

# 4

## WASTE\*

### Features

- Objectives and institutional framework
- Trends in waste generation
- Progress towards waste reduction and recovery targets
- Waste treatment and disposal
- Hazardous waste

---

\* This Chapter reviews progress in the last ten years, and particularly since the 2000 OECD Environmental Performance Review. It also reviews progress with respect to the objectives of the 2001 OECD Environmental Strategy.

## Recommendations:

- reinvigorate implementation of the *National Waste Prevention Programme*, in particular priorities identified under its 2009-13 Prevention Work Plan; improve co-ordination of *regional waste management plans* to achieve national waste targets more efficiently, in particular those for biodegradable and hazardous waste;
- extend *producer responsibility initiatives* to cover a wider range of end-of-life products;
- extend *waste collection programmes* further to cover as many properties as feasible; accelerate the roll-out of programmes for separate collection, giving priority to organic and hazardous waste from households and commercial activities;
- strengthen provisions in *contracts and licences for waste management operations* so that all service providers, public or private, have the same obligation to meet high delivery and quality standards; consider transferring the regulatory and monitoring authority for waste management to regional or national level;
- accelerate implementation of the Market Development Programme for Waste Resources to increase *recycling of waste* and the use of recycled materials within Ireland; extend market-based mechanisms for waste collection, sorting and recovery to encourage private investment in waste recycling and treatment facilities.

## Conclusions

The 1998 and 2002 *national waste policy statements* and the 2001 amendments to the Waste Management Law established ambitious targets and introduced measures for improved waste management. *A number of targets were met in advance of their due dates*, including the 2010-11 targets for recovery of paper, cardboard, wood and packaging waste, and the 2013 targets for recovery of construction and demolition waste and municipal waste. *Large-scale illegal waste dumping* has been eliminated through a mix of measures, such as widening kerbside collection of household waste, setting up a specialised EPA enforcement office and introducing complaint procedures and sanctions. *Agreements between industry and the government* on end-of-life products and improvements to the infrastructure for collecting recyclable waste from households have helped increase recycling rates for glass, wood, chemicals, electrical and electronic equipment, tyres, batteries and plastic. Rationalisation of waste planning and management, including the establishment of *ten waste management regions* (down from 34 previously), and the introduction of *economic instruments* (volume-based waste collection charges, and landfill and plastic bag levies) have helped reduce

landfilling. *Revenue* from these instruments has helped intensify waste prevention and recovery measures and awareness-raising campaigns in the context of the wide-ranging 2004 National Waste Prevention Programme. *Closure of landfills* not meeting EU standards has been completed. *Recent initiatives*, notably the 2006 National Strategy on Biodegradable Waste, the 2008-12 National Hazardous Waste Management Plan and the 2007-11 Market Development Programme for Waste Resources, have set out a framework for increasing waste collection and recycling.

Except in manufacturing, however, waste generation has not been decoupled from economic growth. The amount of *construction and demolition waste* increased during the review period in line with rapid housing and infrastructure development. *Municipal waste* generation grew in line with population growth and final private consumption, and per capita waste generation remains among the highest in the OECD. Accelerated implementation of the *National Strategy on Biodegradable Waste* is now urgent following four-year derogations from the 2006 and 2009 EU Landfill Directive targets. *Hazardous waste* has been on the increase and around 10% is classified as unreported, most likely being mixed with municipal refuse. Ireland continues to rely substantially on *foreign infrastructure for recycling and disposal*, sending abroad over 80% of the total waste and almost half of the hazardous waste generated. Despite improvement, *municipal waste collection* is fragmented and not adequately regulated. Some households still engage in *illegal backyard burning and fly-tipping*, and new legislation has been introduced in 2009 to address the issue of backyard burning. Although recovery has increased, waste management still depends heavily on *landfilling*, and Ireland is far from achieving the 2013 target of diverting 50% of household waste from landfills. The *mechanical-biological treatment capacity* is insufficient for residual waste. A comprehensive review of waste management policy, launched in 2008, should assist in setting priorities for a revitalised approach to waste management.



## 1. Policy and Institutional Setting

### *Objectives*

The 1996 *Waste Management Act and the 1998 policy statement “Changing Our Ways”* provided an overall regulatory framework and policy objectives for waste management, including implementation of the EU waste management hierarchy.<sup>1</sup> The

Waste Management Act introduced a pay-by-use approach, requiring users to cover costs associated with waste management services, along with the proximity principle (*i.e.* treatment and disposal should occur near where the waste is collected). The 1998 statement set several targets, including the following for 2013: recycling 35% of municipal waste and 85% of construction and demolition waste, diverting 50% of household waste and at least 65% of biodegradable waste away from landfills and reducing the number of municipal landfills from 75 to 20. There were also qualitative targets related to increased capacity for biological and thermal treatment of waste with high environmental standards (DELG, 1998). In 2001, a National Hazardous Waste Management Plan set out recommendations for the prevention, collection and treatment of hazardous waste (EPA, 2001a). *Regional planning* for waste services and infrastructure, introduced by the Waste Management Act, promoted integrated solutions for groups of municipalities. By 2002, ten regional waste management plans had been developed, and all have been reviewed in recent years.<sup>2</sup>

Two government documents reiterated the integrated approach to waste management at national level: “*Preventing and Recycling Waste – Delivering Change*” in 2002 and “*Waste Management – Taking Stock and Moving Forward*” in 2004. They also announced the extension of pay-by-use charging, the introduction of levies on plastic shopping bags and landfilling (with the revenue allocated for waste prevention and recycling), the launch of producer responsibility initiatives for end-of-life products and the development of programmes to identify markets for recycled materials. Programmes on priority issues were later approved, including the 2004 National Waste Prevention Programme and the 2006 National Strategy on Biodegradable Waste. The latter aims to meet targets of the EU Landfill Directive (1999/31/EC). A new National Hazardous Waste Management Plan to 2012, adopted in 2008, identified gaps and recommended action to assure sound management and treatment of hazardous waste (EPA, 2008a).

Over 30 pieces of legislation strengthening the waste management regulatory framework, including the 2001 amendments to the Waste Management Act and the 2003 Protection of the Environment Act, came into effect between 1996 and 2008. Many were intended to transpose EU requirements into Irish law, but initially the pace and scope of the transposition were far from satisfactory. For example, in 2005, the European Court of Justice (ECJ) condemned Ireland for systematic disregard of provisions of the Waste Framework Directive, including those on safe disposal, an adequate network of disposal installations and permits for waste disposal operations. More recently, though, the process has accelerated, and with the latest harmonisation of legislation on producer responsibility for end-of-life products, the major transposition problems have been addressed.

### *Institutional framework*

Under the 1996 Waste Management Act, the central government and local authorities share responsibility for implementing waste policy objectives. At the *central level*, the Department of the Environment, Heritage and Local Government (DoEHLG) develops national waste policies within the context of EU and domestic legislation. The DoEHLG also supports waste management projects financially, including through an Environment Fund financed by the levies on plastic shopping bags and landfilling. The Environmental Protection Agency (EPA) is in charge of developing national hazardous waste management plans, licensing waste recovery and disposal activities and operating the national waste information systems. It also defines criteria and procedures for landfill site selection, management, operation and termination. In 2003, the Office of Environmental Enforcement (OEE) was established under the aegis of the EPA to assist local authorities in addressing illegal waste disposal, among other issues.

The role of *local authorities* has gradually evolved from the traditional collection of household waste and operation of landfills to regulation and monitoring of waste services. Other newer tasks of local authorities include preparing waste management plans, promoting waste reduction and recycling, enforcing packaging regulations and controlling illegal dumping.

Many local authorities have allowed *private sector operators* to enter the municipal waste collection market. In 2007, 52% of household waste was collected by private services, which operated in all 34 council areas. The entry of private companies into waste collection and treatment was stimulated by the ability to charge user fees and the increasing volume of waste to be managed; in addition, the rise in waste management quality standards, mainly driven by EU regulations, and the increased costs and skills required, have led local authorities to withdraw from service delivery (OECD, 2008). A movement towards vertical and horizontal market consolidation has taken place within the private sector. Vertical integration has led single companies to offer both collection and waste management services. The small, spread-out customer base has also encouraged horizontal integration: a handful of substantial operators have acquired the business of their smaller counterparts. Several providers have begun to provide services beyond their regional boundaries of their principal operations (OECD, 2008).

## **2. Waste Generation Trends**

Ireland generated almost 31 million tonnes of waste in 2006, an increase of around 80% from the approximately 17 million tonnes generated in 2001 (Table 4.1). This dramatic rise was mostly due to increased generation of *construction and*

*demolition waste* (from 3.7 million tonnes in 2001 to 16.8 million in 2006) and *mining and quarrying waste* (from 3.3 million tonnes in 2001 to 4.8 million in 2006) (EPA, 2001, 2009).<sup>3</sup> Both increases reflect accelerated activity in the construction sector during the review period (Chapter 6). *Manufacturing* was the only sector to record a decrease in waste generation, by 25%. This decline was due partly to industrial restructuring that entailed some facilities being closed, but also to tighter environmental permitting and technological change. Within manufacturing, the food industry is the top waste generator at 43% of the sector total, followed by metals (30%) and chemicals (8%).

The annual volume of *municipal waste* increased by 25%, from 2.7 million tonnes in 2001 to almost 3.4 million in 2007, in line with growth in the economy, the population and private final consumption (Figure 4.1).<sup>4</sup> Household waste increased by 20% while commercial waste rose by nearly 35% and accounted for 46% of the total municipal waste volume in 2007, up from 42% in 2001 (Figure 4.2). The amount of

Table 4.1 **Waste generation, 2001 and 2006**

	2001		2006	
	('000 tonnes)	(%)	('000 tonnes)	(%)
Manufacturing waste	5 120	30	3 819	12
Construction and demolition waste	3 651	21	16 820	55
Mining and quarrying waste	3 334	19	4 783	16
Municipal waste	2 704	16	3 385	11
Dredge spoils	1 257	7	— <sup>a</sup>	—
End-of-life vehicles and scrap metal <sup>b</sup>	350	2	744	2
Energy, gas and water supply waste	310	2	333	1
Hazardous waste	259	1	314 <sup>c</sup>	1
Contaminated soil	169	1	407	1
Urban wastewater sludge	160	1	60	—
Drinking water sludge	7	—	40 <sup>d</sup>	—
Total	17 321	100	30 704	100

a) Dredging not carried out in 2006 at EPA-licensed operations.

b) Municipal metals counted in the municipal waste stream.

c) Including 29 888 tonnes of unreported hazardous waste.

d) Best estimate available.

Source: EPA, 2001b, 2009.

municipal waste per capita is very high by OECD standards at 780 kg in 2007 (an increase from 600 kg in 2000); only Denmark and Norway generate more waste per person. About 70% of the municipal waste generated in Ireland is biodegradable, and the amount of biodegradable waste has grown at twice the rate of overall municipal waste (Box 4.1 and Table 4.2).<sup>5</sup> The amount of sewage sludge generated, however, decreased from 160 000 tonnes in 2001 to 60 000 tonnes in 2006.

In 2007, 305 000 tonnes of *hazardous waste* was generated, up by 18% from 2001 (Table 8.7). This includes about 30 000 tonnes of unreported hazardous waste generated mainly by households, small businesses and farms (EPA, 2009).<sup>6</sup> Industry generated the largest share of hazardous waste, including solvents, waste oil, sludge and chemical waste. Around 200 000 tonnes of *contaminated soil* is removed every year for treatment.<sup>7</sup>

Table 4.2 Biodegradable waste, 2001-07

	2001	2002	2003	2004	2005	2006	2007	Performance targets of the 2006 National Strategy on Biodegradable Waste		
								2010	2013	2016
Managed ('000 t)	1 491	1 548	1 683	1 935	1 999	2 279	2 318			
Disposed ('000 t)	1 257	1 187	1 146	1 304	1 308	1 413	1 475	967	665	451
Recovery of organics ('000 t)	22	34	47	49	48	65	79	242	318	332
<i>Recovery rate (%)</i>	4	6	8	7	6	8	9	25	33	36
Recovery of textiles ('000 t)	4	1	3	11	11	10	11	29	38	45
<i>Recovery rate (%)</i>	7	2	6	7	7	6	4	15	20	25
Recovery of paper and cardboard ('000 t)	166	263	359	376	432	589	530	573	675	665
<i>Recovery rate (%)</i>	21	31	39	46	49	55	58	55	65	67
Recovery of wood ('000 t)	41	64	128	161	200	204	224	164	164	165
<i>Recovery rate (%)</i>	85	91	96	92	94	93	93	90	90	95
Home composting ('000 t)	..	..	..	..	30	29	34	97	96	110

Source: EPA, 2009.

### Box 4.1 Biodegradable waste

About 70% (2.3 million tonnes) of the household and commercial waste managed in 2007 was biodegradable. The largest fractions of biodegradable municipal waste are organic (food and garden) waste at 40% and paper and cardboard at 39%, with textiles (11%) and wood (10%) accounting for the rest. The volume of biodegradable waste generated has increased by 50% since 2001. The percentage of organic waste in household and commercial bins has also increased as more recyclable waste is collected separately. The growing share of biodegradable waste in municipal refuse has several negative effects. These include the release of odorous landfill gases, which also contribute to global warming, and increased management costs for leachate and gas collection, which must be carried out both during landfills' operation and after their closure.

The *EU Landfill Directive* requires member countries to reduce the amount of biodegradable municipal waste going to landfill to 75% of the level produced in 1995 by 2006, 50% by 2009 and 35% by 2016. Ireland received four year derogations on the 2006 and 2009 targets as one of the EU countries consigning more than 80% of collected municipal waste to landfill in 1995 (92% of the 1.3 million tonnes of biodegradable waste generated that year).

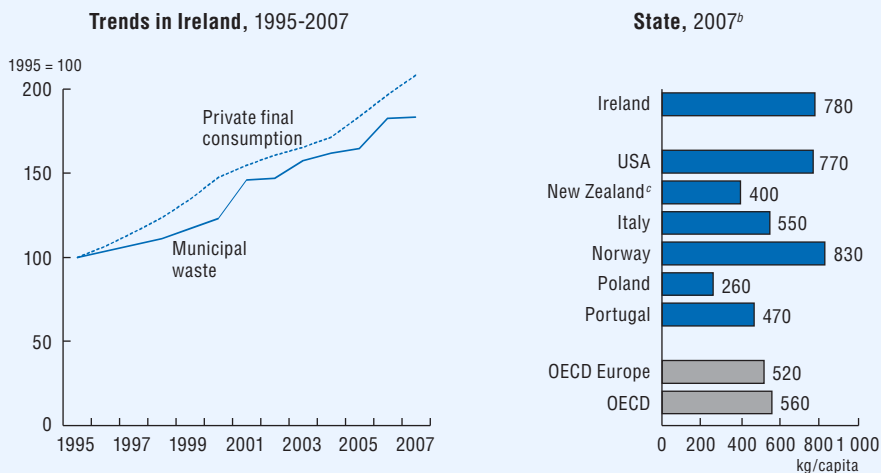
Ireland has made *impressive progress in diverting biodegradable municipal waste from landfills*: in 2007, 840 000 tonnes of such waste was diverted, nearly four times the 2001 amount. This represented 36% of the total biodegradable waste generated, up from 15% in 2001. While recovery rates are high for wood (93%) and paper (58%), they are low for organics (9%) and textiles (4%). Notwithstanding the significant progress, meeting the Landfill Directive targets is challenging. In 2007, the amount of waste going to landfills was still more than 50% above the new 2010 target.

The 2006 *National Strategy on Biodegradable Waste* sets out measures to meet the targets and facilitate the diversion of some 1.4 million tonnes of biodegradable municipal waste by 2010, rising to a projected 1.8 million tonnes by 2016 (DoEHLG, 2006a). Provisions for separate, kerbside collection of organic waste in brown bins are designed to cover at least 40% of those households which cannot compost their waste by 2010, 45% by 2013 and 50% by 2016. In 2007 there were 22 operational composting projects, increasingly based on in-vessel systems with recent interest in anaerobic digestion for animal and industrial bio-waste. The strategy envisages further development of centralised composting capacity and the development of mechanical-biological treatment for residual waste, supported by thermal treatment with energy recovery.

Efforts are also being made to promote *home composting* where feasible. Some local authorities in Ireland offer compost containers to households at reduced prices. The cost varies by county but is generally between EUR 25 and EUR 35 per bin.



Figure 4.1 Municipal waste generation<sup>a</sup>



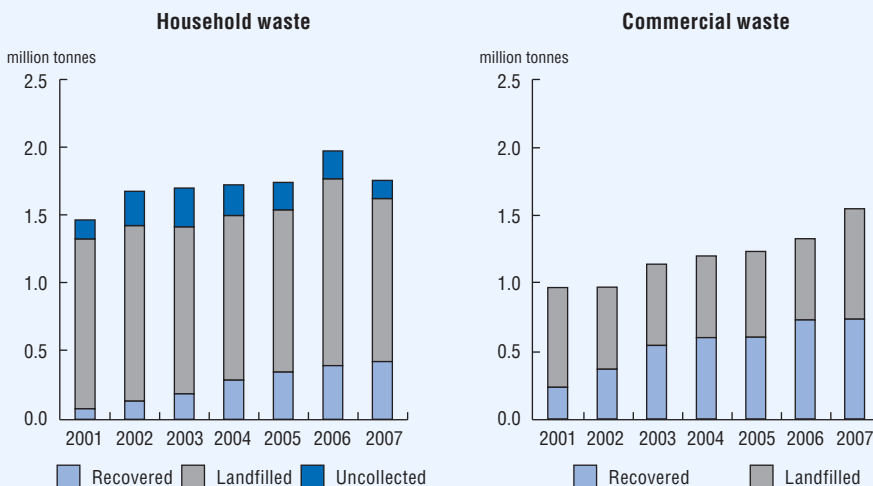
a) In interpreting national figures, it should be borne in mind that survey methods and definitions of municipal waste may vary from one country to another. According to the definition used by the OECD, municipal waste is waste collected by or for municipalities and includes household, bulky and commercial waste and similar waste handled at the same facilities.

b) Or latest available year.

c) Household waste only.

Source: OECD, Environment Directorate.

Figure 4.2 Municipal waste generation, recovery and disposal, 2001-07



Source: EPA (2009).

### 3. Performance in Managing Non-Hazardous Waste

#### 3.1 Reduction and recovery

##### *Construction, demolition, mining and manufacturing waste*

Although the volume of construction and demolition waste generated is high, so is the recovery rate: in 2005, 13 million tonnes or 87% of such waste was recovered, mostly for use as landfill cover and in landscaping, exceeding the 2013 target of 85%,<sup>8</sup> though the rate dropped to 79% in 2006 and 72% in 2007. Construction and demolition waste is largely soil and stones (76%) and a recovery rate of 80% of this fraction was reported in 2007, down from 95% in 2005. The reported recovery rate for the remainder, consisting of concrete, rubble, wood, glass, metal and plastic, was lower but increasing, reaching 44% in 2007 (EPA, 2001 and 2009).

However, a significant degree of *non-compliance with reporting obligations by the waste industry* undermines data validity.<sup>9</sup> To improve reporting performance, local authorities should join together to let operators know they will not renew permits or authorise new ones for operators that consistently fail to comply with permit conditions. In 2007, the EPA provided training to local authorities on data management and reporting, and carried out data audits. As a result, local authorities' information management systems are improving (EPA, 2007).

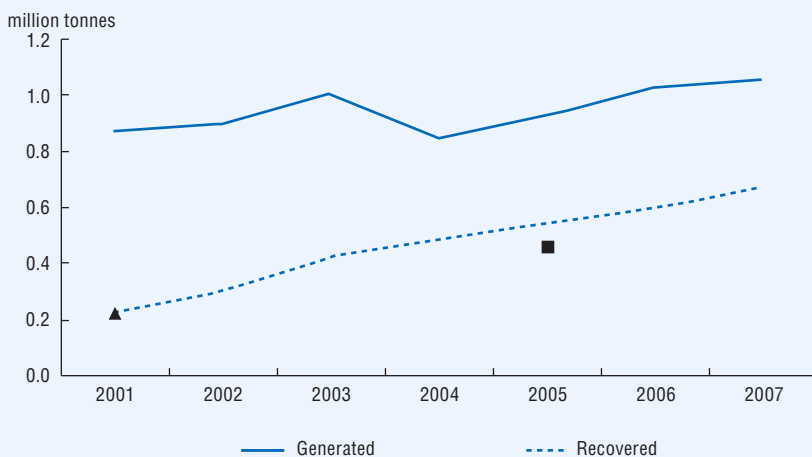
The *National Construction and Demolition Waste Council* (NCDWC), set up in 2002, co-ordinated the development and implementation of a voluntary construction industry programme and launched a voluntary construction industry initiative (NCDWC, 2005). Through local seminars the initiative promoted better waste management, including the Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects, which were subsequently published by the DoEHLG in 2006. The guidelines introduced the concept of on-site waste management planning for projects above certain thresholds and provided a blueprint for designers, developers, practitioners and authorities regarding management of construction and demolition waste. The voluntary mandate of the NCDWC and the overall management of construction and demolition waste are being studied as part of the review of waste policy to ensure that the industry is applying the best possible means of preventing, minimising and recycling such waste.

*Mining, quarrying and manufacturing waste* comes from a small number of large facilities, which are regulated under the EPA integrated pollution prevention and control (IPPC) licensing regime. Over 80% of mining waste, including tailings, is either recovered or disposed of on site. Recovery of manufacturing waste increased

from 35% in 2004 to 38% in 2006 (EPA, 2007). Implementation of the landfill levy, along with landfilling quotas and bans for manufacturing waste, put pressure on producers to find alternative disposal methods, including recycling.

Producer responsibility initiatives for *recovery of packaging, electrical and electronic equipment, farm plastics and end-of-life vehicles* have helped increase recycling rates, particularly in the first three categories. Packaging waste recovery rose from 25% in 2001 to 64% in 2007, exceeding the 2005 EU target of 50% in 2004 and the 2011 target of 60% in 2007 (Figure 4.3). Ireland's collection rate for waste electrical and electronic equipment from households is 7.4 kg per capita, nearly twice that required under the EU directive on such waste. It is estimated that over 8 500 tonnes of farm plastics, 55% of the total generated, has been recycled under the relevant initiative since its launch in 1997.<sup>10</sup> The success of these initiatives prompted the DoEHLG to introduce similar regulations for tyres in 2007 and batteries in 2008. Because the producers and importers of the goods concerned have been identified and are relatively few, relations between government and industry are good and recovery initiatives for end-of-life products have been effective in most cases.

Figure 4.3 **Packaging waste generation and recovery,<sup>a</sup> 2001-07**



a) Recovery targets are 25% by 2001 (▲) and 50% by 2005 (■).  
Source: EPA (2009).

However, a large amount of manufacturing waste is exported for recovery and disposal. It mainly consists of meat and bone meal from slaughtering and rendering operations and solvents from the chemical and pharmaceutical sectors. The exports have been stimulated by easily access to markets for such waste in other countries, low transport costs and lack of appropriate waste recovery infrastructure in Ireland. This practice contravenes the proximity principle and does not provide incentives for waste reduction. Industry should actively apply waste prevention, reduction, reuse and recycling principles, taking advantage of opportunities provided under the 2007-11 Market Development Programme for Waste Resources and the 2004 National Waste Prevention Programme (Box 4.2). As in the case of construction and demolition waste, greater attention needs to be paid to the obligation to accurately record waste generation and management, and to the use of existing guidance and advice on waste quantification and monitoring.

### *Municipal waste*

Growing problems stemming from increasing amounts of municipal waste and widespread illegal dumping that occurred in the early 2000s have stimulated efforts to improve waste collection. *Kerbside collection* expanded in the review period to reach 80% of households on average in 2007, up from 76% in 2004, and to account for around 70% of the 1.8 million tonnes of household waste.<sup>11</sup> While coverage is 100% in the larger urban centres, it remains as low as 50% in some rural areas (EPA, 2005).

Kerbside collection is carried out by municipal services and, increasingly, by the private sector operators.<sup>12</sup> *Waste collection permits*, issued by local authorities, include extensive operational requirements, such as full compliance with waste collection and disposal regulations, adequate equipment and insurance, and confirmed and agreed legal outlets for the waste collected. Compliance is audited by dedicated enforcement teams. However, the permits do not specify charges to householders, and the impact of a given operator's charging system (on low-income households, for example) is not taken into consideration when issuing permits. Permit applications cannot be refused except for a very limited range of reasons. Some municipalities allow property owners and private waste collectors to reach individual agreements without municipal involvement, resulting in waste collection regimes that do not cover all households.<sup>13</sup> In 2008, Dublin's four local authorities reviewed the waste collection permits held by more than 100 companies in an effort to address the unsustainable practice of having numerous trucks collecting waste in the same neighbourhoods, causing traffic congestion, noise and air pollution, and adding to greenhouse gas emissions.

Kerbside collection has been supported by public investment in *waste collection points* called "bring banks" and "civic amenity sites", where individuals can deposit waste for recycling.<sup>14</sup> The network of bring banks expanded from

### Box 4.2 National Waste Prevention Programme

The National Waste Prevention Programme, initiated in 2004, aims to prevent and minimise generation of both hazardous and non-hazardous waste. A *National Waste Prevention Committee*, overseeing the programme development and implementation, is chaired by the EPA and comprises a wide range of stakeholders from industry, commerce, agriculture, local authorities, non-government organisations and government departments.

Since its establishment, over EUR 12 million has been committed to the programme from the Environment Fund. Programme initiatives include:

- *Local Authority Prevention Demonstration Programme* ([www.lapd.ie](http://www.lapd.ie)), which helps local authorities design and implement integrated waste prevention programmes and projects with direct technical expertise (from the Clean Technology Centre, Cork Institute of Technology), and provides grants to increase waste prevention capacity. In many instances, local authority staff have been seconded to prevention projects.
- *Green Business Initiative* ([www.greenbusiness.ie](http://www.greenbusiness.ie)), a web-centred project enabling any business or organisation to assess its environmental performance, particularly in relation to waste and to water use. Self-audit tools were piloted in 2008 at a range of companies in various sectors. Via telephone, e-mail and site visits, advice is available at no cost to participating firms on how to make net cost savings through resource efficiency measures.
- *Green Hospitality Awards*, a programme involving up to 200 hotels, providing opportunities for audits, training and guidance on waste prevention, among other environmental issues. A range of award and assessment criteria underpins the project. After an entry-level bronze award, participants can progress to silver, gold and platinum levels – the last being close to the EU Flower level of environmental performance. The awards are based on independent inspections. Award ceremonies are held for successful businesses.
- *Packaging Prevention Programme* ([www.preventandsave.ie](http://www.preventandsave.ie)), jointly funded by the National Waste Prevention Programme and Repak, an industry initiative. It involves the development of initiatives to assist with packaging prevention by producers, and includes training, seminars, case studies and information on requirements. The programme is part of the strategy being devised by the National Strategy Group for Packaging Waste Recycling.
- *Green Home Programme* ([www.greenhome.ie](http://www.greenhome.ie)), which promotes waste prevention and sustainable living in the homes of school children associated with the An Taisce Green Schools initiative, but also targets the wider community. A comprehensive website, an action pack and a handbook cover prevention at home in relation to waste, water, composting, energy and transport. Each participating school community was awarded a Green Home pennant for display along with the Green Schools Flag.

### Box 4.2 National Waste Prevention Programme (*cont.*)

Also as part of this programme, a National Waste Report has been published annually and the revision and implementation of the National Hazardous Waste Management Plan have been pursued. The programme provides enforcement support for producer responsibility initiatives, including those for waste electrical and electronic equipment, packaging, and restriction of solvents and decorative paints, as well as regulations in relation to ozone depleting substances, persistent organic pollutants and polychlorinated biphenyls. In 2008, a *revised prevention plan for 2009-12* was published, the aim being to further support prevention opportunities and meet the requirements of the revised EU Waste Framework Directive.

around 1 600 in 2002 to nearly 2 000 in 2007 and the amount of waste collected rose from 35 000 tonnes to 95 000 tonnes. The number of civic amenity sites nearly doubled, from 49 to 90, in the same period, during which the amount collected grew from 60 000 tonnes to over 200 000 tonnes (EPA, 2009).

Waste collection was not subject to charging before 1999 in many places, including the city of Dublin. The gradual introduction of a flat charge drew public opposition, as it was considered double taxation. The protests were eliminated through the introduction of *weight- or volume-related waste collection charging*, which began in 2005, the date the government had set for applying pay-by-use systems. This approach, first announced in the 1996 Waste Management Act, involves linking cost recovery (estimated at 80% in Ireland) with incentives to minimise waste. It gives collectors discretion in charging provided they respect the pay-by-use principle. The systems chosen range from tag-a-bag/bin to on-board weighing of bins using microchip technology. Household waste collection rates vary considerably, from EUR 80 in Dublin to EUR 466 in Wexford (annual flat fee for collection of a 2 40l bin), plus a volumetric fee ranging from EUR 1.5 to EUR 13 (OECD, 2008). Most service providers differentiate between separated and residual waste, so households have financial incentives to minimise and separate waste. Recent studies indicate that the average reduction in volumes of mixed waste is 40-50% in some local authorities where weight-based charging is used, and that the presence of a kerbside recycling service has a large part to play in getting households to reduce waste (O'Callaghan-Platt, Davies, 2008). Nevertheless, some service providers still offer tariffs that only tenuously link charges to volume or weight (Lyons, 2009).

With the introduction of user charges, *charges have been waived* for some low-income households. Such waivers mostly occur in cities where waste collection is not run by private providers. Waterford City Council provides the most waivers of any local authority, with almost 10% of its population exempted (OECD, 2008). No national guidelines on waivers exist. Some local authorities link waivers to income, while others give them only to the elderly and unemployed. The relative lack of aid for poorer segments of society, especially in rural areas, may have reinforced the tendency towards fly-tipping.

*Recycling of municipal waste* has grown rapidly, from 9% of total municipal waste treated in 1998 to 36.5% in 2007 (Figure 4.2).<sup>15</sup> Ireland is now in the top fifth of OECD countries for municipal waste recycling, having reached in 2005 the overall 2013 target of a 35% recycling rate for municipal waste; however, this achievement was mostly due to high recycling rates for commercial waste (nearly 50%); only 26% of household waste was recovered in 2007. Thus, some distance remains to meet the 2013 target of diverting 50% of household waste from landfills. In 2003, some 560 000 Irish households (42% of the total) had multibin collection service; current industry figures indicate that segregated collection of dry recyclables (paper, cardboard, cans, plastic) is provided to over 1 million households nationwide, with the service continuing to expand (OECD, 2008). Policies and measures on household waste diversion, including awareness-raising campaigns, still need to be strengthened, especially as regards collection systems for dry recyclables and organic (food and garden) waste (Box 4.2).

While separate collection and waste recovery have increased, *recycling capacity has not*. Ireland exports over 75% of its recyclable municipal waste for recovery and treatment (mostly to the UK, Spain, Portugal, the Netherlands and Asia), as it has no facilities to recycle ferrous metal, glass, or paper and cardboard (Table 4.3).<sup>16</sup> Interest in exploiting the commercial and job potential of recycling in Ireland has been limited, as the home market for recycled products is unstable and small while the cost of waste transport is low (especially towards Asia, since returning freight ships can be loaded with waste for recycling).

To remedy the underdeveloped waste infrastructure, the *Waste Management Infrastructural Grant Scheme* under the Regional Operational Programmes 2000-06 provided over EUR 100 million in financial assistance. The funds helped local authorities develop waste recovery infrastructure, including collection points and centralised composting facilities. In addition, much of the Environment Fund resources are allocated for improving recycling infrastructure (Box 4.3).

The 2000-06 National Development Plan (NDP) assumed that EUR 570 million, or 70%, of the investment in *waste management infrastructure would come from the*

Table 4.3 **Waste recycling in Ireland and abroad, <sup>a</sup> 2007**

	Recycled in Ireland	Recycled abroad		Share of waste recycled abroad
	('000 tonnes)			
	Total	Total	Packaging waste	(%)
Organic waste <sup>b</sup>	218	10	–	4
Wood	224	13	11	6
Textiles	2	5	–	76
Plastic	20	64	39	77
Aluminium	4	14	4	78
Glass	25	123	114	83
Other metals	5	37	–	88
Paper and cardboard	3	527	314	99
Ferrous metals	2	732	53	99
Refuse-derived fuel	–	33	7	100
Other <sup>c</sup>	–	1	1	100
<b>Total</b>	<b>503</b>	<b>1 559</b>	<b>543</b>	

a) Includes municipal waste; excludes imports and hazardous waste.

b) Includes edible oil and fat.

c) Composites and mixed packaging.

Source: EPA, 2009.

*private sector*. However, less than half that much was raised (OECD, 2008). The main obstacle to private sector investment in recycling facilities is the lack of *i*) a clear regulatory framework for waste management and *ii*) integrated planning for the use of waste as a resource. For example, due to competition for waste between local authority and private providers, there is no long-term guarantee of secure flows of appropriate waste streams for recycling facilities. Decision-making at regional level does not provide an adequate basis for taking advantage of economies of scale in managing some municipal waste streams nationwide. It has been argued that regional plans have not allowed providers to build up sufficient operational capacity for composting of source-separated food and garden waste (OECD, 2008). A comprehensive review of waste management policy, launched in 2008, is expected to result in proposals for more effective relations between the public and private sectors in waste collection. Meanwhile, the 2007-11 Market Development Programme for Waste Resources, launched by the DoEHLG in 2006, will assist in developing markets for recyclables so as to reduce reliance on exports (DoEHLG, 2007a).



### Box 4.3 The Environment Fund and the plastic bag and landfill levies

The Environment Fund was established in 2002 to manage the revenue generated by the *plastic bag levy*, introduced in March 2002, and the *landfill levy*, introduced in July 2002. The DoEHLG manages the fund.

The *levy on plastic bags* was designed to control litter from discarded plastic shopping bags. Initially set at EUR 0.15 per bag, it is collected by the Revenue Commissioners on behalf of the DoEHLG. Since its introduction, over EUR 98 million has been collected, including over EUR 19 million in 2006 and over EUR 22 million in 2007. The introduction of the levy led to an immediate decrease of 90% in the use of plastic bags, to an average 21 bags per capita compared with 328 previously. However, the usage rate gradually increased again, reaching 31 bags per capita in 2006. As a result, the levy was raised to EUR 0.22 per bag in 2007. While no immediate increase to the levy is currently sought new legislation is expected to increase the levy by the Consumer Price Index from the date of the last increase, plus up to 10% of the base in the given year, with a defined cap of EUR 0.40.

The purpose of the *landfill levy* is to encourage waste recovery and recycling by increasing the gate fee at landfills, thereby making landfilling less commercially attractive. The levy applies to both local authority and private landfills and is collected by local authorities on behalf of the DoEHLG. Initially EUR 15 per tonne, it was raised in 2006 to EUR 20 per tonne. Local authorities can retain 2% of levies collected from private landfills to cover administrative costs. They can retain 80% of levies collected in connection with dealing with unauthorised sites, to defray the additional costs incurred in pursuing these cases. Since 2001, over EUR 165 million has been collected, including EUR 30 million in 2006 and EUR 32 million in 2007 (DoEHLG, 2007b). Existing legislation allows the levy to be increased by EUR 5 in any 12 month period. As with the plastic bag levy, consideration is being given to substantially increasing the levy and to raising the maximum increase allowed in future years. A further proposal would broaden the scope of the levy to include incineration.

The *revenue from the Environment Fund*, which came to over EUR 50 million in 2006, supports a range of activities in waste management, including prevention and reduction programmes, recovery activities, research and development, enforcement of laws relating to waste management and both regional and national environmental awareness-raising campaigns. In 2006, the largest expenditures supported recycling operating costs (EUR 10 million), research and development by the EPA (EUR 7 million) and local authority enforcement initiatives, particularly those combating illegal dumping and other unauthorised waste activities (EUR 7.5 million).

### 3.2 Treatment and disposal

The amount of waste landfilled decreased significantly over the review period, from 47% (8.3 million tonnes) of the total generated in 2001 to 19% (6 million tonnes) in 2007. Around 4 million tonnes of waste was deposited in private or industrial landfills in 2007, compared with 5.1 million tonnes in 2001, and 2 million tonnes went to landfills operated by local authorities or on their behalf, down from 3.1 million in 2001 (EPA, 2009). Despite the steady increase in material recovered, the amount of municipal waste landfilled per year still averages 1.9 million tonnes (1.2-1.4 million tonnes of household and 0.6-0.8 million tonnes of commercial waste; 55% of the total), unchanged since 2000 (Figure 4.2). Similarly, around 2 million tonnes a year of mining waste is landfilled (around 40% of the total). Around 1 million tonnes of construction and demolition waste (5.6% of the total) and 0.3 million tonnes of manufacturing waste (6% of the total) go to authorised landfills each year.

Disposal of *sewage sludge* at sea, mainly from the Ringsend Treatment Plant, was terminated in 1999.<sup>17</sup> Some 60% of sludge is reused on agricultural land and 40% is disposed of in landfills. Ireland is now compliant with EU sewage sludge policy. Local authorities maintain a register of all movements and uses of sludge and other biosolids and require advance notification of proposed land banks to be used for spreading of biosolids. Use of biosolids in agriculture requires compliance with an approved nutrient management plan and the DoEHLG codes of good practice.

The national *landfill capacity for municipal waste* seems adequate, even though the number of landfills fell from 92 in 2001 (of which local authorities operated 50) to 48 in 2007 (29 of them run by local authorities). Several landfills were closed because they were full and/or because of strict licensing conditions: since 2004 the EPA has refused licences to landfills not complying with the EU Landfill Directive (EPA, 2009).

In an attempt to maintain landfill capacity, make alternative waste management options financially viable and meet costs of the stricter environmental and hygiene standards for siting, design and operation under the licensing system, *landfill gate fees* were increased. Average fee levels rose by 375%, from EUR 40 per tonne in 2000 to EUR 150 per tonne in 2004.<sup>18</sup> Although the fees were moderated in 2006 (to EUR 135) and 2007 (to EUR 127 or even, in some parts of the country, to less than EUR 100) due to competition from recycling (including composting) and waste-to-energy facilities, they remain relatively high. Gate fees include the *national landfill levy* introduced in 2002 to encourage waste recovery and recycling (Box 4.3). Gate fees for organic waste, at EUR 90 per tonne in 2007, remain among the highest in Europe. The higher cost of organic waste treatment in Ireland is partly due to the relatively small scale of facilities in operation (Eunomia, 2007).

Landfilling of municipal waste was at its lowest in 2003 and 2004, when landfill fees were the highest (Figure 4.2). This suggests that the increase in fees had the effect of diverting waste streams from landfill (Forfás, 2008). On the other hand, increases in the cost of waste management, combined with landfill scarcity and a lack of organised services for rental properties, have led to less desirable conduct, such as *ad-hoc fly-tipping, backyard burning and more organised larger-scale illegal dumping* (O’Callaghan-Platt, Davies, 2008).<sup>19</sup> There has also been significant illegal movement of waste to Northern Ireland, especially in 2002-04 (Chapter 8). The widespread occurrence of illegal waste activity, as well as ECJ rulings on non-compliance with EU waste legislation, brought about significant efforts to tackle these problems. The responses included *i*) establishing the Office of Environmental Enforcement within the EPA to tackle illegal waste activity, *ii*) providing government funding for dedicated local authority enforcement staff, *iii*) setting up a 24 hour confidential helpline for reporting illegal waste activity, *iv*) launching a National Complaints Procedure, handled by the OEE, and *v*) strengthening sanctions against dumping.

A 2005 study of unauthorized waste activity concluded that large-scale illegal dumping was no longer taking place but that fly-tipping and backyard burning still occurred, with the latter being the main source of dioxins in Ireland (Chapter 2). While the practice of backyard burning of waste was already considered illegal under waste legislation, the Waste Management (Prohibition of Waste Disposal by Burning) Regulations introduced in July 2009 made more explicit the prohibition of this practice (except in specified circumstances related to agricultural practices) and increased fines for failure to comply with the regulations to as much as EUR 3 000.

It is recognised that local authorities face major challenges in meeting the costs of *remediation of old landfill sites*, including unlicensed ones. An EPA analysis put total remediation costs at EUR 140-200 million. Since 2006, the DoEHLG has provided financial assistance in the form of limited grants towards remediation of closed licensed landfills, pending completion of an inventory and detailed site-by-site analysis.

Ireland has no *thermal treatment plants* for municipal waste. The EPA granted licences for commercial incinerators at Carranstown and Ringaskiddy in 2005, and for one at Ringsend in Dublin in 2008. So far construction has started only at the Carranstown facility, after delays stemming from judicial reviews of the plant’s conformity with EU environmental regulations.<sup>20</sup> Although regional waste management plans propose seven incinerators, the current government policy is to limit incineration to facilities that have already received a licence and to focus on waste reduction, reuse and recycling (EPA, 2009).

## 4. Hazardous Waste Management

*Slightly more than 50% of the hazardous waste generated in Ireland is treated domestically: around 27% is treated on site (56% of this portion being recovered, 26% incinerated and 18% landfilled), mostly at IPPC-licensed facilities; a further 25% is handled at 15 authorised hazardous waste facilities, with 60% recovery and 40% final disposal rates (Chapter 8). From 2000 to 2005, on-site treatment steadily decreased, but this trend appears to have reversed in 2006. Treatment at commercial facilities nearly doubled over the same period, with waste oil, oily sludge, acid and alkali waste, solvents and general chemical waste accounting for most of the increase.*

Implementation of several measures in the *2001 Hazardous Waste Management Plan* led to some improvement in hazardous waste management. The measures included the Hazred project, in which several small and medium-sized enterprises agreed to apply hazardous waste prevention measures; the installation by local authorities of many drop-off and mobile collection points for household hazardous waste; and awareness-raising activities by local authority “green business” officers who work with householders and businesses on hazardous waste prevention. As a result of interest in the blending of waste solvents, the EPA has licensed four facilities to blend solvents for use as fuel in cement kilns abroad.<sup>21</sup> Several other new facilities have been authorised to treat waste electrical and electronic equipment, some of which is classified as hazardous (EPA, 2008a).

However, a 2004 report on implementation of the 2001 plan noted that “overall, any progress with regard to the Plan’s recommendations has been achieved in an unplanned and uncoordinated way” (EPA, 2005). The *total volume of hazardous waste has increased, and nearly half of it (48%) is exported*, with appropriate notifications, mostly for thermal treatment (incineration and use as fuel), but also for metal recovery, solvent recovery and landfilling (EPA, 2009). Increases in exports were very large until 2003, but since then have gradually diminished (Chapter 8). Recovery and disposal of most contaminated soil also take place abroad, though the share of soil exported decreased from 95% in 2001 to 75% in 2007 (EPA, 2009).

Dependence on exports has led to ineffective hazardous waste collection programmes (with a possibility of hazardous waste and non-hazardous municipal waste being mixed) and insufficient domestic treatment capacity. There are plans to build a 100 000 tonne private facility in Cork to treat hazardous waste, but this will not be enough and no similar public facilities are envisaged. In the EPA’s new *National Hazardous Waste Management Plan for 2008-12* the main objective is to reduce hazardous waste exports by decreasing both industrial and household hazardous waste generation and increasing self-sufficiency in the safe management of

such waste. The plan identifies three strategic actions to increase treatment capacity: *i*) co-incineration, using waste as fuel; *ii*) development of landfill capacity for management of non-recoverable, non-combustible hazardous waste (such as asbestos) and residues; and *iii*) expansion of other forms of recovery, and development of physico-chemical treatment capacity. Two studies whose results are expected in 2009 will examine ways to increase treatment of waste solvents, with particular attention to the potential for recycling, and will clarify the technical and economic aspects of providing hazardous waste landfill capacity. The DoEHLG, in co-operation with the EPA, plans to start concerted awareness-raising and enforcement programmes on improving management of hazardous waste by small business activities such as garages, small laboratories, construction projects, and small industrial and health care facilities (DoEHLG, 2008).

## 5. Looking Ahead

Progress in strengthening Ireland's waste management has been made through a comprehensive regulatory framework, better national and regional planning and increased public and private investment in waste services and infrastructure. However, there is a need to accelerate efforts to address the key waste management challenges highlighted in the *2007-13 NDP*: *i*) stabilising growth in municipal waste generation; *ii*) reducing landfilling of biodegradable municipal waste and increasing recycling of materials such as metal, glass, plastic, paper and textiles; and *iii*) increasing treatment capacity for hazardous waste and organic municipal waste (GoI, 2007).

*A comprehensive review of waste management in Ireland*, launched in 2008, is expected to identify how best to deliver equitable and cost-effective solutions. Among many measures that could advance the NDP objectives, particular attention should be given to implementation of the 2004 National Waste Prevention Programme and its 2009-12 work plan (EPA, 2008b), and related initiatives such as the Local Authority Prevention Demonstration Programme, the Green Business Initiative, the Packaging Prevention Programme, an accredited prevention training programme, the Green Home programme and the Green Hospitality Awards (Box 4.2). These activities need to be supported by resources commensurate to the challenges. Focusing on increasing resource efficiency in production processes, construction and consumption would give a new dimension to waste prevention efforts.

At the same time, efforts to implement the *2006 National Strategy on Biodegradable Waste* and the *2008 National Hazardous Waste Management Plan* need to be redoubled to meet the objectives of the EU Landfill Directive and to

increase self-sufficiency in hazardous waste management, respectively. Separation at source is the key to maximising diversion of biodegradable and hazardous waste from landfills. Regarding biodegradable waste, there is an urgent need to increase separate collection of organic (food and garden) waste from households and commerce. In addition, both rural and urban households with suitable garden space should be encouraged to compost organic waste and use the material to improve the soil. For hazardous waste, the 2008 plan recommends further use of producer responsibility obligations for additional waste streams, including medicine, farm chemical containers, waste oil, oil filters, paint and paint containers, household pesticides and herbicides (and their containers) and industrial ink and ink containers from publishing.

To the maximum extent possible, and within the framework of the free internal market for recyclable waste within the EU, Ireland should develop *facilities, stable markets and outlets to recycle its waste within the country*. Among the benefits would be the ability to process materials closer to source, thus reducing transport; resource conservation; and the creation of jobs and investment opportunities in the Irish recycling industry. Infrastructure for treating biodegradable waste should include additional central composting capacity combined with cross-sectoral approaches for co-treatment with agricultural and organic industrial waste. To treat residual waste, additional capacity for mechanical-biological treatment is required. It should be supported, where necessary, by thermal treatment with energy recovery. The 2007 Market Development Programme for Waste Resources should play a major role in identifying and stimulating markets for recycled materials.<sup>22</sup>

The *regional model of waste management planning* in Ireland has delivered real change in permitting and regulating, moving towards an integrated approach through waste collection and treatment permits. However, the combined regional waste strategies do not necessarily achieve the national waste policy targets and they make it more difficult to establish the conditions for countrywide infrastructure investment. Better co-ordination of the regional waste management plans could facilitate waste infrastructure development at national level so as to take advantage of economies of scale in treating certain waste streams, including biodegradable and hazardous waste.

The establishment of waste management fees and their subsequent increase, along with the withdrawal of local authorities from much of the waste collection market, have created new opportunities for *private sector participation in waste collection*. However, the failure to use existing tools to regulate competition among public and private waste management operators makes it difficult to achieve waste management policy objectives. Local authorities complain about private sector “cherry picking” of the most profitable waste collection areas and about having to

shoulder the entire cost of recycling, while the private sector complains about local authorities' dual regulatory and service delivery role (with subsidies and preferential regulatory treatment favouring the public sector) and the lack of transparency in the setting of public waste collection rates (O'Callaghan-Platt, Davies, 2008). In the short term, these problems can be addressed through better use of competitive tendering procedures and licences for waste services. Licensing should aim to give all service providers, public and private, the same obligation to meet delivery and quality standards and to reduce discretionary instruments, such as subsidies or preferential treatment. In the longer term, the identification of an appropriate regional or national regulatory body to oversee waste services across Ireland should be considered, in line with the 2006 DoEHLG consultation paper "Regulation of the Waste Management Sector" (DoEHLG, 2006b).

## Notes

1. The hierarchy stipulates that waste prevention and minimisation are preferable to waste management and that recovery, including recycling, is preferable to disposal.
2. Joint plans were prepared for seven regions comprising 31 of Ireland's 34 local authorities. The three remaining local authorities – Wicklow, Kildare and Donegal – made their own regional waste plans, with County Donegal joining Northern Ireland in the preparation of a cross-border plan. The revised regional plans took stock of progress to date on each element of regional waste strategies and noted the public reaction.
3. Waste generation and management in Ireland have been reviewed periodically in national waste reports since 1995, and annually since 2001.
4. The 2007 total included an estimated 136 000 tonnes of uncollected household waste, down from the 2003 estimate of 288 000 tonnes.
5. Biodegradable waste includes food and garden waste, wood, paper and cardboard, and textiles.
6. In other words, it is not recorded as having been handled by the formal waste management industry. The amount estimated to have been generated has decreased by 36% since 2004, principally because the use of sheep dip and its subsequent land disposal have declined.
7. Largely because of the Dublin Docklands redevelopment, which generated large quantities of contaminated soil, the amount reported as having received off-site treatment in 2006 was over 400 000 tonnes, an unprecedented peak. The current Cork Docklands redevelopment is expected to generate similarly large quantities.
8. An interim target of 50% had been met by 2003.
9. Local authorities compile construction and demolition waste data from reports provided by operators holding permits to collect this type of waste. It has been estimated that the waste industry failed to report the recovery of some 2 million tonnes of such waste in 2006, or about 16% of the potential total. An estimated 1 725 facilities, or some 46% of those operating, did not report.
10. The initiative requires manufacturers and importers to pay a levy of EUR 127 per tonne of farm plastics marketed. The Irish Farm Films Producers Group manages the initiative and collects the levy, and is required to meet recovery and recycling targets.
11. Around 28% is taken to waste collection points (bring banks and civic amenity sites; see note 14), and 2% is composted by individual households.
12. In 2006, 18 out of 34 local authorities relied exclusively on private collection services, and in some of the other 16 council areas, local authority services were only marginally involved. On average, five waste collectors operated in each local authority area.
13. The legislation allows households to opt out of the collection service. Where the service has been privatised, many local authorities do not know who has opted out and who has not.
14. Bring banks are containers in which people can deposit recyclable waste such as plastic bottles, glass containers, textiles and beverage cans. They are generally in accessible and highly visible locations such as shopping centres, garage forecourts, leisure/sports centres and public open spaces. A key requirement is avoiding the need for extra car journeys to deposit



- items. Civic amenity sites are sorting and treatment facilities accepting a wider range of material for recycling: glass, textiles/clothing, paper and cardboard, plastic, aluminium, steel, wood, brown goods (typically furniture) and white goods (refrigerators, washing machines, etc.), small quantities of rubble and steel, household electrical and electronic goods (TV sets, computers, etc.), food and garden waste, and household hazardous waste (bleach, paint, fluorescent lighting, etc.). The sites do not accept commercial waste, although there are plans to permit access by SMEs.
15. Recycling rates vary among local authorities: the lowest is that of the County Wicklow Council, with 2% of household waste recycled, and the highest is Galway City Council with 52%. Most local authorities (25 out of 34) have recycling rates between 10% and 30%.
  16. Dublin's only glass recycling plant was closed in 2002. A new facility was opened in Naas in 2008 with annual capacity of 50 000 tonnes of bottles and jars.
  17. Sludge from the Ringsend Plant is now treated by thermal drying and used as fertiliser.
  18. The fees can vary considerably across the country due to factors such as the available landfill capacity, the amount of waste generated and whether there are alternative treatment options in the region.
  19. A case against Ireland was brought to the ECJ in 2005 in relation to this problem (ECJ C-494/01).
  20. The principal reasons for delays on these projects have been *i*) public opposition fuelled by mistrust of the regulatory authority due to a poor history of waste management, until recently; and *ii*) information campaigns by local opponents of the projects. An innovative stakeholder involvement approach used in the Dublin project reduced public opposition considerably compared with the other proposals. It involved using a local community interest group to independently facilitate the gathering of a considerable amount of project information from Dublin City Council well in advance of the decision-making process.
  21. Three are currently operational.
  22. A National Recycling Market Development Group, established by the DoEHLG in 2004, assists in promoting an indigenous recycling industry. Its initial aim is to establish stable markets for organics, paper and plastics.

## Selected Sources

The government documents, OECD documents and other documents used as sources for this Chapter included the following. Also see the list of websites at the end of this report.

Department of the Environment and Local Government (DELG) (1998), *A Policy Statement: Waste Management – Changing Our Ways*, DELG, Dublin.

DELG (2002), *A Policy Statement: Preventing and Recycling Waste – Delivering Change*, DELG, Dublin.

Department of the Environment, Heritage and Local Government (DoEHLG) (2004), *Waste Management: Taking Stock and Moving Forward*, DoEHLG, Dublin.

DoEHLG (2006a), *National Strategy on Biodegradable Waste*, DoEHLG, Dublin.

DoEHLG (2006b), *Consultation Paper: Regulation of the Waste Management Sector*, DoEHLG, Dublin.

DoEHLG (2007a), *Market Development Programme for Waste Resources 2007-2011*, Market Development Group, DoEHLG, Dublin.

DoEHLG (2007b), *Environmental Fund Accounts 2006 and Comptroller and Auditor General Report*, DoEHLG, Dublin.

Environmental Protection Agency (EPA) (2001a), *National Hazardous Waste Management Plan*, EPA, County Wexford.

EPA (2001b), *National Waste Database Report*, EPA, County Wexford.

EPA (2005), *The Nature and Extent of Unauthorised Waste Activity in Ireland*, EPA, County Wexford.

EPA (2007), *National Waste Report – 2006*, EPA, County Wexford.

EPA (2008a), *National Hazardous Management Plan*, EPA, County Wexford.

EPA (2008b), *National Waste Prevention Programme – Prevention Plan 2009-2012*, EPA, County Wexford.

EPA (2009), *National Waste Report – 2007*, EPA, County Wexford.

Eunomia (2007), *Waste Policy, Planning and Regulation in Ireland*, Final report for Greenstar by Eunomia Research and Consulting Ltd. in association with TOBIN Consulting Engineers, Eunomia, Bristol, UK.

Government of Ireland (GoI) (2007), *Ireland's National Development Plan (NDP), 2007-2013 – Transforming Ireland*, Dublin.

Lyons, S. *et al.* (2009), *Managing Household Waste in Ireland: Behavioural Parameters and Policy Options*, Working Paper No. 295, Economic and Social Research Institute (ESRI), Dublin.

National Construction and Demolition Waste Council (NCDWC) (2005), *Annual Report 2004/2005*, NCDWC, Dublin.

National Policy and Advisory Board for Enterprise, Trade, Science, Technology and Innovation (Forfás) (2008), *Waste Management Benchmarking Analysis and Policy Priorities*, Forfás, Dublin.

O'Callaghan-Platt, A. and Davies, A. (2008), *A Nationwide Review of Pay-By-Use (PBU) Domestic Waste Collection Charges in Ireland: Case Study Report*, prepared for the EPA STRIVE Programme, EPA, County Wexford.

OECD (2007), *OECD Environmental Data, Compendium 2006/07: Waste*, OECD, Paris.

OECD (2008), *OECD Public Management Reviews: Ireland. Towards an Integrated Public Service*, OECD, Paris.



**From:**  
**OECD Environmental Performance Reviews:  
Ireland 2010**

**Access the complete publication at:**  
<https://doi.org/10.1787/9789264079502-en>

**Please cite this chapter as:**

OECD (2010), "Waste", in *OECD Environmental Performance Reviews: Ireland 2010*, OECD Publishing, Paris.

DOI: <https://doi.org/10.1787/9789264079502-4-en>

This work is published under the responsibility of the Secretary-General of the OECD. The opinions expressed and arguments employed herein do not necessarily reflect the official views of OECD member countries.

This document and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

You can copy, download or print OECD content for your own use, and you can include excerpts from OECD publications, databases and multimedia products in your own documents, presentations, blogs, websites and teaching materials, provided that suitable acknowledgment of OECD as source and copyright owner is given. All requests for public or commercial use and translation rights should be submitted to [rights@oecd.org](mailto:rights@oecd.org). Requests for permission to photocopy portions of this material for public or commercial use shall be addressed directly to the Copyright Clearance Center (CCC) at [info@copyright.com](mailto:info@copyright.com) or the Centre français d'exploitation du droit de copie (CFC) at [contact@cfcopies.com](mailto:contact@cfcopies.com).