

State of the Nation Report

Landfilling Practices and Regulation in Scotland

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SCOTLAND

1. Summary of Solid Waste Management Sector

Historically, Scotland, in common with the rest of the UK, has relied on landfill for the disposal of most waste streams. With increasingly expensive operational costs, tight regulations and the introduction of the landfill tax in 1996, landfill is no longer considered a cheap option. Landfill is now considered the lowest environmental priority option for treating and disposing of waste within the waste hierarchy.

Landfill Classifications

In Scotland Landfills are categorized as Inert, Non-Hazardous or Hazardous. The table below gives an overview of the number and type. Municipal Solid Waste falls in the non-hazardous category. Scotland's landfills are predominantly located along the East Coast and Central part of Scotland.

Type of Landfill	Active in 2009		Not active in 2009		Total	
	Number	Remaining capacity(tonnes)*	Number	Remaining capacity (tonnes)*	Number	Remaining capacity (tonnes)*
Inert	18	7,181,875	3	Not available	21	7,181,875
Non-hazardous	45	61,344,910	4	4,275,000	49	65,619,910
Hazardous	1	358,056	0	0	1	358,056
Total	64	68,884,841	7	4,275,000	71	73,159,841

*for some sites, remaining capacity figures have not been reported or are irrelevant due to sites entering restoration phase.

[Table taken from SEPA (2009) Landfill Capacity Report for Scotland]¹

Waste generation rates (total or per capita) in million tonnes

Waste type	2004	2005	2006	2007	2008
Household	2.77	2.87	2.97	3.00	2.94
Commercial	6.54	6.21	5.07	5.48	5.75
Industrial-other	2.58	2.36	2.71	2.75	2.19
Industrial – C&D	6.15	10.61	8.03	9.44	8.63
Total	18.04	22.05	18.78	20.67	19.51

[Table taken from SEPA (2010) Waste Data Digest 10: key facts and trends]²

¹ SEPA (2009) Landfill Capacity Report for Scotland,

http://www.sepa.org.uk/waste/waste_data/site_capacity_infrastructure/landfill_capacity_reports.aspx

² SEPA (2010) Waste Data Digest 10: key facts and trends (http://www.sepa.org.uk/waste/waste_data.aspx)

The amount of waste in Scotland's Landfills based on 2009 permit figures³ ranges from 12,000 tonnes in place at the smallest landfill through to 22,073,075 tonnes at the largest landfill. A rough estimate based on the same permit figures gives a total-in-place waste in Scotland's Operational Landfills of 82,000,000 tonnes. The annual waste acceptance rates for landfills in Scotland in 2009, ranged from 1,000 to 1,300,000 tonnes. The total accepted rate of waste to Landfill for 2009 was 3,345,553, which was below the total annual permitted capacity of 9,505,897. The dates for ceasing landfill as at 31 December 2009 range from September 2010 (the earliest landfill to be closed) until June 2090 (the latest to be closed).

The table below gives the waste composition and basic characterization of landfilled waste in Scotland during the period 2004 through 2008

Controlled waste disposed to landfill in thousand tonnes

Waste type by EWC-STAT* code	2004	2005	2006	2007	2008
3 Other chemical wastes	39.62	24.82	24.13	24.31	27.77
7 Non-metallic wastes	54.14	31.76	34.64	21.03	30.64
9 Animal and vegetal wastes	105.93	63.71	31.46	27.62	62.35
10 Mixed ordinary wastes	3,905.03	3,648.24	3,523.33	3,491.95	3,220.30
11 Common sludges	25.12	91.09	59.26	41.76	42.91
12 Mineral wastes	3,520.37	3,387.42	3,448.18	3,621.61	2,613.46
Other EWC-STAT codes	164.66	69.68	108.05	143.56	138.43
Total	7,814.87	7,316.72	7,229.05	7,371.83	6,135.85

*European Waste Catalogue for statistics

[Table taken from SEPA (2010) Waste Data Digest10: key facts and trends]⁴

In 2008, the main waste streams landfilled⁵ were mineral wastes (including construction and demolition waste) and mixed ordinary wastes (including municipal waste). Together these waste streams comprise 95% of the total. About 31% of waste landfilled originates from households and the remainder is produced by commerce and industry.

³ http://www.sepa.org.uk/waste/waste_data/site_capacity__infrastructure/landfill_capacity_reports.aspx

⁴ SEPA (2010) Waste Data Digest 10: key facts and trends (http://www.sepa.org.uk/waste/waste_data.aspx)

⁵ SEPA (2010) Waste Data Digest 10: key facts and trends (http://www.sepa.org.uk/waste/waste_data.aspx)

Landfill Inventories

Existing landfill inventories for Scotland can be found at:

http://www.sepa.org.uk/waste/waste_infrastructure_maps.aspx

2. Overview of Landfill Practices

Landfill management practices

In Scotland the operation of waste management, including landfill, is regulated by the Scottish Environment Protection Agency (SEPA)⁶. All landfill sites are now constructed and operated to strict technical standards in order to reduce environmental effects. When waste is received it is weighed and checked to ensure it is compliant with its landfill operating licence. The waste is compacted and covered to prevent odour, litter, and pest infestations. Leachates and gas from the decomposition process, are removed through a system of pipes. The leachates are then usually treated, while the gas may be burnt off or used in an on-site energy generation plant which contributes energy to the national grid. When landfill has reached maximum capacity it is covered completely with an engineered cap, e.g. using clay and restored using soils or other covering materials so that the sites can be used for agriculture, amenities or nature conservation

All permitted landfills in Scotland are engineered with leachate collection, a sealing system and a geological barrier. Landfills in Scotland are required to collect and treat leachate, protect ground and surface water. Operators are also required to monitor landfill leachate, ground water and surface water. The SEPA provides guidance documents on: landfill gas management; monitoring; engineering (lining and capping); hydrogeological risk assessment; financial provision; waste acceptance and disposal; habitats guidance, which are available at http://www.sepa.org.uk/waste/waste_regulation/landfill.aspx

Current Status and Trends for Landfill Design

The general policy for management of landfill gas is laid down in the Landfill Directive; gas must be controlled, collected and where possible utilised and any residual gas combusted in an enclosed flare. SEPA encourages operators to maximise utilisation of landfill gas. Permit applications require a risk assessment that demonstrates through modeling that there will be sufficient capacity to collect and use the predicted quantities of gas. On operational sites SEPA practices emissions based regulation. The aim is to balance the benefits to the global atmosphere from methane combustion with the local impacts of emissions from combustion of the gas. Targets on individual emissions are set on best practice and beyond the boundary of the site National Air Quality standards are applied. Operators report annually on emissions from engines, enclosed flares and landfill surfaces using monitoring guidance issued by SEPA.

SEPA provides Technical Guidance documents on Landfill Gas Management, Monitoring, Engineering (lining and capping), Hydrogeological Risk Assessment, Waste Acceptance and Disposal.

⁶ http://www.sepa.org.uk/waste/waste_regulation/landfill.aspx

3. Key Stakeholders in the solid waste disposal sector relating to Landfill

Some of the key Stakeholders connected to Landfill in Scotland include: Scottish Environment Protection Agency, Zero Waste Scotland, Local Authorities, Chartered Institution of Wastes Management (CIWM), the Scottish Environmental Services Association and the Environmental Services Association, Private Waste Management Companies, Consultants and Equipment suppliers.

4. Legal and Policy Frameworks for Landfill

Current legal framework

In Scotland Landfills are regulated by the Waste Management Licensing Regulations 1994 and the Pollution Prevention and Control (Scotland) Regulations 2000⁷. These regulations require that the landfills comply with the Groundwater Directive. In this respect landfill sites should be subject to 'requisite surveillance'.

The Landfill Directive 1999 is implemented in Scotland through the Landfill (Scotland) Regulations 2003 and the Pollution Prevention and Control Regulations. The Directive requires that a control and monitoring programme be carried out and that control and trigger levels be established for groundwater. The Directive also sets out other monitoring requirements for leachate, groundwater and surface water

The world-leading Climate Change (Scotland) Act was passed unanimously by the Scottish Parliament in 2009.

Policies or mandates that may affect waste streams

The Landfill Directive (1999/31/EC) aims to reduce, as far as possible, the negative effects of landfilling waste. It sets targets and timescales for reducing the amount of biodegradable municipal waste (BMW) sent to landfill and from this the UK government has identified the maximum amount of BMW that the UK can landfill for certain target years up to 2020. A proportion of these targets have been allocated to Scotland.

To meet its landfill targets Scotland has the Landfill Allowance Scheme (LAS)⁸. This scheme was introduced by the Landfill Allowance Scheme (Scotland) Regulations 2005 which came into force in April 2005 and identify SEPA as the competent monitoring authority.

Failure to meet the BMW landfill targets may result in fines for the UK. To ensure that Scotland does not exceed its part of the UK's target, the Scottish Government has allocated annual BMW landfill allowances to each Scottish local authority until the 2009/2010 financial year. These allowances are set out in Annex B of the Landfill Allowance Scheme (Scotland) Regulations 2005 - Scottish Executive Guidance: March 2007.

The following regulations also affect the waste sent to landfill:

1. Packaging Waste Directive (1994/62/EC)

The Packaging and Packaging Waste Directive aims to harmonise measures concerning the management of packaging and packaging waste and in particular, obligates the UK to meet targets for the recovery and recycling of packaging waste. The Directive covers all packaging placed on the Community market. Targets are set as a percentage of packaging flowing into the waste stream.

In Scotland the Packaging Directive was implemented with the Producer Responsibility Obligations (Packaging Waste) Regulations 2005, with further changes being made to the

⁷ http://www.sepa.org.uk/waste/waste_regulation/landfill.aspx

⁸ http://www.sepa.org.uk/waste/waste_data/municipal_waste/landfill_allowance_scheme.aspx

Regulations in 2007. The changes require volumes and weights of packaging to be the minimum necessary to maintain safety and hygiene. Producers of waste are made responsible for proving that their waste is diverted from landfill by getting Packaging Waste Recovery Notes (PRNs) from accredited re-processors or recyclers. The Regulations sought a 60% overall recovery and 55% minimum recycling of packaging waste by the end of last year, with specific recycling targets for each commodity.

Further changes to the Regulations have more recently been consulted upon following the publication of the UK's Packaging Strategy in 2009. Changes proposed include higher targets for each material type and greater transparency on how PRN funds are spent.

2. End of Life Vehicles Directive 2000/23/EC

The purpose of the End of Life Vehicles (ELV) Directive is to prevent waste from end of life vehicles and promote the collection, reuse and recycling of their components. It sets recycling targets and will require producers, dismantlers and shredders to establish collection systems for ELVs.

The End of Life Vehicles Directive 2000/23/EC resulted in the End of Life Vehicle (Producer Responsibility) Regulations 2005 dealing with cars and other vehicles. For motor cars, this aims to increase the recovery and recycling of old cars by requiring the use of authorised treatment facilities (ATFs) for their breakdown and reprocessing, and manufacturers are charged with the collection and recycling of their own-brand vehicles. The Regulations deal with metals, oils, batteries, tyres, plastics and WEEE from end of life vehicles. They set escalating targets for reuse and recovery. They require free take-back from 2007. These Regulations were a prequel to the government's Scrap Vehicles scheme described below.

- Car Scrappage Scheme

The UK car scrappage scheme was set-up to take older cars off the roads, to encourage the new car market, and by working through dealers ensure returned cars are recycled as far as possible. In order to qualify for the £2000 payment, cars to be scrapped had to be 10 years old or more, the car to be purchased had to be new, the buyer had to have owned or kept the vehicle for at least twelve months, it had to have a valid MOT. Vans up to 3.5 tonnes also qualified for the scheme which was voluntary. Initially due to end in February 2010, the scheme ended March 2010.

The End-of-Life (Producer Responsibility) Regulations 2005, implementing Articles 5(1), (2), (4) and 7 of End-of-Life Vehicles Directive (2000/53/EC) is also applicable in Scotland, Northern Ireland and Wales. Regulatory targets for the reuse, recovery and recycling for end-of-life vehicles treated at authorised treatment facilities (Regulation 18) are the same across all regions of the UK.

3. EU Batteries Directive:

The earlier relevant legislation includes the EU Directive 1991/157/EEC on Batteries and Accumulators as well as 1993/86/EEC and 1998/101/EC. A new Batteries Directive came into force in September 2006 and the UK transposed this into law during 2008.

The Waste Batteries (Scotland) Regulations 2009 updated the Environmental Protection Act 1990, the Environment Act 1995, the Waste Management Licensing Regulations 1994, the Pollution Prevention and Control (Scotland) Regulations 2000 and the Landfill (Scotland) Regulations 2003 in line with requirements of the Batteries Directive (2006/66/EC)

4. Waste Electrical And Electronic Equipment Directive (WEEE):

Two European Directives exist relating to WEEE. These are Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE), and Directive 2002/95/EC governing the use of hazardous substances.

As for England and Wales, the Waste Electrical and Electronic Equipment Regulations 2006 transpose the main provisions of the WEEE Directive (2002/96/EC) and its subsequent amendments in Scotland.

The Waste Management Licensing Amendment (Waste Electrical and Electronic Equipment) (Scotland) Regulations 2007 transpose the permit requirements of Article 6 and Annexes II and III of the WEEE Directive (2002/96/EC), and amend the Waste Management Licensing Regulations 1994 to facilitate the grant or variation of waste management licences in respect of WEEE

5. EU Hazardous Waste Directive

A series of pieces of legislation set rules identifying hazardous materials, their controlling management, reprocessing and disposal to ensure public and environmental safety. The materials affected are listed in the European Waste Catalogue (EWC) 2002.

In Scotland, the Special Waste Regulations 1996 and The Special Waste Amendment (Scotland) Regulations 2004 set out procedures to be followed when disposing of, carrying and receiving special waste, and transpose the Hazardous Waste Directive (91/689/EC). The Special Waste Regulations 2006 are the principal piece of legislation covering special waste arising in Scotland.

The sources of waste include fluorescent tubes, cleaning fluids, batteries, oils, electrical goods, commercial facilities including photographic processors, vehicle re-processors, television and computer re-processors.

From 2004 co-disposal of hazardous and non-hazardous waste was banned. A producer registration scheme was entered-into in 2005, with waste being catalogued and sent for authorised recovery or re-processing. And from 2005, pre-treatment before disposal was introduced, with a Waste Acceptance Procedure under Waste Acceptance Criteria (WAC).

6. Waste Oil Directive 75/439/EEC.

The Waste Oil Directive 75/439/EEC prioritises regeneration of waste oil, for use again as oil. Currently, most waste oil in the UK is treated and used as a fuel substitute for virgin oil (primarily in power generation and kilns).

Waste oil is subject to the requirements laid down in the Control of Pollution (Oil Storage) Regulations 2003 and the Waste Incineration (Scotland) Regulations 2003, as well as the Special Waste Regulations 1996 and its subsequent amendments.

7. Household Waste Recycling Act 2003

The Act requires local authorities in England to collect separately at least two separate recyclable fractions of household waste by 2010.

5. Domestic Country Strategy

The Scottish Government launched Scotland's first Zero Waste Plan on the 9th June 2010⁹. Scotland's Zero Waste Plan sets out the Scottish Government's vision for a zero waste society. This vision describes a Scotland where all waste is seen as a resource; Waste is minimised; valuable resources are not disposed of in landfills, and most waste is sorted, leaving only limited amounts to be treated. This plan implicates landfills by placing a ban on specific waste types that can be received, in order to reduce greenhouse gas emissions and capture value from resources. Furthermore Scotland has set a new target, to have only 5 percent waste sent to landfill by 2025.

List the elements the country is using and plans to use to overcome the barriers and promote methane emission reductions from landfills.

As mentioned above Scotland has established a Zero Waste Plan which is aimed to help reduce methane emissions from Landfills. In connection with the Zero Waste Plan the Scottish Government has developed the proposed Zero Waste (Scotland) Regulations 2011. A public consultation is currently underway on the proposed Regulations¹⁰. This consultation covers 3 actions relating to the introduction of regulatory measures to:

- require source segregation and separate collection of specified waste materials;
- restrict input to landfill (effectively banning materials which could be re-used or recycled or which could be used to produce energy); and
- restrict inputs to Energy from Waste facilities (effectively banning materials which could be re-used or recycled).

Scotland also has the Landfill Allowance Scheme, to help reach the landfill targets laid out in the Landfill Directive (1999/31/EC)¹¹. The Landfill Allowance Scheme puts restrictions on waste that is or contains biodegradable municipal waste (BMW).

Scotland has very recently adopted a world-leading approach to measuring recycling performance with a new carbon metric. The new measurement means that climate change impacts will be considered in targets for achieving zero waste from 2013 onwards. Under the new system, tonnage diversion levels will be additionally weighted by applying a 'carbon factor' to the materials collected, which takes into account the environmental benefits of recycling those materials over sending them to landfill. This is believed to be the first attempt anywhere in the world to apply climate change thinking to waste management performance measurement.

⁹ <http://www.scotland.gov.uk/Topics/Environment/waste-and-pollution/Waste-1/wastestrategy>

¹⁰ <http://www.scotland.gov.uk/Publications/2011/02/09135833/0>

¹¹ http://www.sepa.org.uk/waste/waste_data/municipal_waste/landfill_allowance_scheme.aspx

6. Conclusions and Observations

While the UK is the 'Member State' in the EU and all targets and potential fines refer to the UK, waste is a devolved responsibility in Wales and Scotland. Separate regulations are in force in England, Wales and Scotland for waste strategic policy and for the implementation of Directive. England and Wales share a regulation Agency (the Environment Agency) but Scotland has its own (SEPA).

Operational management at landfill sites may be similar across the UK particularly where the landfill is owned by a multinational organisation; however, national strategic policy relating to landfill targets is different. As shown earlier landfill as a disposal treatment has reduced substantially in the past 10 years and that trend will continue and increase in the next 10 years as waste prevention and recycling initiatives take hold and other treatment technologies are implemented.

Due to the history of landfill in the UK (and the almost unique geology) there is a wealth of expertise not only in design and operational aspects but also in leachate and landfill gas capture. That expertise has been taken to many developed and developing countries and will continue to do so.

It is anticipated that landfill will continue in the UK as it will in many countries but the waste stream will be reduced in quantity and change in quality. Landfill Directive targets will reduce the Biodegradable Municipal Waste tonnages sent to landfill and it is likely that long term the only waste going to landfill in the UK will be the residue of other treatment technologies.

All the nations in the UK are considering extending the ban on certain waste streams going to landfill, in addition to those listed earlier. This initiative which has proven to be successful in other European countries would result in even more waste being diverted from landfill and utilised as a resources.