

Hazardous waste in the European Union

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1. Introduction

Hazardous waste is a very sensitive topic for different sectors of our society. Due to the harm it may cause to health and the environment, this is a particularly important field within the domain of environment statistics. Therefore, this publication intends to present information and to explain the main problems.

For the purpose of this document, Eurostat has analysed the results of the 1998 Eurostat/OECD questionnaire on the state of the environment which is sent out to the Member States every two years, thus constituting a primary source of information.

After scrutinising the data from 15 Member States as well as Norway, Iceland and Switzerland, Eurostat estimates that the total amount of hazardous waste generated in the European Union accounted for, approximately, 27 million tonnes during the mid 90s. Note that this figure may only be stated with care, due to the different classifications and definitions used by each country. In trying to establish comparable statistics for hazardous waste, it becomes obvious that the existence of international and national classifications –many of which are not harmonised- complicates the situation.

Looking at the annual variations that take place, it is noted that the amount of hazardous waste generated is increasing. Nevertheless in some countries the data shows a decrease in the generation (Germany, Netherlands and UK). A further disaggregation of the figures provided would permit an improved evaluation of the situation.

Regarding treatment and disposal of hazardous waste, landfilling and incineration are clearly the practices most used. In general, the highest amounts of hazardous wastes are landfilled. In the near future, with the implementation of the Council Directive on landfill of waste, landfilling will be regulated and restricted. In some countries, however, such as Netherlands and France, the amount of hazardous waste landfilled has already decreased during the 90s. Incineration is also a rather common treatment method in most countries. Denmark, France and Switzerland incinerate more than 30 % of the total amount of hazardous waste generated or managed.

Hazardous waste treatment and disposal plants are essential in order to avoid uncontrolled dumping. Therefore, countries should make an effort to provide the necessary information on these facilities in order to permit a further analysis of the needs.

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2. Generation of hazardous waste

The joint Eurostat/OECD questionnaire collects data on the generation of hazardous waste as defined in the Basel Convention¹. The waste categories listed in the questionnaire (Y1-Y18), refer to the 18 categories of waste streams to be controlled according to the Basel Convention on the control of transboundary movements of hazardous wastes and their disposal. If data according to the Basel definition are not available, amounts can be given according to national definition. In fact, Member States still report their hazardous waste generation mostly according to national specific classifications.

The total amount of hazardous waste generated according to national classifications used by each country is shown in **Table 1**. The values correspond, in general, to the latest available data. As the data are based on national definitions, comparisons between countries are only indicative. However, changes over time for each country show that the amounts of hazardous waste generated decreased in Germany, Luxembourg, Netherlands and UK, while Flanders, Denmark, Spain, Austria and Norway show increasing tendencies. Large variations over time in some countries such as Spain or Finland suggest that the list of wastes considered hazardous may have changed during the period observed. In **Table 1** the total amounts generated show figures on the production of hazardous waste per capita. Once more, due to the differences between the definitions and classifications used in the countries it is not intended to establish a comparison between countries. The amounts of hazardous waste generated per capita in the different European countries may vary from approximately 18 kg in Sweden to 276 kg in Flanders. This high amount of hazardous waste registered in Flanders - is due to the fact that more than 50 % of the total hazardous waste generated in Flanders is hazardous waste stemming from waste treatment. It is also important to point out that in Luxembourg the amount of hazardous waste generated (481 kg/inhabitant) is due to the fact that a large site rehabilitation and decontamination has taken place in this period.

In recent years politicians and the public have become aware of the dangers of hazardous waste to the environment and to the population due to the problems of contaminated sites and relating health problems. To support politicians in their decisions,

there is a clear need for more precise and reliable statistics based on harmonised definitions.

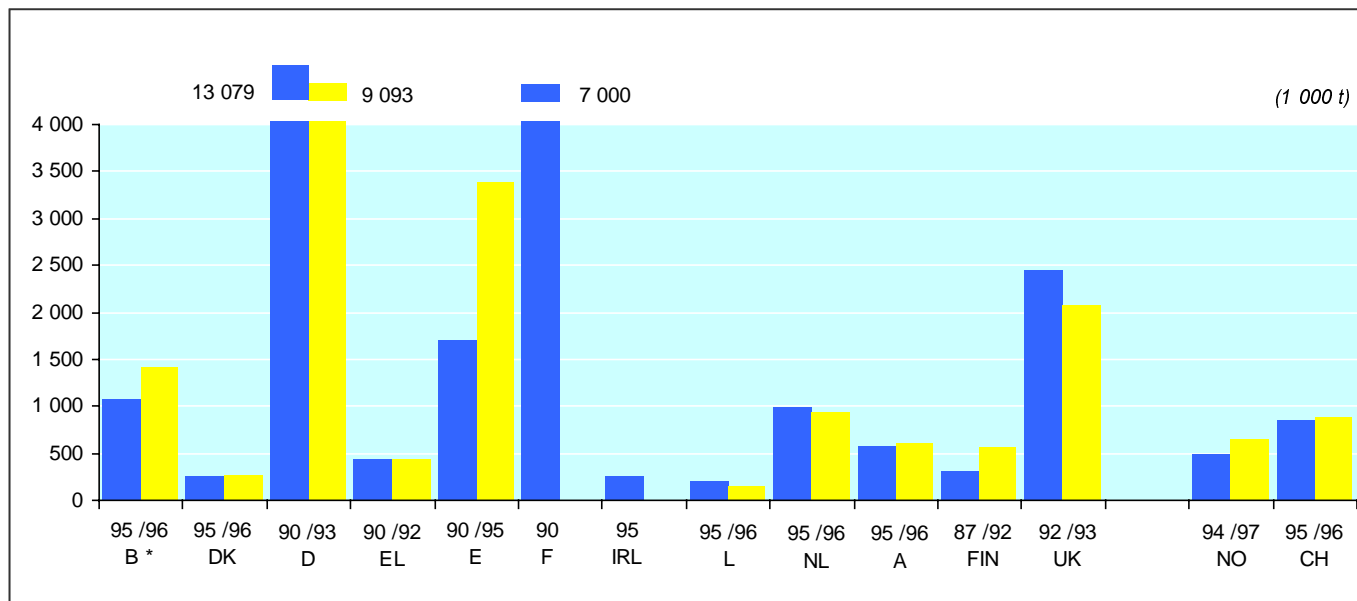
Table 1: Amount of Hazardous waste generated (national classification)

		Total (1 000 t)	kg per capita
Belgium (Flanders)	1994	1 033	177
	1995	1 079	184
	1996	1 410	240
	1997	1 625	276
Denmark	1994	194	37
	1995	252	48
	1996	269	51
	1997	252	48
Germany	1990	13 079	165
	1993	9 093	112
Greece	1990	450	44
	1992	450	44
	1997	350	33
Spain	1990	1 700	43
	1995	3 394	84
France	1990	7 000	123
Ireland **	1995	248	69
Luxembourg	1990	116	304
	1993	86	216
	1994	81	201
	1995	197	481
	1996	157	377
	1997	142	341
Netherlands	1990	1 040	70
	1992	1 430	94
	1993	883	58
	1994	837	54
	1995	983	64
	1996	930	60
Austria	1990	668	86
	1992	398	64
	1993	478	72
	1994	513	75
	1995	577	72
	1996	606	75
Finland	1987	314	64
	1992	559	111
Sweden *	1990	154	18
	1994	139	16
United Kingdom	1992	2 452	42
	1993	2 077	36
Norway	1994	500	115
	1997	640	146
Switzerland	1991	738	109
	1992	837	122
	1993	715	103
	1994	870	124
	1995	856	122
	1996	888	126

Notes: * Sweden: according to the Basel Convention
** Ireland: including recovery on site

¹ Signed in 1989 under the auspices of UNEP (United Nations Environment Programme), and regulating the transboundary movements of hazardous wastes, lays down categories of waste and defines a list of characteristics which render waste hazardous.

Figure 1 : Hazardous waste – National Classification



Note: *B: refers to Flanders region

3. Management of hazardous waste: Treatment and disposal

Management of hazardous waste includes a wide range of possibilities of which prevention should be the first consideration. Poor management of hazardous waste can represent a very important danger for soil, groundwater, the health of humans and animals, and the environment in general, therefore unsafe disposal should be avoided.

The treatment and disposal operations that have been analysed in this publication refer to those listed in the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal.

Eight operations are listed in the questionnaire out of which the four most important (physico/chemical treatment, incineration, recovery operations, and waste landfilled) are represented in **Table 2**.

The corresponding figure 2, represents the percentage distribution of treatment and disposal methods of hazardous waste in the EU-15 during the mid 90s showing that landfilling and incineration are the most used practices.

Figure 2 : Percentage distribution of treatment and disposal methods of hazardous waste in the EU-15 (mid 90s)

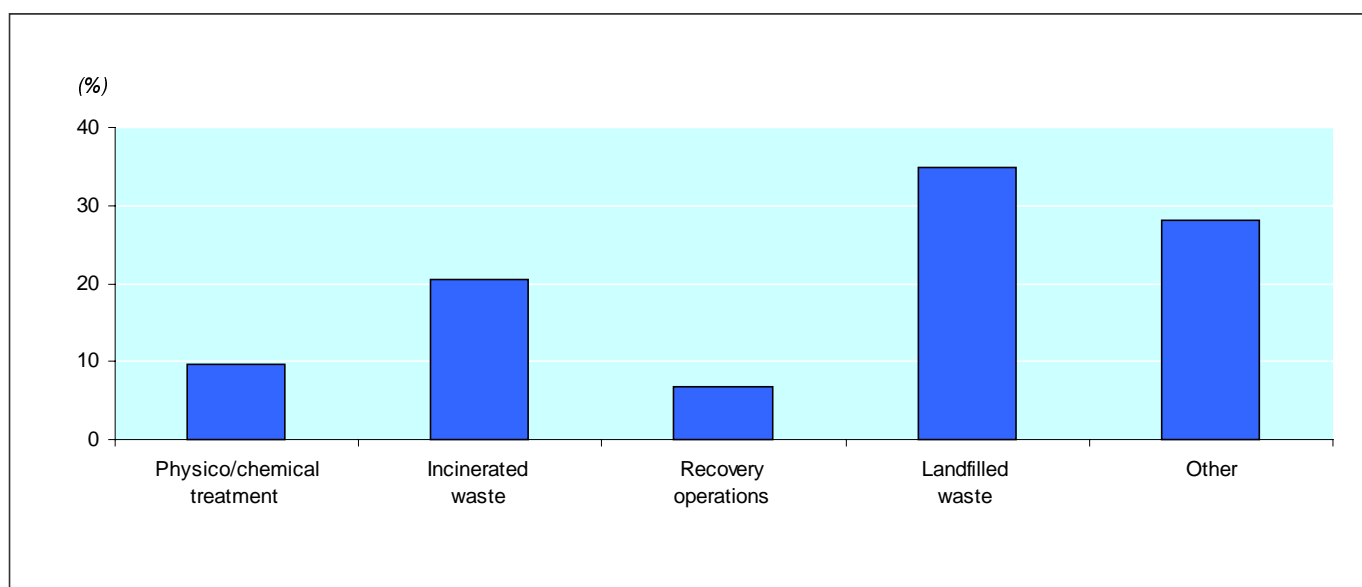


Table 2: Hazardous waste: treatment and disposal

	1 000 t	Physico/ chemical treatment	Waste incinerated	Recovery operations	Waste landfilled	Other
		D9	D10-11	R1-13	D1	
Belgium (Flanders)	1994	174	50	186	479	144
	1995	215	168	201	475	21
	1996	249	123	185	778	75
	1997	483	126	280	632	104
Denmark	1994	:	108	24	62	0
	1995	:	116	84	52	0
	1996	:	114	95	59	1
	1997	:	107	100	47	0
Germany	1990	:	2 441	:	4 626	6 012
	1993	:	2 034	:	3 254	3 805
Greece	1990	:	:	121	:	329
	1992	:	:	88	:	362
	1997	12	1	100	226	11
Spain	1990	448	:	306	974	0
France	1985	292	419	:	355	20
	1988	363	655	:	:	10
	1989	396	796	:	538	15
	1990	377	899	:	658	8
	1991	343	910	:	618	8
	1992	368	984	:	773	10
	1993	344	1 022	:	719	8
	1994	340	1 210	:	728	8
	1995	324	1 193	:	747	7
	1996	319	1 288	:	693	1
Ireland **	1995	7	50	103	5	83
Luxembourg *	1990	:	:	:	116	0
	1993	:	:	:	20	66
	1994	:	:	:	44	36
	1995	:	:	23	17	157
	1996	:	:	51	:	106
	1997	0.48	:	42	:	99
Netherlands	1990	116	180	38	270	436
	1992	165	165	36	430	634
	1993	198	148	64	150	323
	1994	176	161	69	172	259
	1995	222	189	110	148	314
	1996	258	156	91	89	336
Austria	1990	:	60	:	:	608
	1992	:	105	:	:	293
	1993	:	95	:	:	383
	1994	:	99	:	:	414
	1995	:	90	:	:	487
	1996	:	106	:	:	500
Finland	1987	27	32	145	14	96
	1992	44	44	204	23	244
United Kingdom	1992	512	158	168	1 490	124
	1993	620	185	196	931	145
Norway	1990	2	3	30	:	64
	1992	:	:	40	7	30
	1994	10	19	83	:	388
Iceland	1994	:	4	1	:	0
	1995	:	3	1	:	0
Switzerland	1991	208	252	112	159	7
	1992	287	287	94	180	0
	1993	231	254	55	171	0
	1994	220	289	38	207	0
	1995	228	282	51	177	0
	1996	246	298	47	173	0

Notes: *Luxembourg: waste landfilled includes non-hazardous waste; ** Ireland: including recovery on site

In figure 3, six countries (B-Flanders, Denmark, France, Netherlands, Finland and Switzerland) have been selected in order to show what percentages of the hazardous waste generated (or managed) are treated or disposed of. The data provided are from the replies received from the joint Eurostat/OECD questionnaire on the state of the environment.

On the one hand the structure of the national economy determines to a large extent the types of treatment or disposal methods used, on the other hand the composition and level of hazard are very important factors in the treatment of hazardous wastes.

The incineration of hazardous wastes, may lead to positive effects such as waste reduction and energy generation but, on the other hand, it has also some limiting factors such as toxic gaseous emissions, hazardous residual ash and polluted water from flue gas cleaning. Therefore, it is difficult to evaluate the burden that incineration may cause to the environment and depends on the use of other treatment or disposal methods.

An important amount (nearly 50 %) of hazardous waste is incinerated in Denmark and France while Netherlands, Finland and the Flemish region register a low percentage of incineration. For most countries, the amounts of hazardous wastes incinerated have a stable development over time.

Apart from incineration, there are many possible ways of treating hazardous waste depending on the characteristics of the waste to be treated. Treatment may be chemical, physical or biological. Physical/chemical treatment can range from 0 % (Denmark) to more than 30 % in Switzerland.

Under the category 'recovery operations' are included a list of operations that enable waste recovery

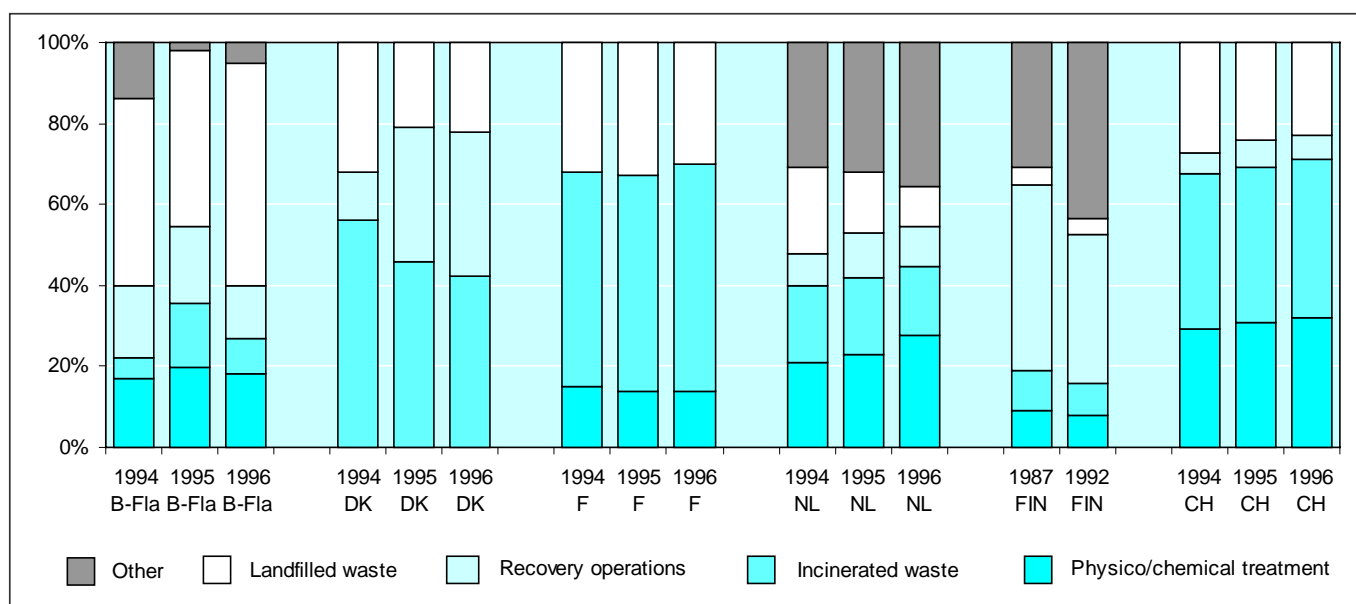
without endangering human health or causing harm to the environment. Such operations are recycling/reclamation of metals and metal compounds, recycling/reclamation of other inorganic materials, solvent reclamation/regeneration, regeneration of acids or bases etc. The data reported show a tendency to increase the amount of hazardous waste recovered using these operations.

Disposal of waste by landfill, if not properly managed, can result in the leaching of toxic substances into soil and groundwater. The EUs 15 Member States have agreed that landfill is the option of last resort and should only be used when all possibilities of treatment have been exhausted. The amount of waste landfilled depends on the national policy on waste management and on the role given to other possible actions (waste minimisation, recycling or incineration).

Landfilling can range from less than 10 % (Finland) to more than 50 % (Flanders). As has already been mentioned, more than 50 % of the total hazardous waste generated in Flanders is hazardous waste resulting from waste treatment. Since these wastes (ashes from waste incineration and waste from physico-chemical treatment of hazardous waste) are mainly landfilled, this is the explanation for the high percentage of landfilling of hazardous waste in Flanders. If waste resulting from waste treatment were excluded from the figures, the percentage of landfilled waste would be only 10 %.

However, annual variations show in general a decreasing tendency in the amount of hazardous waste used for landfill, which translates into a decrease in the burden on the environment.

Figure 3: Treatment and disposal methods of hazardous waste



4. Hazardous waste treatment and disposal facilities

One of the objectives of the Basel Convention is to control the transboundary movements of hazardous wastes. Following this objective and according to the recommendations of the Basel Convention, treatment of hazardous waste should be made as close to the source of generation as possible.

Therefore, there is a need to set up treatment and disposal facilities in order to avoid uncontrolled dumping.

Table 3 provides the data reported on waste treatment and disposal installations. A perfect separation of these installations into hazardous and non-hazardous does not exist in reality and therefore it may lead to some confusion.

An analysis of the data shows that the data availability is in general very poor. Nevertheless, the best coverage is achieved for the information on landfill sites and incineration plants.

The number of landfill sites varies considerably from one country to another and it is difficult to establish comparisons. Switzerland is the country with a higher amount of landfill sites, but the total capacity of these seems to be rather small. Finland, France and Denmark have an average of 12 landfill sites but their capacities vary considerably.

Most countries have reported the existence of incineration plants but again data on total capacity is very scarce. In general most incineration plants include energy recovery possibilities. In order to be able to evaluate the environmental pressures caused by incineration, supplementary information such as pollution abatement facilities attached to incinerators and residuals from waste incineration should be provided.

Table 3: Hazardous waste management facilities

		Treatment plants		Incineration plants		Landfill sites	
		number n	Capacity 1 000 t/year	number n	Capacity 1 000 t/year	number n	Capacity 1 000 t
Belgium (Brussels)	1997	1	30	2	1	:	:
Belgium (Flanders)	1996	33	:	4	143	b)	16
Belgium (Wallonia)	1997	35	:	1	:	b)d)	4
Denmark	1993	:	137	2	:	:	7
	1996	:	:	37	:	b)c)	13
Germany	1990	:	:	347	:	i)	222
	1993	:	:	164	:	i)	96
Greece	1990	4	:	:	:	:	:
Spain	1990	:	488	:	246	g)	:
	1995	26	:	11	:	g)	:
France	1992	:	:	45	:	:	11
	1994	:	:	48	:	:	13
	1996	:	:	51	:	:	12
Ireland	1995	:	:	7	:	:	:
Luxembourg	1990	:	:	:	:	:	1
	1992	:	:	:	:	:	1
	1994	:	:	:	:	:	1
Netherlands	1992	:	:	2	:	:	:
	1994	:	:	2	:	:	:
	1996	:	:	2	:	:	:
Austria	1990	47	200	5	55	h)	:
	1993	78	1 100	7	110	h)	:
	1997	28	465	9	174	b)	:
Finland	1993	:	:	1	150	b)	11
	1997	65	:	3	150	b)	11
Sweden	1998	70	:	10	78	e)	:
Norway	1995	25	:	1	20	:	1
	1997	25	:	1	20	:	1
Switzerland	1990	:	350	13	150	:	5
	1991	:	350	46	254	:	30
	1996	:	:	:	:	:	51

Notes:

- a) All landfill sites are controlled.
- b) All incineration plants are with energy reclamation.
- c) 2 special plants for hazardous waste.
- d) 1 special plant for hazardous waste.
- e) 8 incineration plants with energy reclamation, capacity = 64 000 t.
- f) Controlled sites for final waste only.
- g) All incineration plants with energy reclamation.
- h) 1990: 4 incineration plants with energy reclamation. 1993: 6 incineration plants with energy reclamation.
- i) The number of incinerators does not only include special hazardous waste incinerators but all combustion facilities in which hazardous wastes are burnt.
- j) Only the landfills belonging to public waste management and to the manufacturing industry including hospitals.

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