National Waste Report 2009

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National Waste Report 2009

Published by the Environmental Protection Agency, Ireland

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ISBN: 978-1-84095-381-7 02/11/350
Price: €20

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ACKNOWLEDGEMENTS

The cooperation of all respondents with the Environmental Protection Agency (EPA) waste data surveys is gratefully acknowledged.

Acknowledgement is also due to SKM Enviros, who worked on behalf of the EPA in the collection, compilation and validation of the waste data submitted by local authorities, recovery operators, hazardous waste treatment facilities and landfills, and to RPS Consultants who carried out characterisations of municipal wastes on behalf of the EPA.

The authors would like to acknowledge their colleagues in the Office of Environmental Enforcement for their part in obtaining and verifying waste data submitted by EPA licensed facilities[1] and any other EPA colleagues who helped with the preparation of this report.

The assistance of staff in a number of other organisations is also acknowledged, including the National TransFrontier Shipment Office (NTFSO), Repak, WEEE Ireland, the European Recycling Platform (ERP), the Central Statistics Office (CSO), the Economic and Social Research Institute (ESRI) and the Department of the Environment, Heritage and Local Government (DEHLG).

[1] Data from Annual Environmental Reports (AERs) and Pollutant Release and Transfer Register (PRTR).

LIST OF TERMS

This list of terms is intended to assist understanding of this report, and does not purport to be a legal interpretation of said terms.

An **Annual Environmental Report (AER)** must be submitted to the EPA each year by companies with either Waste or IPPC licences, providing summary information on all aspects of the environmental performance of the licensed facility e.g. data on emissions to air and water, waste management, resource consumption, objectives and targets, ambient monitoring and complaints. AERs are made publicly available on the EPA website. Local authorities also require AERs from all waste collection permit (WCP) and waste permit (WP) holders.

2-bin or 3-bin system refers to a source segregated collection system where dry recyclables and residual wastes are separately collected (2-bin system), or where dry recyclables, organics and residuals are separately collected (3-bin system). The reference to **'black bin'** in this document is a reference to a single bin collection or to the residuals bin from a 2-bin or 3-bin system. The reference to **'green bin'** in this document is a reference to a dry recyclables collection, and **'brown bin'** is a reference to an organics bin collection.

Biodegradable (in the context of waste) means waste that is capable of undergoing anaerobic or aerobic biological decomposition, such as food and garden waste, paper and cardboard etc.

Biodegradable municipal waste (BMW) means the biodegradable component of municipal waste, and does not include biostabilised waste. Biodegradable municipal waste is typically composed of food and garden waste, wood, paper, cardboard and textiles.

Biostabilised residual waste means residual BMW that has been treated to achieve an EPA approved biodegradability stability standard[2] prior to landfilling or alternative agreed use.

Biowaste under the terms of the new Waste Framework Directive (2008/98/EC) means biodegradable garden and park waste, food and kitchen waste from households, restaurants, caterers and retail premises and comparable waste from food processing plants.

c. (circa) - approximately.

Commercial waste, in the context of this report, is a term used to describe the non-household fraction of municipal waste, which is produced by commercial premises such as shops, offices and restaurants, as well as municipal premises such as schools, hospitals etc. It also includes non-process industrial waste arising from factory canteens, offices etc. Commercial waste is broadly similar in composition to household waste, consisting of a mixture of paper and cardboard, plastics, organics, metal and glass.

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

CSO – the Central Statistics Office.

DEHLG – the Department of the Environment, Heritage and Local Government.

Disposal means any operation which is not recovery even where the operation has as a secondary consequence the reclamation of substances or energy. Annex I of the new Waste Framework Directive (Directive 2008/98/EC) sets out a non-exhaustive list of disposal operations.

EEE is electrical and electronic equipment.

End of Life Vehicle (ELV) means a vehicle which is waste within the meaning of Article 1(a) of the Waste Directive (refer to Directive 2000/53/EC on end-of life vehicles).

EPA – the Environmental Protection Agency.

[2] http://www.epa.ie/downloads/pubs/research/waste/name,26127,en.html

ESRI – the Economic and Social Research Institute.

EU - European Union.

European Waste Catalogue (EWC), now known as the List of Wastes (LoW), is a list of all waste types generated in the EU. The different types of waste are fully defined by a six-digit code, with two digits each for chapter, sub-chapter and waste type. The catalogue is available for download from the EPA website at www.epa.ie/downloads/pubs/waste/stats/EPA_waste_catalogue_hazard_list_2002.pdf.

GNP (Gross National Product). Gross Domestic Product (GDP) and Gross National Product (GNP) are closely related macroeconomic parameters. GDP measures the total output of the economy in a period i.e. the value of work done by employees, companies and self-employed persons. This work generates incomes but not all of the incomes earned in the economy remain the property of residents (and residents may earn some income abroad). The total income remaining with Irish residents is the GNP and it differs from GDP by the net amount of incomes sent to or received from abroad.

Hazardous wastes are wastes that have the potential to cause harm to human health or the environment. Any waste which displays one or more of the hazardous properties listed in Annex III of the new Waste Framework Directive (2008/98/EC) is defined as hazardous waste.

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

Industrial waste is waste produced by industrial activity such as that of factories, mills and mines. Non-process industrial waste (e.g. from site canteen, office, etc.) is similar in character to commercial waste.

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

An **Integrated Pollution Prevention and Control (IPPC)** licence is an authorisation issued and enforced by the EPA for specific industrial and agricultural activities. An IPPC licence sets limits on air and water emissions, waste and noise and requires that an activity must use the Best Available Techniques (BAT).

An **Integrated Waste Management Facility (IWMF)** in the context of this report is one that combines a landfill and other waste infrastructure such as civic amenity site, transfer station, composting or other treatment facilities.

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

LCA Life Cycle Assessment.

LCT Life Cycle Thinking.

Mechanical-biological treatment (MBT) means the treatment of residual municipal waste (black bin) through a combination of manual and mechanical processing and biological stabilisation, in order to stabilise and reduce the mass of waste that requires disposal.

Merchant operator. A commercial operator that accepts waste from third parties for treatment (as opposed to an industrial activity with facilities for the treatment of waste arising from their own processes, such as on-site incineration).

Metric tonnes are expressed as 't' throughout this report. Mt = million tonnes.

MDR Mixed dry recyclables.

MFSU manufacture, formulation, supply and use.

Municipal solid waste (MSW) or **Municipal waste** means household waste as well as commercial and other waste that, because of its nature or composition, is similar to household waste. It excludes municipal sludges and effluents. In the context of this report municipal waste consists of three main elements - household, commercial (including non-process industrial waste), and street cleansing waste (street sweepings, street bins and municipal parks and cemeteries maintenance waste, litter campaign material).

N/A – not applicable.

NACE - Nomenclature Generale des Activites Economiques dans l`Union Europeenne (general name for economic activities in the European Union).

NSAI – National Standards Authority of Ireland.

NEC – not elsewhere classified.

Organic waste is biodegradable food, garden and landscaping waste, and where the context permits, will also include industrial organic sludges (e.g. from the food and drink production sector).

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

Pollutant Release and Transfer Register (PRTR) Regulations 2007. These Regulations require that releases of pollutants and off-site transfers of waste by facilities operating in relevant industrial sectors must be reported annually to the EPA. The EPA in turn reports this information to the European E-PRTR website.

Preparing for reuse means checking, cleaning or repairing recovery operations, by which products or components of products that have become waste are prepared so that they can be reused without any other pre-processing.

Recovery means any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy. Annex II of the new Waste Framework Directive (WsFD) (2008/98/EC) sets out a non-exhaustive list of recovery operations, which includes material recovery (i.e. recycling), energy recovery (i.e. use a fuel (other than in direct incineration) or other means to generate energy) and biological recovery (e.g. composting).

Recycling means any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations.

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

Residual waste means the fraction of collected waste remaining after a treatment or diversion step, which generally requires further treatment or disposal.

Reuse means any operation by which products or components that are not waste are used again for the same purpose for which they were conceived.

SI (Statutory Instrument). An order, regulation, rule, scheme or bye-law made in exercise of a power conferred by statute.

Solid recovered fuels (SRF) are fuels refined from crude refuse derived fuels (RDF). To be defined as SRF a fuel must meet minimum standards for moisture content, particle size, metals, chloride and chlorine content and calorific value.

The **TransFrontier Shipment of Waste (TFS)** Regulations 2007 set out new notification procedures, revised waste listings and enforcement provisions in relation to the export, import and transit of waste shipments within the EU. The National TFS Office at Dublin City Council is the competent authority for the implementation and enforcement of the TFS Regulations since 12 July 2007.

Treatment/pre-treatment includes, in relation to waste, any manual, thermal, physical, chemical or biological processes that change the characteristics of waste in order to reduce its mass, or hazardous nature or otherwise, to facilitate its handling, disposal or recovery.

Waste is defined as any substance or object which the holder discards, intends to discard or is required to discard, under the new Waste Framework Directive (WsFD) (Directive 2008/98/EC).

Waste management means the collection, transport, recovery and disposal of waste, including the supervision of such operations and the after-care of disposal sites, and including actions taken as a dealer or broker.

Waste producer means anyone whose activities produce waste (original waste producer) or anyone who carries out pre-processing, mixing or other operations resulting in a change in the nature or composition of this waste, under the new Waste Framework Directive (WsFD) (Directive 2008/98/EC).

Waste electrical and electronic equipment (WEEE) refers to electrical and electronic equipment which is waste within the meaning of article 3(a) of the new Waste Directive 2008/98/EC, including all components, subassemblies and consumables which are part of the product at the time of discarding.

Waste Framework Directive (WsFD) new Waste Directive 2008/98/EC of 19 November 2008.

WCP (Waste Collection Permit). A permit issued by a local authority for the collection of waste under the Waste Management (Collection Permit) Regulations 2007, as amended.

WP (Waste Permit). A permit issued by a local authority to a facility for the transfer, storage or treatment of waste under the Waste Management (Facility Permit and Registration) Regulations 2007, as amended.

EXECUTIVE SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The Environmental Protection Agency's (EPA) National Waste Prevention Programme takes responsibility for producing national statistics on waste generation and management in the Republic of Ireland. The objective of this report is to present the most up to date information available on waste generation and management in Ireland, as reported to the EPA. This report is for the calendar year 2009 and deals with municipal solid wastes (household, commercial and local authority cleansing wastes), waste streams subject to producer responsibility initiatives (packaging, waste electrical and electronic equipment, end of life vehicles) as well as construction & demolition and hazardous wastes. Some of the key statistics and findings from the report are set out below.

Municipal waste

- A total of 2,952,977 t of municipal waste was generated, a decrease of 8.4% on 2008. This amount is below that generated in 2004;
- The recovery rate for managed municipal waste increased by 1.5% to yield an overall recovery rate of 39% (1,101,272 t);
- Municipal waste disposed to landfill was 1,723,705 t, a decrease of 11% from 2008;
- Ireland's municipal waste recycling rate (excluding energy recovery) is 35%, close to the EU27 norm of 40%;
- The UK remains the principal initial destination for Irish municipal waste recyclables.

Household waste

- Household waste generation dropped by 3% to 1,626,469 t, representing 365 kg household waste generated per person in the State. This decrease was despite a reported population rise of c. 37,200 persons;
- The proportion of managed household waste recovered increased from 26% in 2008 to 29.5% in 2009;
- Household waste disposed to landfill decreased by 8.6% to 1,056,267 t, this represents 237 kg household waste disposed to landfill per person in the State;
- An estimated 19% of occupied houses do not avail of, or are not offered, a collection service;
- The total quantity of household waste collected at kerbside reduced by 1.3% in 2009;
- The private sector collected 60% of the 1,145,486 t of kerbside waste reported as collected from households (57% in 2008);
- A 2-bin service (residuals and mixed dry recyclables bins) was provided to 96% of serviced households (95% in 2008);
- A 3-bin service (residuals, mixed dry recyclables and organics bins) was provided to 24% of serviced households (21% in 2008).

Biodegradable municipal waste

- The estimate of home composting remained static at 36,733 t;
- The quantity of biodegradable municipal waste disposed at landfill decreased by 11% from 2008 to 1,059,852 t.
- Ireland is on track to meet the first EU Landfill Directive biodegradable municipal waste diversion target due by July 2010;
- Of the 1,939,182 t of biodegradable municipal waste available, 55% was consigned to landfill (down from 57% in 2008), and 45% of it was recycled;
- The quantity of organic waste collected from household kerbsides grew by 65% (62,447 t in 2009, 37,920 t in 2008);
- 11 of the 34 local authority functional areas didn't have any kerbside collection of organics available to householders in 2009 (down from 16 in 2008).

Commercial waste

- Commercial waste generation dropped by 12% on 2008 figures, to 1,299,807 t;
- Commercial waste recovery increased from 49% in 2008 to 51% in 2009;
- Commercial waste disposed to landfill was 640,737 t, a decrease of 15% from 2008.

Producer responsibility initiative waste streams

- A recovery rate of 70% is reported for packaging waste (up from 65% in 2008), exceeding the EU target of 60% recovery due in 2011;
- A total of 45,327 t of waste electrical and electronic equipment (WEEE) was collected for recovery (down from 51,964 t in 2008). Nearly 9 kg per person of household WEEE was collected, exceeding the 4 kg per person EU target;
- For End of Life Vehicles a reuse/recovery rate of 82% and a reuse/recycling rate of 76% was achieved against targets for 2006 of 85% and 80%, respectively.

Construction and demolition waste

- There was a 62% decrease in the reported quantity of construction & demolition waste collected (5.1 Mt) and a 50% decrease in the reported quantity managed by recovery and disposal facilities (5.2 Mt), compared with 2008 data;
- Contaminated soil (usually generated in land development/redevelopment projects) exported for treatment/disposal reduced sharply from 449,574 t in 2008 to 476 t in 2009.

Hazardous waste

- The reported quantity of hazardous waste managed in Ireland in 2009 decreased by 9% since 2008 to 289,910 t, originating primarily from the pharmaceutical and chemical industries;

- A 4% increase was noted in the quantity of hazardous waste treated on site at EPA-licensed industrial (Integrated Pollution and Prevention Control) facilities;
- A 21% decrease was noted in the quantity of hazardous waste treated at EPA-licensed commercial hazardous waste treatment facilities.

Waste infrastructure

- A total of 29 active landfills accepted municipal waste for disposal;
- At the end of 2009 the remaining consented landfill capacity for municipal waste was c.28M t;
- At current fill rates, 16 of the existing municipal solid waste landfills will use up their consented capacity within 3 years;
- As a consequence of landfill distribution and closure, significant inter-regional movement of waste will need to be accommodated;
- Local authorities reported that there were 107 civic amenity sites and 1,962 bring banks in operation in 2009, compared to 96 and 1,989 respectively in 2008;
- The reported tonnage of municipal waste brought to civic amenity sites and bring banks was 268,958 t, a decrease of 11% on 2008;
- Ireland's first municipal waste incinerator is expected to commence operations in 2011 subject to determination of their waste licence review application;
- In 2009, 22 facilities reported accepting municipal organic wastes for composting;
- In 2009, integrated Mechanical Biological Treatment (MBT) was operated at two sites in small or experimental volumes and the biological output did not meet EPA stability standards;
- Refuse Derived Fuel (RDF) manufacture from municipal residual wastes increased significantly in 2009 to c. 48,000 t (up from c. 26,000 t in 2008), principally at four mechanical processing plants;

Progress towards national & EU obligations

Progress made towards meeting national and EU recycling, recovery and diversion targets arising from EU Directives and national waste strategies is presented in Tables 1A & 1B.

As is apparent from Table 1A, and with the exception of End of Life Vehicle targets, Ireland is well advanced towards achievement of most of its EU obligations across a broad range of waste legislation. There remain some data gaps which will be addressed in the coming years.

In relation to national waste management targets (Table 1B), Ireland is at risk of not achieving a number of them. There is a significant distance to the target for the diversion from landfill of 50% of household waste by 2013. For construction & demolition wastes and municipal wastes, the targets set in national policy in 1998 have been achieved. Both public and private waste collectors have been slow to roll-out source separated waste collection services for biowaste from households and commercial premises. This has contributed significantly to the failure to progress a number of the targets specified in the *National Strategy on Biodegradable Waste* (DEHLG, 2006).

Of some significant note is the progress between 2008 and 2009 with respect to the diversion of BMW from landfill. With the continued drop in biodegradable waste consigned to landfill in 2009 (as a proportion of municipal waste landfilled), it is now possible to say that Ireland has moved its position from one of being *At Risk* of not meeting the BMW diversion targets (as recorded in the National Waste Report 2008), to a position on being *On Track* to meet the July 2010 target (Table 1A). The *On Track* risk rating for the EU 2010 target is supported by national initiatives such as the Food Waste Regulations (SI No. 508 of 2009) (which promote segregation and recovery of food waste arising in the commercial sector), EPA waste licence reviews for landfill facilities, increasing penetration of three bin collections, and the continued economic slow-down. There are however much stricter BMW diversion targets in force for 2013 and 2016, which will more difficult to achieve. For these two targets the indicator status remains at *Risk*. In 2010, the Government signalled its intention to put into effect an obligation on waste collectors to provide or arrange for the separate collection of household food waste, through the publication of draft regulations to this effect. Implementation of this obligation would see increased diversion of household food waste from landfill.

Also of significance is the fact that Ireland is failing by a small margin to meet the current targets under the ELV Directive. The current targets are in place since January 2006, and there are higher targets coming into effect from January 2015. In order to meet the EU targets, it is expected that additional processing of ELVs will be required, through increased dismantling of ELVs prior to shredding and/or the application of post-shredder technologies to extract recyclable materials (metals, plastics) from the shredded material.

Table 1A: Progress towards EU waste recycling, recovery and diversion targets

Directive	Title	Article	Targets		Current progress to target in Ireland (2009)	Indicator
			Target date	Specifics		
94/62/EC as amended	Packaging Directive	6(1)	31-12-2011	60% as a minimum by weight of packaging waste will be recovered or incinerated at waste incineration plants with energy recovery.	70%	Achieved
				55% as a minimum by weight of packaging waste will be recycled.	65%	Achieved
				No later than 31 December 2011 the following minimum recycling targets for materials contained in packaging waste will be attained:		
				(i) 60% by weight for glass;	76%	Achieved
				(ii) 60% by weight for paper and board;	81%	Achieved
				(iii) 50% by weight for metals;	50%	Achieved
				(iv) 22.5% by weight for plastics, counting exclusively material that is recycled back into plastics;	36%	Achieved
				(v) 15% by weight for wood.	79%	Achieved
2002/96/EC	WEEE Directive	5(5)	(31-12-2006) 31-12-2008[3]	Separate collection of > 4kg of WEEE from private households per person per year.	9 kg	Achieved
		7(2)		For large household appliances and automatic dispensers:- – recovery shall be increased to a minimum of 80% by an average weight per appliance; and – component, material and substance reuse and recycling shall be increased to a minimum of 75% by an average weight per appliance.	83%[4] 83%[4]	Achieved
				For IT, telecommunications and consumer equipment:- – the rate of recovery shall be increased to a minimum of 75% by an average weight per appliance; and – component, material and substance reuse and recycling shall be increased to a minimum of 65% by an average weight per appliance.	87%[4] 84%[4]	Achieved
				For small household appliances, lighting equipment, electrical & electronic tools, toys, leisure and sports equipment, monitoring and control instruments:- – the rate of recovery shall be increased to a minimum of 70% by an average weight per appliance; and – component, material and substance reuse and recycling shall be increased to a minimum of 50% by an average weight per appliance.	85%[4] 81%[4]	Achieved
				For gas discharge lamps, the rate of component, material and substance reuse and recycling shall reach a minimum of 80% by weight of the lamps.	91%[4]	Achieved

[3] Ireland obtained a two-year derogation.
[4] As specified by the WEEE Directive, these estimated recovery and recycling percentages exclude the preparation for reuse of whole appliances.

Directive	Title	Article	Targets		Current progress to target in Ireland (2009)	Indicator
			Target date	Specifics		
2000/53/EC	**End of Life Vehicles Directive**	7(2)(a)	1-1-2006	Reuse and recovery to a minimum of 85% by average weight of vehicle and year.	82%[5]	Not achieved
				Reuse and **recycling** to a minimum of 80% by average weight of vehicle and year.	76%[5]	Not achieved
		7(2)(b)	1-1-2015	Reuse and recovery to a minimum of 95% by average weight of vehicle and year.		- Risk - Due January 2015
				Reuse and **recycling** to a minimum of 85% by average weight of vehicle and year.		- Risk - Due January 2015
2006/66/EC	**Batteries Directive**	10(2)	26-9-2012	Minimum 25% collection rate for batteries & accumulators.	17%	- Risk - Due Sept 2012
			26-9-2016	Minimum 45% collection rate for batteries & accumulators.	17%	- Risk - Due Sept 2016
		12(4)	26-9-2011	Recycling processes shall achieve the following minimum recycling efficiencies:		-
				(a) recycling of 65 % by average weight of lead-acid batteries and accumulators, including recycling of the lead content to the highest degree that is technically feasible while avoiding excessive costs;	Future National Waste Reports	
				(b) recycling of 75 % by average weight of nickel-cadmium batteries and accumulators, including recycling of the cadmium content to the highest degree that is technically feasible while avoiding excessive costs; and		
				(c) recycling of 50 % by average weight of other waste batteries and accumulators.		
1999/31/EC	**Landfill Directive**	5(2)	(16-7-2006) 16-7-2010[6]	Biodegradable municipal waste going to landfills must be reduced to 75% of the total quantity (by weight) biodegradable municipal waste produced in 1995 (< 916,000 t)	+ 144,000 t	On Track Due July 2010
			(16-7-2009) 16-7-2013	Biodegradable municipal waste going to landfills must be reduced to 50% of the total quantity (by weight) biodegradable municipal waste produced in 1995 (< 610,000 t)	+ 450,000 t (estimate)[7]	- Risk - Due July 2013
			16-7-2016	Biodegradable municipal waste going to landfills must be reduced to 35% of the total quantity (by weight) biodegradable municipal waste produced in 1995 (427,000 t)	+ 633,000 t (estimate)[7]	- Risk - Due July 2016
2008/98/EC	**New Waste Framework Directive**	11(2)(a)	12-12-2020	Preparing for reuse and recycling of 50% by weight of household derived paper, metal, plastic & glass *(includes metal and plastic estimates from household WEEE).*	48%	On Track
		11(2)(b)	12-12-2020	Preparing for reuse, recycling and other material recovery (incl. beneficial backfilling operations using waste as a substitute) of 70% by weight of C&D waste (excluding natural soils & stone)	(98%)[8]	Achieved
		29	12-12-2013	Establishment of a National Waste Prevention Programme (NWPP)	NWPP established in 2004	Achieved

[5] 2008 data
[6] Ireland secured a four-year derogation on first and second targets.
[7] Based on 2009 BMW to landfill, and assuming no increase in BMW to landfill (standstill).
[8] This figure is provisional as there are anomalies in the reported C&D waste data.

Table 1B: Progress towards national waste management targets

Issue	Target	Source	Current progress (2009)	Indicator
Household waste	50% diversion from landfill of managed household waste by end 2013	Waste Management: Changing Our Ways (DEHLG, 1998)	29.5%	- Risk -
Municipal waste	Recycling 35% of municipal waste by end 2013		35% (excluding energy recovery)	Achieved
Construction & demolition waste	Recycling 85% of C&D wastes by end 2013		99% (excluding energy recovery)	Achieved
Biodegradable waste	Recycling of municipal paper and card:	National Strategy on Biodegradable Waste (DEHLG, 2006) (selected targets)		
	(i) 55% of that managed by end 2010		50%	- Risk -
	(ii) 65% of that managed by end 2013		(50%)	- Risk -
	(iii) 67% of that managed by end 2016		(50%)	- Risk -
	Recovery of source separated municipal derived organic wastes (including home composting), as a proportion of biowaste content of MSW managed:			
	(i) 35% of that managed by end 2010		18%	- Risk -
	(ii) 43% of that managed by end 2013		(18%)	- Risk -
	(iii) 50% of that managed by end 2016		(18%)	- Risk -
Batteries	Achieve interim collection targets of waste portable batteries based on the quantity of portable batteries placed on the market in the State:	DEHLG communication dated 25-9-2008		
	(i) 15% by 26 September 2010		(17%)[9]	Achieved
	(ii) 30% by 26 September 2014		(17%)[9]	- Risk -

Conclusions

The 8.4% decline in the generation of municipal waste mirrored the fall in Gross National Product (GNP) between 2008 and 2009 (refer Figure 2, page 12). The data also show that household waste generation fell despite a rise in population and household and commercial recovery rates also improved in 2009.

Ireland is well advanced with achievement of its EU recovery/recycling obligations in relation to a range of EU waste directives, as set out in Table 1A. Ireland is failing by a small margin however to meet the End of Life Vehicle Directive reuse and recovery/recycling targets. There is also still some risk that Ireland will fail to meet the July 2013 and 2016 Landfill Directive targets for diversion of biodegradable municipal waste from landfill. The new EU Waste Framework Directive (2008/98/EC) will be a significant influence and driver of change in waste management practices and governance in Ireland and elsewhere over the coming decade. In relation to achievement of nationally expressed waste management targets Ireland has been less successful (Table 1B).

The economic downturn is having a marked influence on waste generation, particularly in the commercial waste and construction & demolition waste streams. The downturn (and consequent reduction in waste generation) has resulted in Ireland moving towards achievement of the EU Landfill Directive targets for biodegradable waste diversion. The Economic and Social Research Institute predicted economic recovery scenarios for Ireland indicate that municipal solid waste will grow by 1 Mt (to 4 Mt) over the next ten to twelve

[9] Based on data from one of the battery compliance schemes.

years. Ireland remains underdeveloped with respect to the sophistication of essential waste infrastructure for the pre-treatment of municipal waste prior to disposal (e.g. anaerobic digestion, waste to energy, etc.). It will be a challenge to meet waste diversion and waste recovery targets if municipal waste generation increases with economic recovery and the necessary waste infrastructure is not in place.

Recommendations

As Ireland moves towards economic recovery, a focus must remain in relation to the policies and actions necessary to decouple waste growth from economic growth. Waste prevention and not mere diversion must remain a priority. The need for businesses and state services to reduce costs in the current difficult economic and budgetary climate underlines the need for continued support for resource efficiency and conservation initiatives in relation to waste, water and energy, such as those provided under the EPA National Waste Prevention Programme, by the Sustainable Energy Authority of Ireland and Enterprise Ireland.

The diversion of very large quantities of food waste from landfill remains a priority that must be addressed, as does the improvement in recycling rates for municipal wastes.

The priority actions for biodegradable municipal waste management in Ireland for 2010 are similar to those identified in previous National Waste Reports, and include the need to:

- Ensure there is adequate infrastructure to treat the very large quantities of organic (particularly food) waste that must be collected separately and diverted from landfill and also for the organic component of the mixed residual waste stream;
- Put in place services for the separate collection of organic (particularly food) waste at households and commercial premises in all local authority functional areas; and
- Develop outlets for the products of such treatment; to this end successful implementation of the DEHLG sponsored rx3 (Market Development Programme) should provide valuable support mechanisms for the national recyclates industry;
- Update and clarify National waste policy. This will assist in providing certainty within the waste industry in Ireland to better enable the accelerated investment programmes that are necessary if organic waste is to be treated and landfill avoided;
- Promote food waste prevention through National Waste Prevention Programme initiatives such as StopFoodWaste.ie (www.stopfoodwaste.ie), Green Business and Green Hospitality Programme;
- Improved penetration of educational material to households on the use of the third (organics) bin (e.g. www.foodwaste.ie).

Whilst much of the effort to date in relation to biodegradable waste has been around the source separation and treatment of the collected fraction, the waste characterisation surveys undertaken for the EPA demonstrate that a residual bin from a three bin collection service will still contain a considerable fraction of biodegradable materials (up to 47% for household collections). If Ireland is to meet the 2013 and 2016 EU Landfill Directive diversion targets, then infrastructure will have to be developed that will treat this residual fraction.

The End of Life Vehicle (ELV) Directive reuse and recycling/recovery rates achieved were just below the Directive targets. The producers responsible for the achievement of these targets must address this issue as a priority. The DEHLG plans to engage with all ELV stakeholders responsible for the implementation and enforcement of the ELV Regulations with regards to the failure to meet the targets under the current system of implementation. In order to meet the EU targets, it is expected that additional processing of ELVs will be required, through increased dismantling of ELVs prior to shredding and/or the application of post-shredder technologies to extract recyclable materials (such as metals, plastics) from the shredded material. There are even more stringent targets to be met by 2015.

In order to have up-to-date information on permitted waste infrastructure in the State, local authorities are encouraged to populate the Waste Permit and Certificate of Registration Database[10] as soon as waste permits and certificates of registration are granted, reviewed, revoked or expired.

The importance of timely and accurate waste data from stakeholders in order to meet national and EU reporting obligations cannot be over-emphasised. There are legal obligations to record and report on waste management, therefore all stakeholders must ensure that sufficient resources are given to data management and reporting. The introduction of better waste flow accounting processes from point of collection through treatment, transfer and to disposal/recovery, will assist accurate measurement of national diversion and recovery achievements.

[10] http://www.epa.ie/wastepermit/

1 INTRODUCTION

The EPA's National Waste Prevention Programme (NWPP) takes responsibility for producing national statistics on waste generation and management in the Republic of Ireland, including information on waste exports and imports. The objective of the National Waste Report (NWR) is to present the most up to date information available on waste generation and management in Ireland, as reported to the EPA. National waste statistics are prepared and published annually[11] as part of the NWPP[12]. The waste data collected for the NWR is used to report to the EU Commission on various EU Directives (Packaging, WEEE, ELVs), the Waste Statistics Regulation (2150/2002/EC as amended) and the Basel Convention on the control of transboundary movements of hazardous wastes. The EPA recognises that good data on waste generation and waste management are essential to correctly inform national and EU policy and decision makers in relation to waste.

1.1 National Waste Report survey approach

This NWR presents waste data for the calendar year 2009[13]. Generators of waste described in this report include municipal sources (households, commercial premises), industrial and construction activities. Waste data was sought from the following sources to collate the information presented in this NWR:

- Local authorities;
- National TransFrontier Shipment Office;
- Licensed waste operators (landfills, hazardous waste treatment operators, composters etc.);
- Permitted waste operators (recovery organisations, such as metal handlers, authorised treatment facilities for end of life vehicles);
- Integrated Pollution and Prevention Control activities;
- WEEE self-complying producers and WEEE and battery compliance schemes; and
- The national packaging compliance scheme.

The sources of all data cited are referenced throughout the report. The co-operation of all respondent organisations is gratefully acknowledged and this report could not be produced without the provision of timely and accurate data. All survey returns were desk-top validated and 33 data verification audits were carried out, covering 10 local authority functional areas and 23 waste operators. The EPA audited data for eight of the larger municipal solid waste operators[14] and carried out data reconciliation visits to the WEEE and packaging compliance schemes. Each year the EPA provides training workshops on completion of the surveys, updates its online guidance manuals[15], and provides a National Waste Report Helpline and dedicated e-mail address for waste operators.

The collection of waste generation and management data for the State continues to place a significant resource burden on the waste industry, local authorities, the EPA and others. The NWR is a key national document that

[11] National Waste Reports for the years 1995, 1998 and all years from 2001–2008 are available to download at www.wastereport.ie.
[12] More information at www.nwpp.ie.
[13] Except for Section 7 End of Life Vehicles which reports on 2008 data.
[14] Greenstar, AES, Oxigen Environmental Ltd, Mr Binman, Panda Waste Services, Thorntons Recycling, Greyhound Recycling & Recovery Ltd, Barna Waste.
[15] See www.wastesurvey.ie

informs policy as well as private sector investment strategy and business planning. Moreover, the data collected under the NWR programme provides the data used to report under EU waste reporting requirements. The data therefore informs the EU as to whether Ireland is meeting (or not meeting) its targets under a variety of EU Directives and Regulations and could result in fines and penalties on the State should we fail to comply. In this regard, the importance of timely and accurate waste data from stakeholders in order to meet these reporting obligations cannot be over-stated. Indeed there are statutory obligations on respondents to provide this information to the EPA. In 2009, a number of issues arose which meant that data was not provided to the EPA by Dublin City Council (data from the Dublin Region[16] waste collection operators and waste facility permit operators). The EPA had to survey these operators and validate and collate the data, in order to complete the national dataset. Additionally, Cork City Council, Cork County Council and Wicklow County Council failed to provide C&D data to the EPA. Therefore, estimates of C&D waste collected and recovered in those functional areas had to be used to complete the national dataset. It is recognised that there is room for national efficiencies in how waste data is collected and reported, particularly given the recent expansion in EU driven data obligations. The EPA is currently supporting (through the Limerick Clare Kerry Regional Waste Management Office) the development of a national waste collection permit AER electronic reporting facility, which is intended to yield efficiencies for operators and local authorities.

It is proving increasingly difficult to apportion mixed municipal waste categories consigned to landfill into household and commercial waste stream categories. This shows major frailties with current practices in classification of the delivered municipal solid waste as applied at the landfill gate. The complex municipal waste management chain from collection through processing and then to various recovery and disposal outlets is rendering the determination of the make-up of residual municipal waste to landfill a challenge for these operators (i.e. how much is household and how much commercial). This is a matter that the waste consigners and the landfill operators will have to improve on in future years. Weak data in this area impacts directly on recycling figures for household and commercial waste streams. Moreover, given the significant differences in biodegradable municipal waste content of household and commercial waste streams, poor recording of waste flows could result in Ireland seemingly not achieving required EU targets.

The waste accounting method used in this and previous NWRs does not include material in transit or temporary storage as it is neither disposed nor recovered in the calendar year. It was reported in NWR 2008 that there was increased storage of mixed dry recyclables/packaging waste, arising from the low international market prices for dry recyclables in late 2008. As a result, there was approximately 40,000 t more mixed dry recyclables/packaging waste in storage at the end of 2008 than the end of 2007. Some recovery in international market prices for dry recyclables occurred in 2009, and movement of dry recyclables from storage in 2009 is reflected in the data.

It should be noted that table totals appearing in this report may vary by +/- 1 tonne due to statistical rounding.

[16] Dublin City, Dun Laoghaire Rathdown, Fingal and South Dublin County Councils.

1.2 National developments and issues

The National Waste Report informs, and is informed by, national and EU legislative and policy developments, as well as technical advancements in waste management. Accordingly, it is useful here to examine some of the key developments in waste management policy and practice over the previous year, and to look to future development scenarios. Such analysis is intended to assist operators, policy development and infrastructural planning.

National waste policy consultation

In July 2010 the Minister for the Environment, Heritage and Local Government published a consultation document on a new national waste policy.[17] The document articulated the Government's key principles and actions which it envisions '*will inform Irish waste policy for the coming decade and beyond'*. The new policy consultation document was accompanied by two other documents; one was a proposed set of regulations requiring a three bin collection service to all domestic dwellings, and the second was a proposed Waste Management Act Section 60 policy direction capping incineration of MSW and other matters.

The proposed policy includes a reminder that it is essential that Irish waste management policy recognises the European evolution from 'waste management' to 'resource efficiency' and 'sustainable materials management'. It is stated that Irish policy must be reshaped significantly in order to deliver the step-up required to achieve an ambitious high value, high quality resource and waste management objective.

Waste Management (Food Waste) Regulations 2009 (SI 508 of 2009)

These regulations, which came into operation in January 2010 and have practical application from 1 July 2010, are designed to promote the segregation and beneficial use of food waste arising in the commercial sector. Their aim is to increase the amount of food waste that is recovered. In particular, the Regulations are intended to facilitate the achievement of the targets set out in Directive 99/31/EC on the Landfill of Waste for the diversion of biodegradable municipal waste from landfill sites, by directing source-segregated food waste to composting and biogas plants and to other forms of treatment.

The Regulations impose obligations on the major generators of food waste, such as State buildings where food is prepared, restaurants and cafés, hot food outlets, canteens, hotels and larger guest houses, hospitals, universities, airports and supermarkets and other food retailers, to segregate these materials. They must then make them available for separate collection or direct transfer by the producer for the purposes of authorised treatment. Alternatively, these materials can be treated on the premises where they are produced under specified conditions.

As noted, these Regulations speak to the commercial sector, however in summer 2010, the Department of the Environment, Heritage and Local Government issued for consultation a proposed set of regulations that would require source separation and collection of such biowastes for householders. No decision has been made to date on the publication of any final set of regulation in this respect.

[17] http://www.environ.ie/en/Environment/Waste/PublicConsultations/

Persistent organic pollutants

Persistent organic pollutants (POPs) are substances which pose a threat to human health and the environment. They are toxic, persist in the environment, and bioaccumulate through the food web. POPs are listed under the Stockholm Convention on Persistent Organic Pollutants (Convention) and the UNECE Convention on Long Range Transboundary Air Pollution on Persistent Organic Pollutants (Protocol).

They can be sub-divided into three main categories:-

- Pesticides e.g. DDT;
- Industrial chemicals e.g. polychlorinated biphenyls (PCBs);
- Unintentional by-products e.g. dioxins, furans.

The EPA is the competent authority for the purposes of implementing the national Persistent Organic Pollutant Regulations (SI No. 235 of 2010) and EC Regulation 850/2004 on persistent organic pollutants (EU POPs Regulation). The main objectives of the EU POPs Regulation is the protection of human health and the environment by prohibiting, phasing out as soon as possible, or restricting the production, placing on the market and use of POPs listed in the Convention and Protocol. In addition, wastes containing POPs above certain concentrations must be destroyed or irreversibly transformed subject to very limited derogations.

In 2010, the EU POPs Regulation was amended to include additional substances as listed POPs. These substances include polybrominated diphenylethers (PBDEs), perfluorooctane sulfonic acid (PFOS) and its derivatives, and pentachlorobenzene. The presence and concentration of these new POPs will have an impact on how wastes containing them will be managed. The European Commission is currently undertaking a study to develop proposals for low POP concentrations limits for waste containing these new POPs, above which they will be required to be managed as POPs wastes. Such limits are expected to be introduced in 2011.

Wastes that have been identified by the European Commission that may contain new POP substances include sewage sludges, wastes arising from products of a certain age including carpets and upholstered products (e.g. furniture, mattresses etc.), automotive shredder residue, and specific WEEE. The EPA is currently organising the testing of samples of such wastes produced in Ireland to determine the levels of these new POPs. This is to identify implications for the management of such wastes and to help feed into EU discussions on waste limits in early 2011. This is an area of developing policy that may have significant implications for certain waste streams, including some traditionally directed to recycling. More information can be found at http://www.epa.ie/whatwedo/resource/hazardous/pops/.

Municipal solid waste pre-treatment

The EPA *Municipal Solid Waste Pre-treatment & Residuals Management* guidance was published in 2009[18]. Subsequently the EPA commenced a review of the landfill licences to incorporate the appropriate pre-treatment targets, monitoring, measuring and reporting protocols. In 2010, the EPA published two further advice documents on the implementation of the pre-treatment obligations. The first document is a draft guidance manual that sets out the sampling and monitoring regime which will provide acceptable evidence to the EPA of BMW content of municipal waste sent to landfill[19]. It is anticipated that this document will be finalised after the second round of waste characterisation surveys at biological treatment and other plants. The second document is a list of 'BMW

[18] http://www.epa.ie/downloads/advice/waste/municipalwaste/name,26146,en.html.
[19] http://www.epa.ie/downloads/advice/waste/municipalwaste/name,27244,en.html.

factors'[20] which allows the application of proven BMW content factors of collected and selected pre-treated waste streams.

Through this guidance, the EPA, working with the waste industry and local authorities, aims to provide appropriate factors, guidance and templates for measuring and reporting on BMW being consigned to landfill that will be standardised across the industry. This will eliminate the automatic need for each landfill to undertake its own BMW characterisation for certified waste streams, thereby reducing costs. With the better understanding of waste flows to landfill, the application of appropriate biodegradability factors, and the quarterly e-reporting of BMW intake, it will be possible to improve on the accuracy of the measurement of the biodegradable content of residual waste accepted for disposal at landfill. Central to the efficient operation of the calculation of BMW in MSW disposed to landfill, is accurate recording of the nature of the MSW waste stream delivered to landfills (household or commercial, pre-treatment applied, etc.).

Also completed in 2010 was a survey of *Residual Waste from Businesses provided with Organic Waste Collection*[21] (i.e. a third bin). This survey, which is related to the EPA municipal waste characterisation work[22] published in 2008, looks at the impact on the character of the residual bin from commercial premises when a three bin service is used. The results indicated that the BMW content of the residual bin for the commercial sector only dropped marginally from 77% to 73.4%. It is expected that there will be further reduction in the BMW content of the residual commercial bin as the full impact of the recently introduced Food Waste Regulations, which came into force in January 2010, is felt.

National Hazardous Waste Management Plan

The EPA is preparing an interim review of progress under the National Hazardous Waste Management Plan 2008-2012. Over the last year a number of studies and actions identified under the plan were completed by the EPA, including:

- Need assessment for a National Difficult Waste Facility (incorporating hazardous waste landfill);
- Economic study of solvent waste recycling and treatment;
- *Smart Garage Guide* promoting environmental best practices at garages;
- Project to develop a code of practice for the acceptance of hazardous waste at civic amenity sites;
- Report on hazardous wastes arisings from the farm sector.

The outputs of these studies in the form of reports and guidance are, or will on completion, be available at the following link: http://www.epa.ie/whatwedo/resource/hazardous/. This information is intended to contribute to a better understanding and management of hazardous waste streams in Ireland by the relevant stakeholders.

The EPA National Waste Prevention Programme (NWPP)

In November 2010 the sixth annual progress report of the EPA NWPP was published.[23] The *Prevention Plan 2009-2012*, which was published early in 2009 following stakeholder consultation, sets out the ambition and architecture of the programme up to 2012[24]. The EPA NWPP (incorporating resources conservation) which has

[20] http://www.epa.ie/downloads/advice/waste/municipalwaste/name,29763,en.html.
[21] http://www.epa.ie/downloads/pubs/waste/stats/name,30407,en.html.
[22] http://www.epa.ie/downloads/pubs/waste/plans/name,11659,en.html.
[23] http://www.epa.ie/downloads/pubs/waste/prevention.
[24] http://www.epa.ie/whatwedo/resource/nwpp.

been running since 2004 with a total spend of almost €16M to date continues to perform strongly. It is not always easy to quantify the impact of behavioural change or incremental environmental improvements in monetary terms, but measurement of direct cost savings to the business and institutional sector through interaction with the NWPP has been measured as yielding cumulative annual cost savings exceeding €5M for those involved. With only modest penetration of the programme to some sectors to date, the EPA is convinced that similar savings are available to other business activities and organisations in the State.

The EPA will continue to work with all relevant players to promote the ongoing development of capacity for waste prevention and resource efficiency in Irish society. This in turn will have a positive economic impact as Ireland strives to emerge from the current downturn as a more sustainable society.

Inter-Agency cooperation on waste policy

The EPA is actively working with a number of State bodies in relation to waste management issues and policy with a view to offering efficiencies, integrated guidance and service to the waste industry and policy makers. Such cooperation also helps to ensure that environmental protection and resource conservation is kept at the centre of decision making across a range of policy areas that impact on waste management practices and operations.

The management of certain radioactive materials is one area of such inter-agency cooperation that has resulted in useful integrated guidance for the business community. Such wastes are generally outside the normal waste management structure and legislative regime in Ireland (managed under specific legislation) except for a few key areas. For example in the WEEE management area, radioactive waste management policy overlaps with general waste policy in areas such as decommissioning of waste smoke detectors (which contain a small radioactive source), and discarded X-Ray equipment. Guidance on the management of such waste streams and other low risk radioactive wastes is available at the following links:

http://www.epa.ie/downloads/advice/waste/weee/; and

http://www.rpii.ie/CMSPages/GetFile.aspx?nodeguid=0d9a7d17-e83f-4c8c-a551-044b2409d095&PublicationID=4648

1.3 EU developments and obligations

New Waste Framework Directive (2008/98/EC)

In November 2010, the DEHLG held a consultation period for the proposed transposing regulation for the new EU Waste Framework Directive (2008/98/EC) (WsFD). This Directive came into effect on 12 December 2010.

Some of the main areas of European Commission activity in EU waste policy development in 2010 were associated with the bedding in of the new Waste Framework Directive were:

- Articulation of draft measurement protocols for the recycling targets specified in Article 11 of the WsFD for paper, metals, plastic and glass. There are four proposed methods of measurement and it is clear that there are divergent views amongst Member States on the manner by which the achievement of these targets should be calculated.
- Articulation of draft end of waste criteria for metals (refer to Article 6 of the WsFD) (see Section 1.4 of this report).
- Drafting of end of waste criteria for other materials such as glass and paper, and devising a candidate list for other materials (such as refuse derived fuel).

- Development of European Commission guidance on application of the R1 efficiency formula (energy from waste) (refer to Annex II of WsFD).
- Preparation of a guidance document on interpretation of WsFD and its definitions.
- Publication of European Commission guidance on the application of Life-Cycle-Thinking (LCT) and Life-Cycle-Assessment (LCA) in waste management.
- Articulation of best practice in waste prevention programmes (including Ireland's NWPP examples).
- Articulation of proposed amendments to the EU List of Wastes

The volume and range of material and initiatives coming out of the WsFD is very large. However, these developments will have a significant influence on how the Directive is interpreted and operated at national level.

EU policy on Life Cycle Thinking and Assessment in waste management

The EU Commission is very active in promoting and formatting the concepts of Life Cycle Thinking (LCT) and Life Cycle Assessment (LCA) as appropriate supportive scientific approaches to modern environmental policy and business decision making[25]. The fundamental aim of LCT is to reduce overall environmental impacts. This can involve trade-offs between impacts at different stages of the life cycle of a product or service.

The new WsFD has for the first time put the waste hierarchy as a requirement of law, and this hierarchy has been drawn up implicitly taking life cycle approaches into account. Article 4 of the Directive states that the 'hierarchy shall apply as a priority order in waste prevention and management legislation and policy'. Article 4(2) of the Directive states that when applying the hierarchy 'Member States shall take measures to encourage the [waste technology/policy] options that deliver the best overall environmental outcome', and LCT is proposed as a means of evaluation, particularly where deviation from the hierarchy is proposed. The WsFD recognises that the application of the hierarchy and use of LCT and LCA are not divorced from the need to also consider the technical feasibility and economic viability of the technology or policy options (refer to Article 4, last paragraph).

It is clear that the development of EU policy on the use of Life-Cycle-Thinking/Life-Cycle-Assessment in waste management is significant; and specifically its role in applying the waste hierarchy tests for the purposes of Article 4 for the WsFD. Through its research and resource portals at http://lct.jrc.ec.europa.eu/index_jrc the EU Commission is building a series of reference documents and support tools in the areas of LCT and LCA. For example at this site there are useful publications on environmental assessment of different waste management scenarios[26], and an inventory of LCA studies for biowaste management.[27] In recent months the Commission has conducted targeted and confidential consultations on proposed *Strategic Guidance for LCT and LCA in Waste Management*, and two documents intended to support environmentally sound decisions in waste management are titled *A Guide to Life Cycle Thinking & Assessment in Waste Management for Policy-Makers and Business* and *A Technical Guide to Life Cycle Thinking & Assessment in Waste Management for Waste Experts and LCA Practitioners*. These document the Commission's suggested approach to evaluation of local or national waste policy and technology against the obligations of the waste hierarchy, and any proposed deviations from same. When the guidance is published by the Commission, the EPA has been advised that the Department of the Environment, Heritage & local Government will engage with stakeholders regarding practical application of LCT/LCA to waste management in Ireland.

[25] Linked back to the EU Thematic Strategies on *Prevention & Recycling of Waste* and on *The Sustainable Use of Natural Resources*. http://ec.europa.eu/environment/waste/strategy.htm.
[26] http://lct.jrc.ec.europa.eu/pdf-directory/LCA-waste-part-I-Data-collection-and-preliminary-assessment.pdf , and http://lct.jrc.ec.europa.eu/pdf-directory/LCA-waste-part-II-Detailed-LCAs.pdf
[27] http://lct.jrc.ec.europa.eu/pdf-directory/Inventory-of-existing-studies-applying-life-cycle-thinking-to-biowaste-management.pdf

The EPA, under the STRIVE research programme, has supported an all-island and international team of researchers to develop a tool to help in satisfying the future need to apply life-cycle thinking in the development of waste legislation and policy. The research project is titled *Development of an Integrated Waste Management Life Cycle Analysis and Carbon Footprinting Tool for the Major Waste Streams in Ireland* (STRIVE reference: 2008-WRM-MS-2-S1). The output of this research is expected to be published in early 2011.

Sewage sludge proposals

In September 2010, the Commission circulated a draft discussion document on sludge and biowaste management[28]. This consultation is asking if it is appropriate to incorporate biowaste standards and compost standards (for material derived from biowaste) where such materials are proposed to be spread on land as a fertiliser and/or soil improver. Such a move may obviate the need for a standalone biowaste directive. Certain biowastes are excluded from the consultation text (e.g. industrial waste water treatment plant sludges from dairy, brewing and food plants).

The draft discussion document proposes contaminant limits for biowastes and sewage sludge. The document considers additional restrictions for the use of such materials on land, such as:

- Ban on untreated sludge going to land;
- Stabilisation of sludge (minimisation of odour);
- Sanitisation of sludge (*Salmonella* and *Escherichia coli* limitation);
- Spreading restrictions (time of year, land condition, lag between spreading and cropping/grazing).

The Commission has not indicated when it expects to finalise this initiative.

Waste Statistics Regulation

The Waste Statistics Regulation (2150/2002/EC) requires biennial reporting by Member States on (i) waste generation (by NACE[29] economic sectors and households for 48 waste categories) (ii) waste treatment (disposal and recovery), (iii) treatment infrastructure (the number and capacity of treatment facilities in the State) and (iv) percentage coverage of the collection scheme. The EPA uses data collated for the National Waste Report to report to the EU Commission on the Waste Statistics Regulation. The Waste Statistics Regulation was amended in 2010 (849/2010/EC) and this will impact on data for reference year 2010, to be reported by June 2012. The EPA is assisted in this task by the Central Statistics Office.

1.4 Waste as a resource

The new Waste Framework Directive (2008/98/EC) includes a wide definition of waste prevention that includes concepts such as re-use and preparation for reuse and use as a raw material substitute etc. Resource efficiency (incorporating the philosophy of maximising the value derived from secondary resources, or recycling and reuse initiatives etc.) has become one of the top environmental priorities in Europe since its inclusion as one of the seven flagship initiatives in the EU Commission Europe 2020 strategy published in March 2010[30]. The use of waste as a raw material for production is a rapidly growing area of activity in the policy and industrial arenas. Significant cost savings are possible if wastes can be used as a raw material or resource, and there are growing

[28] DG ENV C2/BZ/tb, dated 21-9-10
[29] Nomenclature Generale des Activites Economiques dans l`Union Europeenne" (General Name for Economic Activities in the European Union).
[30] http://ec.europa.eu/eu2020/index_en.htm

business opportunities in this area that span from redesign (eco-design) of process so as to ensure residues, if they cannot be prevented, are rendered easier to reprocess/recover; to development of secondary resources standards (e.g. compost, aggregates, metals etc.); to energy technologies that can use secondary fuels; to waste matching initiatives (your waste matched to a facility that can use it as a resource[31]) etc.

The DEHLG funded *rx3* programme[32] (rethink, recycle, remake) is very active in this resources conservation arena. The *rx3* initiative developed out of the Government's Market Development Group, and in simple terms its objective is to facilitate the development of sustainable markets and outlets for recyclable materials and to achieve the twin objectives of accelerating recycling levels based on the provision of segregated collection services and contributing towards the overall sustainability of waste resource management in Ireland. Waste streams that *rx3* is focussing on are paper, plastics and organics. *rx3*, as part of its current five year programme (2007-2011) is carrying out an assessment of the recovered paper supply chain in Ireland as well as developing best practice guidance for an improvement in recovered paper quality.

The Government's ambitions in relation to Green Public Procurement[33] will also influence the resources conservation/efficiency agenda and contribute to sustainable market conditions for recycling opportunities. The employment of recyclates and secondary materials in public projects and service contracts will benefit market conditions and opportunities for these materials. The EU Commission in its recent industrial policy communication (*An Integrated Industrial Policy for the Globalisation Era: Putting Competitiveness and Sustainability at Centre Stage[34]*) when talking about promoting industrial modernisation, identified resource efficiency as central to this ambition. The communication sees policy action in areas of green procurement, research, eco-innovation, smart regulation, material substitution, recycling, use of renewables, and use of secondary raw materials as important to the delivery of sustainable and competitive industrial activities.

In 2009, Ireland recovered c. 1.1 Mt of its municipal type waste streams (wood, plastics, paper, organics, metals, etc.) (including C&D derived metal, wood, plastic and glass streams), of which 69% was sent abroad for recovery. The majority of this recovery is reported as being recycling (i.e. non-energy use recovery). In 2008 (the most recent industrial source material survey) an approximate 1.2 Mt of industrial waste was reported as being recovered, of which approximately 75% went to non-energy use recycling activities (includes some municipal type streams from industrial activities such as paper, card, etc.). The data would thus suggest that there is a potential for a minimum c. 1.6 Mt waste recyclables currently available to the Irish market. This excludes any consideration of the potential additional resources locked up in the residual waste currently consigned for disposal to merchant landfills (1.86 Mt in 2009). The development of quality standards for secondary resources is seen as a key element in the establishment of indigenous industry activities. This would contribute to the economy through job creation, innovation, and raw material conservation.

End-of-waste

There have been a number of important EU developments in relation to end-of-waste (EoW) status (refer to Article 6 of the new WsFD) for certain recovered materials. Through the joint EU Technical Adaptation Committee (TAC) established under the Directive, EoW criteria are being articulated for specified (and other selected) materials that have gone through a recovery/recycling process. Member States can agree harmonised EU-wide criteria for certain types of waste and then have to adopt the specified measures at national level when published. Proposed EoW criteria have been published by the Commission for metals, and work is ongoing in relation to glass, paper and others. Material that has reached EoW standard ceases to be waste for the purpose of national

[31] For example SMILE initiative, see www.wastematchers.com
[32] See www.rx3.ie.
[33] http://www.environ.ie/en/Environment/SustainableDevelopment/GreenPublicProcurement/
[34] http://ec.europa.eu/enterprise/policies/industrial-competitiveness/industrial-policy/files/communication_on_industrial_policy_en.pdf

recovery and recycling targets. Further information is available at the following EU Commission web link: http://ec.europa.eu/environment/waste/framework/end_of_waste.htm.

For materials that are not yet, or proposed to be, subject to the EU TAC process for articulation of EoW criteria, Member States are free to decide on a case-by-case basis whether certain wastes have ceased to be waste taking into account the applicable law. When any Member State decides to set EoW criteria for a material, it has to formally notify this decision (as a technical regulation) to the other Member States and the Commission (c.f. Article 6.4 of WsFD 2008/98/EC). In 2010, the EPA proposed two EoW standards (for recovered gypsum and baled tyres). The progress of these notifications can be tracked on the EU Technical Information and Regulation System (TRIS) web site at: http://ec.europa.eu/enterprise/tris/about/index_en.htm. Other Member States are also availing of this system, for example the United Kingdom have notified technical regulations for EoW for pulverised fuel ash, recovered fuel oils, gypsum, etc. Following acceptance of any of these notified technical standards, the material can be traded across the EU as a resource (not a waste).

By-products

Under the WsFD an assessment and decision structure has been put in place regarding the classification of by-products (i.e. when is a process residue a resource and not a waste). For most primary products the question is not relevant, but for some processes that produce a residue or *by-product*, the classification of this material as a waste or not can be difficult and indeed can vary depending on circumstances. The WsFD sets out criteria under which the classification of by-products can be determined.

The construct of the WsFD is such that although the 'proofs' required for Article 5 (By-Product) and Article 6 (End-of-Waste) decisions are similar, the administrative requirements are quite distinct. There is no notification of EU required for Article 5, nor is there an express instruction to the Commission to bring forward *by-product* criteria as is mandated in the case of certain EoW candidate materials. Most *by-product* decisions will be use-specific. Naturally any material that is moving from a potential discard (waste) status to one of being a *by-product* will have to move into the REACH and packaging and labelling regulatory requirements. In respect of the latter legislative controls, certain reliefs are given for material to be re-used again as a resource on the site of production.

2 GENERATION OF MUNICIPAL WASTE

In 2009, it is estimated that a total of 2,952,977 t of municipal waste[35] was generated in Ireland, a decrease of 8.4% on the 2008 figures (Table 2 and Figure 1). This is a significant downward shift to below 2004 levels. Figure 2 shows that the drop in waste generation in Ireland mirrored the fall in GNP and a significant fall in personal consumption. Household waste generation reflects personal consumption patterns.

The data for household waste generation also includes estimates for uncollected household waste (128,000 t; refer to end of Section 3.2). A distinction is therefore drawn between municipal waste *generated* and municipal waste *managed* – the latter concerning itself only with waste that is either home composted, collected or brought directly to waste facilities.

Table 2 show a continuation of the downward trend in municipal waste generation commenced in 2008. Household waste generated decreased by 3% on 2008 figures, and commercial waste generation decreased by 12% on 2008 figures. The tonnage of household waste generated is down c. 50,000 t on 2008 data, and is at a level that is comparable to data for 2004 despite a rise in population (Figure 2). A more detailed analysis of the main components of the managed household and commercial municipal streams is discussed in Sections 3.2 and 3.3 of this report.

Table 2: Municipal waste generation, 2004–2009

	2004	2005	2006	2007	2008	2009
Household waste (t)	1,728,154	1,746,408	1,978,716	1,761,167	1,677,338	[36]1,626,469
Commercial waste (t)	1,202,824	1,235,629	1,327,068	1,549,075	1,477,397	1,299,807
Cleansing waste (t)	(69,661)	(58,677)	(78,822)	(87,441)	(69,546)	26,701
Total municipal waste (t)	**3,000,638**	**3,040,714**	**3,384,606**	**3,397,683**	**3,224,281**	**2,952,977**
% change	2.8	1.3	11.3	0.4	-5.1	-8.4

(Source: recovery organisations survey; landfill survey, local authority survey)

Cleansing waste comprises street sweepings, the content of municipal bins, parks and gardens waste. This year fly-tipped material has been assigned to either commercial or household waste categories depending on description and this explains the apparent drop in tonnage of such material. Tracking this latter material over its full management cycle is challenging, as much of this waste is merged with collected household waste at waste transfer and treatment facilities. Apart from street sweepings (mixed litter and grit, water etc.), the remainder of this material has a similar character to household and commercial wastes and is accordingly indistinguishable. The municipal landfill section of this report (Section 10.1) identifies 26,701 t of street sweepings and parks maintenance waste disposed of at landfill in 2009, though more was likely collected and co-mingled with household and commercial streams for landfill.

[35] In the context of this report municipal waste consists of three main elements - Household, Commercial (including non-process industrial waste), and Street Cleansing waste (street sweepings, street bins and municipal parks and cemeteries maintenance waste, litter campaign material).
[36] Including household WEEE collected at civic amenity sites and retail premises.

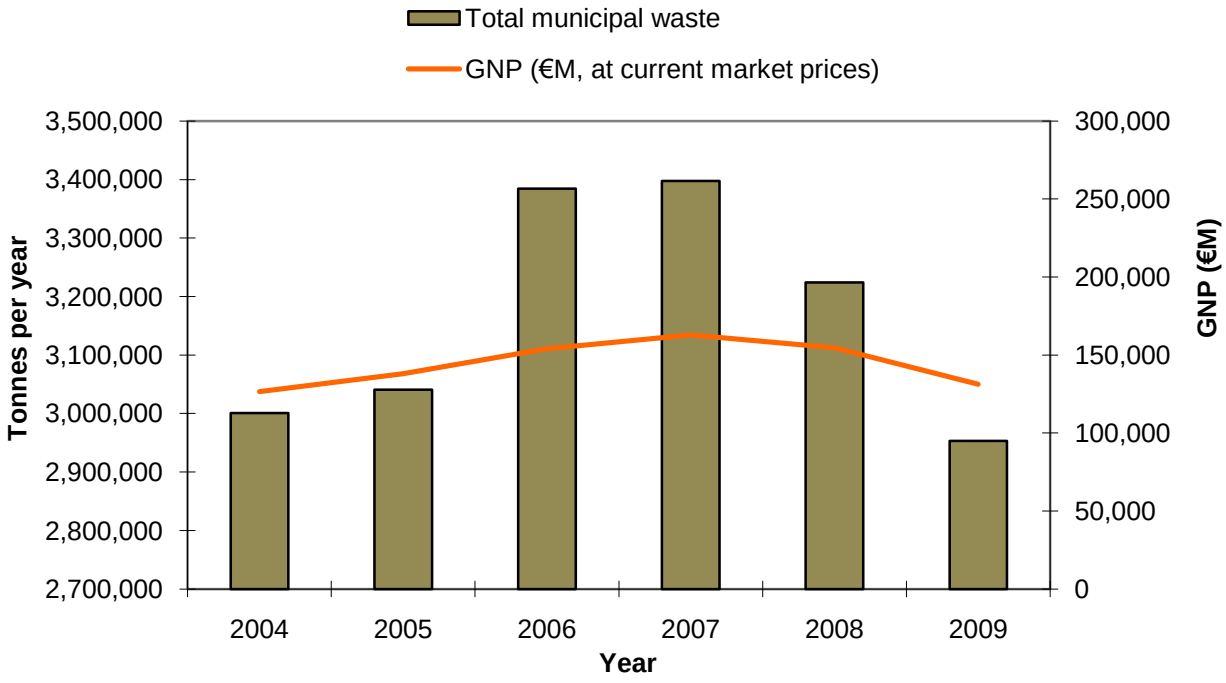

Figure 1: Trends in generation of municipal waste and GNP, 2004–2009

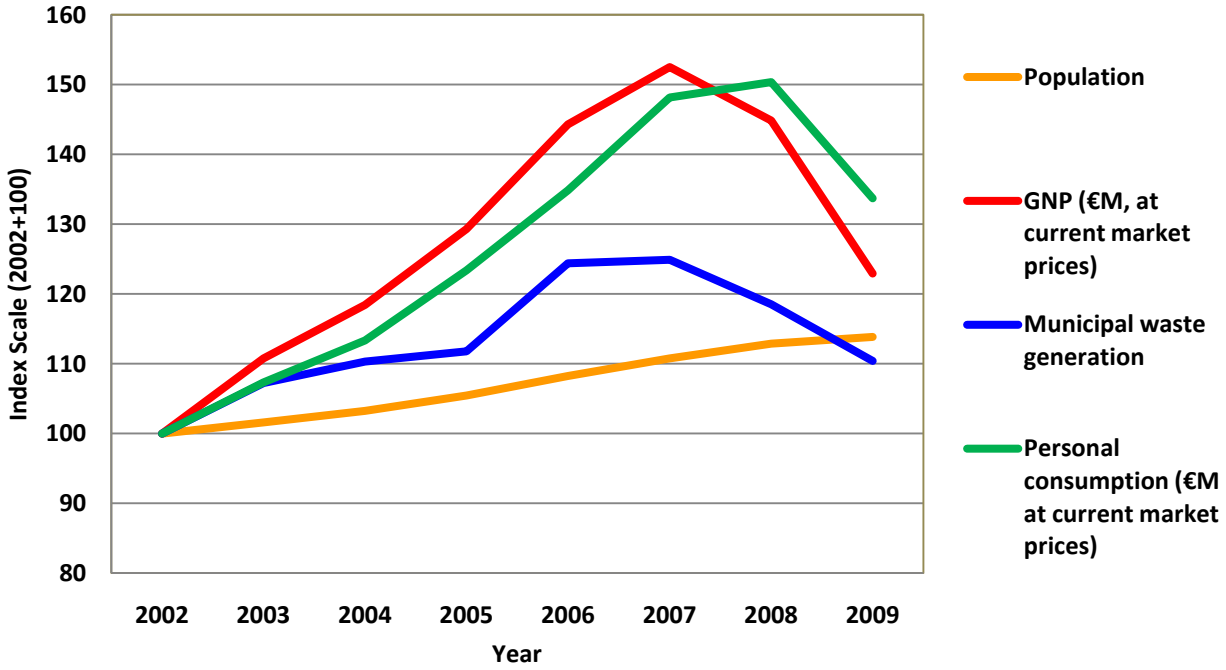

Figure 2: Trends in generation of municipal waste, GNP, population and consumption

Using Central Statistics Office data on population, GNP and personal consumption

Municipal waste outlook

The Economic and Social Research Institute (ESRI) was commissioned by the EPA STRIVE research programme to design and build a Sustainable Development Model for Ireland (ISus)[37] that will forecast national environmental emissions and resource use up to 2025, having regard to economic and social developments. The ISus model is driven by the ERSI's HERMES model, which projects economic production and consumption per sector.

The tonnage of future streams of municipal waste is intricately linked to the performance of the economy and its ability to move out of recession. Using the ISus model, it is possible to project future tonnages of managed municipal waste for the period up to 2025 depending on the economic recovery possibilities. Bergin *et al.* 2010[38] have explored a number of scenarios for future economic recovery for Ireland: two main scenarios are considered, *High Growth* and *Low Growth*.

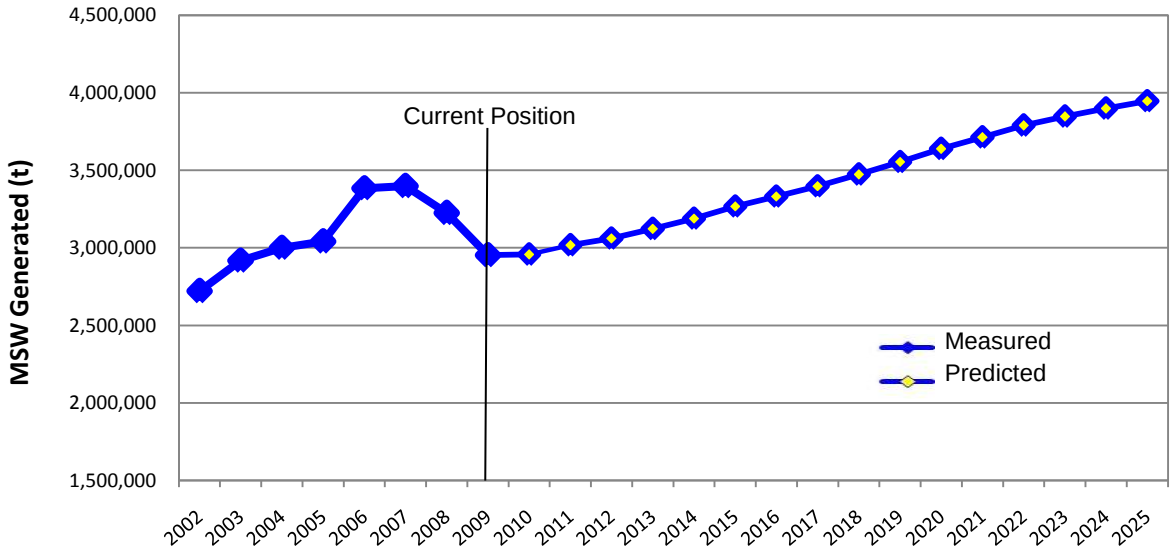

Figure 3: Predicted growth in municipal waste (ISus model[37] – Low Growth Scenario)

Assuming an economic recovery in 2012 and beyond, it is anticipated that the tonnage of municipal waste will increase by 2 to 2.5% per annum (Low Growth Scenario, Figure 3). With that level of growth, the total tonnage of municipal waste generated will increase by roughly one million tonnes within approximately 15 years (the low growth scenario for the economy extends the 10 year time-scale reported in the National Waste Report 2008 for such an increase). While there may be sufficient management capacity in the immediate future, the predicted growth of municipal waste within the coming decade will necessitate investment in waste management infrastructure.

In the coming years it will be important that waste prevention, resource conservation, and eco-design programmes become embedded, so as to assist in the decoupling of waste generation in Ireland from any future economic growth.

[37] For further information on the ISus model see www.esri.ie/research/research_areas/environment/isus/
[38] Bergin, A., T. Confrey, J.D. FitzGerald, and I. Kearney (2010), 'Recovery Scenarios for Ireland: An Update', *Quarterly Economic Commentary*, 2010, pp.55-101.

3 MANAGEMENT OF MUNICIPAL WASTE

The quantity of municipal waste *managed* in 2009 (2,824,977 t) indicates an 8% reduction on that managed in 2008 (3,103,820 t). Disposal and recovery rates for the managed municipal waste streams are shown in Table 3 and Figure 4. The quantity of municipal waste recovered in 2009 increased by 1.5% on that reported in 2008 (from 37.5% to 39%, as a proportion of waste generated), while the landfill of municipal waste decreased by a corresponding amount. The recovery rate continues to exceed the national target of 35% recycling by 2013. The total *managed* municipal waste arisings comprised 1,498,469 t of household wastes; 1,299,807 t of commercial wastes and 26,701 t of street cleansing wastes. The constituents of the commercial and household waste streams are examined in greater detail later in this section.

Table 3: Disposal and recovery of managed municipal waste, 2009

Material	Quantity managed (t)[39]	Quantity disposed to landfill (t)	National landfill disposal rate (%)	Quantity recovered (t)	National recovery rate (%)
Total	**2,824,977**	**1,723,705**	**61**	**1,101,272**	**39**

(Source: recovery organisations survey, local authority survey, landfill survey)

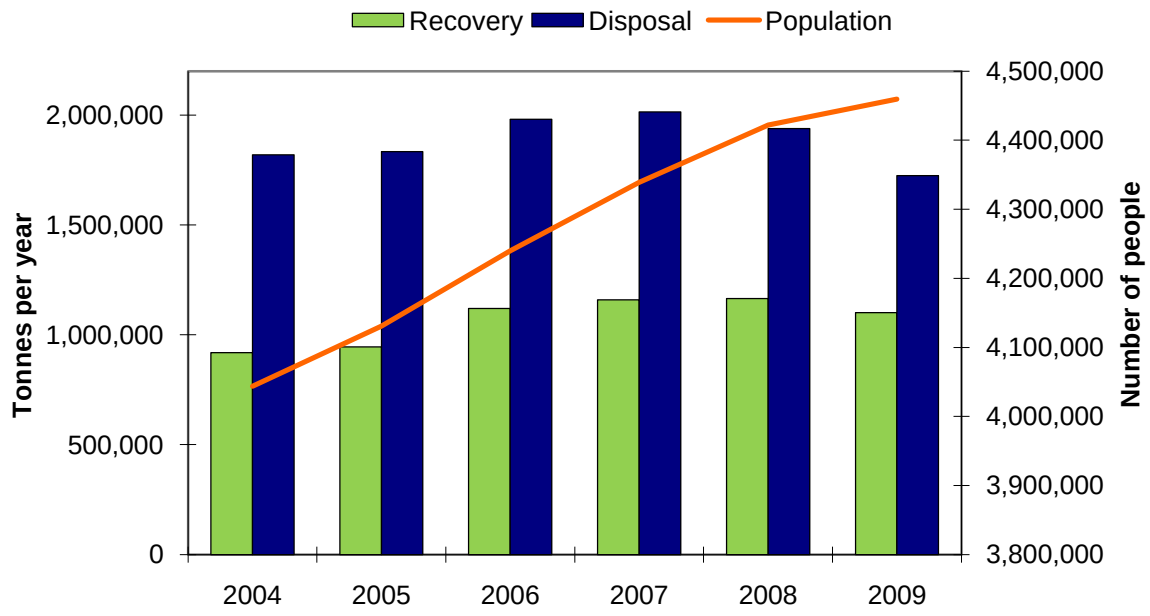

Figure 4: Trends in recovery and disposal of municipal waste, 2004–2009

Figure 4 illustrates trends in the recovery and disposal of municipal waste, together with population growth over the last six years. The trends illustrated in Figure 4 (and Figure 2) suggest a decoupling of the link between increasing municipal waste generation and population growth.

[39] This total doesn't include estimates of uncollected waste (128,000 t).

Although Ireland is still very dependent on landfill for residual waste treatment, the improving recycling rate (i.e. energy recovery excluded) achieved (35%) is closing on the EU 27 average of 40%[40] (Figure 5).

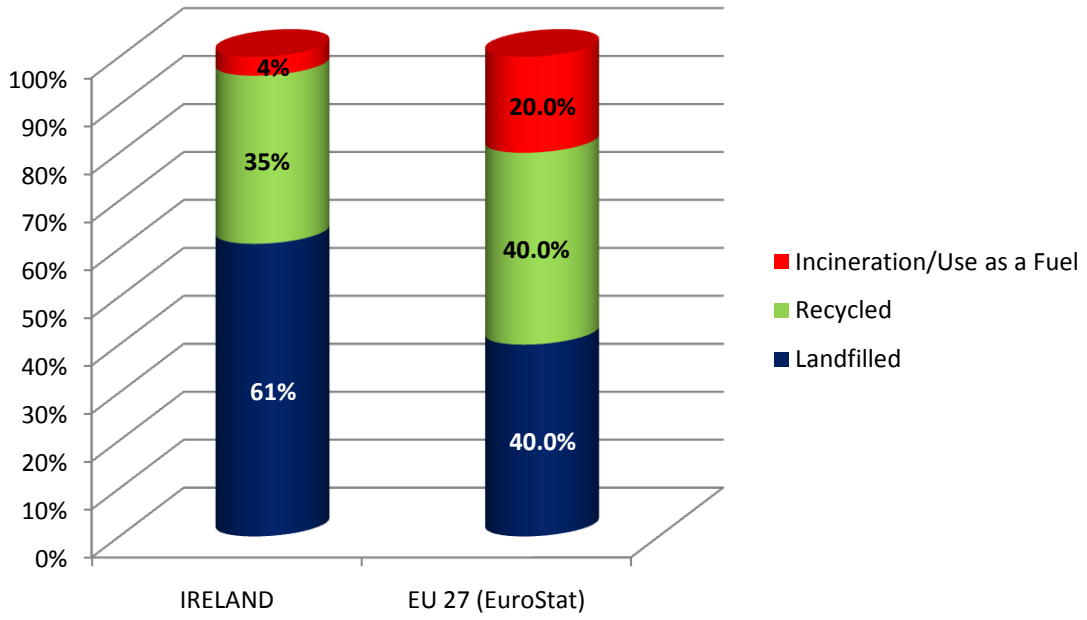

Figure 5: Management of Irish MSW for 2009 in comparison with EU 27 MSW

Table 4 presents the breakdown of the municipal disposal data for 2009 and calculates the market change since 2008. Notably the commercial waste stream disposed to landfill is down by 15% on 2008 figures, this being a continuation of the downward trend noted in the National Waste Report 2008. Since report year 2007, there has been a c. 21% drop in residual commercial waste tonnage disposed to landfill, principally due to economic decline.

Table 4: Change in landfill disposal of municipal waste components between 2008 and 2009

	Household waste disposed to landfill (t)	Commercial waste disposed to landfill (including non-process industrial) (t)	Street sweepings disposed to landfill (t)	Total MSW disposed to landfill (t)
2008	1,155,567	758,178	24,969	1,938,714
2009	1,056,267	640,737	26,701	1,723,705
% change	**-8.6%**	**-15%**	**+7%**	**-11%**

[40] http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-32-10-283/EN/KS-32-10-283-EN.PDF

3.1 Waste recovery and recycling

The following section presents information on recovery of waste streams managed in Ireland, using the data provided by the recovery organisations and landfills surveyed.

Table 5 below provides information on recovery of municipal plus non-municipal wastes (e.g. glass from end of life vehicles or plastic off-cuts from industrial processes) as this reflects how this material is processed (excluding hazardous and C&D waste recovery as these are reported elsewhere in this report).

Table 5: Segregated non-hazardous waste streams recovered in Ireland and abroad in 2009

Material recovered	Irish segregated waste recovered in Ireland (t)	Irish segregated waste recovered abroad (t)
	Total	Total
Ferrous Metals	348	469,253
Paper and Cardboard	5,269	504,324
Glass	15,049	108,388
Plastic	30,111	67,585
Textiles[41]	471	7,187
Mixed Metals	1,764	20,013
Aluminium	2,464	14,257
Wood	234,712	2,012
Organic Waste	91,682	5,642
Refuse Derived Fuel	36,642	11,176
WEEE	19,574	18,869
Tyres	12,263	4,256
Other[42]	0	14,337
Total	**450,350**	**1,247,299**

(Source: recovery organisations survey, landfill survey)

Table 6 shows that in 2009, 31.1% of municipal waste recovery took place in Ireland. An increase in the quantity of refuse derived fuel being recovered in Ireland is the most significant change in 2009 over 2008 (36,642 t recovered in 2009 compared to 63 t in 2008). This is due to an increasing number of waste operators processing their waste to provide refuse derived fuel (RDF) as well as a developing national market. The largest decrease in tonnage in a municipal waste stream is paper and cardboard. A total of 509,512 t of paper and cardboard was recovered in Ireland and abroad in 2009, compared to 596,471 t in 2008, a decrease of 86,959 t (mainly as a consequence of that amount available – municipal waste generation fell significantly in 2009 (8.4%)).

[41] A substantial proportion of textiles are reused.
[42] Composite packaging, mixed packaging.

Table 6: Non-hazardous municipal waste recovered in Ireland in 2008 and 2009 (not including imports)

Material[43]	2008		2009	
	Recovered in Ireland (t)	% recovered in Ireland (compared to total recovery of each material)	Recovered in Ireland (t)	% recovered in Ireland (compared to total recovery of each material)
Wood	173,266	95.1	171,464	98.9
Organic waste[44]	90,484	93.0	91,546	94.2
Refuse derived fuel[45]	63	0.2	36,642	76.6
Plastic	22,437	29.8	23,102	31.6
Glass	18,274	15.2	13,507	11.2
Textiles[46]	2,514	33.2	471	6.2
Paper and cardboard	5,554	0.9	5,269	1.0
Aluminium	3,121	17.9	17	0.4
Mixed metals	4,718	17.8	0	0.0
Ferrous metals	2,159	0.4	0	0.0
Total	**322,592**	**18.4**	**342,018**	**31.1**

(Source: recovery organisations survey, landfill survey)

Ireland's substantial reliance on recovery of municipal recyclables abroad continues (Table 7), in particular for metals, paper and cardboard and glass.

Table 7: Non-hazardous municipal waste recovered abroad in 2008 and 2009

Material[43]	2008		2009	
	Recovered abroad (t)	% recovered abroad (compared to total recovery of each material)	Recovered abroad (t)	% recovered abroad (compared to total recovery of each material)
Ferrous metals	[47]605,136	99.6	51,772	100
Other[48]	370	100.0	14,206	100
Mixed metals	21,748	82.2	1,411	100
Aluminium	14,359	82.1	4,344	99.6
Paper and cardboard	590,917	99.1	504,243	99.0
Textiles[46]	5,061	66.8	7,187	93.8
Glass	101,692	83.0	106,988	88.8
Plastic	52,883	70.2	49,943	68.4
Refuse derived fuel[45]	26,171	99.8	11,176	23.4
Organic waste[44]	6,840	7.0	5,642	5.8
Wood	8,986	4.9	1,936	1.1
Total	**1,434,163**	**81.6**	**758,848**	**68.9**

(Source: recovery organisations survey)

[43] All hazardous waste has been excluded from this table. See Section 9 for information on hazardous waste recovery. For metals, 2008 data includes some non-municipal wastes also.
[44] Includes edible oils and fats.
[45] Used as a fuel.
[46] A substantial proportion of textiles are reused.
[47] This figure contains some metal from the breakdown of WEEE.
[48] Composites, mixed packaging.

Some waste materials are imported into Ireland for recovery (Table 8). In 2009, a total of 89,680 t of waste was reported as imported into Ireland, comprising mainly plastic packaging waste (e.g. plastic bottles) (69%) and mixed metals (20%).

Table 8: Import of non-hazardous waste for recovery, 2008 and 2009

Material imported for recovery[49]	Import of segregated waste (t)	
	2008	2009
Plastic	62,001	62,276
Mixed metals	19,134	17,479
Wood	35	4,487
Ferrous metals	4,229	3,168
Organic waste[50]	19	2,017
WEEE	2,137	236
Aluminium	16	16
Paper and cardboard	0	1
Total	**87,571**	**89,680**

(Source: recovery organisations survey)

Table 9 shows that the United Kingdom continues to be the principal initial destination for municipal recyclable waste (although a percentage of what is exported to the UK is subsequently bulked and sent outside the UK for treatment). A total of 504,243 t of paper and cardboard was exported in 2009 for recovery (a reduction on 2008), although it is impossible to report on the final country where actual recovery takes place as some recovery operators provided the final destination to the EPA, and others provided the next destination (which is pre-treatment only, e.g. bulking). A total of 106,988 t of glass was exported, to the UK (70%) and Holland (30%). A total of 57,527 t of municipal metal was exported in 2009, mainly to the UK (67%) and Spain and Portugal (24%).

The implementation of the Market Development Programme for Waste Resources 2007–2011[51], which was formally launched in 2009 as rx3 (rethink, recycle, remake), aims to develop domestic markets for recyclables and identify new applications and markets for recyclables in Ireland. Key issues to be addressed by rx3 include promoting stable demand for recovered materials, supporting the achievement of economies of scale in the production of products made from recycled materials, and the need for more recovery and recycling infrastructure in Ireland to reduce reliance on overseas markets. The waste pre-treatment guidance published by the EPA in 2009[52] should also, in time, contribute to the generation of a stable supply of recyclables to the national market, with a consequent benefit for the recovery and recycling industry.

[49] All hazardous waste has been excluded from this table. See Section 9 for information on hazardous waste recovery. For metals, 2008 data includes some non-municipal wastes also.
[50] Includes edible oils and fats.
[51] Market Development Programme for Waste Resources 2007–2011, available to download from www.environ.ie and www.envirocentre.ie. See also www.rx3.ie.
[52] Municipal Solid Waste – Pre-Treatment & Residuals Management: An EPA Technical Guidance Document. EPA, 2009.

Table 9: Destination of municipal recyclable waste streams exported in 2009 (all units in tonnes)

	Paper & cardboard	Glass	Metals	Plastic	Other	RDF/SRF	Textiles	Organic waste	Wood	Total
UK[53]	146,250	74,642	38,433	29,298	8,105	1,282	7,187	5,478	1,936	312,612
China	109,234			10,217						119,451
Belgium	86,516				1,947					88,463
Holland	15,718	32,345	4,042		3,378			134		55,617
Asia	40,360		240	9,474	272					50,346
Unknown[54]	48,820		10	781						49,611
India	26,725		356							27,081
Europe (unspecified)	22,988			148						23,136
Spain/ Portugal			13,608			95				13,703
Sweden					505	9,799				10,304
France	7,468		788		48					8,304
Germany	88			25	67			30		210
Pakistan	76		50							126
Total	**504,243**	**106,988**	**57,527**	**49,943**	**14,322**	**11,176**	**7,187**	**5,642**	**1,936**	**758,964**

(Source: recovery organisations survey)

3.2 Household waste

The reported quantity of household waste managed by the waste industry decreased in 2009 from that reported for 2008, by approximately 3.8% to 1,498,469 t[55] (Table 10). The quantity of household waste recovered increased by approximately 10% to 442,202 t; and when the fall in household waste generation is factored in, the net recovery rate (at 29.5%) represents a 3.7% increase on that achieved in 2008 (Tables 10 and 11). Correspondingly, the proportion of managed household waste disposed to landfill fell to 70.5%. Disposal and recovery trends in household waste management are shown in Table 10 and Figure 6. The reduction in household waste managed reflects the decrease in personal consumption but is significant that it runs contrary to population growth trends (Figure 7).

Table 10: Trends in household waste management

	2004	2005	2006	2007	2008	2009
Quantity disposed to landfill (t)	1,214,908	1,198,504	1,379,246	1,200,980	1,155,567	1,056,267
Quantity recovered (t)	285,872	344,964	393,995	424,510	401,312	442,202
Recovery rate (%)	*19.0*	*22.3*	*22.2*	*26.1*	*25.8*	*29.5*
Total (t)	**1,500,780**	**1,543,468**	**1,773,242**	**1,625,490**	**1,556,879**	**1,498,469**

[53] UK totals include the following municipal wastes sent to Northern Ireland: 61,810 t glass; 5,441 t organic waste; 10,593 t plastic; 31,756 t paper & cardboard; 7,187 t textiles, 1,936 t wood and 12,672 t metals.

[54] One waste operator reported paper & cardboard and plastic tonnages as sent to 'China, India, Holland and UK' but failed to provide tonnages by country of destination.

[55] Waste collected, brought to bring banks, civic amenity sites and directly to landfill, home composted and household WEEE (includes 18,662 t WEEE collected at retailers).

Table 11: Disposal and recovery rates in the household waste stream, 2009

	Quantity managed (t)	Quantity landfilled (t)	National landfill rate %	Quantity recovered (t)	National recovery rate %
Total managed household waste[56]:	1,498,469	1,056,267	70.5	442,202	29.5

(Source: recovery organisations survey, local authority survey, landfill survey)

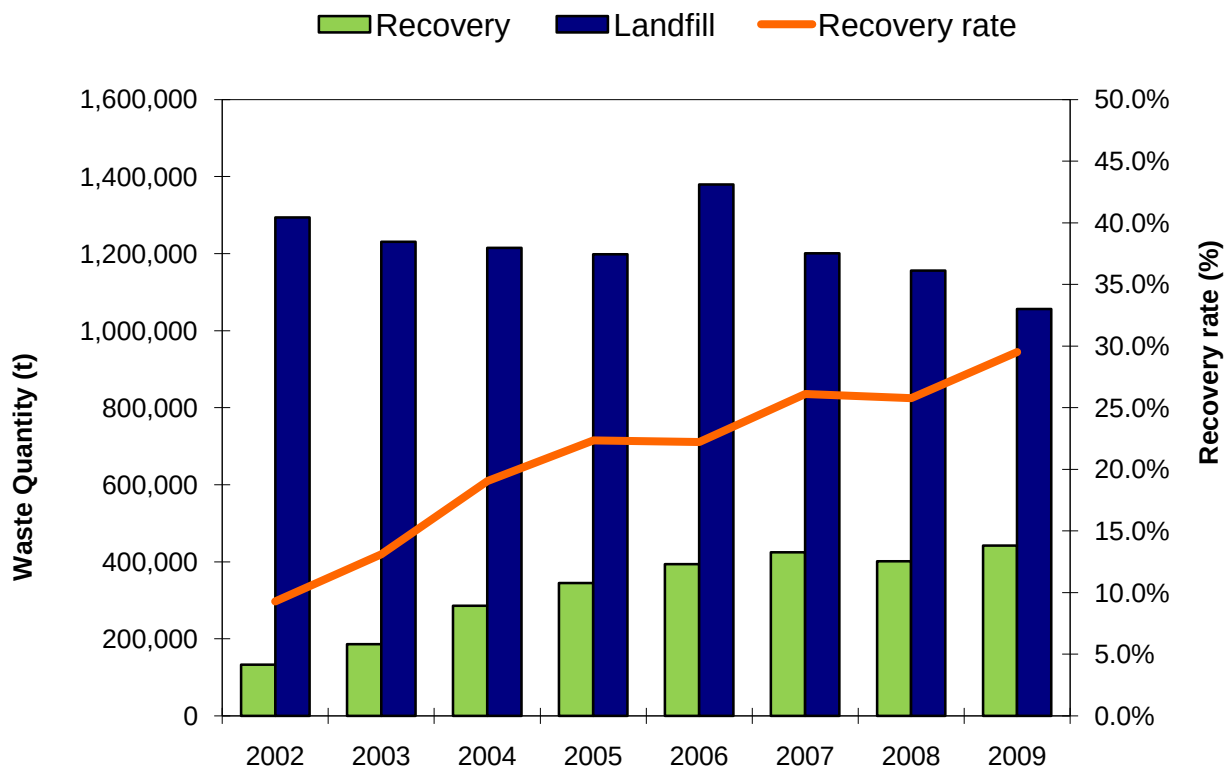

Figure 6: Disposal and recovery trends in household waste management, 2002–2009

This continued improvement in household recycling rates represents a very positive step despite the economic turndown and reported low landfill gate fees. There was a carry-over of mixed dry recyclables/packaging (c. 40,000 t from 2008) due to the market price collapse, and this will have contributed in part to the positive figures. This increase in recycling also reflects the increased collection of source segregated recyclables via increased use of the third bin (organics) and a consistent stream of dry recyclables from kerbside and bring centres (Table 12). There was 237 kg of residual household waste disposed to landfill per person in the State in 2009.

[56] Excludes estimated uncollected household waste, includes home composting and retail deposited household WEEE (18,662t).

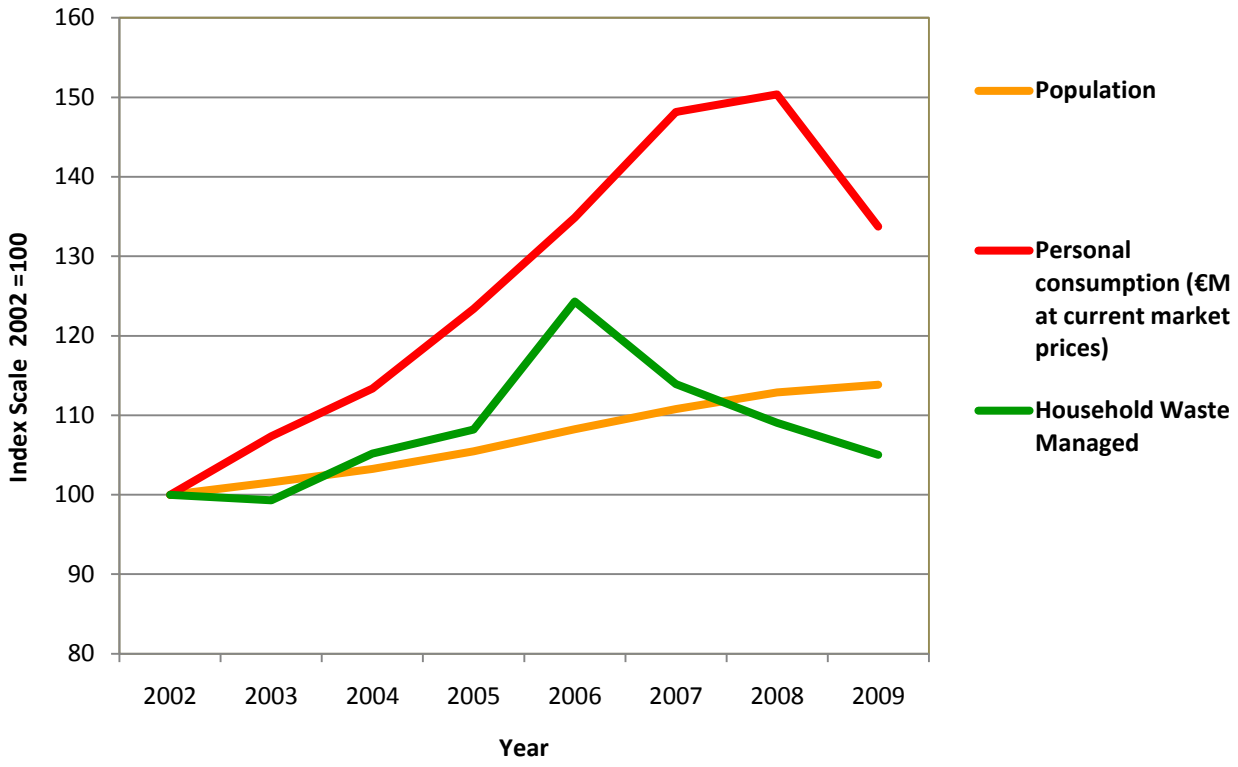

Figure 7: Household waste managed with population growth (CSO data) and personal consumption indices (CSO data)

Table 12: Relative proportions of collected and 'brought' household waste (% by weight)[57]

	Waste streams				
	Mixed residual waste (black bin) [58]	Mixed dry recyclables (green bin)	Mixed organics (brown bin collected & home composted)	Bring banks & civic amenity sites & retail WEEE	Total
% Total collected & brought (1,498,469 t)	56% (down from 58% equivalent in 2008)	18% (up from 17% equivalent in 2008)	7% (up from 5% equivalent in 2008)	19% (down from 20% equivalent in 2008)	**100%**

(Source: local authority survey, WEEE compliance schemes)

A survey of the character and composition of collected household waste is available on the EPA website at www.epa.ie/downloads/pubs/waste/plans/name,11659,en.html, and summarised in Appendix F of this report.

[57] Excludes estimated uncollected waste (128,000 t)
[58] Includes residual waste delivered direct to landfill by householder.

The Minister for the Environment, Heritage & Local Government raised the landfill levy to €30 per tonne of waste disposed in February 2010 (a doubling of levy since 2008). This increase, along with further proposed levy rises (see draft waste policy at www.environ.ie) and the now fully implemented EPA pre-treatment obligations should further contribute to this increasing household waste recycling trend. However, there remains a significant distance to go to meet the national target of 50% diversion of household waste from landfill by 2013.

Household waste collection

Summary information on household waste collection by waste management region is shown in Appendix B. According to the data, the total quantity of household waste collected or brought to collection facilities in Ireland in 2009 was 1,461,736 t, with an additional estimated 36,733 t composted at home. Local authorities reported that 268,958 t of household waste was collected at civic amenity sites and bring banks, a decrease on that collected at these facilities in 2008 (likely due to the 8% drop in managed municipal waste in 2009). A reported 18,662 t of household WEEE was deposited at electrical retail premises. The total quantity of household waste 'managed' in 2009 was 1,498,470 t. A further 128,000 t was estimated as uncollected (from unserviced occupied houses).

The local authority data and CSO census data suggest that there were c. 1,503,349 occupied houses in the State in 2009 (from 2006 national census data). Of these, a reported 1,221,638 dwellings (c. 81%) were serviced by a waste collection service, which was further broken down into:

- 43,664 dwellings on a single bin (black bin) service only;
- 889,500 dwellings on a 2-bin service only (residuals bin and dry recyclables bin); and
- 288,474 dwellings on a 3-bin service (residuals bin, dry recyclables bin, and organics bin).

Figure 8 and Table 13 present the relative proportions of the different household waste collection services. The figures indicate that 96% of serviced dwellings have at least a 2-bin service available to them. It is thus clear that 96% of collected household waste meets the minimum EU Landfill Directive (1999/31/EC) pre-treatment obligations in Article 6 (by virtue of the 2-bin system).

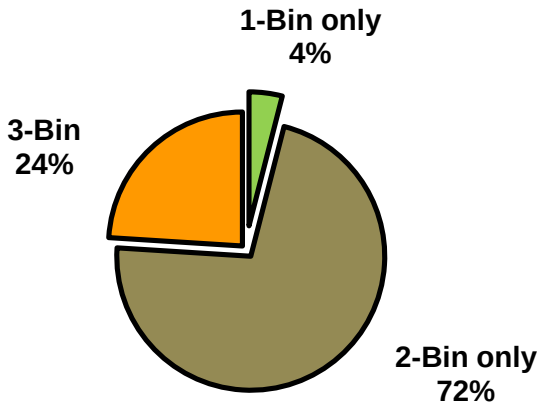

Figure 8: Market proportion of different household waste collection services

Table 13: Distribution and type of collection service providers for household waste

Local authority area	Local authority			Private sector			Combined private & local authority serviced[59]		Unserviced occupied households (%)[60]
	MSW/ residual	Mixed dry recyclables (2nd bin)	Organic (3rd bin)	MSW / residual	Mixed dry recyclables (2nd bin)	Organic (3rd bin)	2-bin market penetration	3-bin market penetration	
Cavan	0	0	0	✓	✓	✓	99%	3%	55%
Roscommon	0	0	0	✓	✓	0	100%	0%	54%
Offaly	0	0	0	✓	✓	✓	74%	4%	48%
Donegal	0	0	0	✓	✓	0	55%	0%	45%
Kerry	✓	✓	✓	✓	✓	✓	100%	12%	45%
Kilkenny	✓	✓	0	✓	✓	0	96%	0%	45%
Limerick County	0	0	0	✓	✓	✓	100%	15%	45%
Clare	0	0	0	✓	✓	✓	94%	28%	41%
Mayo	0	0	0	✓	✓	0	96%	0%	35%
Galway County	0	0	0	✓	✓	✓	100%	5%	34%
Laois	0	0	0	✓	✓	✓	100%	0%	34%
Monaghan	0	0	0	✓	✓	✓	97%	17%	33%
Carlow	0	0	0	✓	✓	✓	100%	27%	32%
Leitrim	0	0	0	✓	✓	0	100%	0%	27%
Westmeath	✓	✓	✓	✓	✓	0	98%	5%	27%
South Tipperary	✓	✓	0	✓	✓	0	100%	0%	26%
North Tipperary	0	0	0	✓	✓	✓	93%	2%	25%
Cork County & City	✓✓	✓✓	0	✓✓	✓✓	0	100%	0%	24%
Waterford County	✓	✓	✓	✓	✓	✓	100%	70%	21%
Sligo	0	0	0	✓	✓	0	100%	0%	18%
Louth	0	0	0	✓	✓	✓	94%	29%	16%
Wexford	✓	✓	✓	✓	✓	✓	100%	25%	16%
Meath	0	0	0	✓	✓	✓	86%	1.5%	15%
Longford	0	0	0	✓	✓	0	88%	0%	13%
Waterford City	✓	✓	✓	✓	✓	✓	100%	99%	10%
Wicklow	0	0	0	✓	✓	✓	76%	2%	10%
Kildare	✓	✓	0	✓	✓	✓	97%	33%	6%
Dublin City	✓	✓	✓	✓	✓	✓	100%	57%	5%
Limerick City	0	0	0	✓	✓	✓	97%	18%	5%
Dun Laoghaire-Rathdown	✓	✓	0	✓	✓	0	100%	0%	0%
Fingal	✓	✓	✓	✓	✓	✓	100%	74%	0%
Galway City	✓	✓	✓	✓	✓	✓	97%	83%	0%
South Dublin	✓	✓	0	✓	✓	✓	100%	1%	0%
TOTAL (t) / **AVERAGE**	**307,185**	**108,189**	**41,763**	**509,530**	**158,135**	**20,685**	**96%**	**c. 24%**	**24%**

(Source: local authority survey, CSO)

[59] Based on households serviced by a collection service (rounded).
[60] Based on local authority survey returns and 2006 census data (rounded).

The household kerbside collection of mixed residual waste decreased by 5% in 2009, mixed dry recyclables increased by 2% in 2009, and organics by 65% (Table 14).

The total quantity of household waste collected at kerbside reduced by 1.3% in 2009 (1,145,486 t in 2009 compared to 1,161,152 t in 2008) with no appreciable drop in the number of houses serviced. Of the 1,145,486 t household waste collected at kerbside, 60% was collected by the private sector and 40% by local authorities (down 3% on 2008) (Table 14). The local authorities, despite their low presence in the collection market, still have the highest percentage collection of brown bin waste at 67% (mainly due to local authority collection in large urban centres, see Tables 13 and 15). The increase in provision of brown bins to householders by the private sector collectors is evidenced by the increase in the private sector percentage tonnage collection increasing from 22% in 2008 to 33% in 2009.

Table 14: Market share of local authority and private sector household kerbside collection, 2008-2009

Year	Local authority			Private sector		
	Black bin (residual) (t)	Green bin (Dry recyclables) (t)	Brown bin (Organics) (t)	Black bin (Residual) (t)	Green bin (Dry recyclables) (t)	Brown bin (Organics) (t)
2008	359,074	114,150	29,519	502,941	147,069	8,400
	43% of total collection tonnage for 3 bins 42% of collection tonnage of black bin 44% of collection tonnage of green bin 78% of collection tonnage of brown bin			57% of total collection tonnage for 3 bins 58% of collection tonnage of black bin 56% of collection tonnage of green bin 22% of collection tonnage of brown bin		
2009	**307,185**	**108,189**	**41,763**	**509,530**	**158,135**	**20,685**
	40% of total collection tonnage for 3 bins 38% of collection tonnage of black bin 41% of collection tonnage of green bin 67% of collection tonnage of brown bin			60% of total collection tonnage for 3 bins 62% of collection tonnage of black bin 59% of collection tonnage of green bin 33% of collection tonnage of brown bin		

(Source: local authority survey)

Table 15 presents the data for separate household kerbside collections of organic waste (brown bin) in 2008 and 2009 as reported by local authorities, including organic waste brought by householders to civic amenity sites. As noted previously, there was a significant increase in the tonnage of organic waste collected at kerbside (from 37,920 t in 2008 to 62,447 t in 2009). This was due to the number of kerbside collection services for an organics bin increasing from being available in 16 local authority functional areas in 2008 to 23 local authority functional areas in 2009. In all areas, private sector operators came into the market.

The market penetration of the third bin (organics) varied hugely (1% to 99%) across local authority areas where the service was available and, as expected, the more rural counties in general had the most unserviced households (Tables 13 and 15). There were effectively 11 local authority functional areas that did not have household kerbside organic collections rolled out in 2009, namely Cork City, Cork County, Donegal, Dun Laoghaire Rathdown, Kilkenny, Leitrim, Longford, Mayo, Roscommon, Sligo and South Tipperary. Indeed, it is noted that in Mayo the third bin collection service that was present in 2008 (though modest) appears to have

ceased in 2009. There was negligible brown bin collection services in a further four county council areas (Cavan, Meath, Wicklow and North Tipperary). An amount of 23,679 t of household organic waste was separately collected at civic amenity sites in 2009 (a slight increase in the 21,219 t reported in 2008).

Table 15: Separate collection of household organic waste

Local authority area	2008		2009	
	Separate kerbside collection of household organic waste (brown bins) (t)		Separate kerbside collection of household organic waste (brown bins) (t)	
	Local authority	Private operators	Local authority	Private operators
Carlow	-	-	-	625
Cavan	-	-	-	8
Clare	-	-	-	112
Dublin City	8,287	266	16,128	3,214
Fingal	10,210	338	16,023	932
Galway City	4,603	1,573	3,699	1,530
Galway County	-	932	-	761
Kerry	340	-	404	1
Kildare	-	59	-	6,888
Laois	-	-	-	210
Limerick City	-	-	-	81
Limerick County	-	-	-	122
Louth	-	2,898		2,514
Mayo	-	32	-	-
Meath	-	23	-	139
Monaghan	-	225	-	271
North Tipperary	-	22	-	104
Offaly	-	-	-	105
South Dublin	-	1,312	-	134
Waterford City	3,584	280	3,439	450
Waterford County	2,342	65	1,932	256
Westmeath	86	-	76	-
Wexford	68	375	62	1,814
Wicklow	-	-	-	413
Sub-Totals (t)	**29,520**	**8,400**	**41,763**	**20,684**
Totals separate kerbside collection (t)	**37,920**		**62,447**	
Household organic waste collected at civic amenity sites & bring centres (t)	21,219		23,679	
Totals kerbside collection plus civic amenity sites & bring centres (t)	**59,139**		**86,126**	

(Source: local authority survey)

In the case of the household organics bin waste, the quantity collected varies hugely (20 kg to 900 kg/household/year) and is likely influenced by four key factors: price (if charged or not for third bin); knowledge (what can and cannot go into the bin); location (urban or rural – less garden waste in rural and urban fringe collections); and duration of collection service (i.e. if only recently commenced).

Taking the total kerbside collected household waste (1,145,486 t) (refer Appendix B) it can be calculated that the separate household organics collection (third bin) represents only 5.5% (up from 3.3% in 2008) of the total tonnage of kerbside collected household waste. EPA municipal waste characterisation studies (EPA, 2008) summarised in Table F-1 of Appendix F indicates that organics (food and garden waste) comprise c. 23% by weight of the gross household bin waste stream. This equates to an estimate 'available' organic waste content of c. 263,462 t in the kerbside collected household waste stream, of which 62,447 t is reported separately collected at kerbside (Table 15). Even if one factors in the home composting estimate (36,733 t, refer Appendix B) and the organic waste delivered by households to civic amenity sites (23,679 t) there remains a conservative estimate of c. 140,000 t available organic waste in the managed household waste stream that is not separately collected at kerbside. It is accepted that not all of this potentially 'available' organic material is suitable for brown-bin collection systems (e.g. food still in packaging). Nevertheless, greater penetration of the third organics bin to householders across the State (currently estimated at only 24% of householders, refer Table 13) would significantly cut into the available material and divert it from landfill.

Civic amenity sites and bring banks

Local authorities were surveyed to gather data on waste brought to civic amenity sites and bring banks. The quantity of waste deposited at civic amenity sites decreased by 12% in 2009 to 177,158 t. The tonnage of waste collected at bring banks decreased by 10%, to a total of 91,800 t (reflecting the overall reduction in municipal waste generated). In addition, householders deposited 18,662 t household WEEE at electrical retail premises. Further information on waste 'bring-facility' infrastructure is provided in Section 10.7 of this report.

Appendices C and D provide information on waste types and respective quantities collected at bring banks and civic amenity sites in 2009. Civic amenity sites also accept waste for disposal in addition to recovery, e.g. mixed residual waste and some hazardous waste.

Uncollected household waste

In order to estimate the number of households that are not provided with, or choose not to avail of, waste collection services, local authorities are asked to report on the number of households served with collection services in their functional areas. Nationally, an estimated 81% of occupied households availed of a kerbside collection service in 2009 (note that housing stock and occupancy is based on last full national census, 2006). In some areas, participation rates (in a collection scheme) are as low as 46%; while in some of the larger urban centres, coverage is reported to be 100% (see also Section 10.6 of this report). Part of the low participation issue may be due to no kerbside collection service being offered, particularly in rural areas. The waste generated at households that do not avail of kerbside waste collection services (whether by choice or lack of service) is referred to as "uncollected waste". The quantity is calculated by each local authority using a standard methodology and is adjusted to take account of local conditions such as the number of holiday or unoccupied houses, estimates of bin-sharing and the quantifiable use of alternative outlets (such as local civic amenity sites, bring banks and landfills). In 2009, the national estimate of uncollected household waste was 128,000 t, a 6% increase on the 120,459 t estimated in 2008.

3.3 Commercial waste

For the purposes of data handling, 'commercial waste' is waste collected from commercial premises (shops, pubs, restaurants etc.) as well as wastes arising from municipal premises such as schools, hospitals etc., and non-process industrial waste (from factory canteens, offices etc.). After household waste, the commercial waste stream is the next largest component of municipal waste.

The quantity of managed commercial waste decreased by 12% to 1,299,807 t in 2009, from 1,477,397 t in 2008. The calculated recovery rate increased 2% on that reported for 2008, to stand at 51% (Table 16, and Figures 9 and 10). The reported increase in recovery rates is very encouraging and is despite of the economic downturn evident in Figure 9. However, some of this high rate in 2009 was likely assisted by the movement of dry recyclables still in storage at the end of 2008 due to the fall in the market prices for these materials during that latter period. The typically higher quality of commercial dry recyclables contributed to the relative stability in its market position. It is significant that the recovery rate for commercial wastes has for the first time since 2006 exceeded the disposal rate (Figure 10).

Table 16: Disposal and recovery in the commercial waste stream, 2009

	Quantity managed (t)	Quantity landfilled (t)	National landfill rate (%)	Quantity recovered (t)	National recovery rate (%)
Total	1,299,807	640,737	49	659,070	51

(Source: recovery organisations survey, local authority survey, landfill survey)

It is becoming increasingly difficult for the waste industry operators to identify at the landfill gate what proportion of municipal waste accepted is household and what is commercial. A similar challenge faces the recycling organisations accepting mixed dry recyclables. Such classifications impact on recycling and diversion figures and thus on target achievement. It is very important for waste operators to apply due care to the division between household wastes and commercial sources wastes in the residual stream to landfill.

A survey of the character and composition of commercial waste was carried out in 2008 and 2010. The results are summarised in Table F-5 of Appendix F and the full reports are available for download at:

www.epa.ie/downloads/pubs/waste/plans/name,11659,en.html; and,

www.epa.ie/downloads/pubs/waste/stats/name,30407,en.html.

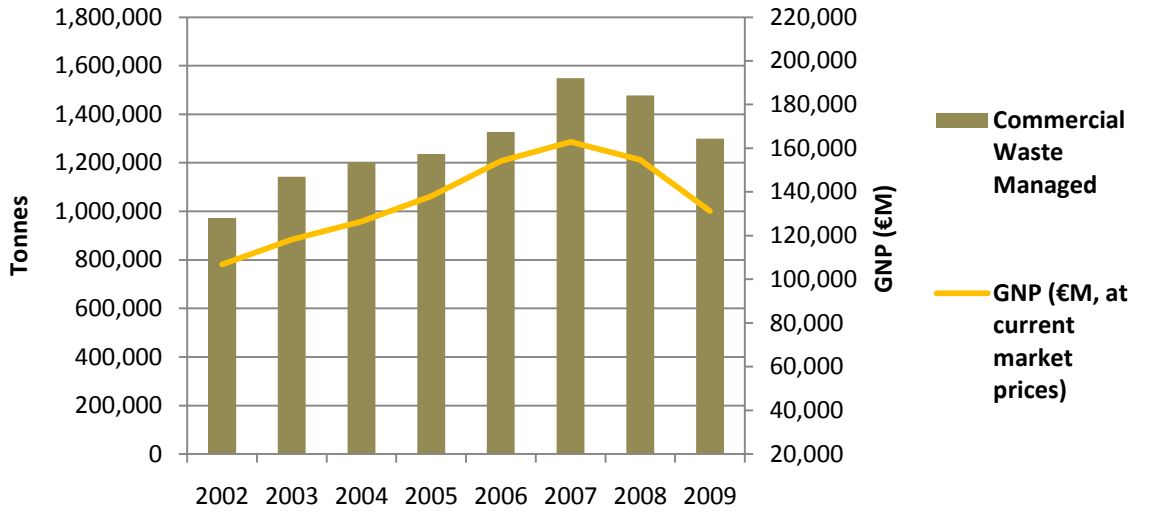

Figure 9: Commercial waste generation and GNP

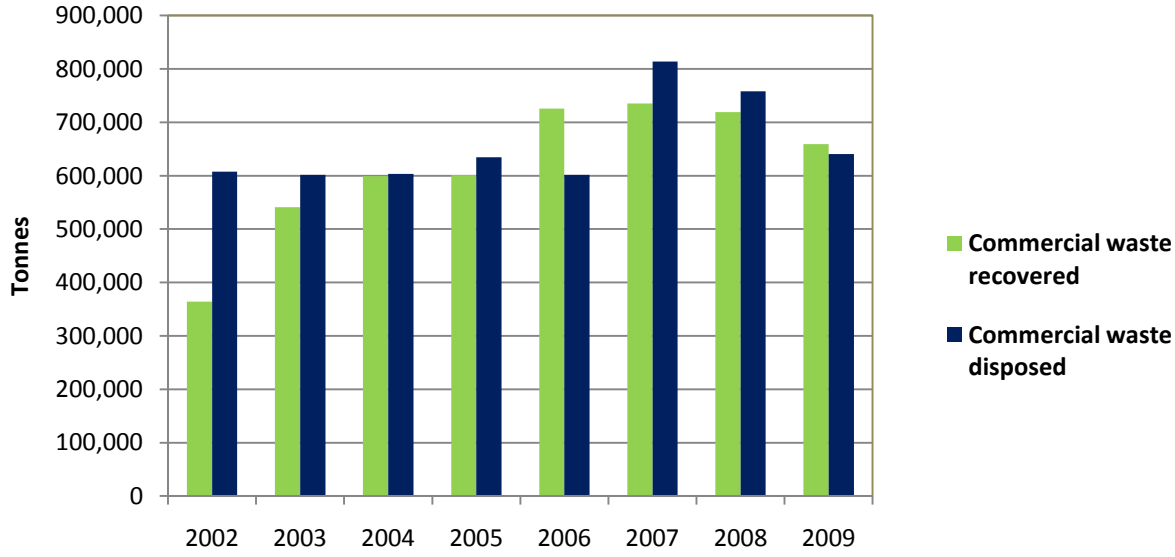

Figure 10: Commercial waste disposal and recovery

4 BIODEGRADABLE MUNICIPAL WASTE

Biodegradable municipal waste (BMW) comprises those elements of the household, commercial (including non-process industrial waste) and cleansing waste streams that will rot or degrade biologically. The main constituents of the biodegradable proportion of municipal waste are typically parks and garden waste, food waste, timber, paper, card and textiles. There are two key pieces of EU legislation that deal with biodegradable waste. The first is the Landfill Directive[61] (1999/31/EC) which requires the diversion of biodegradable waste from landfill. The second EU instrument is the new Waste Framework Directive (2008/98/EC), Article 22 of which requires Member States to take measures to encourage separate collection of biowaste (putrescible portion of biodegradable wastes).

4.1 EU Landfill Directive

The legal obligations falling due under the Landfill Directive were examined in some detail in Section 4 of the EPA's National Waste Report 2008[62]. In relation to biodegradable municipal waste the Landfill Directive sets limits on what can be sent to landfill. These limitations (which are tied to the 1995 statistical base year for waste production in Ireland[63]) are phased, with each phase having a stricter obligation in relation to diversion. Ireland negotiated with the EU Commission for a four-year extension to the first two compliance dates specified in Article 5 (2006 to 2010, and 2009 to 2013 respectively).

These obligations can be summarised as follows:

- By 16 July 2010 Ireland can only landfill a maximum 75% of the BMW generated in 1995;
- By 16 July 2013 Ireland can only landfill a maximum 50% of the BMW generated in 1995;
- By 16 July 2016 Ireland can only landfill a maximum 35% of the BMW generated in 1995.

In its National Waste Report 2008, the EPA re-examined the national calculations for biodegradable waste diversion (including revised biodegradability factors for textiles and wood) and established the targets detailed in Table 17.

Table 17: Targets for biodegradable waste diversion from landfill (per Directive 1999/31/EC)

Baseline		Quantity BMW generated (t)
1995		1,220,840

Targets

Target year[64]	Landfill Directive target	Maximum quantity allowed to be landfilled (t, rounded)
2010	75% of quantity BMW generated in 1995	916,000
2013	50% of quantity BMW generated in 1995	610,000
2016	35% of quantity BMW generated in 1995	427,000

[61] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:1999:182:0001:0019:EN:PDF
[62] http://www.epa.ie/downloads/pubs/waste/stats/name,27341,en.html.
[63] *National Waste Database Report 1995*. EPA, 1996.
[64] The Landfill Directive allows Ireland to avail of a derogation under Article 5 of the Directive which postpones the 2006 and 2009 targets for 4 years.

The EPA technical guidance document *Municipal Solid Waste – Pre-treatment and Residuals Management* (2009) set out the steps expected of EPA landfill licence holders regarding the biodegradable waste diversion obligations stated in the EU Landfill Directive. The EPA also reviewed the landfill licences to put in place conditions reflecting these pre-treatment expectations. There is a lot of background information on MSW pre-treatment available on the EPA web site including the guidance document referred to. See http://www.epa.ie/whatwedo/advice/waste/municipalwastepre-treatment/.

4.2 Municipal biodegradable waste arisings 2009

Given the complexities of the national waste management collection and treatment arrangements for municipal wastes, it is appropriate to examine the biodegradable element of the different streams making up MSW. This is made possible by detailed EPA characterisation studies on commercial and household waste streams.[65]

In Ireland MSW comprise the following streams;

- Household waste;
- Commercial and non-process industrial wastes (canteen and office);
- Street cleansing waste.

Each of these streams in turn can be sub-divided into unique waste flows (influenced by collection and source type) that will have a given character with respect to biodegradability (Figure 11).

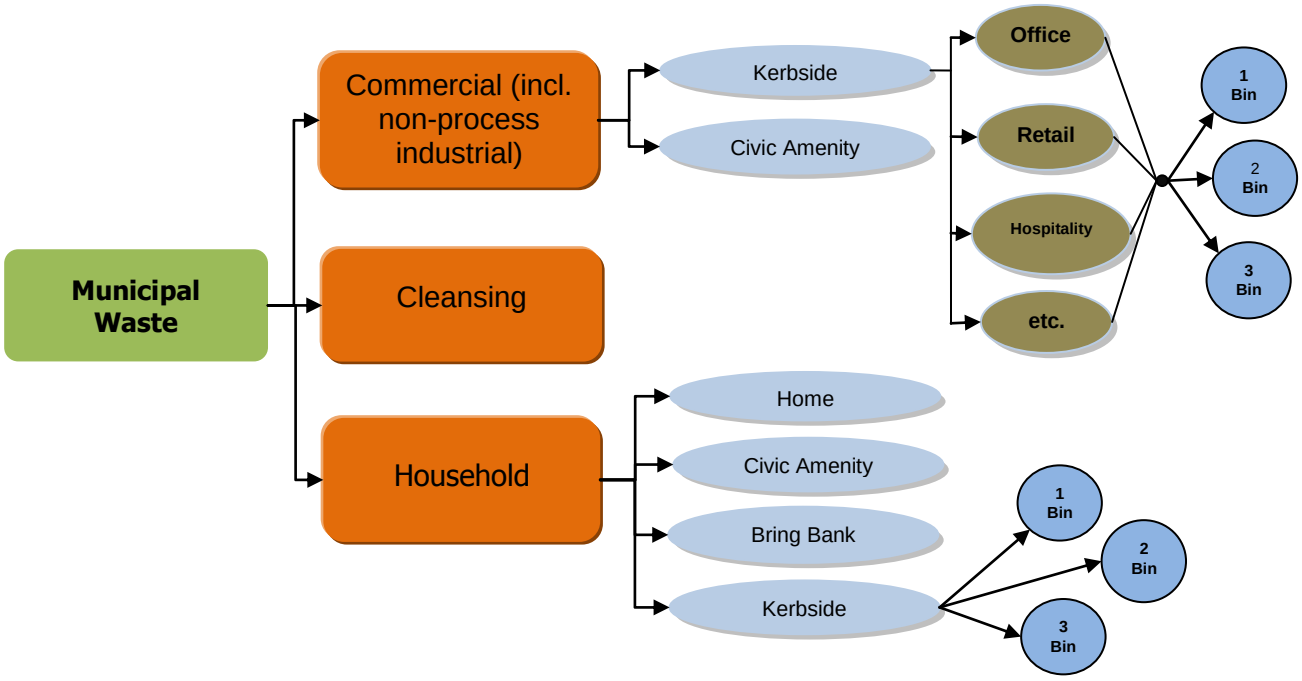

Figure 11: Municipal waste collection/presentation flows

[65] http://www.epa.ie/whatwedo/resource/nwr/municipal/#d.en.12485.

Biodegradable content of household waste

The results of the household stream biodegradability assessment are presented in Appendix F (see Tables F-2, F-3, and F-4). From these tables it is possible to compile an accurate material flow or waste stream based assessment of the biodegradable content of household wastes. This indicates that the household stream produced 881,980 t of available biodegradable waste in 2009 (biodegradable in a landfill), of which an estimated 560,662 t was consigned to landfill (Table 18). Approximately 59% of gross household waste across all collection and bring services (including WEEE) waste is estimated to be biodegradable.

Table 18: BMW content of managed household waste streams reported in 2009[66]

Household waste source stream	Amount collected (t)	Biodegradability factor	Available BMW content (t)	BMW content in proportion of household waste stream consigned to landfill (t)
Residuals bin (or black bin)	816,715	Refer Table F-3 in Appendix F	483,823	483,823
Dry recyclables bin (second or green bin)	266,324	72.9%	194,150	19,415[67]
Organics bin (third or brown bin)	62,447	93.6%	58,450	749
Civic amenity, bring banks & WEEE to retailers	287,620	Refer Table F-4 in Appendix F	90,214	38,065
Direct to landfill	28,630	65%	18,610	18,610
Home composting	36,733	100%	36,733	0
TOTAL:	**1,498,469**	-	**881,980**	**560,662**

(Source: local authority survey, WEEE compliance schemes)

Biodegradable content of commercial wastes

The EPA funded Municipal Waste Characterisation study (2008)[68] yields two biodegradability factors for the collected commercial waste streams, one for the dry recyclables bin (green or second bin) and one for the residuals bin (black bin), refer Table F-5 in Appendix F. A third bin organics collection service is not widely available for the commercial sector in a statistically relevant quantity. In 2010, the EPA commissioned a characterisation study of the third bin for facilities where the Waste Management (Food Waste) Regulations would apply (SI No. 508 of 2009). See report at the following link: http://www.epa.ie/downloads/pubs/waste/stats/name,30407,en.html.

The collection data for the commercial waste sector is not sufficient to yield an accurate break-down between the tonnage residual bin and tonnage dry recyclable bin in the collected tonnage. It is therefore appropriate to use the composite biodegradability figure for commercial wastes of 80% when calculating the gross *available* biodegradable waste (refer Table F-5). In 2009, 1,299,807 t of commercial waste was estimated as being collected. This yields an available biodegradable waste content of 1,039,846 t. A reported 640,737 t residual was consigned to disposal. The residual proportion will have a biodegradability proportion closer to the commercial

[66] Excludes uncollected household waste estimates.
[67] Assumes a 10% reject from dry recyclables processing.
[68] www.epa.ie/downloads/pubs/waste/plans/name,11659,en.html.

black bin content of 75.2% (see Table F-5 of Appendix F, and EPA Waste Characterisation Survey 2008). Accordingly it is estimated that the biodegradable proportion of the commercial waste sent to landfill is 481,834 t.

Biodegradable content of cleansing waste

The three components of municipal waste are household, commercial (including non-process industrial) and cleansing wastes. Cleansing waste also reports the traditional elements such as sweepings, parks and cemeteries maintenance, and municipal street bin collections etc. In 2009, a reported 26,701 t of this material was generated. A conservative biodegradability factor equivalent to that of gross household waste (65%) is assigned to this material, yielding 17,336 t biodegradable wastes available from the cleansing waste stream.

Overall municipal waste biodegradability

Table 19 presents the compiled available biodegradability for the above three components of the municipal waste stream, and the estimate of the biodegradable content in the residual consigned to landfill. In total it is estimated that 1,939,182 t (i.e. 69%) of the managed municipal waste (2,824,977 t) was biodegradable waste, and of this former amount, 1,059,852 t (or 55%) was consigned to landfill. This yields a recycling figure of c. 879,330 t (45%) of the available biodegradable portion of managed municipal waste.

Table 19: BMW content of managed municipal waste streams reported in 2009[69]

Managed municipal waste source stream	Available biodegradable waste portion (t)	BMW content residual consigned to landfill (t)
Household	881,980	560,662
Commercial and non-process industrial	1,039,846	481,834
Cleansing	17,356	17,356
Total:	**1,939,182**	**1,059,852**

Taking these figures and evaluating the distance' to the 2010 target for the 2009 reporting period, Table 20 shows that Ireland continues to make significant inroads into closing the distance between the EU limits on biodegradable waste consigned for landfill disposal and current standing. This achievement is significantly influenced by the reduction in municipal waste generation, in particular the commercial waste stream.

[69] Excludes uncollected household waste estimates.

Table 20: Distance to 2010 target for EU Landfill Directive diversion, 2009

Target year	Maximum quantity allowed to be landfilled (t, rounded)
2010	916,000
2013	610,000
2016	427,000

Current position	Quantity biodegradable municipal waste landfilled (t)
2009	1,059,852

Current position	Distance to first EU Landfill Directive target (July 2010) (t, rounded)
2009	144,000

Future actions for biodegradable waste

As noted previously, the separate kerbside collection of household food and garden waste (in brown bins) increased substantially from 18,705 t in 2007 to 62,447 t in 2009 (c. 300% increase).

The Minister for the Environment, Heritage and Local Government, in a 2008 circular[70], requested local authorities to intensify the roll out of brown bins. The number of local authority areas where household brown bin waste was collected at kerbside increased from 13 (2007) to 16 (2008) to 22 (2009) (of 34 local authority areas, refer Tables 13 and 15), mainly provided by private operators. Fifteen local authorities are involved in household kerbside waste collection, and of these only eight offer a three bin service. As is apparent from Table 13, the third bin is only available to c. 24% of serviced households in the State. Greater penetration of separate organic waste collections is necessary. In relation to commercial operations, the impact of the recently introduced Waste Management (Food Waste) Regulations 2009 (SI 508 of 2009) will only be reflected in the next National Waste Report (for year 2010) as these regulations came into effect in January 2010. These regulations require scheduled activities (e.g. those producing catering waste such as hotels, restaurants, workplace canteens, hospitals, etc) to provide for the source separation and collection for recycling of food waste.

Another significant factor in the operation of the third bin collection system is the problem of 'presentation'. There is a lack of understanding as to what can or cannot be placed in this biowaste bin. This latter knowledge gap is being addressed through the DEHLG funded food waste education and information programme at www.foodwaste.ie (operated by Cré), and through information leaflets provided by the collectors and local authority campaigns. The figure for waste collected in the third bin per household served with a third bin, suggest a very wide range of 20 kg - 900 kg per household biowaste, with an average of 307 kg/household served (Tables 13 and 15). The higher figures are generally associated with urban areas, and are probably due in the main to the inclusion of garden waste (rural householders have more space to home compost this material). Some of the very low figures are likely a reflection of the late commencement of a third bin collection (in the report year). Nevertheless, this data would suggest there is a significant variation in presentation of biowaste to the third bin that has to be addressed through more effective education programmes.

Source separated collections of biodegradable waste in themselves will not ensure that Ireland meets the diversion targets set out in the EU Landfill Directive. For example, the residual bin from a three bin household

[70] Circular WPPR 17/08, 31 July 2008, to each county and city manager.

collection service can contain up to 47% biodegradables (by weight) (see Table F-1 of Appendix F). Treatment of this biodegradable component of the residual waste will be essential in order to meet the 2013 and 2016 Landfill Directive diversion obligations. To date there has been minimal reported development, or consistent operation, of infrastructure to deal with the biodegradable component of the residual bin from municipal waste collections. Waste to energy incineration will certainly contribute when it comes on stream, as would waste to energy mechanical biological treatment (MBT) processes were they to be developed.

In summer 2010, a set of draft regulations were published which would have the effect of requiring authorised waste collectors to provide a food waste collection to households on a phased basis. The consultation period for these regulations closed on 1 October 2010.[71]

Ireland's poor economic performance in 2009 and 2010 is having a significant influence on particular waste streams. As this report shows, waste generation in the commercial sector is significantly down on 2008, as is waste from the construction & demolition sector. The high biodegradable content of the commercial waste stream (c. 77%) means that any drop in the annual tonnages of this waste flow will have a marked impact on the residual biodegradable waste to landfill. The economic slow-down will therefore likely contribute in a significant way to Ireland's achievement of the first EU Landfill Directive diversion target for biodegradable waste (in addition to the EPA's and Government's regulatory interventions). It must be recognised that this low economic output basis for achievement of targets is not in itself sufficient to ensure continued compliance with EU requirements, particularly as the economy recovers. Accordingly efforts in waste prevention, diversion to recovery and the development of necessary supporting infrastructure must continue.

EPA considers that the priorities for improvements in biodegradable municipal waste management in Ireland are:

- Putting in place the services for the separate collection of organic (particularly food) waste at households and commercial premises;
- Ensuring there is adequate infrastructure to treat the large quantities of organic (particularly food) waste that must be collected separately and diverted from landfill;
- Ensuring there is adequate infrastructure to treat the biodegradable portion of the residual bin from all municipal collection services (residual or third bin from households contains up to 47% biodegradables);
- Continuing to promote food waste prevention through the NWPP initiatives such as StopFoodWaste.ie, Green Business, Green Healthcare and Green Hospitality Awards;
- Improving penetration of the information and educational programmes in relation to the operation of the third bin, with a view to increasing the national average presentation tonnage; and,
- Developing sustainable market outlets for the products of such treatment.

[71] http://www.environ.ie/en/Environment/Waste/PublicConsultations/#Invitation for Submissions

5 PACKAGING WASTE

Ireland is obliged to meet recovery and recycling targets under the Packaging Directive (94/62/EC as amended). The Waste Management (Packaging) Regulations 2007 (SI No. 798 of 2007) give effect to the EU Directive as amended and have brought forward the 2011 targets established in the EU Directive to 2008. The quantity of packaging waste managed in 2009 was lower than in 2008 (1,026,759 t in 2008, 972,430 t in 2009). The quantity recovered increased from 65% in 2008 to 70% in 2009 (Table 21). This is in excess of the 60% recovery target for 2011 under the Packaging Directive. The increase in the recovery rate in 2009 is due to a number of factors. The quantity of packaging waste estimated as landfilled decreased in 2009, and there was an increase in plastic and 'other packaging' recovery reported (in particular the packaging element of refuse derived fuel). There would also have been an impact from mixed dry recyclables/packaging which were in storage at the end of 2008 (due to the price reduction in the international recyclates market) moving out of storage for recovery in 2009.

The Packaging Directive sets minimum non-energy use recycling targets for materials contained in packaging waste (e.g. plastics, wood) by December 2011 (refer Table 1A). The quantities of packaging *recycled* (i.e. not including packaging sent for energy recovery) are also reported in Table 21. This data is provided by recovery operators through EPA surveys. For 2009, the EU 2011 recycling targets have been met.

Table 21: Packaging waste 2009

Material	Quantity managed (t)	Quantity recovered (t)	National recovery rate (%)	Quantity landfilled (t)	National landfill rate (%)	Quantity recycled (t)	National recycling rate (%)
Paper and cardboard	370,194	300,662	81.2	69,532	18.8	300,662	81.2
Glass	156,176	118,456	75.8	37,720	24.2	118,456	75.8
Plastic	224,350	81,175	36.2	143,176	63.8	81,175	36.2
Ferrous	39,547	25,580	64.7	13,967	35.3	25,580	64.7
Aluminium	12,970	4,535	35.0	8,435	65.0	4,535	35.0
Other metals	691	0	0.0	691	100.0	0	0.0
Textiles	1,647	0	0.0	1,647	100.0	0	0.0
Wood	109,585	108,528	99.0	1,056	1.0	86,723	79.1
Other[72]	57,270	40,599	70.9	[73]16,671	29.1	14,255	24.9
Total	**972,430**	**679,535**	**69.9**	**292,894**	**30.1**	**631,386**	**64.9**

(Source: recovery organisations survey, landfill survey, 2008 waste characterisation study)

The quantity of packaging waste *landfilled* is estimated using waste composition factors. Municipal waste composition surveys conducted in 2008 show that the quantity of packaging in the residual black bin decreased from that reported in the previous waste characterisation study in 2005[74]. In 2010, a waste characterisation study

[72] Composites, mixed packaging and refuse derived fuel.
[73] Not including refuse derived fuel.
[74] www.epa.ie/downloads/pubs/waste/plans/name,11659,en.html

of residual wastes from commercial premises provided with organic waste source separation collection systems was undertaken[75]. The composition factors for the 2010 commercial bin study were not used for the data presented as there was not a widespread roll out of the third organic commercial bin in 2009. The quantity of packaging waste *recovered* is based on data provided by recovery operators through EPA surveys. All packaging reported as sent for recovery is taken as 100% recovered (e.g. paper and cardboard sent to paper mills in Asia) although it would be expected that there would be a certain residual that goes for disposal.

The EPA's survey of recovery operators, which gathers data on waste packaging recovered (as reported in Table 21), does not differentiate between whether the tonnage was recovered on behalf of self-compliers or members of Repak, the national packaging compliance scheme. However, a majority of the packaging recovered would have come from Repak members.

Figure 12 shows the recovery rate for packaging waste from 2001 to 2009 and shows that packaging recovery rates have been, and are likely to remain, compliant with all EU targets.

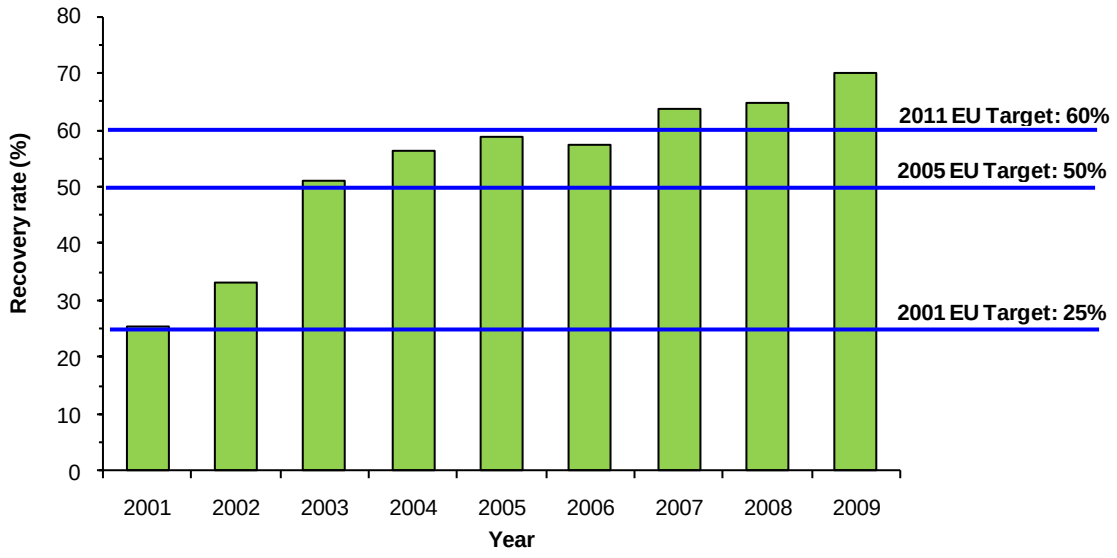

Figure 12: Recovery of packaging waste, 2001–2009, and progress towards targets

The Waste Management (Packaging) Regulations 2007 provide for producers of packaging waste to either join a compliance scheme (Repak is the only packaging compliance scheme in the State) or self-comply. Local authorities are responsible for enforcement of the Packaging Regulations, including enforcing the obligations of self-complying producers. All thirty-four local authorities responded to a DEHLG survey on packaging self-compliers registered in their functional area in 2009. The data provided is outlined in Table 22. Four local authorities reported no registered self-compliers in their area (Donegal, Leitrim, Waterford County and Wexford). Table 22 also reports on the number of packaging self-compliers registered in each local authority functional area in 2009, the number of premises, the tonnage of packaging placed on the market, and the tonnage of packaging reported as recovered in 2009.

[75] http://www.epa.ie/downloads/pubs/waste/stats/name,30407,en.html.

Table 22: Packaging self-compliers reported in local authority areas in 2009

Local authority	Number of companies	Number of premises	Packaging placed on the market (t)	Packaging recovered (t)[76]
Carlow	1	2	12	7
Cavan	5	5	15,504	895
Clare	2	4	3,687	112
Cork City	2	2	35	21
Cork County	4	8	555	397
Donegal	0	0	0	0
Dublin City	16	24	2,978	2,021
Dun Laoghaire-Rathdown	11	12	3,519	2,222
Fingal	20	20	3,415	955
Galway City	6	11	506	306
Galway County	3	15	231	151
Kerry	2	2	391	0
Kildare	5	5	2,341	1,696
Kilkenny	4	5	380	235
Laois	1	1	20	42
Leitrim	0	0	0	0
Limerick City	1	3	30	18
Limerick County	6	6	4,771	516
Longford	2	2	39	23
Louth	4	5	322	215
Mayo	4	10	671	935
Meath	7	8	974	519
Monaghan	5	5	935	131
North Tipperary	1	3	19	11
Offaly	1	5	13	15
Roscommon	4	6	138	40
Sligo	1	1	22	17
South Dublin	20	21	14,720	2,842
South Tipperary	2	3	133	105
Waterford City	1	1	6	4
Waterford County	0	0	0	0
Westmeath	2	4	363	217
Wexford	0	0	0	0
Wicklow	5	7	4,745	908
Total	**148**	**206**	**61,475**	**15,576**

(Source: DEHLG and local authorities)

[76] Local authorities reported that thirteen self-complying producers failed to provide 2009 recovery data.

Table 23 compares packaging self-complier data for 2008 and 2009, in terms of number of companies and number of premises registered and the tonnage of packaging placed on the market. Packaging recovered (as reported by self-compliers to local authorities) was not surveyed by the EPA for the National Waste Report 2008 therefore recovery data for 2008 is not available for comparison. Local authorities reported that thirteen self-complying producers failed to provide their 2009 packaging recovered data; therefore the packaging recovered tonnage in 2009 is an incomplete dataset. All self-complying producers have a legal obligation to submit reports to the relevant local authority on packaging placed on the market and waste packaging reused, recovered and disposed. It is essential that these reports are submitted so that local authorities can determine whether self-complying producers are meeting their legal obligations with regard to recovery and recycling targets.

Table 23: Packaging self-compliers – comparison of 2008 and 2009 data

Year	Number of registered self-complier companies	Number of premises	Packaging placed on the market (t)	Packaging recovered (t)
2008	152	212	74,130	Not available
2009	148	205	61,475	15,576

(Source: DEHLG and local authorities)

6 WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT

The Waste Electrical and Electronic Equipment (WEEE) Directive (2002/96/EC) aims to prevent the generation of WEEE and sets targets for the collection and treatment of WEEE in an environmentally sound manner. The WEEE Regulations[77] transpose the WEEE Directive into Irish law, and obligations under the WEEE Regulations came into effect in Ireland on 13 August 2005. The data on WEEE collection and treatment in Ireland in 2009 are based on information supplied by WEEE recovery operators, by the WEEE compliance schemes[78], and by self-complying producers of electrical and electronic equipment (EEE).

Table 24 shows that 45,327 t of WEEE were collected in Ireland in 2009, which is nearly 13% less than in 2008. The drop in overall collection is mainly a reflection of the decrease of the recovery of heavy items such as washing machines and dishwashers, which is a reflection of the reduced Personal Consumption index (refer Figure 7), i.e. less replacement or turnover of household EEE). In addition to WEEE, 725 t of pre-owned and used EEE were collected for reuse (i.e. not waste). Most of the material for reuse consisted of information and communication technology equipment. Nearly half of the total WEEE collected in 2009 was exported to other EU countries for treatment. No WEEE was exported from Ireland to non-EU countries. A total of 236 t of non-hazardous WEEE imported into Ireland for treatment (refer Table 6). On average, nearly 9 kg of household WEEE was collected from each person living in the Republic of Ireland in 2009. This is more than double the target of 4 kg per person specified by the WEEE Directive.

Since 31 December 2008, producers of EEE have been responsible for meeting targets for the percentage recovery, and the percentage component, material and substance reuse and recycling of WEEE sent for treatment. Estimated recovery and recycling percentages are summarised in Table 1A of this report and suggest that in 2009 the Republic of Ireland met all WEEE treatment targets set by EU and national legislation.

Table 24: WEEE collected, treated, exported and stored in 2009[79]

	Fridges and freezers	Large household appliances[80]	TVs and monitors	Lighting equipment[81]	Other WEEE[82]	Total WEEE
Collected (t)	6,159	17,100	6,604	649	14,815	**45,327**
Of which:						
Treated in ROI (t)	0	10,492	5,874	556	6,237	**23,159**
Exported to EU[83] (t)	6,136	6,642	727	102	8,554	**22,161**
Total recovered (t)	5,506	13,804	6,021	555	12,557	**38,443**
Change in storage (t)	23	-35	2	-9	24	**5**

(Source: WEEE and recovery organisations survey, self-complying producers)

[77] Waste Management (Electrical and Electronic Equipment) Regulations, 2005 (SI No. 290 of 2005) and Waste Management (Waste Electrical and Electronic Equipment) Regulations, 2005 (SI No. 340 of 2005 as amended by SI No. 375 of 2008).
[78] WEEE Ireland (www.weeeireland.ie) and European Recycling Platform (www.erp-recycling.org).
[79] Data from several self-complying producers are outstanding.
[80] For example dishwashers, washing machines, cookers.
[81] Includes all fluorescent lamps (including compact fluorescent lamps), high and low pressure gas discharge lamps, and equipment for the purpose of spreading or controlling light with the exception of household luminaires.
[82] For example stereos, telephones, toys, vacuum cleaners, toasters, computers.
[83] Exports to Northern Ireland amounted to 7,484 t in 2009.

7 END OF LIFE VEHICLES

The collection, storage, dismantling and treatment of end of life vehicles (ELVs) have been subject to EU legislation since 2000. The ELV Directive (2000/53/EC) was transposed into national law under the Protection of the Environment Act 2003 and the Waste Management (ELV) Regulations 2006 (SI No. 282 of 2006), as amended by the Waste Management (ELV) (Amendment) Regulations 2010 (SI No. 142 of 2010).

The overall aim of the ELV Directive is to minimise the impact of ELVs on the environment. This is principally achieved at the 'design phase' where the use of certain hazardous materials in the manufacture of new cars is controlled, and at the 'waste phase' where appropriate treatment systems are established for the removal of hazardous materials (oils, batteries) and reuse and recycling of materials (metals, plastics, glass, tyres). The ELV Directive covers vehicles that are used for carrying passengers (maximum of eight seats) and vehicles that are used for transporting goods (maximum vehicle weight of 3.5 t). The ELV legislation falls under the 'producer responsibility initiative' set of legislation, and the producers therefore have obligations to ensure the environmentally sound management of ELVs. The manufacturers and importers who place vehicles on the Irish market are defined as the producers. Producers are obligated to contract a network of authorised treatment facilities (ATFs), which must accept ELVs from registered owners free of charge.

To accept ELVs, independent ATFs and ATFs contracted by producers must be in possession of either a waste permit or a waste licence[84]. They must meet the minimum technical requirements for the storage, appropriate treatment and recovery of ELVs. ATFs issue certificates of destruction to registered owners of ELVs as a condition for deregistration. Depolluted ELVs are sent to metal shredders. There are currently three operational ELV shredders in the State. Some depolluted ELVs are sent abroad for shredding.

Local authorities reported to the EPA that 130 ATFs were permitted in their functional areas in 2009 (of which 126 were operational). Five local authorities reported no ATFs operational in their functional areas in 2009 (Cork City, Dun Laoghaire Rathdown, Leitrim[85], Longford and Waterford City).

Amongst other obligations, the EU ELV Directive sets out targets to be met by each Member State relating to the reuse, recycling and recovery of ELVs. These targets are:

(i) By 1 January 2006 a minimum of 80% reuse and recycling and a minimum of 85% reuse and recovery; and
(ii) By 1 January 2015 a minimum 85% reuse and recycling and a minimum of 95% reuse and recovery.

In order to gather data on reuse, recovery and recycling of ELVs in Ireland, the EPA surveys ATFs and ELV shredder operators[86]. The 2008 data is the most up-to-date analysed dataset. In 2008, ATFs reported accepting 127,612 ELVs for depollution, weighing approximately 136,672 tonnes. Information on materials reused, recycled and recovered from ELV dismantling is summarised in Table 25.

[84] The EPA and local authorities are working together to ensure that unauthorised vehicle dismantlers in the State are subject to a system of inspections and sanctions that prevents their ongoing operation without permits.
[85] Leitrim County Council reported that a planning application for an ATF was under consideration by their planning department.
[86] 84 ATFs and 3 shredders were surveyed for 2008 data.

Table 25: Fate of materials resulting from the treatment of ELVs arising in Ireland in 2008

	Reused (t)	Recycled (t)	Recovered (excluding that recycled) (t)	Disposed (t)
ATFs	1,033	9,191	605	1,077
Shredders in Ireland		76,730	7488	16,781
Shredders in UK		16,713		5,736

(Source: ATF survey, shredder operator survey, metal handler survey, *Depollution and Shredder Trial Report*)

From the figures in Table 25, reuse and recovery was 82% and reuse and recycling was 76% in 2008. These percentages indicate that Ireland is failing marginally to meet the EU targets of 85% reuse and recovery and 80% reuse and recycling which have been in force since January 2006. In order to meet the targets, it is expected that additional processing of ELVs will be required, through (i) increased dismantling of ELVs prior to shredding and/or (ii) application of post shredder technologies to extract recyclable materials from the shredder residue. Obligated producers will need to ensure that this is achieved as more stringent targets are in place to be met by 2015.

ELV depollution and shredder trial

The EPA published a report on an *ELV Depollution and Shredder Trial*[87] for Ireland in September 2010. The trial was funded by the EPA and the DEHLG.

The objectives of the trial were to:

(i) Carry out a depollution and shredder trial on a representative sample of ELVs;
(ii) Report on the depolluted constituents of ELVs; and
(iii) Generate a metal content assumption for shredding/fragmentising of ELVs to facilitate Ireland in making a complete statistical report to the European Commission.

An ELV sample population of 100 ELVs (90 passenger cars and 10 commercial vans) were depolluted and shredded. Data from the depollution trial indicate that, on average, an Irish ELV weighs a rounded 1,071 kg; and 977 kg when depolluted. The metal content recovered from ELVs processed in the trial was 70.35% of the total initial weight (excluding fuel), and 70.41% when missing parts were substituted (e.g. catalytic converters, tools, tyres etc.). While post shredder technologies are not currently carried out on shredder residue in the Republic of Ireland, for the purposes of gaining maximum information for the trial, dense media separation of the heavy shredder fraction and a waste characterisation of the shredder residue also took place. The results of these assessments are provided in the *ELV Depollution and Shredder Trial* report.

[87] http://www.epa.ie/downloads/pubs/waste/stats/name,30314,en.html.

8 CONSTRUCTION AND DEMOLITION WASTE

The total quantity of construction and demolition (C&D) waste collected in 2009 is estimated at 5,093,666 t, a decrease of 62% since 2008. The bulk of this waste is made up of soil and stones (3,770,549 t). The remaining 1,323,117 t of C&D waste collected consisted of other waste materials such as rubble, metals, timber, plastic, glass and mixed C&D waste. Data on C&D waste collected are derived from data submitted by waste collection permit (WCP) holders to local authorities in their annual environmental reports (AERs). The EPA collates these data from 34 local authorities to arrive at an estimate of total C&D waste collected in Ireland.[88]

There were a reported 1,975 active WCP holders authorised to collect C&D waste in 2009 and 1,633 of these submitted an AER, which is an 83% reporting rate. Local authorities estimated that the 342 non-reporting collection permit holders collected 83,926 t of C&D waste.

During 2009, a reported 5,099,310 t of C&D waste was recovered and 55,926 t (1%) was disposed at authorised landfills (Table 26). Information on the recovery and disposal of C&D waste is derived from three sources: EPA-licensed landfills, which submit a landfill survey return, EPA-licensed waste treatment facilities, which submit a recovery organisations survey, and waste permit (WP) holders, who submit AERs to local authorities. Overall, the total quantity of C&D waste reported as managed in 2009 (5,155,236 t) represented a 51% decrease on that reported in 2008 (see footnote).

Table 26: Collection and management of all construction and demolition waste, 2009

Collected (t):		**5,093,666**
Management (t)	**Recovery**	**Disposal**
EPA licensed landfills	994,302[89]	55,926
Local authority permitted sites	4,062,689	0
EPA licensed waste facilities (other than landfills)	42,319	0
Total	**5,099,310**	**55,926**
Grand total	**5,155,236**	
Recovery rate[90]	**99%**	

(Source: local authority survey, landfill survey and recovery organisations survey)

The figures for 2009 highlight a discrepancy between the reported collection of C&D waste and its reported disposal and recovery. The tonnage reported as collected is 61,570 t lower than that reported as recovered and disposed in the calendar year.

[88] No C&D data for 2009 was obtained from the Cork Region or Wicklow County Council and so a factor was applied in both cases to their 2008 data to estimate 2009 tonnages. Factors applied were based on the observed national reduction in quantities of C&D collected and recovered from 2008 to 2009.

[89] Cover/landscaping material, other landfill engineering purposes.

[90] Recovery rate is calculated based on reported tonnage managed by recovery or disposal.

Table 27 outlines the collection and management of soil and stones. In 2009, more soil and stone was reported as recovered (4,371,833 t) than was reported as collected (3,770,549 t). This theoretically represents a 116% recovery rate if the calculation is based on the tonnage of soil and stones reported as *collected* by WCP holders. A 99% recovery rate is achieved when taking the actual figures for recovered or disposed material.

Table 27: Collection and management of construction and demolition waste, soil and stones only, 2009

Collected (t):		**3,770,549**
Management (t)	**Recovery**	**Disposal**
EPA-licensed landfills	736,226	39,092
Local authority-permitted sites	3,618,714	0
EPA licensed waste facilities (other than landfill)	16,892	0
Total	**4,371,833**	**39,092**
Grand total	**4,410,925**	
Recovery rate[91]	**99%**	

(Source: local authority survey, landfill survey and recovery organisations survey)

Of the non-soil and stones fraction of C&D waste (Table 28), some 727,477 t were reported as recovered, which represents a 98% recovery rate (based on C&D managed). For the non-soil and stone C&D fraction the reported collection exceeded reported disposal and recovery by 578,806 t (44%).

Table 28: Collection and management of other construction and demolition waste (excl. soil and stones) 2009

Collected (t):		**1,323,117**
Management (t)	**Recovery**	**Disposal**
EPA-licensed landfills	258,076	16,833
Local authority-permitted sites	443,975	0
EPA licensed waste treatment facilities	25,426	
Total	**727,477**	**16,833**
Grand total	**744,310**	
Recovery rate[91]	**98%**	

(Source: local authority survey, landfill survey and recovery organisations survey)

In 2009, local authorities reported a total of 639 active waste facility permit holders authorised to accept C&D waste. Of these, 489 submitted an AER to the local authorities, representing a 77% reporting rate. Local authorities estimate that there may have been an additional 212,000 t of C&D recovered at local authority permitted sites in 2009 based on the 150 non-reporting facilities. Taking this into account and the estimated non-reporting collected tonnage of up to 83,926 t, this still leaves a discrepancy between the reported collection of total C&D waste and the reported disposal and recovery of total C&D waste of 189,644 t.

[91] Recovery rate is calculated based on reported tonnage managed by recovery or disposal.

Gaps in the data may be attributed to a lack of attention to maintenance of good records and the obligation on the sector to provide accurate data to the local authorities annually. There is also an issue with the types of material that the construction industry defines as waste, which may lead to secondary resources not being properly accounted for. Cork Region (Cork City Council and Cork County Council) and Wicklow County Council failed to provide 2009 C&D data, therefore estimates were used to complete the national dataset. In addition, there may have been some storage of C&D waste which was collected in 2008 but may not have been reported as recovered or disposed until 2009. There is also potential for double-reporting by WCP and WP holders across local authority boundaries, potentially leading to an over-reporting of the quantity of C&D waste collected and recovered nationally.

The recovery rates estimated above for C&D waste need to be treated with caution given the poor records and reporting experience with the sector. Sector operators need to greatly improve their records in relation to their wastes and additional enforcement and data verification efforts by the local authorities may be necessary to ensure that this happens.

9 HAZARDOUS WASTE

Waste is classified as being hazardous when it displays properties (i.e. oxidising, explosive, flammable, irritant, toxic) that make it dangerous or potentially harmful to human health or the environment. A full list of these properties is listed in Annex III of the new Waste Directive 2008/98/EC. Industry is the largest generator of hazardous waste in Ireland, giving rise to hazardous waste materials such as industrial solvents, sludges, oils and chemicals. Households, small businesses, farms and the healthcare and construction sectors also generate substantial quantities of hazardous waste such as lead-acid batteries, waste electrical and electronic equipment, healthcare risk waste, solvent-based paints and varnishes, pesticides, herbicides, waste oils and asbestos, among others. Information on the generation and management of hazardous waste in 2009 was compiled from three sources, based on the location of treatment:

- Data on the treatment of hazardous waste on-site at the industry where it was generated (which occurs under IPPC licence at companies mainly in the pharmachem sector), was obtained from Pollutant Release and Transfer Returns (PRTR) and Annual Environmental Reports;
- Data on the treatment of hazardous waste off-site at commercial facilities in Ireland was obtained by way of the hazardous waste treatment survey, which was sent to facilities that are licensed by the EPA or permitted by the local authority to treat a range of hazardous wastes; and
- Data on the export of hazardous waste for recovery or disposal abroad was obtained from records maintained by the National TransFrontier Shipment Office (NTFSO).

The total amount of hazardous waste managed in Ireland in 2009 is presented in Table 29 and in Figure 13. Total hazardous waste managed in 2009 (excluding contaminated soil) is 9% less than the 2008 figure.

Table 29: Summary of hazardous waste management, 2001–2009 (excluding contaminated soil)

Category	2001	2002	2003	2004	2005	2006	2007	2008	2009
[92]On-site at industry (t)	95,566			86,328		88,409	82,732	72,038	74,668
[93]Off-site in Ireland (t)	48,013			55,952		60,872	91,240	113,839	89,992
Exported (t)	115,366	109,545	170,678	165,498	146,811	134,904	147,542	157,207	150,395
Total (t)	**258,945**			**307,778**		**284,184**	**304,941**	**319,098**	**289,910**[94]

(Source: IPPC PRTR annual returns; hazardous waste treatment survey; TFS records, recovery organisations survey for WEEE)

The reported quantity of hazardous waste treated in Ireland in 2009 was 164,661 t, a decrease of 11% since 2008 (Table 29). This was as a result of a decrease in the treatment of hazardous waste off-site at commercial facilities in Ireland, which decreased by 21% on 2008 tonnage to 89,992 t (Table 30). The decrease was largely attributable to a decrease in the treatment of waste oil, oily sludges and asbestos waste. There was also a decrease in the total solvent treated at off-site treatment facilities in Ireland in 2009. Table 30 identifies the reported recovery and disposal classes for hazardous waste managed in Ireland.

[92] 'On-site at industry' refers to hazardous waste recovered or disposed on-site at the industrial facility where it was generated, under IPPC licence.

[93] 'Off-site in Ireland' refers to waste sent to EPA licensed commercial hazardous waste treatment facilities for recovery or disposal.

[94] A reported 25,145 t of solvent waste was blended at facilities in Ireland prior to export as a waste for further treatment (24,959 t exported for use as fuel in cement kilns or incinerators, 186 t was exported for incineration). These quantities are correctly counted in both the treated 'off-site in Ireland' column and the 'exported' columns. However, they have been discounted in the 'total' column to avoid double counting in the total amount of hazardous waste managed. Similar discounting also took place in the 'total' columns in 2007 and 2008 to avoid double counting in the total amount of hazardous waste managed.

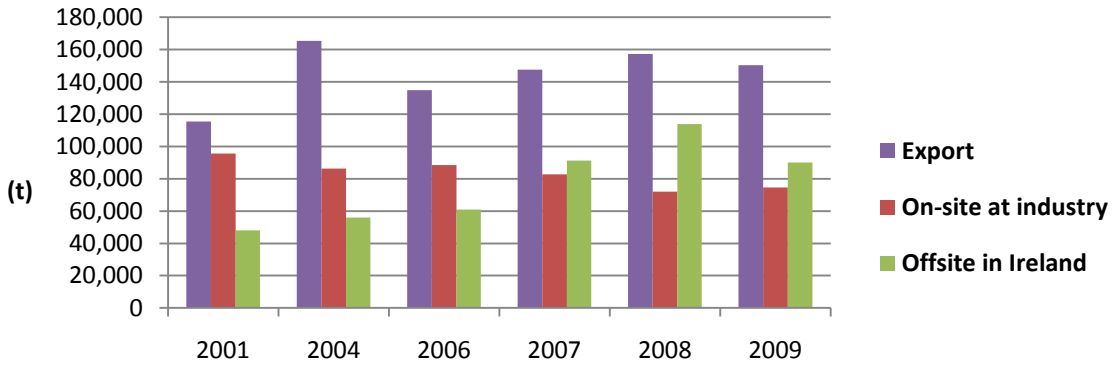

Figure 13: The location of hazardous waste treatment 2001-2009 (excluding contaminated soil)

Table 30: Treatment of hazardous waste in Ireland, 2009 (excluding contaminated soil)

Category	[95]On-site at industry (t)	[96]Off-site in Ireland (t)	Total (t)
Solvents	47,809	18,543	66,352
Industrial hazardous waste (other)	3,276	5,762	9,038
Oil waste (mineral oil)	180	27,124	27,304
Solvents (halogenated, where specified)	5,787	112	5,899
Oily sludges		9,241	9,241
Equipment (electrical, electronic, mechanical)		5,874	5,874
Salts and saltcake	15,238		15,238
Healthcare risk waste		9,475	9,475
Aqueous washing liquids and mother liquors (07 __ 01*)	1,998	6,921	8,919
Sludges and filter cakes	6	1,006	1,013
Paint, ink and varnish waste (including packaging)	6	985	990
Acid and alkali waste		2,171	2,171
Chemical waste (other)		150	150
Solid wastes from MFSU of pharmaceuticals (07 05 13*)	299	2	300
Packaging (contaminated or containing residues)	40	1,859	1,899
Absorbents, wiping cloths etc. (EWC 15 02 02*)	21	8	29
Photographic chemical waste		140	140
Thermal treatment and other combustion residues		286	286
Fluorescent lamps		297	297
Laboratory and general chemical waste	8	20	28
Construction and demolition waste (hazardous)		6	6
Metal- and heavy metal-containing waste		2	2
Municipal hazardous waste (other)		8	8
Totals	**74,668**	**89,992**	**164,661**

(Source: IPPC PRTR annual returns; hazardous waste treatment survey; recovery organisations survey for WEEE)

[95] 'On-site at industry' refers to hazardous waste recovered or disposed on-site at the industrial facility where it was generated, under IPPC licence.

[96] 'Off-site in Ireland' refers to waste sent to EPA-licensed commercial hazardous waste treatment facilities in Ireland for recovery or disposal.

Table 31: Methods of treatment of hazardous waste in Ireland in 2009 (excluding contaminated soil)

Recovery/ Disposal code[97]	Disposal or recovery activity	[98]On-site at industry (t)	[99]Off-site in Ireland (t)	Total (t)
D1	Landfill	15,238		15,238
D5	Engineered landfill		126	126
D8	Biological treatment	1,808		1,808
D9	Physico-chemical treatment	119	21,536	21,654
D10	Incineration	21,378		21,378
D12	Permanent storage	1		1
D13	Blending or mixing		186[100]	186
	Sub-total disposal	**38,544**	**21,848**	**60,392**
R1	Use as fuel	10,599	17,745[101]	28.344
R2	Solvent recovery	25,047	7,547[102]	32,594
R3	Organic substance recovery	297	2	299
R4	Metal recovery		1,551	1,551
R5	Inorganic substance recovery		5,874	5,874
R4/R5	Combination of R4 and R5		297	297
R9	Oil recovery	180	23,912	24,092
R9/D9	Combination of R9 and D9		11,218[103]	11,218
	Sub-total recovery	**36,124**	**68,145**	**104,269**
	Total	**74,668**	**89,992**	**164,661**

(Source: IPPC PRTR annual returns; hazardous waste treatment survey, recovery organisations survey for WEEE)

A reported 25,145 t of waste solvent was blended at EPA licensed hazardous waste treatment facilities in Ireland in 2009, prior to being exported as a waste for use as fuel in cement kilns or incinerators as well as incineration abroad (Table 31).

Tables 32 and 33 provide information on the export of hazardous waste in 2009. There was a 4% decrease in the quantity of hazardous waste exported for treatment abroad in 2009 compared to 2008.

[97] See Appendix G for list of recovery and disposal operations.
[98] 'On-site at industry' refers to hazardous waste recovered or disposed on-site at the industrial facility where it was generated.
[99] 'Off-site in Ireland' refers to waste sent to commercial hazardous waste treatment facilities in Ireland for recovery or disposal.
[100] 186 t (163 t of non-halogenated solvent and 22 t of aqueous washing liquids and mother liquors) represents the blending of waste solvents in Ireland prior to their export as waste for incineration.
[101] 17,745 t of solvent waste was blended prior to its export as waste for use as fuel in cement kilns or incinerators.
[102] 7,214 t of the 7,547 t was reported as waste solvent which was blended at commercial hazardous waste treatment facilities prior to its export as waste for use as fuel in cement kilns and incinerators abroad.
[103] The treatment of interceptor sludges and coolants by Rilta Environmental Ltd (Reg. No. W0192-02) was reported as a combination of R9 and D9 in 2009.

Table 32: Categories of reported exports of hazardous waste, 2007-2009

Category	Exported (tonnes) 2007	Exported (tonnes) 2008	Exported (tonnes) 2009
Solvents	48,671	58,611	52,370
Solvents (halogenated, where specified)	6,743	8,693	4,540
Oil waste (mineral oil)	617	230	2,443
Industrial hazardous waste (other)	33,854	33,154	[104]11,927
Healthcare risk waste	478	728	734
Oily sludges	7	107	94
Lead-acid batteries	10,565	11,050	11,832
Equipment (electrical, electronic, mechanical)	6,423	7,386	8,410
Chemical waste (other)	4,091	3,559	[104]3,701
Paint, ink and varnish waste (including packaging)	2,805	4,843	4,834
Acid and alkali waste	2,384	2,917	2,578
Asbestos waste	6,168	7,007	14,068
Aqueous washing liquids and mother liquors (07 __ 01*)	10,747	5,278	[104]10,647
Solid wastes from MFSU of pharmaceuticals (07 05 13*)	3,790	2,534	1,956
Sludges and filter cakes	5,036	6,057	3,834
Batteries (small, non-lead acid)	328	228	223
Packaging (contaminated or containing residues)	785	746	[104]664
Photographic chemical waste	680	650	432
Oil filters	640	1,092	741
Construction and demolition waste (hazardous)	82	137	12,892
Metal- and heavy metal-containing waste	42	71	69
Agricultural hazardous waste			72
Absorbents, wiping cloths etc. (EWC 15 02 02*)	1,894	1,373	661
Fluorescent lamps	116	56	74
Pesticides, herbicides	71	71	56
Laboratory and general chemical waste	332	193	485
Thermal treatment and combustion residues	32	428	59
Medicines	1	3	See footnote #104
Municipal hazardous waste (other)	89		
Polychlorinated biphenyls	71		1
Total	**147,542**	**157,207**	**150,395**

(Source: NTFSO survey)

[104] 8 t of obsolete medicines were exported to Indaver, Belgium and AVG, Germany for incineration in 2009. This 8 t was exported in six separate consignments in the 2009 TFS dataset and appears under the following categories: Industrial hazardous waste (other), Chemical waste, Aqueous washing liquids and mother liquors (07 __ 01*) and Packaging (contaminated or containing residues) as above.

Table 33: Disposal and recovery of reported export of hazardous waste, 2009

Disposal (D) or recovery (R) code[105]	Exported (t)
D1	14,989
D10	34,079
D12	87
D13	622
D14	51
D15	28
D5	126
D8	1,084
[106]D8/D9	657
D9	621
Sub-total hazardous waste exported for disposal	**52,345**
R1	23,157
R1/R3	93
R1/R3/R4	2,279
R1/R3/R5	242
R1/R4	494
R1/R4/R5	1,168
R1/R5	524
R1/R9	2,096
R10	70
R11	137
R12	1,299
R13	354
R2	18,953
R2/R3	3,666
R2/R3/R4	258
R3	15,702
R3/R4	3,345
R4	18,923
R4/R11	42
R4/R5	127
R5	3,157
R6	1,441
R7	38
R8	5
R9	478
Sub-total hazardous waste exported for recovery	**98,049**
Total hazardous waste exported for treatment	**150,395**

(Source: NTFSO survey)

While off-site treatment of hazardous waste decreased in 2009, the quantity of hazardous wastes recovered or disposed on-site at IPPC-licensed facilities increased marginally to 74,668 t in 2009 from 72,038 t in 2008 (Table 34).

[105] See Appendix G for a descriptive list of recovery and disposal operations.
[106] In order for the TransFrontierShipment (TFS) notification to reflect the entire treatment process, multiple codes were reported in some cases as per Table 33 above.

Table 34: Treatment of hazardous waste on-site at IPPC-licensed facilities in 2009 (excluding contaminated soil)

Facility name	IPPC Reg No.	Waste Type	Recovery/ Disposal Code[107]	Quantity treated (tonnes)
Arran Chemical Co Ltd	P0110-02	Solvents	R2	118
Astellas Ireland Co. Ltd	P0007-03	Solvents	D10	475
			D10	1,650
Aughinish Alumina Ltd	P0035-04	Salts and salt cake	D1	15,238
Cognis Ireland Ltd	P0052-02	Other industrial hazardous waste	R1	3,273
Conoco Phillips	P0419-01	Oil waste (mineral oil)	R9	180
DIS Enbi Seals Ireland Ltd	P0064-01	Oil waste (mineral oil)	R9	0.3
Eli Lilly	P0009-03	Solvents	D10	10,578
			R2	659
			D10	186
Galmoy Mines Ltd	P0517-01	Absorbents, wiping cloths	D12	1
Irish Industrial Explosives Ltd.	P0055-01	Other industrial hazardous waste	D10	3
Liebherr Container Cranes Ltd	P0146-01	Paint, ink, varnish	R2	6
Mallinckrodt Medical Imaging	P0050-02	Solvents	D8	349
			R2	6,713
			D8	<0.1
			D9	119
Merck Sharp & Dohme	P0011-03	Solvents	D8	1,002
			R2	1,521
Millipore Ireland Limited	P0571-02	Solvents	R2	736
Novartis Ringaskiddy Ltd	P0006-03	Oil waste (mineral oil)	D10	<0.1
		Packaging (contaminates or containing residues)	D10	40
		Sludges and filter cakes	D10	6
		Solvents	D10	0.2
			D8	443
			R1	1,854
			R2	6,222
		Absorbents, Wiping cloths	D10	20
		Solvents	D10	343
			D8	5
		Solid wastes from MFSU of pharmaceuticals (07 05 13*)	D10	2
		Laboratory and general chemical waste	D10	8
Pfizer Cork Limited	P0103-02	Solvents	R2	156
			R2	79
Pfizer Ireland Pharmaceuticals	P0013-04	Solvents	R2	4,257
Roche Ireland Limited	P0012-04	Solvents	R1	1,416
			R1	689
Schering-Plough (Ireland)	P0015-04	Solvents	R1	997
Sigma-Aldrich Ireland Ltd	P0089-03	Solvents	R2	98
Smithkline Beecham (Cork) Limited	P0004-03	Solvents	D10	4,276
			R1	2,372
			R2	295
Swords Laboratories	P0014-04	Solvents	R2	448
			R2	382
Bristol Myers Squibb Cruiserath	P0552-02	Solvents	D10	94
			R2	1,683
			D10	3,696
			D8	8
			R2	628
Temmler Ireland Ltd	P0813-01	Solvents	R2	1,047
		Solid wastes from MFSU of pharmaceuticals (07 05 13*)	R3	297
			Total	**74,668**

(Source: IPPC PRTR and Annual Environmental Reports)

[107] See Appendix G for list of recovery and disposal operations.

Figure 14 and Table 35 provide information on the destination and fate of hazardous waste exported from Ireland in 2009 for treatment at authorised facilities abroad. Records on the authorised export of hazardous waste were obtained from the National TFS Office. Five European countries (UK, Belgium, Germany, Netherlands and Denmark) received 99% of Irish hazardous waste exports in 2009.

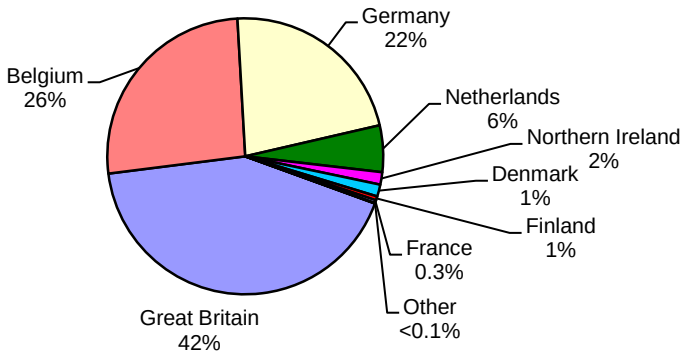

Figure 14: Destination of exported hazardous waste, 2009 (excluding contaminated soil)

The National Hazardous Waste Management Plan 2008-2012 was published by the Agency in 2008[108]. This plan sets out the objectives and priority actions for the prevention and improved management of hazardous waste in Ireland. A number of projects to implement the plan's recommendations have been undertaken as discussed in Section 10. These include a Farm Hazardous Waste project, a Smart Garage Guide[109], a project to develop a Code of Practice for Civic Amenity Sites and a Study on the Technical and Economic Aspects of developing a National Difficult Waste Facility[110]. A separate *Implementation Report on the National Hazardous Waste Management Plan* is currently in preparation by EPA.

[108] See www.epa.ie/downloads/pubs/waste/haz.
[109] http://www.epa.ie/downloads/pubs/waste/wastepreventionprojectoutputs/
[110] http://www.epa.ie/downloads/pubs/waste/haz/name,30331,en.html

Table 35: Destination and fate of notified hazardous waste exports, excluding contaminated soil, 2009

Destination	Disposal[111]		Recovery[111]		Total Exports
	D Code	(t)	R Code	(t)	(t) 2009
Belgium	D10 D8 D9	7,834 886 228	R1 R1/R3/R5 R1/R4/R5 R1/R9 R12 R13 R2 R4 R4/R5 R5 R6	22,404 242 333 2,096 675 11 250 3,756 127 25 375	
Total Belgium (t)		**8,948**		**30,295**	**39,243**
Germany	D1 D10 D12 D13 D15 D5 D9	14,890 12,981 87 622 28 126 304	R1 R1/R4 R1/R4/R5 R1/R5 R10 R12 R13 R2 R2/R3/R4 R3 R3/R4 R4 R5	360 84 834 524 70 69 333 301 258 477 198 630 348	
Total Germany (t)		**29,039**		**4,487**	**33,527**
Denmark	D10	2,111			
Total Denmark (t)		**2,111**			**2,111**
Finland	D10	669	R4/R11	42	
Total Finland (t)		**669**		**42**	**711**
France	D10	192	R11 R12 R2 R4	137 88 18 90	
Total France (t)		**192**		**333**	**525**
Italy			R8	5	
Total Italy (t)				**5**	**5**
Netherlands	D10 D14 D8 D8/D9 D9	334 51 198 657 89	R1 R1/R3 R1/R3/R4 R1/R4 R12 R13 R3 R3/R4 R4 R5	393 93 2,279 410 468 11 1,552 665 15 988	
Total Netherlands (t)		**1,330**		**6,872**	**8,201**
Poland			R4	24	
Total Poland (t)				**24**	**24**
UK	D1 D10	99 9,958	R2 R2/R3 R3 R3/R4 R4 R5 R6 R7 R9	18,384 3,666 13,674 2,482 14,384 1,796 1,065 38 478	
Total UK (t)		**10,057**		**55,967**	**66,024**
USA			R4	24	
Total USA				**24**	**24**
Overall totals (t)		**52,345**		**98,049**	**150,395**

[111] See Appendix G for list of recovery and disposal operations.

Contaminated soil

Table 36 outlines trends in the management of contaminated soil and export since 2001, including contaminated soil treated off-site in Ireland at commercial hazardous waste treatment facilities and contaminated soil which was exported for treatment. There was a large (71%) decrease in the treatment of contaminated soil off-site in Ireland in 2009 compared with that in 2008. All reported off-site treatment in Ireland takes place at Enva's Portlaoise facility (EPA Waste Licence Register No. W0184-01). The data do not reflect any contaminated soil that was treated *in situ* at its point of generation. Overall, there was also a significantly large decrease in the reported export of contaminated soil to 476 t (Table 35). Only 4% of contaminated soils were reported as exported for treatment in 2009, principally to the Netherlands and also to Germany.

Table 36: Reported off-site management of contaminated soil, 2001-2009

	2001	2004	2005	2006	2007	2008	2009
Off-site in Ireland (t)	**8,636 (R)**	**14,838 (R)**	**-**	**36,872 (R)**	**44,221(R)**	**2 (D) 43,531 (R)**	**12,428 (R)**
Exported (total) (t)	**159,943**	**206,299**	**140,442**	**370,032**	**143,906**	**449,574**	**476**
Germany	14,063 (R)	172,948 (D)	120,455 (D)	341,158 (D) 28,570 (R)	126,859 (D) 14,919 (R)	285,028 (D) 135,980 (R)	7 (D)[112]
Netherlands		10,691 (R)		305(R)	2,128(R)	12,655 (D) 15,911 (R)	469 (R)[113]
Belgium	145,192(R)	22,531(R)					
Elsewhere in Europe	742 (R)	126 (R)	19,983 (D)				
Total reported (t)	**168,579**	**221,137**	**-**	**406,904**	**188,127**	**493,107**	**12,904**

Note: (R) = predominantly recovery or recycling; (D) = predominantly disposal.

(Source: hazardous waste treatment survey, NTFSO survey)

[112] D10 – incineration on land.
[113] R5 - Inorganic substance recovery.

10 WASTE INFRASTRUCTURE

This section examines the provision of some key national waste infrastructure necessary for final disposal and recovery of municipal wastes. Landfills at EPA IPPC licensed activities and other industrial waste infrastructure (such as on-site incinerators) are not included in this discussion as these are not available to the general public, local authorities or merchant waste operators.

National waste infrastructure and capacity cannot be easily accessed or reported on at this time as the Waste Permit and Certificate of Registration Database (which is a register of waste collection permits, waste facility permits and certificates of registration issued by local authorities under the 2007 Waste Collection and Waste Facility permit Regulations) is incomplete. Not all local authorities have been keeping the database up-to-date. In addition, the database does not include permits issued under the 'old' 2001 Regulations. Once all authorisations issued under the 2001 Regulations have been reviewed (or been revoked, or have expired), and all local authorities keep it updated with permits issued under the 'new' Regulations, the database will have information that can be queried for the purposes of reporting on national waste treatment infrastructure and capacity.

10.1 Municipal landfill

A total of 29 landfills accepted 1,763,925 t of municipal solid waste (MSW) in 2009 for both recovery and disposal (excluding Neiphin Trading Ltd. (Kerdiffstown), W0047-02). A summary of municipal waste landfilled in 2008 and 2009 and the percentage change is set out in Table 37.

Table 37: Municipal waste landfilled in 2008 and 2009

	Household waste disposed to landfill (t)	Commercial waste disposed to landfill (t)	Street sweepings disposed to landfill (t)	Total MSW disposed to landfill (t)
2008	1,155,567	758,178	24,969	1,938,714
2009	1,056,267	640,737	26,701	1,723,705
% change	**-3%**	**-15%**	**+7%**	**-11%**

(Source: landfill survey)

The market share for merchant private and public sector landfill activities for municipal waste is set out in Table 38. Also included in Table 38 is summary data from Appendix E on the market role of merchant landfills in the management of certain industrial wastes.

Table 39 shows the breakdown of waste accepted at each of these landfills. A more detailed breakdown of waste accepted at all landfills in operation is also provided in Appendix E. One of the 29 landfills did not accept any waste for disposal, i.e. only restoration material comprising composted municipal organics was accepted.

Table 38: Market share of public and private landfills operating in 2009

Year: 2009	Number of merchant MSW landfills[114]	Household waste market disposed to private sector landfills	Commercial waste market disposed to private sector landfills	MSW disposal market served by private sector landfills	MSW recovery to private sector landfill	Merchant national landfill for industrial waste served by private sector (from Appendix E)	Merchant national landfill disposal (all classes bar C&D and Clonbulloge) served by private sector (from Appendix E)
	6 private sector	26%	54%	36%	47%	37%	37%
	23 local authority						

(Source: landfill survey)

Across all facilities, some 40,220 t of municipal waste was used in a recovery capacity (wood chip and composted/stabilised organics used for cover, landscaping, etc.). Off-specification compost and trommel fines used for daily cover that do not meet EPA stability standard are not classed as recovery.

The 1,723,705 t of municipal waste disposed in the MSW landfills consisted of 1,056,267 t of household waste and 640,737 t of non-household waste (refer Appendix E). Residual household waste disposed to landfill decreased by 8.6 % in 2009 (from 2008), and commercial (and non-process industrial) wastes disposed to landfill in 2009 was 15% less than that reported for 2008. Total residual municipal waste disposed to landfill in 2009 fell 11% on that disposed in 2008.

[114] Excluding Clonbullogue Ash Depository and C&D (only) recovery facilities.

Table 39: Municipal waste landfills operating in 2009

EPA licence reg. no.[115]	Landfill	Waste management planning region	Household waste disposed (t)	Cleansing waste disposed **(t)**	Commercial waste disposed **(t)**	MSW disposal to landfill (t)	Municipal organic waste (stabilised waste and woodchip) recovered to landfill (t)
W0001-03	North Kerry	Clare Limerick Kerry	24,423	29	15,128	**39,580**	600
W0017-03	Gortadroma	Clare Limerick Kerry	90,184	693	12,924	**103,801**	0
W0109-01	Inagh	Clare Limerick Kerry	13,507	756	10,106	**24,369**	477
W0013-01	Carrowbrown	Connaught	0	0	0	**0**	7,267
W0059-02	Ballaghaderreen	Connaught	23,780	58	5,857	**29,695**	0
W0067-01	Rathroeen	Connaught	20,800	3,942	5,671	**30,413**	1,143
W0178-01	Connaught Regional	Connaught	55,155	984	41,768	**97,907**	1,030
W0012-02	Kinsale Road	Cork	44,318	5,617	35,987	**85,922**	1,837
W0068-02	Youghal	Cork	41,216	0	16,911	**58,127**	0
W0089-01	Derryconnell	Cork	8,192	130	231	**8,553**	0
W0024-02	Ballynacarrick	Donegal	15,238	1,195	7,041	**23,474**	0
W0004-03	Arthurstown	Dublin	214,560	0	0	**214,560**	0
W0009-02	Balleally	Dublin	41,205	319	20,559	**62,083**	0
W0047-02	Kerdiffstown[116]	Kildare	-	-	-	**0**	0
W0081-03	KTK	Kildare	0	0	6,699	**6,699**	942
W0201-02	Drehid	Kildare	66,774	0	138,385	**205,159**	5,783
W0026-02	Kyletelesha	Midlands	17,296	454	25,267	**43,017**	0
W0028-02	Ballydonagh	Midlands	20,480	786	25,737	**47,003**	0
W0029-02	Derryclure	Midlands	8,554	0	15,468	**24,022**	0
W0078-02	Ballaghaveny	Midlands	15,904	1,245	4,167	**21,316**	0
W0020-01	Scotch Corner	North East	22,510	668	15,553	**38,731**	4,765
W0060-01	Whiteriver	North East	26,601	4,014	20,426	**51,041**	0
W0077-02	Corranure	North East	51,770	49	23,469	**75,288**	1,229
W0146-01	Knockharley	North East	101,791	69	69,350	**171,210**	0
W0025-02	Powerstown	South East	17,953	1,728	970	**20,651**	1,663
W0030-02	Dunmore	South East	9,003	1,175	4,097	**14,275**	1,506
W0074-02	Donohill	South East	9,392	1,232	218	**10,842**	562
W0191-01	Holmestown	South East	23,485	852	4,233	**28,570**	158
W0066-02	Rampere	Wicklow	25,805	670	25,427	**51,902**	0
W0165-01	Ballynagran	Wicklow	46,371	36	89,088	**135,495**	11,258
		Total	**1,056,267**	**26,701**	**640,737**		
					TOTAL MSW disposed to landfill:	**1,723,705**	
						TOTAL MSW recovered to landfill	**40,220**
						TOTAL MSW to landfill:	**1,763,925**

(Source: landfill survey)

[115] Shaded cells are private sector MSW landfills.
[116] Licence Register No. W0047-02 - forced closure in 2010.

10.2 Municipal landfill disposal capacity

At the end of 2009, the remaining capacity of fully consented MSW landfill capacity (i.e. with waste licence and planning permission in place) was approximately 28 Mt nationally (Table 40). This estimate includes two consented facilities that have yet to commence construction (Bottlehill Landfill in Cork County Council area (EPA licence register no. W0161-02) and Fingal Landfill, Nevitt (EPA licence register no. W0231-01)). These two uncommenced landfills together contribute a potential 14.8 Mt to this national reserve capacity figure.

A breakdown of MSW disposal capacity by landfill and waste planning region is also shown in Table 40. Of the resultant 13 Mt *operational* municipal landfill capacity nationally, the majority (62%) of this is owned by just four private sector landfills. If disposal to MSW landfill were to continue at the 2009 rate of approximately 1.7 Mt per annum, this means that there is approximately 16 years municipal waste landfill capacity remaining, i.e. enough capacity to last to c. 2025. Significantly, this capacity is not distributed evenly around the State. Some regions such as Donegal are at critical capacity shortage stage (Donegal is expected to have no residual municipal landfill capacity by the end of 2011). However, such predictions must be treated with caution as they are affected by numerous factors including, changing character of waste, higher recycling targets, pre-treatment obligations, commencement of incineration, new applications for landfill void in application process, etc. If both the Fingal County Council Nevitt and Cork County Council Bottlehill landfills do not proceed to development stage, then the available MSW void nationally will last for c. 8 years at current waste generation and landfill disposal rates.

Table 40: National MSW landfill disposal capacity (at end of 2009)

EPA licence reg. no.[117]	Licensee	Landfill	Waste management planning region	Approximate remaining disposal capacity (t)[118]	Approximate remaining life expectancy[119,120]	
					Site	Region
W0001-03	Kerry County Council	North Kerry	Clare Limerick Kerry	550,000	15	5.5
W0017-03	Limerick County Council	Gortadroma	Clare Limerick Kerry	300,000	3	
W0109-01	Clare County Council	Inagh	Clare Limerick Kerry	75,000	2	
W0021-01	Mayo County Council	Derrinumera	Connaught	56,000	3	7.5
W0059-02	Roscommon County Council	Ballaghaderreen	Connaught	48,000	1	
W0067-01	Mayo County Council	Rathroeen	Connaught	162,000	5	
W0178-01	Greenstar Holdings	Connaught Regional	Connaught	900,000	8.5	
W0012-02	Cork City Council	Kinsale Road	Cork	0	0	(35)
W0068-02	Cork County Council	Youghal	Cork	50,000	<1	
W0089-01	Cork County Council	Derryconnell	Cork	0	0	
W0161-02	Cork County Council	Bottlehill	Cork	*5,392,000*	Not operational yet	
W0024-02	Donegal County Council	Ballynacarrick	Donegal	73,000	2	2
W0004-03	South Dublin County Council	Arthurstown	Dublin	274,000	1	(35)
W0009-02	Fingal County Council	Balleally	Dublin	90,000	<1	
W0231-01	Fingal County Council	Nevitt	Dublin	*9,400,000*	Not operational yet	
W0047-02	Neiphin Trading Ltd	Kerdiffstown	Kildare	-	-	15
W0081-03	KTK Landfill Ltd	KTK	Kildare	0	0	
W0201-02	Bord na Móna plc	Drehid	Kildare	3,300,000	15	
W0026-02	Laois County Council	Kyletelesha	Midlands	330,000	7.5	8
W0028-02	Westmeath County Council	Ballydonagh	Midlands	50,000	1	
W0029-02	Offaly County Council	Derryclure	Midlands	550,000	15	
W0078-02	North Tipperary County Council	Ballaghaveny	Midlands	160,000	8	
W0020-01	Monaghan County Council	Scotch Corner	North East	210,000	5	9
W0060-01	Louth County Council	Whiteriver	North East	700,000	7	
W0077-02	Cavan County Council	Corranure	North East	200,000	2	
W0146-01	Greenstar Holdings	Knockharley	North East	2,000,000	10	
W0025-02	Carlow County Council	Powerstown	South East	150,000	4.5	14
W0030-02	Kilkenny County Council	Dunmore	South East	1,500	0	
W0074-02	South Tipperary County Council	Donohill	South East	30,000	2	
W0191-01	Wexford County Council	Holmestown	South East	860,000	29	
W0066-02	Wicklow County Council	Rampere	Wicklow	111,000	2	10.5
W0165-01	Greenstar Holdings	Ballynagran	Wicklow	1,900,000	11	
			Total	**27,922,500**	**16**	

(Source: landfill survey)

It is recognised that the regional planning or administrative boundaries are somewhat artificial as waste does move between waste planning regions for disposal. Taking the Dublin Metropolitan Area (four Dublin Authorities, as well as Wicklow, Kildare, and Meath) which currently effectively operates as a waste management region, there is

[117] Shaded cells are private sector MSW landfills.
[118] Based on AER returns from landfill operators for 2009.
[119] Based on 2009 fill rate (2008 for W0021-01, no data for W0047-02).
[120] Remaining lifespan assumes constant MSW, industrial and other waste input as that recorded in 2009 for these facilities.

approximately 20 years landfill disposal capacity for municipal wastes (at 2009 fill rates) (Table 41). This latter void capacity assumes the successful development of the 9.4 Mt Fingal County Council Nevitt landfill. Without this facility there would be 9 years capacity remaining.

Table 41: Dublin metropolitan waste management area MSW data for 2009

	MSW managed (t)			MSW disposed in area in 2009 (t)	Remaining MSW disposal capacity in area (t)
	Household	Commercial	Total		
Dublin City Council	174,185	508,959[121]	1,140,886	0	0
Dun Laoghaire-Rathdown	81,710			0	0
Fingal County Council	98,685			62,083	9,490,000[122]
South Dublin County Council	108,061			0	0
Kildare County Council	72,046			426,418	3,574,000
Meath County Council	57,572			171,210	2,000,000
Wicklow County Council	39,668			187,397	2,011,000
Total (t):	**631,927**	**508,959**	**1,140,886**	**847,108**	**17,075,000**

(Source: CSO, local authority survey and landfill survey)

In infrastructure delivery terms, it can take 8 years or more for a new MSW landfill proposal for a greenfield site to progress from site selection stage, to being open for business (assuming success at planning and licensing stages). Shorter provision periods can be expected for major extensions of existing licensed facilities. The number of landfills is expected to continue to decline, with **16** of the currently **28** active MSW disposal facilities expected to close in the next three years (unless extensions are applied for and then granted). This contraction will likely lead to significant inter-regional movement of waste.

10.3 Integrated landfill facilities

Twenty-nine landfills accepted municipal waste for disposal and recovery in 2009 (excluding Neiphin Trading Ltd. (Kerdiffstown), Register W0047-02). A further 37 facilities hold landfill licences but are closed to landfill activities[123], and 2 have permissions but have yet to be built.

Twenty-one of the 29 active landfills (i.e. receiving waste to the landfill void) have other non-landfill associated waste infrastructure (18 had civic amenity sites only; two had civic amenity and composting facilities; one had composting only; two have associated transfer/baling operations). Of the 37 closed landfills, 11 had other waste infrastructure (10 civic amenity sites; two composting; and 4 had waste transfer facilities). None of the private municipal landfills offered civic amenity facilities, or reported composting on-site.

10.4 Hazardous waste landfill

Ireland currently has no dedicated hazardous waste landfill disposal facility. In 2010, the EPA published a study commissioned under the National Hazardous Waste Management Plan 2008-2012 that examined the technical and

[121] Commercial waste estimated from population of the seven authorities (1,749,000 – CSO 2006 Census adjusted up by CSO estimated national 5.2% population growth) by the national rate of commercial waste produced (refer Appendix A). This is likely to be an underestimate given the concentration of commercial development in this area.

[122] The Fingal County Council Nevitt Landfill is included in capacity calculations. South Dublin County Council owned Arthurstown Landfill is included with Kildare capacity.

[123] See EPA's *Focus on Landfilling in Ireland* report, 2010.

economic aspects of developing a National Difficult Waste Facility (incorporating hazardous waste landfill)[124]. This study took an all-island view in relation to needs assessment and concluded that there was an annual need for c. 216,000 t hazardous waste landfill capacity rising to 300,000 t by 2020. This report also considered technical and economic aspects of the location, design and operation for such a facility, including the potential for co-location with existing industrial or waste activities. A significant governance aspect for such hazardous waste facilities is the 'care in perpetuity' commitment. The environmental and health risks for hazardous waste such as asbestos, etc. do not diminish in time or degrade, so even after safe containment there has to be long term institutional control to ensure maintenance of facility integrity.

During 2010, Murphy Environmental Hollywood Ltd who operate an industrial waste facility at The Naul, Co. Dublin (EPA licence register no. W0129-02) announced that they were entering the Strategic Infrastructure process with An Bord Pleanála for the development of a hazardous waste facility at the Hollywood site.

10.5 Thermal treatment (including incineration)

Incineration of municipal waste

Commercial incineration as a waste treatment option for municipal waste is not available in Ireland at the time of writing this report. In November 2005, the EPA granted licences[125] for two commercial incinerators. The licences provide for the operation of waste incineration facilities by Indaver Ireland at Carranstown, Co. Meath (W0167-01) and Ringaskiddy, Co. Cork (W0186-01). The operators of the Carranstown facility have applied to the EPA to increase capacity to 0.2 Mt per year (up from the currently consented 0.15 Mt per year). In December 2008, the EPA granted a licence for a third municipal waste incinerator at Poolbeg in Dublin (W0232-01). None of these facilities are operating at present, though construction is well advanced at the Carranstown facility, and in its very early stages at the Poolbeg facility. Commissioning of the Indaver Carranstown plant is expected in early 2011, with full operation commencing in the second half of 2011 subject to determination of their waste licence review application.

Use of waste as a fuel

Table 42 shows that, in 2009, recovery operators reported that 150,826 t of non-hazardous waste was used as a fuel (other than in direct incineration) to generate energy in Ireland and abroad. There was an increased tonnage of refuse derived fuel combusted in 2009 compared to 2008.

Table 42: Non-hazardous waste used as a fuel, 2008 and 2009

Material Type	Total (t) 2008	*Of which packaging (t)*	Total (t) 2009	*Of which packaging (t)*
Wood	59,382	24,682	72,586	21,834
RDF/SRF	26,234	5,665	47,818	26,262
Edible oil and fats	2,166	0	4,018	0
Other non-hazardous wastes	792	0	26,405	0
Total	**88,574**	**30,347**	**150,826**	**48,096**

(Source: recovery organisations survey)

[124] http://www.epa.ie/downloads/pubs/waste/haz/name,30331,en.html.
[125] Further licence details at www.epa.ie.

10.6 Mechanical and biological treatment infrastructure

Collection and treatment routes for municipal waste streams are becoming increasingly diverse and complex (refer Figure 11 in Chapter 4 and Figure 15 below). Waste is now rarely transported directly from point of collection to landfill. Dry recyclable and biowaste bin contents are sent for specialist treatment (e.g. Material Recovery Facilities (MRF), composting, anaerobic digestion, etc.) and en route this can often involve bulking up and/or transfer at intermediate stations.

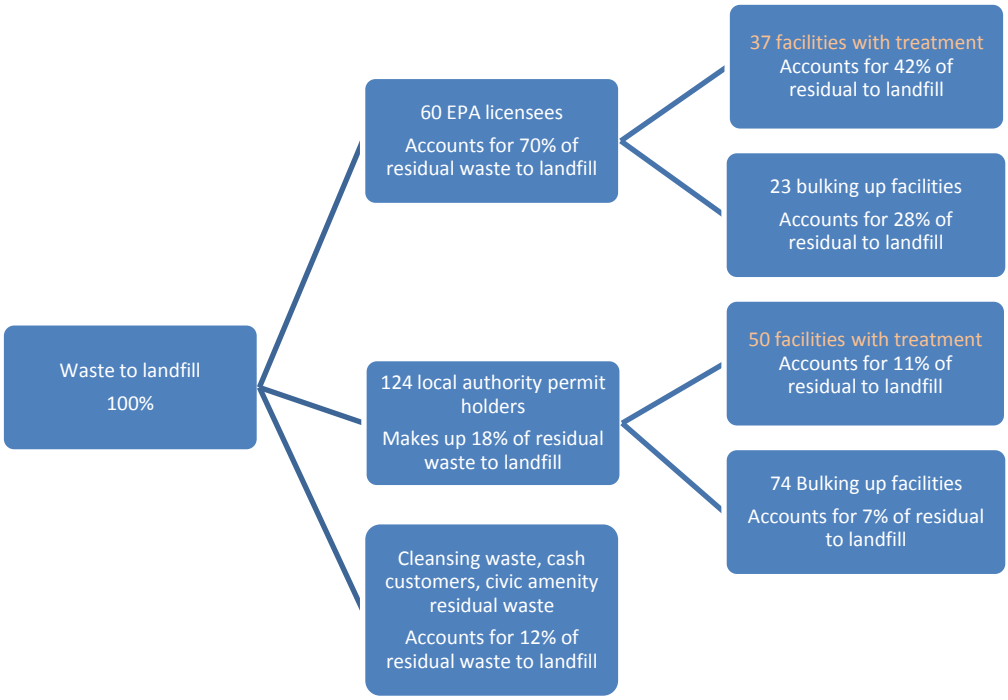

Figure 15: Residual municipal waste proportionate flow-path to landfill

The material collected in the residuals bin undergoes similar processes of transfer and bulking and in some cases mechanical and biological treatment. The regulation of these intermediate waste processes (between collection and final disposal/recovery) is undertaken by the EPA and the local authorities.

In 2009, the EPA undertook an assessment of municipal waste material flows to landfill (i.e. residual), the outcome of this assessment is presented in Figure 15. Of the 87 treatment facilities identified only two are reported as operating a form of integrated (on the same site) mechanical biological treatment (MBT). Small volumes of waste are processed through the full system which could be described as trial or experimental in nature. The 'B' (Biological) component of the treatment at these facilities did not achieve the EPA stability standard; accordingly the material is classified as disposal when consigned to landfill. In some limited cases material 'fines' from processing of residual municipal wastes (the mechanical step) are sent off site for biological treatment elsewhere, prior to landfill. Here too the EPA biodegradability standard has not been achieved on any consistent or satisfactory basis to allow the material to be consigned to landfill as recovery.

In 2009, four mechanical treatment facilities reported producing a refuse derived fuel (RDF) from residual municipal waste, with an additional one site reported as undergoing production trials.

The waste treatment surveys for 2009, allied to information held by the national composting representative organisation Cré, indicated that there were 22 facilities accepting municipal wastes for composting. Five of these were located at landfill sites (noted above); 3 were located at civic amenity facilities, and 15 were stand alone operations.

10.7 Civic amenity site and bring bank infrastructure

Table 43 presents the number of bring banks and civic amenity sites operational in each local authority area between 2005 and 2009. Bring banks are unmanned, fixed receptacles for the deposit of non-hazardous, dry recyclables such as glass, clothes, beverage cans. Civic amenity sites are manned, permanent facilities for the reception of municipal (mainly household) residual and recyclable waste, and in some cases hazardous waste.

The number of bring banks decreased from 1,989 in 2008 to 1,962 in 2009. The number of bring banks can fluctuate from year to year, through consolidation of sites, availability of alternative outlets, or removal of bring banks due to illegal dumping, public complaints or antisocial behaviour. The number of civic amenity sites increased by eleven to 107 in 2009.

Table 43: Bring banks and civic amenity sites, 2005–2009

	2005	2006	2007	2008	2009
Number of bring banks	1,921	1,919	1,960	1,989	1,962
Collected at bring banks (t)	*84,980*	*96,727*	*95,569*	*102,300*	*91,800*
Number of civic amenity sites	79	86	90	96	107
Collected at civic amenity sites (t)	*104,267*	*191,399*	*203,282*	*200,455*	*177,158*

(Source: local authority survey)

Table 44 lists the number of bring banks and civic amenity sites in operation in 2009 by local authority functional area. For more information on waste accepted at bring banks and civic amenity sites, refer to Appendices B and C.

Table 44: Bring banks and civic amenity sites in operation, 2009

Local authority	Bring banks	Civic amenity sites
Carlow	28	3
Cavan	31	2
Clare	54	5
Cork City and County	192	9
Donegal	63	7
Dublin City	125	2
Dun Laoghaire-Rathdown	48	3
Fingal	73	3
Galway County	88	6
Galway City	12	1
Kerry	100	8
Kildare	54	2
Kilkenny	65	1
Laois	44	2
Leitrim	38	2
Limerick County	48	4
Limerick City	18	1
Longford	53	2
Louth	48	2
Mayo	97	2
Meath	37	3
Monaghan	29	1
North Tipperary	39	3
Offaly	46	6
Roscommon	39	4
Sligo	50	3
South Dublin	70	2
South Tipperary	71	4
Waterford	45	3
Waterford City	19	1
Westmeath	48	2
Wexford	137	3
Wicklow	53	5
Total	**1,962**	**107**

(Source: local authority survey)

APPENDICES

APPENDIX A – INDICATORS

Indicator	2004	2005	2006	2007	2008	2009
Municipal waste						
Municipal waste managed (t)	2,703,603	2,779,097	3,100,310	3,174,565	3,103,820	2,824,977
Municipal waste managed/person (t)	0.67	0.67	0.73	0.73	0.70	0.63
Municipal waste generated (t)[126]	3,000,638	3,040,714	3,384,606	3,397,683	3,224,279	2,952,977
Municipal waste generated/person (t)[127]	0.74	0.74	0.80	0.78	0.73	0.66
Disposal of managed municipal waste to landfill (t)	1,818,536	1,833,330	1,980,618	2,014,797	1,938,712	1,723,705
Disposal rate for managed municipal waste	67%	66%	64%	64%	63%	61%
Recovery of municipal waste (t)	885,068	945,767	1,119,692	1,159,767	1,165,108	1,101,272
Recovery rate for municipal waste	33%	34%	36%	37%	38%	39%
Number landfills accepting municipal waste for disposal	34	32	29	29	31	28
Number of bring banks	1,824	1,921	1,919	1,960	1,989	1,962
Number of civic amenity sites	69	79	86	90	96	107
Household waste						
Household waste managed (t)	1,500,780	1,543,468	1,773,242	1,625,490	1,556,879	1,498,469
Household waste managed/person (t)	0.37	0.37	0.42	0.37	0.35	0.34
Household waste generated (t)	1,728,154	1,746,408	1,978,716	1,761,167	1,677,338	1,626,469
Household waste generated/person (t)	0.43	0.42	0.47	0.41	0.38	0.37
Disposal of household waste to landfill (t)	1,214,908	1,198,504	1,379,246	1,200,980	1,155,567	1,056,267
Residual household waste disposal/person (landfill) (t)	-	-	-	0.28	0.26	0.24
Disposal rate for household waste	81%	78%	78%	74%	74%	71%
Recovery of household waste (t)	285,872	344,964	393,995	424,510	401,312	442,202
Recovery rate for household waste	19%	22%	22%	26%	26%	30%
Commercial waste						
Commercial waste managed (t)	1,202,824	1,235,629	1,327,068	1,549,075	1,477,395	1,299,807
Commercial waste managed/person (t)	0.3	0.3	0.31	0.36	0.33	0.29
Disposal of commercial waste to landfill (t)	603,628	634,826	601,372	813,817	758,176	640,737
Disposal rate for commercial waste	50%	51%	45%	53%	51%	49%
Recovery of commercial waste (t)	599,196	600,803	725,697	735,257	719,219	659,070
Recovery rate for commercial waste	50%	49%	55%	48%	49%	51%
Packaging waste						
Best estimate of total quantity generated (t)	850,911	925,221	1,028,472	1,055,952	1,026,759	972,458
Packaging waste generated/person (t)	0.21	0.22	0.24	0.24	0.23	0.22
Best estimate of packaging waste recovered (t)	479,540	545,368	589,519	671,630	664,043	668,733
Packaging waste recovered/person (t)	0.12	0.13	0.14	0.15	0.15	0.15
National recovery rate	56%	59%	57%	64%	65%	70%

[126] Generated MSW includes estimated uncollected household waste of 128,000 t.
[127] Per person calculations based on CSO population estimate of 4,459,300 persons in 2009.

APPENDIX B – HOUSEHOLD WASTE

Local authority	Mixed/residual collection (black bins) (t)	Mixed dry recyclables collection (green bin) (t)	Organics collection (brown bins) (t)	Bring banks (t)	Civic amenity sites (t)	Household waste delivered directly to landfill face by householders (t)	Estimate of home composting (t)	Total collected and brought household waste (t)
Dublin City Council	101,537	30,693	19,342	13,721	4,763	0	4,129	**174,185**
Dun Laoghaire-Rathdown	44,297	18,741	0	2,754	14,724	0	1,194	**81,710**
Fingal County Council	49,346	17,835	16,955	4,647	8,899	0	1,003	**98,685**
South Dublin County Council	63,079	20,012	134	5,130	18,465	0	1,241	**108,061**
Kildare County Council	39,925	13,250	6,888	4,138	5,366	700	1,779	**72,046**
Meath County Council	39,819	9,294	139	1,925	5,100	0	1,295	**57,572**
Wicklow County Council	21,653	4,776	413	2,010	4,680	236	5,900	**39,668**
Dublin Metropolitan Area Sub-total	**359,656**	**114,601**	**43,871**	**34,325**	**61,997**	**936**	**16,540**	**631,927**
Cavan County Council	11,195	2,164	8	2,334	2,790	0	322	**18,813**
Louth County Council	22,322	6,063	2,514	2,061	10,687	3,002	83	**46,733**
Monaghan County Council	8,973	3,276	271	995	1,334	0	350	**15,200**
North East Region (rest) sub-total	**42,491**	**11,503**	**2,794**	**5,390**	**14,811**	**3,002**	**755**	**80,745**
Cork City and County Council	89,763	34,223	0	13,167	20,430	0	2,000	**159,582**
Cork Region sub-total	**89,763**	**34,223**	**0**	**13,167**	**20,430**	**0**	**2,000**	**159,582**
Galway County Council	27,050	11,260	761	4,129	3,340	0	1,900	**48,440**
Galway City Council	10,722	4,498	5,229	2,623	889	0	60	**24,021**
Leitrim County Council	3,967	1,429	0	759	491	170	560	**7,376**
Mayo County Council	24,953	6,688	0	3,022	5,557	0	1,480	**41,700**
Roscommon County Council	9,431	3,066	0	782	3,099	2,164	207	**18,749**
Sligo County Council	14,742	2,940	0	1,348	2,307	350	930	**22,617**
Connaught Region sub-total	**90,865**	**29,881**	**5,990**	**12,663**	**15,683**	**2,684**	**5,137**	**162,902**

Local authority	Mixed/residual collection (black bins) (t)	Mixed dry recyclables collection (green bin) (t)	Organics collection (brown bins) (t)	Bring banks (t)	Civic amenity sites (t)	Household waste delivered directly to landfill face by householders (t)	Estimate of home composting (t)	Total collected and brought household waste (t)
Clare County Council	13,967	6,149	112	1,447	11,295	0	1,021	**33,991**
Kerry County Council	19,006	5,945	405	3,479	11,664	3,111	1,441	**45,050**
Limerick County Council	17,981	6,667	122	1,602	4,082	2,778	1,040	**34,271**
Limerick City Council	15,459	4,599	81	912	929	0	330	**22,310**
Mid-West Region sub-total	**66,413**	**23,359**	**720**	**7,440**	**27,970**	**5,889**	**3,831**	**135,622**
Carlow County Council	12,170	1,911	625	1,259	2,570	3,916	310	**22,761**
Kilkenny County Council	12,333	4,275	0	2,003	5,206	4,460	1,131	**29,408**
South Tipp County Council	16,454	4,244	0	1,974	2,285	0	820	**25,777**
Waterford County Council	12,108	4,086	2,188	1,427	1,829	0	360	**21,998**
Waterford City Council	8,324	2,869	3,889	1,065	1,809	0	360	**18,315**
Wexford County Council	25,091	9,903	1,876	3,495	4,985	0	1,873	**47,223**
South East Region sub-total	**86,480**	**27,288**	**8,578**	**11,223**	**18,684**	**8,376**	**4,854**	**165,482**
Laois County Council	11,585	4,703	210	1,015	2,027	0	474	**20,014**
Offaly County Council	10,260	3,785	105	994	5,636	3,541	393	**24,713**
Longford County Council	9,145	3,154	0	486	1,521	0	437	**14,743**
North Tipp County Council	15,302	4,182	104	1,102	4,247	2,073	275	**27,285**
Westmeath County Council	17,223	3,754	76	1,421	2,294	1,994	937	**27,699**
Midlands Region Sub-total	**63,515**	**19,578**	**495**	**5,018**	**15,725**	**7,607**	**2,515**	**114,454**
Donegal County Council	17,533	5,891	0	2,574	1,858	137	1,100	**29,093**
Non-Regional Sub-total	**17,533**	**5,891**	**0**	**2,574**	**1,858**	**137**	**1,100**	**29,093**
Overall total	**816,715**	**266,324**	**62,447**	**91,800**	**177,158**	**28,631**	**36,733**	**1,479,807**[128]

[128] Note that a further 18,662 t household WEEE collected at retail premises.

APPENDIX C – WASTE TYPES COLLECTED AT BRING BANKS

Local authority area	Paper & card (t)	Glass (t)	Aluminium cans (t)	Steel cans (t)	Plastic (t)	Composite packaging (t)	Small batteries (t)	Other[129] (t)	Total (t)
Carlow	459	758	42	0	0	0	0.00	0	**1,259**
Cavan	124	1,158	68	5	974	5	0.00	0	**2,334**
Clare	0	1,236	40	58	113	0	0.00	0	**1,447**
Cork Region	1,334	11,371	45	208	209	0	0.00	0	**13,167**
Donegal	153	2,196	41	121	46	0	0.34	17	**2,574**
Dublin City	1,907	9,786	36	1	0	0	0.00	1,991	**13,721**
Dun Laoghaire-Rathdown	0	2,713	26	0	15	0	0.06	0	**2,754**
Fingal	0	4,626	19	0	0	0	2.21	0	**4,647**
Galway County	0	3,932	197	0	0	0	0.00	0	**4,129**
Galway City	0	2,568	0	0	0	0	0.00	55	**2,623**
Kerry	0	2,945	85	191	258	0	0.00	0	**3,479**
Kildare	0	4,065	73	0	0	0	0.00	0	**4,138**
Kilkenny	167	1,688	65	55	28	0	0.00	0	**2,003**
Laois	0	971	44	0	0	0	0.00	0	**1,015**
Leitrim	0	727	32	0	0	0	0.00	0	**759**
Limerick County	5	1,456	26	91	3	0	21.00	0	**1,602**
Limerick City	0	784	23	18	80	0	7.21	0	**912**
Longford	0	458	20	0	0	0	0.00	8	**486**
Louth	0	1,702	59	0	300	0	0.00	0	**2,061**
Mayo	0	2,926	96	0	0	0	0.00	0	**3,022**
Meath	0	1,902	23	0	0	0	0.00	0	**1,925**
Monaghan	0	964	31	0	0	0	0.00	0	**995**
North Tipperary	0	1,076	26	0	0	0	0.00	0	**1,102**
Offaly	0	955	28	11	0	0	0.00	0	**994**
Roscommon	0	737	45	0	0	0	0.00	0	**782**
Sligo	0	1,306	42	0	0	0	0.00	0	**1,348**
South Dublin	0	5,113	17	0	0	0	0.00	0	**5,130**
South Tipperary	76	1,827	65	6	0	0	0.00	0	**1,974**
Waterford County	0	1,427	0	0	0	0	0.00	0	**1,427**
Waterford City	0	1,025	40	0	0	0	0.00	0	**1,065**
Westmeath	0	1,395	26	0	0	0	0.00	0	**1,421**
Wexford	211	3,157	103	0	24	0	0.00	0	**3,495**
Wicklow	0	1,946	59	5	0	0	0.31	0	**2,010**
Total	**4,436**	**80,895**	**1,542**	**770**	**2,050**	**5**	**31.13**	**2,071**	**91,800**

[129] Other = wood, green waste (e.g. Christmas trees), flat glass, household hazardous waste, etc.

APPENDIX D – WASTE TYPES COLLECTED AT CIVIC AMENITY SITES

Local authority area	Mixed residual waste (t)	Organic waste (food & garden) (t)	Mixed dry recyclables (t)	Paper, card & magazines (t)	Glass (t)	Metals (t)	Plastic (t)	Composites (e.g. tetrapak) (t)	C&D (DIY) (t)	Wood[130] (t)	Batteries[131] (t)	Waste mineral oils & filters (t)	Waste cooking or veg. oils (t)	Paint & varnish (t)	WEEE[132] (t)	Bulky waste (t)	Household hazardous waste (t)	Other[133] (t)	Total (t)
Carlow	601	365	0	374	103	288	83	0	29	350	23.8	14.8	1.7	4.8	319	0	4.5	8.4	**2,570**
Cavan	43	550	0	667	218	290	182	6	108	340	24.0	9.1	0.0	0.0	353	0	0.0	0.0	**2,790**
Clare	4,962	677	0	1,030	1,307	1,284	256	24	70	947	116.1	25.8	1.0	10.2	585	0	0.0	0.0	**11,295**
Cork Region	6,636	1,916	469	2,464	1,262	1,425	357	3	1,018	1,841	82.5	53.4	14.1	82.6	2,800	0	1.5	4.3	**20,430**
Donegal	176	0	0	646	218	68	116	5	0	8	11.5	0.0	0.0	0.0	410	200	0.0	0.0	**1,858**
Dublin City	0	23	107	118	229	135	48	2	771	255	12.3	2.0	0.0	182.0	989	1,883	0.0	6.3	**4,763**
Dun Laoghaire-Rathdown	3,043	5,504	9	985	669	457	226	14	738	1,001	40.4	23.1	3.9	94.1	834	1,073	2.0	7.9	**14,724**
Fingal	0	1,185	0	559	771	404	128	10	1,132	1,196	51.0	18.3	5.6	162.0	1,491	1,746	2.4	38.0	**8,899**
Galway County	266	1,278	225	322	294	370	6	0	0	16	27.0	12.3	0.0	28.7	493	0	1.6	0.3	**3,340**
Galway City	0	0	0	0	16	0	0	0	0	0	17.2	0.0	3.0	0.0	853	0	0.0	0.0	**889**
Kerry	8,610	609	130	957	111	389	74	0	0	95	48.6	15.5	2.3	3.7	612	0	0.0	7.0	**11,664**
Kildare	3,512	329	0	410	121	366	1	0	28	84	17.0	3.9	0.0	0.0	465	0	21.2	7.8	**5,366**
Kilkenny	3,932	0	0	299	108	187	85	11	0	32	13.0	3.1	0.1	0.0	324	196	14.4	2.1	**5,206**
Laois	2	15	0	632	279	329	230	0	32	24	2.9	22.0	0.0	0.0	447	0	12.3	0.0	**2,027**
Leitrim	101	0	0	118	0	48	19	0	0	73	8.0	0.0	0.0	0.0	113	0	11.2	0.0	**491**
Limerick County	11	345	0	744	211	614	281	9	638	479	29.0	7.0	3.8	56.0	633	0	0.0	21.0	**4,082**
Limerick City	0	0	0	223	157	4	0	0	0	0	7.2	0.0	0.2	22.4	514	0	0.0	1.0	**929**
Longford	758	0	232	18	27	81	39	0	0	65	0.8	0.0	0.0	0.0	301	0	0.0	0.0	**1,521**
Louth	0	3,280	0	2,786	706	575	1,093	0	1,729	0	45.0	5.0	3.2	0.0	461	0	4.7	0.0	**10,687**
Mayo	2,515	0	0	884	309	316	101	12	44	625	71.8	15.7	5.8	23.3	612	0	0.1	22.0	**5,557**
Meath	32	1,105	958	768	426	423	170	23	146	403	33.5	104.0	21.0	23.0	457	0	2.2	5.4	**5,100**
Monaghan	289	136	0	409	75	72	52	0	101	0	10.3	19.3	0.8	0.8	165	0	0.0	4.6	**1,334**
North Tipperary	2,088	0	0	1,071	256	195	158	16	0	4	9.5	8.8	0.0	0.0	436	0	0.0	3.9	**4,247**
Offaly	3,051	276	0	597	192	326	197	31	20	510	2.8	16.2	2.1	11.4	378	18	0.0	7.6	**5,636**
Roscommon	649	0	23	925	266	291	142	0	0	260	40.2	7.2	0.0	27.7	468	0	0.0	0.0	**3,099**
Sligo	0	690	0	451	164	109	28	16	390	66	5.4	0.0	0.0	0.0	388	0	0.0	0.0	**2,307**
South Dublin	3,238	4,685	0	284	119	449	0	0	656	337	24.0	27.0	0.7	29.3	1,110	7,499	0.0	6.0	**18,464**
South Tipperary	925	0	319	32	9	44	0	0	146	325	9.0	3.8	0.1	5.5	431	15	1.5	18.3	**2,285**
Waterford County	489	0	276	0	12	63	116	0	149	118	0.0	2.4	0.5	0.0	408	195	0.0	0.0	**1,829**
Waterford City	160	160	0	34	1,078	71	0	0	0	3	3.8	2.8	1.6	5.9	289	0	0.0	0.0	**1,809**
Westmeath	0	551	0	504	134	202	75	0	0	280	25.4	6.8	0.0	2.7	513	0	0.2	0.0	**2,294**
Wexford	3,506	0	15	337	178	373	24	15	0	0	39.6	13.6	4.0	0.0	469	0	0.0	11.0	**4,985**
Wicklow	448	0	0	1,715	855	266	480	69	0	0	53.5	5.4	7.3	16.1	765	0	0.0	0.0	**4,680**
Total (t)	**50,043**	**23,679**	**2,763**	**21,363**	**10,880**	**10,514**	**4,767**	**266**	**7,945**	**9,737**	**906**	**448**	**83**	**792**	**19,884**	**12,825**	**80**	**183**	**177,158**

[130] 75% of which (in t) is home improvement/DIY source.
[131] 90% of which (in t) are lead acid.
[132] Compliance scheme data for household WEEE collected at civic amenity sites. Also a further 18,662 t household WEEE collected at retail premises.
[133] Other = aerosols, gas cylinders, tyres, CDs, DVDs & books, miscellaneous recyclables etc.

APPENDIX E – LANDFILLS IN OPERATION

	Local authority / private sector operator	Facility name	Waste licence reg no.	Total in 2008 (t)	Total in 2009 (t)	DISPOSAL						RECOVERY		
						Household waste (t)	Commercial waste[134] (t)	Industrial waste (t)	C & D waste (t)	Municipal sweepings & parks (t)	Other wastes (t)	C & D waste (t)	Organic waste[135] (t)	Other wastes (t)
1	Carlow County Council	Powerstown Landfill	W0025-03	46,202	32,983	17,953	970	1,009	0	1,728	0	9,660	1,663	0
2	Cavan County Council	Corranure Landfill	W0077-03	144,202	116,354	51,770	23,469	167	13,710	49	0	24,721	1,229	1,239
3	Clare County Council	Inagh (Ballyduff Beg) Landfill	W0109-02	46,626	36,394	13,507	10,106	1,276	0	756	0	70	477	10,202
4	Cork City Council	Kinsale Road Landfill	W0012-02	66,673	87,759	44,318	35,987	0	0	5,617	0	0	1,837	0
5	Cork County Council	Youghal Landfill	W0068-03	148,828	58,188	41,216	16,911	0	0	0	0	61	0	0
6	Cork County Council	Derryconnell Landfill	W0089-02	9,019	10,024	8,192	231	0	0	130	0	1,471	0	0
7	Donegal County Council	Ballynacarrick Landfill	W0024-04	30,332	35,373	15,238	7,041	986	75	1,195	0	10,838	0	0
8	Fingal County Council	Balleally Landfill	W0009-03	589,528	317,585	41,205	20,559	7,569	10,886	319	0	237,047	0	0
9	Galway City Council	Carrowbrowne Landfill	W0013-01	7,261	7,267	0	0	0	0	0	0	0	7,267	0
10	Kerry County Council	North Kerry Landfill	W0001-04	63,009	41,168	24,423	15,128	97	76	29	0	815	600	0
11	Kilkenny County Council	Dunmore Landfill	W0030-02	45,686	33,042	9,003	4,097	0	0	1,175	0	17,261	1,506	0

[134] Includes non-process industrial waste.
[135] Organic waste contains an element of C&D, e.g. shredded C&D wood, and industrial sourced shredded wood. 40,220 t of this is MSW, of which 21,950 t is commercial and 18,270 t is household.

	Local authority / private sector operator	Facility name	Waste licence reg no.	Total in 2008 (t)	Total in 2009 (t)	DISPOSAL						RECOVERY		
						Household waste (t)	Commercial waste[134] (t)	Industrial waste (t)	C & D waste (t)	Municipal sweepings & parks (t)	Other wastes (t)	C & D waste (t)	Organic waste[135] (t)	Other wastes (t)
12	Laois County Council	Kyletelesha Landfill	W0026-03	63,552	43,052	17,296	25,267	0	0	454	0	35	0	0
13	Limerick County Council	Gortadroma	W0017-04	67,213	108,259	90,184	12,924	41	0	693	0	805	0	3,612
14	Louth County Council	Whiteriver	W0060-03	133,940	112,749	26,601	20,426	2,623	0	4,014	0	59,085	0	0
15	Mayo County Council	Rathroeen Landfill	W0067-02	16,876	31,556	20,800	5,671	0	0	3,942	0	0	1,143	0
16	Monaghan County Council	Scotch Corner Landfill	W0020-02	40,376	46,376	22,510	15,553	0	93	668	0	2,787	4,765	0
17	North Tipperary County Council	Ballaghaveny Landfill	W0078-03	25,112	21,442	15,904	4,167	53	73	1,245	0	0	0	0
18	Offaly County Council	Derryclure Landfill	W0029-04	89,784	35,873	8,554	15,468	0	0	0	0	11,851	0	0
19	Roscommon County Council	Ballaghaderreen Landfill	W0059-03	32,988	45,834	23,780	5,857	161	0	58	0	15,436	389	153
20	South Dublin County Council	Arthurstown Landfill	W0004-04	359,297	214,770	214,560	0	0	0	0	0	210	0	0
21	South Tipperary County Council	Donohill Landfill	W0074-03	15,649	14,236	9,392	218	686	0	1,232	0	1,277	1,431	0
22	Westmeath County Council	Ballydonagh Landfill	W0028-03	54,271	56,194	20,480	25,737	0	0	786	0	9,191	0	0
23	Wexford County Council	Holmestown Landfill	W0191-02	13,952	28,728	23,485	4,233	0	0	852	0	0	158	0
24	Wicklow County Council	Rampere Landfill	W0066-03	51,722	60,788	25,805	25,427	17	0	670	0	8,869	0	0

	Local authority / private sector operator	Facility name	Waste licence reg no.	Total in 2008 (t)	Total in 2009 (t)	DISPOSAL						RECOVERY		
						Household waste (t)	Commercial waste[134] (t)	Industrial waste (t)	C & D waste (t)	Municipal sweepings & parks (t)	Other wastes (t)	C & D waste (t)	Organic waste[135] (t)	Other wastes (t)
25	Bord Na Móna	Clonbulloge Ash Repository	W0049-02	33,968	34,007	0	0	34,007	0	0	0	0	0	0
26	Bord Na Móna	Drehid Waste Management Facility	W0201-03	154,708	277,375	66,774	138,385	132	0	0	0	65,779	6,255	50
27	Greenstar Holdings Ltd.	Knockharley Landfill	W0146-02	180,965	199,822	101,791	69,350	2,016	2	69	0	21,172	5,422	0
28	Greenstar Holdings Ltd.	Connaught Regional Residual Landfill	W0178-02	112,225	104,563	55,155	41,768	1,731	0	984	0	522	4,403	0
29	Greenstar Holdings Ltd.	Ballynagran Landfill	W0165-02	144,386	175,112	46,371	89,088	2,072	1	36	0	26,286	11,258	0
30	KTK Landfill Ltd.	KTK Landfill Ltd.	W0081-03	349,514	143,710	0	6,699	11,868	0	0	0	124,201	942	0
31	Murphy Concrete Manufacturing Ltd.	Hollywood Landfill	W0129-02	225,996	42,206	0	0	11,196	31,010	0	0	0	0	0
32	Murphy Concrete Manufacturing Ltd.	Sarsfieldtown Landfill Gormanston	W0151-01	350,476	352,319	0	0	0	0	0	0	352,319	0	0
33	Neiphin Trading Ltd.[136]	Kerdiffstown	W0047-01	222,670	-	-	-	-	-	-	-	-	-	-
Total					**2,925,108**	1,056,267	640,737	77,707	55,926	26,701	0	1,001,769	50,745	15,256

- Recovered organic waste includes wood chip from C&D, Industrial and municipal sources

Total Disposal: 1,857,338 **Total Recovery:** 1,067,770

Landfills that accepted waste for disposal in 2008 but not in 2009:	Killurin Landfill, Co. Wexford (W0016-02); Derrinumera Landfill, Co. Mayo (W0021-01)

[136] No survey return submitted by operator.

APPENDIX F – BIODEGRADABLE WASTE CALCULATIONS

Table F-1: Collected household waste composition profile (% by weight)

Waste streams	Mixed residual waste (black bin)[137]	Mixed dry recyclables (green bin)	Mixed organics (brown bin)	Total	Biodegradability factor
% Total collected at kerbside (1,145,486 t)	**71.3%**	**23.2%**	**5.5%**	**100.0%**	-
BMW Content	61.6%[138]	72.9%	93.6%	66%	-
	Weight %	**Weight %**	**Weight %**	**Weight %**	**-**
Organic waste	24.0%	1.3%	28.5%	16.6%	1
Garden waste	6.5%	0.1%	50.8%	6.1%	1
Papers	12.5%	54.0%	9.8%	19.0%	1
Cardboards	3.6%	15.3%	0.5%	6.0%	1
Composites	1.0%	2.2%	0.1%	1.0%	0
Textiles	7.3%	1.1%	0.5%	5.6%	0.5
Nappies	8.4%	0.4%	0.8%	5.4%	0.5
Plastics	13.6%	15.5%	1.8%	12.4%	0
Glass	3.3%	2.3%	0.2%	8.5%	0
Metals	3.1%	4.0%	0.1%	3.7%	0
Wood	1.2%	0.3%	0.1%	1.9%	0.5
Hazardous waste	0.9%	0.5%	0.0%	0.9%	0
WEEE	0.3%	0.2%	0.0%	1.8%	0
Unclassified combustibles	1.4%	0.2%	0.7%	1.7%	0.5
Unclassified incombustibles	1.2%	0.2%	0.1%	1.6%	0
Fines smaller than 20mm	11.7%	2.4%	6.0%	7.8%	0.5
Total	**100%**	**100%**	**100%**	**100%**	-

(Source: EPA Municipal Waste Characterisation Report 2008 at www.epa.ie/downloads/pubs/waste/plans/name,11659,en.html)

[137] This represents an average or composite of the residual bin from either a 1-bin, 2-bin or 3-bin collection service.
[138] The residual bin from a 3-bin collection service has a BMW content of 47% (refer to EPA Waste Characterisation Report 2008).

Table F-2: Elements of household waste arisings for 2009 (incl. estimated uncollected waste)

Household waste arisings	Totals (t)
Mixed residual collection (black bins)	816,715
Separate kerbside collection of mixed dry recyclables (green bins)	266,324
Separate kerbside collection of food and garden waste (brown bins)	62,447
Household waste brought to bring banks	91,800
Household waste brought to civic amenity sites	177,158
Household waste delivered directly to landfill face by householders	28,630
Estimate of home composting	36,733
Estimate of uncollected household waste	128,000
Household WEEE collected at retail premises by compliance schemes	18,662
Total household waste (t)	1,626,469

Table F-2 details the various sources of household waste for 2009, including an estimate for uncollected waste (from unserviced or non-participating households – with allowance made for material brought to CA sites and direct to landfill). Refer to Appendices B, C & D for detail.

As recorded in Table 13 approximately 4% of the serviced household collection market operates on a single bin basis; 72% of the market operates a two-bin collection service and 24% of the market operates on a 3-bin basis. The EPA have published biodegradability factors for the different waste streams which are presented in Table F-6 (i.e. 1-bin, 2-bin or 3-bin; pre-treated, etc.). From this data Table F-3 can be constructed.

Table F-3: BMW content in residuals (black bin) bin for differentiated household collection services

Proportion of 816,715 t residual waste/black bin collected	Amount (t)	Biodegradability factor	BMW content in national collected household residual (black bin) service
1 Bin 4% of market	32,669	65%	21,235
2 Bin 72% of market	588,034	63%	370,462
3 Bin 24% of market	196,012	47%	92,126
Total	**816,715**	-	**483,823**

Table F-4 presents the estimated available biodegradable waste and landfilled biodegradable waste in the household waste streams brought to civic amenity sites and bring-banks. The biodegradability factors are based on EPA waste characterisation studies in the case of mixed dry recyclables and mixed residual waste (see Table F-1 above). For wood in landfill the factor reflects the advice from the InterGovernmental Panel on Climate Change; and for textiles the factors reflects the observations of the *International Review of Waste Management Policy in Ireland*. A conservative 10% factor is applied to the 'Other' category (experiential) to capture the biodegradable elements of some bulky wastes such as mattresses etc.

Table F-4: BMW content in waste brought to civic amenity and bring bank facilities

Waste stream	Brought to civic amenity sites (t)	Brought to bring banks (t)	Total brought (t)	Reject allowance %	Biodegradability factor %	Available BMW (t)	Disposed to landfill (t)	Gross BMW disposed to landfill (t)
Paper & card	21,363	4,436	25,799	10	100 (100% for reject)	25,799	No (Reject Yes)	2,589
Glass	10,880	80,895	91,775	1	0	0	N/A	0
Metals (including batteries)	11,420	2,343	13,763	0	0	0	N/A	0
Plastic	4,767	2,050	6,817	10	0	0	N/A	0
Mixed dry recyclables	2,763	0	2,763	10	72.9 (same for reject)	2,014	No (Reject Yes)	201
Wood	9,737	0	9,737	10	50	4,869	No	0
Mixed residual waste	50,043	0	50,043	N/A	65	32,528	Yes	32,528
Organic & green waste	23,679	0	23,679	6	100 (20% of reject assumed biodegradable)	22,542	No (Reject Yes)	285
Household hazardous waste	80	0	80	0	0	0	N/A	0
WEEE	19,884	0	19,884	0	0	0	N/A	0
Other[139]	22,542	2,076	24,618	N/A	10	2,462	Yes	2,462
Total	**177,158**	**91,800**	**268,958**		**-**	**90,214**	**-**	**38,065**

Note that allowances are made for source separated recyclables that get rejected at recycling stations and consigned to landfill. The reject percentage is based on observed waste characterisation results, and industry communications.

[139] Composites, oil, paints, bulky wastes, mattresses, household hazardous wastes, DIY waste, tyres, bric-a-brac etc.

Table F-5 Composition and biodegradability factors for commercial wastes 2009

Waste streams	Mixed residual Waste (black bin)	Mixed dry recyclables (green bin)	Total	Biodegradability factor
BMW content	75.20%	85.10%	80.00%	-
	Weight %	**Weight %**	**Weight %**	**-**
Organic waste	42.20%	11.80%	27.40%	1
Garden waste	0.20%	0.00%	0.10%	1
Papers	25.50%	24.20%	24.80%	1
Cardboards	4.00%	48.60%	25.80%	1
Composites	3.40%	0.70%	2.10%	0
Textiles	4.90%	0.60%	2.80%	0.5
Nappies	0.00%	0.00%	0.00%	0.5
Plastics	10.80%	5.30%	8.10%	0
Glass	1.70%	6.80%	4.20%	0
Metals	2.10%	0.90%	1.50%	0
Wood	0.40%	0.00%	0.20%	0.5
Hazardous waste	3.00%	0.90%	1.90%	0
WEEE	0.20%	0.00%	0.10%	0
Unclassified combustibles	0.40%	0.10%	0.30%	0.5
Unclassified incombustibles	0.20%	0.00%	0.10%	0
Fines smaller than 20mm	1.00%	0.10%	0.60%	0.5
Total	**100%**	**100%**	**100%**	-

(Source: EPA Municipal Waste Characterisation Report 2008, available at www.epa.ie/downloads/pubs/waste/plans/name,11659,en.html).

Table F-6 EPA approved factors to calculate the BMW content of municipal waste streams

Municipal waste stream	BMW factor
Untreated 1-bin household waste [Note 1]	0.65
2-bin residual household waste	0.63
3-bin residual household waste	0.47
Untreated 1-bin commercial waste [Note 1]	0.77
2-bin residual commercial waste	0.75
3-bin residual commercial waste	0.68
Untreated MSW skip waste [Note 1]	0.33
Bulky waste from sorting of MSW skips	0.50
Oversize residues from MSW skips	0.44
Fines residues from MSW skips	0.42
Oversize residues from MSW bin collections (“wet waste”)	0.41
Fines residues from MSW bin collections (“wet waste”)	0.95
Residues from source separated recyclable waste (“clean MRF”)	0.47
Biostabilised residual waste	0
Untreated cleansing waste (fly-tipping, street bins, road sweepings etc.) [Note 1]	0.65
Residual MSW from civic amenity facility	0.63
Ash residue from MSW incineration	0

Note 1: Only waste that has been subject to treatment can be accepted for disposal at a landfill facility.
(See *EPA Approved Factors to Calculate the BMW Content of Municipal Waste Streams*, Version 1.0, 21 June 2010. http://www.epa.ie/downloads/advice/waste/municipalwaste/).

APPENDIX G – RECOVERY AND DISPOSAL OPERATIONS

Table G-1 Disposal operations as per Annex II A of Directive (2006/12/EC) on waste

Code	Disposal operations
D1	Deposit into or onto land (e.g. landfill, etc.)
D2	Land Treatment (e.g. biodegradation of liquid or sludgy discards in soils etc.)
D3	Deep injection (e.g. injection of pumpable discards into wells, salt domes or naturally occurring repositories etc.)
D4	Surface impoundment (e.g. placement of liquid or sludgy discards into pits, ponds or lagoons etc.)
D5	Specially engineered landfill (e.g. placement into lined discrete cells which are capped and isolated from one another and the environment etc.)
D6	Release into a water body except seas / oceans
D7	Release into seas/oceans including sea-bed insertion
D8	Biological treatment not specified elsewhere in this Annex which results in final compounds or mixtures which are discarded by means of any of the operations numbered D1 to D7 and D9 to D12
D9	Physico chemical treatment not specified elsewhere in this Annex which results in final compounds or mixtures which are discarded by means of any of the operations numbered D1 to D8 and D10 to D12 (e.g. evaporation, drying, calcination etc.)
D10	Incineration on land
D11	Incineration at sea
D12	Permanent storage (e.g. emplacement of containers in a mine, etc.)
D13	Blending or mixing prior to submission to any of the operations numbered D1 to D12
D14	Repackaging prior to submission to any of the operations numbered D1 to D13
D15	Storage pending any of the operations numbered D1 to D14 (excluding temporary storage, pending collection, on the site where it is produced)

Table G-2 Recovery operations as per Annex II B of Directive (2006/12/EC) on waste

Code	Recovery operations
R1	Use principally as a fuel or other means to generate energy
R2	Solvent reclamation/regeneration
R3	Recycling/reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes)
R4	Recycling / reclamation of metals and metal compounds
R5	Recycling / reclamation of other inorganic materials
R6	Regeneration of acids or bases
R7	Recovery of components used for pollution abatement
R8	Recovery of components from catalysts
R9	Oil re-refining or other reuses of oil
R10	Land treatment resulting in benefit to agriculture or ecological improvement
R11	Use of wastes obtained from any of the operations numbered R1 to R10
R12	Exchange of wastes for submission to any of the operations numbered R1 to R11
R13	Storage of wastes pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where it is produced)