

Chapter 6

Waste



Waste Management

The Current Situation

Improvements in waste management have been achieved, but there remain issues to address.

Diverse societal and economic wastes are generated in Ireland: household and similar waste (commonly called “municipal waste”), industrial process waste (including extractive waste), radioactive waste, animal by-products, explosive and pyrotechnic waste, contaminated land¹ and dredging material.²

Ireland’s waste management practices, infrastructure and regulation have matured significantly since the Waste Management Act (1996) was enacted. This change has been driven by EU and national legislation, national policy and economic initiatives. Since 2012, there has been a clear government policy focus on waste as a resource and virtual elimination of landfilling. Waste management planning and waste enforcement structures have recently been consolidated and strengthened. The current and future focus is on waste prevention, reuse, maximising recycling and using waste as a fuel in replacement of fossil fuels: all elements of the circular economy strategy to boost competitiveness, foster sustainable economic growth and generate new jobs.

The waste sector is now almost exclusively privatised (although local authorities manage a significant civic amenity and bring bank network, as well as some landfills). The private sector has invested significantly in infrastructure that has increased the sophistication of

waste processing and treatment and brought innovation, but privatisation has also brought some challenges. A number of operators have gone into receivership or liquidation, and securing financial provisions for environmental liabilities at waste facilities is of critical importance to ensure that the State is not left with remediation costs.

From an environmental performance perspective, the waste sector is responsible for a high number of odour nuisance complaints, particularly relating to non-hazardous waste transfer and landfill activities, and there were six fires at waste facilities in 2014. Societal littering and fly-tipping is still a problem in urban and rural areas, indicating that a section of society has poor citizenship values.

The most significant change in waste management since the last State of the Environment report in 2012 is that more residual waste is now recovered (i.e. used as a fuel) than disposed to landfill. There are six active landfills for the disposal of municipal waste, compared with 18 in 2012. Segregation and separate collection of food waste from households has been legislated for since 2013 and municipal waste recycling at composting and anaerobic digestion facilities has increased as a result. Ireland is currently heavily reliant on export markets for the treatment of residual and recyclable wastes. Proactive planning for adequate future treatment capacity in the State (and abroad where necessary) is essential to ensure that there are no negative environmental impacts from increased waste generation.

Preliminary data for 2014 (EPA, personal communication) indicate increases in municipal and construction and demolition waste generation since 2012, most likely as a result of economic growth.

¹ See Chapter 7.

² See Chapter 5.



Figure 6.1 Performance Targets under Waste Management Plans, 2015-2021 (Source: WMP Regions)

Waste Policy and Planning

Future objective is a circular economy.

The Department of the Environment, Community and Local Government (DECLG) has published *A Resource Opportunity – Waste Management Policy in Ireland*, which is the current government waste policy (DECLG, 2012a). Radioactive waste, which is subject to separate legislation, has its own policy (DECLG, 2010).

EU legislation, EU action programmes and EU roadmaps continue to be primary drivers of change in relation to waste management practices in Ireland. The waste legislative proposals under the European Commission's December 2015 Circular Economy Package³ look to set ambitious targets for recycling of packaging and municipal waste, and reduction in municipal waste landfilled.

There are three waste management planning regions (reduced from 10 since 2013): Connacht-Ulster, Eastern-Midlands and Southern. The 2015-2021 Waste Management Plans analyse the current situation and provide information on waste infrastructure. The plans set three performance targets (Figure 6.1) and eight strategic objectives for key policy areas with linked actions and roles and responsibilities.

Waste Regulation

Dealing with odour nuisance, fire risk and securing financial provision for environmental liabilities are key priorities for the Environmental Protection Agency.

The EPA, the National TransFrontier Shipments Office (NTFSO), the National Waste Collection Permit Office (NWCPO) and local authorities are responsible for regulation of the waste industry (i.e. storage, transit and treatment), and approximately 4,500 waste authorisations are in place. The authorisation type (licence, permit or certificate of registration) depends on the class of activity and capacity

(EPA, 2015a). The NWCPO maintain national registers of all waste collection and facility authorisations.

Since 2015, three Waste Enforcement Regional Lead Authorities (WERLAs) have been responsible for co-ordinating local authority enforcement within their region, while local authority personnel remain the first responders to investigate breaches of waste legislation.

The waste sector, particularly non-hazardous waste facilities and landfills, continues to be the source of a high number of odour complaints (92% of 539 complaints received in 2014 related to odour). There were six fires at EPA-licensed waste facilities in 2014, and more stringent conditions relating to waste storage and fire risk assessment have been attached to licences to mitigate risk. Eight shipments of waste were returned from abroad in 2014 and, although this represented a very small percentage of overall waste exports, the trend needs to be reversed. *EPA Licensed Sites – Report on Waste Enforcement 2014* (EPA, 2015a) summarises enforcement activities at 169 waste sites licensed by the EPA. In 2014, apart from complaints, the EPA carried out 270 inspections, handled 630 incidents and opened 64 compliance investigations to tackle areas of non-



³ www.ec.europa.eu/environment/circular-economy/index_en.htm

compliance. Strategic enforcement priorities for the EPA in the waste sector are:

- dealing with, and minimising the risk of fire
- introducing effective measures to minimise odour nuisance
- securing financial provision for environmental liabilities at waste facilities
- ensuring waste exports comply with the Waste Shipments Regulation
- implementing the reorganisation of local authority enforcement.

Local authorities prepare annual waste enforcement work programmes and, in 2014, they reported carrying out approximately 64,000 inspections and initiating over 450 prosecutions (EPA, 2015a).

Waste Targets and Prevention

Ireland is meeting current waste targets but some future targets are at risk.

A number of EU directives set targets for recovery of waste and its diversion from landfill. Ireland has met all statutory targets, although some future targets are at risk (Table 6.1), particularly for separate collection of portable batteries and recycling/recovery of end-of-life vehicles.

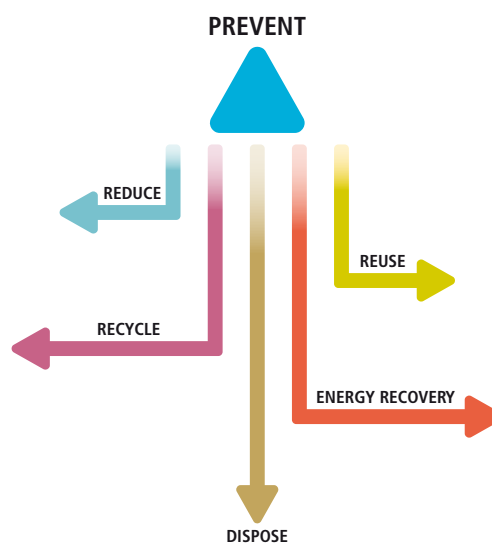
The Commission's Circular Economy Package is proposing ambitious future targets for 2025 and beyond for municipal waste recycling, municipal waste disposal to landfill and packaging waste recycling. These proposals are currently under negotiation.

Waste Prevention

Ireland's National Waste Prevention Programme is well established.

Waste prevention is higher on the waste hierarchy, and is therefore preferred to recovery or disposal (see Figure 6.2).

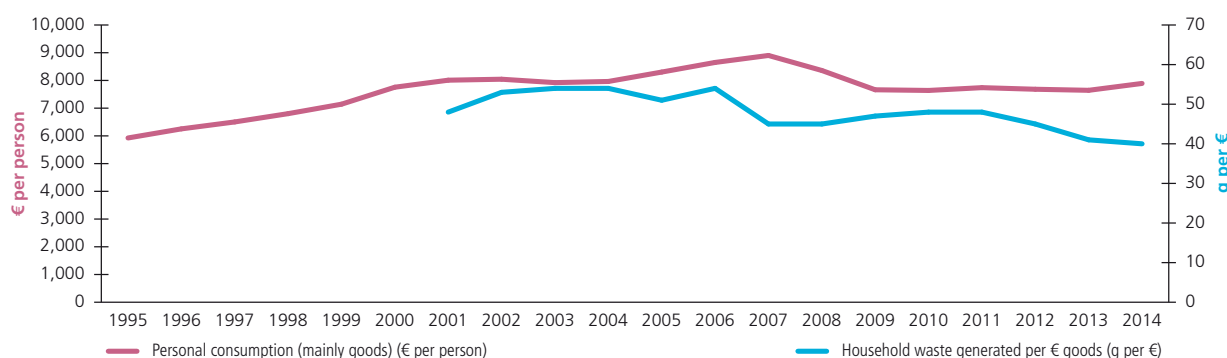
Figure 6.2 Waste Hierarchy (Source: EPA)



Ireland's National Waste Prevention Programme (NWPP) was established in 2004 and is led by the EPA. Businesses, households and the public sector are given support and guidance to be more resource efficient, not only in waste prevention but also in the reduction of energy and water consumption.⁵ Some examples of NWPP initiatives are Stop Food Waste, LAPN (Local Authority Prevention Network

Table 6.1 Progress Towards EU Recovery and Recycling Targets (Source: EPA, various)⁴

Directive	Progress to targets	Traffic light Indicator
Packaging and Packaging Waste Directive (1994/62/EC)	All targets met	●
Landfill Directive (1999/31/EC)	All targets met (preliminary data for 2016 target)	●
End-of-Life Vehicles (ELV) Directive (2000/53/EC)	2015 recycling/reuse targets at risk	●
Waste Electrical & Electronic Equipment (WEEE) Directive (2002/96/EC)	All targets met	●
WEEE Directive recast (2012/19/EU)	2016 targets at risk	●
Batteries and Accumulators Directive (2006/66/EC)	2016 portable battery collection target at risk	●
	Recycling efficiency targets met	●
Waste Framework Directive (2008/98/EC)	2020 targets currently on track	●

Figure 6.3 Waste Intensity of Goods Consumed by Households, 2001-2014 (Source: EPA, CSO)

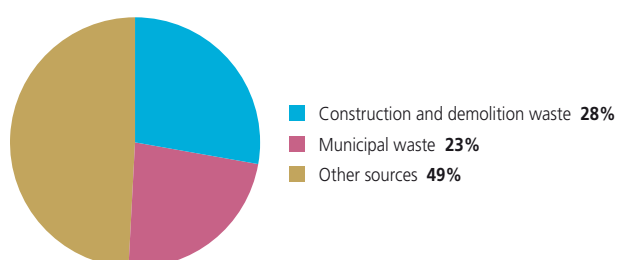
projects), Green Business, Green Hospitality and Green Healthcare. The latest NWPP plan is *Towards a Resource Efficient Ireland: A National Strategy to 2020* (EPA, 2014a). There is also a strong focus on waste prevention in the current regional Waste Management Plans.

To obtain an indicator for household waste prevention, household waste generated per person was divided by the goods-related component of the Central Statistics Office's personal consumption of goods and services indicator (goods include food, drink, transport, household equipment). This gives estimates for household waste generated per euro spent on goods and is called "waste intensity". There is some evidence of a general decline in waste intensity of goods between 2004 and 2014 (see Figure 6.3), which may be due to waste prevention efforts.

Waste Generation

Industrial waste accounts for 80% of national waste generation.

National waste generation data are compiled every 2 years as required under the Waste Statistics Regulation.⁶ Preliminary data indicate that 11.91 Mt of waste was generated in 2014.⁷ Of this total, 23% (2.73 Mt) was generated by municipal sources, 28% (3.31 Mt) by construction and demolition sources and 49% (5.87 Mt) by other sources (e.g. industry, agriculture) (see Figure 6.4).

Figure 6.4 Waste Generation in 2014, Percentage by Source (Source: EPA, 2016)

Extended Producer Responsibility

The national review of extended producer responsibility will lead to an expansion in the schemes in place.

Four waste streams are subject to Extended Producer Responsibility (EPR) under EU legislation: packaging, end-of-life vehicles, batteries and accumulators, and WEEE. In Ireland farm plastics and tyres are also subject to EPR under national legislation. Under EPR, producers⁸ have obligations regarding the environmental impact of their products from design to end of life. A review of the EPR models in Ireland by DECLG recommended changes to the ELV and tyre systems (DECLG, 2014). DECLG is currently progressing the review recommendations through stakeholder working groups.

Tyres/Waste Tyres

The management of waste tyres has been subject to national regulation since 2007. The existing scheme is mainly to track tyres/waste tyres, but a review of the scheme estimated that 24–51% of waste tyres were unaccounted for (DECLG, 2014). The DECLG has therefore established a new EPR for the sector, which will place much greater responsibility on producers and importers, and include financing of the scheme. It is anticipated that the revised legislation will be in place by the end of 2016.



⁶ Radioactive waste is excluded from the scope of this reporting obligation.

⁷ Final 2014 data will be available later in 2016.

⁸ The definition of producer varies for different EPRs, but essentially covers manufacturers and importers of products.



Waste Management and Infrastructure

The most significant change in residual waste treatment since 2012 has been the shift from disposal to landfill, to energy recovery.

While the collection and treatment of waste is essentially privatised in Ireland,⁹ local authorities have a key role in the provision and management of civic amenity and bring bank infrastructure. Local authorities are responsible for the aftercare of a significant number of closed and historic landfill sites.

The most significant change in residual waste treatment since 2012 has been the shift from disposal to landfill to energy recovery, with six active landfills in 2016, in comparison with 18 in 2012. One operational municipal waste incinerator has opened since 2012, with a second under construction and due to open in 2017.

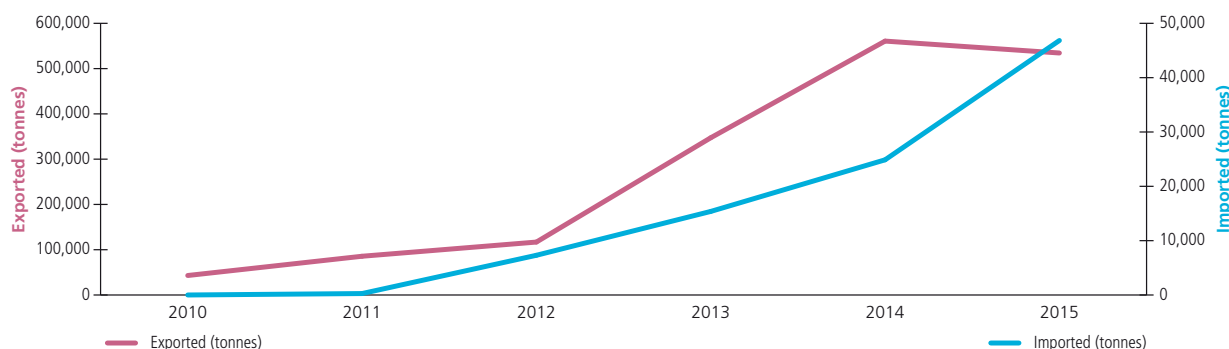
Three cement kilns are accepting solid recovered fuel (SRF) for co-incineration as an alternative to fossil fuels. Along with this growth in capacity in the State, there has been

a significant increase in the export of residual waste for use as a fuel, peaking in 2014 (Figure 6.5). Note that the import of solid recovered fuel for use as a fuel at cement kilns has also been increasing since 2011 (classified as a thermal waste recovery activity).

Although energy recovery is preferable to disposal on the waste hierarchy, there are challenges in the processing and storage of these wastes, manifested in odour complaints and increased number of fires (EPA, 2015a). There is also the risk that, if energy recovery replaces disposal as the preferred option for treatment of residual waste, opportunities for maximising extraction of recyclables from residual waste will not be fully exploited. The export of waste is a lost resource for the State, and there is a risk that, should the capacity of the export markets decrease at short notice, the infrastructure capacity in the State (landfill disposal and waste to energy recovery) will not be adequate to cope with increased demand.

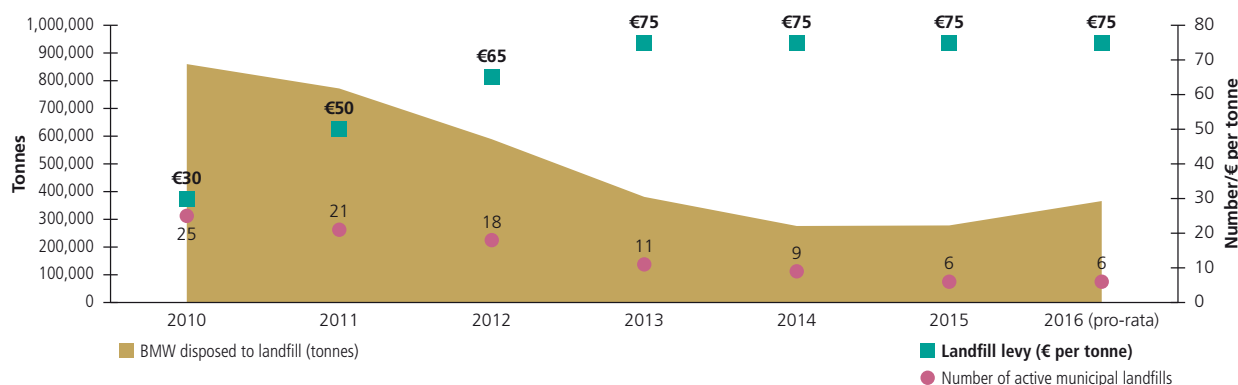
In early 2016, built landfill capacity was identified as critically low; additional capacity was authorised to prevent environmental impacts, such as stockpiling of wastes or illegal activity. Figure 6.6 shows an increase in tonnage of

Figure 6.5 Residual Waste Exported and Imported for Use as a Fuel, 2010-2015 (Source: NTFSO)



⁹ Kilkenny Borough Council is the only local authority still in the household waste collection market.

Figure 6.6 BMW Disposed to Landfill (tonnes), Landfill Levy (€ per tonne) and Number of Active Landfills 2010-2016¹⁰ (Source: EPA)



biodegradable municipal waste (BMW) disposed to landfill in 2015 and 2016 (in the same time period the export for residual waste for recovery decreased). It would be a retrograde step if the quantity of municipal waste disposed to landfill were to start to increase again, but with additional waste to energy capacity coming on-stream in 2017, it is hoped that the 2015-2016 trend will be short term, the result, perhaps, of a lack of export markets, or cost driven. While preliminary data indicate that the July 2016 Landfill Directive target for BMW disposal to landfill has been met, there is a risk that increased generation of municipal waste, or lack of waste to energy capacity, will increase the BMW disposal tonnage in future.

Many industries treat the waste they generate on-site, under licence issued by the EPA. Types of activity are incineration (e.g. waste solvents) and landfilling (mining/mineral waste landfills).

Segregated metal, glass, plastic, paper and cardboard wastes are in the main exported for recycling owing to a lack of national infrastructure. The regional Waste Management Plans reported an overcapacity for pretreatment activities (storage, sorting, bulking, transfer of waste). Table 6.2 presents information on key waste infrastructure capacity.

Table 6.2 Waste Infrastructure Capacities in Ireland (Source: EPA)

Landfill	Built municipal waste landfill capacity	910,000 tonnes built capacity at end of 2014
	Hazardous waste landfill	Zero
Incineration	Municipal waste to energy incineration	230,000 tonnes per annum active 600,000 tonnes per annum under construction
	Co-incineration of solid recovered fuel at cement kilns	343,000 tonnes per annum
Biological treatment	Composting and anaerobic digestion	Approx. 540,000 tonnes per annum (65,000 tonnes of which is anaerobic digestion)
Commercial hazardous waste treatment		Approx. 380,000 tonnes*
Public amenity facilities**	Civic amenity sites	130 (94 public sector, 36 private sector)
	Bring banks	1,787 (1,772 public sector, 15 private sector)
	Pay-to-use compactors	Approx. 50 (private sector)

*Physical and chemical treatment. Not including incineration and co-incineration plants which are authorised to accept certain hazardous materials for treatment.

**2014 data

¹⁰ 2016 pro-rata based on Q1 and Q2 2016 data.

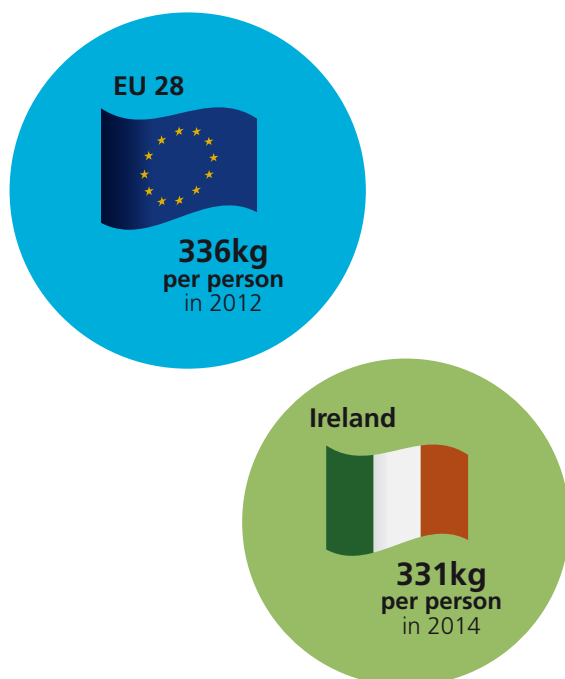
Municipal Waste Management

Municipal waste generation is increasing.

Municipal waste in Ireland is made up of household waste as well as commercial and other waste that, because of its nature or composition, is similar to household waste. Municipal waste generation is a good indicator of the consumption behaviours within society. The amount of municipal waste generated in Ireland in 2014 is estimated at 2.73 Mt (EPA, unpublished preliminary data), an increase of 6% since 2012.

Household waste is a core component of municipal waste. Preliminary data indicate that 1.52 Mt of household waste was generated in 2014 (331kg per person), which is similar compared to the EU-28 average (Figure 6.7). Most household waste is collected at the kerbside. Of households on a kerbside service in 2014, 97% received a two-bin service (residual and dry recyclables bin) and 43% were on a three-bin service (residual, dry recyclables and organics).

Figure 6.7 Household Waste Generated Per Capita in Ireland Compared with the EU Average
(Source: Eurostat, EPA)



Food Waste

One of the UN Sustainable Development Goals (Target 12.3) is to “halve per capita global food waste at the retail and consumer level, and reduce food losses along production and supply chains by 2030”. EU-funded research estimated that 87.6 Mt of food waste was generated across the EU in 2012 (FUSIONS, 2016). In Ireland, it is estimated that 509,900 tonnes of food waste (251,000 tonnes household plus 258,900 tonnes food services) is generated per annum in Ireland, and that food waste costs each Irish household €700 per year. Ireland’s Stop Food Waste campaign has been to the forefront of food waste prevention since 2009 and has been promoting behavioural changes through provision of information, training, local champions and peer example. National food reuse schemes operated by social enterprises such as Bia Food Initiative¹¹ and by Foodcloud,¹² and supported by food retailers and the catering industry, are EU exemplars.

By July 2016, waste collectors are obliged to offer all households situated in population agglomerations of more than 500 persons a separate food waste collection service. Although the number of households with a separate organic bin service has been increasing (43% of those on a collection service in 2014), householders are still placing food waste into the residual bin, which is a missed opportunity for recycling of food waste (CSO, 2016).



¹¹ www.biafi.ie

¹² www.food.cloud



Litter and Fly-tipping

Litter and fly-tipping is still a significant issue in Ireland.

The presence of litter and fly-tipped waste in the environment is one of the most visible and undesirable aspects of waste generation. Local authorities are responsible for its management and for enforcement.

The best estimate for 2014 is that 70,000 tonnes of waste from litter and street bins and from street cleansing, fly-tipped and community clean-up was collected for management. This is a considerable amount of waste, which potentially includes recyclable packaging waste and WEEE. The sociological reasons for littering are complex, but in the main stem from cost avoidance and poorly developed citizenship values. The threat of enforcement and the level of economic sanctions are clearly insufficient to deter the public.

The National Litter Pollution Monitoring System's most recent report (DECLG, 2015b) indicates that the proportion of areas deemed to be completely unpolluted was 12.3%, the highest level achieved since monitoring began, while 0.3% of areas were deemed to be grossly polluted. The main cause of litter pollution is passing pedestrians (41%). The main constituent elements of litter pollution are cigarette-related (55%), chewing gum (15%) and packaging (12%).

Some national anti-litter initiatives, which are examples of good citizenship, include:

- National Spring Clean run by An Taisce¹³
- SuperValu Tidy Towns competition¹⁴
- Irish Business Against Litter (IBAL) National Litter League.¹⁵

¹³ www.nationalspringclean.org

¹⁴ www.tidytowns.ie

¹⁵ www.ibal.ie

See it? Say it!

The EPA's smartphone app *See it? Say it!* helps people to report environmental pollution such as fly-tipping, littering and backyard burning.



This app complements the 24-hour nationwide environmental complaints phone line (1850 365 121). The complaints are ultimately delivered to the FixYourStreet.ie website (www.fixyourstreet.ie), which is monitored continuously by all local authorities. Local authorities receive in the region of 50,000 to 60,000 complaints annually in relation to environmental issues, of which approximately 68% are related to litter and fly-tipping. In many cases the litter includes material that can be recycled for free (e.g. WEEE, batteries). The app can be downloaded by visiting goo.gl/gOJMa (iPhone App) or goo.gl/V7eNYe (Android App).



Construction and Demolition Waste

Quantity of construction and demolition waste generated is a good indicator of economic growth.

The quantity of construction and demolition (C&D) waste managed is indicative of economic activity. The bulk of C&D waste is made up of uncontaminated soil and stones, with the remainder segregated wastes such as rubble, concrete, bricks, glass, plastic, wood, metals and mixed C&D waste. At the peak of the boom, approximately 17.8 Mt of C&D waste was collected for treatment. This dropped to 3 Mt mid-recession. Preliminary data indicate that 3.31 Mt of C&D waste was generated in 2014. With a government policy focus on the provision of social housing, major road infrastructural projects and the new children's hospital, C&D waste generated will increase again in the coming years. We need to ensure that C&D waste is prevented where possible, and otherwise managed properly, and that there is adequate treatment capacity to cope with renewed activity in the sector.

Management of Animal By-products

Animal by-products are regulated because of the risk they pose to human and animal health.

Animal by-products (ABPs) are defined as “entire bodies or parts of animals, products of animal origin or other products obtained from animals that are not intended for human consumption”. ABPs can present a risk to human and animal health and their use or disposal is covered by EU legislation.

Approximately 500,000 tonnes of raw ABPs is produced in Ireland each year and is mainly rendered to produce meat-and-bone-meal (MBM) and tallow. Other ABPs that do not spring directly from the meat industry, such as former foodstuffs, are more commonly used as feedstock for composting (DAFM, 2015).

In 2014, renderers accepted 226,000 tonnes of Category 1 material (high risk) and 250,000 tonnes of Category 3 (low risk) material. Processing of Category 1 material produced 61,000 tonnes of MBM and 27,000 tonnes of biofuel. Processing of Category 3 material yielded 70,000 tonnes of meal for pet food and 33,000 tonnes of tallow used for animal feed and industrial uses (Federation of Irish Renderers, 2016).

Hazardous Waste Management

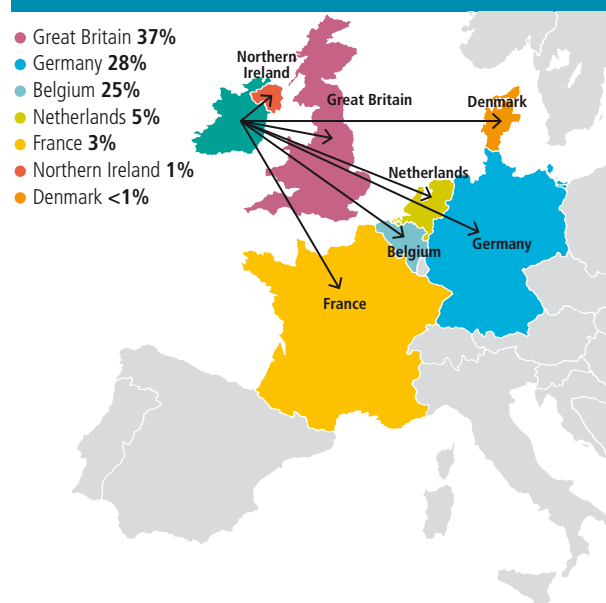
Prevention comes first but Ireland is dependent on exporting for treatment.

The current National Hazardous Waste Management Plan (NHWMP) for 2014-2020 (EPA, 2014b) sets out the priorities to improve the management of hazardous waste, including hazardous waste prevention, maximise the collection of hazardous waste, strive for self-sufficiency in hazardous waste management and minimise the environmental, health, social and economic impacts of hazardous waste generation and management.



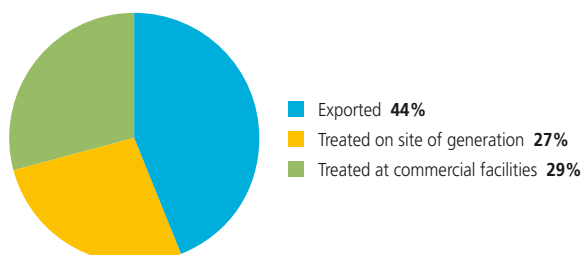
There is no commercial hazardous waste landfill in the State, and there are limited hazardous waste treatment operations (these are mainly used for oil recovery, healthcare waste treatment and solvent reclamation), meaning that Ireland is dependent on export for treatment of many hazardous waste streams. The NHWMP identifies three strategic needs if additional hazardous waste is to be treated in Ireland: (1) expansion of physico-chemical treatment, (2) addressing the deficit in thermal treatment capacity, and (3) securing long-term disposal arrangements for hazardous waste streams not suitable for thermal treatment or recovery. Ireland would be vulnerable in the event of a crisis such as an infectious disease outbreak. Figure 6.8 shows the destination of exported hazardous waste in 2014 (EPA, 2016a). The majority of waste exports were to the UK, Germany and Belgium.

Figure 6.8 Destination of Exported Hazardous Waste, 2014 (Source: EPA, NTFSO)



The amount of hazardous waste generated, and its treatment pathways, have remained relatively unchanged in recent years (Figure 6.9). An example of waste treated on site of generation is waste solvent incinerated at industrial facilities.

Figure 6.9 Treatment of Hazardous Waste, 2014 (Source: EPA)



Farm Hazardous Waste Collection Scheme

The EPA is leading a pilot farm hazardous waste collection programme, which represents the largest ever voluntary bulk removal of highly toxic pollutants out of the Irish environment in a concentrated period of time. Between 2013 and 2015, 598 tonnes of waste was collected at 26 centres (400 tonnes deemed hazardous). Types of waste collected included waste oils, batteries, veterinary medicines and sharps, pesticides and WEEE. Over 1 tonne of the pesticides was classified as persistent organic pollutants (POPs). Many of the POPs collected have been banned for considerable time and included DDT, lindane (gamma-HCH), dieldrin and endosulfan. These waste pesticides not only pose risks to human health and the environment, they threaten the very considerable efforts and investments made in recent years by farmers to enact environmental protection measures should accidental contamination occur. In the long term, the establishment of a national farm hazardous waste collection scheme would support the green and smart ambitions of the farming industry as well as enabling farmers to meet their legislative obligations.

Similar schemes supported by the DECLG which were operated by the local authorities and aimed at householders were delivered in 2015. There is a case to be made for household orientated hazardous waste schemes to be operated on a regional, if not national, scale so as to achieve efficiencies and effectiveness.



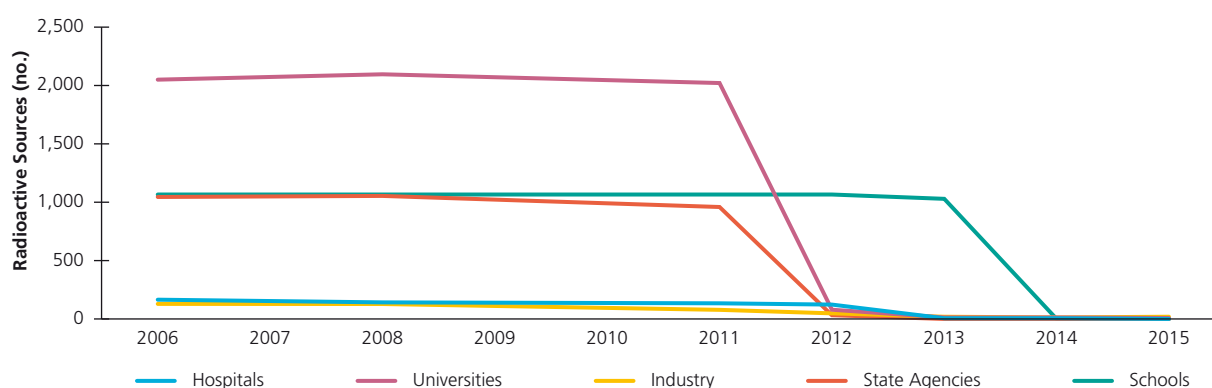
Radioactive Waste Management

A 99% reduction in the national inventory of disused radioactive sources has been achieved.

The National Inventory Reduction Programme is one of the programmes prioritised under radioactive waste policy. Particular focus was given to the inspection of licensees across the medical, industrial, educational and State sectors that had not yet disposed of their legacy radioactive waste. The inspections, in conjunction with other regulatory initiatives, resulted in a 99% reduction in the national inventory of disused sources with half-life ($t_{1/2}$) greater than 10 years between 2010 and 2013 (see Figure 6.10).

A National Radioactive Waste Storage Facility for disused radioactive sources is to be established. A National Implementation Committee has been constituted to draw up a specification and make recommendations on the siting, management and resourcing of the facility.

Figure 6.10 National Inventory of Disused Sources, 2006-2015 (Source: EPA)



Explosive and Pyrotechnic Waste

Small amounts of explosive and pyrotechnic waste are generated and treated.

Explosive waste (from use in quarries) and pyrotechnic waste (flares and distress rockets) are generated in small quantities. The Navy undertakes destruction of pyrotechnic waste and the small amounts of explosive waste left over from quarry works that cannot legally be returned are subject to controlled destruction on site.

Biological Waste Treatment

National food and biowaste regulations are having a positive impact.

Composting and anaerobic digestion are the main biological treatment processes for biodegradable wastes (food waste, garden and park waste, sludges). With an increasing focus at national and EU level on the segregation and separate collection of food waste, it is critical to have adequate waste treatment infrastructure in the State.

In 2015, approximately 300,000 tonnes of biodegradable waste was accepted at composting and anaerobic digestion plants for treatment with authorised capacity at approximately 540,000 tonnes (see Table 6.2). The Food Waste Regulations, which require the segregation and separate collection of commercial and household food waste, are resulting in increasing amounts of organic waste being available for recycling (Figure 6.11) and are an example of regulation driving better outcomes for the environment. The uptake of anaerobic digestion has been slower in Ireland than other Member States.

When residual municipal waste is mechanically treated, one of the outputs is organic fines. Organic fines need to be biostabilised in order to reduce the biological activity of the material. The quantity of biostabilised residual waste increased from 50,000 tonnes in 2013 to 119,000 tonnes in 2015. The main outlet for this waste is landfill cover. With municipal waste tonnages increasing, and the number of open landfills decreasing, finding useful and safe outlets for biostabilised residual waste will be a growing challenge.

Sewage Sludge

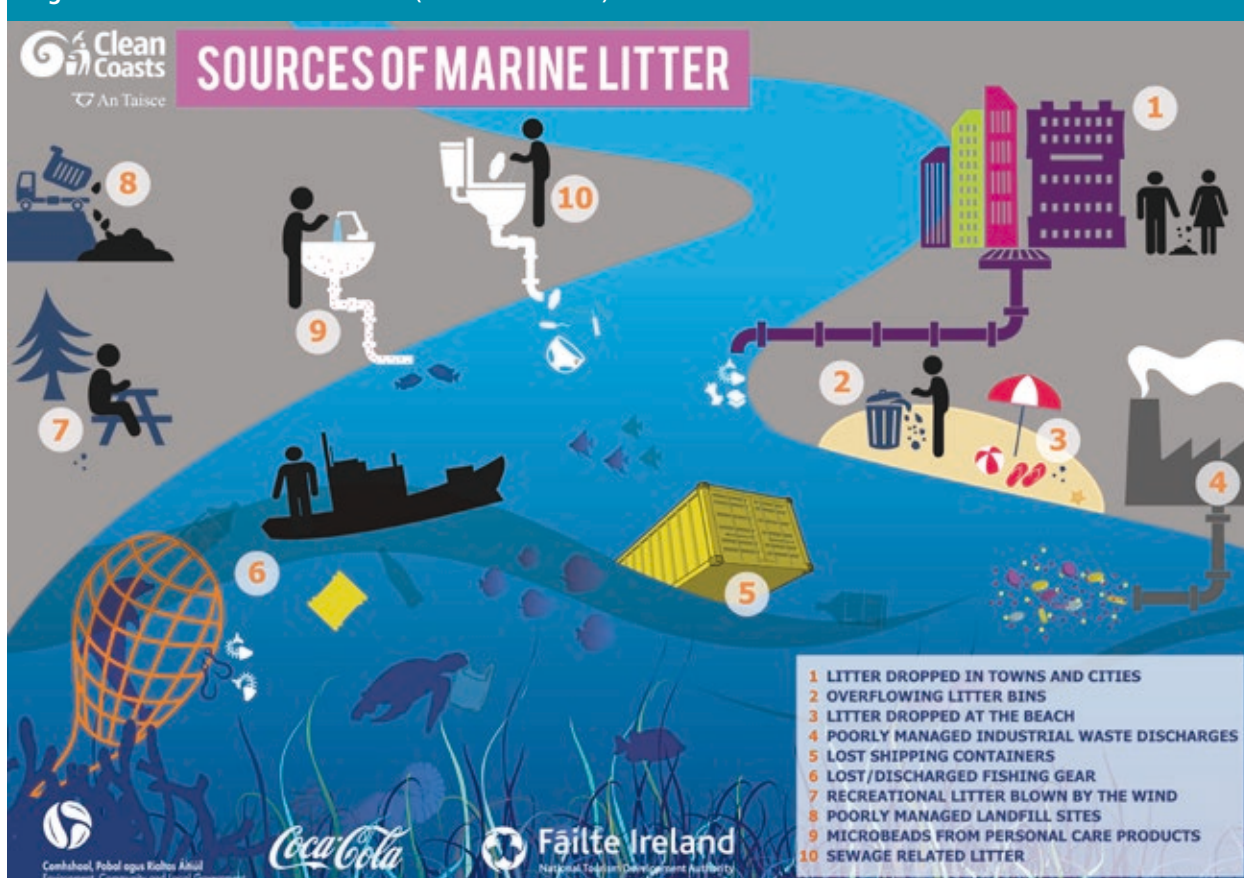
Sewage sludge treatment capacity needs expansion to cater for improving waste water treatment.

Sewage sludge is a by-product of the waste water treatment process and includes biosolids removed from waste water during treatment as well as residual organic matter from the treatment process. Irish Water's waste water treatment plants produced 53,543 tonnes of sewage sludge (dry solids) in 2014. Most of this sewage sludge was treated and used on agricultural land as a fertiliser or soil enhancer (EPA, 2015b). Research has shown that additional capacity is needed for the treatment of sewage sludge (EPA, 2014c). Irish Water published a Draft National Wastewater Sludge Management Plan, which outlines its strategy to ensure a nationwide, standardised approach to managing waste water sludge for the next 25 years (Irish Water, 2016). Some objectives of the plan are establishment of long-term, secure and sustainable treatment routes and outlets, and extraction of energy and other resources where economically feasible. Sewage sludge also arises from domestic septic tanks. The national sludge management plan will need to take the management of domestic sewage sludges into consideration.

Figure 6.11 Municipal Waste Accepted for Composting/Anaerobic Digestion, 2005-2015 (Source: EPA)



Figure 6.12 Sources of Marine Litter (Source: An Taisce)



Marine Litter

Marine litter is a threat to the health of our seas and coasts.

Much legislative focus to date has been on waste in the terrestrial environment, but marine litter is increasingly under the spotlight. The EU Marine Strategy Framework Directive (2008/56/EC) identifies marine litter as one area to tackle in order to achieve good environmental status for all marine waters by 2020. The 2030 UN Sustainable Development Goals include a target to “prevent and significantly reduce marine pollution of all kinds”. Marine litter comes from land activities (e.g. littering, landfills, storm water drain discharges) and marine activities (fishing, offshore mining and extraction, illegal dumping at sea) and is a cross-border

problem; once it enters the sea, it has no owner (see Figure 6.12). This makes its management dependent on good regional and international collaboration.

Plastic debris is particularly worrying because of its resistance to environmental breakdown. Marine species are affected through ingestion and/or entanglement. Microplastics or beads (items smaller than 5 mm) are of particular concern due to their potential toxicity and size. Microplastics come from products (cosmetic exfoliants, industrial abrasives), fragments from larger plastics, or fibres from washing clothes carried by sewage. While the consequences of plastic build-up in the food chain are not fully known, human health concerns are being raised. Several NGO and State based campaigns are currently focussed on banning micro-beads in product use.^{16,17}

Ireland has a number of citizen initiatives that monitor and report on marine litter. The Clean Coasts Volunteering Programme promotes and facilitates clean-up initiatives and marine litter surveys.¹⁸ Over 1,000 volunteers participated in the 2015 All-Ireland Coastwatch Survey.¹⁹



16 www.cleancoasts.org/our-initiatives/beat-the-microbead/

17 www.marinedebris.noaa.gov/types-and-sources-solutions/states-consider-plastic-microbead-bans

18 www.cleancoasts.org

19 www.coastwatch.org

Waste Research

EPA-funded waste research projects have delivered knowledge and solutions and influenced policy.

Between 2007 and 2015, the EPA's Research Programme funded approximately 30 waste research projects with a total commitment of €4.1 million. Research informs policy development and implementation, enforcement and sustainable waste treatment options. A key finding from a research report led to the establishment of the National Waste Prevention Programme (EPA, 2001). Key findings of specific research projects (mechanical biological treatment and pay-by-use charging) were referenced in the National Biodegradable Waste Management Strategy. The DECLG's rx3 Recycling Market Development Programme foundation was attributed to the EPA's research projects. A Waste Prevention Design Tool for architects and designers was developed, as were novel technologies and procedures for environmental enforcement.

Drivers and Pressures

Consumption and waste generation

Consumption is the key driver for waste generation.

Consumption of products and services is the key driver and pressure for waste generation, at household, commercial and industrial level. With regrowth in the economy, there is a risk that waste generation will increase to pre-recession levels, particularly for waste streams such as municipal waste and construction and demolition waste. Ireland's population is estimated to grow by 1 million persons in the next 20 years (CSO, 2013), which will put further demands on waste infrastructure. Resource efficiency and the circular economy (including waste prevention programmes, Eco-design initiatives, and similar) must be kept at the heart of policy and economic initiatives to ensure environmental sustainability. Through periods of economic boom and recession, Ireland has struggled with littering and fly-tipping, which indicates that an element of our society disregards the environmental impact of poor post-consumption behaviours. Although sanctions are available (on-the-spot fines, prosecutions), this does not seem to have been successful as a deterrent to this poor citizenship. While urban communities are well serviced with waste acceptance and collection facilities, the same is not always the case for rural communities, although the issue of littering and fly-tipping is not unique to rural or urban areas.

EU Legislation and Action Plans

EU legislation and action plans driving positive waste management practices.

Without a doubt, EU legislation and policies have been a key factor for improving waste management practices, driving segregation and separate collection of wastes (e.g. municipal waste), prioritising waste streams with significant polluting and recycling potential (e.g. packaging, WEEE, ELVs, batteries), requiring implementation of the waste hierarchy (favouring recovery over disposal), and requiring implementation of waste management and waste prevention plans. The landfill levy has been particularly successful in incentivising diversion from landfill and the plastic bag levy in encouraging consumers to reuse plastic bags.

Responses

National Policy and Implementation

New national policies including pay-by-weight are to be implemented.

The implementation of the measures under *A Resource Opportunity* (DECLG, 2012a) will continue, including the initiatives on regulation of household waste collection. From July 2017, householders will be charged on a pay-by-weight basis for their waste collection service. The aim is to encourage positive environmental behavioural changes, including improved recycling. An EPA research study (EPA, 2011) evaluating pay-by-use domestic waste collection systems found that weight-based charges were the single most effective system, prompting the highest recycling levels, highest rates of diversion from landfill and lowest total kerbside waste figures.

Future Challenges

Future challenges are to move towards self-sufficiency in waste management and deal with emerging issues such as marine litter and regulation of household waste collection.

There was a 10-fold increase in residual waste exported for use as a fuel in the period between 2010 and 2014. While energy recovery is preferable to disposal to landfill, export is not helping Ireland to move towards self-sufficiency. In 2015, the DECLG carried out a public consultation entitled *Exporting a Resource Opportunity? Measures to Maximise Resource Efficiency and Jobs in Ireland* (DECLG, 2015a) in response to the growing trend to export waste for further processing and treatment. It is expected that it will result in a number of policy measures to incentivise treatment of waste in Ireland, which will also result in Ireland benefitting from the associated resource and jobs potential.

Ireland has some waste infrastructure deficits, such as the lack of a hazardous waste landfill, and currently has limited capacity for other infrastructure (waste to energy, landfill, recycling). The tracking of built and planned national waste infrastructure capacity, and monitoring trends in export of waste, is key to waste management planning. If Ireland is largely dependent on its export market and has insufficiently developed national capacity, we are vulnerable to external forces such as economic recession, currency fluctuations and any changes to import policy in the EU.

Ireland is at risk of failing to meet some of its future EU waste targets, in particular the recovery and recycling of end-of-life vehicles and portable battery collection. In order to achieve these targets, there will need to be a concerted effort by all stakeholders to bring in the necessary measures.

There is scope for additional EPR schemes. The farm hazardous waste collection initiative has been a tremendous success. A similar initiative could be rolled out for household hazardous waste streams, which, owing to a lack of awareness and/or outlets, are improperly managed (CSO, 2016).

The consolidation of waste management planning and waste enforcement regions will result in more focused, strategic and consistent waste management planning and enforcement. A key challenge will be ensuring that the lead authorities for these regions are adequately resourced to carry out these important roles. Another challenge the regions face is achievement of the targets set out in their 2015-2021 plans. The plans and target achievement are supported through Local Authority Executive Orders, however waste management is carried out by the private sector with the result that competition and market forces will significantly influence how waste is directed for treatment.

Marine litter prevention and generation are linked to a variety of human activities and policy areas, such as waste and waste water management, product design, shipping, fisheries policies, consumption and behavioural patterns. Successful implementation of waste policy is a prerequisite to avoid plastic litter entering the marine environment.

Another challenge is whether we can become a recycling society. By the end of 2017, there will be national capacity for incineration or co-incineration of up to 860,000 tonnes per annum. The perceived risk is that recycling will suffer at the expense of energy recovery, however there are regulatory controls in place at these facilities to prevent acceptance of recyclable material. Waste operators report high rates of contamination in bins presented for collection, which limits their ability to recycle the material. Significant improvement in national recycling rates could be achieved through improved segregation behaviours at point of generation of waste. With pay-by-weight coming

into force in July 2017, it will be a challenge to ensure that associated enforcement plans for any contamination of bins or illegal burning or fly-tipping of waste are targeted, effective and proportional. A major public awareness and educational programme should precede the implementation of the charging measures.

Last but not least, we must ensure that prevention of waste and preparation for reuse remain central to Ireland's waste management policy. There is much scope for building on the successful NWPP and for Ireland to continue to lead on prevention on the EU stage. There is scope to build on existing social enterprises and increase preparation for reuse initiatives for waste streams such as furniture and WEEE.

Ireland has pioneered economic initiatives which have changed consumer behaviour and prevented waste (e.g. the plastic bag levy). Our NWPP is well established and an example of best practice (EEA, 2015; EPA, 2016b). Ireland should seek to be innovative and productive at this time of opportunity while the concept of the circular economy is taking root, being planned and implemented.

References

- CSO (Central Statistics Office), 2013. *Regional Population Projections 2016-2031*. CSO, Dublin.
- CSO (Central Statistics Office), 2016. *CSO Statistical Release. Module on Environment*. CSO, Dublin.
- DAFM (Department of Agriculture, Food and the Marine), *Annual Report 2015* (2016). DAFM, Dublin.
- DECLG (Department of the Environment, Community and Local Government), 2010. *National Policy Position. Nuclear Safety and Radiation Protection*. DECLG, Dublin.
- DECLG (Department of the Environment, Community and Local Government), 2012a. *A Resource Opportunity – Waste Management Policy in Ireland*. Stationery Office, Dublin.
- DECLG (Department of the Environment, Community and Local Government), 2014. *Report on Review of PRI Models in Ireland*. DECLG, Dublin.
- DECLG (Department of the Environment, Community and Local Government), 2015a. *Exporting a Resource Opportunity? Measures to Maximise Resource Efficiency and Jobs in Ireland*. DECLG, Dublin.
- DECLG (Department of the Environment, Community and Local Government), 2015b. *The National Litter Pollution Monitoring System – Litter Monitoring Body, System Results 2014*. Stationery Office Dublin.

EEA (European Environment Agency), 2015. *Waste Prevention in Europe – the Status in 2014*. EEA, Copenhagen.

EPA (Environmental Protection Agency), 2001. *Assessment and Development of a Waste Prevention Framework for Ireland*. ERTDI Report 22. EPA, Wexford, Ireland.

EPA (Environmental Protection Agency), 2011. *Study of Pay-by-Use Systems for Maximising Waste Reduction Behaviour in Ireland*. EPA, Wexford, Ireland.

EPA (Environmental Protection Agency), 2014a. *Towards a Resource Efficient Ireland: a National Strategy to 2020*. EPA, Wexford, Ireland.

EPA (Environmental Protection Agency), 2014b. *National Hazardous Waste Management Plan 2014-2020*. EPA, Wexford, Ireland.

EPA (Environmental Protection Agency), 2014c. *Management Options for the Collection, Treatment and Disposal of Sludge Derived from Domestic Wastewater Treatment Systems*. STRIVE Report Series No. 123 (2012-W-DS-9). EPA, Wexford, Ireland.

EPA (Environmental Protection Agency), 2015a. *EPA Licensed Sites – Report on Waste Enforcement 2014*. EPA, Wexford, Ireland.

EPA (Environmental Protection Agency), 2015b. *Urban Waste Water Treatment in 2014*. EPA, Wexford, Ireland.

EPA (Environmental Protection Agency), 2016a. *Hazardous Waste Data 2014*. EPA, Wexford, Ireland.

EPA (Environmental Protection Agency), 2016b. *National Waste Prevention Programme. Annual Report for 2015*. EPA, Wexford, Ireland.

Federation of Irish Renderers, 2016. Personal communication.

FUSIONS (Food Use for Social Innovation by Optimising Waste Prevention Strategies), 2016. *Food Waste Quantification Manual to Monitor Food Waste Amounts and Progression*. European Commission, Brussels.

Irish Water, 2016. *Draft National Wastewater Sludge Management Plan, 2016*. Irish Water, Dublin.