

European Commission, Brussels



**THE ORGANISATION OF AWARENESS-RAISING EVENTS ON THE APPLICATION OF  
COMMUNITY LEGISLATION ON SHIPMENTS OF WASTE, ON LANDFILLS; ON WASTE  
MANAGEMENT PLANS  
AND ON WASTE PREVENTION PROGRAMMES**

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**IRELAND – LANDFILL OF WASTE**

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**BiPRO**

Beratungsgesellschaft für integrierte Problemlösungen

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# 1 Outcome of events

## 1.1 Workshop on landfill of waste in Ireland

Dublin	7 and 8 May 2009	<b>National Cooperation partner:</b> Department of Environment, Heritage and Local Government (DoEH&LG) <b>Venue:</b> Custom House, Premises of the DoEH&LG <b>Participants:</b> 28 <b>Agenda:</b> 11 presentations (including EC and BiPRO)
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Table 1-1: Overview on workshop on landfill of waste in Ireland

The information exchange and awareness raising event on landfill of waste in Ireland took place the 7 and 8 May in Dublin. The event was organised with intensive support of the Department of Environment, Heritage and Local Government (DoEH&LG).

The 28 participants comprised representatives of the DoEH&LG, the Environmental Protection Agency, 8 County Councils and of some NGOs, companies and scientific institutions. (see Table 2-2 participation list).

The workshop was held in English. In total 11 presentations were held.

Note: The workshop comprised an informative excursion to Ballymount Materials Recycling Facility and Arthurstown Landfill.

### 1.1.1 *Summaries of presentations held in Ireland*

Apart from the presentations from BiPRO and the Commission Services, the following presentations were held during the workshop in Ireland:

#### (1) Overview of Landfill in Ireland (DoEH&LG)

The presentation provided a general overview on the national key policy and waste management in Ireland. It stressed targets to be reached for the next years for biodegradable waste. In addition the presentation detailed data about existing waste collection and treatment facilities, e.g. numbers on civic amenity sites, recycling rates on different waste streams, on municipal and household waste and on landfills. General data about population and household stocks were provided in the light of the future development in the waste sector. Finally data for remediation of landfills were presented.

#### (2) The new EPA Landfill pre-treatment guidance (EPA)

The presentation introduced the Pre-Treatment Guidance for municipal solid waste (MSW) which will soon be published by the EPA. In this context the problem of the high bio-waste fraction disposed of in landfills and the problems encountered achieving the reduction targets for the diversion of bio-waste was stressed. Figures for the production of bio-waste and projections for the next years were presented. Furthermore actions taken from EPA to tackle the problem such as the National Bio-waste Strategy and the Pre-treatment Guideline were highlighted.

### (3) Odour Management at Landfills (EPA)

Within the presentation the problem of odour nuisance from landfills was stressed. Numbers and trends about complaints connected to odour nuisance over the last years and reasons from technical and management point of view were presented. The presentation also focused on the ways the EPA is tackling the problems by e.g. carrying out landfill gas emissions surveys, by including odour management conditions in landfill licences, by preparing guidance and outlined plans to directly address landfill managers and staff via workshops on the topic of odour management.

### (4) Waste Management and Competitiveness in Ireland (Forfás)

The presentation stressed that waste policy and the need for an integrated and diversified method of waste management is a highly important issue from a competitiveness perspective. It gave an overview on Ireland's recent waste management performance, waste treatment options in Ireland compared to other European and non-EU countries and waste management policy priorities from the business perspective.

### (5) Meeting Ireland's Landfill Diversion Targets (CEWEP)

Within the presentation it was stressed that Ireland's waste management policy is over-relying on landfills as unique final treatment option and that decisions for alternative treatment options have to be taken on political level also to achieve the reduction targets for biodegradable waste in 2010. Figures for bio-waste landfilled and capacity void on landfills were presented. Thermal treatment and incineration (WtE) were discussed as alternative option and numbers of such facilities under construction and planning. Furthermore the speaker presented possible ways to support the introduction of such facilities on political level.

### (6) Implementation of Landfill Directive 1999/31/EC and Council Decision 2003/33/EC at Non-Hazardous Landfills (Greenstar Ltd.)

The presentation started with a short introduction to the Greenstar Ltd. and its approach to integrated management. Facts about the implementation of European and national legislation and the compliance of Greenstar landfills were presented. The role of the operator and licensee for an environmental sound management and the need for awareness and educational measures were stressed.

### (7) Design, operation and closure of a non hazardous landfill in compliance with requirements of Landfill Directive 1999/31/EC and Council Decision 2003/33/EC (KTK Landfill)

The presentation introduced the non-hazardous waste landfill located in Co. Kildare, 40km SW of Dublin. Details on capacity, technical construction features and connected infrastructure, applied standards and management of the landfill were provided. The presentation also focused on the standards and procedures laid down in the Waste Acceptance Criteria Decision and on the benefits and problems encountered with its implementation and the limit values for non-hazardous landfill. The presentation gave very practical insides into nuisance and leachate control, into odour management, on landfill gas recovery, on communication, on training and awareness and on restoration and aftercare phase of the landfill.

### Site visit to Arthurstown landfill

The landfill site Arthurstown is a non-hazardous landfill located 25 km south west of Dublin managed by South Dublin County Council. The site started operating in October 1997 and will be closed in December 2010. The operation phase of only 10 years was agreed on with the closed by municipalities. The site area is 72 hectares; 27 hectares are used as landfill. The total capacity is 4.6 million t of which 4.3 million are filled. The site is situated in a former quarry lying in a region that is underlain by naturally occurring black boulder clay functioning as a part of the lining system. The design of the landfill consists of four landfill cells lined with 2.5 mm fully welded HDPE liner on 1 metre of engineered clay with a hydraulic conductivity of  $1 \times 10^{-9}$  m/s, a groundwater and surface water collection systems, an environmental monitoring system, including waste input, void utilisation, stability, groundwater, surface water, noise, dust, gas, leachate and meteorological data. Furthermore the following systems are included:

**Leachate collection:** Leachate is collected within a cell by lining materials at the landfill base and a drainage blanket and herringbone collection pipe work system. It flows by gravity into sumps and pumped to onsite storage and treatment tanks (16 hour bubble aeration). The treated effluent is removed from by road tanker and discharged to Dublin main foul drainage networks and to the Ringsend Municipal Wastewater Treatment Plant. The construction also allows the recirculation of the leachate /effluent into the waste body.

**Gas production:** The gas is collected by a system of vents connected and a collection pipe system. The site produces about 12,000 m<sup>3</sup> gas / hour and gas is used for generating electricity of about 3-4 MW which is fed to the national power grid and serves about 6,000 homes (biggest power generation facility from a landfill site in Ireland). The heat however is not further used as equipment has not been installed when constructing the landfill. Additionally to the measurements mentioned to reduce odours (gas collection, covering), spraying of odour control produces is carried out when odours are detected.



**Bailed waste:** The landfill site accepts only bailed household waste. The consolidation and strapping into bales means a dramatically reduces to the problem of windblown litter. Waste is delivered in fully enclosed containers that are opened only at the working face. However litter nets are used and a regular litter patrol is set in place by engaging a dawn-to-dusk bird control programme.

**Controls and monitoring:** Waste delivery vehicles are controlled at the site entrance and do not access the landfill area directly. Waste is covered hourly n at the close of operation each day. When final design waste levels are reached in particular area, a temporary capping layer of clay is laid down to act as cover until the final cap is constructed. Regular monitoring is carried out. The automated system monitors a comprehensive range of site data on interactive trends for display online and storage to computer. The manager has access to on-site laboratory facilities and can call upon the services of external monitoring contractors.

Box 1-1: Site visit to Arthurstown landfill

The presentations from Ireland, including the standard presentations from the EC and BiPRO are available for download at: [www.bipro.de/waste-events/landfill/events09/ie.htm](http://www.bipro.de/waste-events/landfill/events09/ie.htm)

### 1.1.2 *Legal background and national enforcement structure in Ireland*

Waste management was poorly developed until 1995 and was characterized with few regulatory controls and little strategic planning, poor design and operational standards for facilities and minimal expenditure as well as low technology to converse costs. The following policy documents are the key elements for the improvement of Irish waste policy providing a comprehensive approach to integrated waste management:

- 1998 - Changing Our Ways
- 2002 - Delivering Change
- 2004 - Taking Stock & Moving Forward
- 2006 - National Biodegradable Waste Strategy
- 2008 - “Brown Bin Circular”

Current issues on waste management are the strategic waste management planning, the increase of waste treatment quality and of recovery and disposal facilities. The EPA especially is taken active measures to improve the waste management policy and the implementation of the provisions including the following items:

- National Waste Prevention Programme
- National Waste Report
- STRIVE research programme
- EPA Ten Options for Change Document
- EPA IPPC Licence Conditions
- EPA Waste Licence Conditions
- EPA publication of BAT for regulated activities

A target of the Irish waste management policy is to divert several waste streams, as organics, plastics and paper from going to landfills and to increase the recycling on this fraction.

With Directive 1999/31/EC reduction targets of the bio-waste fraction to be landfilled were introduced for 2006, 2009 and 2016. As Ireland had initially a high rate of BMW fraction landfilled (88.9% in 1995) Ireland has taken the Art 5.2 derogation and the reduction targets are valid with a four year delay for the first two target dates. For the measurement of the diversion targets for bio-waste set for 2009 in the EU Landfill Directive, it is assumed by the Irish EPA that for measurement of achievement the reporting year 2010 is valid.

To solve the problem with the large bio-waste fraction still being disposed of in landfills a national Biodegradable Waste Strategy developed in 2006 is currently implemented, comprising the following components:

- Prevention of bio-waste within the National Waste prevention Programme
- Pay-by-Use Schemes
- Home Composting
- Reuse of packaging & product design
- Prevention & Reuse of paper / card
- Reuse of textiles
- Use of targets

Besides publishing guidance on the issue, EPA is undertaking the following actions to tackle the problem of bio-waste:

- Issue a circular to all existing landfill operators to reinforce the general waste pre-treatment obligation falling due on 16-7-2009 for these operators
- Publishing municipal waste characterisation methodology (essential for the measurement of bio-waste content)
- EPA will publish revised BAT note for Landfill & Waste Treatment - Transfer
- EPA is reviewing and technically amending waste licences

For all landfills standard conditions were set following the Waste Acceptance Criteria Decision within the licensing procedure. Standards including criteria for the acceptance of waste are included in the Irish Guidelines especially the EPA BAT Guidance Note on Best Available Technology for the Waste Sector in particular Landfill Activities and in the Landfill Guidance Manuals. The licence procedure lays down for example the condition laid down in box Box 1-2:

#### **Waste Acceptance Criteria within the licence procedure - An example of an Irish waste licence**

All landfill licences, regardless whether they were existing or new, include standard conditions following the EU Waste Acceptance Criteria Decisions are included since the Irish EPA started issuing them in the late 1990's. Exemplarily the following conditions can be set:

**Written procedures for the acceptance and handling of waste:** Prior to commencement of waste acceptance at the facility, the licensee shall submit to the Agency for its agreement written procedures for the acceptance and handling of all wastes. These procedures shall include details of the pre-treatment of all waste to be carried out prior to acceptance at the facility and shall also include methods for the characterisation of waste in order to distinguish between inert, non-hazardous and hazardous wastes. The procedures shall have regard to the EU Decision (2003/22/EC) on establishing the criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 and Annex II of Directive (1999/31/EC) on the landfill of waste.

**Holders of waste permits:** Waste shall be accepted at the facility, only from customers who are holders of a waste permit, unless exempted, under the Waste Management (Collection Permit) Regulations 2001 or from other licensed/permitted facilities.

**Used tyres:** Whole used tyres (other than bicycle tyres and tyres with an outside diameter greater than 1400mm) shall not be disposed of at the facility. Shredded tyres shall not be disposed of at the facility from 16 July 2006.

**Hazardous/liquid waste:** No hazardous wastes or liquid wastes shall be disposed of at the facility.

**Inert waste:** The licensee shall ensure that inert waste accepted at the facility is subject to treatment where technically feasible.

**Visual checks:** All wastes shall be checked at the working face. Any wastes not suitable for acceptance shall be removed for recovery or disposal at an appropriate alternative facility. Such waste shall be stored in the Waste Quarantine Area only. No waste shall be stored in the Waste Quarantine Area for more than three months.

**Further information at:**

The licenses for all landfills are available for download on the website at: <http://www.epa.ie>

Box 1-2: Exemplary license conditions for Irish landfills following the EU Waste Acceptance Criteria Decision

### 1.1.3 Facts and figures related to landfilling of waste in Ireland

#### Information on waste management infrastructure and landfills

The waste generated on household level is constantly growing in the last years and was 783 kg/inhabitant in 2007. Manufacturing waste generation has seen significant improvements and was 2007 12.9 t/employee almost half what it was in 2004. The top three waste generating manufacturing sectors are food, metals and chemicals. In 2007 64 % of municipal waste was disposed off in landfills while 36% was recycled. At the commercial side the rate is more or less the same with 62% of disposal and 38% of recycling.

While the amount of recovered waste increased from about 300,000 t/a in 2001 to about 1 million t/a in 2007, the amount of waste disposed of is staying more or less stable and is around 2 million t/a. At the same time the household and commercial waste collected increased in the last years (see Figure 1-1).

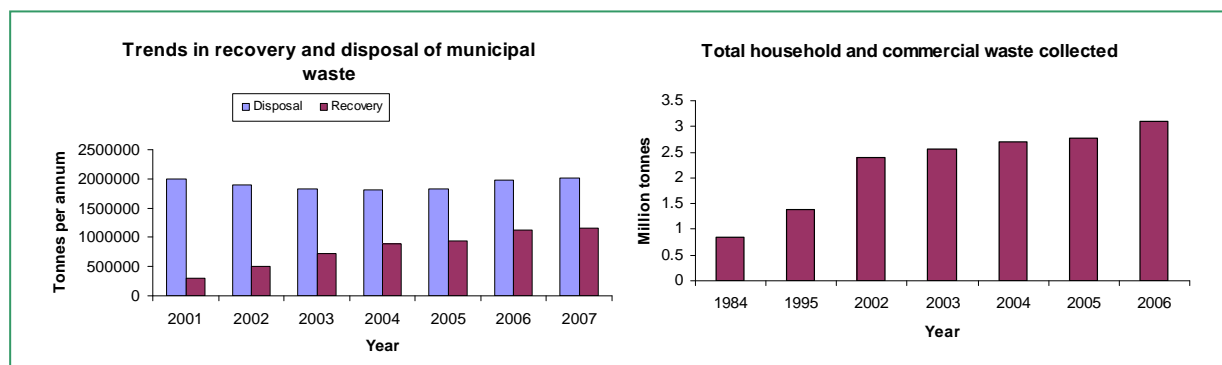


Figure 1-1: Trends of waste generation in Ireland (source: presentation John O'Neill)

In 2008 79 licenses for landfills in force of which 37 are operating, 31 are closed and 11 have not been commenced or the activities have been ceased.

The numbers of landfills accepting mixed municipal waste reduced from about 50 sites in 2001 to about 30 landfills in 2007. As housing stocks and population is still growing, Ireland is facing a lack of landfilling capacity. In the last years there was a surplus in landfill capacity and gate fees decreased in 2004 leaving landfilling as a cheap treatment options. Landfill taxes are 20 €/t. Landfill gate fees are reported to vary 80 to 130 €/t. Landfill costs have fallen significantly in recent times thus impacting the underutilisation of alternative treatments. Additionally biological gate fees in Ireland are quite high compared to other European countries (85 €/t in 2008) due to a relatively small scale of facilities in operation. Though by 2017-2019 the currently consented landfill void will be filled and a lack of landfill capacity is expected, as the number of landfills operated will decrease within the next years from about 30 sites in 2008 to below 20 sites in 2012 (see Figure 1-2).

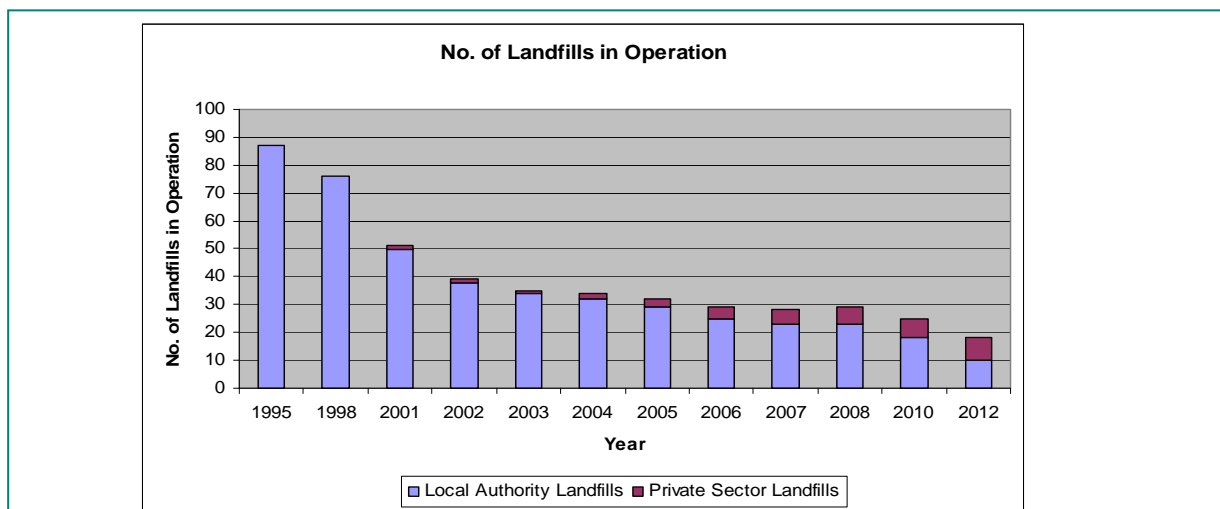


Figure 1-2: Number and forecast of numbers of landfills operated in Ireland (source: presentation Margaret Heavy)

Closed landfills have to be restored following a restoration and aftercare plan supervised by the EPA. Between 2006 and 2008 about 19 sites were covered by remediation activities with a funding of about 30 million €. The issue of historic legacy landfills, landfills operated between 1977 and 1997 is also a big issue. Those sites have to follow an EPA code of practice. Local Authorities are required to register sites within an EPA register and to carry out a risk assessment to determine remediation measures. The EPA has developed a GIS tool to inform an initial Tier 1 risk ranking and following site investigations, all sites will have to be authorised by the EPA. Up to date 345 such sites are registered.

In 2008 the municipal waste collection is organised by private collectors mainly (67%). Another 28% is organised by public entities and 5% by mixed (private and public) bodies. Inhabitants are directly contracted to the private collector and are not obliged to contract to a service.

The coverage of recycling centres steadily increased in the last years, being 28 in 1995 and 90 in 2007. Also the number of recycling rates of cardboard increased in the last years. In 1995 only a rate of 16.5 % of paper and cardboard could be recycled. In 2007 the amount summed up to 58 %.

To further elaborate on the separate collection and recycling EPA funded research is focusing on a compost standard, which is currently developed together with the Composting Association of Ireland (Cré) and European associations. One problem to be solved is the content of animal by-products within bio-waste, as the standards and restrictions of the Animal By-Products Regulation (EC 1774/2002) are very difficult to achieve.

Also the topic on food waste disposers and organic waste management in multi-storey dwelling and on the role of MBT are in focus of future elaboration.

#### Information on pre-treatment

Waste pre-treatment infrastructure currently is poorly developed and no economic incentives are made to deliver appropriate pre-treatment infrastructure. To tackle the problem an EPA Pre-Treatment Guidance was published in June 2009. For operators the following obligations have to be met:

- The operator of an existing landfill has to demonstrate to the EPA that, by 16 July 2009, all waste delivered to the landfill will have been adequately pre-treated. This must include treatment of the biodegradable component of the waste received to the extent necessary to achieve the escalating obligations of the EU Landfill Directive (for 2010, 2013 & 2016).
- The operator of a new landfill (including major extensions of same) has to demonstrate to the EPA that all waste delivered to the landfill will have been adequately pre-treated. This must include treatment of the biodegradable component of the waste received to the extent necessary to achieve the escalating obligations of the EU Landfill Directive (for 2010, 2013 & 2016). For new facilities minimum BAT have to be considered.

Following the guideline, waste pre-treatment options span the manual, mechanical, biological and thermal processes. From the perspective of landfills thermal treatment also is a pre-treatment option. In specific the following processes are recommended as pre-treatment processes (see also Figure 1-3):

- Source separation (e.g. home composting, packaging waste)
- Separate collections (e.g. '2 Bin' or '3 Bin' systems)
- Manual sorting
- Composting
- Aerobic / Anaerobic Digestion
- Mechanical treatment (crushing, grading, magnetic separation, eddy current separation, ballistic separation, trommeling, sorting, etc)

- Biological stabilization of 'black bin' residues (after mechanical treatment)
- Thermal (sterilisation, pyrolysis, incineration, etc)
- Energy from waste
- Rendering

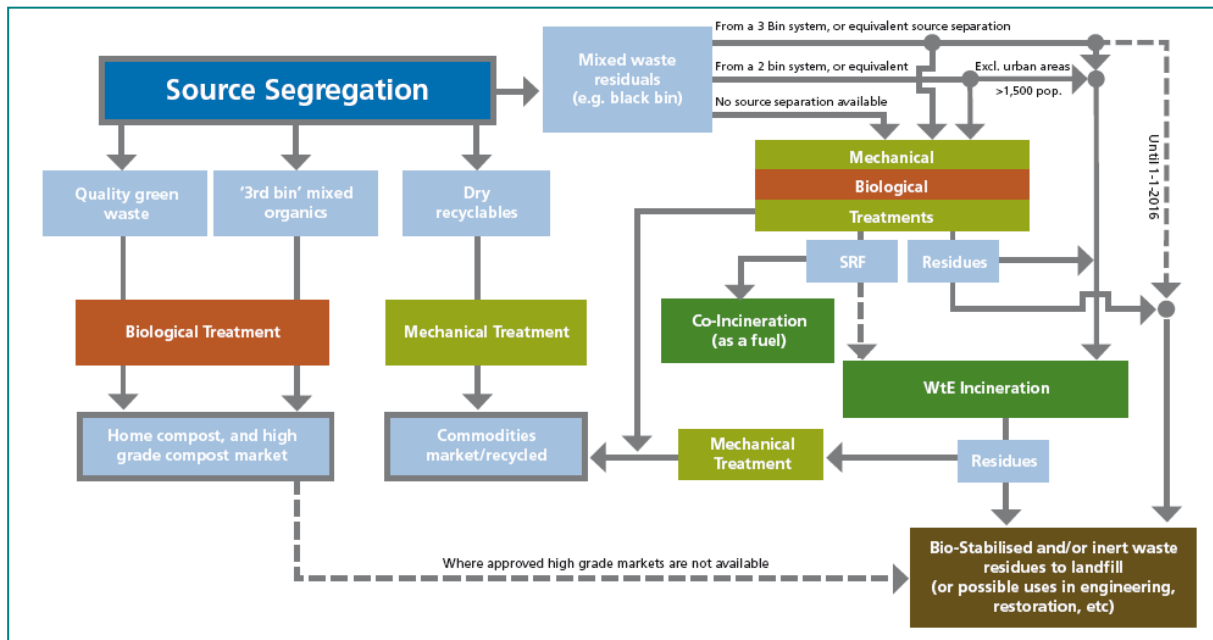


Figure 1-3: Pre-treatment stages for solid municipal waste (source: Municipal Solid Waste Pre-treatment & Residuals Management, EPA Guide)

In September 2008 a consultation to the guidance was published and attracted a number of submissions, the broad subject matter of the submissions can be grouped under a number of headings:

- Preference for a 2 or 3 bin system
- Legal basis for guidance
- Impact of urban-rural divide
- Assertion that the EU Landfill Directive targets are national and cannot be applied to individual landfills
- Landfills do not control pre-treatment
- Available treatment capacity nationally
- Preference for a simultaneous review of landfill licences
- Validation/testing of treatment effort
- Bio-waste stability standard

- Pre-treatment for incineration
- Terminology
- Treatment technologies / options
- Role of MBT in waste management
- Enforcement of pre-treatment obligations

#### Information on biodegradable municipal waste (BMW)

In 2007 Ireland produced 2,318,091 tonnes of biodegradable municipal waste (BMW) comprising of wood, paper & cardboard, organics and textiles. Even a reduction of bio-waste landfilled was achieved compared to the amount disposed of in 1995, the amount of BMW landfilled increased constantly during the last 5 years from 1.3 million t in 2004 to currently 1.47 to in 2007. 64% of all produced BMW was disposed of in landfills in 2007. Increasing population and economic growth were the main drivers behind these trends. Consequently Ireland moves further away from the diversion targets set in the Irish waste management planning (reduction of 1.4 million t in 2010, 1.7 million t in 2013 and 1.8 million t in 2016 compared to 1995). Regarding the targets set for 2010, currently 0.5 million t of bio-waste too much are being landfilled (see Table 1-2 and Figure 1-4).

Target year	Landfill Directive Target	Max. quantity allowed to be landfilled	BMW distance to target (gap) at standstill position (based on 2007 figures)	BMW distance to target (gap) including predicted increasing waste production
2010	75% *	976,433 t	508,000 t	672,000 t
2013	50% *	644,956 t	830,000 t	1,209,000 t
2016	35% * 1995	451,469 t	1,024,000 t	1,603,000 t

\*of quantity generated in 1995

Table 1-2: Diversion targets on BMW and distance to target (source: presentation Jonathan Derham)

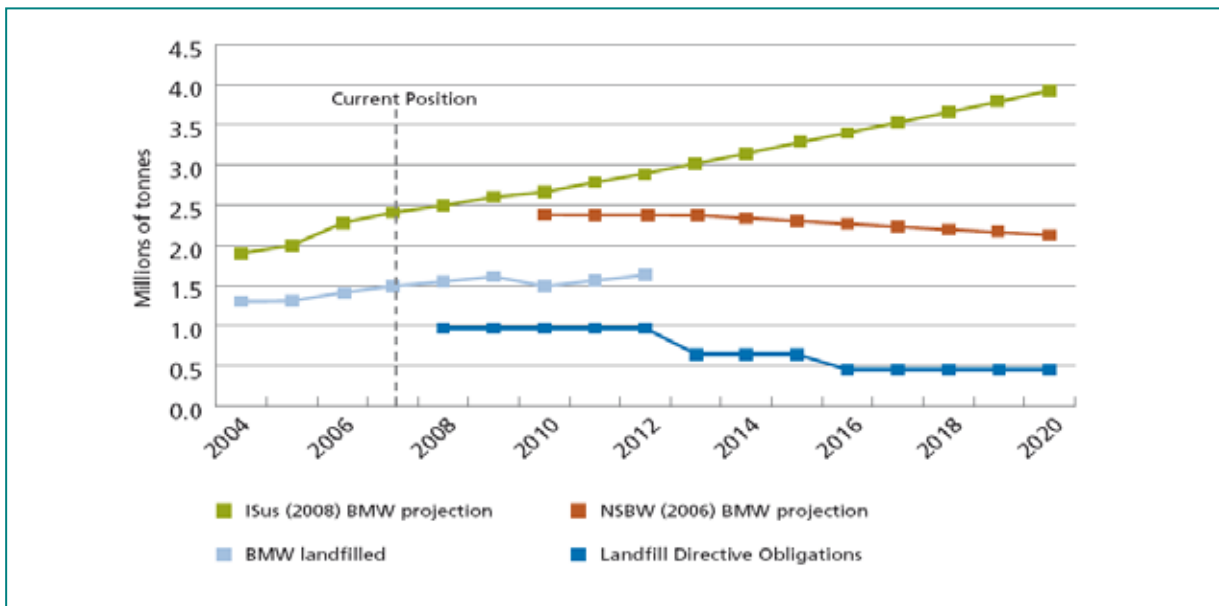


Figure 1-4: Forecast and targets of biodegradable municipal waste (source: presentation Jonathan Derham)

For the 36% of the biodegradable municipal waste not landfilled the current recovery practice includes the separate collection in a third bin (organic) counting only for about 19,000t (to composting), with the bulk of the 36% being made up of wood, paper and card recovery. The recycling rates of organics and textiles in particular are very low (below 10% each). The problem getting more severe, as the municipal growth rate is averaged at about 5.5% (based on the last five report years). The EU EEA predicts a growth of 25% in municipal waste between 2005 and 2020.

In the future thermal treatment will also play a role in waste management. Currently one facility is under construction having a capacity of 200,000 t/a and further 2-3 are planned.

#### Information on licences /enforcement / monitoring issues

The technical quality standards of existing landfills have improved dramatically within the last years and EU standards are enforced by the EPA. Old landfills not complying with the new standards have been closed during the last years. The Environmental Inspectorate is regularly carrying out scheduled and unannounced inspections at the landfills.

Community gain and access to information is an important aspect of landfill licences in Ireland. Beside the condition that the all staff needs an adequate education, e.g. the facility manager and any deputies shall have completed a Waste Management Training Programme agreed by EPA, a management structure has to be submitted to the EPA including the names of the facility managers and other supervising staff, the details of the responsibilities and details on education and training.

Also the an Environmental Management System (EMS) shall be established at the facility updated on an annual basis and submitted to the EPA including at least the schedule of environmental objectives

and targets on a five year basis and an Environmental Management Plan (EMP) including an Operational Practice Manual for the facility, methods by which the targets will be achieved and an Awareness and Training Programme identifying needs for personnel training of staff.

The license also foresees the necessity to establish and maintain a Communication Programme to ensure that members of the public can obtain information at the facility, at all reasonable times, concerning the environmental performance of the facility. This shall be established within six months of the date of grant of the licence. Also an Annual Environmental Report (AER) has to be submitted to the EPA including all relevant information on the site and its management. The AER is a publicly available document.

All landfill facilities have to agree to a Community Support and Development Scheme paying 0.50 € for every tonne of waste accepted for disposal in the landfill into a ring-fenced community support and development fund. Prior to the commencement of waste disposal activities the licensee shall establish a community managed charitable trust (or equivalent) to manage and discharge this fund for the benefit of the social and physical environment of the local community

#### Information on odour management on Irish landfills

As illustrated in Figure 1-5 most reported complains concern odour nuisance. From 2006 to 2007 there was a sharp increase of such complains; decreasing again in 2008. Anyhow more than 1,000 complains (about 80% of all complains) are connected to odour nuisance in 2008 (see Figure 1-5).

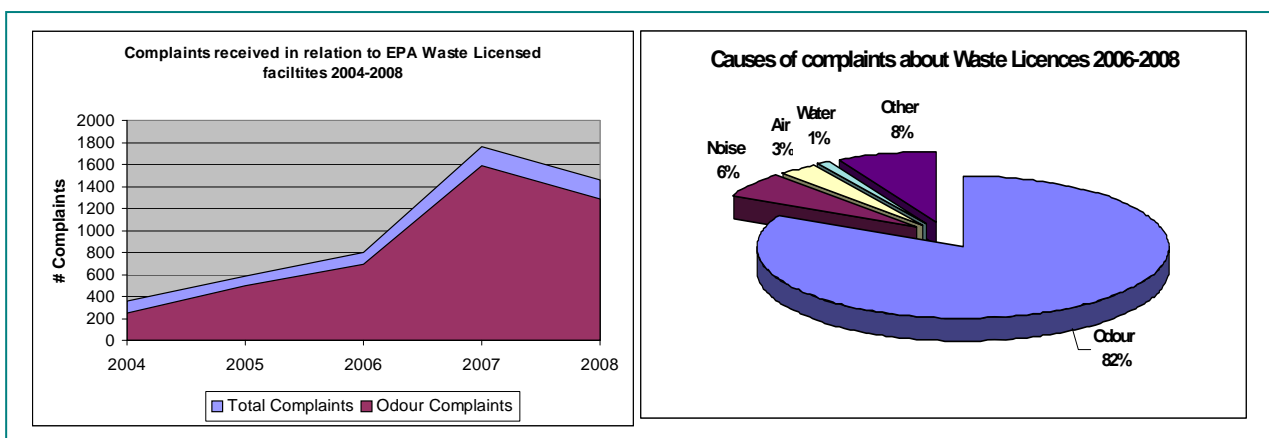


Figure 1-5: Complains related to odour in Irish landfills (source: presentation Jim Moriarty)

Explanations for the raising problem of odour nuisance in landfills are the heavy reliance on landfills in Ireland seeing more waste being consigned to fewer landfills year on year, a rising share of biodegradable waste quantities and the increasing production of landfill gas.

As a lot of people are impacted and they are unwilling to tolerate the problem any further the EPA is addressing the problem as a high priority and the problem is addressed within the following actions:

- Updating the licence conditions
- Development of odour impact assessment procedure and training

- Evaluation and review of on-site landfill operational and management practices with a view to minimising odour impacts off-site
- Assessment of landfill gas management systems including landfill gas leakage audit, detailed assessment of gas collection and management system e.g. condensate management, field balancing etc. and resurvey to determine improvements
- Use of deodorizers and masking of incoming waste
- Updated guidance on landfill site selection (due December 2009)
- Progressive reduction in percentage of biodegradable waste consigned to landfill (max. 15% of intake by 2016)

Successful prosecutions have been taken against three landfill sites in the 2006-2008 period specifically in relation to odour nuisance, and enforcement action is progressing against a number of other facilities at the present time. The problem of odour nuisance is occurring both on old and new landfills and an odour management plan (OMP) is feasible (see Box 1-3).

Technical reasons for gas leakage are especially the poor understanding of issues on part of landfill managers, problems with inadequate covering, problems with flanked areas, leachate management and gas abstraction problems, like pipe work sizing, valving etc., density of installation of wells, sealing of wells, monitoring and interpretation of pressure and blower capacity.

The key issues for current and future measurement are a better design, management and operation of landfill gas plant, the provision of adequate daily and intermediate cover for waste, appropriate sizing and phasing of cells including the management of flanked areas to minimise potential fugitive air emissions and the diversion of biodegradable wastes.

#### **Odour Management Plan - An example for tackling odour nuisance in Ireland**

Odour nuisance and connected complains by the neighbourhood of landfills is a severe problems in Ireland. The problem is occurring both on old and new landfills and especially for landfills including energy production (currently 8 sites) an odour management plan (OMP) is feasible.

**Objective:** With the OMP the problem of odour nuisance shall be reduced by obliging the landfill management to track the sources of odours (e.g. leakages) and the take initiatives to reduced odour nuisance.

**Realization:** The licensee shall submit to the Environmental Protection Agency (EPA) for agreement, an Odour Management Plan (OMP) for the facility. The plan, as agreed, shall be implemented from the time of commencement of waste activities unless otherwise agreed by the EPA. The OMP shall include measures to control potential sources of odour nuisance, including inter alia, provisions regarding:

- Adequate resources and training on-site to provide for the maintenance, monitoring and operation of the landfill gas extraction system
- Acceptance and management of odorous waste deliveries
- Use of sacrificial gas extraction systems; phased capping of the waste body; and an interim capping system at inter-cell boundaries
- Monitoring: VOC surface emissions from capped areas

- Identification of fugitive sources of landfill gas emissions (e.g. from leachate management infrastructure)

In relation to surface emissions from the waste body and identified features, the following shall constitute a trigger level:

- VOC greater than or equal to 50ppmv average over capped area; or

- VOC greater than or equal to 100ppmv instantaneous reading on open surfaces within the landfill footprint;  
or

- VOC greater than or equal to 500ppmv around all identified features.

**Further information at:**

<http://www.epa.ie>

Box 1-3: Odour Management Plan at Irish landfills

Experience shows that landfill gas surveys are effective tools to tackle the problem and the EPA will continue the work in that field. In addition, the implementation of an Odour Management Plan (OMP) and the recently published EPA guidance on waste pre-treatment (including reduction in biodegradable wastes to landfill) will assist. A guidance document of good practices and key operational practices will be prepared and delivered via technical seminars for landfill managers.

#### Information on leachate management on Irish landfills

Ireland has a comparable low share of landfills with leachate treatment. Most of the landfills are reliant on tanker system due to the location of the landfills in very rural parts of the country. However one criterion for the site selection is the isolation from important local surface-water courses, so it is rare to find a landfill proximate to a substantial watercourse that can accommodate a discharge of treated leachate. The municipal waste water treatment plant has to approve the capacity for receiving the leachate transported by tanker trucks for further treatment. Some of the landfills also discharge direct to municipal sewer pipe with/or without prior BOD reduction. Recirculation can also be used in cases where there is a capacity pinch.

When a landfill is at the design stage the capacity of the storm-water and leachate holding tanks is established based on long storm return periods. The conditions for water balance calculations are laid down in the EPA manual for the designing of landfills.

Fully functioning leachate treatment plants are very expensive to construct and operate, especially if the discharge has to meet salmonid standards at point of discharge, because of protected small water with low dilutions which is a typical situation for rural landfills. Large Municipal plants are generally in a better position to accept these waste waters.

However if an operator wants to construct an on-site leachate treatment plant, the EPA accommodates this. In future it is expected that the quality of the leachate will diminish significantly due to the diversion targets for bio-waste from landfills, thus undermining the economics of constructing a sophisticated treatment plant at a remote landfill.

#### 1.1.4 *Major problems and deficits identified in Ireland*

- Heavy reliance on landfills as other waste management infrastructure options are limited
- High share of biodegradable fraction at landfills
- A risk of falling short of the EU obligations for biodegradable waste diversion under current conditions
- Continued increase of municipal waste generation
- Decreasing gate fees for landfills during the last years due to capacity raising; thus leaving landfilling cheap treatment option
- Low share of landfills with gas management
- Uncertainty and problems with waste collection market
- Existence of comparable high costs for separate collection due to small population density
- Existence of immature unevenly distributed waste pre-treatment infrastructure
- No provision of economic incentive to deliver appropriate pre-treatment infrastructure
- Collapse of market for co-incineration of plastics in cement kilns due to financial crisis

#### 1.1.5 *Examples of good practice identified as potential tools to improve implementation and enforcement in Ireland*

- Publishing of MSW pre-treatment guidance (June 2009) and standards for stabilisation of bio-waste by EPA
- Establishment of compost standard together with national and European composting association
- Achievement of substantial progress in the areas of prevention, recycling, WEEE and development of waste management and waste prevention programmes
- Introduction of the plastic levy about 10 years ago (about 22 cent/bag); supply to an environmental fund
- Introducing of strict limits for leachate and recycling of leachate water to drive bioreactors
- Adoption of existing landfills to the EU standards within the last years and dramatically improvement of quality

- Closure of old landfills and development of remediation plan
- Provision of landfill funds for neighbouring communities to increase acceptance (community gain)
- Obliging landfill operator within the license procedure to an Odour Management Plan (OMP) to ensure the tracking and reducing of nuisance
- Mapping of VOC emissions on landfill for identification of hot spots and the development of measures to reduce emissions
- Community gain (funding) and access to information is an important aspects of landfill licences in Ireland, including the provision to set up an Environmental Management Scheme

#### 1.1.6 *Priority activities for waste management in Ireland*

- Need of dramatic measures to meet diversion target for bio-waste in 2010 ; currently 0.5 million t of bio-waste being landfilled above the target units
- Establishment of political and regulatory certainty to ensure commercial feasibility of private investment in waste infrastructure alternatives
- Clarification of roles and responsibilities of the State in regulation and management of waste sector and in provision of services at national, regional and local level
- Increase of separate collection of bio-waste has as facilities and market for high quality compost are available
- Coordination of regional waste management plans at national level to maximise potential economies of scale
- More separation at source of origin of waste
- Installation of thermal treatment capacity with energy recovery
- Installation of thermal treatment or landfill capacity for hazardous waste
- Installation of biological treatment including composting, anaerobic digestion
- Installation of reprocessing re-processing capacity for recovered materials (e.g. paper, glass and plastic recycled materials)
- Increasing landfill levies and gate fees
- Provision of capital incentives to promote composting

- Training of staff
- Planning and regulation of municipal waste collection as high level of private involvement causes problems
- The uncertainty about what direction the Irish waste policy will move to has to be removed and decisions on which alternatives will be prioritised on political level has to be taken

1.1.7 *Proposals, suggestions and needs addressing the EU Commission*

- Clarify to what extent stable non-reactive hazardous waste (i.e. asbestos waste) is allowed to deposit on non-hazardous waste landfill before the classification of the site has to be changed (important implications for EIA also)
- Provide clarification on measuring on remaining biodegradability (stability standard) prior to landfilling of pre-treated biodegradable fraction -> We rephrased this comment for better understanding
- Develop a European composting standard

## 2 Annex II: Agendas and participation lists

### 2.1 Agenda of workshop on landfill of waste in Ireland 2009

07 May 2009

9:30	<b>Registration, Come together, including Coffee</b>
<b>Chair:</b> DOEHLG, BiPRO	
10:00	Representative of DOEHLG <i>Opening of the Workshop</i>
10:10	Anke Joas, BiPRO <i>Introduction to the EU Project</i>
<b>I. RELEVANT LEGISLATION AND STATUS QUO</b>	
10:20	Nicole Seyring, BiPRO <i>Overview on relevant European legislation – The Landfill Directive</i>
10:50	Jose-Jorge Diaz del Castillo, European Commission <i>Status and problems with the implementation of European legislation for landfills</i>
11:15	John O Neill, Environmental Inspectorate, DOEHLG <i>Overview of Landfill in Ireland</i>
11:35	Jonathan Derham, EPA <i>The new EPA Landfill pre-treatment guidance</i>
11:55	Question and Discussion
12:30	<b>LUNCH BREAK</b>
<b>II. PRACTICAL ASPECTS OF WASTE MANAGEMENT PLANNING AND WASTE PREVENTION</b>	
<b>Chair:</b> BiPRO	
13:30	Anke Joas, BiPRO <i>Legal requirements for acceptance and control during operation of landfills</i>
13:50	Jim Moriarty, EPA <i>Odour Management at Landfills</i>
14:10	Alan Quirke, Ireland's National Policy Advisory Body for Enterprise and Science (Forfás) <i>Waste Management and Competitiveness in Ireland</i>
14:30	Claire Downey, Confederation of European Waste-to-Energy Plants (CEWEP) <i>Meeting Ireland's Landfill Diversion Targets</i>
14:50	Margaret Heavey, Greenstar Ltd. <i>Implementation of Landfill Directive 1999/31/EC and Council Decision 2003/33/EC at Non-Hazardous Landfills</i>
15:10	<b>COFFEE BREAK</b>
15:25	Michael Bergin, KTK Landfill <i>Design, operation and closure of a non hazardous landfill in compliance with requirements of Landfill Directive 1999/31/EC and Council Decision 2003/33/EC</i>
15:45	Nicole Seyring, BiPRO <i>Experiences from Previous Events</i>
16:05	Nicole Seyring, BiPRO (on demand) <i>Examples of good practice for waste management planning and waste prevention</i>
17:00	<b>END OF DAY ONE</b>

8 May 2009

<b>III. EXCURSION</b>	
<b>8:30</b>	<b>Excursion to Ballymount Materials Recycling Facility</b>
<b>14:00</b>	Helen McNamara, Environment and Engineering, Dublin City Council <i>Introduction to Facility</i>
	<b>Excursion to Arthurstown Landfill</b>
	John Smith, Arthurstown Landfill <i>Modern Landfill: An overview</i>
<b>14:00</b>	<b>END OF WORKSHOP</b>

Table 2-1: Final agenda for the workshop on landfill of waste in Ireland 2009

## 2.2 Participation list of workshop on landfill of waste in Ireland

	Name	Institution	Phone/Fax	E-mail	Address
1	Mr Jorge José Diaz del Castillo	EU Commission, DG Environment	+32 2 2968263	Jose-Jorge.Diaz-Del-Castillo@ec.europa.eu	Avenue de Beaulieu 5, B-1049 Brussels
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5	Ms Brendan O'Neill	Department of Environment, Heritage and Local Government (DoEH&LG)	+353 1888 2000	Brendan.oneill@environ.ie	Custom House, Dublin 1, Ireland
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12	Mr PJ Lianne	Kilkee Town Council Mayor	+353 876964428	pjlinnane@gmx.com	Corbally, Kilkee, Co. Clare
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17	Mr Éamonn Walsh	Louth County Council Director of Services	+353 42 9324212	Eamonn.Walsh@louthcoco.ie	County Hall, Millennium Centre, Dundalk, C. Louth
18	Mr Alan Quirke	Ireland's National Policy Advisory Body for Enterprise and Science (Forfás)	+ 353 16 07 3273 Fax: +353 160 73 276	Alan.quirke@forfas.ie	Wilton Park House Wilton Place, Dublin 2

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Table 2-2: Final participant list for the workshop on landfill of waste in Ireland 2009

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