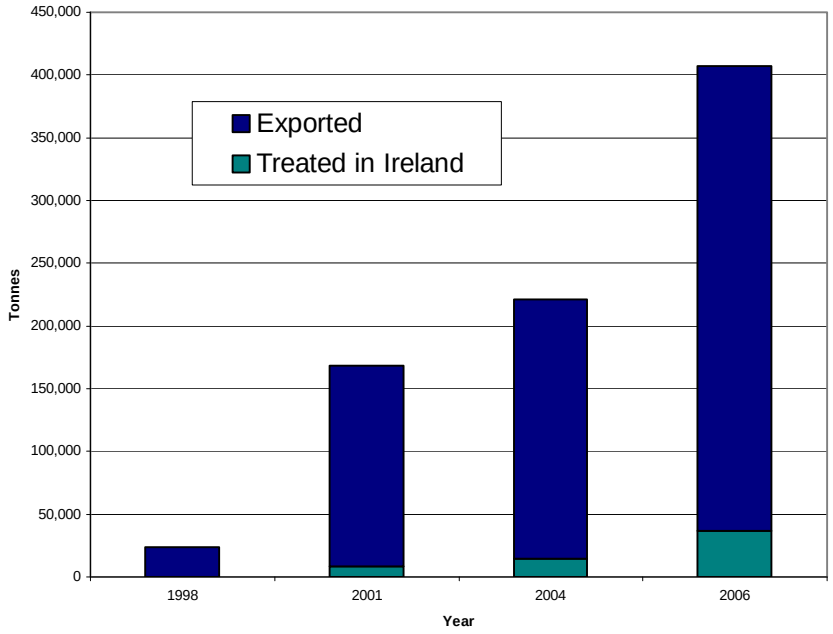

Figure 11 Location of treatment of reported contaminated soil

10 WASTE INFRASTRUCTURE

10.1 Landfill

A total of 4,744,744 tonnes of waste was accepted for disposal at 65 active (local authority and private) landfills in 2006, while a further 3,128,672 tonnes was accepted for recovery at these landfills. A summary is provided in Table 33 and a more detailed breakdown, by facility, is provided in Appendix E.

Table 33 Summary of all waste accepted at landfills in 2006

	Local authority landfills (tonnes)	Private and industrial landfills (tonnes)	Total (tonnes)
Disposal			
Mining waste		1,959,959	**1,959,959**
Household waste	1,207,955	171,291	**1,379,246**
Commercial waste (including non-process industrial waste[69])	294,745	306,627	**601,372**
Construction and demolition waste	3,417	445,130	**448,547**
Industrial waste	4,172	229,398	**233,570**
Other[70]	61,849	[71]60,202	**122,050**
Total disposal to landfill	**1,572,137**	**3,172,607**	**4,744,744**
Recovery			
Construction and demolition waste	[72]1,393,674	1,257,395	**2,651,069**
Mining waste		391,325	**391,325**
Composted or stabilised organic waste used for engineering and landscaping	[72]33,394	43,887	**77,280**
Other[73]	8,128	870	**8,997**
Total recovery at landfill	**1,435,196**	**1,693,476**	**3,128,672**

(Source: waste licence annual environmental reports; IPPC annual environmental reports)

[69] 56,997 tonnes in 2006
[70] Includes agricultural waste, street sweepings, sludges, dredging waste, auto shredder residue and healthcare waste
[71] Includes the disposal of 45,948 tonnes of mixed commercial, industrial, construction and demolition waste excavated from Roadstone Remediation, W0213-01 (remediation of an unauthorised landfill).
[72] Including waste accepted at closed municipal landfills for restoration purposes.
[73] Includes auto shredder residue and fines.

10.1.1 Municipal landfill

A total of 29 landfills[74] accepted 1,980,618 tonnes of municipal waste in 2006. This consisted of 1,379,246 tonnes of household waste, 601,372 tonnes of non-household municipal waste. The breakdown of waste reported as having been accepted at each landfill is presented in Table 34. Landfill is the only disposal option currently available in Ireland for municipal waste. A summary of all landfills operating in 2006, including landfills accepting municipal waste is provided in Appendix E.

Table 34 Municipal waste landfills operating in 2006, waste disposal

EPA Licence Reg. No.	Landfill	Waste Management Planning Region	Household Waste (Tonnes)	Commercial Waste (Tonnes)	Non-process Industrial Waste (Tonnes)	Total (Tonnes)
W0017-03	Gortadroma	Clare Limerick Kerry	50,071	26,375		**76,446**
W0001-03	North Kerry	Clare Limerick Kerry	28,804	30,187		**58,991**
W0109-01	Inagh	Clare Limerick Kerry	31,629	1,109		**32,738**
W0178-01	Connaught Regional	Connaught	44,221	26,313	24,644	**95,178**
W0021-01	Derrinumera	Connaught	21,137	4,182	415	**25,734**
W0059-02	Ballaghaderreen	Connaught	19,286			**19,286**
W0067-01	Rathroeen	Connaught	12,407	5,022	365	**17,794**
W0022-01	East Cork	Cork	21,838	16,963	144	**38,945**
W0012-02	Kinsale Road	Cork	32,870	2,788		**35,658**
W0068-02	Youghal	Cork	1,882	11,899	382	**14,163**
W0089-01	Derryconnell	Cork	10,308	1,402		**11,711**
W0024-02	Ballynacarrick	Donegal	27,778	2,249		**30,026**
W0004-03	Arthurstown	Dublin	591,755			**591,755**
W0009-02	Balleally	Dublin	66,947	63,819		**130,766**
W0081-03	KTK	Kildare		[75]209,725		**209,725**
W0026-02	Kyletelesha	Midlands	23,199	22,459	847	**46,504**
W0029-02	Derryclure	Midlands	18,980	11,876	9,429	**40,284**
W0078-02	Ballaghaveny	Midlands	20,121	10,607		**30,728**
W0028-02	Ballydonagh	Midlands	21,237	8,873	42	**30,151**
W0146-01	Knockharley	North East	105,689	27,431		**133,120**
W0077-02	Corranure	North East	67,738	16,727		**84,465**
W0060-02	Whiteriver	North East	42,968	15,657	13,420	**72,044**
W0020-01	Scotch Corner	North East	13,350	1,726	7,281	**22,357**
W0025-02	Powerstown	South East	33,641	2,782		**36,423**
W0074-02	Donohill	South East	19,152	766		**19,918**
W0030-02	Dunmore	South East	11,304	4,924	29	**16,257**
W0016-02	Killurin	South East	8,620			**8,620**
W0165-01	Ballynagran	Wicklow	21,381	[76]18,514		**39,896**
W0066-02	Rampere	Wicklow	10,935			**10,935**
		Total	**1,379,246**	**544,375**	**56,997**	**1,980,618**

(Source: waste licence annual environmental reports)

[74] One landfill commenced in 2005; Ballynagran (W0165-01). Four landfills closed in 2005; Pollboy (W0027-02), Ballyogan (W0015-01), Tramore (W0075-01) and Kilbarry (W0018-01).

[75] The acceptance of 43,081 tonnes of mixed dry commercial, industrial, construction and demolition waste excavated from Roadstone Remediation, W0213-01 (remediation of an unauthorised landfill), is excluded from this figure.

[76] The acceptance of 2,867 tonnes of mixed dry commercial, industrial, construction and demolition waste excavated from Roadstone Remediation, W0213-01 (remediation of an unauthorised landfill), is excluded from this figure.

10.1.2 Inert landfill

Table 35 illustrates the quantity of inert waste[77] accepted at landfills in 2006, including municipal landfills undergoing restoration and IPPC facilities with on-site landfills. Of the 3,416,626 tonnes, a total of 1,579,715 tonnes (46%) was recovered and 1,836,911 tonnes (54%) was disposed.

Table 35 Waste acceptance at inert landfills in 2006

Inert Landfill	Licence Reg. No.	Disposal (tonnes)	Recovery (tonnes)	Total (tonnes)
Waste licensed facilities				
Murphy Concrete Manufacturing Ltd., Gormanston	W0151-01	0	554,492	**554,492**
Murphy Concrete Manufacturing Ltd., Hollywood	W0129-01	339,754	0	**339,754**
KTK Sand & Gravel Ltd.	W0156-01	0	210,079	**210,079**
Srahmore Peat Deposition Site	W0199-01	112,937	0	**112,937**
Clonbulloge Ash Repository	W0049-02	31,801	0	**31,801**
Former municipal landfills accepting inert waste for capping/restoration				
Dunsink Landfill	W0127-01	0	251,540	**251,540**
Ballyogan Landfill Facility Ballyogan Recycling Park IWMF	W0015-01	0	233,398	**233,398**
Carrowbrowne Landfill	W0013-01	0	119,488	**119,488**
Pollboy Landfill	W0027-02	0	115,543	**115,543**
Tramore Waste Disposal Site	W0075-02	0	47,531	**47,531**
Silliot Hill IWMF	W0014-01	0	43,993	**43,993**
Dungarvan Waste Disposal Site	W0032-02	0	3,650	**3,650**
IPPC facilities with inert landfills				
Aughinish Alumina Ltd., Askeaton, Co. Limerick	P0035-02	1,180,474	0	**1,180,474**
Electricity Supply Board, Money Point, Kilrush, Co. Clare	P0605-02	90,000	0	**90,000**
Electricity Supply Board, Lough Ree Power, Lanesborough, Co. Longford	P0610-01	41,331	0	**41,331**
Electricity Supply Board, West Offaly Power, Shannonbridge, Co Offaly	P0611-01	18,102	0	**18,102**
Premier Periclase Ltd., Drogheda, Co. Louth	P0376-01	13,186	0	**13,186**
Kerry Ingredients Ireland Ltd., Listowel, Co. Kerry	P0393-02	6,710	0	**6,710**
Gypsum Industries Ltd., Carrickmacross, Co. Monaghan	P0519-02	1,780	0	**1,780**
Irish Cement Ltd., Castlemungret, Co. Limerick	P0029-01	560	0	**560**
Finsa Forest Products Ltd., Scariff, Co. Clare	P0022-02	180	0	**180**
Medite Europe Ltd., Clonmel, Co. Tipperary	P0027-02	50	0	**50**
Roche Ireland Ltd., Clarecastle, Co. Clare	P0012-04	46	0	**46**
Total		**1,836,911**	**1,579,715**	**3,416,626**

(Source: waste licence annual environmental reports; IPPC annual environmental reports)

[77] Defined in Article 2 (e) of the Landfill Directive (1999/31/EC) – "waste that does not undergo any significant physical, chemical or biological transformations. Inert waste will not dissolve, burn or otherwise physically or chemically react, biodegrade or adversely affect other matter with which is comes into contact in any way likely to give rise to environmental pollution or harm human health. The total leachability and pollutant content of the waste must be insignificant, and in particular not endanger the quality of surface water and/or groundwater".

10.1.3 Landfill of asbestos and other hazardous waste

Table 36 shows the scale of landfilling of Irish hazardous waste, in Ireland and abroad. Other than contaminated soil, asbestos is the single largest hazardous waste stream that requires landfill disposal. Inorganic sludges and other industrial hazardous wastes are also landfilled. In 2006, a large amount of contaminated soil was exported for landfill disposal. One facility in Ireland, KTK Landfill (waste licence register number W0081-03), is authorised to accept up to 6,000 tonnes of waste construction materials containing asbestos (EWC code 17 06 05*). This facility is scheduled to close by 2009. No other commercially available capacity exists for hazardous waste landfill in Ireland and there are no facilities currently proposed to replace KTK's asbestos disposal capacity from 2009.

In 2006, 2,524 tonnes of asbestos waste was landfilled at KTK Landfill. A further 5,294 tonnes of asbestos waste was exported. Some 6,890 tonnes of other hazardous waste (not including contaminated soil) were exported to Germany in 2006. Table 36 outlines the use of landfill for Irish hazardous waste in Ireland and abroad and indicates a current need for 10,000-15,000 tonnes of capacity per annum. An increase in the export of hazardous waste for landfill is noted between 2004 and 2006, and relates primarily to increased export for landfill of asbestos, sludges and filter cakes.

The landfilling of asbestos is subject to a unique set of criteria. As a 'stabilised non-reactive hazardous waste', construction materials containing asbestos (EWC 17 06 05*) and other suitable asbestos waste may be accepted at non-hazardous landfills, subject to a set of strict waste acceptance and waste management criteria being followed[78]. For example, asbestos must be landfilled alone and separate to the main body of non-hazardous waste; it must be clearly marked on all site maps; and its presence in a dedicated area means that a landfill licence can never be surrendered in relation to that area. The latter is the greatest barrier for landfill operators that might consider accepting asbestos. In addition, any existing licence would need to be reviewed before asbestos could be accepted.

Table 36 Commercial landfilling of Irish hazardous waste, 2004-2006

	2004 (tonnes)		**2006** (tonnes)	
	Off-site	**Exported**	**Off-site**	**Exported**
Asbestos	[79]3,109	[80]4,058	[79]2,524	[81]5,294
Sludges and filter cakes		[82]1,122		2,896
Industrial waste (other)		[83]795		3,994
Contaminated soil		289		21,138
Total	**3,109**	**6,264**	**2,524**	**33,321**
Total off-site landfill excluding contaminated soil		9,084 tonnes		14,708 tonnes
Total off-site landfill of asbestos		7,167 tonnes		7,818 tonnes

[78] As set out in article 6(c)(iii) of the Landfill Directive (1999/31/EC) and section 2.3.3 of the Annex to Council Decision 2003/33/EC.
[79] Landfilled at KTK Landfill, Co. Kildare.
[80] Exported to Germany, of which 3,109 tonnes of construction materials containing asbestos (EWC 17 06 05*) and 949 tonnes of insulation materials containing asbestos (EWC 17 06 01*)
[81] Exported to Germany, of which 3,430 tonnes of construction materials containing asbestos (EWC 17 06 05*) and 1,863 tonnes of insulation materials containing asbestos (EWC 17 06 01*)
[82] Sludges from effluent treatment, from glass manufacture and from metal finishing. Exported to Germany.
[83] Waste from flue gas treatment, from construction, acid and alkali waste and from the pharmaceutical and chemical sector. Exported to Germany, Belgium and Netherlands.

10.2 Thermal Treatment (including incineration)

10.2.1 On-site industrial thermal treatment

Thermal treatment of hazardous waste is carried out on-site at seven IPPC-licensed facilities, treating 44,946 tonnes in 2006, as indicated in Table 37. These facilities are licensed only to treat hazardous waste generated on-site or at sites owned by the same organisation (the latter being subject to special authorisation).

Table 37 Licensed industrial incinerators for on-site waste treatment, 2006

Name of Licensee	IPPC Licence Reg. No.	Number of units	Thermal Treatment (tonnes)		Description
			Disposal by incineration (D10)	Reuse as fuel (R1)	
Astellas Ireland Co Ltd	P0007-03	1	1,918	0	Hazardous liquid waste
Swords Laboratories t/a Bristol Myers Squibb Cruiserath[84]	P0552-01	1	5,497	0	Solvents
Cognis Ireland Ltd	P0052-01		0	3,703	Process distillation residues
Eli Lilly S.A - Irish Branch	P0009-03	2	9,290	0	Solvents
Smithkline Beecham (Cork) Limited	P0004-02	3	16,184	0	Solvents
Novartis Ringaskiddy Limited	P0006-03	2	2,153	2,042	Solid and liquid waste including solvents
Roche Ireland Ltd	P0012-04	1	0	4,159	Halogenated organic waste, header gases, organic liquid waste (bulk)
Total treated			**35,042**	**9,904**	
			44,946		

10.2.2 Commercial incineration

Commercial incineration is not currently a waste treatment option available in Ireland. In November 2005, the EPA granted licenses[85] for two commercial incinerators. The licences provide for the operation of waste incineration facilities by Indaver Ireland at Carranstown, Co. Meath (W0167-01) and Ringaskiddy, Co. Cork (W0186-01). The licences provide for incineration with energy recovery of non-hazardous waste in Carranstown and incineration with energy recovery of both hazardous and non-hazardous waste in Ringaskiddy.

10.2.3 Use of waste as a fuel

In 2006, 124,872 tonnes of non-hazardous waste material was reported by recovery operators to have been used as a fuel, of which at least 28,611 tonnes was packaging. Wood waste is used as a boiler fuel in some

[84] Includes 2,437 tonnes of solvent waste from Swords Laboratories, IPPC Reg. No. P0014-03
[85] Further licence details at epa.ie

integrated pollution prevention control (IPPC) licensed industrial facilities. As reported in section 3.2, 27,883 tonnes of refuse derived fuel was exported in 2006.

Table 38 Non-hazardous waste used as a fuel, 2006

Material Type	Total tonnes	Of which packaging (tonnes)
Wood	84,355	23,093
Refuse derived fuel	27,883	No information
Edible oil and fats	4,686	
Composite packaging	795	795
Other waste	7,153	4,723
Total	**124,872**	**28,611**

(Source: recovery operator survey)

10.3 Mechanical Biological Treatment

The term mechanical biological treatment (MBT) is used to describe not one specific process, but rather a combination of different technologies brought together in an integrated process. MBT can enhance recycling performance where kerbside recycling is already employed, by extracting a further fraction of residual recyclable material. An MBT plant combines mechanical processes to separate out dry recyclables such as glass and metals, and biological processes to drive out moisture and to handle the organic-rich fraction of the incoming waste. In addition to the separation of dry recyclables and organic material from the incoming waste stream, the plant can be designed to produce an energy-rich refuse derived fuel (RDF) comprising paper, plastics and other combustible fractions, that can be combusted in a waste-to-energy plant or in an industrial furnace. The organic-rich fraction is suitable for biostabilisation (producing a low grade compost) or anaerobic digestion. The processes employed reduce the volume of the incoming waste, however there is still a fraction that will require some form of disposal.

At present, some sites in Ireland employ mechanical treatment of waste and it can vary from picking out recyclables to a fully mechanised system of trommels and conveyors to process the waste. In 2006, a total of 12 facilities reported treating residual waste mechanically. However from the available data, it is difficult to estimate how much mixed residual municipal waste was actually treated mechanically in 2006. Construction and demolition waste is also treated mechanically at these facilities. In most cases, it would appear that it is the construction and demolition waste that is being treated mechanically and not mixed residual household and commercial waste and in most cases the mechanical treatment involved little more than mixing the waste and picking out the recyclable material. Only two of these facilities were treating residual household and commercial waste both mechanically and biologically on site. The rest of them were applying some form of mechanical sorting to the waste but the fines produced were being disposed of at landfill. In one case the fines were being sent for stabilisation at a composting facility in Northern Ireland.

Because treatment configurations and the nature of incoming waste can vary, there can be significant variation in the type and quality of the outputs from both the mechanical and biological stages of MBT. The main challenge is to find suitable uses or markets for these outputs. The quality of the recyclables can vary, depending for example on the extent to which they have been contaminated by the general waste with which they were mixed. The calorific value of the refuse derived fuel can differ depending on how much recyclable material has been removed - plastic in particular has a particularly high calorific value. In 2006, a total of 27,883 tonnes of refuse derived fuel was produced at recycling facilities. The RDF was sent abroad and burned in incinerators and cement kilns.

In 2006, there were few facilities treating the organic fines fraction on site so the biological treatment was happening at another facility if at all. In most cases, the organic fines were disposed of directly to landfill. A total of 469,963 tonnes of organic fines were disposed of at EPA-licensed landfills in 2006 although some of this is probably from the mechanical treatment of construction and demolition waste. In the case of the facilities that do produce a biologically stable product for use as landfill cover, there is still uncertainty as to whether the product will meet the requirements of the landfill directive for the diversion of biodegradable waste. The use of these fines as cover for landfill was reported at one landfill in 2006.

11 RESPONSES

The main findings from this National Waste Report may be summarised as follows:

- Waste generation increased in 2006;
- The amount of waste recycled continues a significant upward trend across most municipal waste streams including household waste, packaging waste and biodegradable municipal waste;
- An increasing trend in landfilling has emerged in 2005 and 2006 and this highlights the need to reduce the gross generation of waste at source;
- The increased landfilling of biodegradable municipal waste is making the 2010 target for the diversion of this waste from landfill more difficult to achieve;
- Increased landfilling has caused recycling rates to not increase as much as might be expected given the amount of new waste being recycled;
- Construction and demolition waste generation increased to almost 17 million tonnes and reported construction and demolition waste recycling decreased.

The prevention challenge

Against increasing generation of waste, and in particular its landfill, it is important that efforts are maintained in relation to preventing the generation of waste. The EPA's National Waste Prevention Programme has, since its launch in April 2004, instigated several core prevention projects. Waste prevention and resource efficiency are entering the mainstream language of discussions on waste, and the major prevention projects that are ongoing, and due to commence in 2008, will continue this trend of changing understanding and behaviour in relation to waste.

The Local Authority Prevention Demonstration (LAPD) Programme was launched in 2006. Seven local authorities are participating in phase 1 of the programme and a further six are participating in phase 2. The programme has demonstrated so far that there are considerable benefits to be accrued from local authorities providing dedicated staff to promoting waste prevention and resource efficiency. These include (a) the opportunity for staff to develop expertise in this area and provide better advice to local communities and businesses and (b) the networking and knowledge sharing possibilities of having a large team of dedicated staff around the country. An accredited training programme for local authority staff, for which they will receive a qualification, commenced in November 2007. A second iteration of the course has already been arranged due to demand and further courses will be run annually. The EPA is developing the next phase of the LAPD Programme and will be seeking to maximise its impact across as many local authorities as are willing to participate.

The Green Business Initiative has commenced with three main projects.

- A new website, greenbusiness.ie, is in development and will be rolled out in early 2008. The website will incorporate waste and water audit tools and users will be able to access expert support and advice through the website. Qualifying organisations will be entitled to free on-site assessments of their water and resource consumption, waste generation and potential for prevention.
- The successful Greening Irish Hotels research project, funded by the EPA via the STRIVE research programme, will be rolled out nationally in 2008. Participating hotels will be entitled to an on-site

assessment of their water, energy and resource consumption, and waste generation, with a view to achieving considerable cost and resource use savings.

- The case studies implementation project is seeking case studies from Irish industry and commercial organisations. Feedback indicates there are very few examples of Irish businesses and organisations actually achieving the prevention of waste (as opposed to recycling). This initiative will continue and it is expected that the commencement of the Green Business Initiative as a whole will begin to generate practical case studies in future years.

The Proposed National Hazardous Waste Management Plan outlines a prevention programme to reduce the gross generation of waste in six priority sectors – industrial, commercial and household. It also outlines proposals to ensure that all hazardous waste is collected and managed properly. The Plan will be finalised in early 2008.

An Taisce commenced a Green Home Programme in 2006 with a view to expanding the successful Green Schools project into the home. The National Waste Prevention Programme has provided financial and technical support to An Taisce and discussions are ongoing about extending the Green Home Programme nationally. The aim of the Green Home Programme is to facilitate and support positive, sustainable and practical action for the environment amongst householders.

Repak commenced a packaging prevention programme in 2007 and this is 50% funded by the National Waste Prevention Programme. 'Prevent and save' case studies have been published and several important projects have commenced. One particular project will examine the 'how', 'why' and 'who' of decision-making in the packaging supply chain.

Additional resources are needed to scale up these important initiatives, including dedicated personnel in the EPA and local authorities. In this regard, the Proposed National Hazardous Waste Management Plan recommends that at least one green business officer and one waste prevention officer should be appointed to work in each local authority area.

Promoting resource efficiency and waste prevention is more than simply providing engineering solutions. It is about culture change and reintroducing traditional concepts of efficiency and saving money on simple things. Prevention will be a slow burning initiative that will take many years to be seen at the macro level of national waste statistics. However, the impact at the individual enterprise or organisation level can be profound and far-reaching. The benefits are being exploited by relatively few at present. In future, there may be a need for regulation in this area, and this will be kept under review by the EPA. It is interesting to note that the European Environment Agency has commented that waste prevention is as difficult to accomplish as climate change prevention.

The recycling challenge – maintaining progress and sharing the focus with prevention

On the recycling front, all organisations responsible for promoting and achieving the recycling of waste deserve credit. Recycling is up across many sectors, including household and commercial waste, packaging and waste electrical and electronic equipment. The organisations responsible for these successes, including local authorities, Repak, Cré, WEEE Ireland and ERP deserve credit. Recycling will remain high as long as these organisations remain active and keep stakeholders fully engaged in its promotion. However, Repak, WEEE Ireland and ERP in particular should, on behalf of their members, undertake to reduce the generation of packaging and waste electrical and electronic equipment, respectively, at source, i.e. before it reaches the retailer or the customer. Each organisation has committed to prevention. However, all members of these organisations

should be brought into active initiatives that seek to increase their resource efficiency and reduce the generation of waste. Where voluntary action is inadequate, the Department of Environment, Heritage and Local Government should evaluate the use of quantitative prevention targets in the authorisations for collective schemes.

Additionally, with regard to packaging, it is recommended that Repak consider the business case for diverting effort from finding new sources of packaging waste to recycle and commit to an enhanced packaging prevention programme, which could have the long term benefit of reducing the generation side of the equation and increasing the recycling rate (even with no new recycling). The EPA is committed to continued technical and financial support to Repak in this regard and will match-fund any new resources provided by Repak in the context of an agreed enhanced packaging prevention programme for an initial period of two years (see chapter 5).

The landfill challenge – reducing the disposal of waste

On landfilling, the 8% increase in the landfill of municipal waste in 2006 is disappointing. There are several possible reasons put forward in this report for the increase. Decreasing landfill gate fees are a likely contributor. The acceptability of landfilling untreated biodegradable waste in landfills may be undermining economically marginal recycling activities. The classification of municipal waste by the waste industry may not be consistent, leading to over-reporting at landfill.

It is interesting to note the trend in landfill gate fees, compiled independently by the Irish Waste Management Association and an environmental consultancy White Young Green on landfill gate fees, shown in Figure 12. Landfilling of municipal waste and household waste was at its lowest in 2003 and 2004, when landfill fees were highest[86]. It becomes less certain that the large increase in landfilling seen in 2006 can be attributed entirely to reduced gate fees. However, even in the face of uncertain data, it seems reasonable to observe what common sense would dictate, that cheaper landfill will mean more landfill. If landfill becomes cheaper than recycling, waste contractors will often landfill in preference to recycling.

The EPA has data that indicates organic fines from the mechanical treatment of mixed residual waste (the “M” in MBT – mechanical biological treatment) is being landfilled instead of being further treated by biostabilisation (the “B” in MBT). If the biological part of MBT is to be promoted, then economic and regulatory drivers (such as a ban on landfilling untreated waste) will be required to divert waste from landfill and into preferred management routes. The primary policy objective for the coming year should be to seek a reduction in landfilling and this should where possible be progressed in parallel with the international review of waste management that will take place in 2008.

[86] The highest national average of €160 per tonne was recorded in June 2004.

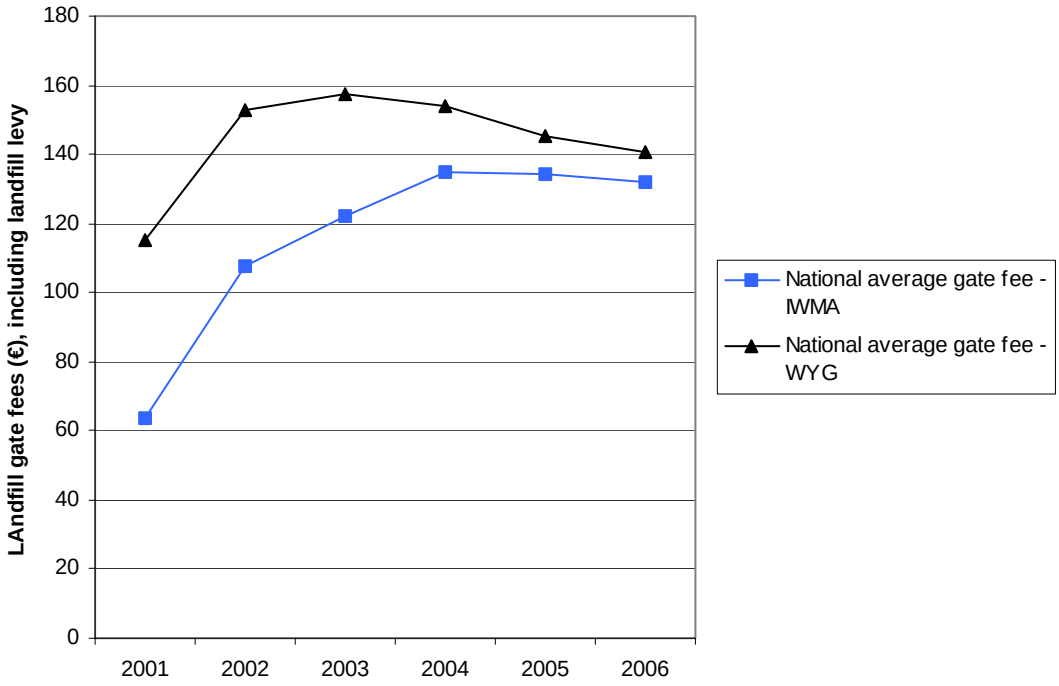

Figure 12 National average landfill gate fee 2000-2006

Source: Irish Waste Management Association (IWMA) and White Young Green (WYG). IWMA average was calculated by IWMA. WYG average was calculated by EPA. WYG data is based on telephone survey of local authority landfills. WYG data is published periodically in the newsletter *Wastelines*. National annual averages are based on reports from landfills operating at that point in time, i.e. a variable number of operating landfills. Generating national averages subjects the data to considerable rounding and aggregation.

Biodegradable municipal waste – and its diversion from landfill

The National Strategy on Biodegradable Waste was published by the Department of the Environment, Heritage and Local Government in April 2006. The principal objective of the strategy is to bring about the diversion of progressively increasing quantities of biodegradable municipal waste from landfill. As set out in chapter 4, the landfill of biodegradable municipal waste is increasing, not decreasing, moving further away from the statutory target for 2010. Urgent action is needed to co-ordinate efforts at the national level to ensure the strategy gets implemented insofar as is possible in the current changing policy landscape. The non-contentious parts of the strategy should receive first priority and the national implementation steering group established without delay to set out an action plan for national and local implementation of the strategy. It is difficult to see how Ireland will reach its landfill diversion targets for 2010 given the scale of the task remaining. However, it appears prudent to do all that is possible in the remaining two years to demonstrate that concrete actions are now underway, thereby reducing the potential scale of sanction that might be sought against Ireland by the European Commission. As set out in the preceding section, a mixture of economic and regulatory instruments should be considered for the diversion of biodegradable municipal waste from landfill. Incineration is also a possible diversion-from-landfill technology and is included in the National Strategy.

Market Development – reducing the export of recyclable waste

The Market Development Group commenced in 2004 but is currently dormant pending the implementation of the Market Development Programme for Waste Resources developed by consultants in 2007. While the export of Irish recyclable waste takes place in a stable European and active worldwide marketplace for material commodities, there are many benefits accruing from recycling our own waste in Ireland, including:

- Reduced export means reduced export emissions. The recently published *Environmental Report relating to the Strategic Environmental Assessment of the Proposed National Hazardous Waste Management Plan 2008-2012* calculated that treating waste solvents in Ireland could save up to 88% of transport related greenhouse gas emissions. Similar greenhouse gas emissions savings would be expected if the transport for export of other waste streams were avoided.
- More recycling industry in Ireland means greater employment, development of expertise and the potential for the sale of knowledge overseas.
- Greater manufacturing of goods and products to a high standard from recycled materials in Ireland could reduce the import of similar goods and products.

The Market Development Programme is reported to require at least three full time staff if it is to be successful.

Green procurement – buying green

Green (public) procurement forms part of the published Market Development Programme for Waste Resources. After many years of discussions on green public procurement, there is no reason for further stating that this is a good idea. Green public procurement principles, with a focus on reducing the use of material resources in the first place, and using recycled products where possible, should be set out in national guidance, and implemented through the use of quantitative targets to be met by public bodies and, if necessary, through regulation.

International review of waste management policy

The Minister for the Environment, Heritage and Local Government announced in 2007 that an international review of waste management policy would be undertaken in 2008 with a view to the best international experience being evaluated and considered for application to a revised waste management policy in Ireland. However, it will be important that the projected 12-month duration of the review does not impede the timely implementation of other initiatives, most notably the National Strategy on Biodegradable Waste.

Producer responsibility –producers taking responsibility for their manufacturing and marketing choices

Producer responsibility has proven a very effective tool in maximising the recycling of packaging and waste electrical and electronic equipment. These producer responsibility obligations have demonstrated the benefit of the business community working collectively to achieve quantified end-goals.

The producer responsibility obligation on end-of-life vehicles remains relatively new. It lacks a compliance scheme, and is therefore being implemented in a piecemeal manner by producers with local authorities responsible for enforcing the requirements.

Producer responsibility for tyres was implemented by regulations in 2007 and the batteries directive will be transposed in 2008. The Proposed National Hazardous Waste Management Plan recommends examining and evaluating the potential use of producer responsibility obligations for a range of other waste streams including medicines, farm chemical containers, waste oil, oil filters, paint and paint containers, household pesticides and herbicides (and their containers) and ink and ink containers from the publishing industry. Producer responsibility should also be considered and evaluated to achieve a reduction in the use of newsprint and to obtain industry support for the recycling of newspapers.

Producer responsibility has proven successful in achieving the recycling of waste. It remains to be seen if it can provide the same results in the improvement in resource efficiencies and reduced waste generation. In this regard, producers should take more responsibility for the marketing and product presentation choices they make and desist from simply and too easily blaming the customer - "this is what the consumer wants." A new paradigm is required that encourages and directs producers down the path of sustainable consumption and production to concepts such as eco-design, product longevity, reuse systems, and to consider new, more sustainable business models. In the absence of voluntary actions by business, for which supports are available through the Green Business Initiative and elsewhere, mandatory targets may be required through producer responsibility and other forms of regulation.

Construction and demolition waste

The National Construction and Demolition Waste Council launched a voluntary construction industry initiative to prevent, minimise and recycle construction and demolition waste in 2004. The initiative set out a number of objectives to be achieved by a range of stakeholders. While making good progress in certain areas, it is clear that the Council suffers from a lack of dedicated resources and has been supported to date by a part-time secretariat at the Construction Industry Federation. Based on the findings presented in chapter 7, and given the lack of reliable data on the generation and management of construction and demolition waste, it is recommended that the voluntary mandate of the National Construction and Demolition Waste Council be independently and impartially reviewed, with a view to ensuring that the Council represents the best possible model for achieving best practice in resource efficiency and waste management in the large and economically important construction sector. The onus should be placed on the Council to demonstrate that the industry has achieved "substantial progress [on recycling] through voluntary effort"[87] and to make the case for continued financial support by Government and public bodies.

[87] Quoted from Proposed Voluntary Construction Industry Initiative to Prevent, Minimise and Recycle C&D Waste, 2004, National Construction and Demolition Waste Council.

Hazardous waste management

In November 2007, the EPA published a Proposed National Hazardous Waste Management Plan for the period 2008 to 2012. The public consultation period closes on 31 January 2008. The Proposed Plan sets out the priorities that the EPA proposes are important for the prevention and management of hazardous waste in Ireland over the five-year period of the Plan. The Proposed Plan sets out 30 recommendations for action. A timeline and responsible body is also proposed for each recommendation. The Department of the Environment, Heritage and Local Government, local authorities and the EPA are proposed as the principal responsible bodies for the Plan's implementation. Implementation of the Plan, subject to its finalisation in early 2008, will commence in 2008 and the EPA will prepare annual implementation reports and compare progress against a set of proposed implementation and environmental indicators.

APPENDIX A – INDICATORS

Indicator	2001	2002	2003	2004	2005[88]	2006[89]
Municipal waste						
Municipal waste managed (tonnes)	2,297,603	2,389,769	2,559,387	2,703,603	2,779,097	3,100,310
Municipal waste managed/person (tonnes)	0.59	0.61	0.65	0.67	0.67	0.73
Municipal waste generated (tonnes) [90]	2,704,035	2,720,385	2,917,886	3,000,638	3,040,714	3,384,606
Municipal waste generated/person (tonnes)	0.69	0.69	0.75	0.74	0.74	0.8
Disposal of household and commercial waste (tonnes)	1,992,050	1,901,864	1,832,625	1,818,536	1,833,330	1,980,618
Disposal rate for household and commercial waste	86.7%	79.6%	71.6%	67.3%	66.0%	63.9%
Recovery of household and commercial waste (tonnes)	305,554	496,905	726,763	885,068	945,767	1,119,692
Recovery rate for household and commercial waste	13.3%	20.8%	28.4%	32.7%	34.0%	36.1%
Number landfills accepting municipal waste	48	39	35	34	32	29
Number of bring banks	1,436	1,636	1,692	1,824	1,921	1,919
Number of civic amenity sites	53	49	60	69	79	86
Household waste						
Household waste managed (tonnes)	1,329,744	1,426,662	1,416,862	1,500,780	1,543,468	1,773,242
Household waste managed/person (tonnes)	0.34	0.36	0.36	0.37	0.37	0.42
Household waste generated (tonnes) [90]	1,468,834	1,679,068	1,704,844	1,728,154	1,746,408	1,978,716
Household waste generated/person (tonnes)	0.37	0.43	0.44	0.43	0.42	0.47
Disposal of household waste (tonnes)	1,254,857	1,294,061	1,231,109	1,214,908	1,198,504	1,379,246
Disposal rate for household waste	94.4%	90.7%	86.9%	81.0%	77.7%	77.8%
Recovery of household waste (tonnes)	74,887	132,602	185,753	285,872	344,964	393,995
Recovery rate for household waste	5.6%	9.3%	13.1%	19.0%	22.3%	22.2%
Commercial waste						
Commercial waste managed (tonnes)	967,859	972,106	1,140,576	1,202,824	1,235,629	1,327,068
Commercial waste managed/person (tonnes)	0.25	0.25	0.29	0.3	0.3	0.31
Disposal of commercial waste (tonnes)	737,193	607,803	601,515	603,628	634,826	601,372
Disposal rate for commercial waste	76.2%	62.5%	52.7%	50.2%	51.4%	45.3%
Recovery of commercial waste (tonnes)	230,666	364,303	541,010	599,196	600,803	725,697
Recovery rate for commercial waste	23.8%	37.5%	47.4%	49.8%	48.6%	54.7%
Packaging waste						
Best estimate of total quantity generated (tonnes)	872,917	899,125	1,006,287	850,911	925,221	1,028,472
Packaging waste generated/person (tonnes)	0.22	0.23	0.26	0.21	0.22	0.24
Best estimate of packaging waste recovered (tonnes)	221,266	296,389	419,600	479,540	545,368	589,519
Packaging waste recovered/person (tonnes)	0.056	0.076	0.107	0.119	0.132	0.14
National recovery rate	25.3%	33%	41.7%	56.4%	58.9%	57.3%

[88] See Appendix F – Revision to tables from National Waste Report 2005
[89] Per person calculations are based on CSO population data from Census 2006 of 4,239,848 people.
[90] Includes uncollected household waste.

APPENDIX B – HOUSEHOLD WASTE, AS REPORTED BY LOCAL AUTHORITIES IN 2006

Local authority	Mixed residual collection (Black Bins)	Separate kerbside collection of mixed dry recyclables (Green Bins)	Separate kerbside collection of food and garden waste (Brown Bins)	Household waste brought to bring banks	Household waste brought to CA sites	Household waste delivered directly to landfill face by householders	Estimate of home composting	"Uncollected" household waste	Total Household Waste
Dublin City Council	153,048	22,635	411	11,140	7,715	0	4,000	0	**198,949**
Dun Laoghaire-Rathdown	35,466	13,211	285	5,747	18,270	0	2,305	246	**75,530**
Fingal County Council	65,302	12,633	1,971	4,085	11,533	0	875	0	**96,399**
South Dublin County Council	61,301	13,859	0	4,752	22,675	0	1,037	0	**103,625**
Dublin Region sub-total	**315,117**	**62,338**	**2,667**	**25,724**	**60,194**	**0**	**8,217**	**246**	**474,503**
Cork County Council	46,900	15,451	0	21,630	22,352	0	397	15,579	**122,309**
Cork City Council	34,926	7,742	0	2,078	5,259	0	330	4,831	**55,166**
Cork Region sub-total	**81,826**	**23,193**	**0**	**23,709**	**27,611**	**0**	**727**	**20,410**	**177,475**
Galway County Council	26,175	10,048	883	2,964	1,120	0	1,607	24,900	**67,697**
Galway City Council	11,342	4,917	5,761	1,995	571	0	60	1,458	**26,103**
Leitrim County Council	4,812	1,000	0	673	486	150	560	2,561	**10,242**
Mayo County Council	29,111	2,010	0	2,079	7,356	11,015	700	11,990	**64,260**
Roscommon County Council	10,872	2,936	0	728	2,857	1,358	180	9,985	**28,916**
Sligo County Council	9,839	1,706	0	990	1,474	0	529	2,295	**16,834**
Connaught Region sub-total	**92,151**	**22,617**	**6,644**	**9,430**	**13,864**	**12,523**	**3,636**	**53,188**	**214,051**
Clare County Council	21,433	4,757	0	1,642	8,176	3,294	906	8,790	**48,996**
Kerry County Council	21,332	6,073	345	2,924	5,923	3,761	1,800	15,826	**57,984**
Limerick County Council	19,800	4,588	0	2,213	3,642	1,509	600	7,513	**39,865**
Limerick City Council	12,635	3,007	0	1,230	531	0	300	929	**18,632**
Mid-west Region sub-total	**75,199**	**18,425**	**345**	**8,009**	**18,272**	**8,564**	**3,606**	**33,058**	**165,478**

Local authority	Mixed residual collection (Black Bins)	Separate kerbside collection of mixed dry recyclables (Green Bins)	Separate kerbside collection of food and garden waste (Brown Bins)	Household waste brought to bring banks	Household waste brought to CA sites	Household waste delivered directly to landfill face by householders	Estimate of home composting	"Uncollected" household waste	Total Household Waste
Cavan County Council	13,656	1,695	0	1,808	3,536	0	260	13,657	**34,612**
Louth County Council	36,157	4,045	0	2,094	12,234	2,576	148	7,346	**64,601**
Meath County Council	40,270	7,583	0	1,442	4,945	0	1,200	1,147	**56,587**
Monaghan County Council	11,537	2,130	0	867	3,644	0	330	5,819	**24,329**
North East Region sub-total	**101,620**	**15,453**	**0**	**6,212**	**24,360**	**2,576**	**1,938**	**27,970**	**180,129**
Carlow County Council	12,764	973	0	1,524	6,038	0	379	1,399	**23,077**
Kilkenny County Council	12,309	3,511	0	2,011	2,129	2,887	1,023	5,278	**29,149**
South Tipp County Council	19,227	5,426	0	2,020	1,014	274	662	5,583	**34,205**
Waterford County Council	9,263	2,697	2,165	1,097	3,239	0	360	3,291	**22,113**
Waterford City Council	7,267	2,558	3,766	1,282	1,242	308	360	414	**17,198**
Wexford County Council	23,853	6,624	0	3,144	3,576	0	1,987	13,630	**52,814**
South East Region sub-total	**84,683**	**21,789**	**5,931**	**11,078**	**17,238**	**3,469**	**4,771**	**29,596**	**178,556**
Laois County Council	10,432	2,693	0	698	2,853	7,043	408	1,853	**25,980**
Offaly County Council	10,599	2,711	0	843	4,061	0	344	2,546	**21,104**
Longford County Council	6,415	2,077	0	469	811	0	225	5,290	**15,288**
North Tipp County Council	15,472	3,502	0	981	3,659	1,092	273	7,931	**32,909**
Westmeath County Council	14,391	3,021	10	1,238	5,665	3,146	141	1,900	**29,513**
Midlands Region sub-total	**57,309**	**14,004**	**10**	**4,229**	**17,049**	**11,281**	**1,391**	**19,521**	**124,794**
Donegal County Council	19,995	2,657	0	2,956	2,036	596	1,600	13,866	**43,705**
Kildare County Council	46,299	10,111	0	2,800	5,738	0	1,500	16	**66,464**
Wicklow County Council	26,734	3,552	0	2,581	5,038	224	1,424	7,605	**47,158**
Total	**900,934**	**194,139**	**15,597**	**96,727**	**191,399**	**39,232**	**28,810**	**205,474**	**1,672,313**

APPENDIX C – WASTE TYPES COLLECTED AT BRING BANKS

Local authority	Paper & cardboard	Glass	Aluminium cans	Steel cans	Plastic packaging	Other plastic	Composite packaging	Textiles	Small batteries	Total
Carlow	833	536	47	0	0	0	0	59	49	**1,524**
Cavan	10	836	50	39	699	0	6	168	0	**1,808**
Clare	0	1,495	71	0	76	0	0	0	0	**1,642**
Cork County	11,251	9,172	488	0	428	0	0	292	0	**21,630**
Cork City	0	2,068	11	0	0	0	0	0	0	**2,078**
Donegal	477	1,879	31	174	158	0	0	238	0	**2,956**
Dublin City	1,849	8,282	102	28	354	0	38	418	69	**11,140**
Dun Laoghaire-Rathdown	349	4,689	70	4	319	0	4	311	2	**5,747**
Fingal	0	3,762	20	20	0	0	0	283	1	**4,085**
Galway	0	2,823	81	3	0	0	0	58	0	**2,964**
Galway City	0	1,995	0	0	0	0	0	0	0	**1,995**
Kerry	607	2,059	83	118	0	0	0	57	0	**2,924**
Kildare	0	2,760	20	20	0	0	0	0	0	**2,800**
Kilkenny	394	1,454	63	50	31	0	0	20	0	**2,011**
Laois	0	567	10	0	0	0	0	121	0	**698**
Leitrim	0	551	23	0	0	0	0	95	3	**672**
Limerick County	632	1,173	50	73	0	95	0	190	0	**2,213**
Limerick City	139	818	41	22	52	0	0	150	7	**1,230**
Longford	0	442	27	0	0	0	0	0	0	**469**
Louth	0	1,705	69	0	0	320	0	0	0	**2,094**
Mayo	0	1,735	93	0	0	0	0	251	0	**2,079**
Meath	0	1,420	22	0	0	0	0	0	0	**1,442**
Monaghan	0	844	23	0	0	0	0	0	0	**867**
North Tipperary	0	957	24	0	0	0	0	0	0	**981**
Offaly	0	823	20	0	0	0	0	0	0	**843**
Roscommon	0	685	43	0	0	0	0	0	0	**728**
Sligo	0	909	40	0	0	0	0	39	2	**990**
South Dublin	0	4,197	53	0	314	0	0	187	1	**4,752**
South Tipperary	59	1,927	34	0	0	0	0	0	0	**2,020**
Waterford County	0	1,097	0	0	0	0	0	0	0	**1,097**
Waterford City	0	1,197	53	0	0	0	0	33	0	**1,283**
Westmeath	0	1,053	33	0	0	0	0	152	0	**1,238**
Wexford	347	2,511	112	0	72	0	0	95	7	**3,144**
Wicklow	0	2,346	101	31	0	0	0	105	0	**2,583**
Total	**16,946**	**70,767**	**2,006**	**581**	**2,501**	**415**	**49**	**3,321**	**143**	**96,728**

APPENDIX D – WASTE TYPES COLLECTED AT CIVIC AMENITY SITES

Local authority	mixed residual waste	organic waste (food and garden)	mixed dry recyclables	Paper & cardboard	Glass	Metals	Plastic	Textiles	Wood	Small batteries	Lead acid batteries	Waste mineral oils	Oil filters (vehicles)	waste cooking or vegetable oils	waste paint and varnish (including containers)	WEEE	bulky waste	Other[91]	Total
Carlow	4,241	0	0	607	179	395	82	58	202	26	49	5	2	3	0	188	0	0	6,038
Cavan	830	337	0	545	221	204	839	169	0	5	29	2	0	0	0	355	0	0	3,536
Clare	3,293	708	0	949	162	828	106	248	834	0	54	8	1	1	3	590	390	0	8,176
Cork County	5,479	1,891	0	3,731	1,133	1,447	1,116	225	3,899	49	190	30	0	21	65	1,778	0	1,297	22,352
Cork City	3,044	354	0	418	128	144	47	0	221	16	0	15	0	0	0	869	0	4	5,259
Donegal	0	0	0	709	67	248	206	35	100	2	27	13	0	5	0	311	281	32	2,036
Dublin City	0	0	0	451	345	383	337	0	416	2	24	7	0	0	280	762	3,169	1,540	7,715
Dun Laoghaire-Rathdown	3,460	6,519	0	1,163	862	608	540	276	1,390	43	0	12	0	1	125	871	2,347	53	18,270
Fingal	4,891	560	0	628	773	289	265	120	933	3	47	19	0	1	35	1,334	1,426	209	11,533
Galway County	0	0	0	310	103	148	63	20	0	4	52	2	0	0	46	379	0	4	1,132
Galway City	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	510	57	0	571
Kerry	3,761	250	5	740	220	158	63	2	0	9	39	10	0	0	1	665	0	0	5,923
Kildare	3,888	450	0	354	116	302	42	53	0	28	0	7	0	1	0	443	0	54	5,738
Kilkenny	964	0	0	414	102	153	82	78	36	2	10	1	0	1	0	254	0	33	2,129
Laois	0	0	0	658	219	262	65	64	1,261	66	0	25	1	0	0	233	0	1	2,853
Leitrim	0	14	0	87	0	57	13	10	0	1	20	7	0	0	7	147	124	0	486
Limerick	15	1,287	17	602	160	465	97	84	177	2	60	7	4	3	20	452	0	189	3,642
Limerick City	0	0	0	139	0	0	0	0	0	1	6	2	0	2	22	360	0	0	531
Longford	531	2	49	107	6	50	23	0	44	0	0	0	0	0	0	0	0	0	811
Louth	1,479	1,525	0	4,336	617	549	586	107	1,020	47	0	11	0	0	0	629	0	1,328	12,234
Mayo	4,487	0	0	1,285	0	524	126	0	240	5	53	10	0	3	24	578	0	21	7,356
Meath	59	1,147	29	1,022	478	513	161	191	527	3	62	7	0	2	5	736	0	1	4,945
Monaghan	417	153	0	1,635	92	393	155	42	612	12	0	0	0	0	0	135	0	0	3,644
North Tipperary	0	4	1,812	928	158	88	103	14	26	29	0	0	8	0	0	409	79	1	3,659
Offaly	2,834	0	0	281	126	168	38	44	262	0	13	6	0	1	0	285	0	3	4,061

[91] Household hazardous waste, mineral oil containers, aerosols, composite packaging, DIY waste, gas cylinders and tyres

Local authority	mixed residual waste	organic waste (food and garden)	mixed dry recyclables	Paper & cardboard	Glass	Metals	Plastic	Textiles	Wood	Small batteries	Lead acid batteries	Waste mineral oils	Oil filters (vehicles)	waste cooking or vegetable oils	waste paint and varnish (including containers)	WEEE	bulky waste	Other[91]	Total
Roscommon	748	0	0	852	260	198	113	72	105	0	47	3	0	0	32	366	62	0	2,857
Sligo	0	8	0	593	143	90	55	19	61	1	15	0	0	0	0	212	0	278	1,474
South Dublin	4,189	8,068	0	659	150	398	46	52	1,226	66	0	36	0	0	0	1,257	6,484	44	22,675
South Tipperary	403	14	0	94	26	26	0	2	46	0	42	2	0	0	12	346	0	0	1,014
Waterford County	1,768	136	480	0	14	119	0	3	263	0	14	0	1	4	2	300	0	136	3,239
Waterford City	308	0	0	47	49	130	0	0	16	1	5	1	0	0	4	484	196	0	1,242
Westmeath	3,545	212	0	577	206	199	71	75	359	29	0	7	0	0	0	371	0	14	5,665
Wexford	2,649	0	0	282	143	9	42	46	0	0	53	7	1	0	0	339	0	5	3,576
Wicklow	200	71	0	2,667	668	206	360	242	0	7	59	7	0	9	0	523	0	20	5,038
Total	**57,486**	**23,708**	**2,392**	**27,871**	**7,926**	**9,750**	**5,841**	**2,352**	**14,274**	**459**	**967**	**268**	**17**	**59**	**674**	**17,473**	**14,615**	**5,266**	**191,399**

APPENDIX E – LANDFILLS IN OPERATION IN 2006

						Disposal						Recovery		
	Local authority / Operator	Facility Name	Waste Licence Reg No.	Total in 2005 (Tonnes)	Total in 2006 (Tonnes)	Household Waste (Tonnes)	Commercial Waste[92] (Tonnes)	Industrial Waste (Tonnes)	Construction & Demolition Waste (Tonnes)	Street Sweepings (Tonnes)	Other Wastes (Tonnes)	C & D Waste (Tonnes)	Organic Waste (Tonnes)	Other Wastes (Tonnes)
1	Carlow County Council	Powerstown Landfill Site	W0025-02	45,407	38,091	33,641	2,782	0	0	1,038	629	0	0	0
2	Cavan County Council	Corranure Landfill	W0077-02	52,624	100,984	67,738	16,727	472	0	575	0	11,415	4,058	0
3	Clare County Council	Ballyduff Beg Inagh	W0109-01	59,725	39,014	31,629	1,109	1,439	0	807	3,721	0	309	0
4	Cork City Council	Kinsale Road Landfill	W0012-02	49,641	48,036	32,870	2,788	0	0	5,822	0	0	6,556	0
5	Cork County Council	East Cork Landfill Site	W0022-01	78,080	111,018	21,838	17,108	16	0	0	4,154	63,301	4,602	0
6	Cork County Council	Raffeen Landfill	W0023-01	180,000	0	0	0	0	0	0	0	0	0	0
7	Cork County Council	Youghal Landfill	W0068-02	17,722	18,776	1,882	12,281	0	0	0	386	4,228	0	0
8	Cork County Council	Derryconnell Landfill Site	W0089-01	10,245	12,536	10,308	1,402	0	247	0	0	577	0	0
9	Donegal County Council	Ballynacarrick Landfill	W0024-02	46,540	32,908	27,778	2,249	1	962	1,241	677	0	0	0
10	Donegal County Council	Glenalla Landfill	W0125-01	34,474	0	0	0	0	0	0	0	0	0	0
11	Donegal County Council	Muckish Landfill	W0126-01	34,667	0	0	0	0	0	0	0	0	0	0
12	Dun Laoghaire-Rathdown	Ballyogan Landfill/ Recycling Park	W0015-01	490,525	233,398	0	0	0	0	0	0	233,398	0	0
13	Fingal County Council	Balleally Landfill	W0009-02	131,236	307,214	66,947	63,819	0	0	0	11,448	165,000	0	0
14	Fingal County Council	Dunsink Landfill	W0127-01	206,900	251,540	0	0	0	0	0	0	251,540	0	0
15	Galway City Council	Carrowbrowne Landfill	W0013-01	0	119,488	0	0	0	0	0	0	112,600	6,888	0
16	Galway County Council	Pollboy Landfill	W0027-02	187,573	115,543	0	0	0	0	0	0	115,000	543	0

[92] Includes non-process industrial waste

	Local authority / Operator	Facility Name	Waste Licence Reg No.	Total in 2005 (Tonnes)	Total in 2006 (Tonnes)	Disposal						Recovery		
						Household Waste (Tonnes)	Commercial Waste[92] (Tonnes)	Industrial Waste (Tonnes)	Construction & Demolition Waste (Tonnes)	Street Sweepings (Tonnes)	Other Wastes (Tonnes)	C & D Waste (Tonnes)	Organic Waste (Tonnes)	Other Wastes (Tonnes)
17	Kerry County Council	North Kerry Landfill Site	W0001-03	34,431	60,025	28,804	30,187	0	409	609	15	0	0	0
18	Kildare County Council	Silliot Hill IWMF	W0014-01	0	43,993	0	0	0	0	0	0	42,622	1,371	0
19	Kilkenny County Council	Dunmore Landfill	W0030-02	22,222	18,581	11,304	4,952	0	579	1,679	66	0	0	0
20	Laois County Council	Kyletelesha Landfill	W0026-02	76,712	133,785	23,199	23,306	71	0	237	0	85,711	1,261	0
21	Limerick County Council	Gortadroma	W0017-03	61,286	95,965	50,071	26,375	600	0	2,543	1,100	6,521	627	8,128
22	Louth County Council	Whiteriver	W0060-02	101,074	120,142	42,968	29,077	0	281	7,972	2,139	35,200	2,505	0
23	Mayo County Council	Derrinumera Landfill	W0021-01	29,983	26,872	21,137	4,597	0	0	574	406	0	159	0
24	Mayo County Council	Rathroeen Landfill	W0067-01	26,502	18,940	12,407	5,387	0	176	889	0	0	81	0
25	Monaghan County Council	Scotch Corner Landfill	W0020-01	48,083	30,727	13,350	9,007	170	291	1,694	1,233	691	4,292	0
26	North Tipperary County Council	Ballaghaveny Landfill	W0078-02	25,594	31,791	20,121	10,607	0	0	1,012	50	0	0	0
27	Offaly County Council	Derryclure Landfill	W0029-02	51,484	98,746	18,980	21,305	0	0	0	4,834	53,628	0	0
28	Roscommon County Council	Ballaghaderreen Landfill	W0059-02	17,347	22,592	19,286	0	0	0	0	291	2,917	99	0
29	South Dublin County Council	Arthurstown Landfill	W0004-03	504,774	699,255	591,755	0	0	0	0	0	107,500	0	0
30	South Tipperary County Council	Donohill Landfill	W0074-02	20,416	23,724	19,152	766	1,294	470	1,176	866	0	0	0
31	Waterford County Council	Kilbarry Landfill	W0018-01	31,482	0	0	0	0	0	0	0	0	0	0
32	Waterford County Council	Dungarvan Waste Disposal Site	W0032-02	1,380	3,650	0	0	0	0	0	0	3,607	42	0
33	Waterford County Council	Tramore Waste Disposal Site	W0075-02	90,297	47,531	0	0	0	0	0	0	47,531	0	0
34	Westmeath County Council	Marlinstown Landfill	W0071-02	4,686	0	0	0	0	0	0	0	0	0	0
35	Westmeath County Council	Ballydonagh Landfill	W0028-02	50,823	56,979	21,237	8,914	110	0	793	0	25,925	0	0

	Local authority / Operator	Facility Name	Waste Licence Reg No.	Total in 2005 (Tonnes)	Total in 2006 (Tonnes)	Disposal						Recovery		
						Household Waste (Tonnes)	Commercial Waste[92] (Tonnes)	Industrial Waste (Tonnes)	Construction & Demolition Waste (Tonnes)	Street Sweepings (Tonnes)	Other Wastes (Tonnes)	C & D Waste (Tonnes)	Organic Waste (Tonnes)	Other Wastes (Tonnes)
36	Wexford County Council	Killurin Landfill	W0016-02	74,087	33,350	8,620	0	0	0	604	0	24,127	0	0
37	Wicklow County Council	Ballymurtagh Landfill Facility	W0011-01	76,380	0	0	0	0	0	0	0	0	0	0
38	Wicklow County Council	Rampere Landfill	W0066-02	9,180	12,138	10,935	0	0	0	391	179	634	0	0
39	Dundalk Town Council	Dundalk Landfill / Civic Waste Facility IWMF	W0034-02	97,198	2,771	0	0	0	0	0	0	1,220	1,551	0
40	Drogheda Borough Council	Drogheda Landfill	W0033-01	0	58,584	0	0	0	0	0	0	58,584	0	0
41	Neiphin Trading Ltd.	Kerdiffstown	W0047-01	363,129	267,708	0	0	0	0	0	0	267,708	0	0
42	KTK Landfill Limited	KTK Landfill Limited	W0081-03	353,625	409,944	0	209,725	16,653	3,367	0	52,290	100,000	27,910	0
43	KTK Sand & Gravel Ltd	KTK Sand & Gravel Ltd	W0156-01	241,965	210,079	0	0	0	0	0	0	210,079	0	0
44	Swalcliffe	Swalcliffe	W0181-01	4,454	0	0	0	0	0	0	0	0	0	0
45	Tegral Building Products Limited	Ballylinan Landfill Site	W0046-01	11,878	0	0	0	0	0	0	0	0	0	0
46	Murphy Concrete Manufacturing Ltd.	Murphy Concrete Manufacturing Ltd. Hollywood	W0129-01	330,973	339,754	0	0	7,661	328,799	0	3,294	0	0	0
47	Murphy Concrete Manufacturing Ltd.	Murphy Concrete Manufacturing Ltd Gormanston	W0151-01	686,662	554,492	0	0	0	0	0	0	554,492	0	0
48	Greenstar Holdings Limited	Knockharley Landfill	W0146-01	169,803	181,417	105,689	27,431	0	0	0	0	39,797	8,501	0
49	Greenstar Holdings Limited	Connaught Regional Residual Landfill	W0178-01	162	116,698	44,221	50,957	1,339	27	711	1,040	15,713	2,690	0
50	Greenstar Holdings Limited	Ballynagran Landfill	W0165-01	0	56,669	21,381	18,514	0	0	0	2,867	9,802	3,234	870
51	Roadstone Dublin Limited	Roadstone Remediation Landfill	W0213-01	0	157,401	0	0	0	0	0	0	29,774	0	127,626
52	Bord Na Mona	Clonbulloge Ash Repository	W0049-02	32,571	31,801	0	0	31,801	0	0	0	0	0	0
53	Bord Na Mona	Srahmore Peat Deposition Site	W0199-01	113,227	112,937	0	0	0	112,937	0	0	0	0	0

	Local authority / Operator	Facility Name	Waste Licence Reg No.	Total in 2005 (Tonnes)	Total in 2006 (Tonnes)	Disposal						Recovery		
						Household Waste (Tonnes)	Commercial Waste[92] (Tonnes)	Industrial Waste (Tonnes)	Construction & Demolition Waste (Tonnes)	Street Sweepings (Tonnes)	Other Wastes (Tonnes)	C & D Waste (Tonnes)	Organic Waste (Tonnes)	Other Wastes (Tonnes)
54	Anglo American Lisheen Mining Limited		P0088-02		1,170,810			779,485						391,325
55	Electricity Supply Board (Money Point)		P0605-02		90,000			90,000						
56	Electricity Supply Board (Lough Ree Power)		P0610-01		41,331			41,331						
57	Electricity Supply Board (West Offaly)		P0611-01		18,102			18,102						
58	Finsa Forest Products		P0022-02		180			180						
59	Roche Ireland		P0012-04		46			46						
60	Medite		P0027-02		50			50						
61	Aughinish alumina Ltd		P0035-02		1,180,474			1,180,474						
62	Premier Periclase Ltd		P0376-01		13,186			13,186						
63	Kerry Ingredients Ireland Ltd		P0393-02		6,710			6,710						
64	Gypsum Industries Ltd		P0519-02		1,780			1,780						
65	Irish Cement Ltd		P0029-01		560			560						
Total				**5,389,228**	**8,030,817**	**1,379,246**	**601,372**	**2,193,529**	**448,547**	**30,366**	**91,685**	**2,680,843**	**77,280**	**527,949**

APPENDIX F – REVISION TO TABLES FROM NATIONAL WASTE REPORT 2005

New information came to light during the 2006 data validation process regarding the 2005 figure of 15,222 tonnes of 'Other' packaging waste, it was established that this was 699 tonnes of composite packaging and 14,523 tonnes of mixed packaging sent abroad for use as fuel. Following further enquiries to the waste operators who reported having sent this material abroad it was clarified that while 5,259 tonnes of mixed packaging used as fuel for energy recovery, the remaining 9,264 tonnes was sent for disposal. Therefore the 9,264 tonnes was subtracted from the total recovery column and added to the disposal column, thereby reducing the total recovery rate for 2005 from 59.9% to 58.9%. It also came to light that 9,336 tonnes of non-packaging paper and cardboard waste previously reported as recovered in Ireland was misreported and so has been excluded. The tables for 2005 were therefore revised. The revised numbers are highlighted in **bold text** and shaded.

Table 2 Disposal and recovery of municipal waste, 2005

Material	Quantity managed (tonnes)	Quantity landfilled (tonnes)	National landfill rate (%)	Quantity recovered (tonnes)	National recovery rate (%)
Wood	213,926	13,939	6.5	199,987	93.5
Ferrous	86,161	24,204	28.1	61,956	71.9
Glass	150,159	53,461	35.6	96,697	64.4
WEEE	34,052	12,312	36.2	21,740	63.8
Paper and cardboard	**881,928**	449,957	51.0	**431,971**	49.0
Plastic	300,110	241,424	80.4	58,687	19.6
Other metals	14,644	12,521	85.5	2,123	14.5
Aluminium	22,466	20,281	90.3	2,186	9.7
Textiles	157,984	146,790	92.9	11,194	7.1
Organics	715,314	667,512	93.3	47,802	6.7
Others	**202,353**	**190,928**	**94.4**	**11,425**	**5.6**
Total	**2,779,097**	**1,833,330**	**66.0**	**945,767**	**34.0**

Table 7 Disposal and recovery rates in the household waste stream, 2005

Material	Gross quantity available (tonnes)	Quantity landfilled (tonnes)	National landfill rate (%)	Quantity recovered (tonnes)	National recovery rate (%)
Glass	121,674	44,173	36.3	77,501	63.7
WEEE	20,672	9,551	46.2	11,121	53.8
Wood	19,010	10,745	56.5	8,266	43.5
Paper and cardboard	395,026	229,223	58.0	165,803	42.0
Ferrous	24,184	17,908	74.0	6,276	26.0
Plastic	194,325	164,754	84.8	29,570	15.2
Aluminium	18,533	16,714	90.2	1,819	9.8
Organics	466,002	432,182	92.7	33,820	7.3
Textiles	138,859	131,326	94.6	7,533	5.4
Other metals	5,005	4,775	95.4	230	4.6
Others	140,178	**137,152**	**97.8**	**3,026**	**2.2**
Total	**1,543,468**	**1,198,504**	**77.7**	**344,964**	**22.3**

Table 13 Disposal and recovery in the commercial waste stream, 2005

Material	Gross quantity available (tonnes)	Quantity landfilled (tonnes)	National landfill rate (%)	Quantity recovered (tonnes)	National recovery rate (%)
Wood	194,916	3,194	1.6	191,722	98.4
Ferrous	61,977	6,296	10.2	55,681	89.8
WEEE	13,380	2,761	20.6	10,619	79.4
Glass	28,484	9,288	32.6	19,197	67.4
Paper and cardboard	**486,902**	220,734	**45.3**	**266,168**	**55.0**
Plastic	105,786	76,669	72.5	29,116	27.5
Other metals	9,639	7,746	80.4	1,893	19.6
Textiles	19,125	15,464	80.9	3,661	19.1
Aluminium	3,933	3,566	90.7	367	9.3
Organics	249,312	235,331	94.4	13,982	5.6
Others	62,175	**53,777**	**86.5**	**8,398**	**13.5**
Total	**1,235,629**	**634,826**	**51.4**	**600,803**	**48.6**

Table 16 Biodegradable municipal waste generation and management, 2005

Material	Gross quantity available (tonnes)	Quantity landfilled (tonnes)	National landfill rate (%)	Quantity recovered (tonnes)	National recovery rate (%)
Wood	213,926	13,939	6.5	199,987	93.5
Paper and cardboard	**881,928**	449,957	51.0	**431,971**	**49.0**
Textiles	157,984	146,790	92.9	11,194	7.1
Organics	744,685	696,883	93.6	47,802	6.4
Total	**1,998,523**	**1,307,570**	**65.4**	**690,953**	**34.6**

Table 18 Packaging waste generation, disposal and recovery, 2005

Material	Gross quantity available (tonnes)	Quantity landfilled (tonnes)	National landfill rate (%)	Quantity recovered (tonnes)	National recovery rate (%)
Paper and cardboard	325,888	92,668	28.4	233,219	71.6
Glass	143,807	51,568	35.9	92,239	64.1
Plastic	218,018	165,431	75.9	52,586	24.1
Ferrous	58,672	18,284	31.2	40,388	68.8
Aluminium	12,549	10,730	85.5	1,819	14.5
Other metals	2,530	1,716	67.9	813	32.1
Textiles	215	215	100.0		
Wood	120,880	2,535	2.1	118,345	97.9
Other	42,663	**36,705**	**86.0**	**5,958**	**14.0**
Total	**925,221**	**379,853**	**41.1**	**545,368**	**58.9**

APPENDIX G – REVISION TO TABLES FROM NATIONAL WASTE REPORT 2004

Chapter 8 Hazardous Waste

Several entries on the hazardous waste dataset for 2004 are herein amended due to significant double-counting in the original returns submitted by one local authority. The cause of the double-counting has been identified as the local authority attempting to provide a record of all notifications received, as opposed to a statistical record of waste exports. Data checking procedures in the EPA have been amended accordingly. Some 15,500 tonnes of exported hazardous waste were double-counted by the local authority.

(Where the original tables are amended, entries are shaded. Where totals have been recalculated due to amended entries, these are also shaded.)

Table 39 Summary of reported and projected generation of hazardous waste

Category of hazardous waste	**2001 (tonnes)**		**2004 (tonnes)**	
Industrial hazardous waste	*Reported* 202,502	*Projected* 244,426	*Reported* 209,197	*Projected* 259,487
Other hazardous waste (reported)	72,185		98,585	
Contaminated soil (reported)	168,579		221,137	
Unreported	48,402		47,011	
Total	**491,669**	**533,592**	**575,930**	**626,220**

(Source: IPPC annual environmental reports; responses to industrial survey waste licence annual environmental reports; TFS records)

Table 40 Generation and destination of reported and unreported hazardous waste, 2004

Category	On-site (tonnes)	Off-site (tonnes)	Exported (tonnes)	Unreported (tonnes)	Total (tonnes)
Solvents	63,351	1,072	87,295		151,718
Solvents (halogenated, where specified)	2,984	4	6,456	26	9,470
Oil waste (mineral oil)	200	22,229	2,043		24,472
Sheep dip			0	22,053	22,053
Industrial hazardous waste (other)	3,879	2,112	9,681		15,672
Salts and saltcake	13,655		0.2		13,655
Healthcare risk waste		12,864	187		13,051
Oily sludges		8,643	44	2,266	10,953
Lead-acid batteries			6,677	3,330	10,007
Equipment (electrical, electronic, mechanical)			9,073		9,073
Household hazardous waste (other)			0	8,765	8,765
Chemical waste (other)		55	8,251		8,305
Paint, ink and varnish waste (including packaging)		387	3,357	4,111	7,855
Acid and alkali waste	114	1,729	4,541		6,384
Asbestos waste	2	3,109	4,066		7,177
Aqueous washing liquids and mother liquors (07 __ 01*)	1,955	521	3,975		6,451
Solid wastes from MFSU of pharmaceuticals (07 05 13*)	0.7	41	5,882		5,924
Sludges and filter cakes	20	218	4,941		5,179
Batteries (small, non-lead acid)			120	3,279	3,399
Packaging (contaminated or containing residues)	22	1,799	1,338		3,159
Photographic chemical waste		409	1,541	2.2	1,952
Oil filters		603	0	1,327	1,930
Construction and demolition waste (hazardous)			1,685		1,685
Metal- and heavy metal-containing waste	29	15	1,580		1,623
Agricultural hazardous waste (other)			0	1,174	1,174
Absorbents, wiping cloths etc. (EWC 150202)	60	11	788		859
Fluorescent lamps		125	74	454	653
Pesticides, herbicides	25	0.3	575		600
Laboratory and general chemical waste	12	7.2	488		508
Thermal treatment and combustion residues	19		290		309
Medicines			308		308
Municipal hazardous waste (other)		1.4	223		224
Commercial hazardous waste (other)			0	224	224
Polychlorinated biphenyls			19		19
Sub-total hazardous waste (excluding contaminated soil)	***86,328***	***55,953***	***165,498***	***47,011***	***354,792***
Contaminated soil		14,838	206,299		221,137
Total	**86,328**	**70,791**	**371,799**	**47,011**	**575,929**

(Source: IPPC annual environmental reports; responses to industrial survey: waste licence annual environmental reports; TFS records)

Table 41 Recovery and disposal of hazardous waste (excluding contaminated soil) in 2004

	Disposal or recovery activity	On-site	Off-site	Exported	Total
D1	Landfill	13,657		5,484	19,142
D3	Deep injection			53	53
D4	Impoundment	18			18
D5	Engineered landfill		3,109	492	3,601
D8	Biological treatment	2,200		906	3,106
D9	Physico-chemical treatment	72	28,397	4,179	32,649
D10	Incineration on land	37,304		54,471	102,210
D12	Permanent storage			44	44
D13	Blending or mixing			70	70
D14	Repackaging prior to disposal			20	20
D15	Storage pending disposal	178		341	519
	Sub-total disposal	**53,429**	**31,506**	**66,059**	**161,430**
R0	Direct reuse	1.6			1.6
R1	Reuse as fuel	6,025		36,518	42,591
R2	Solvent recovery	26,597	837	19,772	47,906
R3	Organic substance recycling	78		2,681	2,760
R4	Metal recovery	29	2,428	20,026	22,799
R5	Inorganic substance recycling			4,758	4,758
R6	Regeneration of acids or bases			3,122	3,122
R7	Recovery of components used for pollution abatement			20	20
R8	Recovery of components from catalysts			42	42
R9	Oil recovery	169	21,181	4	21,354
R12	Waste exchange			820	820
R13	Storage pending recovery	0.1		11,305	11,305
	Sub-total recovery	**32,899**	**24,446**	**99,069**	**157,479**
U	Unspecified			372	372
		86,328	**55,952**	**165,500**	**319,281**

(Source: IPPC annual environmental reports; responses to industrial survey: waste licence annual environmental reports; TFS records)

Table 42 Destination and fate of notified hazardous waste exports, including contaminated soil, 2004

	Disposal (tonnes)					Recovery (tonnes)					Unspecified treatment (tonnes)	Total exports	
	Landfill	Inciner-Ation	Contam-inated soil treatment	Other disposal	*Total disposal*	Reuse as fuel	Solvent recovery	Inorganic material recovery	Other recovery	*Total recovery*		Tonnes	%
Germany	6,088	26,648	170,744	3,399	***206,590***	3,906	20	2,433	4,751	***11,110***	149	**217,849**	**66.1**
Great Britain		19,708		36	***19,743***	4,877	19,635	2,161	28,266	***54,939***	72	**74,754**	**16.5**
Belgium	39	5,997		1,275	***7,312***	2,410	37	24,888	2,675	***30,009***	12	**37,333**	**8.2**
Denmark		20			***20***	22,451				***22,451***		**22,471**	**4.9**
Netherlands	138	1,051		902	***2,091***	2,498		10,731	1,854	***15,084***		**17,174**	**3.8**
Finland		1,040			***1,040***				4	***4***		**1,044**	**0.2**
Northern Ireland						477			4	***481***	82	**564**	**0.1**
France									332	***332***		**332**	**0.1**
USA									21	***21***		**21**	**<0.1**
Switzerland							50			***50***		**50**	**<0.1**
Italy									42	***42***		**42**	**<0.1**
Sweden							30			***30***		**30**	**<0.1**
Unspecified		8			***8***				71	***71***	55	**134**	**<0.1**
Total	**6,265**	**64,906**	**256,658**	**5,612**	***333,441***	**36,666**	**20,472**	**40,212**	**38,337**	***135,688***	**371**	**371,799**	**100%**

(Source: TFS records)

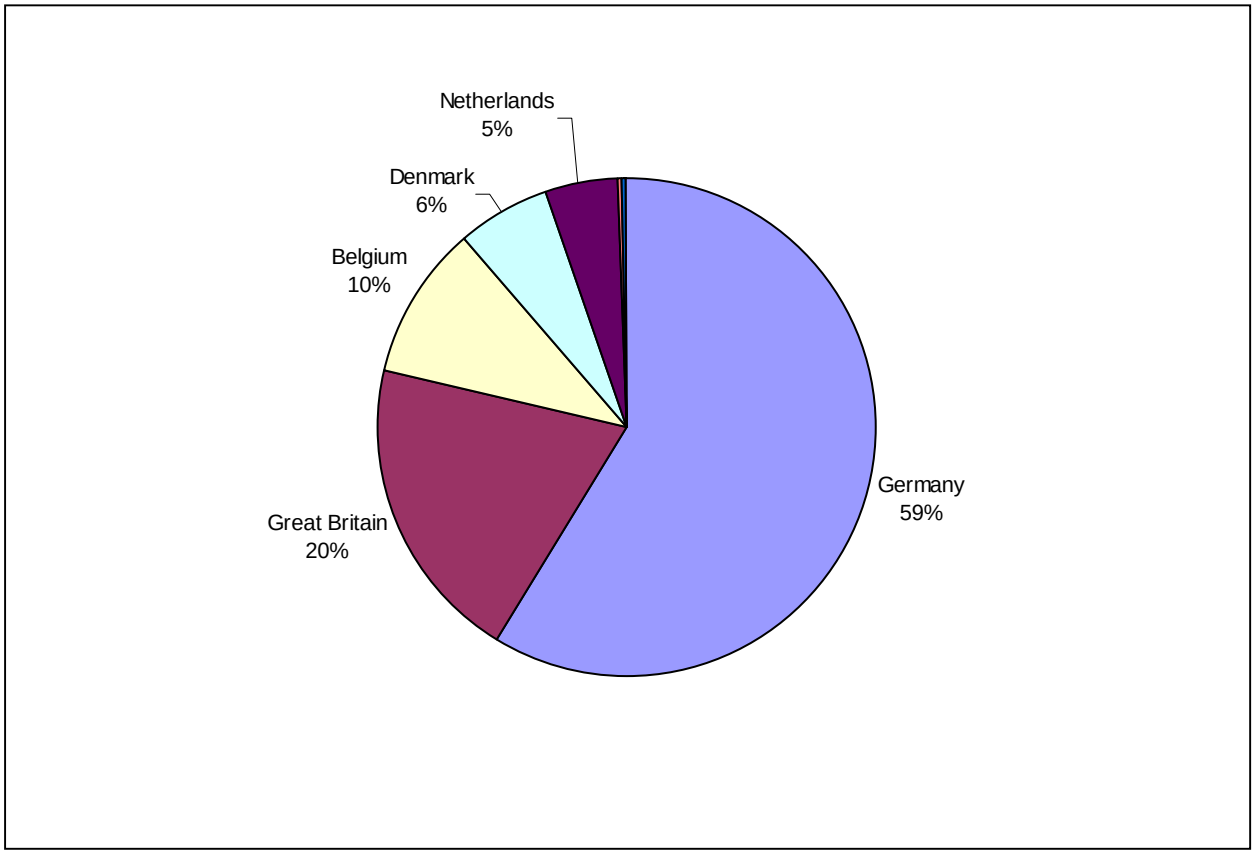

Figure 13 Destination of notified hazardous waste exports in 2004

Figure 14 Recovery and disposal of contaminated soil in 2004

	Disposal or recovery activity	On-site	Off-site	Exported	Total
D1	Landfill	0	0	240	240
D5	Engineered landfill	0	0	49	49
D9	Physico-chemical treatment	0	0	170,455	170,455
	Sub-total disposal	**0**	**0**	170,744	170,744
R1	Reuse as fuel	0	0	100	100
R5	Inorganic substance recycling	0	14,838	35,454	50,292
	Sub-total recovery	**0**	**14,838**	**35,554**	**50,392**
	Total disposal and recovery	**0**	**14,838**	**206,299**	**221,137**

(Source: TFS records; waste licence annual environmental reports)

APPENDIX H – REVISION TO TABLES FROM NATIONAL WASTE DATABASE REPORT 2001

Chapter 4.4 Hazardous Waste

Several entries on the hazardous waste dataset for 2001 are herein amended due to an error in the manner in which off-site treatment of hazardous waste was counted. The quantity of hazardous waste treated at authorised facilities in Ireland was over-counted by 24,378 tonnes.

(Where the original tables are amended, entries are shaded. Where totals have been recalculated due to amended entries, these are also shaded.)

Table 43 Generation and destination of hazardous waste, 2001

Hazardous waste type	On-site (tonnes)	Off-site (tonnes)	Exported (tonnes)	Reported sub-total (tonnes)	Unreported (tonnes)	Total (tonnes)
Contaminated soil		8,500	159,943	168,443		168,443
Organic and organic chlorinated solvents	37,075	687	81,893	119,655	42	119,697
Saltcake/salts	27,554	3	1,460	29,017		29,017
Waste oils	76	23,005	579	23,660		23,660
Washing liquids and mother liquors	4,646	0	10,722	15,368		15,368
Other hazardous wastes	17,581	0	7	17,588		17,588
Sheep dip		0		0	18,000	18,000
Lead acid batteries		1	7,479	7,480	7,146	14,626
Acid/alkali waste	2,969	1,540	1,238	5,747		5,747
Oily sludges	666	5,454	74	6,194	2,349	8,543
Paint and ink packaging		0		0	7,912	7,912
Other household hazardous waste			9	9	7,178	7,187
Clinical waste		5,451	341	5,792		5,792
Still bottoms and reaction residues	4,927	0	341	5,268		5,268
Other pharmaceutical waste		513	4,072	4,585		4,585
Small batteries		0	120	120	2,303	2,423
Laboratory and general chemical waste	21	527	1,554	2,102		2,102
Filter cakes and metal containing sludges	18	0	1,180	1,198		1,198
Paint/ink/varnish liquid waste	8	350	1,081	1,439		1,439
Pesticides (agricultural)			21	21	1,350	1,371
Oil filters		449	33	482	812	1,294
Dross from metallurgy		0	746	746		746
Metal hydroxide sludges/ion exchange resins		527	390	917		917
Asbestos waste		0	822	822		822
Heavy metal containing waste		782	54	836		836
Fluorescent tubes		64	34	98	552	650
Photographic waste		160	393	553	0	553
Contaminated packaging or packaging containing residues		0	429	429		429
Veterinary medicines				0	467	467
Paint/ink/varnish sludges		0		0		0
Adhesive waste	3	0	270	273		273
General office waste				0	291	291
Waste catalysts		0		0		0
Thermal treatment residues	23	0		23		23
PCB waste		0	21	21		21
Boiler dust		0		0		0
Mercury containing wastes		0	1	1		1
Gold solutions		0		0		0
Total	**95,567**	**48,013**	**275,307**	**418,887**	**48,402**	**467,289**

Table 44 Recovery and disposal of hazardous waste in 2001

D/R code	Disposal/Recovery description	On-site (tonnes)	Off-site (tonnes)	Exported (tonnes)	Reported sub-total (tonnes)	Unreported (tonnes)	Total (tonnes)
D1	Landfill	28,656	0	1,377	30,033		30,033
D2	Land treatment		0		0		0
D4	Surface impoundment	35			35		35
D5	Engineering Landfill		0	170	170		170
D6	Release to water body		0		0		0
D7	Release to seas/oceans		0		0		0
D8	Biological pre-treatment	2,105	0		2,105		2,105
D9	Physico-chemical pre-treatment	2,379	15,612	243	18,234		18,234
D10	Incineration on land	21,491		42,974	64,465		64,465
D13	Blending or mixing prior to disposal		0		0		0
D14	Repackaging prior to disposal		0		0		0
D15	Storage prior to disposal		0	3,143	3,143		3,143
DU	Undefined disposal		0	24	24		24
	Sub-total disposal	**54,666**	**15,612**	**47,931**	**118,209**	**0**	**118,209**
R0	Reuse in existing form	1,238	0		1,238		1,238
R1	Use as a fuel	9,560	0	20,402	29,962		29,962
R2	Solvent reclamation/regeneration	9,413	644	22,205	32,262		32,262
R3	Recycling or reclamation of organic materials other than solvents	18,284	0	6,522	24,806		24,806
R4	Recycling or reclamation of metals		513	10,569	11,082		11,082
R5	Recycling or reclamation of inorganic materials	2,121	8,500	157,213	167,834		167,834
R6	Regeneration of acids or bases		0		0		0
R7	Recovery of components used for pollution abatement	21	0		21		21
R8	Recovery of components from catalysts		0		0		0
R9	Used oil re-refining or reuse of waste oil	260	22,744		23,004		23,004
R10	Land treatment			2	2		2
R11	Use of waste from another recovery activity		0		0		0
R12	Waste exchange prior to recovery		0	11	11		11
R13	Storage prior to recovery	3	0	9,949	9,952		9,952
RU	Undefined recovery		0	32	32		32
	Sub-total recovery	**40,900**	**32,401**	**226,905**	**300,206**	**0**	**300,206**
U	Undefined recovery or disposal		0	476	625	48,402	49,027
	Total	**95,566**	**48,013**	**275,312**	**418,891**	**48,402**	**467,293**