

National Waste Database

Interim Report 2003



Environmental Protection Agency

AGENCY STATUS

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

The EPA is managed by a full time Executive Board consisting of a Director General and four Directors. Independence is assured through the selection procedures for the Director General and Directors and the freedom, as provided in the legislation, to act on its own initiative. The assignment, under the legislation, of direct responsibility for a wide range of functions underpins this independence. Under legislation, it is a specific offence to attempt to influence the Agency, or anyone acting on its behalf, in an improper manner.

The Agency is assisted by an Advisory Committee of twelve members, appointed by the Minister for the Environment, Heritage and Local Government.

RESPONSIBILITIES

The EPA has a wide range of statutory duties and powers under the Environmental Protection Act. In addition, the capacity of the EPA in relation to enforcement has been enhanced by powers contained in the Protection of the Environment Act 2003. The main responsibilities of the EPA include the following:

- licensing large/complex industrial and other processes with significant polluting potential;
 - monitoring environmental quality, including the establishment of databases to which the public have access;
 - publishing periodic reports on the state of the environment;
 - promoting environmentally sound practices;
 - promoting and co-ordinating environmental research;
 - licensing all significant waste disposal and recovery activities, including landfills, and the preparation of a national hazardous waste management plan;
 - implementing a system of permitting for the control of VOC emissions resulting from the storage of significant quantities of petrol at terminals;
 - implementing and enforcing the GMO Regulations for the contained and deliberate release of GMOs into the environment;
 - preparing and implementing a national hydrometric programme;
 - drafting a National Allocation Plan for greenhouse gas emissions allowance trading; the establishment of a National Competent Authority for the issuing of trading permits and allowances to those covered by the scheme; the monitoring, overseeing and verification of emissions from participating companies; and the establishment of a National Emissions Trading Registry;
- and, under the Office of Environmental Enforcement, established in 2003 and dedicated to the implementation and enforcement of environmental legislation in Ireland:
- improving overall compliance with environmental protection legislation in Ireland;
 - raising awareness about the importance of enforcement of environmental protection legislation in Ireland;
 - enforcing IPPC licences and Waste licences issued by the EPA;
 - auditing and reporting on the performance of local authorities in the discharge of their environmental protection functions, including:
 - enforcement in respect of breaches of waste permits,
 - taking action in relation to illegal dumping,
 - implementation of waste collection permits, and
 - enforcement of producer responsibility initiatives (for example, in the area of packaging waste);
 - taking action against local authorities that are not discharging their environmental protection functions in an adequate manner;
 - prosecuting, or assisting local authorities to prosecute, significant breaches of environmental protection legislation, in a timely manner; and
 - assisting local authorities to improve their environmental protection performance on a case by case basis, through the establishment of an enforcement network to promote information exchange and best practice, and by the provision of appropriate guidance.

An Ghníomhaireacht um Chaomhnú Comhshaoil

STÁDAS NA GNÍOMHAIREACHTA

Is comhlacht poiblí neamhspleách í an Ghníomhaireacht um Chaomhnú Comhshaoil (EPA) a bunaíodh i mí Iúil 1993 faoin Acht fán nGníomhaireacht um Chaomhnú Comhshaoil, 1992. Ó thaobh an Rialtais, is í an Roinn Comhshaoil agus Rialtais Áitiúil a dhéanann urraíocht uirthi.

Déanann Bord Feidhmeach lánaimseartha comhdhéanta d'Ard-Stiúrthóir agus ceathrar Stiúrthóirí bainistíocht ar an EPA. Cinntítear neamhspleáchas trí nósanna imeachta roghnaithe i gcás an Ard-Stiúrthóra agus na Stiúrthóirí agus an tsaoirse, de réir mar a sholáthraítear sa reachtaíocht, gníomhú as a stuaim féin. Tá an sannadh, faoin reachtaíocht, maidir le freagracht dhíreach as réimse leathan feidhmeanna mar bhonn taca ag an neamhspleáchas sin. Faoin reachtaíocht, is cion sainiúil é iarracht a dhéanamh tionchar a imirt ar an Ghníomhaireacht, nó ar aon duine a bhíonn ag gníomhú thar ceann na Gníomhaireachta, ar bhealach míchuí.

Cuidíonn Coiste Comhairleach ar a bhfuil dhá chomhalta déag arna gceapadh ag an Aire Comhshaoil, Oidhreacht agus Rialtais Áitiúil leis an nGníomhaireacht.

FREAGRACHTAÍ

Tá réimse leathan dualgas agus cumhachtaí reachtúla ag an EPA faoin Acht fán nGníomhaireacht um Chaomhnú Comhshaoil. Chomh maith leis sin, tá curtha le hacmhainn an EPA maidir le forfheidhmiú le cumhachtaí san Acht um Chaomhnú an Chomhshaoil 2003. Áirítear orthu seo a leanas príomhfhreagrachtaí an EPA:

- ceadúnú a dhéanamh ar phróisis thionsclaíocha mhóra/choimpléascacha a bhféadfadh cumas truaillithe suntasach a bheith ag baint leo;
- monatóireacht ar chaighdeán comhshaoil, lena n-áirítear bunachair shonraí a bhunú ar a mbeidh rochtain ag an bpobal;
- tuarascálacha tréimhsiúla maidir le staid an chomhshaoil a fhoilsiú;
- sárchleachtais comhshaoil a chur chun cinn;
- taighde comhshaoil a chur chun cinn agus a chomhordú;
- gníomhaíochtaí díúscartha dramhaíola agus aisghabhála suntasacha, lena n-áirítear láithreacha líonta talún a cheadúnú agus plean bainistíochta guaisdramhaíola náisiúnta a ullmhú;
- córas a chur i bhfeidhm a cheadaíonn rialú astaithe VOC a bhíonn mar thoradh ar scaoileadh GMOanna isteach sa chomhshaoil in aon turas;

- rialacháin GMO a chur i bhfeidhm agus a forfheidhmiú ó thaobh GMOanna a choinneáil agus a scaoileadh amach sa chomhshaoil in aon turas;
- clár hidriméadrach náisiúnta a ullmhú agus a chur i bhfeidhm;
- dréacht a chur le chéile de Phlean Leithroinnte Náisiúnta do thrádáil liúntas astaithe gáis ceaptha teasa; Údarás Inniúla Náisiúnta a bhunú le ceadanna trádála agus liúntais a eisiúint orthu siúd atá clúdaithe ag an scéim; monatóireacht, léargas, agus fíorú maidir le hastuithe ó chuideachtaí rannpháirteacha; agus Clár Trádála Astuithe Náisiúnta a bhunú;

agus, faoin Oifig Forfheidhmiúcháin Comhshaoil, a bunaíodh i 2003 agus atá tiomanta as reachtaíocht comhshaoil a chur i bhfeidhm agus a forfheidhmiú in Éirinn;

- feabhas a chur ar chomhlíonadh reachtaíocht cosanta comhshaoil in Éirinn;
- feasacht a ardú maidir leis an tábhacht a bhaineann le forfheidhmiú i gcás reachtaíochta cosanta comhshaoil in Éirinn;
- ceadúnais IPPC agus ceadúnais Dramhaíola a eisiúint an EPA a forfheidhmiú;
- iniúchadh agus tuairiscí ar fheidhmíocht údarás áitiúil maidir lena bhfeidhmeanna cosanta comhshaoil a chur ar bun, lena n-áirítear:
 - forfheidhmiú maidir le ceadúnais dramhaíola a sháraítear;
 - gníomh maidir le dumpáil mhídhleathach;
 - ceadanna bailithe dramhaíola a chur i bhfeidhm, agus
 - tionscnaimh a bheidh mar fhreagracht ar an táirgeoir a forfheidhmiú (mar shampla, sa réimse a bhaineann le dramhaíl pacáiste);
- gníomh in aghaidh údarás áitiúil nach bhfuil ag comhlíonadh a gcuid feidhmeanna cosanta comhshaoil ar bhealach cuí;
- an dlí a chur nó cuidiú le húdarais áitiúla an dlí a chur ó thaobh sháraithe suntasacha reachtaíochta cosanta comhshaoil ar bhealach caoithiúil; agus
- cuidiú le húdarais áitiúla a gcuid feidhmíocht cosanta comhshaoil a fheabhsú ar bhonn cás ar chás, trí ghréasán forfheidhmithe a bhunú le malartú eolais a chur chun cinn chomh maith le sárchleachtas, agus trí threoir chuí a sholáthar.



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Interim Report

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Executive Summary

The Environmental Protection Agency has compiled information on waste generation and management for the calendar year 2003. Local authorities, recycling organisations and landfill operators were surveyed and the findings from these surveys are presented in this Interim Report.

For the most part, the trends highlighted in this Interim Report are positive and continue to move in the right direction. The following are the principal conclusions drawn in relation to municipal waste management and waste exports in 2003:

- the generation of municipal waste increased by 10%, a disappointing trend given the strong progress in recycling and reduced landfill;
- the recycling of household and commercial waste increased by 46%, illustrating some of the positive impacts of the implementation of Government policy;
- the majority of this recycling took place abroad with the export of 69% of recyclable waste;
- there has been a remarkable increase in the recycling of packaging waste and the headline recycling rate now stands at 42%;
- the landfill of municipal waste decreased by 4%, a significant finding following a 5% reduction in 2002; and
- the export of hazardous waste increased by 56% and illustrates Ireland's continued dependence on treatment facilities across the EU.

There is evidence of very good progress towards the achievement of two key waste management targets with progress in relation to a third being less positive:

- Packaging waste recovery increased from 33% in 2002 to 42% in 2003, indicating that we will very likely achieve the target of 50% recovery in 2005;
- Municipal waste recycling increased from 21% in 2002 to 28% in 2003, closing the gap to the national target of 35% recovery by 2013;
- Household waste recycling increased from 9% in 2002 to 13% in 2003, leaving a relatively large gap towards the achievement of the national target of 50% diversion of household waste from landfill by 2013.

There has generally been a large increase in the actual quantity of material recycled. For example, the recovery of packaging waste increased by 42% in 2003, and the recovery of household waste and commercial waste increased by 40% and 48% respectively in the same period. The quantity of recyclable material exported for recycling increased by 51%.

Waste management infrastructure is becoming more streamlined: fewer landfills accepted municipal waste – 35 landfills in 2003, compared to 39 in 2002. The number of operating civic amenity sites increased in 2003 and there was a marginal increase in the number of bring banks, indicating the continued trend towards the provision of better recycling infrastructure.

The year 2003 was a good year for recycling and diversion of waste from landfill. However, the overall trend of increased waste generation remains a concern that will continue to require concerted action for years to come.

1. Introduction

This report is the fifth report in the National Waste Database series. It provides the latest nationally available information on municipal waste collection, generation and management in 2003, including waste exports. National Waste Database reports have previously been published on a three-year cycle – 1995¹, 1998² and 2001³. Due to other reporting requirements, full datasets on municipal waste management and waste export are now available on an annual basis. In line with increasing demands for more up to date information on waste, the first annual report containing that data was published for the calendar year 2002⁴. The next major National Waste Database Report will be published during 2005 with information for the calendar year 2004. In compliance with the EU Waste Statistics Regulation⁵, major National Waste Database reports will be published on a two-year cycle from 2004 onwards.

The objective of this interim report is to present the most up to date information on:

- municipal waste generation, recovery and disposal;
- packaging waste recycling;
- the export of waste (including hazardous waste); and
- municipal waste landfill, and other waste, infrastructure.

An update on progress towards national and EU targets for municipal waste management is presented. The main focus of the report is on waste generated by the household and commercial sectors, that is, municipal waste.

2. Sources of information used in this report

The following information sources were used to compile the information for this report:

- local authorities;
- recycling organisations; and
- landfill operators.

The assistance of the organisations and people who contributed to the report is acknowledged and appreciated.

Information is collected from local authorities and recycling organisations via questionnaires⁶ in the form of spreadsheets. The timeliness of returns from these

¹ EPA, 1996, *National Waste Database Report for 1995*.

² EPA, 2000, *National Waste Database Report 1998*.

³ EPA, 2003, *National Waste Database Report 2001*.

⁴ EPA, 2004, *National Waste Database Interim Report 2002*.

⁵ Regulation (EC) No 2150/2002 of the European Parliament and of the Council of 25 November 2002 on waste statistics.

⁶ All current questionnaires may be downloaded from www.epa.ie.

organisations remains poor. Local authorities were requested to submit their returns for 2003 by 31 May 2004. By the due date, only six local authorities had responded but, by end-September 2004, only one local authority return remained outstanding.

Though the quality of information available to, and reported by, local authorities continues to improve, some commonly encountered problems remain:

- local authorities sometimes experience difficulty in obtaining information from permitted waste operators;
- some local authorities experience difficulty in obtaining information on waste collection in their own areas;
- the availability of information on commercial waste remains unsatisfactory and is linked primarily to poor reporting by waste collection permit holders; and
- the relative inconsistency of data from year to year remains a concern, notwithstanding the fact that local authorities state that now, more than ever, they are increasingly satisfied with the quality of available information.

Continued efforts must be made by local authorities to ensure that permitted operators (collectors and facility operators) maintain adequate records and provide timely reports on their activities. The Agency will continue to work with local authorities in the development of local and national information management systems.

The survey of recycling organisations also encountered considerable delays in obtaining data for 2003. By the due date of 28 February 2004, only 13% of returns had been submitted. A timely and complete return is essential in order to generate accurate statistics on the recycling of waste generated in Ireland. To verify data submitted by recycling organisations, the EPA arranged for verification audits to be carried at 20 recycling organisations, accounting for 38% of recycled waste. For the first time, the EPA out-sourced the compilation of recycling data for 2003 and the assistance of Enviro Consulting Limited is acknowledged in this regard.

Annual environmental reports were received from all EPA-licensed municipal waste landfill operators. Information in relation to the landfill of household and commercial waste is extracted for use in this report. In 2003, a total of 35 landfills accepted municipal waste.

3. Municipal waste generation

An estimated 3,001,016 tonnes of municipal waste were generated in Ireland in 2003, the first time that municipal waste generation has exceeded three million tonnes. This consisted of 1,596,501 tonnes of household waste, 1,332,735 tonnes of commercial waste and 71,779 tonnes of street cleansing waste. By comparison to the 1% annual increase in municipal waste generation observed in 2002, in 2003, an increase of 10% is evident. Household waste generation increased by 4.5% in 2003, while commercial waste generation increased by 18%.

This data is provided wholly by local authorities. When questioned on the scale of the increase observed in many local authority areas, most responded that the increase is most likely due to the dramatically increased quality of data available from local waste

operators. It is thought likely that the increase is due to a combination of factors including:

- better quality information; and
- overall increased resource use and waste generation on the part of consumers and business.

It should be noted however that no firm explanations exist for the anomalous increasing trend observed in municipal waste generation since 2001. It is strongly believed that the 2003 dataset is the most accurate produced to date, based on improved documentation and annual environmental reports provided by waste collection permit holders.

The EPA intends to commission research, under the National Waste Prevention Programme⁷, to examine the economic and societal factors that are likely to contribute to municipal waste generation.

Table 1 Municipal waste generation, 2001 to 2003

Category of municipal waste	2001	2002	2003
Household waste	1,468,834	1,528,314	1,596,501
Commercial waste	1,156,732	1,129,852	1,332,735
Street cleansing waste	78,469	65,573	71,779
Total municipal waste	2,704,035	2,723,739	3,001,016

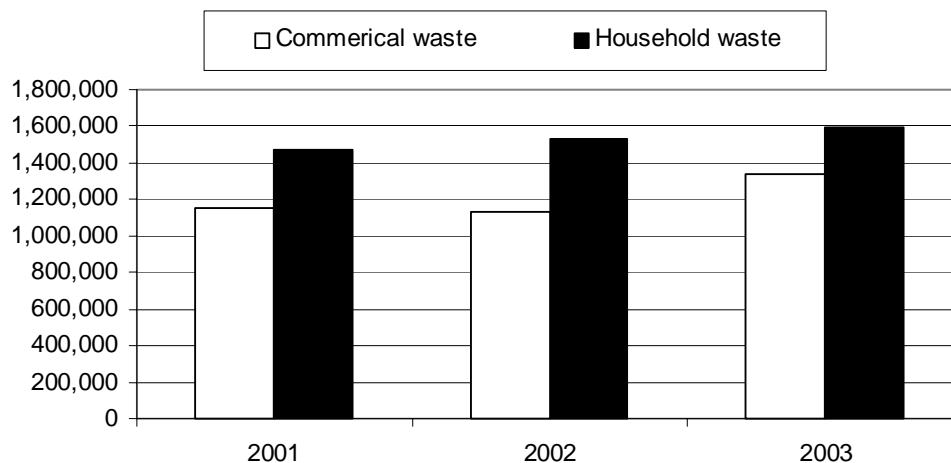


Figure 1 Trends in municipal waste generation, 2001 to 2003

⁷ The National Waste Prevention Programme was commenced by the EPA in April 2004. The Programme's *Outline Work Plan, 2004-2008* is available at www.epa.ie.

Estimate of “uncollected” household waste

In almost all local authority areas, there is a proportion of households that is not provided with, or chooses not to avail of, a waste collection service. There may be several reasons for this including:

- houses are located too far from standard collection routes, particularly in rural areas;
- some householders have direct access to, or use of, a local landfill facility; and
- many householders choose not to engage an available service.

An estimate of “uncollected” household waste was provided by almost all local authorities and, in 2003, it is estimated that a total of 287,294 tonnes of household waste was “uncollected”. This is an increase of 15% from the estimated 248,768 tonnes in 2002.

Nationally, 79% of households are served by a collection service. In some local authority areas the proportion is reported to be as low as 45%, while in others, mainly city council areas, 100% of households are provided with a collection service⁸. Table 2 shows the regional coverage of household waste collection services and illustrates the potential scale of backyard burning of waste or other environmentally unfriendly waste practices at the household level.

The average generation of household waste per person (including “uncollected” household waste) was 398 kg per capita in 2003, a 2% increase on 2002. As in earlier years, there is a wide variance between local authority areas, ranging from 236 kg per capita to 518 kg per capita. However, the variance is not as great as in earlier years. Table 2 illustrates the regional averages for the generation of household waste per capita in 2003.

The generation of municipal waste, as reported by local authorities, is summarised in Table 3.

⁸ In the following local authority areas, 100% of households are reported as availing of a waste collection service: Dublin City; Dun Laoghaire-Rathdown; South Dublin; Fingal; and Waterford City.

Table 2 Observations on household waste collection and generation, by waste management planning region, 2003

Waste management planning region	Percentage of households provided with waste collection service⁹	Average generation of household waste per capita (kg/cap)
Dublin Region	100%	416
Cork Region	69%	462
Connaught Region	63%	353
South East Region	79%	379
Mid-West Region	63%	419
North East Region	70%	464
Midlands Region	74%	385
Donegal	45%	449
Kildare	97%	405
Wicklow	76%	236
National	79%	398 kg/cap

⁹ Determined from known number of households provided with a formal waste collection service compared to the total number of households in each local authority area.

Table 3 Municipal waste generation, as reported by local authorities, 2003

Local Authority	Household waste ¹⁰ (tonnes)	Commercial waste ¹¹ (tonnes)	Street cleansing (tonnes)	Total (tonnes)
Dublin City	215,610	234,313	21,006	470,928
Dun Laoghaire-Rathdown	76,285	68,372	4,254	148,912
Fingal	85,203	78,619	1,960	165,782
South Dublin ¹²	90,462	78,760	3,015	172,237
Dublin Region sub-total	427,560	460,064	30,235	957,859
Cork	155,932	111,003	1,031	267,965
Cork City	50,955	61,338	6,000	118,293
Cork Region sub-total	206,886	172,341	7,031	386,258
Galway	49,049	57,391	1,404	107,844
Galway City	19,006	45,201	4,416	68,623
Leitrim	10,369	7,952	655	18,976
Mayo	47,285	22,334	887	70,505
Roscommon	19,768	5,600	184	25,552
Sligo	18,471	12,406	450	31,327
Connaught Region sub-total	163,947	150,884	7,996	322,827
Carlow	20,721	6,188	1,825	28,734
Kilkenny	20,759	7,609	1,756	30,123
South Tipperary	32,596	16,430	1,339	50,365
Waterford	27,807	11,432	1,112	40,351
Waterford City	15,358	35,986	2,027	53,371
Wexford	43,323	29,850	433	73,606
South East Region sub-total	160,564	107,495	8,491	276,550
Clare	42,162	28,562	795	71,519
Kerry	54,245	35,682	837	90,764
Limerick	50,668	79,296	245	130,209
Limerick City	25,169	26,500	4,153	55,823
Mid-West Region sub-total	172,245	170,040	6,030	348,315
Cavan	26,078	11,780	365	38,223
Louth	44,297	20,426	3,162	67,885
Meath	69,389	65,290	1,295	135,974
Monaghan	20,131	8,880	415	29,426
North-East Region sub-total	159,895	106,377	5,237	271,509
Laois	23,889	17,340	289	41,518
Longford	14,259	13,090	227	27,576
North Tipperary	24,482	9,666	1,030	35,178
Offaly	20,256	5,444	576	26,276
Westmeath	27,468	15,207	1,352	44,027
Midlands Region sub-total	110,354	60,746	3,474	174,574
Donegal	61,705	10,840	1,012	73,557
Kildare	66,335	70,179	1,631	138,145
Wicklow	27,010	23,770	643	51,422
Total	1,596,501	1,332,735	71,779	3,001,016

¹⁰ Household waste: mixed household waste collected; separately collected household waste; household waste estimated to be uncollected; and organic household waste estimated to be home composted.

¹¹ Commercial waste: mixed commercial waste collected; and separately collected commercial waste.

¹² No information was provided for commercial waste collected in 2003. Information is based on data provided in previous years.

4. Municipal waste composition

Composition factors are typically applied to landfill data to determine the composition of mixed household and commercial waste sent to landfill. The results of the analysis for 2003 are presented in Table 4. Composition factors used in this report are as presented in the *National Waste Database Report 2001*. A programme of municipal waste characterisation surveys is currently underway (under the National Waste Prevention Programme) and revised compositional factors will be used in the next National Waste Database report.

Table 4 Composition of household and commercial waste, 2003

Material	Household waste landfilled		Commercial waste landfilled		Household + commercial waste recovered		Household + commercial waste (total)	
	Composition (%) (Note 1)	Landfilled (tonnes)	Composition (%) (Note 2)	Landfilled (tonnes)	Composition (%) (Note 3)	Recovered (tonnes)	Composition (%) (Note 4)	Landfilled + Recovered (tonnes)
Paper	22.3	274,072	48.6	292,289	49.4	358,878	36.2	925,239
Glass	4.4	54,486	7.2	43,180	10.1	73,087	6.7	170,753
Plastic	11.6	142,900	10.3	61,830	6.6	48,158	9.9	252,889
Ferrous	2.1	25,906	1.6	9,847	1.3	9,558	1.8	45,311
Aluminium	0.9	10,884	0.9	5,366	0.3	2,182	0.7	18,432
Other metals	0.7	8,458	0.1	701	0.1	1,046	0.4	10,205
Textiles	3.7	45,973	1.3	7,594	0.5	3,463	2.2	57,030
Organics	32.2	395,881	20.6	123,709	6.5	47,308	22.1	566,898
Wood	0	0	1	6,015	17.7	128,296	5.2	134,311
Others	22.1	272,548	8.5	50,985	7.5	54,787	14.8	378,320
Total	100	1,231,109	100	601,515	100	726,763	100	2,559,387

Note 1: Composition is derived from household waste composition surveys carried out on mixed waste destined for landfill.

Note 2: Composition is derived from commercial waste composition surveys carried out on mixed waste destined for landfill and some segregated fractions.

Note 3: Calculated from mass of material fractions reported by recycling organisations.

Note 4: Calculated from 'Landfilled + Recovered' column.

It is noted that the total landfilling and recovery of household and commercial waste presented in Table 4 (2,559,387 tonnes) is less than the reported generation of household and commercial waste presented in Table 3 (2,929,236 tonnes) by 369,849 tonnes. Excluding the estimated 287,294 tonnes of household waste "uncollected" in 2003, there remains a gap of 82,555 tonnes. It is likely that errors arise from the fact that the information on municipal waste generation, recovery and landfill is obtained from three different sources. As the quality of data improves, it is expected that the gap will also close. However, with different information sources, some divergence is likely to always be experienced.

5. Municipal waste recovery and disposal

The recycling and recovery of municipal waste is calculated by analysing information provided by recycling organisations. Information from recycling organisations is supplemented with information provided by local authorities on, for example, the collection of household waste at bring banks. Table 5, Table 6 and Table 7 illustrate the disposal and recovery of municipal waste in 2003.

Information on waste disposal is obtained directly from landfill operators. The material-specific quantities landfilled are determined by applying waste composition factors to the reported landfill quantities, as described above. From this, the overall municipal waste (and material-specific) disposal and recovery rates are determined.

Table 5 Disposal and recovery of household and commercial waste, 2003

Material	Gross quantity available (tonnes)	Quantity landfilled (tonnes)	National landfill rate (%)	Quantity recovered (tonnes)	National recovery rate (%)
Paper	925,239	566,361	61.2	358,878	38.8
Glass	170,753	97,666	57.2	73,087	42.8
Plastic	252,889	204,730	81.0	48,158	19.0
Ferrous	45,311	35,753	78.9	9,558	21.1
Aluminium	18,432	16,250	88.2	2,182	11.8
Other metals	10,205	9,159	89.7	1,046	10.3
Textiles	57,030	53,567	93.9	3,463	6.1
Organics	566,898	519,590	91.7	47,308	8.3
Wood	134,311	6,015	4.5	128,296	95.5
Others	378,320	323,533	85.5	54,787	14.5
Total	2,559,387	1,832,625	71.6	726,763	28.4

Table 6 Disposal and recovery rates in the household waste stream, 2003

Material	Gross quantity available (tonnes)	Quantity landfilled (tonnes)	National landfill rate (%)	Quantity recovered (tonnes)	National recovery rate (%)
Paper	349,796	274,072	78.4	75,723	21.6
Glass	106,833	54,486	51.0	52,347	49.0
Plastic	152,519	142,900	93.7	9,618	6.3
Ferrous	25,906	25,906	100.0	0	0.0
Aluminium	13,066	10,884	83.3	2,182	16.7
Other metals	8,458	8,458	100.0	0	0.0
Textiles	48,810	45,973	94.2	2,837	5.8
Organics	428,798	395,881	92.3	32,917	7.7
Wood	7,503	0	0.0	7,503	100.0
Others	275,173	272,548	99.0	2,625*	1.0
Total	1,416,862	1,231,109	86.9	185,753	13.1

*Waste electrical and electronic equipment, cooking oil, mineral oil, batteries and composite packaging.

Table 7 Disposal and recovery rates in the commercial waste stream, 2003

Material	Gross quantity available (tonnes)	Quantity landfilled (tonnes)	National landfill rate (%)	Quantity recovered (tonnes)	National recovery rate (%)
Paper	575,443	292,289	50.8	283,154	49.2
Glass	63,920	43,180	67.6	20,740	32.4
Plastic	100,370	61,830	61.6	38,540	38.4
Ferrous	19,404	9,847	50.7	9,558	49.3
Aluminium	5,366	5,366	100.0	0	0.0
Other metals	1,747	701	40.1	1,046	59.9
Textiles	8,220	7,594	92.4	626	7.6
Organics	138,100	123,709	89.6	14,391	10.4
Wood	126,808	6,015	4.7	120,793	95.3
Others	101,198	50,985	50.4	52,162*	51.5
Total	1,140,576	601,515	52.7	541,010	47.4

* Waste electrical and electronic equipment, cooking oil, mineral oil, batteries and tyres.

Table 5 shows that the recovery rate for household and commercial waste has increased to 28% in 2003 (from 21% in 2002). The actual quantity recovered has increased from 496,905 tonnes in 2002 to 726,763 tonnes in 2003, a gross increase of 46%. The disposal rate has decreased from 79% in 2002 to 72% in 2003 and, for the second consecutive year, there is evidence of an actual decrease in the quantity of waste landfilled from 1,901,864 tonnes in 2002 to 1,832,625 tonnes in 2003, a decrease of 4%. This is strong evidence of the positive effect of increased use of separate collection systems, and the diversion of waste from landfill. Figure 2 illustrates that considerable progress is evident towards achieving the national target of 35% (by 2013) for the recycling of municipal waste.

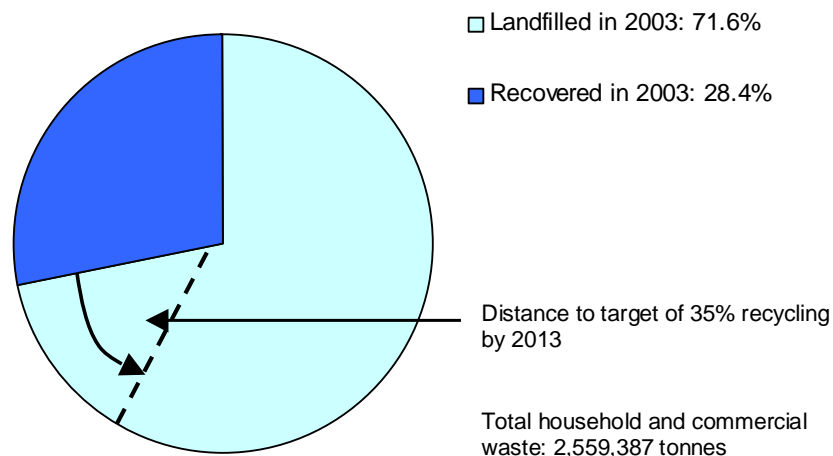
**Figure 2 Recycling of household and commercial waste, 2003**

Table 6 shows the breakdown of recovery and disposal in the household waste stream. The overall recovery rate has increased from 9% in 2002 to 13% in 2003. Considerable progress remains to be achieved to meet the national target of 50% diversion of household waste from landfill (by 2013), as illustrated in Figure 3. There was an increase of 40% in the actual quantity of household waste recycled in 2003.

Table 7 shows that the actual quantity of commercial waste recycled increased by 48% to 541,010 tonnes in 2003. This represents a commercial waste recycling rate of 47% (from 37% in 2002).

For the second consecutive year, there has been a reported decrease in the landfill of household and commercial waste, as illustrated in Figure 4.

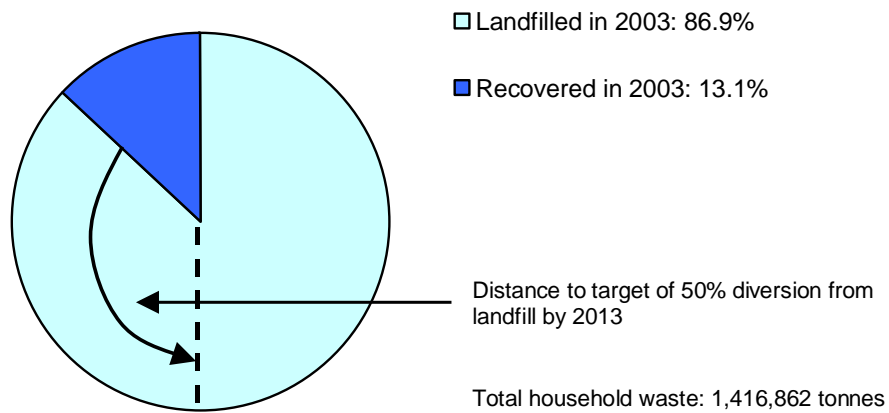


Figure 3 Diversion of household waste from landfill, 2003

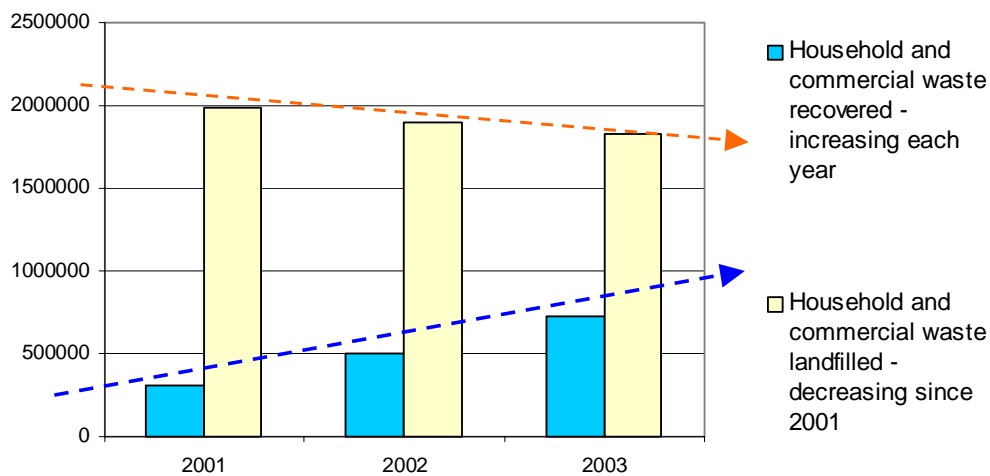


Figure 4 Trends in disposal and recovery of household and commercial waste, 2001 to 2003.

6. Packaging waste recovery and disposal

The quantity of packaging waste recovered is calculated by analysing the returns made by recycling organisations. Table 8 shows that packaging waste recovery increased to an estimated 419,600 tonnes in 2003 (from 296,389 tonnes in 2002): an increase of 42%. The packaging recovery rate has increased from 33% in 2001 to 42% in 2003¹³ illustrating significant progress towards meeting the target¹⁴ of 50% packaging waste recovery by 2005, as illustrated in Figure 5 and Figure 6.

Table 8 Packaging waste generation, disposal and recovery, 2003

	Generated (tonnes)	Landfilled		Recovered	
		Tonnes	%	Tonnes	%
Paper and Cardboard	427,285	251,319	58.8	175,965	41.2
Glass	131,113	61,566	47.0	69,546	53.0
Plastic	208,203	173,363	83.3	34,840	16.7
Ferrous	69,791	30,737	44.0	39,054	56.0
Aluminium	14,467	12,285	84.9	2,182	15.1
Other Metals	8,427	8,427	100.0	0	0.0
Textiles	1,395	1,395	100.0	0	0.0
Wood	103,795	6,078	5.9	97,717	94.1
Others	41,810	41,517	99.3	293.85	0.7
TOTAL	1,006,287	586,687	58.3	419,600	41.7

¹³ A correction factor of 6% for contamination and moisture is typically applied in Ireland's annual report to the European Commission on packaging and packaging waste recycling. Applying the correction factor increases the net packaging recovery rate to 44.2%.

¹⁴ European Parliament and Council Directive 94/62/EC of 20 December 1994 on packaging and packaging waste (OJ L No 365, 31.12.94, p. 10).

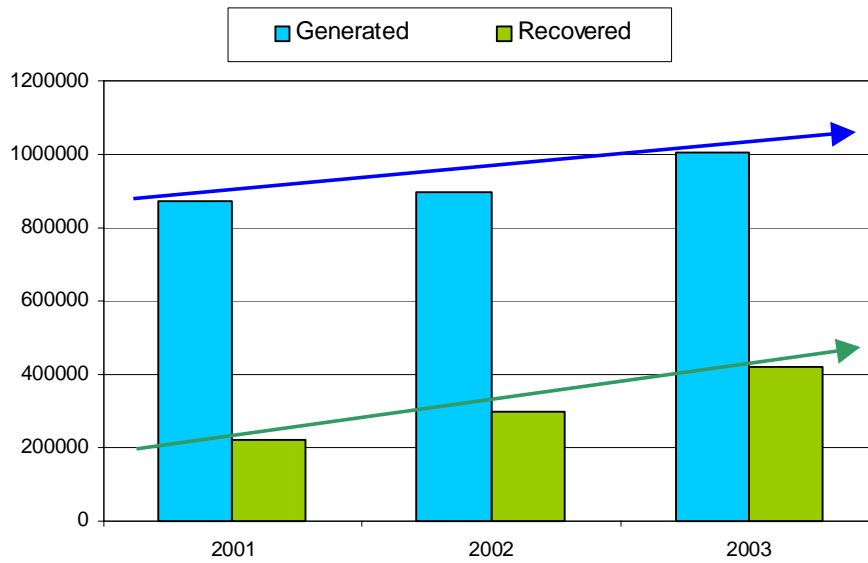


Figure 5 Trends in packaging waste generation and recovery, 2002 and 2003

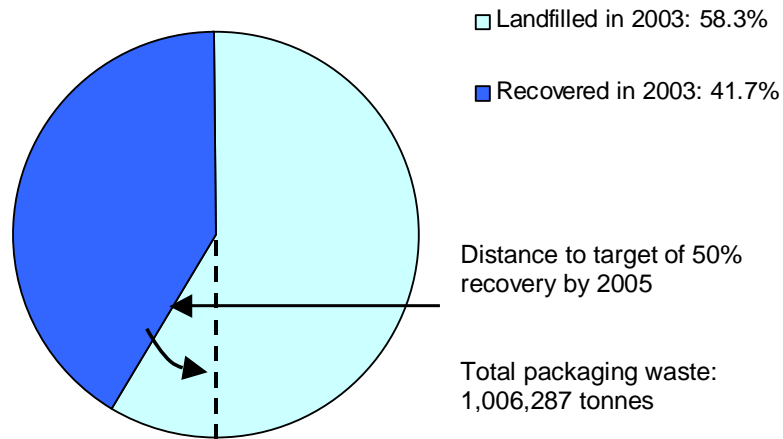


Figure 6 Recovery of packaging waste, 2003

7. Biodegradable municipal waste

As shown in Table 9, an estimated 1,683,477 tonnes of biodegradable municipal waste were generated in Ireland in 2003, of which 1,145,533 tonnes were consigned to landfill and 537,944 tonnes were recycled. In 2003, a total of 32% of biodegradable municipal waste was diverted from landfill: an increase from 23% diversion in 2002, representing a quantitative increase of 49%.

Table 9 Biodegradable municipal waste generation and management, 2003

Material	Gross quantity available (tonnes)	Landfilled (tonnes)	Recovered (tonnes)	Recovery rate (%)
Paper and cardboard	925,239	566,361	358,878	38.8
Textiles	57,030	53,567	3,463	6.1
Organic waste	566,898	519,590	47,308	8.3
Wood	134,311	6,015	128,296	95.5
TOTAL	1,683,477	1,145,533	537,944	32.0

8. Progress towards meeting national and EU targets

Table 10 summarises progress towards the achievement of several national and EU targets for improved waste management. While considerable progress has been made in relation to the targets for municipal and packaging waste, a considerable challenge remains if the household and biodegradable municipal waste targets are to be achieved.

Table 10 Progress towards national and EU targets for the management of municipal waste

Target	National / EU	Target year	Position in 2003
A diversion of 50% of overall household waste away from landfill	National	2013	13.1% recovery
Recycling of 35% of municipal waste	National	2013	28.4% recovery
Recycling of 50% of packaging waste	EU	2005	41.7% recovery
Reduction by 65% of biodegradable waste to landfill (based on 1995 rates and on a phased basis)	EU	2013	In 2002, 1,186,632 tonnes were landfilled. In 2003, this decreased by 3.5% to 1,145,533 tonnes. In order to meet the first phase of the target by 2006, the landfilling of biodegradable municipal waste must be reduced to approximately 840,000 tonnes.

9. Waste infrastructure

9.1. Landfills

A total of 35 landfills accepted 1,832,624 tonnes of household and commercial waste for disposal in 2003 (compared to 39 landfills in 2002). These landfills are listed in Table 11.

Table 11 Municipal waste landfills, household and commercial waste landfilled in 2003

Reg. No.	Landfill	Waste Management Planning Region	Household waste (tonnes)	Commercial waste (tonnes)	Total (tonnes)
109-1	Inagh	Clare Limerick Kerry	46,949	8,851	55,800
17-2	Gortadroma	Clare Limerick Kerry	47,918	29,684	77,602
1-2	North Kerry	Clare Limerick Kerry	32,715	16,789	49,504
59-2	Ballaghaderreen	Connaught	7,295	4,863	12,158
21-1	Derrinnumera	Connaught	24,108	4,106	28,214
27-2	Pollboy	Connaught	33,439	53,824	87,263
67-1	Rathroeen	Connaught	17,813	9,768	27,582
70-1	Benduff	Cork	3,521	0	3,521
89-1	Derryconnell	Cork	6,859	1,090	7,949
22-1	East Cork	Cork	51,584	5,543	57,128
12-2	Kinsale Road	Cork	47,594	6,911	54,505
68-1	Youghal	Cork	20,985	5,064	26,049
90-1	Balbane	Donegal	2,790	0	2,790
24-1	Ballynacarrick	Donegal	15,009	770	15,779
4-2	Arthurstown	Dublin	485,242	0	485,242
9-2	Balleally	Dublin	65,877	150,454	216,331
15-1	Ballyogan	Dublin	69,623	0	69,623
81-2	KTK	Kildare	0	211,939	211,939
78-1	Ballaghveny	Midlands	25,460	7,817	33,277
28-2	Ballydonagh	Midlands	20,865	9,060	29,926
29-2	Derryclure	Midlands	24,390	3,136	27,526
26-2	Kyletalesha	Midlands	22,340	10,069	32,409
71-2	Marlinstown	Midlands	2,251	0	2,251
77-1	Corranure	North East	15,000	25,699	40,699
20-1	Scotch Corner	North East	11,895	2,047	13,942
60-2	Whiteriver	North East	24,438	3,086	27,524
74-2	Donohill	South East	19,271	392	19,663
32-1	Dungarvan	South East	4,339	8,663	13,002
30-2	Dunmore	South East	12,241	2,848	15,089
18-1	Kilbarry	South East	14,445	141	14,586
16-2	Killurin	South East	26,380	7,112	33,492
25-1	Powerstown	South East	14,195	9,005	23,200
23-1	Raffeen	South East	1,200	0	1,200
75-1	Tramore	South East	12,445	2,768	15,213
66-2	Rampere	Wicklow	631	15	646
	TOTAL		1,231,108	601,515	1,832,624

9.2. Bring banks, civic waste facilities and mobile collection services

Infrastructure for the collection of recyclable waste has improved considerably and is contributing to the successful diversion of waste from landfills. The number of bring banks in operation in 2003 increased to 1,692 (from 1,636 in 2002), representing a density of one bring bank for every 2,315 people. A total of 60 civic waste facilities were reportedly in operation in 2003, an increase on 49 in 2002. The number of bring banks and civic amenity sites reported to be in operation in each local authority area is presented in Table 12.

Local authorities continue to periodically provide a facility for the deposition of household hazardous waste by engaging the services of a mobile hazardous waste collection service. The mobile service is aimed primarily at householders and provides an outlet for small-scale household hazardous waste (for example, batteries, fluorescent lamps and paint). In 2003, 154 tonnes of household hazardous waste were collected by this service in eighteen local authority areas.

In addition to bring banks, civic amenity sites and mobile household hazardous waste collection services, local authorities are now also beginning to provide mobile collections for certain materials such as plastic bottles, newspapers and textiles and schemes in schools for the collection of materials such as plastic bottles and batteries. More information on such schemes is expected to emerge in the next few years.

Table 12 Bring banks and civic amenity sites in operation in 2003

Local authority	Civic amenity sites	Bring banks	Local authority	Civic amenity sites	Bring banks
Carlow	3	37	Limerick City	1	19
Cavan	1	23	Longford	0	22
Clare	3	52	Louth	1	20
Cork	4	133	Mayo	2	81
Cork City	1	43	Meath	2	26
Donegal	1	50	Monaghan	1	22
Dublin City	1	73	North Tipperary	3	29
DunLaoghaire-Rathdown	1	64	Offaly	1	38
Fingal	2	80	Roscommon	2	30
Galway	2	100	Sligo	1	42
Galway City	1	13	South Dublin	2	45
Kerry	5	56	South Tipperary	2	55
Kildare	1	51	Waterford	3	43
Kilkenny	3	42	Waterford City	1	24
Laois	1	57	Westmeath	2	60
Leitrim	0	37	Wexford	2	122
Limerick	1	47	Wicklow	3	56
			TOTAL	60	1692

10. Waste export

10.1. Notified waste export

The export of waste is regulated by local authorities in accordance with the EU Transfrontier Shipment of Waste (TFS) Regulation¹⁵. Summary export records submitted by local authorities indicate that 420,841 tonnes of exported waste were notified and authorised in 2003. This included 170,678 tonnes of hazardous waste, 218,521 tonnes of contaminated soil¹⁶ and 31,642 tonnes of non-hazardous waste. Table 13 shows the breakdown by waste type of waste exported in 2003.

The import of waste is regulated by the Environmental Protection Agency. There were no notified imports of waste in 2003.

Table 14 shows the treatment methods to which exported wastes were subjected in 2003. Of the 420,841 tonnes exported, 60% was recovered and 39% was disposed of.

Overall, an increase in the export of waste for disposal is noted. Of particular note is a significant increase in the export of waste for disposal by incineration, from 37,336 tonnes in 2002 to 74,420 tonnes in 2003. Also of note is the export of contaminated soil for disposal, a treatment category that hardly featured in 2002. The quantity of contaminated soil exported for recovery has increased marginally. Contaminated soil generally arises from redevelopment works and the clean-up of historical contamination. It tends to be a one-off event at any one location.

By comparison, the export of waste for recovery has increased to a lesser extent. Export for reuse as fuel and solvent recovery is relatively static. Export of hazardous waste for metal recovery has increased.

Table 15 shows the destination and treatment method for all notified waste exports in 2003. This information is illustrated in Figure 7. Germany remains the most important destination for waste exports at 61%, accounted for predominantly by contaminated soil exports. The United Kingdom remains the second most important destination, accounting for 28% of notified exports.

Table 16 shows the local authority areas from which notified waste was exported in 2003. Dublin City Council and Cork County Council remain the local authorities with the greatest proportion of export notifications, accounting for 48% and 20% respectively. The majority (84%) of waste notified for export from the Dublin City Council area was contaminated soil generated principally by urban redevelopment. The majority (94%) of waste notified for export from Cork County Council area was solvent or solvent-containing waste generated by industry. It should be noted the notification of waste exports in a particular local authority area does not necessarily signify that the waste was generated in that area. Many local authority areas listed towards the top of Table 16 are host to hazardous waste transfer stations that operate on a national basis.

¹⁵ Council Regulation (EEC) No 259/93 of 1 February 1993 on the supervision and control of shipments of waste within, into and out of the European Community (OJ L30, 6.2.1993, p. 1), as amended; as implemented in Ireland by the Waste Management (Transfrontier Shipment of Waste) Regulations, 1998, S.I. No. 149 of 1998.

¹⁶ Contaminated soil is generally classified as hazardous waste. For clarity it is dealt with separate to other hazardous waste in this section of the report.

Table 13 Hazardous and non-hazardous wastes exported in 2003

Hazardous waste type	Tonnes exported
Solvents (including chlorinated solvents)	121,402
Industrial hazardous waste not otherwise specified	10,738
Photographic chemical waste	5,905
Chemical waste not otherwise specified	5,887
Lead acid batteries	5,816
Asbestos	5,192
Equipment (electrical, electronic and mechanical)	4,213
Sludges and filter cakes	3,177
Packaging (contaminated or containing residues)	2,202
Acid and alkali waste	2,163
Paint, ink and varnish waste	1,358
Oil waste (mineral oil)	1,297
Thermal treatment and combustion residues	587
Healthcare risk waste	189
Laboratory and general chemical waste	150
Medicines (including veterinary medicines)	147
Metal and heavy-metal containing waste	92
Fluorescent lamps	61
Batteries	57
Oily sludges	46
Sub-total hazardous waste (excluding contaminated soil)	170,678
Contaminated soil	218,521
Non-hazardous waste	31,642
Total notified waste exports	420,841

Table 14 Recovery and disposal of notified waste exports, 2003

Disposal or recovery operation		Hazardous waste (tonnes)	Contaminated soil (tonnes)	Non-hazardous waste (tonnes)	Total (tonnes)
D1	Landfill	6,210		96	6,306
D5	Engineered landfill	5,451	40,736	70	46,257
D8	Biological pre-treatment	138			138
D9	Physico-chemical pre-treatment	437	33,877		34,314
D10	Incineration on land	74,420	11	772	75,203
D13	Blending or mixing pre-treatment	799		407	1,206
D14	Repackaging pre-treatment	27			27
D15	Storage prior to disposal	715			715
	Sub-total disposal	88,197	74,624	1,345	164,166
R1	Use as fuel	33,919		652	34,571
R2	Solvent reclamation/regeneration	17,732			17,732
R3	Recycling or reclamation of organic materials other than solvents	5,751		9,444	15,195
R4	Recycling or reclamation of metals	17,509		16,031	33,539
R5	Recycling or reclamation of inorganic materials	581	143,854	1,283	145,718
R6	Regeneration of acids or bases	1,010	43		1,053
R8	Recovery of components from catalysts	36			36
R9	Used oil re-refining or reuse of waste oil	956			956
R11	Use of waste from another recovery activity	37		1,841	1,879
R12	Waste exchange prior to recovery	7		343	349
R13	Storage prior to recovery	3,314		124	3,438
	Sub-total recovery	80,852	143,897	29,717	254,467
	Undefined recovery or disposal	1,629		579	2,208
	TOTAL	170,678	218,521	31,642	420,841

Table 15 Destination and fate of notified waste exports, 2003

Country of import	Total exports		Disposal (tonnes)				Recovery (tonnes)					Unspecified treatment
	%	Tonnes	Incineration	Landfill	Other disposal	Total disposal	Inorganic material recovery	Solvent recovery	Use as fuel	Other recovery	Total recovery	
			D10	D1, D5	D8, D9, D11-D15		R5	R2	R1	R3, R4, R6-R13		
Germany	61	254,990	29,983	52,564	36,033	118,580	128,073	90	2,051	5,089	135,304	1,106
Great Britain	22	92,031	39,833		15	39,848	1,213	17,566	11,932	20,944	51,655	528
Northern Ireland	6.2	26,212				0	177	46	72	25,603	25,898	314
Netherlands	5.4	22,825	1,023		79	1,101	15,806		5,277	641	21,723	
Denmark	3.4	14,389	1			1			14,267	28	14,296	93
Belgium	2.1	8,707	3,060		247	3,307	450		971	3,815	5,236	163
Finland	0.3	1,307	1,304			1,304					0	3
France	0.1	261				0				261	261	
Italy	-	40				0				40	40	
Switzerland	-	30				0		30			30	
Unspecified	-	50			26	26				25	25	
TOTAL		420,841	75,203	52,564	36,400	164,166	145,718	17,732	34,571	56,446	254,467	2,208

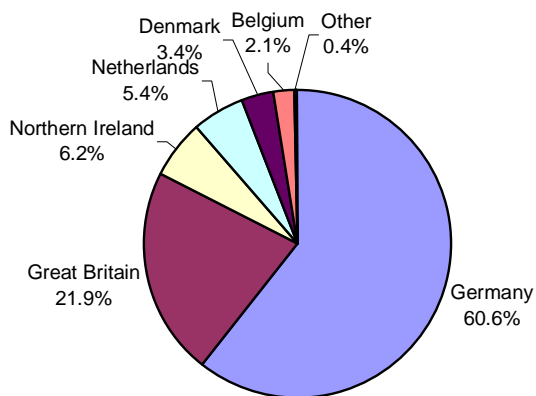
**Figure 7 Destination of notified waste exports in 2003**

Table 16 Export of waste, notifications processed by local authorities, 2003

Local Authority	Total (tonnes)	Contaminated soil (tonnes)	Solvents (tonnes)	Non- hazardous waste (tonnes)	Other (tonnes)
Dublin City	202,878	170,718	10,325	784	21,052
Cork	85,842	43	80,657	1,799	3,343
Laois	25,885	25,250	0	0	635
Fingal	21,443	0	21,106	0	337
South Dublin	18,361	11	2,698	5,276	10,376
Louth	17,032	0	0	16,859	173
Cork City	13,221	10,000	0	2,670	551
Limerick City	10,000	10,000	0	0	0
Clare	6,412	0	3,703	343	2,366
Kildare	5,602	0	730	349	4,523
Galway City and County	3,096	2,500	29	0	567
South Tipperary	2,766	0	472	800	1,494
Longford	2,197	0	0	2,197	0
Roscommon	1,193	0	1,193	0	0
Donegal	978	0	0	0	978
Offaly	879	0	0	0	879
Waterford City	744	0	56	306	383
Westmeath	512	0	220	0	292
Waterford	465	0	0	0	465
Kerry	399	0	0	124	275
Mayo	340	0	0	0	340
Limerick	210	0	160	0	50
North Tipperary	187	0	52	134	0
Kilkenny	120	0	0	0	120
Monaghan	77	0	0	0	77
Total	420,841	218,521	121,402	31,642	49,276

10.2. Non-notified waste exports and imports

Not all exported waste is required to be notified under the Transfrontier Shipment of Waste Regulation. Wastes listed in Annex II (the 'Green List') may be exported or imported for recovery without notification. Green list wastes are typically clean segregated recyclable waste fractions and enjoy unhindered movement within the EU. Ireland continues to rely significantly on foreign infrastructure for the actual recycling of certain materials. Since the closure of Irish Ispat in 2001 and the Irish Glass Bottle Company in 2002, there is very little processing capacity for steel and no capacity for the recycling of glass in the Republic of Ireland. A large glass recycling facility is located in Northern Ireland. The data in Table 17 show that 858,211 tonnes of non-

notified waste were exported for recycling in 2003, representing 69% of Irish waste recycling (compared to 72% in 2002).

Table 18 shows the quantities of packaging and non-packaging waste exported and imported for recycling in 2003. This information is illustrated in Figure 8. Imported waste for recycling consisted mainly of paper and cardboard, plastic and lead.

Table 17 Non-notified waste recycled abroad, 2002 and 2003

Material	2002		2003	
	Tonnes	%	Tonnes	%
Paper and Cardboard	168,867	64.3	238,620	66.5
Glass	40,003	66.6	71,432	97.7
Plastic	22,075	60.3	36,556	75.9
Ferrous	287,859	98.8	429,956	99.0
Aluminium	9,089	67.7	12,539	73.4
Other Metals	24,825	80.2	22,776	87.6
Textiles	491	90.2	3,408	98.4
Wood	8,927	14.0	11,695	5.2
Others*	6,522	28.2	31,229	57.0
TOTAL	568,658	72.0	858,211	69.1

* Composites, WEEE and batteries

Table 18 Export and import of non-notified waste for recovery, 2003

Material exported or imported for recycling	Export of non-notified waste (tonnes)			Import of non-notified waste (tonnes)		
	Total	Packaging waste	Non-packaging waste	Total	Packaging waste	Non-packaging waste
Paper and Cardboard	238,620	134,718	103,902	9,124	688	8,436
Glass	71,432	67,891	3,541	0	0	0
Plastic	36,556	27,451	9,105	46,631	46,631	0
Ferrous	429,956	38,266	391,690	83	83	0
Aluminium	12,539	2,182	10,357	10	0	10
Other Metals	22,776	0	22,776 ¹⁷	9,023	0	9,023
Textiles	3,408	0	3,408	0	0	0
Wood	11,695	10,726	970	0	0	0
Others	23,240	294 ¹⁸	22,946 ¹⁹	0	0	0
Batteries	4,645	0	4,645	0	0	0
WEEE	3,345	0	3,345	0	0	0
TOTAL	858,211	281,527	576,684	64,871	47,402	17,469

¹⁷ Non-ferrous metal, including stainless steel, excluding aluminium

¹⁸ Composites

¹⁹ Waste mineral oil and waste cooking oil

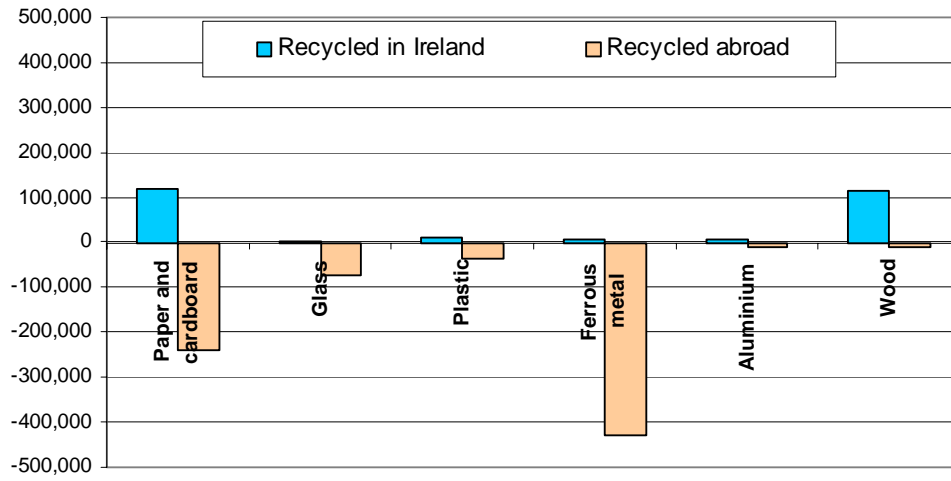


Figure 8 Recycling of waste in Ireland and abroad, 2003

Appendix A – Indicators

Table 19 compares the major waste indicators for 2001, 2002 and 2003. Per capita indicators for 2002 and 2003 were calculated using the final results from Census 2002, 3,917,203 persons²⁰. Indicators are a useful way of looking at year-on-year changes in the generation and management of waste.

Table 19 Waste indicators, 2001 and 2002

Indicator	2001	2002	2003
Municipal waste			
Municipal waste collected/person	0.59 tonnes	0.61 tonnes	0.65 tonnes
Municipal waste arising/person	0.69 tonnes	²¹ 0.69 tonnes	0.77 tonnes
Disposal rate for household and commercial waste collected	86.7%	79.3%	71.6%
Recovery rate for household and commercial waste collected	13.3%	20.7%	28.4%
Number landfills accepting municipal waste	48	39	35
Number of bring banks	1,436	1,636	1692
Household waste			
Household waste collected/person	0.34 tonnes	0.36 tonnes	0.36 tonnes
Household waste arising/person	0.37 tonnes	²² 0.39 tonnes	0.41 tonnes
Disposal rate for household waste	94.4%	90.7%	86.9%
Recovery rate for household waste	5.6%	9.3%	13.1%
Commercial waste			
Commercial waste collected/person	0.25 tonnes	0.25 tonnes	0.29 tonnes
Disposal rate for commercial waste collected	76.2%	62.5%	52.7%
Recovery rate for commercial waste collected	23.8%	37.5%	47.4%
Packaging waste			
Best estimate of total quantity arising	872,917 tonnes	899,125 tonnes	1,006,287
Packaging waste arising/person	0.223 tonnes	0.229 tonnes	0.257 tonnes
Best estimate of packaging waste recovered	221,266 tonnes	296,389 tonnes	419,600
Packaging waste recovered/person	0.056 tonnes	0.076 tonnes	0.107 tonnes
National recovery rate	25.3%	33%	41.7%
Hazardous waste			
Quantity of hazardous waste exported	275,309 tonnes	249,439 tonnes	389,199 tonnes
	226,904 recovery	203,156 recovery	224,749 recovery
	47,929 disposal	42,419 disposal	162,821 disposal
	476 unspecified	3,864 unspecified	1,629 unspecified

²⁰ Per capita indicators for 2001 are calculated using preliminary results for the national population from Census 2002, 3,917,336 persons (www.cso.ie).

²¹ Revised from National Waste Database Interim Report 2002

²² Revised from National Waste Database Interim Report 2002

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