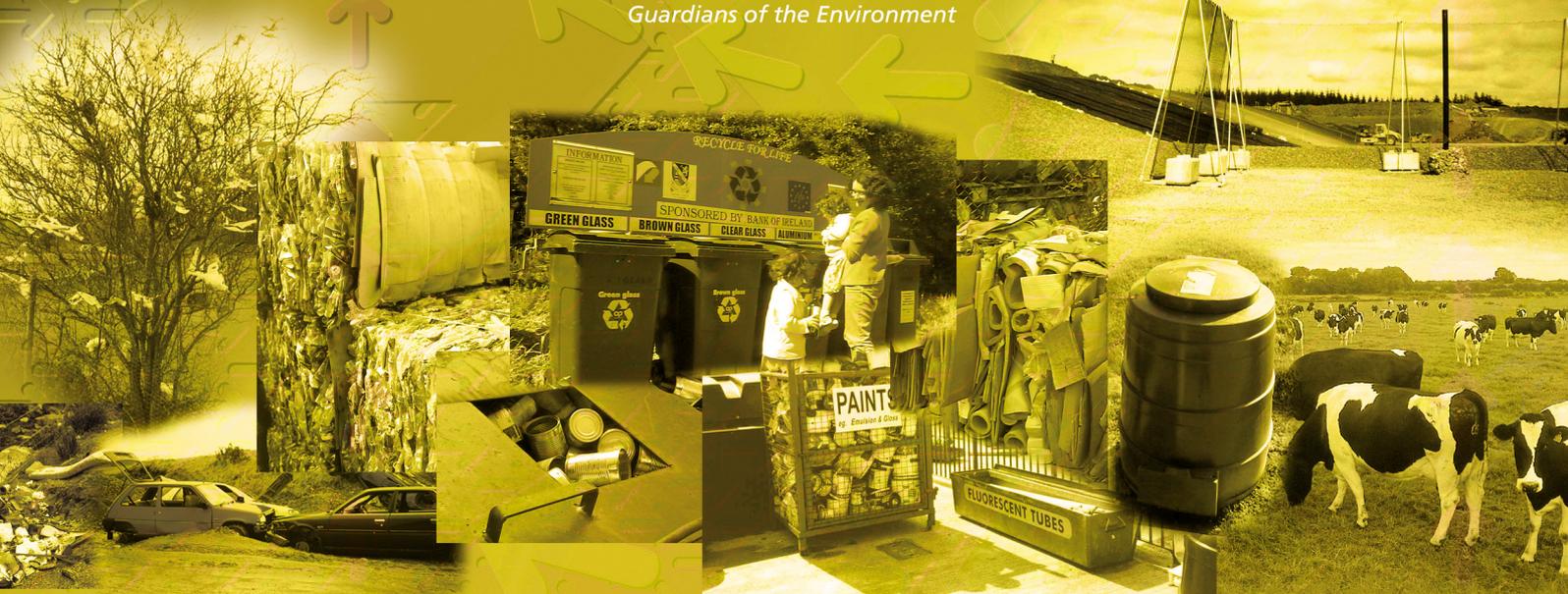




National Waste Database Report 2001

10 YEARS

Guardians of the Environment





National Waste Database Report 2001



Environmental Protection Agency
An Gníomhaireacht um Chaomhnú Comhshaoil
P.O. Box 3000, Johnstown Castle Estate, County Wexford, Ireland
Telephone : 053-60600 Fax : 053-60699
Email: info@epa.ie Website: <http://www.epa.ie>

© Environmental Protection Agency 2003

Parts of this publication may be reproduced without further permission, provided the source is acknowledged.

National Waste Database Report 2001

Published by the Environmental Protection Agency, Ireland.

This document does not purport to be and should not be considered a legal interpretation of the legislation referred to herein.

Although every effort has been made to ensure the accuracy of the material contained in this publication, complete accuracy cannot be guaranteed. Neither the Environmental Protection Agency nor the author(s) accept any responsibility whatsoever for loss or damage occasioned or claimed to have been occasioned, in part or in full, as a consequence of any person acting, or refraining from acting, as a result of a matter contained in this publication.

Authors:

Brian Meaney, Caitríona Collins, Kirsty Nolan, Eva Cahill, John Delaney, Bernie Murray,
Jane Healy and Gerry Carty.

ISBN 1-84095-109-5

03/03/1500

€20

CONTENTS

| | |
|--|-----------|
| CONTENTS | iii |
| LIST OF TABLES | iv |
| LIST OF FIGURES | v |
| FOREWORD | vii |
| ACKNOWLEDGEMENTS | ix |
| 1. INTRODUCTION | 1 |
| 1.1 Objectives | 1 |
| 1.2 Structure of the report | 1 |
| 1.3 Scope of the report | 2 |
| 1.3.1 Definition of waste | 2 |
| 1.3.2 Generation of waste | 2 |
| 1.3.3 Recovery and disposal of waste | 2 |
| 1.3.4 Waste streams | 2 |
| 2. WASTE MANAGEMENT POLICY AND LEGISLATION | 3 |
| 2.1 European Union policy and legislation | 3 |
| 2.2 Irish policy and legislation | 5 |
| 3. METHODOLOGY | 9 |
| 3.1 Introduction | 9 |
| 3.2 Sources of information | 9 |
| 3.2.1 Surveys | 9 |
| 3.2.2 Other sources of information | 9 |
| 3.3 Municipal waste | 10 |
| 3.3.1 Household waste | 10 |
| 3.3.2 Commercial waste (non-household municipal waste) | 10 |
| 3.4 Industrial waste | 11 |
| 3.4.1 Extrapolation or scale-up methodology | 11 |
| 3.5 Hazardous waste | 11 |
| 3.6 Recovery and disposal of waste | 12 |
| 3.7 Export and import of waste | 12 |
| 4. WASTE FLOWS IN IRELAND | 13 |
| 4.1 Total waste generation | 13 |
| 4.2 Municipal waste | 14 |
| 4.2.1 Generation and composition | 14 |
| 4.2.2 Recovery and disposal | 18 |
| 4.3 Industrial waste | 21 |
| 4.4 Hazardous waste | 28 |
| 4.5 Waste export and import | 32 |
| 4.5.1 Notified exports and imports of waste | 32 |
| 4.5.2 Non-notified exports and imports of waste | 34 |
| 4.6 Biodegradable municipal waste | 35 |
| 4.7 Agricultural waste | 36 |
| 4.8 Construction and demolition waste | 37 |
| 4.9 Healthcare waste | 39 |
| 4.10 Packaging waste | 41 |
| 4.11 Polychlorinated biphenyls | 45 |
| 4.12 Scrap metal and end-of-life vehicles | 45 |
| 4.13 Scrap tyres | 48 |
| 4.14 Waste batteries | 49 |
| 4.15 Waste electrical and electronic equipment | 50 |
| 4.16 Waste oils and oily sludges | 52 |
| 4.17 Sludges - sewage, drinking water and industrial | 52 |
| 5. WASTE MANAGEMENT INFRASTRUCTURE | 55 |
| 5.1 Introduction | 55 |
| 5.2 Regulation of waste management activities | 55 |
| 5.2.1 Waste permits | 56 |
| 5.2.2 Waste licences | 56 |
| 5.3 Waste collection, movement and transfer | 61 |
| 5.4 Waste disposal and recovery | 65 |

| | | |
|-----------|---|-----------|
| 5.4.1 | Landfill | 65 |
| 5.4.2 | Incineration | 67 |
| 5.4.3 | Composting | 67 |
| 5.4.4 | Recovery of non-hazardous waste | 68 |
| 5.4.5 | Recovery and disposal of hazardous waste | 69 |
| 6. | INDICATORS AND TRENDS | 71 |
| 6.1 | Indicators | 71 |
| 6.2 | Trends | 74 |
| 6.2.1 | Comparison with economic factors | 74 |
| 6.2.2 | Municipal waste | 75 |
| 6.2.3 | Municipal waste projections | 77 |
| 6.2.4 | Industrial waste | 79 |
| 6.2.5 | Hazardous waste | 80 |
| 6.2.6 | Packaging waste | 81 |
| 7. | CONCLUSIONS AND RECOMMENDATIONS | 83 |
| 7.1 | Conclusions | 83 |
| 7.2 | Recommendations | 86 |
| | APPENDIX A: LIST OF FACTSHEETS | 88 |
| | APPENDIX B: INDUSTRIAL STATISTICS | 89 |
| | APPENDIX C: WASTE LANDFILLS AND COLLECTION | 92 |

LIST OF TABLES

| | | |
|------------|--|----|
| Table 2.1 | Major European legislation on waste management since 1998 | 4 |
| Table 2.2 | Government policy commitments, 2002 | 6 |
| Table 2.3 | Major Irish legislation on waste management since 1998 | 7 |
| Table 4.1 | Comparison of estimated arisings for 1995, 1998 and 2001 | 13 |
| Table 4.2 | Municipal waste generation, 1995 to 2001 | 14 |
| Table 4.3 | Municipal waste generation in each local authority area and waste management planning region, 2001 | 15 |
| Table 4.4 | Composition of household and commercial waste, 2001 | 18 |
| Table 4.5 | Disposal and recovery rates in the household and commercial waste streams, 2001 | 19 |
| Table 4.6 | Disposal and recovery rates in the household waste stream, 2001 | 19 |
| Table 4.7 | Disposal and recovery rates in the commercial waste stream, 2001 | 20 |
| Table 4.8 | Progress towards national targets for the management of municipal waste | 20 |
| Table 4.9 | Summary of reported and projected quantities of industrial waste in 2001 | 21 |
| Table 4.10 | Top ten reported non-hazardous and hazardous industrial wastes in 2001 | 23 |
| Table 4.11 | The source, by sector, of industrial waste in 2001 | 24 |
| Table 4.12 | Reported industrial waste, by county, 2001 | 25 |
| Table 4.13 | Disposal and recovery of reported industrial waste in 2001 | 26 |
| Table 4.14 | Recovery and disposal of waste in surveyed industrial sectors, 2001 | 27 |
| Table 4.15 | Hazardous waste generation in 1996, 1998 and 2001 | 28 |
| Table 4.16 | Generation and destination of hazardous waste, 2001 | 30 |
| Table 4.17 | Recovery and disposal of hazardous waste in 2001 | 31 |
| Table 4.18 | Destination and fate of notified waste exported in 2001 | 32 |

| | |
|--|----|
| Table 4.19 Export of waste, notifications processed by local authorities, 2001 | 33 |
| Table 4.20 Export and import of non-notified waste for recovery, 2001 | 35 |
| Table 4.21 Biodegradable municipal waste generation, 2001 | 35 |
| Table 4.22 Estimated agricultural organic waste generation, 2001 | 36 |
| Table 4.23 Recovery and disposal of construction and demolition waste, 2001 | 38 |
| Table 4.24 Progress towards national targets for recycling construction and demolition waste | 39 |
| Table 4.25 Healthcare waste generation reported by local authorities | 39 |
| Table 4.26 Landfill, treatment and export of healthcare waste at licensed facilities | 40 |
| Table 4.27 Packaging waste generation, disposal and recovery, 2001 | 42 |
| Table 4.28 Packaging factors for landfilled household and commercial waste, 1998 and 2001 | 43 |
| Table 4.29 Export of waste PCBs, 2001 | 45 |
| Table 4.30 End-of-life vehicles, 1995 to 2001 | 47 |
| Table 4.31 Top five non-hazardous industrial sludges | 53 |
| Table 4.32 Disposal and recovery of industrial sludge, 2001 | 53 |
| Table 5.1 Regulation of waste activities in accordance with the Waste Management Acts, 1996 and 2001 | 56 |
| Table 5.2 Waste activities permitted by local authorities at end of December 2002 | 57 |
| Table 5.3 Waste licensed activities regulated by the EPA at end of December 2002 | 57 |
| Table 5.4 Waste accepted at licensed landfills, 2001 | 65 |
| Table 5.5 Remaining landfill capacity for municipal waste, by region, 2001 | 66 |
| Table 5.6 Remaining landfill capacity for municipal waste, 2001 | 66 |
| Table 5.7 Licensed industrial waste incineration facilities | 67 |
| Table 5.8 Licences, permits and applications for hazardous waste facilities at end 2002 | 70 |
| Table 6.1 Waste indicators, 1995, 1998 and 2001 | 71 |

LIST OF FIGURES

| | |
|---|----|
| Figure 4.1 National waste generation, principal sources, 2001 | 13 |
| Figure 4.2 Trends in municipal waste generation, 1995 to 2001 | 14 |
| Figure 4.3 Municipal waste generation in each waste management planning region, 1998 and 2001 | 16 |
| Figure 4.4 Composition of household and commercial waste, 2001 | 17 |
| Figure 4.5 Recovery and disposal of industrial waste, 1995 to 2001 | 27 |
| Figure 4.6 Recovery and disposal of notified waste exports, 1996, 1998 and 2001 | 33 |
| Figure 4.7 Destination of notified exported waste, 1996 to 2001 | 34 |
| Figure 4.8 Construction and demolition waste and dredging spoil generated in 2001 | 38 |
| Figure 4.9 The constituents of non-hazardous hospital waste | 41 |
| Figure 4.10 Recovery of packaging waste, 1995 to 2001 | 44 |
| Figure 4.11 Scrap metal and end-of-life vehicles, 2001 | 46 |
| Figure 4.12 Scrap tyres, 1990 to 2001 | 48 |
| Figure 4.13 Waste electrical and electronic equipment (WEEE) | 51 |
| Figure 5.1 Household, commercial and industrial waste flow in Ireland | 55 |
| Figure 5.2 Location of recycling of certain categories of waste, 2001 | 69 |

| | |
|---|----|
| Figure 6.1 Comparison of GDP and GNP with municipal waste data, 1995 to 2001 | 74 |
| Figure 6.2 Trends in municipal waste generation, 1998 and 2001 | 75 |
| Figure 6.3 Trends in household and commercial waste collected, 1998 and 2001 | 76 |
| Figure 6.4 Trends in disposal and recovery of household and commercial waste combined, 1998 and 2001 | 76 |
| Figure 6.5 Trends in disposal and recovery of household and commercial waste, 1998 and 2001 | 77 |
| Figure 6.6 Generation of municipal waste – projected to 2015 (tonnes) | 78 |
| Figure 6.7 Generation of municipal waste – projected to 2015 (kg per capita) | 78 |
| Figure 6.8 Trends in projected industrial waste generation | 79 |
| Figure 6.9 Trends in disposal and recovery rates for reported industrial waste | 79 |
| Figure 6.10 Hazardous waste generation, 1996 to 2001 | 80 |
| Figure 6.11 Trends in the disposal and recovery of hazardous waste, 1996 to 2001 | 80 |
| Figure 6.12 Trends in the location of hazardous waste recovery and disposal, 1996 to 2001 | 81 |
| Figure 6.13 Trends in packaging waste generation and recovery in the total waste stream, 1995 to 2001 | 81 |
| Figure 6.14 Trends in disposal of packaging waste in the total waste stream, 1995 to 2001 | 82 |
| Figure 6.15 Trends in recovery of packaging waste in the total waste stream, 1995 to 2001 | 82 |

FOREWORD

This report is the third in the National Waste Database Report series. Since the first report was prepared for 1995, the quality and availability of information on waste generation and management has improved.

The National Waste Database Report 2001 is an important publication in providing commentary and trends in waste arisings and management in Ireland. It facilitates comparisons with earlier reports (1995 and 1998) and provides indicators for evaluation of policy initiatives on waste. It should be used by policy makers, the public and the private sectors, as well as commentators on environmental issues, to measure progress on waste management and identify future priorities.

The overall picture that emerges in this report is one of increasing waste generation and high dependence on landfilling. Significant improvements in waste management infrastructure, and in particular in the provision and operation of facilities for the recycling of waste are noted. Further investment in infrastructure for waste management will be essential as the economy continues to grow and practices evolve from an almost complete dependency on landfill to use of a range of integrated waste management solutions. This change is driven by the impact of national and EU legislation and in particular the introduction of the Waste Management Act in 1996 and licensing and permitting systems in 1997.

Capacity for the recovery and disposal of waste is limited in several regions. Capacity for the recycling of waste is growing but needs to expand. Steps should be taken to review and accelerate the implementation of the regional waste management plans and the provision of an integrated network of waste management facilities in each region. Dependence on export outlets for the disposal of waste should be reduced as much as possible. The proximity principle should be implemented to ensure that we have sufficient capacity in Ireland to manage the waste streams produced.

Despite the reporting of high profile illegal waste activities in recent years, the waste management industry is increasingly operated under the regulation of the Environmental Protection Agency and local authorities and is characterised by increasing professionalism on the part of licensed operators. As regulation of the waste industry expands to include waste collection, transportation, storage, recycling and disposal activities, fewer opportunities will exist for the unauthorised handling of waste. Increased awareness and availability of information will minimise the potential for use of unauthorised waste operators. However, the legacy of unauthorised movement of waste and operation of illegal landfills must be dealt with and operators involved in such activities must face the full rigours of the law.

Limited prevention and minimisation is being undertaken by private or public sector organisations. While waste management infrastructure is needed, it is equally important that waste prevention measures be put in place. As emerging international and national policies on waste and material use begin to take effect, waste will increasingly be viewed as a resource. The ultimate aim is to achieve reduction in material usage and waste generation and improved resource efficiency. The National Waste Prevention Programme proposed in the 'Programme for Government' should be implemented as soon as possible.

The information on waste generation and management presented in this report is based on data provided by local authorities, industrial and commercial enterprises, recycling organisations and licensed waste treatment and disposal facilities, typically in response to questionnaires issued to individual organisations. Late submission of responses causes significant delays in preparing waste information for publication. A significant proportion of those surveyed make late or incomplete returns. For this information to be useful, it is essential that timely responses are submitted to the EPA and the EPA will in turn seek to publish information at an earlier date.

A Waste Statistics Regulation was published by the European Commission in 2002 that will dictate the frequency and extent of waste reporting to come. One of the principal objectives of the Regulation is to ensure comparable and timely information on waste management in Member States and the most significant change for Ireland is the requirement to prepare a detailed report every two years. The National Waste Database reporting frequency of three years will be changed to match the reporting

frequency of the Waste Statistics Regulation from 2004. A detailed review of the current waste information collection and collation systems will be undertaken in 2003 to ensure compatibility with the requirements of the Waste Statistics Regulation and identify any adjustments needed.

The EPA has developed a Waste Information Management System for the storage of waste information received from industry and from licensed facilities. The system will need to be expanded to accommodate waste information provided by local authorities and recycling organisations. The Waste Information Management System requires that information be provided in future to the EPA in electronic format and from 2004, all questionnaires will be issued in electronic format.

ACKNOWLEDGEMENTS

The participation of all respondents to EPA questionnaires and queries during preparation of this report is gratefully acknowledged. In particular, we acknowledge the contribution made by individuals in local authorities, industrial enterprises, recycling organisations and demolition contractors who took the time and effort to respond to questionnaires and follow-up queries. Gratitude is also due to EPA licensing inspectors for their part in providing information to the National Waste Database 2001.

Feedback from all participating parties towards improving the National Waste Database is welcome.

1. INTRODUCTION

This report is the third in the series of National Waste Database Reports with earlier editions having been published for the years 1995¹ and 1998². In the interim period since those earlier reports, the structure and nature of waste management in Ireland has changed beyond recognition. All parts of the country are now, for the first time, subject to waste management plans produced by local or regional authorities and a *National Hazardous Waste Management Plan*³ has been published. All legally operating waste disposal and recovery facilities, including landfills, are now regulated by local authorities or the EPA. The availability and scope of information on waste management has improved, although the quality of that information still remains relatively poor for a number of waste streams. This *National Waste Database Report 2001* presents a snapshot of waste management in Ireland at the end of 2001 and into 2002 and highlights the changes and progress made since 1998.

1.1 OBJECTIVES

The objectives of this report are:

- to present information on the generation of waste, as reported by local authorities, commercial activities, industry and farming;
- to estimate, by projection, the total quantity of waste generated in Ireland by each of these sectors;
- to illustrate trends in waste management;
- to describe available waste management infrastructure;
- to highlight shortcomings in the recording or provision of information on waste management;
- to examine changing regulatory and infrastructural requirements; and
- to make recommendations on waste infrastructure, capacity and future management practices.

1.2 STRUCTURE OF THE REPORT

A series of factsheets has been compiled which contain much of the detailed information on which this report is based. The factsheets are available as standalone documents on the EPA website at www.epa.ie. Factsheets on the following topics are available for 2001:

- | | |
|--------------------------------------|--|
| ➤ municipal waste; | ➤ scrap metal and end-of-life vehicles; |
| ➤ municipal waste composition; | ➤ scrap tyres; |
| ➤ packaging waste; | ➤ waste electrical and electronic equipment; and |
| ➤ construction and demolition waste; | ➤ agricultural waste. |
| ➤ waste infrastructure; | |

Chapter 1 of this report provides background information and the scope of the report.

Chapter 2 of this report outlines the methodologies followed in compiling the information contained in the report and in the factsheets.

Chapter 3 provides an update of EU and Irish legislation and policy since 1998.

Chapter 4 presents data and statistics on waste generation and management.

Chapter 5 describes the waste management (recovery and disposal) infrastructure that exists in Ireland.

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

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

³ EPA, 2001, *National Hazardous Waste Management Plan*.

Chapter 6 presents the indicators for 2001 and analyses trends between 1998 and 2001. Future municipal waste projections based on various growth rate scenarios are presented.

Chapter 7 presents conclusions drawn from the data and information for 2001 and makes recommendations with regard to waste management, waste information and waste statistics.

1.3 SCOPE OF THE REPORT

1.3.1 DEFINITION OF WASTE

This report provides statistics on all wastes, where information exists. Waste is defined in the Waste Management Acts, 1996 and 2001, and in summary means any substance or object that the holder discards or intends or is required to discard, regardless of whether that substance or object has a value or can be recycled.

1.3.2 GENERATION OF WASTE

Waste generators include householders, commercial outlets and activities, industry and agriculture. This report provides information on the quantity and nature of waste generated by each of these sector.

1.3.3 RECOVERY AND DISPOSAL OF WASTE

Recovery and disposal are terms used to describe what happens to waste after it has been discarded or thrown away. Recovery includes reuse, recycling and energy recovery (i.e. waste to energy, incineration with energy recovery, reuse as fuel etc.). Disposal includes landfill, incineration without energy recovery and a range of other processes which generally precede landfill and other final disposal options (e.g. physico-chemical treatment, biological treatment etc). A full list of recovery and disposal activity classes is set out in the Third and Fourth Schedules to the Waste Management Acts 1996 and 2001. It should be noted that these Schedules are somewhat different to the EU listing⁴ upon which they are based. This has been a source of confusion in the past and users should take care to ensure that the appropriate listing is used.

The recovery and disposal of waste is described both in terms of what happens to the waste but also in terms of the available infrastructure for the recovery and disposal of waste.

1.3.4 WASTE STREAMS

This report provides specific information on a number of waste streams, listed below:

- Municipal waste;
- Biodegradable municipal waste;
- Industrial waste;
- Hazardous waste;
- Agricultural waste;
- Construction and demolition waste;
- Healthcare waste;
- Waste oils;
- Packaging waste;
- Waste batteries;
- Waste sludges;
- Waste electrical and electronic equipment;
- Polychlorinated biphenyls (PCBs);
- Scrap metals and end-of-life vehicles; and
- Scrap tyres.

⁴ Council Directive 75/442/EEC on waste, as amended. As also used on TFS notification forms.

2. WASTE MANAGEMENT POLICY AND LEGISLATION

2.1 EUROPEAN UNION POLICY AND LEGISLATION

Much of the framework for waste management in Ireland is based on EU, and sometimes international, legislation. Table 2.1 lists some of the major pieces of EU legislation and recent developments in EU waste and materials management policy.

A key driver of change in future waste reporting is the Waste Statistics Regulation⁵ that was published in 2002. The Regulation sets out in detail the information that is required to be collected by Member States and reported to the Commission. The first reporting year under the Regulation is 2004, with the first national report to be submitted to the Commission by June 2006.

The Sixth Environment Action Programme⁶ establishes environmental priorities with the aim of decoupling environmental pressures from economic growth and improving resource efficiency and resource and waste management so as to bring about sustainable production and consumption patterns. In the field of natural resources and waste, the following objectives are set out:

- a significant overall reduction in the volumes of waste generated through waste prevention initiatives, better resource efficiency and a shift towards more sustainable production and consumption patterns;
- a significant reduction in the quantity of waste going to disposal and the volumes of hazardous waste produced while avoiding an increase in emissions to air, water and soil;
- encouraging reuse;
- reducing hazardousness of waste that is still generated;
- giving preference to recovery, and especially recycling;
- minimising the disposal of waste and carrying out disposal safely; and
- treating waste for disposal as close as possible to its place of generation, while maintaining efficiency in waste treatment operations.

The objectives are to be pursued by means of four principal priority actions:

- a thematic strategy on the sustainable use and management of resources;
- developing and implementing measures on waste prevention and management;
- developing a thematic strategy on waste recycling; and
- developing or revising the legislation on waste.

The objectives of the Sixth Environment Action Programme must also consider the integrated product policy approach. A Green Paper on Integrated Product Policy was published in 2001. Integrated product policy seeks to minimise the environmental impact of products by looking at all phases of a product's life-cycle and taking action where it is most effective. A consultation process was carried out in 2001 and ongoing policy development work is exploring the necessary balance between measures such as economic instruments, substance bans, voluntary agreements, environmental labelling and product design guidelines in implementing an integrated product policy.

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

⁶ Decision No 1600/2002/EC of the European Parliament and of the Council of 22 July 2002 laying down the Sixth Community Environment Action Programme.

Table 2.1 Major European legislation on waste management since 1998

| |
|--|
| 1999 Commission Decision 1999/816/EC adapting, pursuant to Articles 16(1) and 42(3), Annexes II, III, IV and V to Council Regulation (EEC) No 259/93 on the supervision and control of shipments of waste within, into and out of the European Community (OJ L316, 10.12.1999, p. 45) |
| 1999 Commission Decision 1999/391/EC concerning the questionnaire relating to Council Directive 96/61/EC concerning integrated pollution prevention and control (IPPC) (implementation of Council Directive 91/692/EEC) (OJ L148, 15.06.1999, p. 39) |
| 1999 Commission Regulation (EC) No 1547/1999 of determining the control procedures under Council Regulation (EEC) No 259/93 to apply to shipments of certain types of waste to certain countries to which OECD Decision C(92)39 final does not apply (OJ L185, 17.07.1999, p. 1) |
| 1999 Council Directive 1999/31/EC on the landfill of waste (OJ L182, 16.07.1999, p. 1) |
| 1999 Council Regulation (EC) No 1420/1999 establishing common rules and procedures to apply to shipments to certain non-OECD countries of certain types of waste (OJ L166, 01.07.1999, p. 6) |
| 2000 Commission Decision 2000/532/EC replacing Decision 94/3/EC establishing a list of wastes pursuant to Article 1(a) of Council Directive 75/442/EEC on waste and Council Decision 94/904/EC establishing a list of hazardous waste pursuant to Article 1(4) of Council Directive 91/689/EEC on hazardous waste (OJ L226, 06.09.2000, p. 3) ... as amended by Decision 2001/118/EC (OJ L47, 16.02.2001, p. 1), Decision 2001/119/EC (OJ L47, 16.02.2001, p. 32) and Decision 2001/573/EC (OJ L203, 28.07.2001, p. 18) |
| 2000 Commission Decision 2000/738/EC concerning a questionnaire for Member States reports on the implementation of Directive 1999/31/EC on the landfill of waste (OJ L298, 25.11.2000, p. 24) |
| 2000 Directive 2000/53/EC of the European Parliament and of the Council on end-of-life vehicles (OJ L269, 21.10.2000, p. 34) |
| 2000 Directive 2000/76/EC of the European Parliament and of the Council on the incineration of waste (OJ L332, 28.12.2000, p. 91) |
| 2000 Directive 2000/59/EC on port-reception facilities for ship-generated waste and cargo residues (OJ L332, 28.12.2000, p. 81) |
| 2001 Commission Decision 2001/753/EC concerning a questionnaire for Member States reports on the implementation of Directive 2000/53/EC of the European Parliament and of the Council on end-of-life vehicles (OJ L282, 26.10.2001, p. 77) |
| 2002 Commission Decision 2002/151/EC on minimum requirements for the certificate of destruction issued in accordance with Article 5(3) of Directive 2000/53/EC of the European Parliament and of the Council on end-of-life vehicles (OJ L50, 21.02.2002, p. 94) |
| 2002 Commission Decision 2002/525/EC amending Annex II of Directive 2000/53/EC of the European Parliament and of the Council on end-of-life vehicles (OJ L170, 29.06.2002, p. 81) |
| 2002 Decision No 1600/2002/EC of the European Parliament and of the Council laying down the Sixth Community Environment Action Programme (OJ L242, 10.09.2002, p. 1) |
| 2002 Directive 2002/95/EC of the European Parliament and of the Council on the restriction of the use of certain hazardous substances in electrical and electronic equipment (OJ L37, 13.02.2003, p. 19) |
| 2002 Directive 2002/96/EC of the European Parliament and of the Council on waste electrical and electronic equipment (WEEE) (OJ L37, 13.02.2003, p. 24) |
| 2002 Regulation (EC) No 2150/2002 of the European Parliament and of the Council on waste statistics (OJ L332, 09.12.2002, p. 1) |

The World Summit on Sustainable Development, held in Johannesburg in 2002, provided an opportunity for the international community to review progress made at global level since the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro in 1992. An implementation plan⁷ was drawn up to further build on the achievements made since 1992 and to expedite realisation of the remaining goals. The implementation plan specifies that the overall objectives of, and essential requirements for, sustainable development are poverty eradication, changing unsustainable patterns of production and consumption and protecting and managing the natural resource base of economic and social development. In relation to waste, the implementation plan specifically advocates prevention and minimisation of waste and the importance of maximising reuse, recycling and the use of environmentally friendly alternative materials. To achieve these goals, the implementation plan recommends the development of reusable consumer goods and biodegradable products and the development of the required waste management infrastructure.

The focus within waste management in the EU is beginning to shift towards the measurement and monitoring of material flows. Material flows techniques allow for a holistic view of waste to be taken with the objective of moving the emphasis away from end-of-pipe technologies and towards the prevention of waste and the minimisation of material and resource use. Material flow analysis does not only look at the material flowing out of a process as waste; it also looks at the material flowing into a process. It allows for opportunities for prevention, minimisation and waste recycling to be identified. The EU and associated bodies have begun to develop the new measurement tool of material flows accounting as an adjunct to traditional waste reporting. The objective is to develop means of measuring the links between economic activities and waste generation with a policy objective of breaking that link; in other words to achieve “dematerialisation” and to “decouple” waste generation from economic activities.

2.2 IRISH POLICY AND LEGISLATION

Irish Government policy on waste management has progressed since the publication of the National Sustainable Development Strategy⁸ in 1997 and *Waste Management – Changing Our Ways*⁹ in 1998. *Changing Our Ways* set down a series of ambitious targets towards improved management of waste and increased diversion from landfill. Developing that theme further, in accordance with EU policy, *Preventing and Recycling Waste – Delivering Change*¹⁰ (2002) proposed ambitious programmes not only for increased recycling of waste and diversion from landfill, but also towards reducing the gross quantities of waste generated; in other words, towards the prevention of waste. Table 2.2 summarises some of the major objectives of *Delivering Change*.

A review¹¹ of the Sustainable Development Policy was published by the Department of the Environment and Local Government in 2002. The review assesses progress made in Ireland since the Earth Summit in 1992 and sets out directions for future action. It mainly focuses on the link between economic activity and pressures on the environment. It stresses a number of key initiatives for the coming years including working to break the link between economic growth and damage to the environment; implementing waste management policy as set out in *Changing our Ways* and *Delivering Change*; using economic and fiscal measures and producer responsibility initiatives; and implementing the national biodiversity and

⁷ United Nations, 2002, *Report of the World Summit on Sustainable Development*, United Nations, New York.

⁸ Department of the Environment, 1997, *Sustainable Development – A Strategy for Ireland*.

⁹ Department of the Environment and Local Government, 1998, *Waste Management – Changing Our Ways*, A Policy Statement.

¹⁰ Department of the Environment and Local Government, 2002, *Preventing and Recycling Waste – Delivering Change*, A Policy Statement.

¹¹ Department of the Environment and Local Government, 2002, *Making Ireland’s Development Sustainable – Review, Assessment and Future Action*, World Summit on Sustainable Development, August/September 2002, National Report for Ireland.

national heritage plans. The report concludes that Ireland requires a greater integration of environmental considerations into economic activities and individual lifestyles. Although good progress has been made in numerous areas, there is still growing pressure on the environment.

Table 2.3 sets out major waste legislation introduced since 1998. A Protection of the Environment Bill was making its way through the Oireachtas at time of writing of this report.

Table 2.2 Government policy commitments, 2002

- Establish a National Waste Management Board to co-ordinate, monitor, review and advise the Government on all aspects of waste management policy at all levels of the waste hierarchy;
- Establish a National Waste Prevention Programme to achieve waste prevention and minimisation;
- Establish a Core Prevention Team within the EPA to drive the National Waste Prevention Programme;
- Promote voluntary action and other initiatives to implement re-use systems and to implement the plastic bag levy;
- Establish a Recycling Consultative Forum to act as a consultative and advisory body on all aspects of recycling;
- Provide funds for waste recovery infrastructure including recycling infrastructure;
- Introduce a landfill levy and implement landfill bans;
- Establish a Market Development Programme to identify and promote markets for recyclable material;
- Further promote or establish producer responsibility initiatives for packaging waste, end-of-life vehicles, waste electrical and electronic equipment, construction and demolition waste, newsprint, tyres and batteries;
- Establish a Producer Responsibility Unit within the EPA;
- Draw up a national strategy on biodegradable waste in the municipal waste stream; and
- Develop a public service waste management programme.



Municipal waste has traditionally been collected as mixed waste and disposed of to landfill.

Table 2.3 Major Irish legislation on waste management since 1998

| |
|--|
| ACTS |
| Local Government (Planning and Development) Act, 1999. |
| Planning and Development Act, 2000. |
| Waste Management (Amendment) Act, 2001. |
| Local Government Act, 2001. |
| REGULATIONS |
| Local Government (Planning and Development) Regulations, 1999, S.I. No. 92 of 1999. |
| Environmental Protection Agency Act, 1992 (Urban Waste Water Treatment) (Amendment) Regulations, 1999, S.I. No. 208 of 1999. |
| Litter Pollution Regulations, 1999, S.I. No. 359 of 1999. |
| Local Government (Planning and Development) (No. 2) Regulations, 1999, S.I. No. 431 of 1999. |
| Waste Management (Hazardous Waste) (Amendment) Regulations, 2000, S.I. No. 73 of 2000. |
| Waste Management (Licensing) Regulations, 2000, S.I. No. 185 of 2000. |
| Planning and Development Regulations, 2000, S.I. No. 350 of 2000. |
| Urban Waste Water Treatment Regulations, 2001, S.I. No. 254 of 2001. |
| Waste Management (Use of Sewage Sludge in Agriculture) (Amendment) Regulations, 2001, S.I. No. 267 of 2001. |
| Waste Management (Farm Plastics) Regulations, 2001, S.I. No. 341 of 2001 |
| Waste Management (Licensing) (Amendment) Regulations, 2001, S.I. No. 397 of 2001 |
| Waste Management (Collection Permit) Regulations, 2001, S.I. No. 402 of 2001. |
| Waste Management (Collection Permit) (Amendment) Regulations, 2001, S.I. No. 540 of 2001 |
| Waste Management (Environmental Levy) (Plastic Bag) Regulations, 2001, S.I. No. 605 of 2001. |
| Waste Management (Landfill Levy) Regulations, 2002, S.I. No. 86 of 2002. |
| Waste Management (Licensing) (Amendment) Regulations, 2002, S.I. No. 336 of 2002. |
| European Communities (Amendment of Waste Management (Licensing) Regulations, 2000) Regulations, 2002, S.I. No. 337 of 2002. |
| Waste Management (Packaging) Regulations, 2003, S.I. No. 61 of 2003. |

3. METHODOLOGY

3.1 INTRODUCTION

The methodologies used in previous National Waste Database Reports have not been substantially altered. Information on waste generation and management was collated from a large number of different sources, as described in earlier reports. Care was taken to ensure that double-counting of data did not occur.

3.2 SOURCES OF INFORMATION

3.2.1 SURVEYS

Surveys of the following groups were carried out:

- local authorities in respect of household and commercial waste arisings and management;
- targeted industrial facilities (non-IPC licensed) in respect of waste arisings and management;
- recycling organisations (both in Ireland and abroad) in respect of waste recycled or exported for recycling; and
- demolition contractors in respect of waste arisings and management.

3.2.2 OTHER SOURCES OF INFORMATION

IPC-licensed industry

Data on waste arisings and management from annual environmental reports submitted by IPC-licensed industry were used.

Waste-licensed facilities

Data on waste acceptance and management from annual environmental reports submitted by waste-licensed facilities were used.

Construction and demolition waste

Factors presented in the *Factsheet on Construction and Demolition Waste, 2001*¹² were used to calculate the generation of waste in construction and demolition activities. The factors were applied to construction statistics published by the Department of the Environment and Local Government¹³.

Agricultural waste

Factors developed in *Developing A National Phosphorus Balance For Agriculture In Ireland*¹⁴ were used to calculate the generation of manure and slurry. The factors were applied to livestock statistics published by the Central Statistics Office. The statistics used relate to the livestock census for 2000 which was the latest data available at time of preparation of this report.

¹² Available on the EPA website at www.epa.ie.

¹³ Department of the Environment and Local Government, 2002, *Construction Industry Review 2001, Outlook 2002-2004*.

¹⁴ EPA, 2001, *Developing A National Phosphorus Balance For Agriculture In Ireland - A Discussion Document*.

Unreported hazardous waste

Factors developed during preparation for the *National Hazardous Waste Management Plan*¹⁵ were used to calculate the generation of unreported hazardous waste. Reported data, where available, was taken into account.

3.3 MUNICIPAL WASTE

Municipal waste is defined in the Waste Management Acts, 1996 and 2001, as *household waste as well as commercial and other waste which, because of its nature or composition, is similar to household waste*. Data on municipal waste generation and management is collated from a number of diverse sources, as detailed below.

3.3.1 HOUSEHOLD WASTE

Household waste is defined in the Waste Management Acts, 1996 and 2001, as *waste produced within the curtilage of a building or self-contained part of a building used for the purposes of living accommodation*.

Local authorities were requested to provide information on:

- the quantity of household waste generated, collected and managed (including landfill and recycling) in their functional areas, either by or on behalf of the local authority; and
- the percentage of households that are served by a collection system.

In local authority areas without 100% coverage by collection systems, total household waste arisings were calculated by extrapolating the reported quantity according to the reported proportion of households not served.

3.3.2 COMMERCIAL WASTE (NON-HOUSEHOLD MUNICIPAL WASTE)

Commercial waste is defined in the Waste Management Acts, 1996 and 2001, as *waste from premises used wholly or mainly for the purposes of trade or business or for the purposes of sport, recreation, education or entertainment but does not include household, agricultural or industrial waste*.

Local authorities were requested to provide information on the quantity of commercial waste collected and managed, either by the local authority or private enterprise, in their functional areas. Four local authorities were unable to quantify the amount of commercial waste collected in their areas. In order to calculate commercial waste generation in these local authority areas, a projection was made using previous years' data. Projections were based on the relative national contributions in 1998 applied to the reported national quantities for 2001.

Local authority information generally relates to commercial waste disposed of to landfill in Ireland. Recycling organisations provided information on commercial and household waste collected for recycling in Ireland and abroad.

Additional information was also obtained from landfill operators who accepted commercial waste at their facilities.

Information from these sources was used to calculate the total generation of commercial waste.

¹⁵ Tobin Environmental Services, 1999, unpublished, *A Strategy Study for a National Hazardous Waste Management Plan*.

3.4 INDUSTRIAL WASTE

Industrial waste is defined in the Waste Management Acts, 1996 and 2001, as including *waste produced or arising from manufacturing or industrial activities or processes*. Economic activities are classified according to the NACE classification system¹⁶ and industrial activities are classified according to NACE codes C, D and E.

For the purposes of gathering information for this report, industry is split into two categories: IPC licensed and non-IPC licensed.

Waste arisings data at IPC licensed industry were taken from annual environmental reports that are submitted by licensed companies to the EPA. A total of 307 annual environmental reports were entered into the industrial waste dataset. IPC-licensed piggeries and poultry farms were characterised as agricultural waste generators and were not considered as part of the industrial dataset.

Non-IPC licensed industry was surveyed as mentioned in section 3.2.1.

3.4.1 EXTRAPOLATION OR SCALE-UP METHODOLOGY

The coverage of the industrial survey (IPC and non-IPC), based on the number of employees represented by the respondents and the overall sectoral employment provided by the Central Statistics Office, is 27.2% of all employees in IPC licensed and non-IPC licensed industry. The equivalent rates in 1995 and 1998 were 22.9% and 38.7% respectively.

Questionnaires were issued to 550 non-IPC-licensed companies from which 159 returns were received. This represents a response rate of 29% of companies surveyed. The equivalent rates in 1995 and 1998 for all companies, including IPC-licensed companies (in the 1998 dataset), were 16% and 23.1% respectively.

In order to represent industry as a whole (i.e. 100%), the scale-up methodology developed for the *National Waste Database Report 1995*, which was used again in 1998, was used. A detailed description of the methodology is available in both earlier reports. In summary, the scale-up methodology is based on employee numbers, from which waste generation per employee is determined for each respondent. The values are aggregated to provide estimates of waste generation for each NACE sector.

3.5 HAZARDOUS WASTE

Hazardous waste is defined in the Waste Management Acts, 1996 and 2001, as, in summary, any waste which appears on the hazardous waste list or is prescribed as a hazardous waste and which displays one or more of the properties of hazardous waste listed in the Act. Detailed information on the definition of hazardous waste is available in a number of EPA documents^{17,18,19}.

“Reported” hazardous waste quantities are taken directly from reported industrial waste arisings and from records of hazardous waste treatment facilities in Ireland. “Unreported” hazardous waste was

¹⁶ Council Regulation (EEC) No 3037/90 of 9 October 1990 on the statistical classification of economic activities in the European Union (OJ No L293, 24.10.1990, p.1); as amended by Commission Regulation (EEC) No 761/93 (OJ No L83, 3.4.93, p.1). NACE classifications from 1 January 2003 will be assigned according to the latest amendment, Commission Regulation (EC) No 29/2002 (OJ No L6, 10.1.2002, p.3).

¹⁷ EPA, 2001, *National Hazardous Waste Management Plan*.

¹⁸ EPA, 2001, *Procedure for the Identification of the Hazardous Components of Waste*, ERTDI Programme 2000-DS-3-M1.

¹⁹ EPA, 2002, *European Waste Catalogue and Hazardous Waste List – Valid from 1 January 2002*.

estimated as described in section 3.2. Information on the export of hazardous waste was obtained from transfrontier shipment of waste records provided by local authorities.

3.6 RECOVERY AND DISPOSAL OF WASTE

Information on the quantities and type of waste being recovered and disposed of at facilities in Ireland and abroad was obtained from the following sources of information:

- Local authority returns in relation to waste accepted for recycling at bring banks and civic waste facilities;
- Local authority returns in relation to notified waste exported for recovery and disposal;
- Local authority returns in relation to waste accepted for recovery and disposal at permitted waste facilities;
- Waste licence returns in relation to waste accepted for recovery and disposal at licensed and applied waste facilities; and
- Recycling organisations returns in relation to waste collected and accepted for recycling, either in Ireland or abroad.

3.7 EXPORT AND IMPORT OF WASTE

Waste exports are quantified on the basis of documented transfrontier shipment (TFS) of waste notification forms that are processed and held by local authorities. All waste exports are subject to the EU Regulation on the transfrontier shipment of waste²⁰.

An exemption is made under the EU Regulation for the export of certain segregated non-hazardous waste fractions that are exported for recovery. An estimate is made of these quantities from the survey of recycling organisations.

Illegal export of waste came to light as a significant problem in 2002 in the form of mis-classified hazardous wastes being exported without authorisation and mixed municipal (household and commercial) waste being exported without authorisation. It was not possible to quantify illegal exports in 2001 as by their nature such activities are illegal and unrecorded and any quantities that might be suggested are speculative. Increased enforcement is required to detect illegal exports and to ensure that further shipments are prevented.

²⁰ 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; and Waste Management (Transfrontier Shipment of Waste) Regulations, 1998, S.I. No. 149 of 1998.

4. WASTE FLOWS IN IRELAND

4.1 TOTAL WASTE GENERATION

In 2001, an estimated 17,384,194 tonnes of waste, other than agricultural waste, were generated in Ireland. This represents an increase of 12.6% in the three years since 1998, or an average of 4.2% per year. Added to this, an estimated 56,687,440 tonnes of agricultural waste were generated, bringing the total generation of waste in 2001 to 74,071,634 tonnes. Table 4.1 presents an overview of total waste generation in 2001, 1998 and 1995.

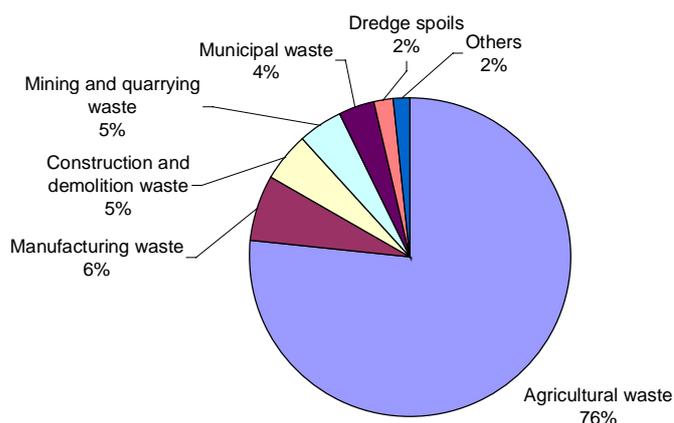


Figure 4.1 National waste generation, principal sources, 2001

Table 4.1 Comparison of estimated arisings for 1995, 1998 and 2001

| Waste category | 2001 | | 1998 | | 1995 | |
|---|-------------------|-------------|-------------------|-------------|-------------------|-------------|
| | Tonnes | % | Tonnes | % | Tonnes | % |
| Manufacturing waste | 5,119,581 | 6.9 | 4,876,406 | 6.1 | 3,540,226 | 8.4 |
| Construction and demolition waste | 3,651,411 | 4.9 | 2,704,958 | 3.4 | 1,318,908 | 3.1 |
| Mining waste (plus quarrying in 2001) | 3,334,041 | 4.5 | 3,510,778 | 4.4 | 2,200,002 | 5.2 |
| Municipal waste | 2,704,035 | 3.7 | 2,056,652 | 2.6 | 1,848,232 | 4.4 |
| Dredge spoils | 1,257,000 | 1.7 | 734,000 | 0.9 | 784,600 | 1.9 |
| End-of-life vehicles and scrap metal | 349,802 | 0.5 | 187,484 | 0.2 | 52,154 | 0.1 |
| Hazardous waste | 323,090 | 0.4 | 324,842 | 0.5 | 243,754 | 0.6 |
| Energy, gas and water supply waste | 310,164 | 0.4 | 448,674 | 0.6 | 351,849 | 0.8 |
| Contaminated soil | 168,579 | 0.2 | 45,486 | 0.0 | 0 | 0.0 |
| Urban wastewater sludges | 159,947 | 0.2 | 505,686 | 0.6 | 851,380 | 2.0 |
| Drinking water sludges | 6,544 | 0.0 | 38,988 | 0.0 | 58,095 | 0.1 |
| Sub-total non-agricultural waste | 17,384,194 | 23.5 | 15,433,954 | 19.3 | 11,249,900 | 26.6 |
| Agricultural waste | 56,687,440 | 76.5 | 64,578,724 | 80.7 | 31,000,000 | 73.4 |
| Total | 74,071,634 | - | 80,012,678 | - | 42,249,200 | - |

4.2 MUNICIPAL WASTE

4.2.1 GENERATION AND COMPOSITION

An estimated 2,704,035 tonnes of municipal waste were generated in 2001, consisting of 1,468,834 tonnes of household waste, 1,156,732 tonnes of commercial waste and 78,469 tonnes of street cleansing waste. An overall increase of 31.5% is observed between 1998 and 2001, an average of 10.5% per annum. Table 4.2 and Figure 4.2 illustrate the increasing trend in municipal waste quantities since 1995. Table 4.3 shows the quantity of municipal waste reported by local authorities for their functional areas and Figure 4.3 illustrates the generation of municipal waste in each waste management planning region in 1998 and 2001.

There is wide variance in the quality of the information provided by local authorities. Applying county populations to the data, there is a wide range of values for household waste generation per capita, ranging from 248kg/capita to 876kg/capita with an average of 375kg/capita. Local authorities, particularly those showing unusually high or low per capita waste generation, should take steps to examine their waste information management systems to ensure that they are up to the required standard of quality and robustness. The growth in municipal waste generation reflects economic growth between 1998 and 2001.

Table 4.2 Municipal waste generation, 1995 to 2001

| Category of municipal waste | 2001 (tonnes) | 1998 (tonnes) | 1995 (tonnes) |
|------------------------------|------------------|------------------|------------------|
| Household waste | 1,468,834 | 1,220,856 | 1,324,521 |
| Commercial waste | 1,156,732 | 754,797 | 476,920 |
| Street cleansing waste | 78,469 | 80,999 | 46,791 |
| Total municipal waste | 2,704,035 | 2,056,652 | 1,848,232 |

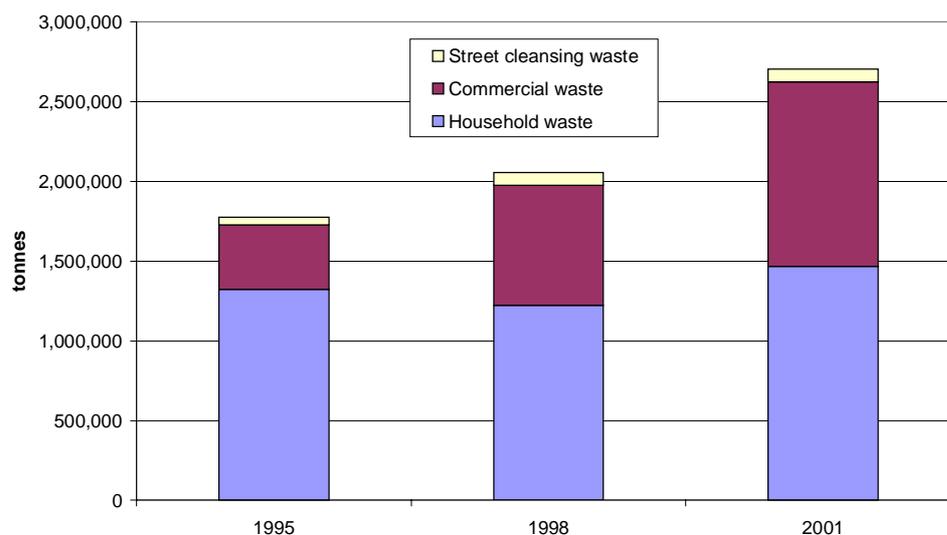


Figure 4.2 Trends in municipal waste generation, 1995 to 2001

Table 4.3 Municipal waste generation in each local authority area and waste management planning region, 2001

| | Household waste (tonnes) | Commercial waste (tonnes) | Street cleansing (tonnes) | Total (tonnes) | Household waste per capita (kg/cap) |
|------------------------------------|--------------------------|---------------------------|---------------------------|------------------|-------------------------------------|
| Dublin City | 203,979 | 241,986 | 22,000 | 467,965 | 412 |
| Dun Laoghaire-Rathdown | 78,915 | 60,819 | 2,902 | 142,636 | 412 |
| Fingal | 66,835 | 33,102 | 3,850 | 103,787 | 341 |
| South Dublin | 91,310 | 78,760 | 5,832 | 175,902 | 381 |
| Dublin Region sub-total | 441,039 | 414,667 | 34,584 | 890,290 | 393 |
| Cork | 117,185 | 94,413 | 6,000 | 217,598 | 361 |
| Cork City | 56,472 | 66,549 | 3,492 | 126,513 | 458 |
| Cork Region sub-total | 173,657 | 160,962 | 9,492 | 344,111 | 387 |
| Galway | 57,562 | 50,470 | 227 | 108,259 | 402 |
| Galway City | 16,638 | 70,770 | 2,005 | 89,413 | 253 |
| Leitrim | 22,603 | 5,000 | 0 | 27,603 | 876 |
| Mayo | 42,545 | 9,366 | 514 | 52,425 | 362 |
| Roscommon | 13,327 | 8,040 | 636 | 22,003 | 248 |
| Sligo | 23,592 | 9,080 | 0 | 32,672 | 406 |
| Connaught Region sub-total | 176,267 | 152,726 | 3,382 | 332,375 | 380 |
| Carlow | 15,940 | 9,632 | 1,300 | 26,872 | 348 |
| Kilkenny | 28,205 | 10,301 | 3,610 | 42,116 | 351 |
| South Tipperary | 32,407 | 10,970 | 600 | 43,977 | 409 |
| Waterford | 16,790 | 9,800 | 1,150 | 27,740 | 295 |
| Waterford City | 13,750 | 57,788 | 1,310 | 72,848 | 309 |
| Wexford | 37,414 | 15,206 | 0 | 52,620 | 321 |
| South East Region sub-total | 144,506 | 113,697 | 7,970 | 266,173 | 341 |
| Clare | 49,103 | 12,506 | 1,273 | 62,882 | 475 |
| Kerry | 32,994 | 42,669 | 1,647 | 77,310 | 249 |
| Limerick | 33,032 | 24,961 | 515 | 58,508 | 272 |
| Limerick City | 25,274 | 33,067 | 3,400 | 61,741 | 468 |
| Mid-West Region sub-total | 140,403 | 113,203 | 6,835 | 260,441 | 341 |
| Cavan | 23,710 | 13,236 | 2,162 | 39,108 | 420 |
| Louth | 46,431 | 16,920 | 2,581 | 65,932 | 456 |
| Meath | 71,476 | 15,202 | 492 | 87,170 | 534 |
| Monaghan | 13,548 | 5,839 | 103 | 19,490 | 257 |
| North East Region sub-total | 155,165 | 51,197 | 5,338 | 211,700 | 450 |
| Laois | 24,910 | 9,726 | 46 | 34,682 | 424 |
| Longford | 15,275 | 5,808 | 505 | 21,588 | 491 |
| North Tipperary | 20,950 | 4,563 | 611 | 26,124 | 343 |
| Offaly | 37,534 | 31,675 | 332 | 69,541 | 589 |
| Westmeath | 17,949 | 15,981 | 540 | 34,470 | 249 |
| Midlands Region sub-total | 116,618 | 67,753 | 2,034 | 186,405 | 407 |
| Donegal | 34,550 | 11,996 | 2,000 | 48,546 | 251 |
| Kildare | 54,637 | 7,000 | 6,374 | 68,011 | 333 |
| Wicklow | 31,992 | 63,531 | 460 | 95,983 | 279 |
| Total | 1,468,834 | 1,156,732 | 78,469 | 2,704,035 | 375 |

Note: Shaded cells indicate that information was not available on commercial waste generation in the local authority area in 2001. Figures were extrapolated from commercial waste data submitted for 1998.

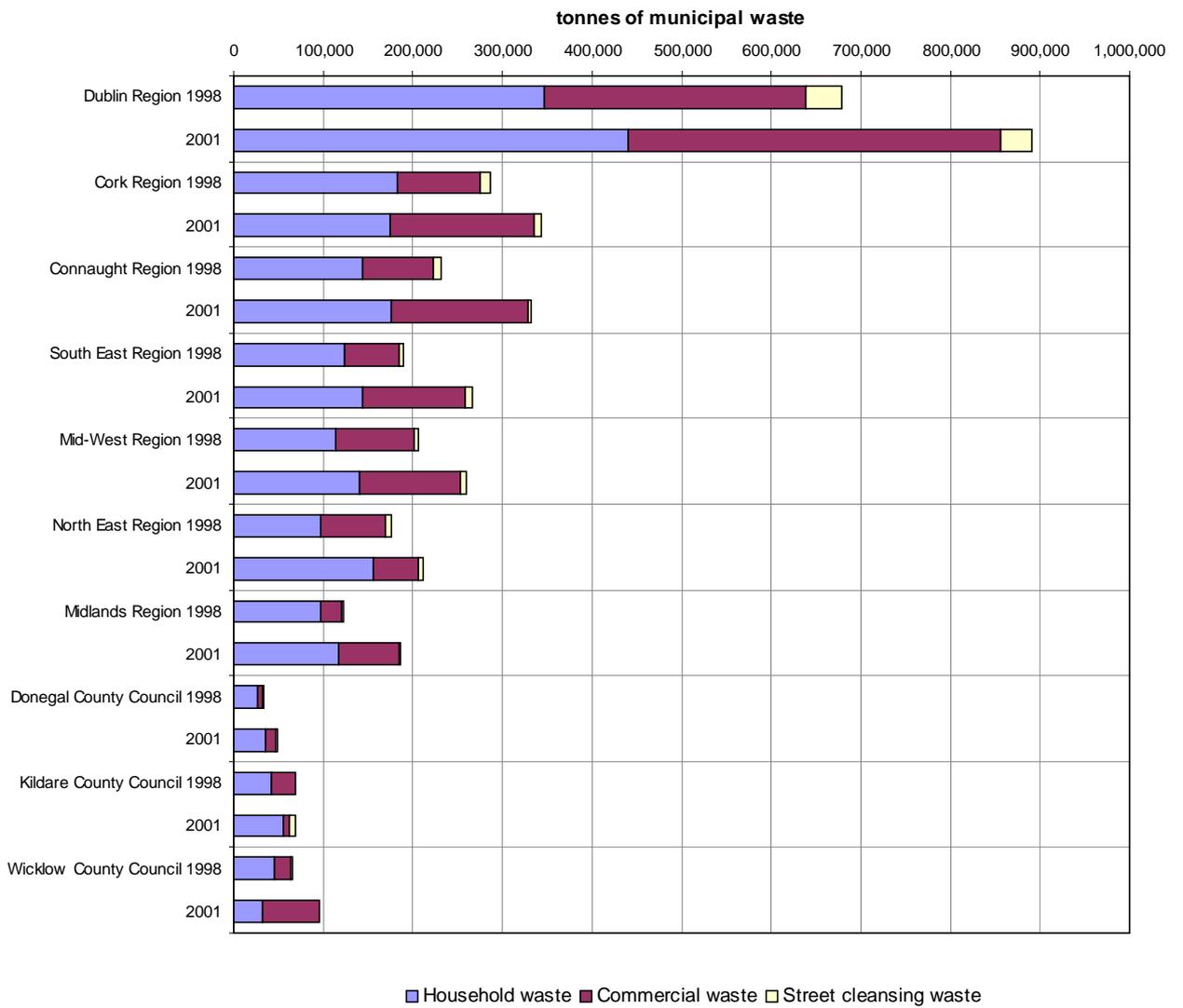


Figure 4.3 Municipal waste generation in each waste management planning region, 1998 and 2001

Figure 4.4 illustrates the composition of household and commercial waste. The composition is based on household and commercial waste characterisation surveys carried out by local authorities and under contract to the EPA between 1995 and 2002. Organic waste (i.e. food and garden waste) constitutes the single largest fraction of household waste at 32% of the total. Paper and organic waste make up the largest fractions of commercial waste, together comprising 70% of the total. Further information on household and commercial waste composition is contained in *Municipal Waste Composition Factsheet, 2001*²¹.

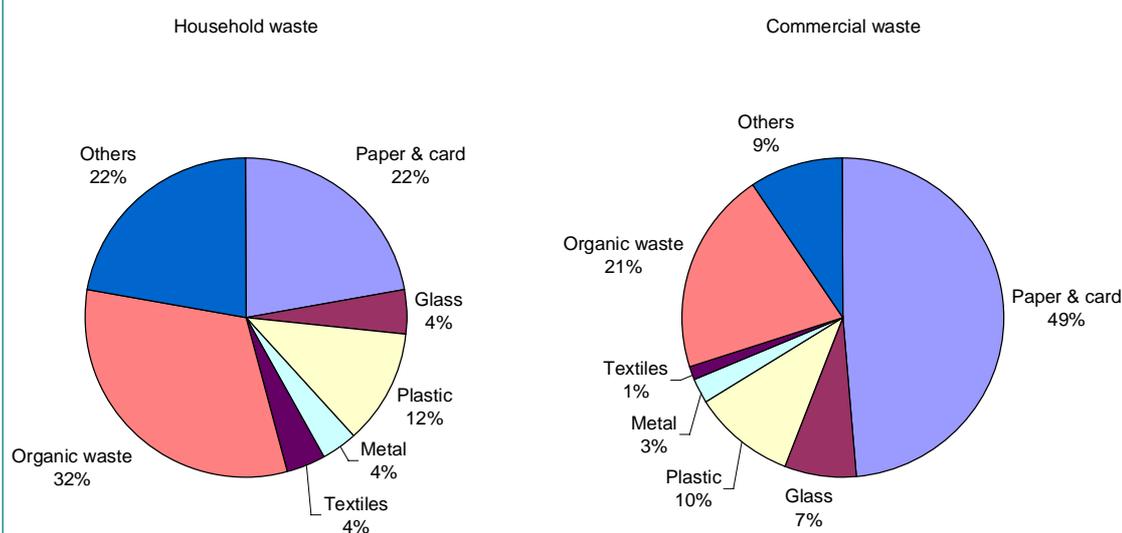


Figure 4.4 Composition of household and commercial waste, 2001

Since 1998, a considerable amount of household and commercial compositional information has been reported. A total of 24 local authorities have carried out household waste composition surveys since 1995 and 6 local authorities have carried out commercial waste surveys. In addition, the EPA commissioned a research project²² which yielded additional commercial waste composition surveys. Commercial waste surveys have now been carried out on the following sectors: hotels, supermarkets, shopping centres, other retailers, offices, colleges, schools, restaurants and hospitals. Table 4.4 shows the composition of household and commercial waste that is landfilled and recovered. The greater the number of household and commercial waste characterisation surveys carried out, the greater the confidence that can be attached to the derived national municipal waste composition. Therefore, continued efforts are required to maintain this momentum and to increase the collective knowledge on household and commercial waste composition.

The composition of municipal waste has been determined in accordance with the EPA publication, *Municipal Waste Characterisation*²³, and surveys have generally been determined on waste samples destined for landfill. As waste segregation and waste recycling increases, the landfilled portion of waste becomes less representative of the total. The outputs from the aforementioned research project²² will be used to develop a revised municipal waste characterisation methodology, to be published by the EPA, which will explicitly allow for the incorporation of recycled waste fractions.

²¹ Available on the EPA website at www.epa.ie.

²² Environmental RTDI Programme 2000-2006, 2000-MS-7-M1, *Composition of non-household municipal waste in Ireland and the development of an approach to tracking municipal waste composition*.

²³ EPA, 1996, *Municipal Waste Characterisation*.

Table 4.4 Composition of household and commercial waste, 2001

| 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 | 279,833 | 48.6 | 358,276 | 54.4 | 166,305 | 35.0 | 804,414 |
| Glass | 4.4 | 55,214 | 7.2 | 53,078 | 14.1 | 42,939 | 6.6 | 151,231 |
| Plastic | 11.6 | 145,563 | 10.3 | 75,931 | 5.2 | 15,932 | 10.3 | 237,426 |
| Ferrous | 2.1 | 26,352 | 1.6 | 11,795 | 0.1 | 437 | 1.7 | 38,584 |
| Aluminium | 0.9 | 11,294 | 0.9 | 6,635 | 0.4 | 1,146 | 0.8 | 19,074 |
| Other metals | 0.7 | 8,784 | 0.1 | 737 | 0.8 | 2,378 | 0.5 | 11,899 |
| Textiles | 3.7 | 46,430 | 1.3 | 9,584 | 1.3 | 4,060 | 2.6 | 60,073 |
| Organics | 32.2 | 404,064 | 20.6 | 151,862 | 7.3 | 22,233 | 25.2 | 578,158 |
| Others | 22.1 | 277,323 | 9.4 | 69,296 | 16.4 | 50,124 | 17.3 | 396,743 |
| Total | 100.0 | 1,254,857 | 100.0 | 737,193 | 100.0 | 305,554 | 100.0 | 2,297,603 |

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

Note 2: Composition 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.

4.2.2 RECOVERY AND DISPOSAL

As shown in Table 4.5, the recovery rate for household and commercial waste has increased from 9% in 1998 to 13.3% in 2001. The actual quantity recovered also increased from 166,684 tonnes in 1998 to 305,554 tonnes in 2001, a gross increase of 83.3%. The rate of landfilling decreased from 91% in 1998 to 86.7% in 2001. However, the actual quantity landfilled increased from 1,685,766 tonnes in 1998 to 1,992,050 tonnes in 2001. Overall, increased recovery represents an encouraging trend, however this success is tempered somewhat by the increase in the quantity of municipal waste landfilled.

Table 4.6 and Table 4.7 elaborate on Table 4.5 with respect to the household and commercial waste streams respectively.

Looking at an individual waste stream, the recovery of commercial glass waste decreased from 53.2% in 1998 to 27.7% in 2001 although the actual quantity of glass being recovered has remained relatively static at 21,900 tonnes in 1998 and 20,325 tonnes in 2001 (see Table 4.7). New commercial waste composition surveys carried out in 2001 and 2002 have indicated that the proportion of glass contained in commercial waste is 7.2%, compared with 3.4% in 1998. This increase can be attributed largely to the completion of composition surveys in the hotel sector, a large generator of glass waste²⁴. It should be noted that compositional data is applied only to landfilled waste and this is reflected in the increased estimate of glass being landfilled. Glass recovery information is provided by glass recyclers and no significant change in quantities is reported. As glass is an important recyclable material, it is essential that increased information on its generation in the commercial sector be obtained through the continued carrying out of commercial waste characterisation studies.

²⁴ A recent separate study found that glass comprised 55% of waste generated by restaurants, pubs and hotels in Temple Bar, Dublin, in 2001. The study report is entitled *Waste Characterisation and Disposal Study, Temple Bar, 2001 & 2002* and is available at www.temple-bar.ie/tenvironment.asp.

The Government policy statement, *Changing Our Ways*²⁵, sets out three quantitative targets for the management of municipal waste over a fifteen year period from 1998. Table 4.8 illustrates progress towards the targets in 2001. Significant policy commitments which, if implemented, should accelerate progress towards achieving these and other waste management targets are contained in the more recent Government policy statement, *Delivering Change*²⁶.

Table 4.5 Disposal and recovery rates in the household and commercial waste streams, 2001

| Material | Gross quantity available (tonnes) | Quantity landfilled (tonnes) | National landfill rate (%) | Quantity recovered (tonnes) | National recovery rate (%) |
|--------------|-----------------------------------|------------------------------|----------------------------|-----------------------------|----------------------------|
| Paper | 804,414 | 638,109 | 79.3 | 166,305 | 20.7 |
| Glass | 151,231 | 108,292 | 71.6 | 42,939 | 28.4 |
| Plastic | 237,426 | 221,494 | 93.3 | 15,932 | 6.7 |
| Ferrous | 38,584 | 38,147 | 98.9 | 437 | 1.1 |
| Aluminium | 19,074 | 17,928 | 94.0 | 1,146 | 6.0 |
| Other Metals | 11,899 | 9,521 | 80.0 | 2,378 | 20.0 |
| Textiles | 60,073 | 56,013 | 93.2 | 4,060 | 6.8 |
| Organics | 578,158 | 555,926 | 96.2 | 22,233 | 3.8 |
| Others | 396,743 | 346,619 | 87.4 | * 50,124 | 12.6 |
| Total | 2,297,603 | 1,992,050 | 86.7 | 305,554 | 13.3 |

* Wood, batteries and electrical and electronic equipment.

Table 4.6 Disposal and recovery rates in the household waste stream, 2001

| Material | Gross quantity available (tonnes) | Quantity landfilled (tonnes) | National landfill rate (%) | Quantity recovered (tonnes) | National recovery rate (%) |
|--------------|-----------------------------------|------------------------------|----------------------------|-----------------------------|----------------------------|
| Paper | 302,062 | 279,833 | 92.6 | 22,229 | 7.4 |
| Glass | 77,827 | 55,214 | 70.9 | 22,614 | 29.1 |
| Plastic | 146,489 | 145,563 | 99.4 | 925 | 0.6 |
| Ferrous | 26,352 | 26,352 | 100.0 | 0 | 0.0 |
| Aluminium | 12,046 | 11,294 | 93.8 | 752 | 6.2 |
| Other Metals | 10,329 | 8,784 | 85.0 | 1,545 | 15.0 |
| Textiles | 50,490 | 46,430 | 92.0 | 4,060 | 8.0 |
| Organics | 423,910 | 404,064 | 95.3 | 19,846 | 4.7 |
| Others | 280,239 | 277,323 | 99.0 | 2,915 | 1.0 |
| Total | 1,329,744 | 1,254,857 | 94.4 | 74,887 | 5.6 |

²⁵ Department of the Environment and Local Government, 1998, *Waste Management – Changing Our Ways*, A Policy Statement.

²⁶ Department of the Environment and Local Government, 2002, *Preventing and Recycling Waste – Delivering Change*, A Policy Statement.

Table 4.7 Disposal and recovery rates in the commercial waste stream, 2001

| Material | Gross quantity available (tonnes) | Quantity landfilled (tonnes) | National landfill rate (%) | Quantity recovered (tonnes) | National recovery rate (%) |
|-----------------|--|-------------------------------------|-----------------------------------|------------------------------------|-----------------------------------|
| Paper | 502,352 | 358,276 | 71.3 | 144,076 | 28.7 |
| Glass | 73,403 | 53,078 | 72.3 | 20,325 | 27.7 |
| Plastic | 90,938 | 75,931 | 83.5 | 15,007 | 16.5 |
| Ferrous | 12,232 | 11,795 | 96.4 | 437 | 3.6 |
| Aluminium | 7,028 | 6,635 | 94.4 | 394 | 5.6 |
| Other Metals | 1,570 | 737 | 47.0 | 833 | 53.0 |
| Textiles | 9,584 | 9,584 | 100.0 | 0 | 0.0 |
| Organics | 154,248 | 151,862 | 98.5 | 2,386 | 1.5 |
| Others | 116,505 | 69,296 | 59.5 | 47,209 | 40.5 |
| Total | 967,859 | 737,193 | 76.2 | 230,666 | 23.8 |

Table 4.8 Progress towards national targets for the management of municipal waste

| Target²⁵ (set in 1998, to be achieved by 2013) | Position in 2001 |
|--|---|
| A diversion of 50% of overall household waste away from landfill | In 1998, 3.2% of household waste was recovered. In 2001, 5.6% was recovered. |
| A minimum 65% reduction in biodegradable wastes consigned to landfill [on a phased basis to meet the requirements of the Landfill Directive 1999/31/EC] – see section 4.6. | In 1998, 1,039,195 tonnes of organic waste (excluding wood) were landfilled. In 2001, 1,250,048 tonnes (excluding wood) were landfilled; a quantitative increase of 20.3% between 1998 and 2001. |
| Recycling of 35% of municipal waste | In 1998, 9% of municipal waste was recovered. In 2001, 13.3% was recovered. |

4.3 INDUSTRIAL WASTE

As stated in chapter 3, industrial waste is defined in the Waste Management Acts, 1996 and 2001, as including *waste produced or arising from manufacturing or industrial activities or processes*. As described in section 3.4.1, an estimate was made of industrial waste generation and management based on information provided by 307 IPC-licensed companies and 159 non-IPC-licensed companies. A scale-up methodology based on sectoral employee numbers was used to calculate the projected total industrial waste generation. Table 4.9 shows the results of the data collation (reported quantities) and scale-up (projected quantities) procedures.

Table 4.9 Summary of reported and projected quantities of industrial waste in 2001

| | Hazardous industrial waste (tonnes) | | Non-hazardous industrial waste (tonnes) | | Total industrial waste (tonnes) | |
|----------------------|-------------------------------------|---------|---|-----------|---------------------------------|-----------|
| | 1998 | 2001 | 1998 | 2001 | 1998 | 2001 |
| Reported quantities* | 219,974 | 202,502 | 7,639,465 | 6,359,423 | 7,859,439 | 6,561,925 |
| Projected quantities | 238,892 | 244,426 | 8,835,859 | 8,763,785 | 9,074,751 | 9,008,211 |

* Sample size in 1998, 523 companies; sample size in 2001, 466 companies.

Reported industrial waste generation decreased by 16.5% from 7,859,439 tonnes in 1998 to 6,561,925 tonnes in 2001. The reduction is partly explained by the fact that the sample size in 2001 was 466 companies compared with 523 companies in 1998. Following scale-up, there is a 0.7% decrease in projected total industrial waste generation from 9,074,751 tonnes in 1998 to 9,008,211 tonnes in 2001. For reported quantities, the following examples illustrate some of the principal differences noted from company reports:

- A significant decrease in the reported quantity of sludges is noted (see section 4.17 for further details). In some instances, companies have reported the installation of dewatering equipment, thereby significantly decreasing the quantity of sludge requiring management;
- One company reported significantly lower overall waste quantities in 2001 compared with 1998, accounted for principally by the fact that a very large waste stream is now dewatered prior to disposal or recovery;
- One company reported a 24% decrease in waste generation between 1998 and 2001 mainly as a result of the installation of a waste lime press. Lime is now recovered on site and sold as a commodity.
- One company in the chemical and pharmaceutical sector showed an 85% reduction in reported waste generation between 1998 and 2001. A construction project on-site in 1998 generated 92,000 tonnes of construction waste, a quantity not generated in 2001.

Table 4.10 illustrates the top ten reported non-hazardous and hazardous industrial waste types. The top ten non-hazardous wastes comprise 75% of the reported non-hazardous industrial waste, while the top ten hazardous industrial wastes comprise 76% of total reported hazardous industrial waste in 2001. This latter finding is consistent with studies on hazardous waste generation in other countries and indicates where resources can be best employed towards managing, preventing or minimising industrial waste.

Table 4.11 illustrates the major industrial waste generating sectors of industry. The manufacturing sector is the largest generator of industrial waste, within which the metal products and food and beverage sub-sectors are the most significant. The next largest sector is the mining and quarrying sector. The electricity, gas and water supply sectors also generated large quantities of industrial waste.

Table 4.12 shows the source by county of industrial waste generated in 2001. It can be seen that County Meath generates the highest quantity of industrial waste, with 2,062,338 tonnes, while counties Limerick and Tipperary also generate in excess of one million tonnes each. However, it must be noted that there is one company in each of the three counties which contributes a significant proportion of the waste generated in these counties²⁷. Cork remains the largest generator of hazardous industrial waste reflecting the presence in the county of major chemical and pharmaceutical facilities.

Table 4.13 shows the disposal and recovery methods to which reported industrial waste was subjected. There is no great change between the levels of recovery and disposal reported in 1998. The disposal rate for reported industrial waste in 2001 was 74.5% compared with a recovery rate of 25.5%. The equivalent rates in 1998 were 73.4% and 26.6% respectively, as illustrated in Figure 4.5.

Table 4.14 shows the level of recovery in the industrial sectors. Information for 1998 is provided for comparative purposes. The overall proportion of recovery in industry is increasing although a number of sectors indicate decreased recovery of industrial waste since 1998, for example the basic metals and metal products sector (DJ). Aughinish Alumina was reclassified to sector DJ from the chemicals and chemical products sector (DG), resulting in a very large increase in waste generation in sector DJ. This also gave rise to increased disposal from this sector and considerably decreased recovery. There was a consequent change in the chemicals and chemical products sector, from which Aughinish Alumina was moved.

²⁷ Tara Mines in Meath, Aughinish Alumina in Limerick and Lisheen Mines in Tipperary.

Table 4.10 Top ten reported non-hazardous and hazardous industrial wastes in 2001

| EWC Code | Non-hazardous industrial waste description | Tonnes |
|-----------------|--|------------------|
| 01 03 01 | Tailings (from further physical processing of metaliferous metals) | 2,612,886 |
| 01 03 03 | Red mud from alumina production (from further physical processing of metaliferous metals) | 861,121 |
| 01 03 99 | Wastes not otherwise specified (from further physical processing of metaliferous metals) | 206,274 |
| 10 01 02 | Coal fly ash (from power station and other combustion plants) | 202,950 |
| 02 07 99 | Wastes not otherwise specified (from the production of alcoholic and non-alcoholic beverages, excluding coffee, tea and cocoa) | 196,370 |
| 03 01 02 | Sawdust (from wood processing and the production of panels and furniture) | 188,949 |
| 01 01 02 | Waste form mineral non-metaliferous excavation (from mineral excavation) | 143,769 |
| 02 02 02 | Animal tissue waste (from the preparation and processing of meat, fish and other foods of animal origin) | 130,904 |
| 02 02 99 | Wastes not otherwise specified (from the preparation and processing of meat, fish and other foods of animal origin) | 128,385 |
| 01 01 01 | Waste from mineral metaliferous excavation (from mineral excavation) | 112,060 |
| | Total | 4,783,669 |
| EWC Code | Hazardous industrial waste description | Tonnes |
| 07 05 04 | Other organic solvents, washing liquids and mother liquors (from the MFSU* of pharmaceuticals) | 81,433 |
| 06 03 99 | Wastes not otherwise specified (waste salt and their solutions from inorganic chemical processes) | 27,554 |
| 07 05 01 | Aqueous washing liquids and other liquors (from the MFSU of pharmaceuticals) | 21,279 |
| 07 05 03 | Organic halogenated solvents, washing liquids and other liquors (from the MFSU of pharmaceuticals) | 5,395 |
| 07 07 04 | Other organic solvents, washing liquids and mother liquors (from the MFSU of fine chemicals and chemical products not otherwise specified) | 4,244 |
| 06 02 01 | Calcium hydroxide (from waste alkaline solutions from inorganic chemical processes) | 4,101 |
| 07 05 99 | Wastes not otherwise specified (from the MFSU of pharmaceuticals) | 2,697 |
| 07 05 07 | Halogenated still bottoms and reaction residues (from the MFSU of pharmaceuticals) | 2,512 |
| 07 07 08 | Other still bottoms and reaction residues (from the MFSU of fine chemicals and chemical products not otherwise specified) | 2,415 |
| 13 06 01 | Oil waste not otherwise specified | 2,371 |
| | Total | 154,002 |

* MFSU = manufacture, formulation, supply and use.

Table 4.11 The source, by sector, of industrial waste in 2001

| Sector | NACE | Hazardous waste (tonnes) | | Non-hazardous waste (tonnes) | | Total industrial waste (tonnes) | |
|--|------|--------------------------|----------------|------------------------------|------------------|---------------------------------|------------------|
| | | Reported | Projected | Reported | Projected | Reported | Projected |
| Food products; Beverages and Tobacco | DA | 1,811 | 2,133 | 981,428 | 2,580,965 | 983,239 | 2,583,099 |
| Textiles and Textile Products | DB | 796 | 894 | 15,746 | 26,588 | 16,541 | 27,482 |
| Leather and Leather Products | DC | 0 | 0 | 615 | 4,100 | 615 | 4,100 |
| Wood and Wood Products | DD | 295 | 318 | 236,526 | 306,983 | 236,821 | 307,301 |
| Pulp, Paper and Paper Products; Printing, Publishing | DE | 197 | 1,337 | 136,006 | 486,151 | 136,203 | 487,489 |
| Coke, Refined Petroleum Products and Nuclear Fuel | DF | 1,191 | 1,191 | 877 | 877 | 2,068 | 2,068 |
| Chemicals, Chemical Products and Man Made Fibres | DG | 157,607 | 182,329 | 183,303 | 234,532 | 340,910 | 416,861 |
| Rubber and Plastic Products | DH | 1,742 | 2,054 | 14,046 | 42,861 | 15,788 | 44,916 |
| Other Non-Metallic Mineral Products | DI | 503 | 1,667 | 47,592 | 154,989 | 48,095 | 156,657 |
| Basic Metals and Fabricated Metal Products | DJ | 30,771 | 32,117 | 1,128,921 | 1,159,886 | 1,159,692 | 1,192,003 |
| Machinery and Equipment not elsewhere classified | DK | 1,036 | 2,098 | 7,536 | 42,941 | 8,573 | 45,038 |
| Electrical and Optical Equipment | DL | 2,365 | 11,355 | 12,041 | 49,357 | 14,407 | 60,712 |
| Transport Equipment | DM | 1,134 | 3,540 | 4,205 | 14,021 | 5,339 | 17,561 |
| Manufacturing not elsewhere classified | DN | 203 | 324 | 5,037 | 15,329 | 5,240 | 15,653 |
| Sub-total manufacturing | | 199,651 | 241,359 | 2,773,879 | 5,119,581 | 2,973,530 | 5,360,939 |
| Mining and Quarrying | C | 2,228 | 2,444 | 3,275,380 | 3,334,041 | 3,277,608 | 3,336,485 |
| Electricity, gas and water supply | E | 623 | 623 | 310,164 | 310,164 | 310,787 | 310,787 |
| Total | | 202,502 | 244,426 | 6,359,423 | 8,763,785 | 6,561,925 | 9,008,211 |

Table 4.12 Reported industrial waste, by county, 2001

| County | Hazardous industrial waste (tonnes) | Non-hazardous industrial waste (tonnes) | Total industrial waste (tonnes) |
|--------------|-------------------------------------|---|---------------------------------|
| Meath | 628 | 2,061,710 | 2,062,338 |
| Limerick | 28,011 | 1,110,781 | 1,138,792 |
| Tipperary | 9,955 | 1,109,529 | 1,119,484 |
| Cork | 115,347 | 438,403 | 553,750 |
| Clare | 6,228 | 241,125 | 247,354 |
| Dublin | 23,258 | 179,225 | 202,483 |
| Mayo | 385 | 175,975 | 176,360 |
| Kilkenny | 2,046 | 163,893 | 165,939 |
| Kildare | 2,143 | 158,525 | 160,668 |
| Galway | 266 | 147,550 | 147,816 |
| Waterford | 670 | 73,125 | 73,795 |
| Carlow | 74 | 67,893 | 67,968 |
| Monaghan | 140 | 60,898 | 61,037 |
| Laois | 794 | 56,760 | 57,555 |
| Roscommon | 1,537 | 44,684 | 46,221 |
| Leitrim | 190 | 43,013 | 43,203 |
| Wexford | 112 | 38,591 | 38,703 |
| Offaly | 177 | 37,846 | 38,022 |
| Louth | 59 | 35,928 | 35,987 |
| Westmeath | 2,100 | 27,318 | 29,417 |
| Longford | 49 | 26,490 | 26,539 |
| Donegal | 55 | 24,065 | 24,120 |
| Wicklow | 5,031 | 12,578 | 17,609 |
| Cavan | 63 | 12,811 | 12,874 |
| Kerry | 3,064 | 7,154 | 10,217 |
| Sligo | 123 | 3,552 | 3,674 |
| Total | 202,502 | 6,359,423 | 6,561,925 |

Table 4.13 Disposal and recovery of reported industrial waste in 2001

| D/R Code | Disposal/Recovery description | Hazardous waste (tonnes) | % | Non-hazardous waste (tonnes) | % | Total industrial waste (tonnes) | % |
|----------|---|--------------------------|-------------|------------------------------|-------------|---------------------------------|-------------|
| D1 | Landfill | 33,529 | 16.6 | 2,776,986 | 43.7 | 2,810,515 | 42.8 |
| D2 | Land treatment | 339 | 0.2 | 26,543 | 0.4 | 26,882 | 0.4 |
| D3 | Deep injection | 0 | 0.0 | 6,536 | 0.1 | 6,536 | 0.1 |
| D4 | Impoundment | 35 | 0.0 | 1,837,417 | 28.9 | 1,837,452 | 28.0 |
| D5 | Engineered landfill | 51 | 0.0 | 42,444 | 0.7 | 42,495 | 0.6 |
| D6 | Release to waters | 807 | 0.4 | 7,136 | 0.1 | 7,942 | 0.1 |
| D7 | Release to sea | 263 | 0.1 | 5,334 | 0.1 | 5,597 | 0.1 |
| D8 | Biological treatment | 3,509 | 1.7 | 593 | 0.0 | 4,102 | 0.1 |
| D9 | Physico-chemical treatment | 5,085 | 2.5 | 33,022 | 0.5 | 38,107 | 0.6 |
| D10 | Incineration on land | 69,673 | 34.4 | 2,485 | 0.0 | 72,158 | 1.1 |
| D11 | Incineration at sea | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| D12 | Permanent storage | 24 | 0.0 | 139 | 0.0 | 163 | 0.6 |
| D13 | Blending or mixing | 29 | 0.0 | 335 | 0.0 | 365 | 0.0 |
| D14 | Repackaging prior to disposal | 27 | 0.0 | 12 | 0.0 | 39 | 0.0 |
| D15 | Storage pending disposal | 305 | 0.2 | 33,639 | 0.5 | 33,944 | 0.5 |
| DU | Unspecified disposal | 127 | 0.1 | 996 | 0.0 | 1,123 | 0.0 |
| | Sub-total disposal | 113,802 | 56.2 | 4,773,616 | 75.1 | 4,887,419 | 74.5 |
| R0 | Direct reuse | 1,589 | 0.8 | 332,666 | 5.2 | 334,256 | 5.1 |
| R1 | Reuse as fuel | 17,667 | 8.7 | 126,858 | 2.0 | 144,525 | 2.2 |
| R2 | Solvent recovery | 40,884 | 20.2 | 14,210 | 0.2 | 55,094 | 0.8 |
| R3 | Organic substance recycling | 18,723 | 9.2 | 658,912 | 10.4 | 677,635 | 24.1 |
| R4 | Metal recovery | 2,601 | 1.3 | 37,145 | 0.6 | 39,746 | 0.6 |
| R5 | Inorganic substance recycling | 2,269 | 1.1 | 75,874 | 1.2 | 78,143 | 1.2 |
| R6 | Regeneration of acids or bases | 664 | 0.3 | 12 | 0.0 | 676 | 0.0 |
| R7 | Recovery of components used for pollution abatement | 23 | 0.0 | 139 | 0.0 | 162 | 0.0 |
| R8 | Recovery of components from catalysts | 234 | 0.1 | 1 | 0.0 | 235 | 0.0 |
| R9 | Oil recovery | 2,723 | 1.3 | 181 | 0.0 | 2,904 | 0.0 |
| R10 | Landspreading | 93 | 0.0 | 203,430 | 3.2 | 203,523 | 3.1 |
| R11 | Use of residuals | 68 | 0.0 | 43,126 | 0.7 | 43,194 | 0.7 |
| R12 | Waste exchange | 8 | 0.0 | 835 | 0.0 | 843 | 0.0 |
| R13 | Storage pending recovery | 215 | 0.1 | 87,921 | 1.4 | 88,137 | 1.3 |
| RU | Unspecified recovery | 772 | 0.4 | 386 | 0.0 | 1,158 | 0.0 |
| | Sub-total recovery | 88,533 | 43.7 | 1,581,697 | 24.9 | 1,670,230 | 25.5 |
| U | Unspecified | 167 | 0.1 | 4,110 | 0.1 | 4,277 | 0.1 |
| | Grand total | 202,502 | 100 | 6,359,423 | 100 | 6,561,925 | 100 |

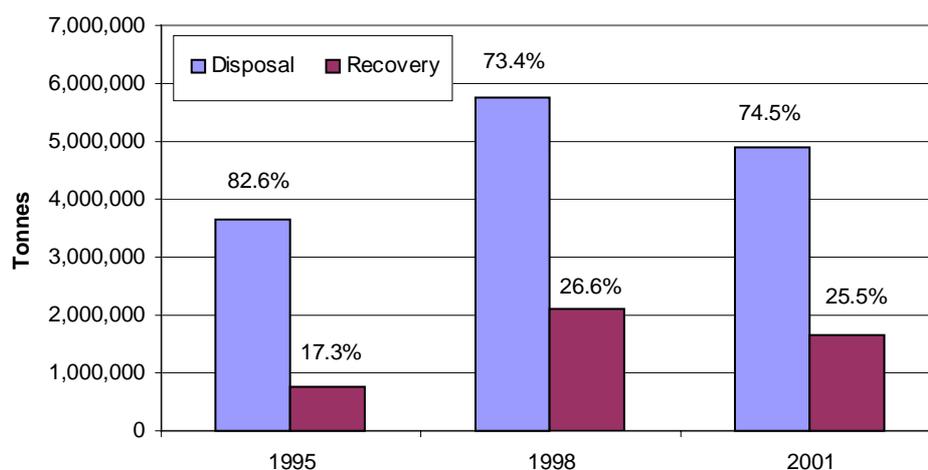


Figure 4.5 Recovery and disposal of industrial waste, 1995 to 2001

Table 4.14 Recovery and disposal of waste in surveyed industrial sectors, 2001

| Sector name | NACE Code | Disposal | | | Recovery | | | Unspecified Tonnes | % | |
|--|-----------|------------------|-------------|-------------|------------------|-------------|-------------|--------------------|------------|------------|
| | | Tonnes | 2001 | 1998 | Tonnes | 2001 | 1998 | | 2001 | 1998 |
| <i>Manufacturing industry</i> | | | | | | | | | | |
| Food products; beverages and tobacco | DA | 178,051 | 18.1 | 11.5 | 804,259 | 81.8 | 88.5 | 928 | 0.1 | 0.0 |
| Textiles and textile products | DB | 7,201 | 43.5 | 82.6 | 9,319 | 56.3 | 17.4 | 22 | 0.1 | 0.0 |
| Leather and leather products | DC | 615 | 100 | 35.4 | 0 | 0.0 | 64.6 | 0 | 0.0 | 0.0 |
| Wood and wood products | DD | 10,719 | 4.5 | 9.4 | 225,490 | 95.2 | 90.6 | 612 | 0.3 | 0.0 |
| Pulp, paper and paper products; printing, publishing | DE | 9,143 | 6.7 | 26.7 | 127,036 | 93.3 | 73.3 | 24 | 0.0 | 0.0 |
| Coke, refined petroleum products and nuclear fuel | DF | 338 | 16.4 | 77.2 | 1,729 | 83.6 | 22.8 | 0 | 0.0 | 0.0 |
| Chemicals, chemical products and man made fibres | DG | 150,403 | 44.1 | 88.1 | 188,796 | 55.4 | 11.9 | 1,711 | 0.5 | 0.0 |
| Rubber and plastic products | DH | 7,671 | 48.6 | 54.0 | 8,117 | 51.4 | 46.0 | 0 | 0.0 | 0.0 |
| Other non-metallic mineral products | DI | 20,898 | 43.5 | 96.0 | 26,598 | 55.3 | 4.0 | 598 | 1.2 | 0.0 |
| Basic metals and fabricated metal products | DJ | 1,148,094 | 99.0 | 22.7 | 11,590 | 1.0 | 77.2 | 8 | 0.0 | 0.1 |
| Machinery and equipment | DK | 2,863 | 33.4 | 33.5 | 5,710 | 66.6 | 66.5 | 0 | 0.0 | 0.0 |
| Electrical and optical equipment | DL | 7,117 | 49.4 | 62.8 | 6,916 | 48.0 | 37.2 | 374 | 2.6 | 0.0 |
| Transport equipment | DM | 3,376 | 63.2 | 81.5 | 1,963 | 36.8 | 18.5 | 0 | 0.0 | 0.0 |
| Manufacturing other | DN | 2,403 | 45.9 | 36.2 | 2,837 | 54.1 | 63.8 | 0 | 0.0 | 0.0 |
| Sub-total manufacturing | | 1,548,891 | 52.1 | 48.6 | 1,420,362 | 47.8 | 51.4 | 4,276 | 0.1 | 0.0 |
| Mining and quarrying | C | 3,134,909 | 95.6 | 99.6 | 142,699 | 4.4 | 0.4 | 0 | 0.0 | 0.0 |
| Electricity, gas and water supply | E | 203,619 | 65.5 | 84.0 | 107,169 | 34.5 | 16.0 | 0 | 0.0 | 0.0 |
| Total | | 4,887,419 | 74.5 | 73.4 | 1,670,229 | 25.5 | 26.6 | 4,276 | 0.1 | 0.0 |

4.4 HAZARDOUS WASTE

Excluding contaminated soil, reported hazardous waste generation increased by 9.6% from 250,531 tonnes in 1998 to 274,687 tonnes in 2001, as summarised in Table 4.15. Total hazardous waste generation increased by 33.3% in this period.

Contaminated soil is the largest single hazardous waste generated in 2001. Of 168,579 tonnes reported, 145,192 tonnes arising from the remediation of the Docklands gasworks site were exported by the Dublin Docklands Development Authority. A further 8,500 tonnes were processed at Atlas Ireland. Contaminated soil was classified as hazardous waste in most instances in 2001 by the reporting organisation. For consistency, all contaminated soil remains within the hazardous waste dataset for this report.

The second largest single hazardous waste type is organic solvents accounting for 131,361 tonnes in 2001. The quantity of solvents has remained relatively consistent however, being up to 136,134 tonnes²⁸ in 1996 and 119,730 tonnes in 1998.

Unreported hazardous waste has decreased from 74,311 tonnes in 1998 to 48,402 tonnes in 2001. Some categories of unreported hazardous waste do not appear in 2001, namely waste oils and photographic processing waste. This is due to the quantity of reported (and hence treated) waste increasing in these sectors between 1998 and 2001. The remaining unreported hazardous waste is limited to a small number of waste types produced by household, agricultural and commercial activities. Local authorities and farming organisations should continue to take steps towards creating awareness of hazardous waste generation and management in these sectors.

Table 4.15 Hazardous waste generation in 1996, 1998 and 2001

| Category | 1996 (tonnes) | 1998 (tonnes) | 2001 (tonnes) |
|----------------------------|------------------|------------------|------------------|
| Reported hazardous waste | 229,234 | 250,531 | 274,687 |
| Unreported hazardous waste | 98,228 | 74,311 | 48,402 |
| Contaminated soil | 400 | 45,486 | 168,579 |
| Total | 327,862 | 370,328 | 491,669 |

Table 4.16 illustrates the generation and destination of hazardous waste according to waste types. Hazardous waste types are sorted according to material-specific 'tags' which are logically assigned based on the EWC code, description and treatment option for each hazardous waste record. Amendments to the hazardous waste tags have been made to those presented in the *National Waste Database Report 1998*. Tags for 'heavy metal containing waste', 'contaminated packaging or packaging containing residues' and 'laboratory and general chemical waste' have been added. No sub-division was made between halogenated and non-halogenated solvents.

Table 4.17 shows the disposal and recovery routes for hazardous waste, both in Ireland and abroad. Overall, 25.6% of hazardous waste was disposed of while 64.5% was recovered. The disposal of unreported waste accounts for 9.8%²⁹ of the total. The corresponding rates for 1998 were 32.5%, 41.2% and 26.9% respectively. The increase in recovery rates and reduction in unreported hazardous waste is a

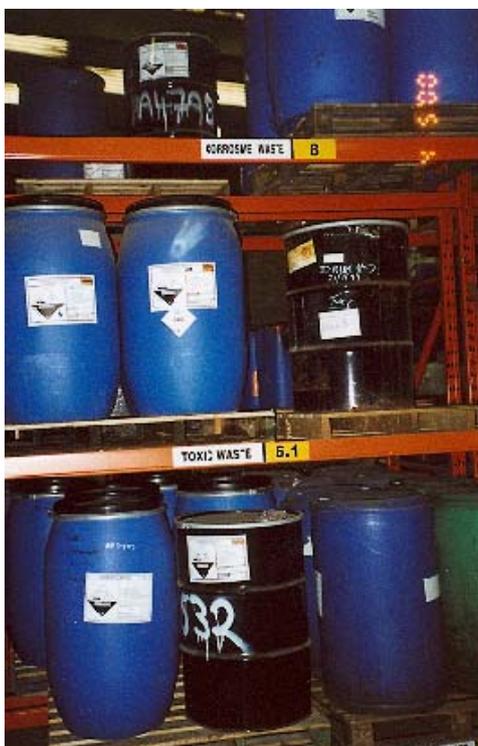
²⁸ In 1996, 86,651 tonnes of solvents and 49,483 tonnes of 'other pharmaceutical waste' were generated. It is assumed but cannot be verified that the latter quantity is comprised principally of solvents. See *National Waste Database Report 1998*, p. 43.

²⁹ It is assumed that unreported hazardous waste is disposed of unwittingly or indiscriminately on land, although it is entered in the 'unspecified' row of Table 4.17.

welcome and positive development. A notable increase is seen in the quantity of hazardous waste treated at off-site facilities for recovery and disposal in Ireland from 42,485 tonnes in 1998 to 72,391 tonnes in 2001. This quantity is primarily composed of waste oils, oily sludges, acid/alkali waste, contaminated soil and healthcare risk waste, plus a number of smaller hazardous waste streams. These were subjected to a range of recycling processes and physico-chemical treatments (the latter being typically followed by disposal, such as discharges to sewer and landfilling of treatment residues). The licensed facilities that carry out these treatment operations represent a significant increase in the capacity for hazardous waste treatment in Ireland (see section 5.4.5 for further information on authorised hazardous waste facilities).

The incorrect classification by waste generators and contractors of non-hazardous waste as hazardous, and vice versa, results in a grey area between what is reported as hazardous waste and what is not. Not all detected cases of mis-classification have been amended during this study to the correct classification. For example, the reporting of contaminated packaging waste as hazardous waste means that there must be a hazardous component or residue within that package that has made the generator or broker wish to report it as a hazardous waste. In such cases, the entry has remained a hazardous waste. Other reported hazardous wastes, for example waste catalysts (various codes), photographic paper (09 01 07) and asbestos-based construction materials (17 01 05), have generally been reclassified as non-hazardous waste. Increased efforts are required by industry and waste contractors to ensure that wastes are properly classified (in accordance with the European Waste Catalogue), described and reported as either hazardous or non-hazardous waste.

Similar difficulties are created by the fact that there are two different lists (or definitions) of disposal and recovery activities for waste; one contained in Irish legislation (namely the Third and Fourth Schedules of the Waste Management Acts, 1996 and 2001); the other contained in EU legislation (namely the Waste Framework Directive and also used in the TFS Regulation). The former codes are generally used for wastes managed at waste-licensed facilities in Ireland while the latter codes are generally used for wastes managed on-site at IPC-licensed facilities and for exports. Where crossover in the use of these lists has been detected, corrections have been made. Consistent use of either list needs to be assured in order to verify that disposal and recovery options are being correctly represented. It is recommended that Irish legislation be amended so that the two lists are harmonised.



Hazardous waste should be stored appropriately according to its hazard class.

Table 4.16 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 hazardous waste (tonnes) |
|---|---------------------|----------------------|----------------------|-----------------------------------|------------------------|--------------------------------------|
| Contaminated soil | | 8,636 | 159,943 | 168,579 | | 168,579 |
| Organic and organic chlorinated solvents | 37,075 | 12,351 | 81,893 | 131,319 | 42 | 131,361 |
| Saltcake/salts | 27,554 | 8 | 1,460 | 29,022 | | 29,022 |
| Waste oils | 76 | 23,343 | 579 | 23,997 | | 23,997 |
| Washing liquids and mother liquors | 4,646 | 3,278 | 10,722 | 18,646 | | 18,646 |
| Other hazardous wastes | 17,581 | 448 | 7 | 18,036 | | 18,036 |
| Sheep dip | | | | 0 | 18,000 | 18,000 |
| Lead acid batteries | | 152 | 7,479 | 7,631 | 7,146 | 14,777 |
| Acid/alkali waste | 2,969 | 7,645 | 1,238 | 11,852 | | 11,852 |
| Oily sludges | 666 | 5,739 | 74 | 6,479 | 2,349 | 8,828 |
| Paint and ink packaging | | 1 | | 1 | 7,912 | 7,913 |
| Other household hazardous waste | | | 9 | 9 | 7,178 | 7,188 |
| Clinical waste | | 5,492 | 341 | 5,833 | | 5,833 |
| Still bottoms and reaction residues | 4,927 | 3 | 341 | 5,271 | | 5,271 |
| Other pharmaceutical waste | | 589 | 4,072 | 4,661 | | 4,661 |
| Small batteries | | 3 | 120 | 123 | 2,303 | 2,426 |
| Laboratory and general chemical waste | 21 | 527 | 1,554 | 2,103 | | 2,103 |
| Filter cakes and metal containing sludges | 18 | 506 | 1,180 | 1,704 | | 1,704 |
| Paint/ink/varnish liquid waste | 8 | 404 | 1,081 | 1,493 | | 1,493 |
| Pesticides (agricultural) | | | 21 | 21 | 1,350 | 1,371 |
| Oil filters | | 482 | 33 | 515 | 812 | 1,327 |
| Dross from metallurgy | | 468 | 746 | 1,214 | | 1,214 |
| Metal hydroxide sludges/ion exchange resins | | 612 | 390 | 1,002 | | 1,002 |
| Asbestos waste | | 25 | 822 | 847 | | 847 |
| Heavy metal containing waste | | 786 | 54 | 840 | | 840 |
| Fluorescent tubes | | 86 | 34 | 120 | 552 | 672 |
| Photographic waste | | 173 | 393 | 567 | 0 | 567 |
| Contaminated packaging or packaging containing residues | | 50 | 429 | 479 | | 479 |
| Veterinary medicines | | | | 0 | 467 | 467 |
| Paint/ink/varnish sludges | | 382 | | 382 | | 382 |
| Adhesive waste | 3 | 50 | 270 | 323 | | 323 |
| General office waste | | | | 0 | 291 | 291 |
| Waste catalysts | | 101 | | 101 | | 101 |
| Thermal treatment residues | 23 | 40 | | 63 | | 63 |
| PCB waste | | 3 | 21 | 23 | | 23 |
| Boiler dust | | 6 | | 6 | | 6 |
| Mercury containing wastes | | 2 | 1 | 3 | | 3 |
| Gold solutions | | 1 | | 1 | | 1 |
| Total | 95,566 | 72,391 | 275,309 | 443,266 | 48,402 | 491,669 |

Table 4.17 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 hazardous waste (tonnes) |
|----------|---|---------------------|----------------------|----------------------|--------------------------------|------------------------|--------------------------------|
| D1 | Landfill | 28,656 | 4,674 | 1,377 | 34,707 | | 34,707 |
| D2 | Land Treatment | | 339 | | 339 | | 339 |
| D4 | Surface impoundment | 35 | | | 35 | | 35 |
| D5 | Engineering Landfill | | 19 | 170 | 188 | | 188 |
| D6 | Release to water body | | 57 | | 57 | | 57 |
| D7 | Release to seas/oceans | | 263 | | 263 | | 263 |
| D8 | Biological pre-treatment | 2,105 | 1,182 | | 3,287 | | 3,287 |
| D9 | Physico-chemical pre-treatment | 2,379 | 16,387 | 243 | 19,008 | | 19,008 |
| D10 | Incineration on land | 21,491 | | 42,974 | 64,465 | | 64,465 |
| D13 | Blending or mixing prior to disposal | | 29 | | 29 | | 29 |
| D14 | Repackaging prior to disposal | | 24 | | 24 | | 24 |
| D15 | Storage prior to disposal | | 8 | 3,143 | 3,151 | | 3,151 |
| DU | Undefined disposal | | 51 | 24 | 75 | | 75 |
| | Sub-total disposal | 54,666 | 23,033 | 47,929 | 125,629 | 0 | 125,629 |
| R0 | Reuse in existing form | 1,238 | 243 | | 1,480 | | 1,480 |
| R1 | Use as a fuel | 9,560 | 3,124 | 20,402 | 33,086 | | 33,086 |
| R2 | Solvent reclamation/regeneration | 9,413 | 11,115 | 22,205 | 42,733 | | 42,733 |
| R3 | Recycling or reclamation of organic materials other than solvents | 18,284 | 203 | 6,522 | 25,009 | | 25,009 |
| R4 | Recycling or reclamation of metals | | 1,487 | 10,569 | 12,056 | | 12,056 |
| R5 | Recycling or reclamation of inorganic materials | 2,121 | 8,632 | 157,213 | 167,967 | | 167,967 |
| R6 | Regeneration of acids or bases | | 567 | | 567 | | 567 |
| R7 | Recovery of components used for pollution abatement | 21 | 1 | | 22 | | 22 |
| R8 | Recovery of components from catalysts | | 14 | | 14 | | 14 |
| R9 | Used oil re-refining or reuse of waste oil | 260 | 22,978 | | 23,238 | | 23,238 |
| R10 | Land treatment | | | 2 | 2 | | 2 |
| R11 | Use of waste from another recovery activity | | 45 | | 45 | | 45 |
| R12 | Waste exchange prior to recovery | | 8 | 11 | 19 | | 19 |
| R13 | Storage prior to recovery | 3 | 20 | 9,949 | 9,972 | | 9,972 |
| RU | Undefined recovery | | 772 | 32 | 804 | | 804 |
| | Sub-total recovery | 40,900 | 49,209 | 226,904 | 317,013 | 0 | 317,013 |
| U | Undefined recovery or disposal | | 149 | 476 | 625 | 48,402 | 49,027 |
| | Total | 95,566 | 72,391 | 275,309 | 443,266 | 48,402 | 491,669 |

4.5 WASTE EXPORT AND IMPORT

4.5.1 NOTIFIED EXPORTS AND IMPORTS OF WASTE

Transfrontier shipment of waste records indicate that 287,062 tonnes of exported waste were notified in accordance with the TFS Regulation³⁰ in 2001. This includes 115,366 tonnes of hazardous waste, 159,943 tonnes of contaminated soil classified as hazardous waste (see section 4.4) and 11,753 tonnes of non-hazardous waste. Table 4.18 shows the destination and treatment method for all notified waste exports in 2001 and Figure 4.6 illustrates the recovery and disposal (with contaminated soil exported for recovery shown separately) of notified waste exports. For the first time, Belgium, in 2001, became the most important destination for waste exports due to the export of 145,192 tonnes of contaminated soil shipped for 'inorganic material recovery' from redevelopment works undertaken by the Dublin Docklands Development Authority. Excluding this one off series of shipments, the UK remains the principal destination for the export of waste. Figure 4.7 illustrates the destination of notified waste exports between 1996³¹ and 2001. Since 1998, Germany has been the principal destination for waste to be disposed of by either thermal treatment or landfill. The UK has always been an important destination for the disposal of waste by thermal treatment. UK policy³² restricts the import of waste for all disposal options other than high temperature incineration from Ireland and Portugal and since 1998, the use, for Irish-generated waste, of other disposal options in the UK has been minimal. The recovery of inorganic materials, metals and solvents are all important treatment options and are exploited principally in Belgium, UK, Germany and Denmark with minor variations from year to year. No imports of waste were notified in 2001.

Table 4.18 Destination and fate of notified waste exported in 2001

| Country of import | Total exports* | Disposal | | | | Recovery | | | | | Unspecified treatment |
|-------------------|----------------|-------------------|----------|----------------|----------------|-----------------------------|------------------|-------------|----------------|----------------|-----------------------|
| | | Thermal treatment | Landfill | Other disposal | Total disposal | Inorganic material recovery | Solvent recovery | Use as fuel | Other recovery | Total recovery | |
| Belgium | 148,811 | 1,440 | | 174 | 1,614 | 145,192 | 54 | | 1,934 | 147,179 | 17 |
| UK | 66,427 | 15,777 | | 1,683 | 17,460 | | 20,783 | 1,074 | 25,115 | 46,972 | 1,995 |
| Germany | 47,812 | 25,356 | 3,041 | 1,563 | 29,960 | 11,280 | 1,346 | 1,128 | 3,937 | 17,690 | 161 |
| Denmark | 19,262 | 565 | | | 565 | | 79 | 18,618 | | 18,697 | |
| Finland | 2,435 | 2,391 | 44 | | 2,435 | | | | | | |
| Netherlands | 1,184 | 435 | | | 435 | 742 | | | | 742 | 6 |
| Unspecified | 669 | 240 | | 5 | 245 | | 13 | | 186 | 199 | 225 |
| France | 320 | | | | | | | | 320 | 320 | |
| USA | 144 | | | | | | | | | | 144 |
| Total | 287,062 | 46,205 | 3,085 | 3,424 | 52,714 | 157,213 | 22,274 | 20,820 | 31,492 | 231,799 | 2,549 |

* Comprised of 275,309 tonnes of hazardous waste (of which 159,943 tonnes contaminated soil) and 11,753 tonnes of non-hazardous waste.

Table 4.19 shows the local authority from where notified waste was exported in 2001. As noted above, the predominance of Dublin City is due to the export of contaminated soil from the docklands redevelopment. Cork is the principal exporter of hazardous waste other than contaminated soil, followed by Clare, Kildare, South Dublin and Roscommon. Each of these counties hosts chemical, pharmaceutical or electronics industries or hazardous waste facilities. Kilkenny's elevated position on the list is due to the generation and export of contaminated soil.

³⁰ 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; and Waste Management (Transfrontier Shipment of Waste) Regulations, 1998, S.I. No. 149 of 1998.

³¹ Data from: EPA, 2001, *National Hazardous Waste Management Plan*.

³² *United Kingdom Management Plan for Exports and Imports of Waste*, HMSO, 1996.

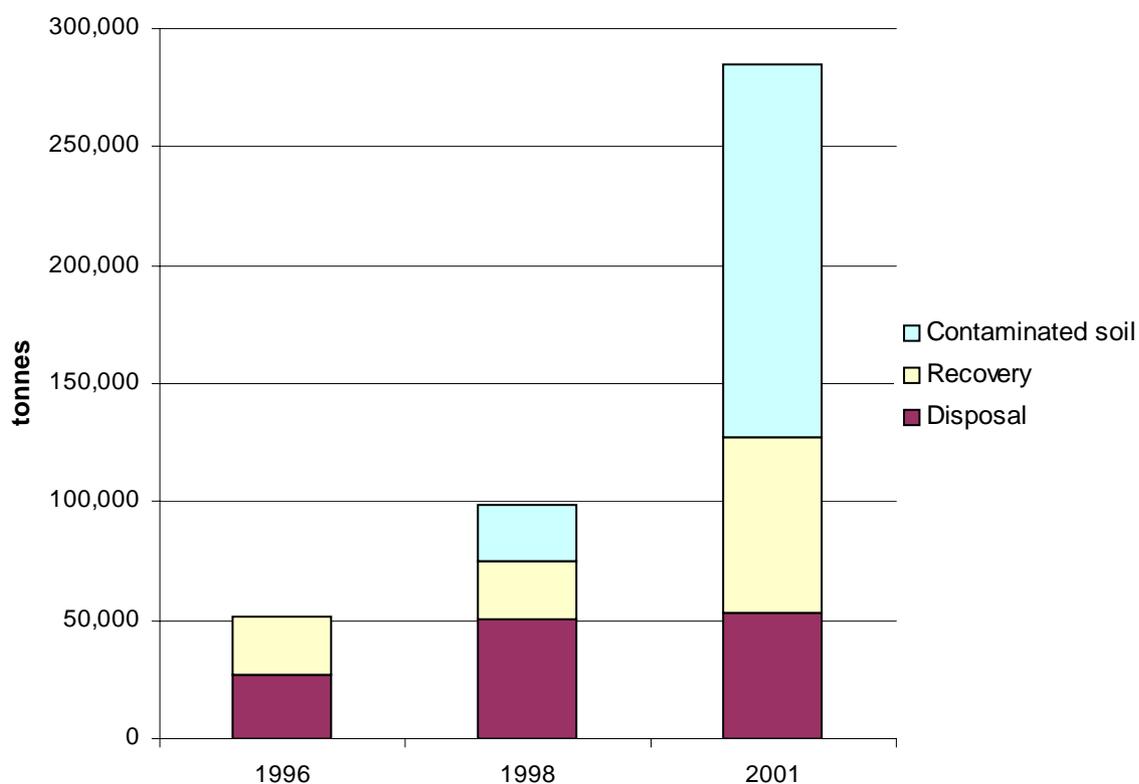


Figure 4.6 Recovery and disposal of notified waste exports, 1996, 1998 and 2001

Table 4.19 Export of waste, notifications processed by local authorities, 2001

| Local authority | Quantity notified (tonnes) | Local authority | Quantity notified (tonnes) |
|--------------------------------|----------------------------|--------------------------------|----------------------------|
| Dublin City Council | 164,738 | Galway County Council | 1,043 |
| Cork County Council | 74,637 | Westmeath County Council | 392 |
| Clare County Council | 7,723 | Louth County Council | 270 |
| Kildare County Council | 6,863 | Waterford City Council | 252 |
| Kilkenny County Council | 6,845 | Limerick County Council | 202 |
| South Dublin County Council | 6,426 | Mayo County Council | 150 |
| Roscommon County Council | 5,905 | Cork City Council | 133 |
| Wicklow County Council | 3,882 | North Tipperary County Council | 132 |
| Fingal County Council | 3,102 | Meath County Council | 119 |
| Offaly County Council | 2,540 | Sligo County Council | 68 |
| South Tipperary County Council | 1,599 | Carlow County Council | 40 |
| | | Total | 287,062 tonnes |

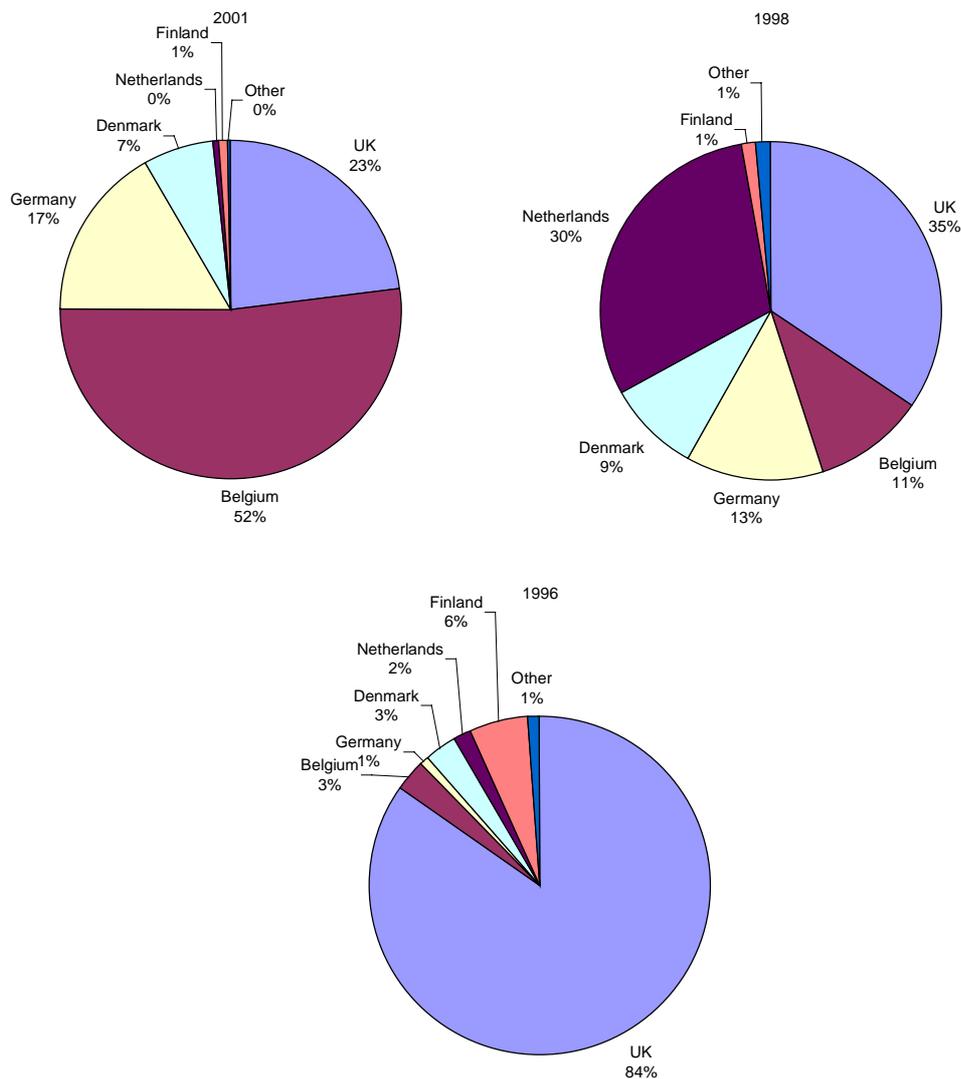


Figure 4.7 Destination of notified exported waste, 1996 to 2001

4.5.2 NON-NOTIFIED EXPORTS AND IMPORTS OF WASTE

According to the TFS Regulation, where green list (Annex II) wastes are to be exported or imported for recovery, no notification is required. Green list wastes are typically clean segregated recyclable waste fractions and their movement for recycling across the EU is intended to be unhindered by the detailed regulatory framework in place for amber and red list wastes (Annex III and IV respectively). As described in section 3.2.1, a survey of recycling organisations was carried out in 2001. Large quantities of waste are exported and imported by these organisations and it is considered that much of these exports and imports are of green list waste. Table 4.20 shows the information on waste exports and imports taken from the survey returns. The data shows that 380,816 tonnes of non-notified waste were exported for recycling in 2001 while 67,561 tonnes were imported. The largest exports were metals, paper, cardboard and plastic. The most important destinations were the UK (including Northern Ireland), Spain, Germany and China. The largest imports were plastic PET packaging and glass packaging (the glass having been imported from Northern Ireland and the Netherlands for recycling at the Irish Glass Bottle Company, since closed).

Table 4.20 Export and import of non-notified waste for recovery, 2001

| Material | Export of non-notified waste for recycling (tonnes) | | | Import of non-notified waste for recycling (tonnes) | | |
|---------------------|---|--------------------|----------------------------|---|--------------------|----------------------------|
| | Total | Packaging waste | Non- packaging waste | Total | Packaging waste | Non- packaging waste |
| Paper and cardboard | 134,252 | 61,966 | 72,286 | 9,154 | 146 | 9,008 |
| Glass | 4,912 | 2,929 | 1,983 | 19,912 | 19,912 | 0 |
| Plastic | 14,492 | 13,566 | 926 | 37,000 | 37,000 | 0 |
| Ferrous metal | 183,042 | 15,715 | 167,327 | 0 | 0 | 0 |
| Aluminium | 8,547 | 958 | 7,589 | 477 | 0 | 477 |
| Other metal | 18,817 | 28 | 18,789 | 0 | 0 | 0 |
| Textiles | 4,044 | 0 | 4,044 | 0 | 0 | 0 |
| Wood | 4,175 | 3,887 | 288 | 1,000 | 0 | 1,000 |
| Others | 8,535 | 444 | 8,091 | 18 | 0 | 18 |
| Total | 380,816 | 99,493 | 281,325 | 67,561 | 57,058 | 10,503 |

4.6 BIODEGRADABLE MUNICIPAL WASTE

Biodegradable municipal waste (BMW) is generated in households and other sources and is described as any waste that is capable of undergoing anaerobic or aerobic decomposition, such as food and garden waste and paper and cardboard.

Biodegradable municipal waste makes up approximately 65% of the municipal waste stream. As shown in Table 4.21, an estimated 1,491,272 tonnes of biodegradable municipal waste were generated in Ireland in 2001, of which 1,257,420 tonnes were consigned to landfill and 233,852 tonnes were recycled. The largest single fraction of biodegradable municipal waste is paper and cardboard (54%) of which 166,305 tonnes were separately collected and recycled in 2001. The second largest fraction of biodegradable municipal waste is organic waste (39%) which consists of food and garden waste. Textiles make up 4% of biodegradable municipal waste and wood an estimated 3%³³.

Table 4.21 Biodegradable municipal waste generation, 2001

| Material | Gross quantity available (tonnes) | Landfilled (tonnes) | Recovered (tonnes) |
|---------------------|--------------------------------------|------------------------|-----------------------|
| Paper and cardboard | 804,414 | 638,109 | 166,305 |
| Textiles | 60,073 | 56,013 | 4,060 |
| Organic waste | 578,158 | 555,926 | 22,233 |
| Wood | 48,626 | 7,372 | 41,254 |
| Total | 1,491,272 | 1,257,420 | 233,852 |

³³ The only wood fraction reported in waste compositional surveys relates to wood packaging in the commercial waste stream. Hence, the figure of 3% is an underestimate of all wood contained in the municipal waste stream.

Kerry County Council operates a separate collection scheme for organic waste. Pilot separate collection schemes for household organic waste (kitchen and garden) have been established in Cork, Waterford, Limerick, Galway and Nenagh, with experience to date being broadly encouraging. Regional waste management plans provide for the progressive development of separate collection schemes, including collection of source separated organic waste from households and commercial/institutional producers.

There are a number of potential environmental impacts associated with landfilling biodegradable municipal waste including the generation of leachate, landfill gas and odours and the attraction of flies and vermin. In addressing these concerns, the Landfill Directive³⁴ sets targets for the reduction in the landfilling of biodegradable municipal waste. By 2006, Member States are restricted to landfilling a maximum of 75% of the total amount by weight of biodegradable municipal waste generated in 1995. This maximum decreases to 50% in 2009 and 35% in 2016. Countries that landfilled more than 80% of biodegradable municipal waste generated in 1995 may postpone the attainment of the targets by a maximum of four years. In *Delivering Change*³⁵, the Government committed itself to drawing up a national strategy on biodegradable waste which will set out the steps necessary to achieve the Directive's targets.

4.7 AGRICULTURAL WASTE

Agriculture is the single largest source of waste in Ireland. In 2001, 56,687,440 tonnes of agricultural organic waste were generated, a reduction of 12.2% since 1998. The reduction is primarily due to a reduction in animal numbers which consequently results in reduced generation of manure, slurry and soiled wash water. The reduction in the generation of silage effluent is primarily due to a lower moisture content in grass in 2001. Table 4.22 provides a breakdown of agricultural organic waste generation in 2001.

Agricultural organic waste is managed by spreading on land. In general, it is assumed that the landspreading of agricultural organic waste is carried out with a consequential benefit of improving soil conditions for crop growth. This type of management is considered to be recovery. If organic waste is applied to agricultural or other land in quantities exceeding agronomic requirements, then the waste is being disposed of. In order to determine the correct agronomic requirements of a soil, and consequently whether a disposal or recovery activity is being carried out, a nutrient management plan should be prepared.

Table 4.22 Estimated agricultural organic waste generation, 2001

| Waste category | Waste generation* (tonnes wet weight) | % |
|---------------------------|--|------------|
| Cattle manure and slurry | 34,753,820 | 61.30 |
| Soiled water (dairy only) | 17,266,500 | 30.46 |
| Pig slurry | 2,412,883 | 4.26 |
| Silage effluent | 1,177,745 | 2.08 |
| Poultry litter | 448,310 | 0.79 |
| Sheep manure | 333,440 | 0.59 |
| Spent mushroom compost | 294,742 | 0.52 |
| Total | 56,687,440 | 100 |

* It is estimated that an additional 55 million tonnes are deposited directly on land by grazing animals (cattle and sheep) as faeces and urine.

³⁴ Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste (OJ L 182, 16.7.1999, p.1).

³⁵ Department of the Environment and Local Government, 2002, *Preventing and Recycling Waste – Delivering Change*, A Policy Statement.

Agricultural contractors engaged in the collection and transport of animal slurries and manure off-site for land spreading are obliged to obtain a waste collection permit in accordance with the Waste Management (Collection Permit) (Amendment) Regulations 2001. Certain exemptions apply. A contractor spreading the waste on the same premises from which the waste originated is not required to obtain a waste collection permit. Similarly a waste collection permit is not required by a farmer spreading waste for recovery on his or her own land. This includes spreading on outlying lands in the same tenure and transporting waste to those outlying lands.

4.8 CONSTRUCTION AND DEMOLITION WASTE

Construction and demolition waste is one of the largest waste streams in Ireland. Despite this predominance, few records, particularly on waste generation, are maintained by operators within this sector. Given the need to meet ambitious and time-bound Government targets for the recycling of construction and demolition waste, quantitative information on construction and demolition waste generation should be provided by operators and contractors in the sector.

The Minister for the Environment and Local Government has implemented two principal initiatives in recent years to facilitate the construction industry in meeting the principal target for which this industry is responsible, namely, the recycling of at least 50% of construction and demolition waste by 2003, with a progressive increase to at least 85% recycling by 2013³⁶. The first initiative, the report of Task Force B4 of the Forum for the Construction Industry to investigate the issue of recycling construction and demolition waste, was completed in 2001³⁷. The second initiative was commenced in 2002 and involved the establishment of a National Construction and Demolition Waste Council. The Council began meeting in autumn 2002 and is expected to report back to the Minister by mid-2003.

A number of initiatives have been initiated which aim to divert construction and demolition waste away from landfill and to stimulate recycling. They include:

- Recycling of construction and demolition waste at Ballealy Landfill in Fingal involving the crushing and sorting of waste and its use as an engineering material at the landfill and elsewhere.
- DEMCON 20/20 project at Kinsale Road Landfill in Cork where construction and demolition waste delivered to the landfill is stockpiled, processed and stored for re-use as engineering material at the landfill.
- Ballymun Regeneration where a minimum of 50% of the material arising from the demolition of the tower blocks will be used in the construction of new residential units.
- A waste exchange website for the construction industry was launched in 2000 at www.canddwaste.ie and provides for the reuse or recycling of materials that might otherwise be disposed of as waste.
- FÁS and the Construction Industry Federation provided a Construction and Demolition Waste National Awareness Programme in 2002 providing information at regional seminars.

Two methodologies were used to estimate the generation of construction and demolition waste in 2001. The first methodology, described in section 3.2.2, estimates that 3,651,411 tonnes of construction and demolition waste were generated in 2001. This represents an increase of 35.0% over the estimated 2,704,958 million tonnes generated in 1998. Figure 4.8 illustrates the components of this estimate and shows that new construction, repair and maintenance activities are the greatest generators of waste followed by soil excavation and demolition activities. In addition, information provided by the Marine Institute indicates that 1,257,000 tonnes of dredging spoil were disposed of at sea in 2001.

³⁶ Department of the Environment and Local Government, 1998, *Waste Management – Changing Our Ways*, A Policy Statement.

³⁷ Forum for the Construction Industry, Task Force B4, 2001, *Recycling of Construction and Demolition Waste*, Final report on the development and implementation of a voluntary construction industry programme to meet the Government's objectives for the recovery of construction and demolition waste.

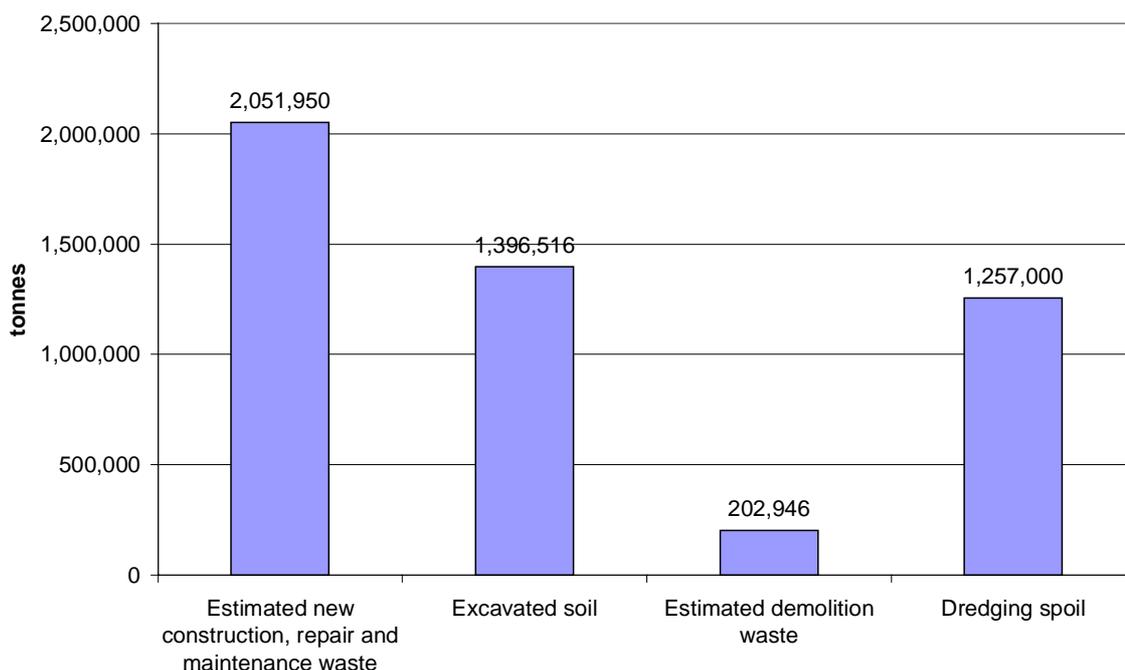


Figure 4.8 Construction and demolition waste and dredging spoil generated in 2001

The second methodology is based on records of construction and demolition waste accepted for recovery and disposal at EPA-licensed and local authority-permitted facilities, as shown in Table 4.23. Based on this information, a best estimate of 65.4% of construction and demolition waste was recovered in 2001. The data providing this estimate contain certain assumptions. It is assumed that soil and construction and demolition waste accepted at local authority-permitted sites is recovered. It is also assumed that the deposit of an estimated 500,000 tonnes of soil at unauthorised sites in one local authority area (as reported by that local authority) is disposal.

Table 4.23 Recovery and disposal of construction and demolition waste, 2001

| Category of C&D waste | Disposal (tonnes) | Recovery (tonnes) |
|--|-------------------------|-------------------|
| Cover material accepted at EPA-licensed landfills | | 459,692 |
| C&D waste accepted for recovery at EPA-licensed landfills | | 347,341 |
| C&D waste accepted for disposal at EPA-licensed landfills | 750,297 | |
| C&D waste accepted at local authority-permitted facilities | | 661,317 |
| Soil accepted at local authority-permitted facilities | | 896,516 |
| Soil estimated to have been accepted at unauthorised sites | 500,000 | |
| Total | 1,250,297 | 2,364,866 |
| Total recovery and disposal | 3,615,163 tonnes | |
| Recovery rate | 65.4% | |
| Disposal rate | 34.6% | |

There is not a significant difference between the two methods of estimating the generation of construction and demolition waste and this increases confidence in the magnitude of the estimates. In order to improve confidence in construction and demolition waste generation, recovery and disposal

data, improved information on construction and demolition waste disposal and recovery is required. This means that all recovery and disposal operations must be appropriately authorised and records maintained. Local authorities should continue to take steps to ensure that all construction and demolition waste recovery and disposal sites are appropriately authorised. Similarly, the generators of construction and demolition waste should endeavour to maintain adequate records of waste generation and management.

Table 4.24 shows that progress is being made towards national targets for the recycling of construction and demolition waste. Increased efforts will be required to achieve the long term target of 85% recycling and dedicated facilities for the processing of construction and demolition waste will be required.

Table 4.24 Progress towards national targets for recycling construction and demolition waste

| Target²⁵ (set in 1998, to be achieved by 2013) | Position in 2001 |
|---|--|
| Recycling of 50% of construction and demolition waste by 2003, with a progressive increase to at least 85% recycling by 2013. | In 1998, 43.3% of construction and demolition waste was recovered. In 2001, a best estimate of 65.4% was recovered. |

4.9 HEALTHCARE WASTE

Healthcare waste is typically defined as waste from human or animal health care and related research. Records on waste from human healthcare are derived from three sources: local authority returns, waste-licensed facilities and export of waste records. A total of 13 local authorities reported that 9,706 tonnes of healthcare waste were generated in their functional areas in 2001, as shown in Table 4.25, and five local authorities reported the disposal of 1,584 tonnes of non-hazardous healthcare waste to landfill. Table 4.26 shows that three waste-licensed hazardous healthcare waste treatment facilities were in operation in 2001 (though one has since closed) and accepted 6,101 tonnes of hazardous healthcare waste. These facilities are licensed to accept certain categories of potentially infectious waste for disinfection in proprietary heat treatment equipment. Treated and shredded healthcare waste from these facilities is disposed of to landfill. Three waste contractors notified the export of 370 tonnes of healthcare waste for incineration.

Table 4.25 Healthcare waste generation reported by local authorities

| Category of healthcare waste | Number of reporting local authorities | Quantity (tonnes) |
|-------------------------------------|--|--------------------------|
| Healthcare waste (hazardous) | 9 | 6,652 |
| Healthcare waste (non-hazardous) | 8 | 3,054 |
| Total reported generation | | 9,706 |

There is an inconsistency between the reported generation of 6,652 tonnes of hazardous healthcare waste in nine local authority areas (itself a significant under-representation of the national situation) and the reported treatment and export of 6,471 tonnes of hazardous healthcare waste by waste contractors. The source of the discrepancy is possibly in part due to the misclassification of landfilled healthcare waste by healthcare institutions or local authorities. Improved information on the generation and management of non-hazardous and hazardous waste from healthcare activities is needed and healthcare institutions and managers should maintain adequate records of waste generation and management.

Table 4.26 Landfill, treatment and export of healthcare waste at licensed facilities

| Facility name | Licence register number | Potentially infectious healthcare waste treated prior to landfill (tonnes) | Healthcare waste exported to Belgium for incineration (tonnes) |
|---|-------------------------|--|--|
| Sterile Technologies Ireland | 55-1 | 4,541 | - |
| Eco-Safe Systems | 54-1 | 910 | 39 |
| Southern Health Board | *38-1 | 650 | - |
| Sorundon (Irish Environmental Services) | 40-1 | - | **226 |
| Minchem Environmental Services | - | - | ***105 |
| Totals | | 6,101 | 370 |

* Facility closed in August 2001.

** Including 34.24 tonnes of discarded medicines exported to Germany for unspecified treatment.

*** Exported directly from Counties Roscommon and Galway.

The constituents of non-hazardous hospital waste, shown in Figure 4.9, were determined in 2002 as part of a research project commissioned by the EPA under the ERTDI programme³⁸. Paper and food waste are the largest constituents. The composition of hazardous healthcare waste has not been determined in detail but in nature is not greatly dissimilar to non-hazardous healthcare waste. Many of the components of healthcare waste and healthcare risk waste are clearly identifiable as metal, paper, textile and plastic.

Greencode – an environmental management system for hospitals

Greencode is a computerised environmental management system (EMS) principally aimed at hospitals and healthcare institutions. It was developed in 1993 by the National Health Service in Scotland and the Health and Social Services in Northern Ireland. Greencode software allows an organisation to put the necessary systems, procedures and records in place to achieve 60-70% of ISO 14001 certification, without adopting the formalities of the ISO standard.

Prior to the implementation of Greencode at the National Maternity Hospital, Holles Street, there was little recycling of waste. Waste was sometimes stored for long periods and transported without all the necessary documentation. Staff were not trained in waste management/awareness.

Since the implementation of the Greencode EMS in 2001, waste generation at the National Maternity Hospital has been reviewed and there have been considerable improvements in the way waste is managed, handled and disposed of. Most significantly, wastes are now identified, classified and properly segregated. Standard operating procedures have been implemented to control the management of waste. All waste is fully traceable, transported under appropriate documentation by authorised contractors and detailed records are retained. The National Maternity Hospital has obtained a certificate of registration for the storage of solid hazardous waste. Ongoing staff training is implemented at all levels and waste information is communicated to all staff.

Greencode requires commitment from management and well informed and trained staff. At the National Maternity Hospital, it has represented the key steps in establishing good waste management practices; the identification, quantification, segregation and recording of individual waste streams.

³⁸ Environmental RTDI Programme 2000-2006, 2000-MS-7-M1, *Composition of non-household municipal waste in Ireland and the development of an approach to tracking municipal waste composition.*

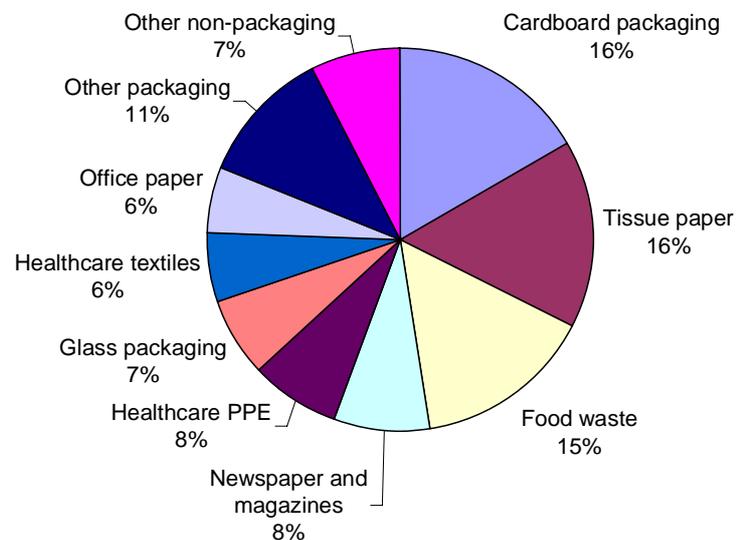


Figure 4.9 The constituents of non-hazardous hospital waste

4.10 PACKAGING WASTE

Packaging is defined in the Waste Management Acts, 1996 and 2001, as *any material, container or wrapping, used for or in connection with the containment, transport, handling, protection, promotion, marketing or sale of any product or substance, including such packaging as may be prescribed*. Items such as glass bottles, plastic containers, food wrappers, aluminium cans and timber pallets are all classified as packaging.

Table 4.27 shows that an estimated 872,917 tonnes³⁹ of packaging waste was generated in 2001. This consists of 651,650 tonnes of household and commercial packaging waste consigned to landfill and 221,266 tonnes of packaging waste reported as having been recovered by recycling organisations. This gives a recycling rate of 25.3% with a corresponding disposal rate of 74.7%.

Of the 221,266 tonnes of packaging waste recovered, 121,774 tonnes (55%) were recycled in Ireland, consisting mainly of material recycling with some energy recovery (3,042 tonnes of wood used as boiler fuel). The remaining 99,472 tonnes (45%) were exported to Northern Ireland and further afield for recycling. Most of the materials sent abroad for recycling were partially processed in Ireland. For example, ferrous metals are often sorted according to various grades and shredded; plastic is crushed and baled; paper is shredded and cardboard baled. Table 4.27 shows that the largest fractions of packaging waste recycled in 2001 were wood, ferrous metals, glass and paper reaching recycling rates of 84.8%, 46.2%, 39.1% and 23.3% respectively.

There has been a significant increase in the estimated quantities of packaging waste generated and the quantity of packaging waste reported to be recovered between 1995 and 2001. In 1995, the best estimate of packaging waste generation was 639,216 tonnes. This increased in 1998 to a best estimate of 682,688 tonnes and 872,917 tonnes in 2001 representing a 28% increase between 1998 and 2001. There has also

³⁹ This represents an average 223kg of packaging waste generated per capita in 2001. This per capita rate is high compared with other EU countries.

been a steady increase in the quantity of packaging waste recovered between 1995 and 2001. In 1995, 139,857 tonnes of packaging waste was reported as being recovered. In 1998, it was reported that 100,905 tonnes were recovered and in 2001, 221,266 tonnes, representing a 119% increase in recovery between 1998 and 2001 with an overall increase in the rate of packaging waste recovery from 14.8% in 1998 to 25.3% in 2001.

Table 4.27 Packaging waste generation, disposal and recovery, 2001

| Packaging material | Generated (tonnes) | Landfilled | | Recovered | |
|--------------------|--------------------|------------------|-------------|------------------|-------------|
| | | Tonnes | Percentage | Tonnes | Percentage |
| Paper & cardboard | 380,209 | 291,560 | 76.7 | 88,649 | 23.3 |
| Glass | 105,273 | 64,118 | 60.9 | 41,156 | 39.1 |
| Plastic | 206,480 | 186,033 | 90.1 | 20,447 | 9.9 |
| Ferrous metal | 60,843 | 32,747 | 53.8 | 28,096 | 46.2 |
| Aluminium | 14,295 | 13,336 | 93.3 | 959 | 6.7 |
| Other metals | 8,623 | 8,596 | 99.7 | 28 | 0.3 |
| Textiles | 2,486 | 2,486 | 100 | 0 | 0 |
| Wood | 48,626 | 7,372 | 15.2 | 41,254 | 84.8 |
| Others | 46,082 | 45,404 | 98.5 | 678 | 1.5 |
| Total | 872,917 | * 651,650 | 74.7 | * 221,266 | 25.3 |

* Gross quantities reported.

There are three major factors used in calculating packaging recycling rates: (a) the quantity of packaging placed on the market, (b) the quantity of packaging waste landfilled and (c) the quantity of packaging waste recycled. It is assumed that 'packaging placed on the market' is equal to 'packaging waste generated'. Packaging waste generated is calculated from the sum of packaging waste landfilled and packaging waste recycled (i.e. (b) + (c)). Packaging waste landfilled is estimated by applying household and commercial waste composition factors to total household and commercial waste landfilled. Packaging waste recycled is calculated from data provided directly by packaging waste recyclers and exporters. Packaging waste recycling rates are calculated by dividing (c) by (a).



Pallets and other wood packaging represent a significant proportion of total packaging waste recovered in Ireland.

Table 4.28 shows the difference in the composition of landfilled household and commercial waste vis-à-vis packaging in 1998 and 2001. What the data appear to show is that increased diversion of commercial

packaging waste away from landfill has resulted in a decrease in the amount of packaging contained in household and commercial waste deposited to landfill. The most significant examples are paper and glass packaging whose proportion in landfilled commercial waste dropped from 35.2% to 30.1% and 2.8% to 1.2% between 1998 and 2001 respectively. In addition, increased knowledge on the composition of commercial waste from specific sectors means that the composition factors are more representative of commercial waste as a whole. A research project⁴⁰ commissioned by the EPA in 2001 provided information on a number of additional sectors over and above the four sectors characterised for earlier reports. Compositional data used in 1998 and additional data from 2001/2 were combined to calculate the composition of commercial waste in 2001. This combination of compositional information ensures the maximum coverage of commercial sectors. The level of coverage and knowledge of non-household municipal sectors is now much improved but continued efforts are required to examine waste arisings in sectors not yet studied and at distinct sub-sectors within those sectors previously studied.

Table 4.28 Packaging factors for landfilled household and commercial waste, 1998 and 2001

| | 2001 | | 1998 | |
|---------------|---------------|----------------|---------------|----------------|
| | Household (%) | Commercial (%) | Household (%) | Commercial (%) |
| Paper | 5.6 | 30.1 | 5.1 | 35.2 |
| Glass | 4.4 | 1.2 | 5.3 | 2.8 |
| Plastic | 10.2 | 7.9 | 10.4 | 8.5 |
| Ferrous metal | 1.9 | 1.2 | 1.9 | 0.9 |
| Aluminium | 0.7 | 0.7 | 0.7 | 0.6 |
| Other metals | 0.7 | 0.0 | 0.03 | 0.0 |
| Textiles | 0.2 | 0.1 | 0.3 | 0.3 |
| Putrescibles | 0.0 | 0.0 | 0.0 | 0.0 |
| Wood | 0.0 | 1.0 | 2.5 | 2.7 |
| Others | 2.1 | 2.6 | | |

There has been a noticeable improvement in the quality of packaging data being reported to the EPA between 1998 and 2001. This is partly due to the introduction of the RPS payment scheme by Repak in 2000 whereby waste contractors are paid a subsidy based on the quantity and type of packaging waste collected for recovery. Approved contractors are required to maintain accurate records on wastes collected and this obligation is reflected in the quality of information now provided to the EPA. The EPA carries out audits⁴¹ on companies engaged in the recycling of packaging waste to ensure that adequate recording systems are in place.

The quality and availability of information on landfilled waste has increased in recent years as a result of increased regulation of landfills and the installation of weighbridges at landfills, elements which require and allow for, respectively, the maintenance of accurate records. It is apparent however that an unknown proportion of commercial waste that is accepted at landfills is in fact industrial waste. Landfill operators do not typically distinguish between the two as waste is usually mixed at transfer stations or by waste collectors and is generally described by landfill operators as commercial/industrial waste. Landfill operators and waste collectors alike will, in future, have to endeavour to maintain separate information on quantities of commercial and industrial waste delivered to transfer stations and landfills.

⁴⁰ Environmental RTDI Programme 2000-2006, 2000-MS-7-M1, *Composition of non-household municipal waste in Ireland and the development of an approach to tracking municipal waste composition.*

⁴¹ For data relating to 2001, 10 audits were carried out at recycling organisations.

Figure 4.10 illustrates the recovery of packaging waste compared with the targets set out in the Packaging Directive. It should be noted that the percentages included in Figure 4.10 do not include any allowances for contamination or moisture content. Factors will be developed and used in the National Report on implementation of the Directive for 2001. Hence, it is likely that these percentages will be adjusted upwards. While the target of 25% recovery has been achieved for 2001, significant efforts will be required in order to reach the 2005 target of 50% recovery. To facilitate achieving this target, the Waste Management (Packaging) Regulations, 2003, came into force on 1 March, 2003. The main feature of the new Regulations is the requirement on all businesses who place packaging on the market (i.e. manufacturers, importers, wholesalers and retailers) to segregate specified packaging waste materials generated on their premises and to have it collected by authorised waste operators for recycling. The specified packaging materials that must be segregated for recycling are glass, paper, fibreboard, steel, aluminium, plastic sheeting and wood. It is expected that this will lead to a further increase in the recycling of commercial packaging. Other measures aimed at increasing the recovery of packaging waste include the progressive roll-out by local authorities of segregated household waste collection services including an extended network of bring banks and civic waste facilities.

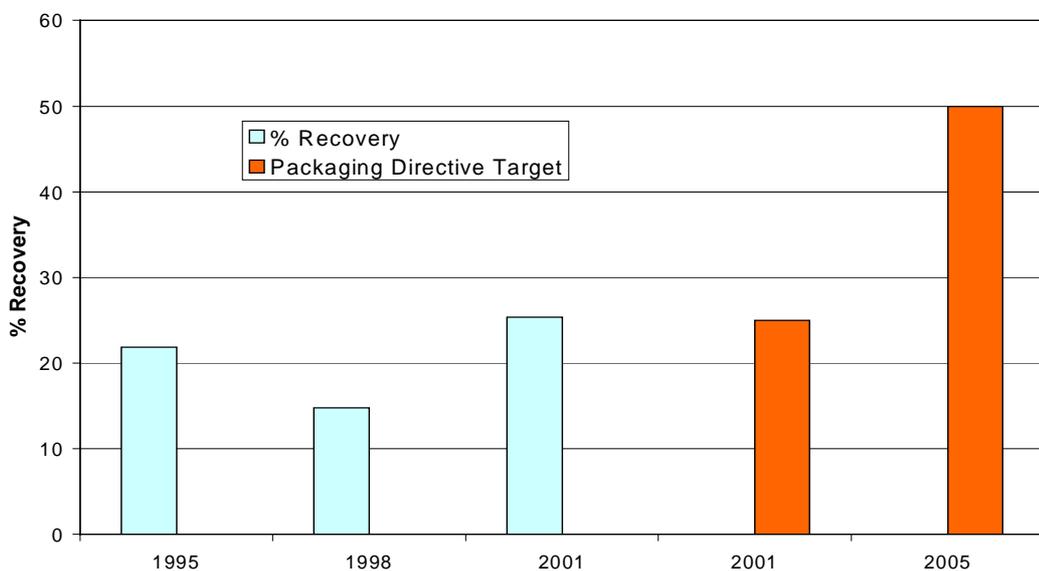


Figure 4.10 Recovery of packaging waste, 1995 to 2001



Measures to prevent excessive packaging waste should be implemented, in accordance with the Packaging Directive.

4.11 POLYCHLORINATED BIPHENYLS

Polychlorinated biphenyls (PCBs) is the collective name applied to a group of aromatic chlorinated chemical compounds which are now banned but were used extensively up until the late 1980s in a large number of applications, both closed (e.g. in transformers and capacitors) and open (e.g. as heat exchange fluids, lubricating oils and as additives in paint, plastics and other products). PCBs are defined in EU⁴² and Irish⁴³ legislation and are subject to provisions contained in the *Management Plan for Polychlorinated Biphenyls*⁴⁴ and the *National Hazardous Waste Management Plan*⁴⁵.

According to the 1998 Regulations, all holders of PCBs or PCB-containing equipment are obliged to notify the EPA of their holdings on an annual basis by 1 September each year. However, by 2001, only two notifications had been made. The EPA commissioned a survey of potential PCB holdings in 2001 which indicated that 263,787 litres of PCB may remain in use in Ireland. Further work is ongoing to verify these findings and an inventory of verified potential PCB holdings will be published on the EPA website. Complete information and notification forms for use by holders or potential holders of PCBs are contained in the *Management Plan for PCBs* and on the EPA website.

As the use of PCBs in new applications or equipment is now banned, waste PCBs generally arise as a result of the decommissioning or decontamination of PCB-containing electrical equipment. There is no disposal capacity for PCBs in Ireland so all waste PCBs must be exported for incineration. Export records (see Table 4.29), show that 20.7 tonnes of waste PCBs were exported in 2001. The local authority of origin of shipment reflects the location in each of these local authority areas of a licensed hazardous waste transfer station at which waste PCBs were stored prior to export.

Table 4.29 Export of waste PCBs, 2001

| Local authority of origin of shipment | Quantity (tonnes) | Treatment | Country of export |
|---------------------------------------|-------------------|---------------|-------------------|
| Clare County Council | 0.132 | Use as a fuel | Denmark |
| Clare County Council | 1.663 | Incineration | UK |
| South Dublin County Council | 1.800 | Incineration | Finland |
| Cork County Council | 7.149 | Incineration | UK |
| Dublin City Council | 9.940 | Incineration | UK |
| Total export of waste PCBs | 20.684 | | |

4.12 SCRAP METAL AND END-OF-LIFE VEHICLES

Scrap metal is composed of two fractions, ferrous and non-ferrous metals. Ferrous metal waste comes from end-of-life vehicles, waste electrical and electronic equipment, construction and demolition waste

⁴² Council Directive 96/59/EC of 16 September 1996 on the disposal of polychlorinated biphenyls and polychlorinated terphenyls (PCB/PCT) (OJ No L243, 24.9.96, p.31)

⁴³ Waste Management (Hazardous Waste) Regulations, 1998, S.I. No. 163 of 1998.

⁴⁴ EPA, 2002, *Management Plan for Polychlorinated Biphenyls (PCBs)*. For updates on the Plan, see the PCBs page on the EPA website at www.epa.ie.

⁴⁵ EPA, 2001, *National Hazardous Waste Management Plan*.

and household, industrial, manufacturing and agricultural sources. The majority of non-ferrous metal waste is generated by manufacturing processes that use non-ferrous metals. Smaller quantities of non-ferrous metal waste are contained in copper wiring, lead cladding, cast iron, stainless steel piping and end-of-life vehicles.

Figure 4.11 shows that an estimated 316,227 tonnes of ferrous metal waste was generated in 2001. Of this, 124,111 tonnes was comprised of fragmented scrap from shredding machines (made up of metal from end-of-life vehicles and other light metal goods such as cookers and washing machines). The remainder comprised, for example, heavy iron, structural plate and cast iron scrap. Of 124,111 tonnes of fragmented scrap, an estimated 93,050 tonnes was derived from end-of-life vehicles.

Approximately 33,575 tonnes of non-ferrous metal was generated in 2001 consisting of 10,839 tonnes of aluminium and 22,736 tonnes of other non-ferrous metals, including stainless steel. Although the quantity of non-ferrous metals is small in comparison to ferrous metal, the comparative value of non-ferrous metals is high.

Scrap ferrous metal in the form of end-of-life vehicles and white goods (e.g. fridges, freezers, washing machines and cookers) is often shredded at one of three shredding facilities in the Republic of Ireland and Northern Ireland before being exported for smelting. The shredders produce a shredded ferrous product known as fragmented scrap and a mix of non-ferrous metals, all of which are exported for further processing. Another waste stream known as shredder residue is also produced which contains all of the dust, dirt, rubber, plastic, foam and other materials which were contained in the vehicles and equipment. Shredder residue has historically been landfilled. However, it is now classified as hazardous waste. The scrap metal industry should take steps to establish facilities for the disposal of shredder residue or alternatively take steps to ensure that shredder residue does not contain the level of contamination that would restrict its acceptance at landfills.

In addition to the shredder operators, there are several companies that act as metal merchants who use mechanical shears for the dismantling of metal items. There are also specialist electrical and electronic recyclers who either refurbish equipment for reuse, extract components and materials for recycling or export quantities abroad to countries with more advanced recycling systems (see section 4.15 for more information on waste electrical and electronic equipment).

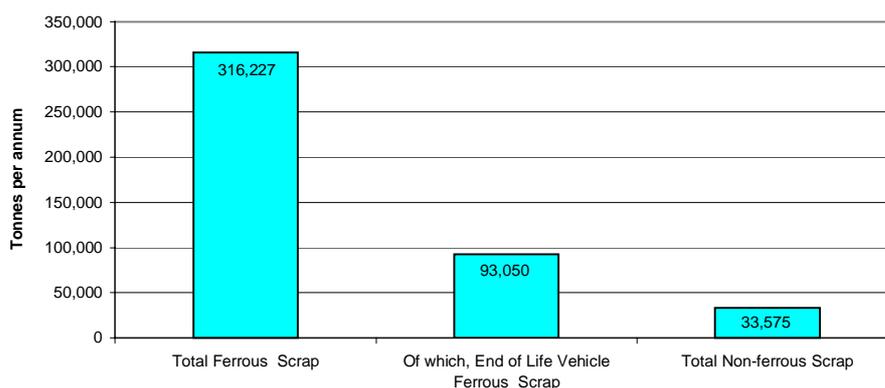


Figure 4.11 Scrap metal and end-of-life vehicles, 2001

Table 4.30 illustrates the generation of end-of-life vehicles between 1995 and 2001, as estimated by two methodologies. The general trend shows a steady increase in end-of-life vehicle arisings up to 2000, with a considerable decrease in 2001. This decrease matches closely the reduced sales of new vehicles in 2001, according to data published by the Vehicle Registration Unit of the Department of the

Environment and Local Government⁴⁶. Detailed information on the methodologies used in estimating end-of-life vehicle numbers is contained in *End-of-Life Vehicles – A Sectoral Report*⁴⁷.

Table 4.30 End-of-life vehicles, 1995 to 2001

| Year | Estimate based on information provided by recovery (shredder) operators | | Estimate based on projections of vehicle stock (ETC/W adjusted methodology) | |
|------|---|-----------------|---|-----------------|
| | Tonnes | No. of vehicles | Tonnes | No. of vehicles |
| 1995 | 52,154 | 86,294 | 49,710 | 82,850 |
| 1998 | 30,000 | 50,000 | 77,376 | 128,960 |
| 1999 | 63,513 | 105,855 | 91,636 | 152,727 |
| 2000 | 105,979 | 176,632 | 130,322 | 217,203 |
| 2001 | 93,050 | 155,094 | 75,877 | 126,462 |

Note: It is assumed that vehicles contain an average 0.6 tonnes of ferrous metal.

Approximately 75% of the weight of the average car is made up of steel and aluminium, most of which can be recycled. Potentially hazardous materials present in vehicles include lead, mercury, cadmium, hexavalent chromium, anti-freeze, brake fluid and oil. The remainder is composed of plastic.



Ferrous metal from end-of-life vehicles has traditionally enjoyed a high level of recovery. Increased recovery of non-ferrous metals and other materials from vehicles is necessary to meet the targets set in the End-of-Life Vehicles Directive.

⁴⁶ Vehicle Registration Unit, *Irish Bulletin of Vehicle and Driver Statistics* series, published annually.

⁴⁷ EPA, 2002, *End-of-Life Vehicles – A Sectoral Report*.

The Directive on End of Life Vehicles⁴⁸, which was published in October 2000, sets out a series of targets to be met in relation to the reuse, recycling and recovery of end-of-life vehicles. The targets are set out as follows in Article 7 of the Directive:

- By 1 January 2006, re-use and recovery of the components of end-of-life vehicles shall be increased to a minimum of 85% and re-use and recycling shall be increased to a minimum of 80%, measured by the average weight per vehicle. For vehicles produced before 1 January 1980, Member States may lay down lower targets, but not lower than 75% for reuse and recovery and 70% for reuse and recycling.
- By 1 January 2015, re-use and recovery shall be increased to a minimum of 95%, and re-use and recycling shall be increased to a minimum of 85%.

At present, metal recyclers are primarily concerned with recycling the metal component of end-of-life vehicles, thus considerable effort will be required to achieve the overall 85% and 95% recycling targets set out in the Directive. The Directive also contains provisions on waste prevention, producer responsibility, reduced use of hazardous substances and increased use of recycled materials in vehicle manufacture. At time of going to print, discussions were ongoing between the motor industry and Government on agreed means of meeting the requirements of the Directive.

4.13 SCRAP TYRES

It is estimated that 34,394 tonnes of waste tyres were generated in 2001. Of the total, 17,860 tonnes (52%) were car tyres with the remainder from buses, lorries, aircraft, motorcycles, bicycles and other sources. Figure 4.12 illustrates the increase in the generation of scrap tyres from 1990 to 2001. As there is no tyre production in Ireland at present, the best estimates of tyres arising as waste are made using available statistics in relation to net imports of tyres into the country.

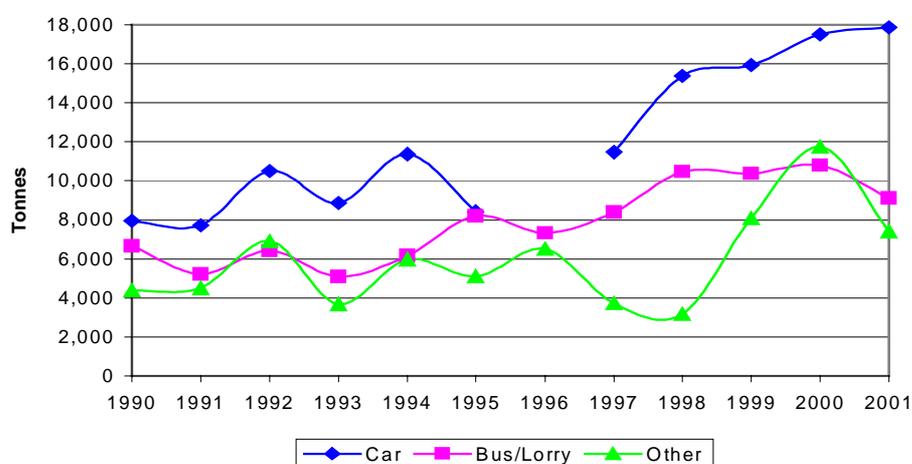


Figure 4.12 Scrap tyres, 1990 to 2001

Waste tyres are collected by a number of commercial operators who grade the tyres and return a certain quantity for remoulding/retreading. Currently, there are two retreaders for car tyres and six for truck tyres in Ireland. It has been estimated that 150,000 car tyres are remoulded and 36,000 truck tyres are retreaded each year. However, such recycling forms only a small part of the overall tyre industry, due to the availability of relatively cheap first life new tyres.

⁴⁸ Directive 2000/53/EC of the European Parliament and of the Council on end-of life vehicles (OJ L269, 21.10.2000, p.34)

Up until recently, old tyres were disposed of in landfills. However, the Landfill Directive bans the landfilling of whole tyres from July 2003 and shredded tyres from July 2006, except for use as engineering material. In addition, the use of old tyres to hold down silage pit covering has lessened over time due to the increased use of baled silage. Alternative uses of scrap tyres include use as fenders on boats, building blocks, plant pots and use as a fuel in cement kilns (tyres have a high energy content). In response to the reduced availability of traditional disposal and reuse routes for tyres, the Irish Tyre Industry Association is in consultation with the Government regarding the setting up of a scheme for the recycling of scrap tyres which are unsuitable for retreading or remoulding.



Scrap tyres have traditionally been used for agricultural purposes. However, this demand is declining and alternative outlets will need to be found.

4.14 WASTE BATTERIES

There are two principal categories of battery: lead acid batteries and other (small) batteries. Lead acid batteries are typically used as vehicle batteries and are classified as hazardous waste. No recycling of lead acid batteries is being carried out in Ireland and all lead acid batteries collected by authorised contractors are exported whole for recycling. The most valuable part of a lead acid battery is the lead and is the reason why lead acid batteries have long had good recycling rates. Other components of lead acid batteries (acid, plastic and other metals) are recycled or disposed of as their value dictates. It is reported that 7,479 tonnes of lead acid batteries were exported for recycling in 2001. An estimated 7,146 tonnes of lead acid batteries were unreported. The motor industry and other relevant parties should ensure that batteries are not handed over to unauthorised operators.

Small batteries are used in watches, calculators, torches, remote controls, mobile phones, etc. Some are rechargeable and some are not. Nickel-cadmium (NiCd) batteries and mercury cells are classified as hazardous waste. All other small batteries are non-hazardous waste. Small batteries can be recycled for their metal content at facilities in France and Switzerland. It is reported that 120 tonnes of small batteries were exported for recycling in 2001. An estimated 2,303 tonnes of small batteries were unreported and were most likely disposed of to landfill with general refuse. Collection points for small batteries are becoming more common but significant steps are required if collection and recycling rates for small batteries are to progress beyond their current low levels.

The European Commission has been considering proposals to amend the Batteries Directive since 1997. The latest consultation was commenced in March 2003⁴⁹.

⁴⁹ www.europa.eu.int/comm/environment/waste/batteries/consultation.htm.

4.15 WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT

Waste electrical and electronic equipment is commonly known as WEEE and includes items such as fridges, freezers, cookers, toasters, televisions, computers, electrical tools, monitoring and control instruments and automatic instruments. It is one of the fastest growing waste streams with an expected growth rate in Ireland of 7.5% per annum between 2001 and 2005.

Based on information from studies on waste electrical and electronic equipment^{50,51,52}, an estimated 35,000 to 82,000 tonnes of waste electrical and electronic equipment were generated in 2001. This equates to 9 to 18kg per person and represents 1.65% to 3.35% of municipal waste. The reason for the large range of values is that a number of methodologies, used in other countries, were used to estimate quantities of waste electrical and electronic equipment for Ireland. However, due to the large range of values obtained from the different methodologies, there was no way of selecting one value or methodology. Implementation of the directive (see below) on waste electrical and electronic equipment will provide accurate data on the generation, collection and recycling of waste electrical and electronic equipment from 2005.

Iron and steel are the most common materials contained in waste electrical and electronic equipment and together account for 48% of the total weight. Plastic is the second largest component by weight, representing 21% of the waste stream. Non-ferrous metals, including precious metals, and glass represent 13% and 5.4% respectively. Figure 4.13 illustrates the type and source of equipment contained in waste electrical and electronic equipment.

There are two sectors of the recycling industry which handle waste electrical and electronic equipment - shredding and dismantling organisations and specialist recyclers. The equipment used for shredding waste electrical and electronic equipment is designed to shred a mixed stream of metal-rich items, resulting in clean shredded ferrous and non-ferrous metals which are sold on for further processing. There is no information on the quantity of waste electrical and electronic equipment processed by shredding facilities in 2001. Specialist recyclers can be broken down into three groups: those who collect items for export abroad whole; those who extract valuable components and materials for recycling; and those who refurbish equipment for reuse. The majority of Irish companies fall into the first group and mostly handle IT equipment from the commercial sector. Specialist recyclers reported the recycling of 2,412 tonnes of waste electrical and electronic equipment in 2001 of which 1,894 tonnes were exported for recycling.

The segregation and separate collection of waste electrical and electronic equipment appears to be increasing and most local authorities now accept a wide range of waste electrical and electronic equipment categories at civic waste facilities. Private companies operating under contract to local authorities manage a number of collection facilities. The EPA funded a research project on the collection of waste electrical and electronic equipment⁵³ that will provide practical experience and guidance to local authorities on collection mechanisms for waste electrical and electronic equipment and their cost.

The European Commission has introduced two directives on waste electrical and electronic equipment⁵⁴ and on the restriction of the use of certain hazardous substances in electrical and electronic equipment⁵⁵.

⁵⁰ EPA, 2001, *Waste from Electrical and Electronic Equipment in Ireland: A Status Report*. Available to download from www.epa.ie

⁵¹ EPA, 2001, *Waste from Electrical and Electronic Equipment*.

⁵² EPA, 2002, *Environmental Survey of the Irish Electrical and Electronics Industry 2001*.

⁵³ Environmental RTDI Programme 2000-2006, 2001-WMWS-MS-2/2, *Waste Electrical and Electronic Equipment (WEEE) Collection Trials in Ireland*. For further information on this project, see www.ctc-cork.ie/weee.

⁵⁴ Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on waste electrical and electronic equipment (OJ L 37, 13.2.2003, p.24).

The overall aims of the directives are to reduce the quantities of waste electrical and electronic equipment being disposed of in landfills; to increase recycling rates; to reduce harmfulness of waste; to conserve natural resources; and to ensure that harmonised measures are put in place in Member States. In 2003, the Department of the Environment and Local Government set up a Task Force to advise on implementing the directives in Ireland.

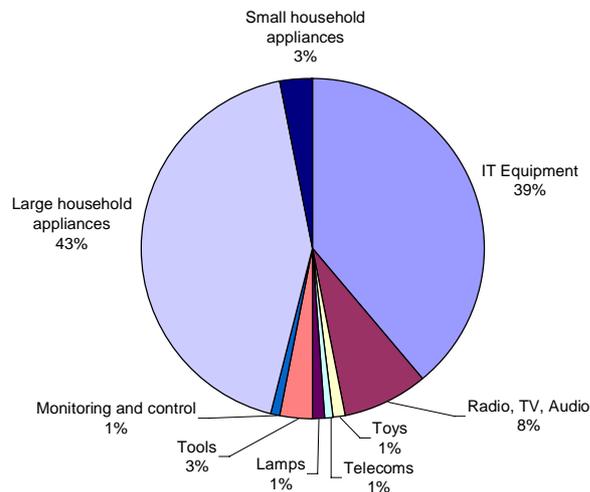


Figure 4.13 Waste electrical and electronic equipment (WEEE)



Waste electrical and electronic equipment can be delivered to civic waste facilities throughout the country.

⁵⁵ Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (OJ L 37, 13.2.2003, p.19)

4.16 WASTE OILS AND OILY SLUDGES

Waste oil is recycled at one principal facility in the Republic of Ireland and recycled oil from this facility is burned as a fuel in large boilers at ESB power stations and other industrial facilities. A second recycling facility exists in Northern Ireland.

Records indicate that 23,997 tonnes of waste oils were collected for processing in 2001, of which 76 tonnes were treated on-site of generation, 23,343 tonnes were treated at facilities in Ireland and 579 tonnes were exported (see section 4.4). Unlike in previous years, it is thought that all waste oil generation is reported, that is there was no unreported waste oil in 2001, indicating that the commercial waste oil collectors now appear to have full coverage over all major waste oil generators (garages, industry etc.). Due to its potential resale value as a secondary fuel, there is a ready market for waste oil and there are few technical or structural impediments to its full collection and processing by authorised operators.

Records indicate that 6,479 tonnes of oily sludges were collected for processing in 2001, of which 666 tonnes were treated on-site of generation, 5,739 tonnes were treated at facilities in Ireland and 74 tonnes were exported. An estimated 2,349 tonnes of oily sludges were unreported in 2001.

4.17 SLUDGES - SEWAGE, DRINKING WATER AND INDUSTRIAL

Provisional data for 2001⁵⁶ indicate that 37,559 tonnes (dry solids) of urban wastewater sludge was generated in 2001 at treatment plants serving agglomerations with a population equivalent greater than or equal to 500. This figure is practically identical to the 1998 figure of 37,577 tonnes. The disposal of sewage sludge to landfill still remains the favoured route by sanitary authorities at 50.9%, an increase from 41% in 1998. The use of sewage sludge in agriculture has increased from 16% in 1998 to 48.1% in 2001. The increased use of sewage sludge in agriculture is a direct result of the cessation of sludge disposal at sea, particularly from Dublin's waste water treatment plant at Ringsend. Sludge at Ringsend is now dried and used in granular form on agricultural land as a fertiliser. Assuming that the 6,962 tonnes of sludge generated at Ringsend has a dry solids concentration of up to 100%, and that all other sludges have a dry solids concentration of 20%, it is estimated that 159,947 tonnes (wet weight) of sewage sludge leaves sewage treatment plants for disposal or recovery.

Fourteen local authorities reported the generation of 6,544 tonnes of water treatment sludge within their functional areas. Of this, 2,845 tonnes (43.5%) were reported as being landfilled, 365 tonnes (5.6%) were reported as being disposed of by means other than landfill and 330 tonnes (5%) were reported as being recovered. A reported 1,636 tonnes were managed within the functional areas of generation and 700 tonnes were exported to other functional areas. Three local authorities reported the landfill of 4,631 tonnes of water treatment sludge in their functional area; it is unclear whether this refers to sludge generated within or imported into the functional areas. It is clear however that improved quantification and reporting of water treatment sludge is required by water treatment plant operators and local authorities.

Information on industrial sludge was taken from the industrial dataset (see section 4.3). The total reported quantity of industrial sludge was 193,533 tonnes, with 0.42% classified as hazardous waste and the remaining 99.58% classified as non-hazardous waste. The sectors generating the greatest quantity of sludge were the food products, beverages and tobacco sector (35% of the total), followed by the chemicals, chemical products and man-made fibres sector which contributed 34%. Total industrial sludge generation in 1998 was 708,070 tonnes; however for that year, most quantities were reported as wet weight and since then, many companies have installed sludge dewatering equipment and reported their sludge in terms of dry weight (i.e. dewatered sludge). The top five non-hazardous sludges are shown in Table 4.31. The top five make up 78.6% of the total. Table 4.32 provides a breakdown of the recovery and disposal routes for industrial sludges and shows that landfill still remains the dominant

⁵⁶ At the time of going to print, the data for 2001 were provisional. Finalised data will be published in the next edition of the *Urban Wastewater Discharges In Ireland* series of reports.

disposal route while the recovery of organic substances (other than solvents) and landspreading are the dominant recovery routes.

A significant proportion of sludges generated from urban wastewater treatment and from the food industry may be biodegradable sludges and hence may be suitable for some form of biological pre-treatment prior to such uses as landspreading. The benefits of biological treatment include improved handling characteristics of a sludge, a reduction in odour and putrescibility, a potential reduction in pathogens and other micro-organisms and, if anaerobic digestion is used, the generation of a biogas which can be burned as a fuel.

Table 4.31 Top five non-hazardous industrial sludges

| EWC Code | Non-hazardous industrial sludges description | Tonnes |
|-----------------|---|----------------|
| 07 01 02 | Sludges from on-site effluent treatment (from the manufacture, formulation, supply and use of basic organic chemicals). | 44,679 |
| 11 02 04 | Sludges not otherwise specified (from non-ferrous hydrometallurgical processes). | 39,596 |
| 02 02 04 | Sludges from on-site effluent treatment (from the preparation and processing of meat, fish and other foods of animal origin). | 34,854 |
| 19 08 04 | Sludges from the treatment of industrial waste water (from waste water treatment plants not otherwise specified). | 17,025 |
| 07 05 02 | Sludges from on-site effluent treatment (from the manufacture, formulation, supply and use of pharmaceuticals). | 15,371 |
| Total | | 151,525 |

Table 4.32 Disposal and recovery of industrial sludge, 2001

| NACE Code | Sector | Landfill (tonnes) | Other disposal (tonnes) | Organic substance recovery (tonnes) | Landsprea- ding (tonnes) | Other recovery (tonnes) | Total (tonnes) |
|------------------|-----------------------------------|------------------------------|------------------------------------|--|---|------------------------------------|---------------------------|
| C | Mining and quarrying | 211 | 35 | | | 7 | 253 |
| DA | Food, beverages and tobacco | 15,134 | 123 | 5,160 | 46,022 | 799 | 67,238 |
| DB | Textiles and textile products | 9 | | | | 14 | 23 |
| DC | Leather and leather products | 115 | | | | | 115 |
| DD | Wood and wood products | 2,595 | 103 | 10,545 | | 10 | 13,253 |
| DE | Pulp, printing, publishing | 13 | | | 1,008 | | 1,021 |
| DG | Chemicals, chemical products | 15,077 | 3,277 | 43,832 | 70 | 3,601 | 65,857 |
| DH | Rubber and plastic products | 10 | 150 | | | 39 | 198 |
| DI | Non-metallic mineral products | 1,355 | 6 | | | | 1,361 |
| DJ | Basic metals and fabricated metal | 39,624 | 26 | | | 3 | 39,654 |
| DK | Machinery and equipment | 3 | 12 | | | 21 | 36 |
| DL | Electrical and optical equipment | 590 | 106 | | | 651 | 1,347 |
| DM | Transport equipment | 344 | 170 | 7 | | 38 | 560 |
| DN | Manufacturing (other) | | 30 | | | 75 | 105 |
| E | Electricity, gas and water supply | 2,345 | 64 | | 37 | 63 | 2,509 |
| | Total | 77,425 | 4,102 | 59,545 | 47,138 | 5,321 | 193,530 |

5. WASTE MANAGEMENT INFRASTRUCTURE

5.1 INTRODUCTION

This chapter provides an overview of waste management infrastructure in Ireland in 2001 and 2002. Waste recovery infrastructure was characterised by an increase in the number of areas where kerbside collection systems are in operation, in addition to an increased number of bring banks, civic waste facilities, composting and recycling facilities. Landfill remains the dominant waste disposal option. However, there has been an increase in the number of transfer stations and material recovery facilities where waste is bulked up, and in some cases sorted and segregated, prior to disposal at landfills.

Figure 5.1 presents a schematic representation of the typical flow of waste from the source of generation, through to collection, treatment and final destination.

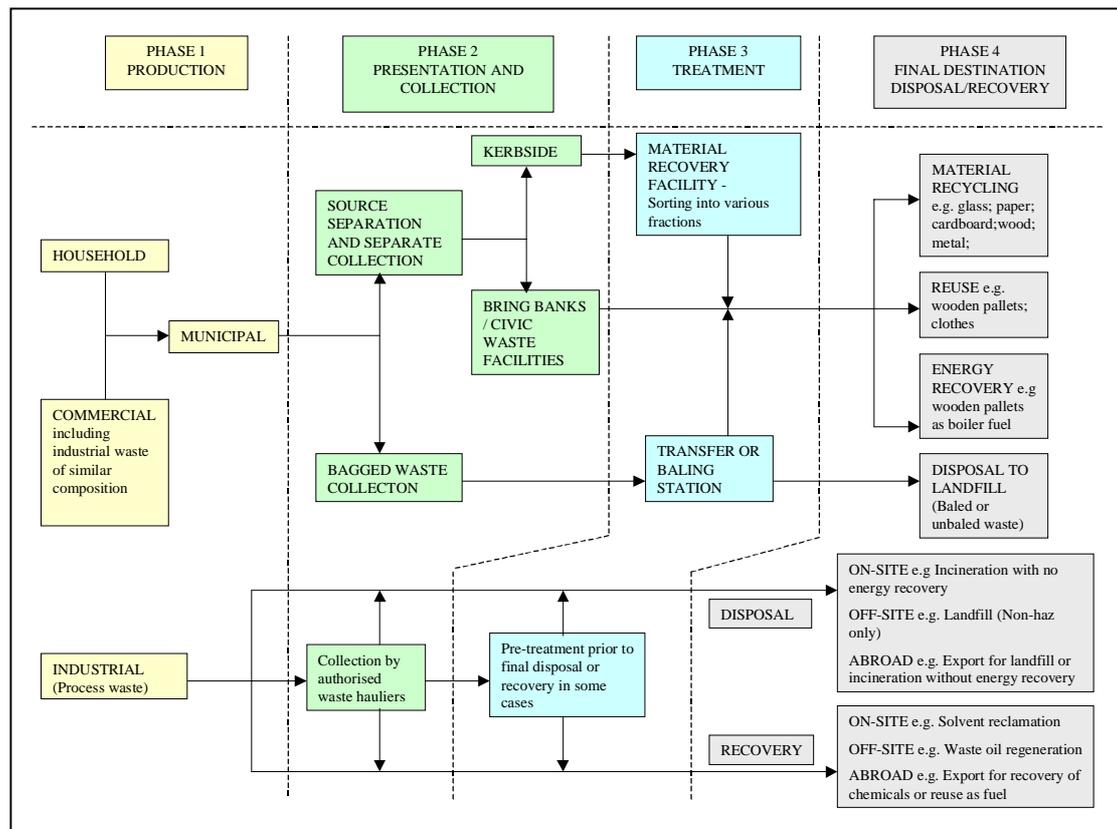


Figure 5.1 Household, commercial and industrial waste flow in Ireland

5.2 REGULATION OF WASTE MANAGEMENT ACTIVITIES

All waste activities are subject to regulation and control. From the point of generation at an industrial, domestic, commercial or institutional facility, to storage, transport, recycling, recovery and disposal, all professional waste operators must be regulated by a local authority or the EPA. Table 5.1 lists, in general terms, the type of regulation required for each class of activity.

Table 5.1 Regulation of waste activities in accordance with the Waste Management Acts, 1996 and 2001

| Activity | Regulation | Issued by |
|---|--------------------------------------|--------------------------|
| 1. Temporary storage of hazardous waste, on the premises where it is generated, of greater than 25,000 litres of liquid waste or 40m ³ of non-liquid waste | Certificate of registration (note 1) | Local authority |
| 2. Operation of certain specified waste recovery and disposal facilities | Waste permit (note 1) | Local authority |
| 3. Operation of certain waste recovery facilities by a local authority | Certificate of registration (note 1) | EPA |
| 4. Collection and transport of waste | Collection permit (note 2) | Local authority (note 4) |
| 5. Operation of listed waste recovery and disposal facilities, including all landfills | Waste licence (note 3) | EPA |

Note 1: Waste Management (Permit) Regulations, 1998, S.I. No. 165 of 1998.

Note 2: Waste Management (Collection Permit) Regulations, 2001, S.I. No. 402 of 2001.

Note 3: Waste Management (Licensing) Regulations, 2000, S.I. No. 185 of 2000.

Note 4: There are ten nominated local authorities who issue collection permits on behalf of all.

5.2.1 WASTE PERMITS

Under the Waste Management (Permit) Regulations, 1998 (S.I. No. 165 of 1998), certain waste disposal and recovery activities require a permit from a local authority. Under article 22 of the Regulations, the EPA is required to maintain a register of facilities permitted by local authorities, and each local authority is obliged to notify the EPA of the issuing of such permits. Up to 31 December 2002, a total of 297 permits were notified to the EPA. It should be noted that only 26 out of the 34 local authorities authorised to issue waste permits have reported to the Agency. Table 5.2 gives a breakdown of the type of waste disposal and recovery activities for which permits have been granted.

Certain activities, such as bring banks and certain waste storage facilities, require a certificate of registration under the Regulations. Certificates of registration are issued by local authorities or, where the activity is carried on by a local authority, by the EPA. A total of 515 certificates of registration were issued by the EPA for activities operated by or on behalf of local authorities up to 31 December 2002.

5.2.2 WASTE LICENCES

Prescribed waste activities are required to operate under a waste licence issued by the EPA under the Waste Management (Licensing) Regulations, 1997 (S.I. No. 133 of 1997, as amended by S.I. No. 162 of 1998 and S.I. No. 185 of 2000). Up to 31 December 2002, a total of 123 facilities had been granted a waste licence by the EPA of which 103 are primarily for disposal and 20 primarily for recovery. In addition to the licensed facilities, 66 applications were under consideration by the EPA, of which 21 were for licence reviews. Table 5.3 shows the activities licensed by the EPA by December 2002. Map 5.1 illustrates the location and status of all waste licence applications up to 31 December 2002.

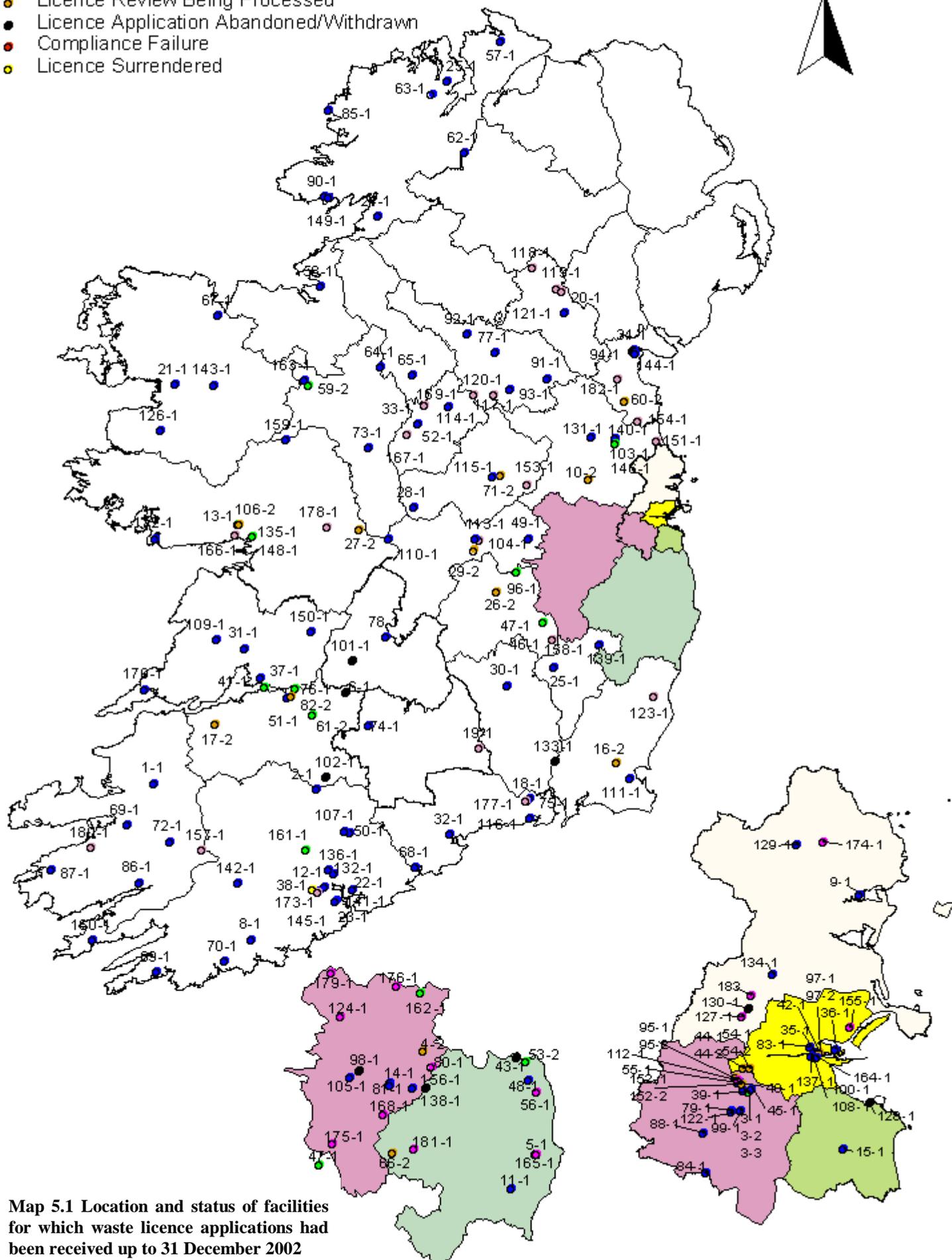
Table 5.2 Waste activities permitted by local authorities at end of December 2002

| Disposal activities | | Recovery activities | |
|--|---------------------------------------|---|---------------------------------------|
| Type of activity | Number of permits notified to the EPA | Type of activity | Number of permits notified to the EPA |
| Incineration of waste (other than hazardous waste or hospital waste) at a facility the capacity of which is equal to or less than 1 tonne per hour. | 1 | Recovery of waste (other than hazardous waste) at a facility (other than a facility for the composting of waste where the amount of compost and waste held at the facility exceeds 1000 cubic metres at any time) | 241 |
| Disposal of waste (other than hazardous waste) at a facility (other than a landfill facility) where the annual intake does not exceed 5000 tonnes per annum. | 8 | Recovery of waste which is composed of or contains mercury or its compounds (including electric lamps, light bulbs and fluorescent tubes) | 1 |
| | | Recovery of scrap metal or other metal waste | 19 |
| | | Dismantling or recovery of vehicles | 27 |
| Total | 9 | Total | 288 |

Table 5.3 Waste licensed activities regulated by the EPA at end of December 2002

| Disposal activities | | Recovery activities | |
|--|----------------------|---|----------------------|
| Principal activity | Number of activities | Principal activity | Number of activities |
| Landfill | 63 | Solvent reclamation or regeneration | 1 |
| Physico-chemical treatment prior to disposal | 4 | Recycling or reclamation of metals and metal compounds | 3 |
| Blending or mixture prior to disposal | 9 | Recycling or reclamation of other inorganic materials | 8 |
| Repackaging prior to disposal | 17 | Storage prior to recovery | 5 |
| Storage prior to disposal | 10 | Recycling or reclamation of organic substances which are not used as solvents | 3 |
| Total | 103 | Total | 20 |

- Licensed Facility
- Proposed Decision Issued
- Licence Application Being Processed
- Licence Review Being Processed
- Licence Application Abandoned/Withdrawn
- Compliance Failure
- Licence Surrendered



Map 5.1 Location and status of facilities for which waste licence applications had been received up to 31 December 2002

Waste Facilities Key 2002

| <i>Reg. No.</i> | <i>Facility name</i> |
|-----------------|----------------------|
|-----------------|----------------------|

● Licensed facilities

| | |
|------|--|
| 1-2 | North Kerry Landfill Site |
| 2-1 | Ballyguyroe Landfill Site |
| 3-2 | Ballymount Baling Station |
| 4-1 | Arthurstown Landfill |
| 8-1 | Clonakilty Waste Transfer Station |
| 9-1 | Balleally Landfill |
| 10-1 | Basketstown Landfill Facility |
| 11-1 | Ballymurtagh Landfill Facility |
| 12-2 | Kinsale Road Landfill |
| 14-1 | Silliot Hill Landfill |
| 15-1 | Ballyogan Landfill Facility/Ballyogan Recycling Park |
| 16-1 | Killurin Landfill Site |
| 17-1 | Gortadroma Landfill Site |
| 18-1 | Kilbarry Landfill Site |
| 20-1 | Scotch Comer Landfill |
| 21-1 | Derrinnumera Landfill |
| 22-1 | East Cork Landfill Site |
| 23-1 | Raffeen Landfill Site |
| 24-1 | Ballynacarrick Landfill Site |
| 25-1 | Powerstown Landfill Site |
| 26-1 | Kyletalesha Landfill |
| 27-1 | Pollboy Landfill |
| 28-1 | Ballydonagh Landfill |
| 29-1 | Derryclure Landfill |
| 30-2 | Dunmore Landfill Site |
| 31-1 | Doora Landfill Site |
| 32-1 | Dungarvan Waste Disposal Site |
| 33-1 | Drogheda Landfill |
| 34-1 | Dundalk Landfill Amenity |
| 35-1 | Sita Environmental Ltd. |
| 36-1 | MinChem Chemicals Ltd. |
| 39-2 | IPODEC Ireland Ltd. |
| 40-1 | Irish Environmental Services |
| 41-1 | Shannon Environmental Services |
| 42-1 | Dean Waste Co. Ltd. |
| 44-1 | Thornton's Recycling Centre |
| 45-1 | Dean Waste Co. Ltd. |
| 46-1 | Ballylinan Landfill Site |
| 48-1 | Marrakesh Ltd. |
| 49-1 | Clonbulloge Ash Repository |
| 50-1 | Safeway Warehousing |

| | |
|-------|--|
| 51-1 | Bunlicky Waste transfer Station |
| 52-1 | Stagrennan Polder, Drogheda Port Company |
| 53-1 | Noble Waste Disposal Ltd. |
| 54-1 | Eco-Safe Systems Limited |
| 55-1 | Sterile Technologies Ireland Limited |
| 57-1 | Carndonagh Civic Amenity |
| 58-1 | Waste Disposal (Sligo) Ltd. |
| 59-1 | Ballaghaderreen Landfill |
| 60-1 | Whiteriver Landfill Site |
| 61-1 | Mr. Binman Ltd. |
| 62-1 | Churchtown Landfill |
| 63-1 | Drumabodan Landfill Site |
| 64-1 | Carrick On Shannon Landfill |
| 65-1 | Mohill Landfill |
| 66-1 | Rampere Landfill |
| 67-1 | Rathroeen Landfill |
| 68-1 | Youghal Landfill |
| 69-1 | Milltown Transfer Station |
| 70-1 | Benduff Landfill Site |
| 71-1 | Marlinstown Landfill |
| 72-1 | Coolcaslagh Transfer Station |
| 73-1 | Roscommon Landfill Facility |
| 74-1 | Donohill Landfill |
| 75-1 | Tramore Waste Disposal Site |
| 77-1 | Corranure Landfill |
| 78-1 | Ballaghveny Landfill |
| 79-1 | National Waste Management Ltd. |
| 81-2 | KTK Landfill Ltd. |
| 82-1 | Ipodec Ireland Ltd. |
| 83-1 | Dempsey Drums Ltd. |
| 84-1 | Southern Excavations Ltd. |
| 85-1 | Burtonport Dredging Deposition Site |
| 86-1 | Kenmare Transfer Station |
| 87-1 | Caherciveen Transfer Station |
| 88-1 | Paul Joyce |
| 89-1 | Derryconnell Landfill Site |
| 90-1 | Balbane Landfill Site |
| 91-1 | Bailiborough Landfill Site |
| 92-1 | Belturbet Landfill |
| 93-1 | Ballyjamesduff Landfill |
| 95-1 | Reduce Reuse and Recycle Ltd. |
| 97-1 | Swalcliffe Ltd. |
| 99-1 | Safety Kleen Ireland Ltd. |
| 103-1 | Knockharley Landfill |
| 105-1 | Returnbatt Limited |
| 106-1 | Bruscar Bhearna Teoranta |

| | |
|-------|---|
| 107-1 | Waste Recovery Services (Fermoy) Ltd |
| 108-1 | Sir John Rogerson's Quay Gasworks |
| 109-1 | Central Waste Management Facility |
| 110-1 | Peat Ash Ltd. |
| 111-1 | Southeast Recycling Centre |
| 113-1 | KMK Metals Recycling Ltd. |
| 114-1 | Yellow Bins (Waste Disposal) Ltd |
| 115-1 | Soltec (Ireland) Limited |
| 116-1 | Waterford Utility Services (Waste Disposal) Ltd |
| 122-1 | Silver Lining Industries (Ireland) Ltd |
| 125-1 | Glenalla Landfill Site |
| 126-1 | Muckish Landfill Site |
| 129-1 | Murphy Concrete Manufacturing Ltd. |
| 131-1 | Midland Waste Disposal Ltd. |
| 132-1 | Lotamore Landfill |
| 134-1 | N. Murphy Waste Disposal Ltd. |
| 136-1 | Ahern Industrial Services |
| 137-1 | Haytonvale Developments Ltd. |
| 139-1 | Haroldstown Transfer Station |
| 140-1 | Panda Waste Services |
| 141-1 | Beaumont Quarry |
| 142-1 | Macroom Civic Amenity Site |
| 143-1 | McGrath Industrial Waste Ltd. |
| 144-1 | Sean Rooney Ltd. t/a Bambi Bins & Wheel Bin Services Ltd. |
| 145-1 | Gleneden Trading Ltd. |
| 147-1 | Ashgrove Recycling |
| 149-1 | Killybegs Harbour |
| 150-1 | Scarriff Civic Amenity Centre |
| 152-1 | Oxigen Environmental Ltd. |
| 156-1 | KTK Sand & Gravel Ltd. |
| 159-1 | Organic Kompost Ltd. |
| 160-1 | Castletownbere Waste Transfer Station |
| 163-1 | Ballaghaderreen Industrial Estate |
| 164-1 | Former Hammond Lane Metal Co\Molloy & Sherry Site |
| 170-1 | Lisdeen Recycling Centre & Transfer Station |
| 172-1 | Rossaveel Harbour Development |

● Proposed decision issued

| | |
|------|----------------------------|
| 3-3 | Ballymount Baling Station |
| 13-1 | Carrowbrowne Landfill Site |
| 37-1 | Tradaree Point E.T.P. |
| 47-1 | Nephin Trading Ltd. |
| 53-2 | Noble Waste Disposal Ltd. |
| 59-2 | Ballaghaderreen Landfill |
| 61-2 | Mr. Binman Ltd. |

| | |
|-------|---------------------------------------|
| 76-1 | Longpavement |
| 96-1 | Advanced Environmental Solutions Ltd. |
| 146-1 | Knockharley Landfill |
| 148-1 | Dean Waste Co. Ltd. |
| 161-1 | Bottlehill |
| 162-1 | Westside Waste |

● Licence application being processed

| | |
|-------|--|
| 19-1 | Proposed Hardbog Landfill |
| 56-1 | Drummin East |
| 80-1 | Dillonsdown |
| 104-1 | Alina Rentabin Limited |
| 112-1 | National Recycling and Environmental Protection Ltd |
| 117-1 | Greenhill Compost Ltd |
| 118-1 | Marley Compost Ltd |
| 119-1 | Kabeyun Ltd |
| 120-1 | Foxfield Mushrooms |
| 121-1 | Kabeyun Ltd |
| 123-1 | Custom Compost Limited |
| 124-1 | Carbury Mushrooms Ltd |
| 127-1 | Dunsink Civic Amenity |
| 151-1 | Murphy Concrete Manufacturing Ltd. |
| 153-1 | Annaskinnan Landfill |
| 154-1 | Height for Hire Ltd. |
| 155-1 | Greenstar Recycling Centre |
| 157-1 | Ballyguyroe Residual Landfill |
| 158-1 | Ray Whelan Ltd. |
| 165-1 | Ballynagran Residual Landfill |
| 166-1 | Galway Corporation Depot |
| 167-1 | Indaver Ireland |
| 168-1 | Usk Landfill |
| 169-1 | Mulleady's Ltd |
| 171-1 | Celtic Waste Ltd. Materials Recovery & Transfer Facility |
| 173-1 | IPODEC Ireland Ltd |
| 174-1 | Herhof Environmental Ltd. |
| 175-1 | Athy Civic Amenity Centre |
| 176-1 | Kilcock Civic Amenity |
| 177-1 | IPODEC Ireland Ltd |
| 178-1 | East Galway Residual Landfill Site |
| 179-1 | Calf Field Integrated Waste Management Facility |
| 180-1 | McGill Environmental Systems (Irl) Ltd |
| 181-1 | Swalcliffe Ltd |
| 182-1 | Natures Way Composting Ltd |

| | |
|-------|------------------|
| 183-1 | Celtic Waste Ltd |
|-------|------------------|

● Licence review being processed

| | |
|-------|-------------------------------|
| 4-2 | Arthurstown Landfill |
| 10-2 | Basketstown Landfill Facility |
| 16-2 | Killurin Landfill Site |
| 17-2 | Gortadroma Landfill Site |
| 26-2 | Kyletalesha Landfill |
| 27-2 | Pollboy Landfill |
| 29-2 | Derryclure Landfill |
| 44-2 | Thornton's Recycling Centre |
| 54-2 | Eco-Safe Systems Limited |
| 60-2 | Whiteriver Landfill Site |
| 66-2 | Rampere Landfill |
| 71-2 | Marlinstown Landfill |
| 82-2 | Ipodec Ireland Ltd. |
| 95-2 | Reduce Reuse and Recycle Ltd. |
| 97-2 | Swalcliffe Ltd. |
| 106-2 | Bruscar Bhearna Teoranta |
| 152-2 | Oxigen Environmental Ltd. |

● Licence application withdrawn, refused or abandoned

| | |
|-------|--------------------------------------|
| 5-1 | Proposed East Wicklow Landfill |
| 6-1 | Proposed East Limerick Landfill Site |
| 7-2 | Proposed Facility at GaelSafe Ltd. |
| 43-1 | Landfill Management Ltd. |
| 94-1 | Keegan Oils T/A Allied Oils Ltd. |
| 98-1 | Bushbury Ltd |
| 101-1 | Silvermines Landfill Facility |
| 102-1 | Ballynacourty Waste Transfer Station |
| 128-1 | Shell (Seaview) Storage Facility |
| 130-1 | Euro Recyclers Ltd. |
| 133-1 | Recycling centre, Raheen |
| 135-1 | Dean Waste Co. Ltd. |
| 138-1 | Russborough Landfill |

● Compliance failure

| | |
|-----|------------------------------------|
| 7-1 | Proposed Facility at GaelSafe Ltd. |
|-----|------------------------------------|

● Licence surrendered

| | |
|-------|---|
| 38-1 | Southern Health Board, Cork University Hospital |
| 100-1 | Sir John Rogersons Quay Gasworks |

5.3 WASTE COLLECTION, MOVEMENT AND TRANSFER

The Waste Management (Collection Permit) Regulations, 2001 (S.I. No. 402 of 2001, as amended by S.I. No. 540 of 2001), required all waste collectors to apply for a collection permit by 30 November 2001. Collection permits are issued by ten nominated local authorities who act on behalf of other local authorities in their area. A collector must make an application in each of the 10 waste collection permit regions in which it is proposed to collect waste. Included under the permit is the requirement that the waste collected is transferred to an authorised facility for disposal or recovery. Collection permits provide a mechanism for improved tracking of waste and reduced illegal disposal of waste. Up to 31 December 2002, a total of 598 waste collection permits were notified to the EPA by eight of the ten nominated local authorities.

Traditionally, the majority of household waste has been collected as mixed waste with each householder putting out a bin or bag of mixed waste for collection. This practice is already changing with improvements in the infrastructure for the separate collection of recyclable materials. The two types of separate collection systems available to householders for recyclable materials include kerbside collection schemes and bring systems.

Kerbside collection schemes have been introduced in a number of local authority areas for the collection of dry recyclable waste including paper, cardboard, plastic and cans. In 2001, separate collection schemes were in operation in parts of Dublin, Galway, Louth, Waterford, Meath, Nenagh, Killarney and Leixlip (pilot scheme). Kerry County Council operate a scheme for the separate collection of organic waste. Pilot separate collection schemes for household organic waste are also in place in Cork, Waterford, Limerick, Galway and Nenagh. Provisions are made in regional and local waste management plans for the progressive establishment of separate collection schemes for dry recyclables and organic waste in all urban areas where it is economically feasible to do so.



Facilities for small scale separate collection of various wastes are available.

Bring systems are facilities at which waste may be directly deposited by individuals. These systems include stand alone bring banks which accept a range of waste types including paper, cardboard, newspapers, plastic, glass, cans and textiles. In 2001, there were 1,436 bring banks in Ireland. This figure compares with 837 sites in 1998, representing an increase of 71.6% over the three year period. On a national scale this represents a density of one bring bank for every 2,728 people, although this varies from one location to the next. The highest density is seen in Wexford and Leitrim, with one site per 993 and 971 people respectively and the lowest density is seen in the Dublin City Council and Monaghan County Council areas with one site per 9,169 and 8,795 people respectively. As shown in Map 5.2, increasing numbers of bring banks are most notable in counties Galway, North Tipperary, Carlow, Westmeath and Waterford. Dublin City Council and Monaghan County Council reported a decrease in the number of bring banks.

Members of the public can bring waste materials to civic waste facilities, also known as civic amenity sites. In addition to the dry recyclable waste accepted at bring banks, civic waste facilities typically accept a range of other materials such as household hazardous waste, electrical equipment and bulky waste such as fridges. A total of 53 civic waste facilities are in operation (see Map 5.3): 35 are located at landfill sites⁵⁷, 11 are associated with transfer stations, one is associated with a composting facility and six are stand alone sites. Regional waste management plans provide for an expanded network of up to 85 modern civic waste facilities throughout the country.

Household hazardous waste includes such substances as pesticides and herbicides, medicines, batteries and fluorescent lamps. A total of 16 local authorities contracted the services of a private company for the collection of household hazardous waste in 2001. Approximately 125 tonnes were collected.

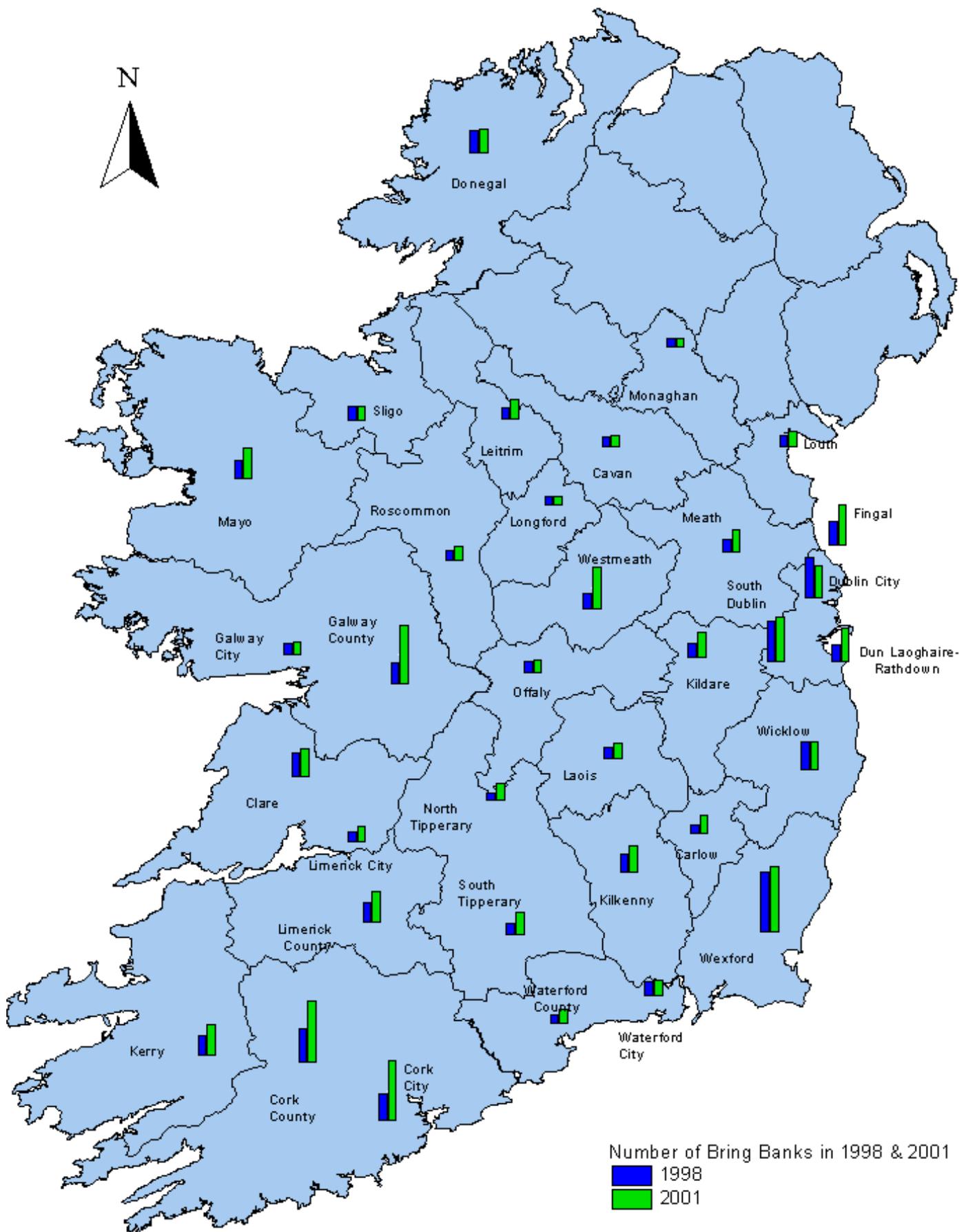
Municipal waste which is collected for disposal or recovery may be taken directly to the facility where the disposal operation will take place or to the facility where the waste is to be recycled or recovered. Alternatively, it may be taken to a transfer station where some processing of the waste occurs prior to disposal or recovery. Where waste is to be disposed of, this processing may include bulking and baling of the waste prior to dispatch to the disposal facility. Where waste is being prepared for recovery, it may be sorted and stored until a sufficient quantity is collected prior to dispatch to a recovery facility in Ireland or abroad. To date, 54 such transfer stations are subject to EPA waste licensing. An additional 98 transfer stations with less than 5,000 tonnes throughput per annum have obtained permits from local authorities. Mixed loads of recyclable materials, for example, bags of dry recyclables collected as part of kerbside schemes, are brought to sorting facilities where waste fractions are segregated. These sorting facilities usually operate in conjunction with licensed or permitted transfer stations.

Waste from commercial and industrial facilities is typically collected as mixed waste or in separate fractions by waste contractors and recyclers. With the introduction of specific legislative requirements aimed at increasing the quantities of waste that are made available for recycling and the increased costs associated with the landfilling of waste, more commercial enterprises are sorting and segregating specific fractions of waste for recycling.

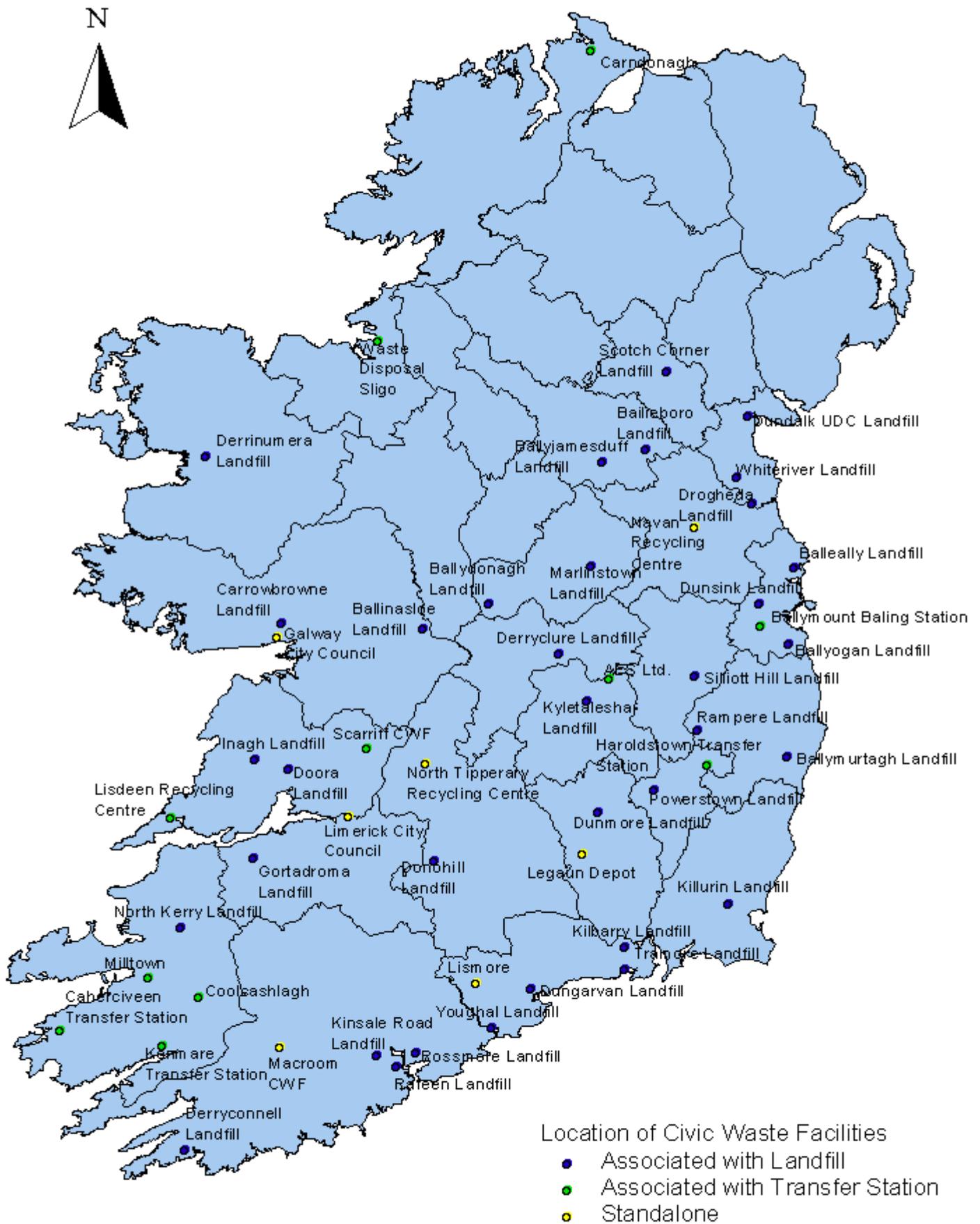


Infrastructure, such as wheel wash systems, at licensed waste management facilities is improving.

⁵⁷ Of which five civic waste facilities are associated with closed landfill sites.



Map 5.2 Bring banks, 1998 and 2001



Map 5.3 Location of civic waste facilities

5.4 WASTE DISPOSAL AND RECOVERY

5.4.1 LANDFILL

Landfilling of waste remains the predominant waste management practice in Ireland. An estimated 8,277,598 tonnes of waste were consigned to authorised landfills in 2001, with 5,176,860 tonnes deposited in private and on-site industrial landfills and 3,100,738 deposited in landfills operated by or on behalf of local authorities. Table 5.4 provides a summary of waste accepted into landfills in 2001, with site specific information being presented in Appendix C (see Table C.1, Table C.2 and Table C.3).

Table 5.4 Waste accepted at licensed landfills, 2001

| Landfill type | Number | Waste accepted (tonnes) | | | | | Total |
|--------------------|-----------|-------------------------|----------------|------------------|------------------|----------------|------------------|
| | | Household | Commercial | Construction | Industrial | Other | |
| Local authority | 50 | 1,254,859 | 533,909 | 682,602 | 151,739 | 477,629 | 3,100,738 |
| Private/industrial | 42 | 0 | 203,284 | 411,894 | 4,329,015 | 232,667 | 5,176,860 |
| Total | 92 | 1,254,859 | 737,193 | 1,094,496 | 4,480,754 | 710,296 | 8,277,598 |

In 2001, there were 92 authorised landfills in operation compared with 126 in 1998. Of the total, 50 landfills were operated by or on behalf of local authorities with the remaining 42 operated by private/industrial operators (a large proportion of which are associated with IPC-licensed facilities and authorised under IPC-licences). This compares with 76 local authority operated sites and 50 private/industrial sites in 1998 and highlights the progressive reduction in landfill numbers in line with Government policy. In addition, it reflects the scope for increased participation by the private sector in waste management in Ireland and interest by the private sector in investment opportunities in this area.



All landfill sites must be engineered to conform to technical standards contained in the facility licence.

There are no hazardous waste landfills in Ireland. As a consequence large quantities of hazardous waste are exported for landfill in other countries. As pointed out in the *National Hazardous Waste Management Plan*, this is an unsatisfactory situation and hazardous waste landfill capacity should be

developed in Ireland as a priority. This shortcoming will become particularly acute in the event that municipal waste incinerators are established and are forced to export flyash for disposal abroad.

Of 50 licensed local authority municipal waste landfills, 33 of the largest had weighbridges in 2001. These facilities accounted for 85% of waste accepted at local authority landfills.

In planning for waste management, it is important that regional waste management plans provide for the management of waste that cannot be prevented, reused, recycled, recovered or incinerated; i.e. waste that must be landfilled. Table 5.5 and Table 5.6 show the remaining municipal waste landfill capacity, by waste managing planning region, in 2001. Both tables highlight the fact that, based on 2001 landfill rates, six of the regions have three years or less remaining landfill capacity, 2 regions have five years or less, one region has ten years or less and one region has greater than 10 years remaining capacity.

Table 5.5 Remaining landfill capacity for municipal waste, by region, 2001

| | Municipal waste landfilled in 2001 (tonnes) | Remaining landfill capacity (tonnes) | Remaining capacity from 2001 at 2001 landfill rates (years) | Remaining capacity from 2001 at 1998- 2001 growth rates (years) |
|-------------------|---|--|--|--|
| Dublin Region | 642,325 | 2,945,815 | 3 | 3 |
| Cork Region | 232,188 | 467,712 | 2 | 1 |
| Connaught Region | 171,330 | 1,192,900 | 6 | 5 |
| South East Region | 178,527 | 409,898 | 2 | 1 |
| Mid-West Region | 204,962 | 1,765,000 | 8 | 5 |
| North East Region | 84,419 | 3,151,136 | 37 | 15 |
| Midlands Region | 125,836 | 1,099,062 | 8 | 6 |
| Donegal | 27,870 | 62,000 | 2 | 1 |
| Kildare | 255,238 | 632,000 | 2 | 2 |
| Wicklow | 69,357 | 271,000 | 3 | 3 |
| National | 1,992,052 | 11,996,523 | 6 | 4 |

Note: 'Remaining capacity' information represents a snapshot at a point in time of available landfill capacity and municipal waste disposal rates.

Table 5.6 Remaining landfill capacity for municipal waste, 2001

| Remaining capacity (years) | ≤ 3 years | ≤ 5 years | ≤ 10 years | > 10 years |
|---|--------------|--------------|---------------|---------------|
| Number of waste management planning regions with remaining capacity from 2001 at 2001 landfill rates | 6 | 0 | 3 | 1 |
| Number of waste management planning regions with remaining capacity from 2001 at 1998-2001 growth rates | 6 | 2 | 1 | 1 |

5.4.2 INCINERATION

Incineration in Ireland is currently carried out at privately operated facilities located on industrial sites. All facilities are used for the destruction of waste arising on those industrial sites and none are available on a commercial basis for the disposal of waste imported from elsewhere. There are seven IPC-licensed facilities operating eleven incinerators, as shown in Table 5.7.

Table 5.7 Licensed industrial waste incineration facilities

| Company name | IPC licence register number | Number of units operated | Energy recovered |
|--|-----------------------------|--------------------------|------------------|
| Lawter International Luxembourg S.a.r.l. | 548 | 1 | Yes |
| Roche Ireland Ltd. | 547 | 1 | Yes |
| Eli Lilly S.A.. | 546 | 2 | No |
| Smithkline Beecham (Manufacturing) Ltd | 473 | 3 | Yes |
| Novartis Ringaskiddy Limited | 545 | 2 | Yes |
| Yamanouchi Ireland Company Limited | 549 | 1 | No |
| Swords Laboratories | 552 | 1 | Yes |

The development of thermal treatment capacity for the disposal of municipal, commercial and hazardous waste has been proposed by local and regional authorities in waste management plans and by private companies. Thermal treatment capacity has been proposed in waste management plans for the following waste management planning regions: Dublin, Mid-West, North-East, South-East and Connaught. In the private sector, Indaver Ireland has applied for planning permission for two facilities, as follows: Carranstown, Co. Meath, in respect of an integrated waste management facility including incineration of municipal solid waste; and Ringaskiddy, Co. Cork, in respect of a hazardous waste incinerator. Planning permission has been granted on appeal for the proposed Carranstown facility. Dublin City Council has invited tenders for the construction and operation of a municipal waste thermal treatment facility at Ringsend.

The proposed development of municipal waste thermal treatment capacity is in conformance with Government policy to develop an integrated approach to waste management. In addition, the proposed development of a hazardous waste incinerator is in conformance with the recommendations of the *National Hazardous Waste Management Plan* and should reduce Ireland's dependence on facilities in other countries.

5.4.3 COMPOSTING

The EPA is processing nine waste licence applications for composting facilities, eight of which are existing operations. Most of these applications are for facilities engaged in the production of mushroom compost. The raw materials for mushroom compost consist of straw, poultry and horse manure, gypsum and water.

A number of local authorities operate composting facilities including Dublin City Council and Kerry County Council. Dublin City Council operates a green waste recycling facility at St. Anne's Park. The City Council and members of the public deposit green wastes such as tree prunings, leaves and grass cuttings at the facility for a minimal charge. In return, members of the public can take away a bag of the mature mulch material. Kerry County Council operates a central composting scheme in Tralee which was launched in March 1999 and serves 1,766 households. Composting is carried out at the North Kerry landfill. The compost is made available to the public free of charge. It is also used for council landscaping activities.

Limerick City Council operated a central composting facility on a temporary basis up to April 2001. Following its closure, interim arrangements were made with a private licensed operator to compost waste collected in green bins from households participating in the composting project. In the long term, Limerick City Council intends to provide a new purpose-built permanent facility as provided for in the Regional Waste Management Plan.

5.4.4 RECOVERY OF NON-HAZARDOUS WASTE

Recycling facilities for non-hazardous waste are primarily regulated by local authorities through the permitting system as described in section 5.2. At the end of 2002, a total of 288 permits had reportedly been issued by local authorities for recovery activities with an additional 20 recovery activities licensed by the EPA, as shown in Table 5.2 and Table 5.3.

In 2001, a total of 674,327 tonnes of waste were recycled. Of this, 45% was recycled in Ireland with the remaining 55% being sent abroad for processing, as illustrated in Figure 5.2. Waste recovery in Ireland consists mainly of material recycling with some energy recovery taking place in the form of wood being used as boiler fuel. Textile waste is the material with the greatest proportion (98%) being sent abroad for recycling followed by non-ferrous metals (excluding aluminium) at 84% and paper and cardboard at 77%. Both wood and glass are almost exclusively recovered in Ireland at 91% and 89% respectively. The situation with glass is likely to change since the closure of the Irish Glass Bottle Company in June 2002. Most materials that are sent abroad for recycling are semi-processed at sites in Ireland. In addition, 67,561 tonnes of waste were imported into Ireland for recycling, mainly consisting of glass and plastic and smaller quantities of paper and cardboard, wood and aluminium.

This situation highlights Ireland's dependency on foreign recycling infrastructure and the need for Ireland to increase the number of facilities for recycling these particular waste streams. The viability of developing particular recycling facilities would have to take into consideration the volumes of wastes which would be readily available, Ireland's relatively disperse population, its geographical location and the availability or otherwise of markets for the recycled products.



Paper and cardboard remains the packaging material with the highest actual quantity recovered.

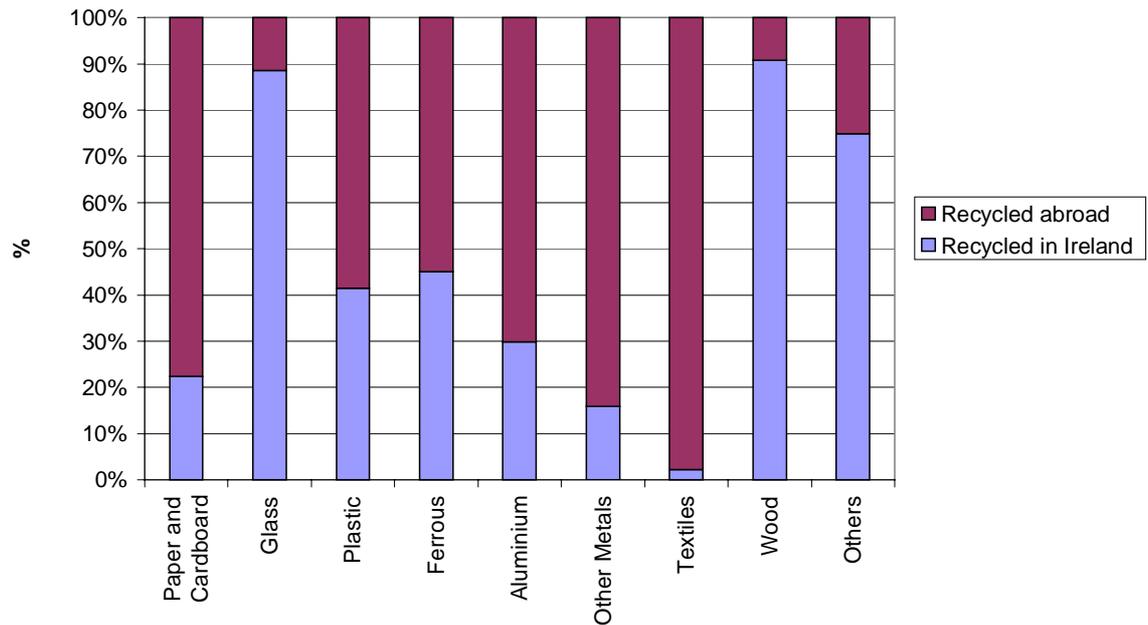


Figure 5.2 Location of recycling of certain categories of waste, 2001

5.4.5 RECOVERY AND DISPOSAL OF HAZARDOUS WASTE

Facilities for the management of hazardous waste are regulated by local authorities and the EPA. Table 5.8 lists all authorised facilities for the storage and processing of hazardous waste. Many of the facilities are transfer stations which are used for the storage of hazardous waste prior to its export for recovery or disposal abroad.

The *National Hazardous Waste Management Plan*⁵⁸ makes recommendations in respect of available and desirable capacity for the treatment of hazardous waste in Ireland. In general terms, the Plan recommends that Ireland strive for self-sufficiency in hazardous waste disposal and recovery capacity. More specifically the Plan recommends the establishment of a hazardous waste thermal treatment facility and at least two hazardous waste landfill facilities. Since publication of the Plan, one application for planning permission for a hazardous waste incinerator has been made. No proposals for hazardous waste landfill have been made and the need for such capacity remains and will become acute as thermal treatment facilities proposed in regional waste management plans begin generating flyash which is likely to require disposal to hazardous waste landfill. In the absence of hazardous waste landfill or alternative flyash treatment options, flyash may have to be exported.

⁵⁸ EPA, 2001, *National Hazardous Waste Management Plan*.

Table 5.8 Licences, permits and applications for hazardous waste facilities at end 2002

| Company name | Licence or permit register number | Hazardous waste operations |
|---|--|---|
| Atlas Ireland | 472 | Oils and oil filters processing, contaminated soils processing |
| AVR-Safeway | 50-1 | General chemical and other hazardous waste storage prior to export |
| Eco-Safe Systems | 54-2 | Healthcare risk waste processing by heat treatment (disinfection) and shredding prior to landfill |
| Minchem Chemicals | 36-1 | General chemical and other hazardous waste storage prior to export |
| Irish Lamp Recycling | 02/2000 | Fluorescent lamps pre-treatment prior to export of segregated materials and other wastes |
| KMK Metals | 113-1 | Metal-bearing wastes storage prior to export |
| National Recycling and Environmental Protection | 112-1 (applied) | General waste and lead-acid batteries storage prior to export |
| Returnbatt | 105-1 | Batteries (lead acid and small batteries) storage prior to export |
| Safety-Kleen Ireland | 99-1 | Solvents and chemical waste storage prior to export |
| Shannon Environmental Services | 41-1 | General chemical waste treatment and storage prior to export |
| Silver Lining Industries (Ireland) | 122-1 | General chemical and electronic waste storage prior to export |
| SITA Environmental Drum Division | 83-1 | Drums and IBCs processing and recycling |
| SITA Environmental Waste Treatment Division | 35-1 | Oily sludges and oils pre-treatment and hazardous waste storage prior to export |
| Soltec (Ireland) | 115-1 | Solvent distillation and recycling |
| Sorundon (Irish Environmental Services) | 40-1 | General chemical and other hazardous waste storage prior to export |
| Sterile Technologies Ireland | 55-1 | Healthcare risk waste processing by shredding and heat treatment (disinfection) prior to landfill |
| | | |
| Total number of facilities | | 16 |
| ... of which processors | | 9 |

6. INDICATORS AND TRENDS

6.1 INDICATORS

Per capita indicators for 2001 are calculated using preliminary results for the national population from Census 2002⁵⁹, 3,917,336 persons. This is assumed to be a more accurate representation for the population in 2001 than earlier estimates made from Census 1996.

Table 6.1 Waste indicators, 1995, 1998 and 2001

| MUNICIPAL WASTE | | | |
|--|-------------|-------------|-------------|
| Indicator | 1995 | 1998 | 2001 |
| Municipal waste collected/person | 0.44 tonnes | 0.53 tonnes | 0.59 tonnes |
| Municipal waste arising/person | 0.52 tonnes | 0.56 tonnes | 0.69 tonnes |
| Disposal rate for household & commercial waste collected | 92.2 % | 91.0% | 86.7% |
| Recovery rate for household & commercial waste collected | 7.8 % | 9.0 % | 13.3% |
| Number of active local authority landfills | 87 | 76 | 50 |
| Number of bring banks | 426 | 837 | 1,436 |

| HOUSEHOLD WASTE | | | |
|---|-------------|-------------|-------------|
| Indicator | 1995 | 1998 | 2001 |
| Household waste collected/person | 0.29 tonnes | 0.32 tonnes | 0.34 tonnes |
| Household waste arising/person | 0.38 tonnes | 0.33 tonnes | 0.37 tonnes |
| Disposal rate for household waste collected | 95.7% | 97.3% | 94.4% |
| Recovery rate for household waste collected | 4.3% | 3.2% | 5.6% |

| COMMERCIAL WASTE | | | |
|--|-------------|-------------|-------------|
| Indicator | 1995 | 1998 | 2001 |
| Commercial waste collected/person | 0.14 tonnes | 0.19 tonnes | 0.25 tonnes |
| Disposal rate for commercial waste collected | 84.7% | 81.3% | 76.2% |
| Recovery rate for commercial waste collected | 15.3% | 18.7% | 23.8% |

⁵⁹ www.cso.ie.

| PACKAGING WASTE | | | |
|--|-------------|----------------|----------------|
| Indicator | 1995 | 1998 | 2001 |
| Best estimate of total quantity arising | | 682,688 tonnes | 872,917 tonnes |
| Packaging waste arising/person | | 0.184 tonnes | 0.223 tonnes |
| Best estimate of packaging waste recovered | | 100,905 tonnes | 221,266 tonnes |
| Packaging waste recovered/person | | 0.027 tonnes | 0.056 tonnes |
| National recovery rate | | 14.8% | 25.3% |

| HAZARDOUS WASTE | | | |
|---|--|--|--|
| Indicator | 1996 | 1998 | 2001 |
| Best estimate of national arisings | 327,862 tonnes | 370,328 tonnes | 491,669 tonnes |
| Reported hazardous waste generation (excluding contaminated soil) | 229,234 tonnes | 250,531 tonnes | 274,687 tonnes |
| Reported contaminated soil generation | 400 tonnes | 45,486 tonnes | 168,579 tonnes |
| Estimated quantity of unreported hazardous waste | 98,228 tonnes | 74,311 tonnes | 48,402 tonnes |
| Quantity of hazardous waste exported | 51,727 tonnes 24,051 recovery 27,369 disposal 307 unspecified | 99,598 tonnes 48,210 recovery 50,180 disposal 1,208 unspecified | 275,309 tonnes 226,904 recovery 47,929 disposal 476 unspecified |
| Quantity of hazardous waste imported under TFS notification | 0 | 0 | 0 |
| Number of authorised hazardous waste recovery and disposal facilities | at least 8 | at least 8 | 16 |
| Quantity of reported hazardous waste recovered | 138,969 tonnes | 152,583 tonnes | 317,013 tonnes |
| Quantity of reported hazardous waste disposed | 86,754 tonnes | 120,354 tonnes | 125,629 tonnes |
| Domestic treatment rate (percentage of total reported hazardous waste treated in Ireland) | 77.3% | 58.9% | 37.9% |

| INDUSTRIAL WASTE | | | |
|---|------------------|------------------|------------------|
| Indicator | 1995 | 1998 | 2001 |
| Best estimate of national arisings (projected) | 6,184,791 tonnes | 9,074,751 tonnes | 9,008,211 tonnes |
| Total quantity reported to be recovered | 480,766 tonnes | 2,088,111 tonnes | 1,670,230 tonnes |
| National recovery rate for reported industrial waste | 12.4% | 26.6% | 25.5% |
| National recovery rate for reported manufacturing waste | 31.2% | 51.4% | 47.8% |
| Total quantity reported to be disposed | 3,387,215 tonnes | 5,771,166 tonnes | 4,887,419 tonnes |
| National disposal rate for reported industrial waste | 87.6% | 73.4% | 74.5% |

| CONSTRUCTION AND DEMOLITION WASTE | | | |
|--|------------------|------------------|------------------|
| Indicator | 1995 | 1998 | 2001 |
| Best estimate of national arisings | 1,318,908 tonnes | 2,704,958 tonnes | 3,615,163 tonnes |
| Total quantity estimated to be recovered | 530,000 tonnes | 1,171,572 tonnes | 2,364,866 tonnes |
| National recovery rate | 40.2% | 43.3% | 65.4% |
| Total quantity estimated to be disposed | 788,908 tonnes | 1,533,386 tonnes | 1,250,297 tonnes |
| National disposal rate | 59.8% | 56.7% | 34.6% |

6.2 TRENDS

6.2.1 COMPARISON WITH ECONOMIC FACTORS

Figure 6.1 illustrates the relationship between Ireland's GDP, GNP and municipal waste generation and collection. It can be seen that all factors have grown significantly between 1995 and 2001. The figure clearly shows that household and commercial waste collection rates up to 2000 closely matched increasing GDP. Municipal waste generation on the other hand grew at a slower rate between 1995 and 1998 but accelerated between 1998 and 2001. The correlation between waste collection and GDP up to 2000 is striking however and suggests that waste collection rates are a good measure of Ireland's consumer society; as individuals have greater spending power, more waste is left out for collection, reflecting the throwaway, built-in obsolescence attitude that prevails in many commercial and consumer sectors. Further analysis on the relationship between economic and individual wealth and waste generation will form a key part of the National Waste Prevention Programme.

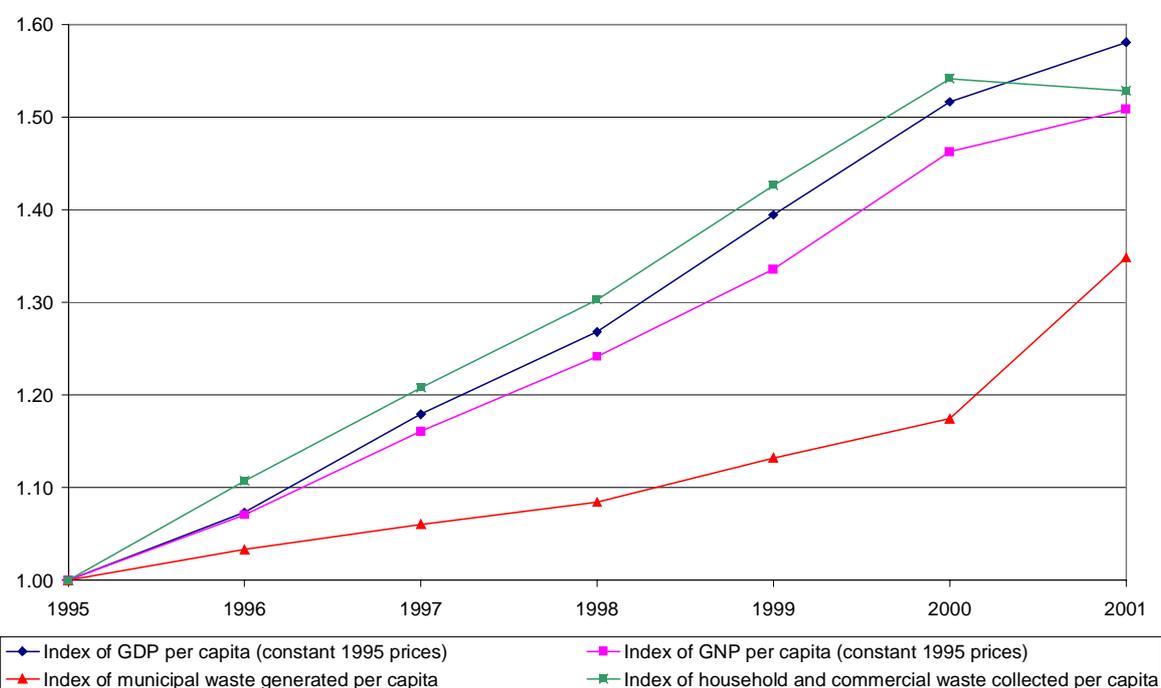


Figure 6.1 Comparison of GDP and GNP with municipal waste data, 1995 to 2001

Note: Waste data for 1995, 1998, 2000 and 2001 from local authority returns. Waste data for 1996, 1997 and 1999 are interpolated linearly. GDP and GNP information from Central Statistics Office.

6.2.2 MUNICIPAL WASTE

The trends in municipal waste generation between 1998 and 2001 are summarised in Figure 6.2. Municipal waste generation is estimated to have increased from 2,056,652 tonnes in 1998 to 2,704,035 in 2001. This represents an increase of 31.5% between 1998 and 2001 or an average increase of 10.5% per annum.

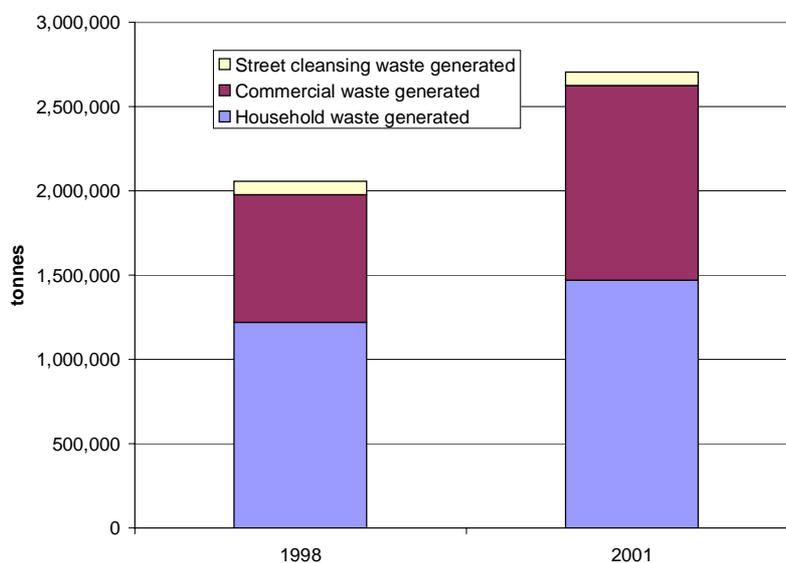


Figure 6.2 Trends in municipal waste generation, 1998 and 2001

In Figure 6.3, trends in the quantity of household and commercial waste reported to be collected for management are illustrated. Between 1998 and 2001, there was an overall increase of 24% in the quantity of household and commercial waste collected from 1,852,450 tonnes in 1998 to 2,297,603 in 2001. The quantity of household waste collected for management over this period increased by 14.3% and the quantity of commercial waste collected for management increased by 40.4%. These trends are similar to those reported for 1998; the collection of household waste increased by 13.3% between 1995 and 1998 and commercial waste by 44.5%.

It is noted that the reported generation of municipal waste is greater than reported landfilling and recycling of municipal waste. A number of reasons can be given for the gap of 406,432 tonnes. Firstly, the information is taken from three different sources:

- municipal waste generation is reporting by local authorities to the EPA via an annual local authority questionnaire;
- municipal waste landfilling is reported by landfill operators to the EPA via waste-licensing reporting systems; and
- municipal waste recycling is reported to the EPA by recycling contractors via an annual recycling organisations questionnaire.

Secondly, local authority information includes an estimate of municipal waste generated in households not served by collection systems. This was reported by 30 local authorities as 170,012 tonnes (including all five city councils and one county council who reported 100% coverage of households). Thirdly, not all facilities, particularly recycling facilities, were licensed or permitted by 2001 and complete records were not available. The gap between generation, landfill and recycling is expected to close in future years as facilities and collection services become regulated and information from these activities is recorded and made available.

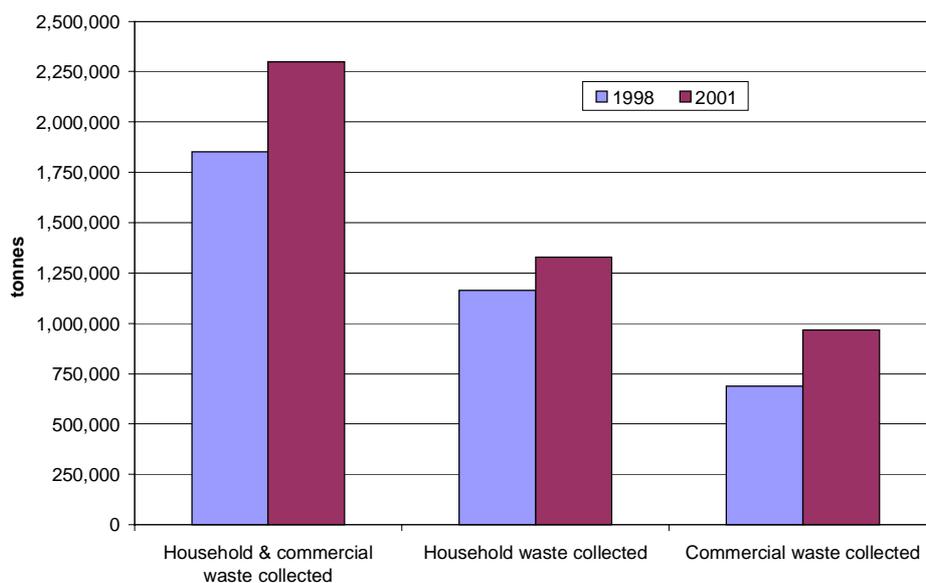


Figure 6.3 Trends in household and commercial waste collected, 1998 and 2001

Of 2,297,603 tonnes of household and commercial waste collected for management in 2001, 1,992,050 tonnes were landfilled and 305,554 tonnes were recovered. Figure 6.4 illustrates that this represents an increase in the quantities landfilled and recovered from 1998 when 1,685,766 tonnes of household and commercial waste were landfilled and 166,684 tonnes were recovered. Further analysis of disposal and recovery rates is presented in Figure 6.5. There has been an increase of 11.5% in the quantity of household waste consigned to landfill and an increase of 99.6% in the quantity of household waste recovered, from 3.2% in 1998 to 5.6% in 2001. The quantity of commercial waste landfilled increased by 31.6% while the quantity of commercial waste recovered increased by 78.6%, from 18.7% in 1998 to 23.8% in 2001.

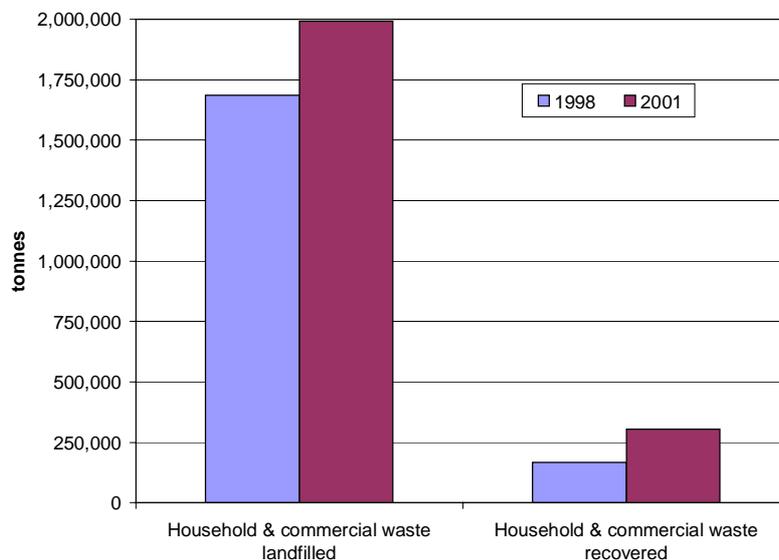


Figure 6.4 Trends in disposal and recovery of household and commercial waste combined, 1998 and 2001

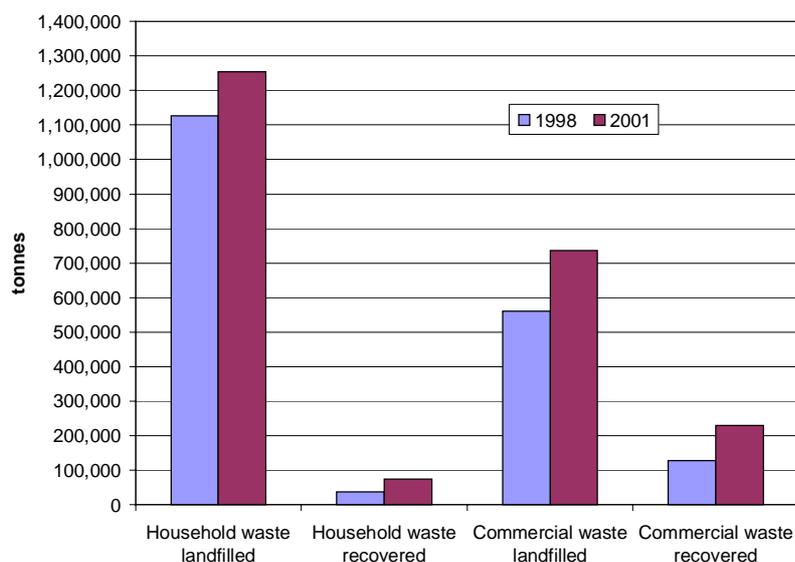


Figure 6.5 Trends in disposal and recovery of household and commercial waste, 1998 and 2001

The key trends in relation to municipal waste are:

- continuing growth in quantities generated. Between 1998 and 2001 the generation of municipal waste increased by 31.5%, an average annual increase of 10.5%;
- increased landfilling of household and commercial waste from 1,685,766 tonnes in 1998 to 1,992,050 tonnes in 2001, an increase of 18.2% over the three year period or an average 6.1% annual increase; and
- increased recovery of household and commercial waste from 166,684 tonnes in 1998 to 305,554 tonnes in 2001, an increase of 83.3% over the three year period or an average 27.8% annual increase.

6.2.3 MUNICIPAL WASTE PROJECTIONS

A series of simple forward-looking projections to 2015 were carried out to illustrate the situation that could prevail if current municipal waste growth rates continue. The following scenarios have been calculated:

- projection, based on 1998-2001 average growth rates of 10.5% (based on gross tonnage) and 8.1% (based on per capita generation), from 2001 calculated with:
 - no prevention of waste;
 - 2% prevention per annum from 2004; and
 - 5% prevention per annum from 2004;
- projection, based on 1995-1998 average growth rates of 3.8% (based on gross tonnage) and 2.8% (based on per capita generation), from 2001 calculated with:
 - no prevention of waste;
 - 2% prevention per annum from 2004; and
 - 5% prevention per annum from 2004.

Figure 6.6 and Figure 6.7 illustrate the derived models. Figure 6.6 is based on gross municipal waste generation and its growth rate since 1995. Figure 6.7 is based on municipal waste generation per capita and the growth rate of this factor since 1995. Per capita growth rates vary differently to gross generation

due to population changes in the same period. Both figures show that at 1998-2001 growth rates, municipal waste generation could increase to a worst case scenario of 11 million tonnes per annum, or over 2 tonnes per capita, by 2015. While an unlikely scenario, it illustrates how the current situation could become unmanageable in a short time. More moderate scenarios all, bar one, show increasing municipal waste generation. The sole negative growth scenario shows that if pre-2001 municipal waste generation rates are to be seen again and assuming a gross waste growth rate of 3.8% per year, then a 5% prevention target per annum must be achieved. It may seem contradictory to allow for a growth rate while also factoring in waste prevention. However, there will be sectors where waste will inevitably grow. By the same token, there will be sectors where waste prevention will be successful. The first priority of any waste prevention programme would be to target those sectors where success is most assured.

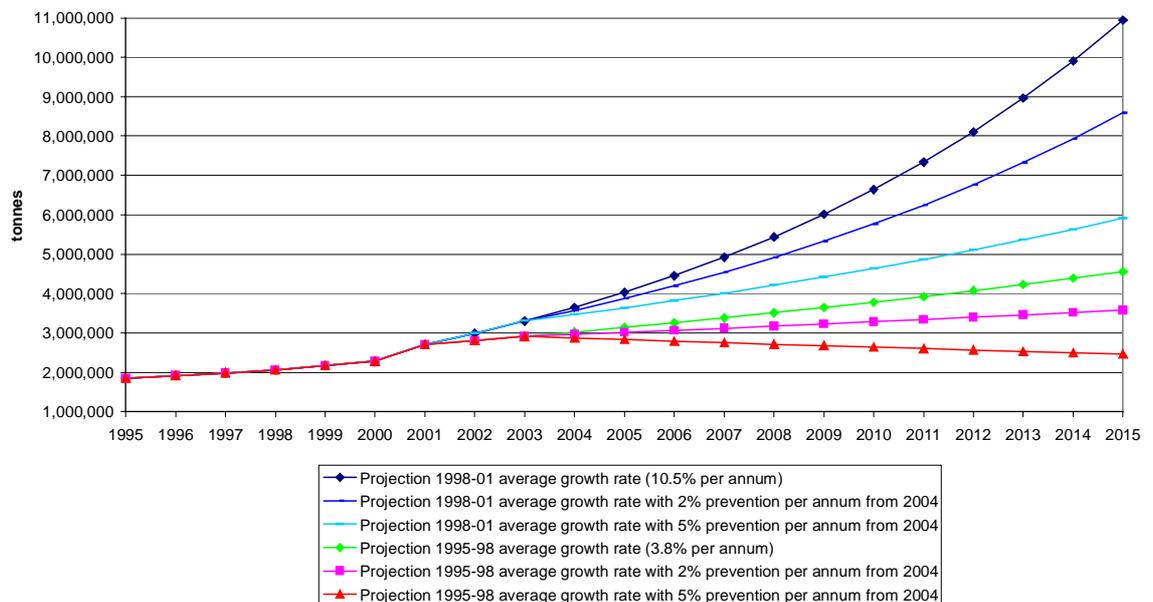


Figure 6.6 Generation of municipal waste – projected to 2015 (tonnes)

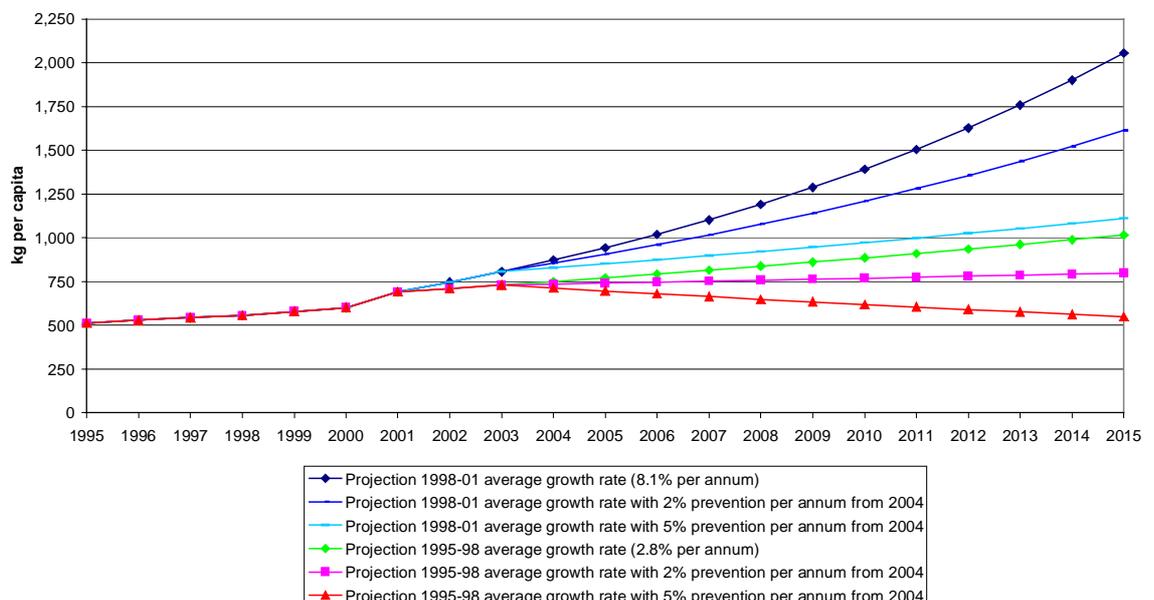


Figure 6.7 Generation of municipal waste – projected to 2015 (kg per capita)

6.2.4 INDUSTRIAL WASTE

Trends in projected (or scaled-up) industrial waste arisings between 1998 and 2001 are presented in Figure 6.8. Projected industrial waste generation is estimated to have marginally reduced from 9,074,751 tonnes in 1998 to 9,008,211 tonnes in 2001. There was no significant change in industrial waste recovery and disposal rates between 1998 and 2001, as illustrated in Figure 6.9.

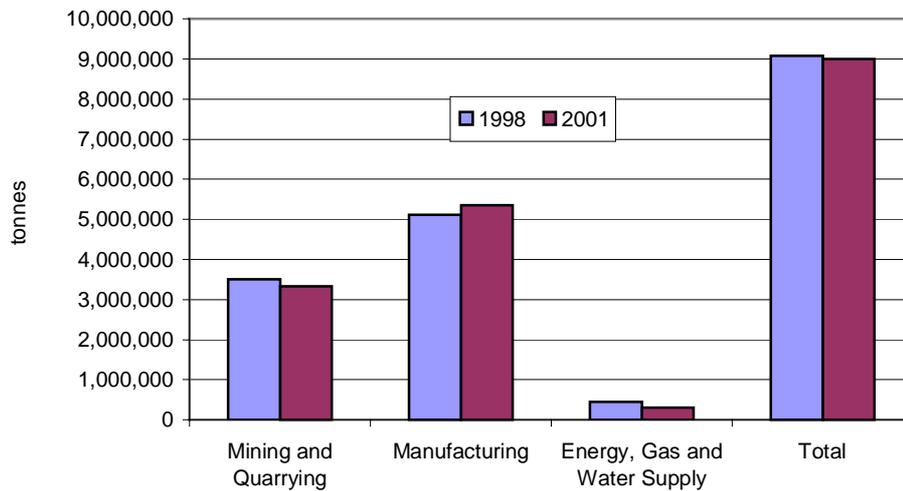


Figure 6.8 Trends in projected industrial waste generation

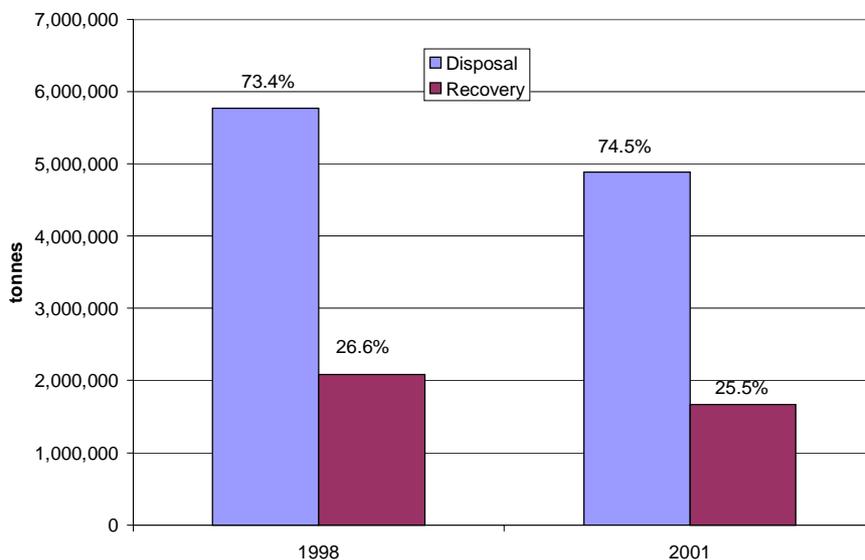


Figure 6.9 Trends in disposal and recovery rates for reported industrial waste

6.2.5 HAZARDOUS WASTE

Hazardous waste generation has increased from 370,328 tonnes in 1998 to 491,669 tonnes in 2001, an increase of 32.8%. Contaminated soil formed a large part of the 2001 figure; excluding contaminated soil, reported hazardous waste generation increased by 9.6% from 250,531 tonnes in 1998 to 274,687 tonnes in 2001. Figure 6.10 illustrates hazardous waste generation between 1996 and 2001. Unreported hazardous waste decreased from 74,311 tonnes in 1998 to 48,402 tonnes in 2001.

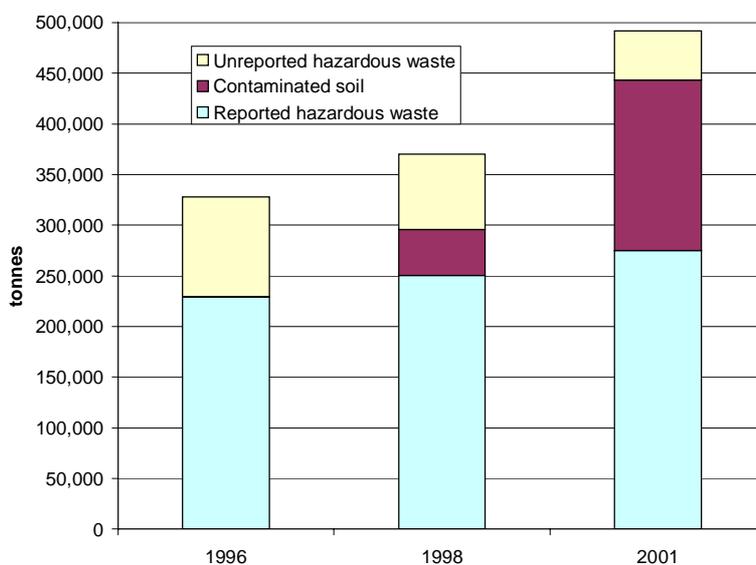


Figure 6.10 Hazardous waste generation, 1996 to 2001

Figure 6.11 shows that the disposal of hazardous waste increased by 4.4% between 1998 and 2001 and that the recovery of hazardous waste (including contaminated soil) increased by 107.8% in the same period. Excluding 159,943 tonnes of contaminated soil exported for recovery in 2001 and 23,691 tonnes in 1998, hazardous waste recovery increased by 21.9%. The *National Hazardous Waste Management Plan* recommends that hazardous waste disposal be reined in and reduced to 1996 levels of 86,754 tonnes. Hazardous waste disposal now stands at 125,629 tonnes and as hazardous waste disposal continues to increase, the target moves further away and becomes more difficult to achieve.

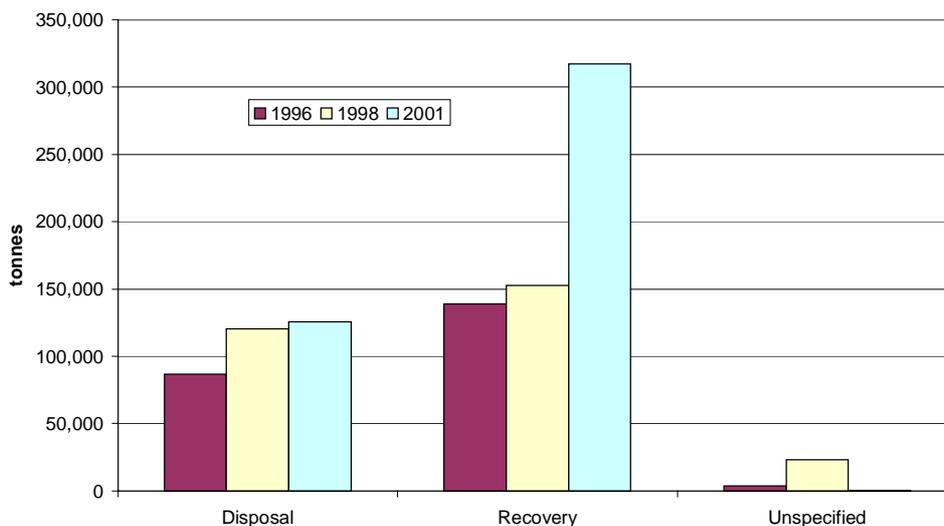


Figure 6.11 Trends in the disposal and recovery of hazardous waste, 1996 to 2001

The location of hazardous waste recovery and disposal has varied significantly between 1996 and 2001. Figure 6.12 shows that while the treatment of hazardous waste on site of generation has decreased by 27.5% between 1998 and 2001, the treatment of hazardous waste at licensed or permitted facilities in Ireland has increased by 70.4% and exports, excluding contaminated soil, have increased by 52.0%.

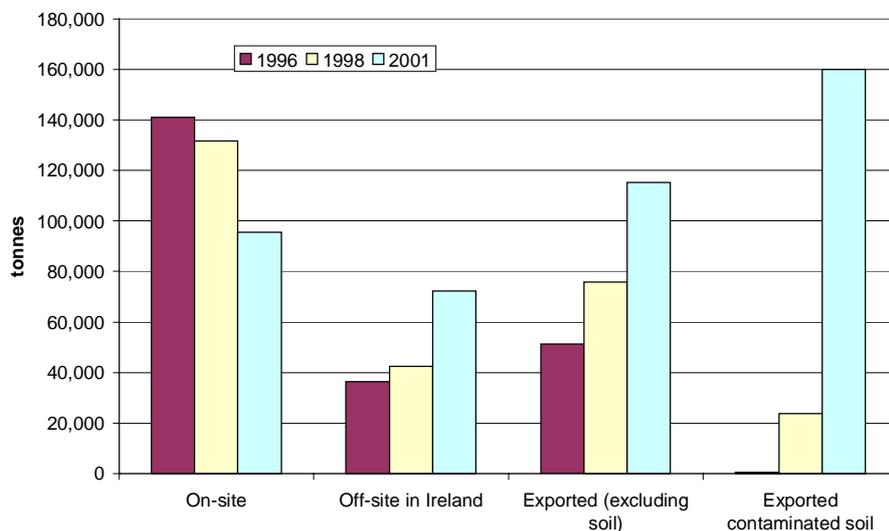


Figure 6.12 Trends in the location of hazardous waste recovery and disposal, 1996 to 2001

6.2.6 PACKAGING WASTE

The best estimate for total packaging waste generated in 2001 is 872,917 tonnes. This consists of 651,650 tonnes of household and commercial packaging waste consigned to landfill and 221,266 tonnes of packaging waste reported to be recovered by recycling organisations. Figure 6.13 illustrates that packaging waste recycling has increased from 14.8% in 1998 to 25.3% in 2001.

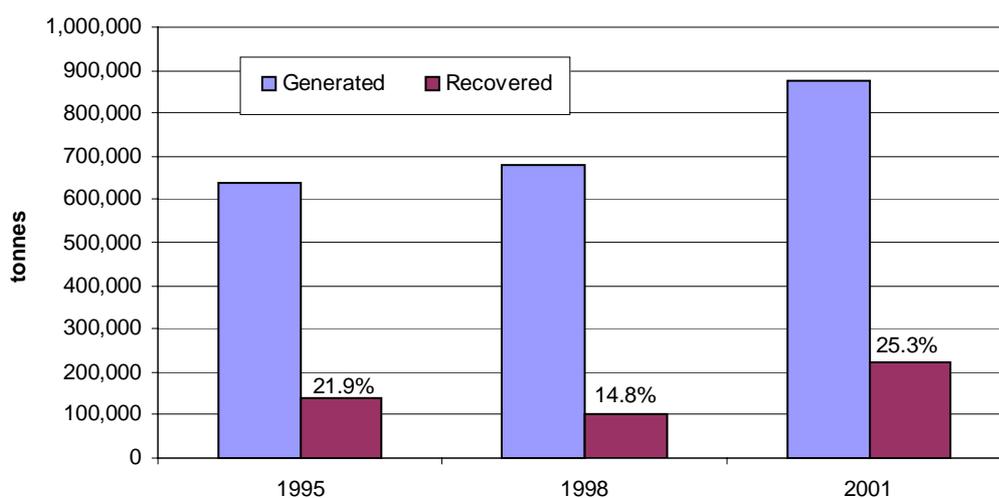


Figure 6.13 Trends in packaging waste generation and recovery in the total waste stream, 1995 to 2001

Figure 6.14 and Figure 6.15 illustrate the disposal and recovery trends between 1995 and 1998 for various packaging materials. It is clear that the bulk of the recovery occurs in the paper and cardboard and the glass sectors, although there has been a significant increase in recovery of plastic and ferrous metal packaging since 1998. This may be partly due to better record keeping leading to more accurate reporting of quantities recovered by the recycling organisations.

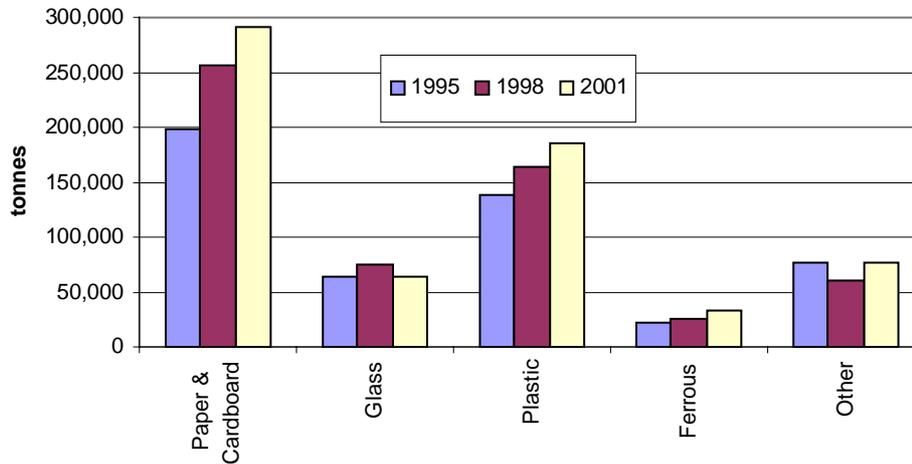


Figure 6.14 Trends in disposal of packaging waste in the total waste stream, 1995 to 2001

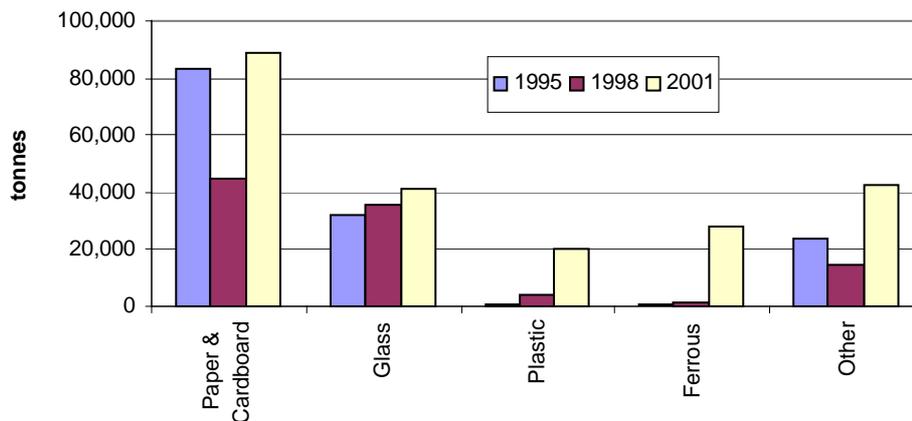


Figure 6.15 Trends in recovery of packaging waste in the total waste stream, 1995 to 2001

7. CONCLUSIONS AND RECOMMENDATIONS

7.1 CONCLUSIONS

General

1. Significant changes in waste generation and management took place between 1998 and 2001.
 - The greatest increases are noted in the generation of municipal and commercial waste;
 - Industrial and hazardous waste generation has remained relatively constant;
 - Agricultural waste and sludge generation have decreased;
 - There are fewer landfills and these operate to a higher standard; and
 - The provision of recycling infrastructure has improved.
2. Municipal waste generation and collection has increased in close correlation with economic growth, a trend that is unsustainable if measures are not implemented to reduce the rapid growth in waste generation.
3. The recycling of municipal waste and packaging waste has significantly increased. The disposal of municipal waste and packaging waste has also significantly increased, though at a lower pace, hiding the good progress made in recycling.
4. Good progress has been made towards achieving Government targets for the recycling of household, commercial, packaging and construction and demolition waste. Progress has been poor in diverting waste (including biodegradable municipal waste) away from landfill.
5. The provision of more civic waste facilities and bring banks provide increased opportunities for householders to recycle waste. However, we are still well behind the density required and available in comparable EU countries.
6. The number of municipal waste landfills has decreased and operational procedures at remaining landfills have improved as a result of their becoming licensed and regulated for the first time. More transfer stations and material recycling facilities have opened for the processing of waste.
7. While increased recycling has been achieved in some sectors, diversion from landfill has been unsuccessful and significant progress is required if we are to move towards the sustainable management of waste.
8. Little evidence exists of efforts towards waste prevention and minimisation, a cornerstone of Irish and EU waste policy, except in a small number of cases driven typically by EPA licensing and local authority initiatives.
9. The quality of data on waste generation and management has improved. A problem remains however with the significant delays often experienced in retrieving data from public and private organisations.
10. The quality of data submitted by some local authorities highlights the need for a consistent and uniform waste information management system and reporting methodology for use by all local authorities.

11. While several sectors maintain excellent records, poor recording of information is evident in particular sectors, for example the construction industry, the healthcare sector and water treatment facilities.

Waste generation

12. The total quantity of waste generated in Ireland has decreased by 7.4% from 80,012,678 tonnes in 1998 to 74,071,634 tonnes in 2001, due mainly to a decrease in agricultural wastes.
13. The total quantity of agricultural manure and slurries has decreased by 12.2% from 64,578,724 tonnes in 1998 to 56,687,440 tonnes in 2001, mainly as a result of reduced animal numbers.
14. The total quantity of municipal (household, commercial and street cleansing) waste generated has increased by 31.5% from 2,056,652 tonnes in 1998 to 2,704,035 tonnes in 2001.
15. The generation of household waste has increased by 20.3% from 1,220,856 tonnes in 1998 to 1,468,834 tonnes in 2001. This represents an average of 375kg of household waste for each person living in Ireland, an increase of 13.6% since 1998.
16. The generation of commercial waste has increased by 53.3% from 754,797 tonnes in 1998 to 1,156,732 tonnes in 2001. It is acknowledged that there is poor differentiation at transfer stations and landfills between commercial and industrial waste. Hence, reported data for commercial waste contains an unquantified proportion of waste from industrial processes.
17. Reported industrial waste has decreased by 16.5% from 7,859,439 tonnes in 1998 to 6,561,925 tonnes in 2001. Changing practices in industry, often as a result of IPC-licensing, such as sludge dewatering which significantly increases the proportion of solids and decreases the proportion of water in the sludge, have contributed to the decrease in reported industrial waste generation. Projected (or scaled-up) industrial waste generation has decreased by 0.7% from 9,074,751 tonnes in 1998 to 9,008,211 tonnes in 2001.
18. Reported hazardous waste (excluding contaminated soil) increased by 9.6% from 250,531 tonnes in 1998 to 274,687 tonnes in 2001. Unreported hazardous waste decreased by 34.9% from 74,311 tonnes in 1998 to 48,402 tonnes in 2001, reflecting in part the increased treatment capacity available for a number of hazardous waste streams at licensed treatment facilities in Ireland and greater awareness of hazardous waste generation and management.
19. Reported contaminated soil generation was 168,579 tonnes in 2001, a significant increase since 1998. Contaminated soil is typically generated by once-off works and the principal source in 2001 was remediation of the gasworks site in the Dublin Docklands.
20. The generation of construction and demolition waste has increased by 35.0% from 2,704,958 tonnes in 1998 to 3,651,411 tonnes in 2001. Much of the increase is attributed to growth in the construction industry and improved estimation methodologies for construction and demolition waste.

Waste recovery and disposal

21. The quality of information on waste accepted at licensed facilities and recycling facilities has improved since 1998. Information from licensed facilities is provided to the EPA in accordance with waste licences in the form of an annual environmental report. Information from recycling facilities is provided in the form of an annual questionnaire return from recycling organisations.
22. The presence of weighbridges at the majority of municipal waste landfill facilities means that 85% of all waste accepted at municipal landfill facilities is now weighed. The remaining 15% is estimated from, for example, the capacity of the collection vehicle.

23. There has been some progress towards increased recovery and recycling of waste:
- household and commercial waste recycling rates have increased from 9.0% in 1998 to 13.3% in 2001;
 - packaging recycling rates have increased from 14.8% in 1998 to 25.3% in 2001;
 - hazardous waste recovery rates have increased from 41.2% in 1998 to 64.5% in 2001; and
 - construction and demolition waste recycling has increased from 43.3% in 1998 to 65.4% in 2001.
24. In many cases, small percentage increases in recycling rates reflect significant increases in the actual quantity of waste recycled.
25. On national targets for the management of waste, available information shows that progress towards achieving some targets has been made while poor progress is noted in others:
- recycling of 50% of construction and demolition waste by 2003; recycling rates in 2001 had increased to 65.4%;
 - diversion of 50% of overall household waste away from landfill; in 2001, 5.6% of household waste was recovered;
 - minimum 65% reduction in biodegradable wastes consigned to landfill from 1998 by 2013; a quantitative increase of 20.3% consigned to landfill was noted between 1998 and 2001; and
 - recycling 35% of municipal waste; in 2001, 13.3% of municipal waste was recovered.
26. The use of two systems for classifying waste disposal and recovery activities creates significant confusion and misclassification of disposal and recovery operations. The two systems are contained in (a) the Third and Fourth Schedules of the Waste Management Acts, 1996 and 2001 and (b) Annex II to the Waste Framework Directive (75/442/EEC).

Waste infrastructure

27. The number of authorised landfills in operation decreased from 126 facilities in 1998 to 92 facilities in 2002. Local authorities operated 50 facilities, compared with 76 in 1998. The private sector operated 42 facilities, compared with 50 in 1998.
28. The number of facilities licensed by the EPA increased from 14 facilities in 1999 to 101 facilities in 2001 and 123 facilities by December 2002.
29. The number of permitted facilities notified to the EPA by local authorities increased from 37 facilities in October 1999 (notified by 11 local authorities) to 297 facilities by December 2001 (notified by 26 local authorities).
30. The number of bring banks increased by 72% from 837 in 1998 to 1,436 in 2001, representing an average density of one bring bank for 2,728 people.
31. The EPA had issued 515 certificates of registration by December 2002 for waste activities carried on by local authorities.
32. At 2001 landfill rates, six out of ten waste management planning regions have less than 3 years remaining landfill capacity, three regions have 10 years or less and only one region has over 10 years remaining landfill capacity. There is clearly a lack of capacity for commercial waste which must be addressed by the provision of landfill or thermal treatment capacity.
33. The treatment of hazardous waste at licensed off-site treatment facilities in Ireland increased from 42,485 tonnes in 1998 to 72,391 tonnes in 2001.

34. Landfill and thermal treatment capacity for the management of hazardous waste is required. Export of hazardous waste in 2001 was 1,377 tonnes for landfill and 42,974 tonnes for incineration, down 32.4% and 10.0% respectively since 1998.
35. The closure of steel and glass recycling facilities in the State since 1998 means that all steel and glass for recycling must now be exported.

7.2 RECOMMENDATIONS

Waste prevention and minimisation

1. Policy measures identified in Government policy should be implemented to decouple waste generation from growth in economic activities.
2. The National Waste Prevention Programme should be implemented immediately. The proposed Core Prevention Team should be established to promote a culture of waste prevention and minimisation that will allow Irish industry to reap the benefits of reduced waste generation and reduce waste management costs. The proposed Producer Responsibility Unit should be established in parallel with the Core Prevention Team.
3. A National Strategy on Biodegradable Waste, as proposed in *Delivering Change*, should be prepared to identify the specific actions required to meet the targets set in Directive 1999/31/EC on the landfill of waste. Recommendations contained in this Strategy should be implemented via regional waste management plans.

Waste management

4. Major construction projects will generate significant quantities of waste on a once-off basis (e.g. Dublin Port Tunnel, Luas, etc.). The identification and provision of facilities for such waste should be integrated into the project planning process and a project waste management plan should be prepared in the early stages of project development.
5. The implications of routinely exporting non-hazardous municipal waste for disposal by incineration should be examined in the context of striving to be self-sufficient in waste management infrastructure, as required by the Waste Framework Directive (75/442/EEC). Consideration should be given to generally prohibiting such shipments of waste, except in appropriate circumstances. It is noteworthy that unlike other EU countries, Ireland is currently dependent on the export of certain waste streams.
6. Implementation of the Waste Management (Permit) Regulations, 1998, should be reviewed to ensure that there is consistent interpretation of the Regulations and that facilities are issued with the appropriate authorisation.

Waste infrastructure

7. The recent trend in export of waste indicates an increasing deficit in waste infrastructure. Implementation of waste management plans should be accelerated to ensure adequate waste disposal and recycling facilities. Particular shortcomings are likely to be experienced in capacity for the disposal of residual non-hazardous and hazardous waste.
8. Regional waste management plans should be reviewed and updated. This study has shown that municipal waste quantities have grown at rates significantly in excess of those projected by regional and local authorities and projected waste generation should be revised using current growth projections. The range and scale of infrastructure required in each region for the integrated

management of municipal and industrial waste should be identified. Infrastructural requirements for a period of at least 15 years should be identified in waste management plans.

9. The implications of the prohibition on transferring waste between regions, as implemented by An Bord Pleanála and local authority planners, should be examined. The inter-regional movement and treatment of waste should be provided for in the revised regional waste management plans in appropriate circumstances.
10. Waste management recovery and disposal capacity in excess of that contained in regional waste management plans, and which takes account of trends in waste arisings, must be provided to ensure that a competitive environment exists in the waste management business and that waste generators have a choice of service provider.
11. Infrastructure requirements should be addressed on a waste stream basis. The network of facilities required nationally for construction and demolition waste, biodegradable waste, hazardous waste, agricultural waste, waste electrical and electronic equipment, scrap metal and end-of-life vehicles, auto-shredder residue, waste packaging and other waste streams should be identified in a national strategy and specific recommendations made to each regional grouping on the minimum requirements to be contained in the regional waste management plan and 'national' facilities to be provided to meet the requirements where appropriate.
12. Hazardous waste thermal treatment and landfill disposal capacity should be provided to address the dependence on export as an outlet for hazardous waste.

Data collation and reporting

13. An information system, for use at local authority level, should be established for the collation and management of information on waste generation, collection, transport (including import and export), authorised collectors and facilities and regulatory actions. A national web-based system for the collation of this information should be developed and implemented to facilitate the input of this information by local authorities. A well-resourced system would be expected to improve the timeliness and availability of local authority information on waste generation and management, including information on the management of waste at facilities regulated by local authorities.
14. The EU Waste Statistics Regulation sets out in detail the requirements vis-à-vis coverage and quality of national data that will apply from 2004. Adequate resources should be provided to ensure the full and satisfactory implementation of the Regulation in Ireland.
15. While information on the composition of household and commercial waste has improved since 1998, considerable information gaps remain and local authorities should continue to allocate resources towards carrying out characterisation surveys on household and commercial waste. The EPA will prepare updated guidance for conducting waste composition surveys.
16. The different systems for classifying waste disposal and recovery operations (contained in the Waste Management Act and the Waste Framework Directive) in use in Ireland should be streamlined.

APPENDIX A

Factsheets

The factsheets listed below were prepared to provide information for this *National Waste Database Report 2001*. The factsheets are available only on the EPA website at www.epa.ie.

INDEX OF FACTSHEETS

- Factsheet 1: Municipal Waste
- Factsheet 2: Composition of Municipal Waste
- Factsheet 3: Packaging Waste
- Factsheet 4: Agricultural Waste
- Factsheet 5: Construction and Demolition Waste
- Factsheet 6: Scrap Metal and End-of-Life Vehicles
- Factsheet 7: Scrap Tyres
- Factsheet 8: Waste Electrical and Electronic Equipment
- Factsheet 9: Waste Management Infrastructure

APPENDIX B

Disposal and recovery routes for industrial sectors

Table B.1 NACE codes used in classifying industrial activities

| NACE Code | Industry Sector |
|------------------|---|
| C | Mining and Quarrying |
| DA | Food Products, Beverages and Tobacco |
| DB | Textiles and Textile Products |
| DC | Leather and Leather Products |
| DD | Wood and Wood Products |
| DE | Pulp, Paper and Paper Products; Printing and Publishing |
| DF | Coke, Refined Petroleum Products and Nuclear Fuel |
| DG | Chemicals, Chemical Products and Man-Made Fibres |
| DH | Rubber and Plastic Products |
| DI | Other Non-Metallic Mineral Products |
| DJ | Basic Metals and Fabricated Metal Products |
| DK | Machinery and Equipment not elsewhere classified |
| DL | Electrical and Optical Equipment |
| DM | Transport Equipment |
| DN | Manufacturing not elsewhere classified |
| E | Electricity, Gas and Water Supply |

Table B.2 Recovery and disposal of industrial waste, by NACE sector, 2001

| | Disposal method | NACE Sector – tonnes of waste recovered and disposed | | | | | | | | | | | | | | | | |
|-----|--------------------------------------|--|----------------|--------------|------------|---------------|--------------|------------|----------------|--------------|---------------|------------------|--------------|--------------|--------------|--------------|----------------|------------------|
| | | C | DA | DB | DC | DD | DE | DF | DG | DH | DI | DJ | DK | DL | DM | DN | E | TOTAL |
| D1 | Landfill | 1,345,414 | 49,286 | 6,635 | 615 | 10,016 | 9,000 | 144 | 34,189 | 6,307 | 17,103 | 1,145,427 | 1,919 | 4,707 | 2,261 | 2,309 | 175,182 | 2,810,515 |
| D2 | Land treatment | | 21,796 | 339 | | | 5 | | 3,191 | | | 781 | | 520 | | | 250 | 26,882 |
| D3 | Injection | | 6,536 | | | | | | | | | | | | | | | 6,536 |
| D4 | Impoundment | 1,789,452 | 47,000 | | | | | | | | | | | | | | 1,000 | 1,837,452 |
| D5 | Engineered landfill | | 6,180 | | | 424 | | | 3,627 | | 3,638 | 1,253 | | 309 | | 32 | 27,032 | 42,495 |
| D6 | Release to waters | | 6,476 | | | | 2 | | 1,359 | | | 8 | 48 | 50 | | | | 7,942 |
| D7 | Release to sea | 0 | | | | | | | 5,177 | | | 235 | 29 | | 157 | | | 5,597 |
| D8 | Biological treatment | 35 | 60 | | | 103 | 12 | | 3,826 | | 6 | 1 | | | 13 | 1 | 46 | 4,102 |
| D9 | Physico-chemical treatment | | 5,730 | 8 | | | 1 | 3 | 30,115 | 128 | 25 | 147 | 814 | 229 | 805 | 28 | 73 | 38,107 |
| D10 | Incineration on land | 8 | 1,258 | 79 | | 176 | 107 | 167 | 67,515 | 1,233 | 126 | 9 | 51 | 1,284 | 105 | 3 | 36 | 72,158 |
| D11 | Incineration at sea | | | | | | | | | | | | | | | | | 0 |
| D12 | Permanent storage | | 24 | 139 | | | | | | | | | | | | | | 163 |
| D13 | Blending or mixing prior to disposal | | 335 | | | | | | 2 | | | | 2 | | | 25 | | 364 |
| D14 | Repackaging prior to disposal | | 0 | | | | | 24 | | | | | | 15 | | | | 39 |
| D15 | Storage pending disposal | 0 | 33,371 | | | 0 | 16 | | 494 | 1 | | 21 | | 1 | 34 | 5 | 0 | 33,944 |
| DU | Unspecified disposal | | | | | | | | 908 | 1 | | 211 | | 2 | | 1 | | 1,123 |
| | Sub-total disposal | 3,134,909 | 178,051 | 7,201 | 615 | 10,719 | 9,143 | 338 | 150,403 | 7,671 | 20,898 | 1,148,094 | 2,863 | 7,117 | 3,376 | 2,403 | 203,619 | 4,887,418 |

| | Recovery method | NACE Sector – tonnes of waste recovered and disposed | | | | | | | | | | | | | | | | |
|-----|---|--|----------------|---------------|------------|----------------|----------------|--------------|----------------|---------------|---------------|------------------|--------------|---------------|--------------|--------------|----------------|------------------|
| | | C | DA | DB | DC | DD | DE | DF | DG | DH | DI | DJ | DK | DL | DM | DN | E | TOTAL |
| R0 | Direct reuse | 42,204 | 156,151 | 3,911 | | 63 | 151 | 387 | 18,692 | 95 | 4,962 | 348 | 190 | 699 | 176 | 21 | 106,207 | 334,256 |
| R1 | Reuse as fuel | 56 | 209 | 4 | | 14,867 | 111,652 | 159 | 17,261 | 3 | | 10 | 8 | 80 | 16 | 67 | 135 | 144,525 |
| R2 | Solvent recovery | | 9,851 | 38 | | | 27 | | 44,432 | 304 | 2 | 71 | 54 | 198 | 117 | | 1 | 55,094 |
| R3 | Organic substance recycling | 190 | 354,717 | 4,670 | | 209,324 | 10,481 | | 90,500 | 4,199 | 755 | 748 | 755 | 1,024 | 133 | 112 | 26 | 677,635 |
| R4 | Metal recovery | 2,496 | 2,800 | 209 | | 392 | 248 | 944 | 8,857 | 1,854 | 1,889 | 9,255 | 4,560 | 3,270 | 927 | 1,450 | 596 | 39,746 |
| R5 | Inorganic substance recycling | 9,084 | 40,008 | 213 | | 618 | 3,391 | 58 | 4,048 | 994 | 16,841 | 62 | 32 | 1,338 | 294 | 1,144 | 19 | 78,143 |
| R6 | Regeneration of acids or bases | | | 30 | | | 0 | | 436 | | 3 | 204 | 2 | | | | 1 | 676 |
| R7 | Recovery of components used for pollution abatement | 22 | | | | | 0 | | 32 | 88 | 0 | | | 20 | | | | 162 |
| R8 | Recovery of components from catalysts | | 5 | | | | | | 227 | | 3 | 1 | | | | | | 235 |
| R9 | Oil recovery | 961 | 338 | 244 | | 81 | 78 | | 362 | 75 | 145 | 59 | 109 | 129 | 185 | 5 | 132 | 2,904 |
| R10 | Landspreading | 3 | 199,443 | | | | 1,008 | 180 | 836 | | 2,000 | | | 1 | | | 52 | 203,523 |
| R11 | Use of residuals | 0 | 40,554 | | | | | | 2,532 | | | 59 | | 13 | | 36 | | 43,194 |
| R12 | Waste exchange prior to recovery | 9 | 129 | 0 | | 144 | | | 7 | 505 | | | | 45 | | 2 | | 842 |
| R13 | Storage prior to recovery | 87,674 | 54 | | | | | 1 | 192 | | | 0 | | 99 | 116 | | 0 | 88,136 |
| RU | Unspecified recovery | | | | | | | | 382 | | | 776 | | | | | | 1,158 |
| | Sub-total recovery | 142,699 | 804,259 | 9,319 | 0 | 225,490 | 127,036 | 1,729 | 188,796 | 8,116 | 26,598 | 11,590 | 5,710 | 6,916 | 1,963 | 2,837 | 107,169 | 1,670,229 |
| U | Unspecified | | 928 | 22 | | 612 | 24 | | 1,711 | | 598 | 8 | | 374 | | | | 4,277 |
| | TOTAL | 3,277,608 | 983,239 | 16,541 | 615 | 236,821 | 136,203 | 2,068 | 340,910 | 15,787 | 48,095 | 1,159,692 | 8,573 | 14,407 | 5,339 | 5,240 | 310,787 | 6,561,924 |

APPENDIX C

Table C.1 Active landfill sites in 1995, 1998 and 2001

'Quantity deposited' includes waste accepted as cover material.

Italics indicate that the facility closed between 1998 and 2001.

Bold indicates facilities that have either opened since 1998 or were not reported in 1998.

On-site landfills associated with IPC-licensed facilities have been included.

| Local authority | Site name | Landfill type | Quantity deposited (tonnes/annum) | | |
|-----------------------------|--|---------------------------|-----------------------------------|----------------|---------------|
| | | | 1995 | 1998 | 2001 |
| Carlow County Council | Ballyellen Limes Works | Industrial/private | | 2,500 | |
| Carlow County Council | Billy Dixon Ltd. | Industrial/private | | 1,000 | |
| Carlow County Council | Dan Morrissey Ltd. | Industrial/private | | 15,000 | |
| Carlow County Council | Irish Sugar Company | Industrial/private | | 20,866 | 57,108 |
| Carlow County Council | Kildavin Concrete Ltd. | Industrial/private | | 3,000 | |
| Carlow County Council | Liam Conway Ltd. | Industrial/private | | 4,000 | |
| Carlow County Council | Powerstown | Municipal | 19,900 | 32,575 | 21,356 |
| Carlow County Council | Stone Development Ltd. | Industrial/private | | 10,000 | |
| Carlow County Council | Tom McDonald Ltd. | Industrial/private | | 8,000 | |
| <i>Cavan County Council</i> | <i>Baileborough</i> | <i>Municipal</i> | <i>2,000</i> | <i>8,927</i> | <i>6,300</i> |
| Cavan County Council | Ballyjamesduff | Municipal | 1,000 | 1,489 | 4,350 |
| <i>Cavan County Council</i> | <i>Belurbet</i> | <i>Municipal</i> | <i>1,000</i> | <i>724</i> | <i>550</i> |
| Cavan County Council | Corranure | Municipal | 13,673 | 21,018 | 9,800 |
| Clare County Council | Bobby O'Connell & Sons Ltd. | Industrial/private | | | 1 |
| <i>Clare County Council</i> | <i>Doora</i> | <i>Municipal</i> | <i>34,000</i> | <i>43,658</i> | <i>53,663</i> |
| Clare County Council | Finsa | Industrial/private | | 48 | 52 |
| Clare County Council | Lisdeen | Municipal | 1,174 | 1,800 | 0 |
| Clare County Council | Moneypoint Ash disposal area | Industrial/private | 33,000 | 120,000 | 119,370 |
| Clare County Council | Roche Ireland Ltd. | Industrial/private | 33,000 | 144 | 319 |
| Clare County Council | Tradaree Point E. F. T. | Industrial/private | 33,000 | 2,500 | 3,223 |
| Clare County Council | Whitegate | Municipal | 1,500 | 700 | |
| Cork City Council | Kinsale Road Sanitary Landfill | Municipal | 122,500 | 388,566 | 250,089 |
| <i>Cork County Council</i> | <i>Ballyguyroe</i> | <i>Municipal</i> | <i>24,000</i> | <i>23,430</i> | <i>16,428</i> |
| Cork County Council | Bandon | Municipal | 4,000 | 3,886 | 0 |
| Cork County Council | Bantry Terminals Ltd. | Industrial/private | | | 50 |
| Cork County Council | Beaumont Quarry | Industrial/private | | | |
| Cork County Council | Benduff | Municipal | 13,000 | 13,993 | 9,847 |
| Cork County Council | Castlemore Quarries Ltd. | Industrial/private | | | 9 |
| Cork County Council | Clountreem | Municipal | | 5,210 | 0 |
| Cork County Council | Derryconnell | Municipal | 2,000 | 4,353 | 14,000 |
| Cork County Council | Irish Ispat Site | Industrial/private | | 9,000 | |
| Cork County Council | Irish Refining PLC | Industrial/private | | 1,207 | |
| Cork County Council | Irish Sugar, Mallow | Industrial/private | | 20,300 | 14,417 |
| Cork County Council | Killbarry | Municipal | 1,000 | 6,834 | |
| Cork County Council | Lotamore | Industrial/private | | | |
| Cork County Council | Macroom | Municipal | 4,500 | | |
| Cork County Council | Mitsui Denman (Ire.) Ltd. | Industrial/private | | | 39,571 |
| <i>Cork County Council</i> | <i>Raffeen</i> | <i>Municipal</i> | <i>20,000</i> | <i>209,664</i> | <i>56,666</i> |
| Cork County Council | East Cork | Municipal | 35,000 | 34,603 | 149,119 |

| Local authority | Site name | Landfill type | Quantity deposited (tonnes/annum) | | |
|--------------------------------|--------------------------------------|---------------------------|-----------------------------------|----------------|----------------|
| | | | 1995 | 1998 | 2001 |
| Cork County Council | Youghal | Municipal | 8,000 | 25,035 | 53,091 |
| Donegal County Council | Balbane | Municipal | 7,340 | 5,500 | 4,107 |
| Donegal County Council | Ballinacarrick | Municipal | 37,440 | 23,000 | 8,300 |
| <i>Donegal County Council</i> | <i>Churchtown</i> | <i>Municipal</i> | <i>11,340</i> | <i>11,500</i> | <i>0</i> |
| Donegal County Council | Drumabodan | Municipal | 7,340 | 7,000 | 0 |
| <i>Donegal County Council</i> | <i>Glenalla</i> | <i>Municipal</i> | | <i>1,000</i> | <i>10,094</i> |
| <i>Donegal County Council</i> | <i>Knocknafaughter</i> | <i>Municipal</i> | | | |
| <i>Donegal County Council</i> | <i>Muckish</i> | <i>Municipal</i> | | <i>4,400</i> | <i>5,729</i> |
| Dun Laoghaire-Rathdown C.C. | Ballyogan | Municipal | 105,000 | 302,566 | 97,808 |
| Fingal County Council | Balleally | Municipal | 246,000 | 387,530 | 282,477 |
| Fingal County Council | Dunsink | Municipal | 284,000 | 931,572 | 334,483 |
| Galway Corporation | Carrowbrowne | Municipal | 70,000 | 79,000 | 0 |
| Galway County Council | Ballinasloe/Pollboy Landfill | Municipal | 27,402 | 24,229 | 175,939 |
| <i>Galway County Council</i> | <i>Inishmore/Aran</i> | <i>Municipal</i> | <i>590</i> | <i>590</i> | |
| Galway County Council | Portumna | Municipal | 5,200 | 3,500 | |
| Galway County Council | Tuam | Municipal | 14,765 | 20,644 | |
| Kerry County Council | Ballyard | Industrial/private | | 25,000 | |
| Kerry County Council | Banemore,Listowel | Industrial/private | | 7,200 | |
| Kerry County Council | Cahirciveen | Municipal | 3,500 | 4,294 | |
| Kerry County Council | Coolcaslagh | Municipal | 11,000 | 12,724 | |
| Kerry County Council | Kenmare | Municipal | 3,000 | 2,091 | |
| Kerry County Council | Klinge Pharma and Co. | Industrial/private | | 130 | |
| Kerry County Council | Milltown | Municipal | 5,000 | 6,996 | |
| Kerry County Council | North Kerry Landfill | Municipal | 22,000 | 33,700 | 62,721 |
| <i>Kildare County Council</i> | <i>Bushbury Ltd.</i> | <i>Industrial/private</i> | | <i>250,000</i> | <i>50,000</i> |
| Kildare County Council | Carnaud Metalbox Ireland Ltd. | Industrial/private | | | 52 |
| Kildare County Council | Curryhills | Industrial/private | | 0 | |
| Kildare County Council | Farrells Kildare | Industrial/private | | 0 | |
| Kildare County Council | KTK Landfill Limited | Industrial/private | | | 320,547 |
| Kildare County Council | Millicent Cross | Industrial/private | | 0 | |
| Kildare County Council | Nephin Trading | Industrial/private | | 250,000 | |
| Kildare County Council | Newtown | Industrial/private | | 0 | |
| Kildare County Council | Silliot Hill | Municipal | 90,000 | 109,999 | 64,127 |
| Kildare County Council | The Range | Industrial/private | | 0 | |
| Kildare County Council | Toghers Pit | Industrial/private | | 0 | |
| <i>Kildare County Council</i> | <i>Tom & Pat Munnelly</i> | <i>Industrial/private</i> | | | <i>15,000</i> |
| Kilkenny County Council | Arcon Mines Ltd. | Industrial/private | | | 43,514 |
| Kilkenny County Council | Dunmore | Municipal | 29,000 | 27,998 | 30,055 |
| Kilkenny County Council | Grannagh | Municipal | 7,000 | 7,000 | |
| Kilkenny County Council | Ormonde Brick Ltd. | Industrial/private | | | 1,728 |
| Laois County Council | Ballylinan | Industrial/private | 450 | 2,500 | 405 |
| Laois County Council | Kyletalesha | Municipal | 23,000 | 38,016 | 47,489 |
| Leitrim County Council | Carrick-on-Shannon | Municipal | 2,500 | 4,470 | 6,559 |
| <i>Leitrim County Council</i> | <i>Manorhamilton</i> | <i>Municipal</i> | <i>2,200</i> | <i>2,200</i> | |
| Leitrim County Council | Mohill | Municipal | 2,000 | 6,430 | 5,762 |
| Limerick County Council | Aughinish Alumina | Industrial/private | | 1,047,378 | 1,101,244 |
| Limerick County Council | Croom | Municipal | 16,500 | 10,000 | |

| Local authority | Site name | Landfill type | Quantity deposited (tonnes/annum) | | |
|---------------------------------|--|---------------------------|-----------------------------------|--------------|----------------|
| | | | 1995 | 1998 | 2001 |
| Limerick County Council | Galtee Veneer Bonding Ltd. | Industrial/private | | | 4 |
| Limerick County Council | Gortadroma | Municipal | 40,000 | 90,700 | 132,679 |
| Limerick County Council | Irish Cement | Industrial/private | | 183,986 | |
| Longford County Council | Bord na Mona Energy Ltd. | Industrial/private | | | 997 |
| Longford County Council | Drumlish | Industrial/private | 9,010 | 9,010 | |
| Longford County Council | Lanesboro, ESB | Industrial/private | | 23,200 | 19,680 |
| Louth County Council | Drogheda Landfill | Municipal | 27,150 | 75,350 | 27,085 |
| Louth County Council | Newry Road | Municipal | 26,700 | 45,457 | |
| Louth County Council | Premiere Periclase | Industrial/private | | 16,000 | 14,720 |
| Louth County Council | White River | Municipal | 13,500 | | 31,500 |
| Mayo County Council | Asahi | Industrial/private | 75 | | |
| Mayo County Council | Beallcorrick, ESB | Industrial/private | | 11,633 | 9,000 |
| Mayo County Council | Derrinnumera | Municipal | 24,929 | 29,950 | 98,209 |
| Mayo County Council | Rathroeen, Ballina | Municipal | 15,551 | 18,000 | 38,368 |
| Mayo County Council | Shranbogrooneen, Belmullet | Municipal | 1,091 | 1,090 | |
| Meath County Council | Basketstown | Municipal | 45,000 | 87,169 | 30,533 |
| Meath County Council | Bord na Mona Energy Ltd. | Industrial/private | | | 127 |
| Meath County Council | Gypsum Industries | Industrial/private | | 7,606 | |
| Meath County Council | Irish Cement Ltd. | Industrial/private | | | 11,216 |
| Meath County Council | Murphy Concrete Manufacturing | Industrial/private | | | 280,000 |
| Meath County Council | Tara Mines Limited | Industrial/private | | 2,159,470 | 1,991,291 |
| Monaghan County Council | Knocnacran Quarry | Industrial/private | | 780 | |
| Monaghan County Council | Scotch Corner | Municipal | 20,000 | 28,730 | 33,256 |
| Offaly County Council | Bord na Mona Energy Ltd. | Industrial/private | | | 6 |
| Offaly County Council | Clonbulloge Ash Repository | Industrial/private | | | 27,049 |
| Offaly County Council | Derryclure | Municipal | 26,000 | 29,268 | 63,960 |
| Offaly County Council | Ferbane | Industrial/private | 8,000 | 30,000 | |
| Offaly County Council | Peat Ash Ltd. | Industrial/private | | | |
| Offaly County Council | Readymix (Midlands & S.E.) Ltd. | Industrial/private | | | 12,040 |
| Offaly County Council | Rhode | Industrial/private | 1,500 | 20,000 | 1,546 |
| Offaly County Council | Shannonbridge | Industrial/private | 18,000 | 35,000 | 24,060 |
| Roscommon County Council | Ballagherren | Municipal | 3,534 | 7,135 | 21,500 |
| Roscommon County Council | Boyle | Municipal | 3,633 | 3,792 | |
| Roscommon County Council | Castlereah | Municipal | 3,533 | 3,192 | |
| <i>Roscommon County Council</i> | <i>Roscommon</i> | <i>Municipal</i> | <i>6,433</i> | <i>5,959</i> | <i>18,278</i> |
| Roscommon County Council | Strokestown | Municipal | 3,033 | 3,014 | |
| South Dublin CC | Arthurstown | Municipal | | 216,284 | 334,333 |
| South Dublin CC | Corbally | Industrial/private | | | 0 |
| North Tipperary CC | Anglo American Lisheen Mining | Industrial/private | | | 910,710 |
| North Tipperary CC | Ballaghveny | Municipal | 20,000 | 22,714 | 22,935 |
| North Tipperary CC | Thurles | Municipal | 10,000 | 10,000 | |
| South Tipperary CC | Connawarries Landfill Site | Municipal | 15,000 | 31,800 | |
| South Tipperary CC | Coole Adjoinment Landfill Site | Municipal | 500 | 0 | |
| South Tipperary CC | Garryshane/Donohill Landfill Site | Municipal | | 29,115 | 42,000 |
| South Tipperary CC | Weyerhaeuser Europe Ltd. | Industrial/private | | | 200 |
| Waterford City Council | Kilbarry | Municipal | 78,000 | 28,650 | 81,700 |
| Waterford County Council | Bawnard | Industrial/private | 2,000 | 2,192 | |
| Waterford County Council | Dungarvan | Municipal | 16,000 | 44,992 | 97,972 |

| Local authority | Site name | Landfill type | Quantity deposited (tonnes/annum) | | |
|---------------------------------|---------------------------------|---------------------------|-----------------------------------|------------------|------------------|
| | | | 1995 | 1998 | 2001 |
| Waterford County Council | Tramore | Municipal | 6,200 | 13,389 | 53,706 |
| Waterford County Council | Waterford Joinery | Industrial/private | | 48 | |
| Waterford County Council | Waterford Stanley | Industrial/private | | 430 | |
| Westmeath County Council | Ballydonagh | Municipal | 15,500 | 20,841 | 23,165 |
| Westmeath County Council | Bord na Mona Energy Ltd. | Industrial/private | | | 4,050 |
| Westmeath County Council | Marlinstown | Municipal | 18,000 | 18,031 | 29,991 |
| Wexford County Council | Ballykeerogue | Municipal | 10,000 | 10,000 | |
| Wexford County Council | Killurin | Municipal | 45,000 | 54,688 | 47,080 |
| Wicklow County Council | Aghfarrell, Brittas | Industrial/private | | 100,000 | |
| Wicklow County Council | Annacurragh | Industrial/private | | 4,000 | |
| Wicklow County Council | Arklow | Industrial/private | | | |
| Wicklow County Council | Ballymurtagh | Municipal | 17,278 | 61,431 | 80,079 |
| Wicklow County Council | Dillonstown, Blessington | Industrial/private | | 100,000 | 6,000 |
| Wicklow County Council | Drummin East | Industrial/private | | 200,000 | |
| Wicklow County Council | Hudson Bros. Ltd. | Industrial/private | | | 40,000 |
| Wicklow County Council | IFI Ltd. | Industrial/private | | | 3,549 |
| Wicklow County Council | Killegar | Industrial/private | 18,400 | 20,000 | 400 |
| Wicklow County Council | Kilmurray South | Industrial/private | | 95,000 | 42,373 |
| Wicklow County Council | Noble Fassaroe | Industrial/private | | 46,000 | 10,472 |
| Wicklow County Council | Rampere | Municipal | 5,746 | 6,229 | 11,500 |
| Wicklow County Council | Russborough | Industrial/private | | | 760 |
| Wicklow County Council | Tinnapark | Industrial/private | | 0 | |
| TOTAL | | | 2,015,110 | 8,755,512 | 8,277,598 |

Table C.2 Local authority landfills, tonnes received in 2001

'Other waste' includes waste accepted as cover material.

| Local authority | Site name | Household waste (tonnes) | Commercial waste (tonnes) | Construction and demolition waste (tonnes) | Industrial waste (tonnes) | Other waste (tonnes) | TOTAL (tonnes) |
|-----------------------|----------------|--------------------------|---------------------------|--|---------------------------|----------------------|----------------|
| Carlow County Council | Powerstown | 15,971 | 4,423 | 0 | 0 | 961 | 21,356 |
| Cavan County Council | Baileboro | 3,100 | 2,200 | 0 | 0 | 1,000 | 6,300 |
| Cavan County Council | Ballyjamesduff | 2,250 | 1,600 | 0 | 0 | 500 | 4,350 |
| Cavan County Council | Belturbet | 450 | 100 | 0 | 0 | 0 | 550 |
| Cavan County Council | Corranure | 5,250 | 3,500 | 0 | 0 | 1,050 | 9,800 |
| Clare County Council | Doora | 16,321 | 7,428 | 0 | 1,651 | 28,263 | 53,663 |
| Cork City Council | Kinsale Road | 54,580 | 58,906 | 131,740 | 1,371 | 3,492 | 250,089 |
| Cork County Council | Ballyguyroe | 9,337 | 7,091 | 0 | 0 | 0 | 16,428 |
| Cork County Council | Bandon | 0 | 0 | 0 | 0 | 0 | 0 |
| Cork County Council | Benduff | 9,360 | 0 | 0 | 0 | 487 | 9,847 |
| Cork County Council | Clountreem | 0 | 0 | 0 | 0 | 0 | 0 |
| Cork County Council | Derryconnell | 10,800 | 1,200 | 2,000 | 0 | 0 | 14,000 |
| Cork County Council | Raffeen | 16,666 | 0 | 40,000 | 0 | 0 | 56,666 |

| Local authority | Site name | Household waste (tonnes) | Commercial waste (tonnes) | Construction and demolition waste (tonnes) | Industrial waste (tonnes) | Other waste (tonnes) | TOTAL (tonnes) |
|---------------------------|-------------------------------|--------------------------|---------------------------|--|---------------------------|----------------------|------------------|
| Cork County Council | East Cork | 36,197 | 13,643 | 0 | 15,210 | 84,069 | 149,119 |
| Cork County Council | Youghal | 14,408 | 0 | 0 | 0 | 38,683 | 53,091 |
| Donegal County Council | Balbane | 4,107 | 0 | 0 | 0 | 0 | 4,107 |
| Donegal County Council | Ballinacarrick | 6,500 | 1,440 | 360 | 0 | 0 | 8,300 |
| Donegal County Council | Glenalla | 10,094 | 0 | 0 | 0 | 0 | 10,094 |
| Donegal County Council | Muckish | 5,729 | 0 | 0 | 0 | 0 | 5,729 |
| Dun Laoghaire-Rathdown CC | Ballyogan | 66,173 | 855 | 27,846 | 0 | 2,934 | 97,808 |
| Fingal County Council | Balleally | 72,421 | 164,810 | 20,834 | 9,770 | 14,642 | 282,477 |
| Fingal County Council | Dunsink | 3,733 | 0 | 330,750 | 0 | 0 | 334,483 |
| Galway County Council | Pollboy | 31,785 | 37,365 | 0 | 5,556 | 101,233 | 175,939 |
| Kerry County Council | North Kerry Landfill | 28,537 | 27,862 | 349 | 5,973 | 0 | 62,721 |
| Kildare County Council | Silliot Hill | 45,021 | 6,933 | 157 | 274 | 11,742 | 64,127 |
| Kilkenny County Council | Dunmore | 15,552 | 6,048 | 424 | 7,580 | 451 | 30,055 |
| Laois County Council | Kyletalesha | 27,534 | 13,198 | 666 | 3,227 | 2,864 | 47,489 |
| Leitrim County Council | Carrick-on-Shannon | 3,032 | 2,297 | 0 | 230 | 1,000 | 6,559 |
| Leitrim County Council | Mohill | 1,939 | 1,468 | 660 | 1,695 | 0 | 5,762 |
| Limerick County Council | Gortadroma | 76,614 | 48,200 | 0 | 1,225 | 6,640 | 132,679 |
| Louth County Council | Drogheda Landfill | 0 | 0 | 27,085 | 0 | 0 | 27,085 |
| Louth County Council | White River | 10,518 | 8,335 | 2,047 | 10,315 | 285 | 31,500 |
| Mayo County Council | Derrinnumera | 28,288 | 3,642 | 588 | 2,089 | 63,602 | 98,209 |
| Mayo County Council | Rathroeen, Ballina | 6,040 | 31,874 | 0 | 346 | 108 | 38,368 |
| Meath County Council | Basketstown | 27,410 | 97 | 0 | 0 | 3,026 | 30,533 |
| Monaghan County Council | Scotch Corner | 13,405 | 6,204 | 60 | 8,406 | 5,181 | 33,256 |
| Offaly County Council | Derryclure | 24,976 | 5,503 | 1,972 | 5,640 | 25,869 | 63,960 |
| Roscommon CC | Ballaghaderren | 1,500 | 5,000 | 15,000 | 0 | 0 | 21,500 |
| Roscommon CC | Roscommon | 12,600 | 4,500 | 900 | 0 | 278 | 18,278 |
| South Dublin CC | Arthurstown | 334,333 | 0 | 0 | 0 | 0 | 334,333 |
| North Tipperary CC | Ballaghveny | 20,292 | 0 | 0 | 403 | 2,240 | 22,935 |
| South Tipperary CC | Garryshane/ Donohill Landfill | 26,600 | 10,200 | 0 | 5,200 | 0 | 42,000 |
| Waterford City Council | Kilbarry | 17,000 | 12,400 | 0 | 49,300 | 3,000 | 81,700 |
| Waterford County Council | Dungarvan | 7,484 | 1,314 | 78,145 | 9,967 | 1,062 | 97,972 |
| Waterford County Council | Tramore | 13,472 | 4,984 | 749 | 346 | 34,155 | 53,706 |
| Westmeath County Council | Ballydonagh | 9,282 | 9,633 | 0 | 4,250 | 0 | 23,165 |
| Westmeath County Council | Marlinstown | 15,418 | 0 | 270 | 1,682 | 12,621 | 29,991 |
| Wexford County Council | Killurin | 34,422 | 8,656 | 0 | 33 | 3,969 | 47,080 |
| Wicklow County Council | Ballymurtagh | 58,357 | 0 | 0 | 0 | 21,722 | 80,079 |
| Wicklow County Council | Rampere | 0 | 11,000 | 0 | 0 | 500 | 11,500 |
| TOTAL | | 1,254,859 | 533,909 | 682,602 | 151,739 | 477,629 | 3,100,738 |

Table C.3 Private and industrial landfills, tonnes received in 2001

'Other waste' includes waste accepted as cover material.

| Local authority | Site name | Household waste (tonnes) | Commercial waste (tonnes) | Construction and demolition waste (tonnes) | Industrial waste (tonnes) | Other waste (tonnes) | TOTAL (tonnes) |
|--------------------------|------------------------------------|--------------------------|---------------------------|--|---------------------------|----------------------|----------------|
| Carlow County Council | Irish Sugar Company | 0 | 0 | 0 | 57,108 | 0 | 57,108 |
| Clare County Council | Bobby O'Connell & Sons Ltd. | 0 | 0 | 0 | 1 | 0 | 1 |
| Clare County Council | Finsa | 0 | 0 | 0 | 0 | 52 | 52 |
| Clare County Council | Moneypoint ash disposal area | 0 | 0 | 0 | 0 | 119,370 | 119,370 |
| Clare County Council | Roche Ireland Ltd. | 0 | 0 | 0 | 0 | 319 | 319 |
| Clare County Council | Tradaree Point EFT | 0 | 0 | 0 | 671 | 2,552 | 3,223 |
| Cork County Council | Bantry Terminals | 0 | 0 | 0 | 50 | 0 | 50 |
| Cork County Council | Castlemore Quarries | 0 | 0 | 0 | 9 | 0 | 9 |
| Cork County Council | Irish Sugar, Mallow | 0 | 0 | 0 | 14,417 | 0 | 14,417 |
| Cork County Council | Mitsui Denman (Ire.) | 0 | 0 | 0 | 39,571 | 0 | 39,571 |
| Kildare County Council | Bushbury Ltd. | 0 | 0 | 0 | 0 | 50,000 | 50,000 |
| Kildare County Council | Carnaud Metalbox Ire. Ltd. | 0 | 0 | 0 | 52 | 0 | 52 |
| Kildare County Council | KTK Landfill | 0 | 203,284 | 89,521 | 0 | 27,742 | 320,547 |
| Kildare County Council | Tom & Pat Munnely | 0 | 0 | 0 | 0 | 15,000 | 15,000 |
| Kilkenny County Council | Arcon Mines Ltd. | 0 | 0 | 0 | 43,514 | 0 | 43,514 |
| Kilkenny County Council | Ormonde Brick Ltd. | 0 | 0 | 0 | 1,728 | 0 | 1,728 |
| Laois County Council | Ballylinan | 0 | 0 | 0 | 405 | 0 | 405 |
| Limerick County Council | Aughinish Alumina | 0 | 0 | 0 | 1,101,244 | 0 | 1,101,244 |
| Limerick County Council | Galtee Veneer Bonding Ltd. | 0 | 0 | 0 | 4 | 0 | 4 |
| Longford County Council | Bord na Mona Energy Ltd. | 0 | 0 | 0 | 997 | 0 | 997 |
| Longford County Council | Lanesboro, ESB | 0 | 0 | 0 | 19,680 | 0 | 19,680 |
| Louth County Council | Premiere Periclase | 0 | 0 | 0 | 14,720 | 0 | 14,720 |
| Mayo County Council | Beallcorrick, ESB | 0 | 0 | 0 | 9,000 | 0 | 9,000 |
| Meath County Council | Bord na Mona Energy Ltd. | 0 | 0 | 0 | 127 | 0 | 127 |
| Meath County Council | Irish Cement Ltd. | 0 | 0 | 0 | 11,216 | 0 | 11,216 |
| Meath County Council | Murphy Concrete Manufacturing Ltd. | 0 | 0 | 280,000 | 0 | 0 | 280,000 |
| Meath County Council | Tara Mines Limited | 0 | 0 | 0 | 1,991,291 | 0 | 1,991,291 |
| Offaly County Council | Bord na Mona Energy Ltd. | 0 | 0 | 0 | 6 | 0 | 6 |
| Offaly County Council | Clonbulloge Ash Repository | 0 | 0 | 0 | 27,049 | 0 | 27,049 |
| Offaly County Council | Readymix Ltd. | 0 | 0 | 0 | 12,040 | 0 | 12,040 |
| Offaly County Council | Rhode | 0 | 0 | 0 | 1,546 | 0 | 1,546 |
| Offaly County Council | Shannonbridge | 0 | 0 | 0 | 24,060 | 0 | 24,060 |
| North Tipperary Co. Co. | Anglo American Lisheen Mining Ltd. | 0 | 0 | 0 | 910,710 | 0 | 910,710 |
| South Tipperary Co. Co. | Weyerhaeuser Europe Ltd. | 0 | 0 | 0 | 200 | 0 | 200 |
| Westmeath County Council | Bord na Mona Energy Ltd. | 0 | 0 | 0 | 4,050 | 0 | 4,050 |

| Local authority | Site name | Household waste (tonnes) | Commercial waste (tonnes) | Construction and demolition waste (tonnes) | Industrial waste (tonnes) | Other waste (tonnes) | TOTAL (tonnes) |
|------------------------|--------------------------|--------------------------|---------------------------|--|---------------------------|----------------------|------------------|
| Wicklow County Council | Dillonstown, Blessington | 0 | 0 | 0 | 0 | 6,000 | 6,000 |
| Wicklow County Council | Hudson Bros. Ltd. | 0 | 0 | 0 | 40,000 | 0 | 40,000 |
| Wicklow County Council | IFI Ltd. | 0 | 0 | 0 | 3,549 | 0 | 3,549 |
| Wicklow County Council | Killegar | 0 | 0 | 0 | 0 | 400 | 400 |
| Wicklow County Council | Kilmurray South | 0 | 0 | 42,373 | 0 | 0 | 42,373 |
| Wicklow County Council | Noble Fassaroe | 0 | 0 | 0 | 0 | 10,472 | 10,472 |
| Wicklow County Council | Russborough | 0 | 0 | 0 | 0 | 760 | 760 |
| TOTAL | | 0 | 203,284 | 411,894 | 4,329,015 | 232,667 | 5,176,860 |