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Orientering fra Miljøstyrelsen

Waste Statistics 2000

Danish Environmental Protection Agency
Danish Ministry of the Environment

Contents

1 Introduction

In 1993, the ISAG (Information System for Waste and Recycling) was used for the first time. The 2000 reports are the eight consecutive reports.

Reports to the ISAG for 2000 cover 407 plants distributed on 299 enterprises. In 1999, reports covered 420 plants distributed on 313 enterprises.

Waste Statistics 2000 follow almost the same layout as in previous years' statistics. Chapter 2 describes general developments in waste generation, whereas Chapter 3 presents recycling of waste.

Chapter 4 deals with generation and treatment of hazardous waste, and in Chapter 5 developments in imports and exports are described, both for ordinary waste and waste subject to mandatory notification.

In Chapter 6, a detailed description of developments in waste amounts and treatment of waste from different sources is given. Furthermore, figures are compared to targets for treatment in year 2004 in the Danish Government's Waste Management Plan 1998 - 2004, Waste 21.

Chapter 7 gives an outline of Danish incineration plants and landfills.

In Chapter 8, a baseline projection of developments in waste generation up to year 2020 is presented. The baseline projection is supplemented with a projection including the effects of the initiatives in Waste 21 on the distribution of waste on treatment options.

The following statements summarise briefly waste generation in 2000:

- Total waste generation in 2000 amounted to 13,031,000 tonnes, which is 7 per cent more than in 1999.
- If amounts of residues from coal-fired power plants are kept apart from statistics, there has been an increase in waste generation of 921,000 tonnes, corresponding to 8 per cent.
- The overall rate of recycling amounted to 65 per cent, which is above the overall recycling target for year 2004 of 64 per cent.
- Waste amounts incinerated accounted for 24 per cent, which is unchanged from 1999 and in line with the overall target for incineration in 2004.
- Waste going to landfill amounted to 11 per cent, which is better than the overall landfill target for year 2004 of a maximum of 12 per cent.
- Targets for treatment of waste from the different sectors, however, are still not complied with – too little waste from households and the service sector is recycled, and too much waste from industry is led to landfill.

2 Waste generation and treatment

2.1 Waste generation 2000 and developments 1999 – 2000

Waste generation in 2000 and developments in waste arisings from 1999 to 2000 are presented in Table 1.

It is seen from the table that total waste generation, after a stabilisation in 1998 and 1999, increased to 13,031,000 million tonnes in year 2000. This corresponds to an increase of 7 per cent from the 1999 waste generation.

However, it is too early to determine whether the increase reflects a trend of increasing waste arisings in future. Such interpretations should await the 2001 waste statistics.

Table 1. Total waste generation in Denmark	'000 tonnes							Development %
	1994	1995	1996	1997	1998	1999	2000	1999-2000
Households	2,575	2,610	2,767	2,776	2,796	2,963	3,084	4
Domestic waste	1,662	1,628	1,655	1,621	1,702	1,665	1,676	1
Bulky waste	606	618	639	588	572	672	730	9
Garden waste	286	326	401	443	438	464	519	12
Other	21	38	72	125	83	163	158	-3
Institutions/trade and offices	656	834	851	861	955	955	1,119	17
Manufacturing industry etc.	2,309	2,563	2,632	2,736	2,783	2,653	2,948	11
Building and construction	2,433	2,559	3,088	3,427	2,962	2,968	3,223	9
Wastewater treatment plants	1,156	1,195	1,212	1,248	1,251	1,379	1,476	7
Slag, fly ash etc. (coal)	1,962	1,699	2,332	1,775	1,469	1,299	1,176	-9
Other	14	6	30	34	18	15	5	-65
Total	11,105	11,466	12,912	12,857	12,233	12,233	13,031	7

Sources: ISAG-reports, Danisco, Association of Danish Recycling Industries and other large scrap dealers, Elsam, Energi E2, and reports to the Danish Environmental Protection Agency on sludge from municipal wastewater treatment plants applied to farmland etc. and incineration of sludge in sludge incineration plants. (For sludge for recycling and incineration figures from 1999 have been used). Figures for sludge are stated in wet weight. Sludge in long-term storage has been included in amounts of sludge applied to farmland etc. Sludge for recovery has been included in sludge for incineration. Figures have been adjusted for imports of waste. The generation of waste is stated as the quantity of waste delivered to waste treatment plants from primary sources. For this purpose, "primary sources" means waste generators that are not waste treatment plants (reprocessing facilities, incineration plants, composting and biogas plants, and landfills). Waste such as slag, fly ash, and flue gas cleaning products from waste incineration plants is therefore not included in the statement as it would otherwise be counted twice. Furthermore, waste from the source "recycling centres/transfer stations" is distributed on other primary sources. The principles for distribution are given in Annex 2.

Waste arisings in households in 2000 amounted to 3,084,000 tonnes, corresponding to an increase of 3 per cent from 1999. The total increase, however, covers considerable variations between the different types of waste from households. Domestic waste amounts remain almost unchanged from the previous year; there has been a slight increase of 11,000 tonnes. As Table 1 shows, amounts of domestic waste in the period 1994 – 2000 have been relatively stable, showing only small variations over the years[1].

[1] Developments from 1994 to 2000 are described in more detail in section 2.5

Amounts of bulky waste and garden waste also increased in 2000, with 9 per cent and 12 per cent respectively. The group "other" decreased slightly. However, this group only constitutes a small part of waste from households and therefore has no significant impact on total amounts.

The generation of waste in the service sector [2] in 2000 amounted to 1,119,000 tonnes, which is as much as 17 per cent more than in 1999 – in actual figures an increase of 164,000 tonnes. The increase is distributed on all fractions, but it should be noted that amounts of the mixed fractions "various combustible" and "various non-combustible" increased by 11 per cent and 13 per cent respectively, amounts of food waste/other organic waste increased by 19 per cent, whereas amounts of health-care risk waste increased by 28 per cent. Amounts of separated paper and cardboard collected for recycling increased by around 3 per cent.

Amounts of waste from industry[3] also increased. From this source, the increase amounts to 295,000 tonnes from 2,653,000 tonnes in 1999 to 2,948,000 tonnes in 2000, corresponding to 11 per cent. The increase is found in the separated fractions of paper and cardboard, food waste/other organic waste, ferrous metals for recycling and various non-combustible that increased by 53 per cent, 25 per cent, 21 per cent and 15 per cent respectively. By contrast, the fractions various combustible, hazardous waste and beet soil have shown a decrease of 14 per cent, 13 per cent and 2 per cent respectively.

The generation of waste in the building and construction sector also was larger in 2000 compared to 1999 – construction and demolition waste amounts reached 3,223,000 tonnes, which corresponds to 255,000 tonnes or 9 per cent more than in 1999.

Sludge from municipal wastewater treatment plants amounted to around 1,476,000[4] tonnes in 2000, stated in wet weight. This is 97,000 tonnes more than in 1999, corresponding to an increase of 7 per cent.

Waste generation at coal-fired power plants decreased by 9 per cent corresponding to a decrease from 1,299,000 tonnes in 1999 to 1,176,000 tonnes in 2000. This is due to the fact that energy generation was lower in 2000 than in 1999. It is remarkable that for the first time in the period 1994- 2000 Denmark had net imports of power in year 2000. Another significant reason for the decrease in residues from coal-fired power plants is that energy to a still larger extent is generated from other fuels than coal and coke[5].

2.2 Treatment of waste in 2000

In the following, developments in treatment of total waste arisings are presented. Furthermore, treatment is related to targets for treatment in the Danish Government's Waste Management Plan 1998 – 2004, Waste 21.

[2] Institutions/trade and offices
[3] Manufacturing industries
[4] The statement for 2000 from municipal wastewater treatment plants of amounts of sludge applied to farmland and incineration of sludge at sludge incineration plants is not yet available. For recycling and incineration, 1999 figures from the Danish Environmental Protection Agency's sludge statistics have been used, whereas for landfilling ISAG figures for year 2000 have been used.
[5] The Danish Energy Agency's preliminary statement of energy generation, consumption and CO2 emissions

Table 2 shows that 8,461,000 tonnes corresponding to 65 per cent of total waste arisings were recycled in 2000. In actual figures this is an increase of 646,000 tonnes or an increase of 1 percentage point compared to 1999.

Table 2. Waste generation by treatment option 1996 - 2000, and target for year 2004											
'000 tonnes	**1996**		**1997**		**1998**		**1999**		**2000**		**W21**
Treatment	tonnes	%	tonnes	%	tonnes	%	tonnes	%	tonnes	%	%
Recycling	7,787	60	8,046	63	7,542	62	7,815	64	8,461	65	64
Incineration, of which	2,507	19	2,622	20	2,740	22	2,929	24	3,064	24	24
Sludge incineration plants	*170*		*177*		*161*		*138*		*156*		
Waste incineration plants with energy recovery	*2,337*		*2,445*		*2,579*		2,791		*2,908*		
Landfilling	2,524	20	2,103	16	1,868	15	1,472	12	1,489	11	12
Special treatment (1)	95	1	86	1	84	1	17	0	17	0	0

Source: As Table 1, and the Danish Government's Waste Management Plan 1998 – 2004, Waste 21.
States that waste was treated separately in a special treatment form. Covers treatment of hazardous waste, including health-care risk waste.

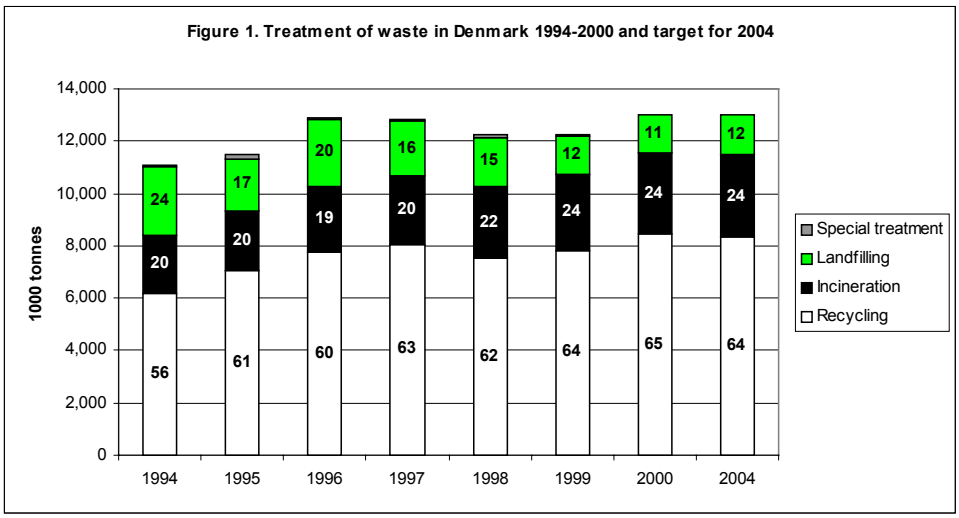
Waste led to incineration in 2000 amounted to 3,064,000 tonnes. This is actually an increase in amounts of 135,000 tonnes, but the rate of total waste amounts remains unchanged at 24 per cent. Waste led to landfill in 2000 amounted to 1,489,000 tonnes, which is a minor increase of 17,000 tonnes from 1999. The rate of waste landfilled amounts to 11 per cent of total arisings.

As the table shows, the relative distribution in recent years among treatment options has varied only little. Variations are often explained by developments in amounts of the different fractions. For example, variations in amounts of residues from coal-fired power plants and construction and demolition waste have large implications on the total rate of recycling, as these two waste types generally have a rate of recycling of 90 per cent or more.

According to Waste 21, short-term targets for stabilisation of waste generation are supplemented by a number of qualitative elements such as better exploitation of resources in waste, quality in treatment of waste and mitigation of problems caused by environmental contaminants in waste.

Overall, targets for sectors and fractions mean that the rate of recycling will increase, that more waste is incinerated, and that the need for landfilling will decrease. Overall targets in Waste 21 for waste management in year 2004 are 64 per cent recycling, 24 per cent incineration and a maximum of 12 per cent landfilling.

As Figure 1 shows, overall targets for waste treatment were already complied with in 1999. In 2000 a further diversion among treatment options has taken place, so that actually the rate of waste for recycling is higher than the target for year 2004. Correspondingly, the target for waste for landfilling has been met with a good margin.



Source: As Table 1 above. Remark that the figure has been designed in a way that total waste amounts year 2004 are similar to waste amounts in 2000. This should not be taken as an expression of projections of total waste amounts.

This is believed to be attributable to the ban on landfilling of waste suitable for incineration that came into effect on 1 January 1997. But other factors play a role.

First of all, amounts of residues from coal-fired power plants have decreased significantly, and they are furthermore recycled to a larger extent than in previous years when they were mainly landfilled.

Another significant factor is sludge. Sludge in long-term storage has been included in recycling and amounted to 510,000 tonnes in 2000. The correctness of including long-term storage in recycling may be questioned as there is no guarantee that sludge is actually recycled as intended. Furthermore, sludge consists of 99 per cent of water and therefore has a disproportionate impact.

2.3 Treatment of waste, WITHOUT residues and construction and demolition waste

Amounts of residues from coal-fired power plants not only depend on energy consumption in Denmark, but also on exports of power to Sweden and Norway. In addition, due to Energy 21 a still larger diversion is taking place from the use of coal and coke as a fuel to the use of natural gas and renewable energy.

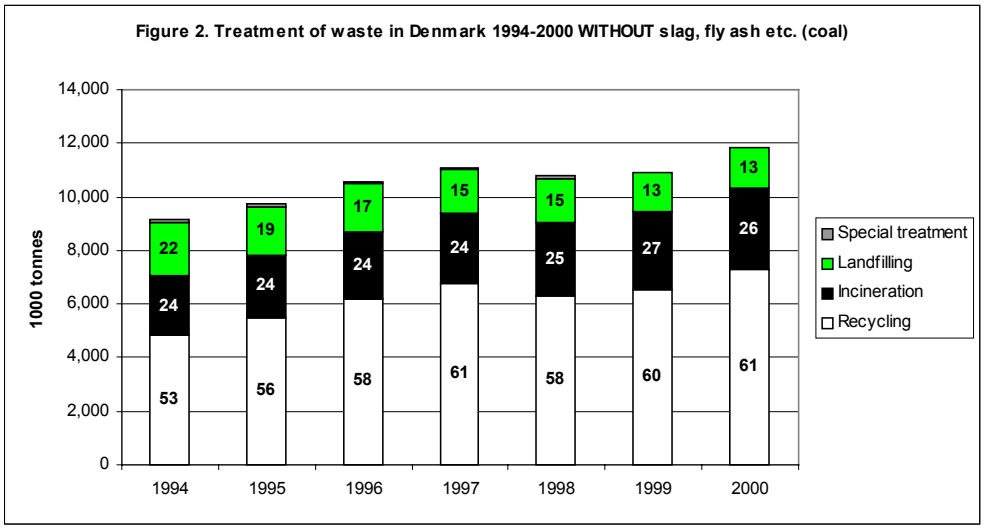
Since 1996, when Denmark exported particularly much power to Sweden and Norway, amounts of residues have decreased steadily – actually there has been a decrease of 1,156,000 tonnes, corresponding almost to a 50 per cent reduction.

Naturally, this has an impact on developments of total waste amounts, but as residues have a very high rate of recycling, it also has an impact on compliance with overall treatment targets.

A similar picture is seen for construction and demolition waste. As discussed in section 6.2, the rate of recycling of construction and demolition waste typically reaches around 90 per cent.

Therefore, it is interesting to look at the distribution of waste on the different treatment options if residues and construction and demolition waste are kept apart from statistics.

Figure 2 shows the distribution on the different treatment options when residues from coal-fired power plants are kept apart from statistics.



Source: As Table 1 above.

When residues are kept apart it is seen that 61 per cent of the remaining waste was recycled in 2000, which is an increase of 757,000 tonnes from 1999.

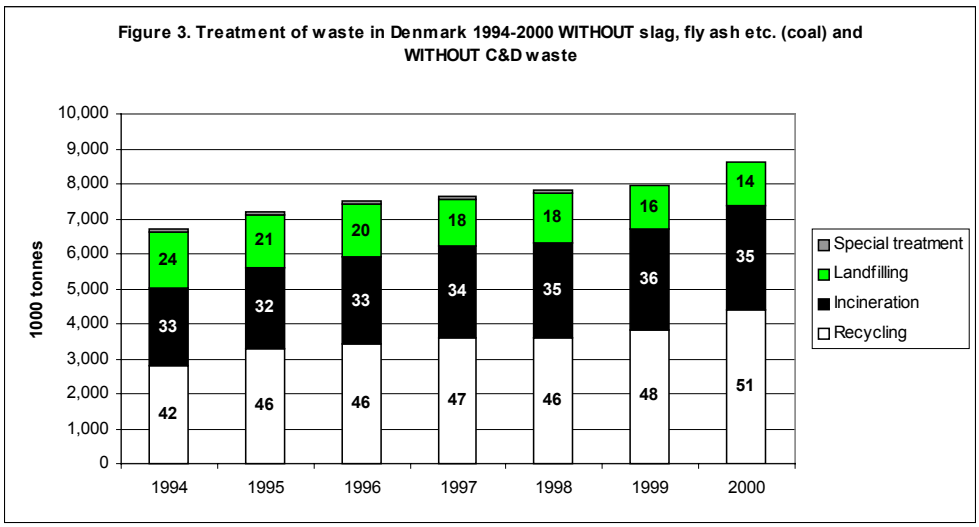
The rate of remaining waste incinerated in 2000 is 26 per cent, which is slightly less than in 1999. The rate of waste for landfilling is 13 per cent, which is identical to 1999.

In absolute figures this means in 2000 that apart from residues 11,855,000 tonnes of waste were generated. Of this, 7,285,000 tonnes were recycled, whereas 3,064,000 tonnes were incinerated and 1,489,000 tonnes led to landfill. 17,000 tonnes – similar to 1999 – were subjected to special treatment.

Total waste amounts without waste from coal-fired power plants increased by 33 per cent from 1994 to 2000.

In Figure 3 also waste from the building and construction sector has been kept apart from statistics. This causes a decrease in the rate of remaining waste for recycling, whereas the rates for incineration and landfilling increase.

Residues from coal-fired power plants and construction and demolition waste are recycled to a very large extent: in 2000, 100 per cent and 90 per cent respectively, cf. Chapter 6. It is seen that these two fractions play a very significant role in the compliance with overall waste treatment targets in Waste 21.



Source: As Table 1 above.

2.4 Treatment by sources and waste types

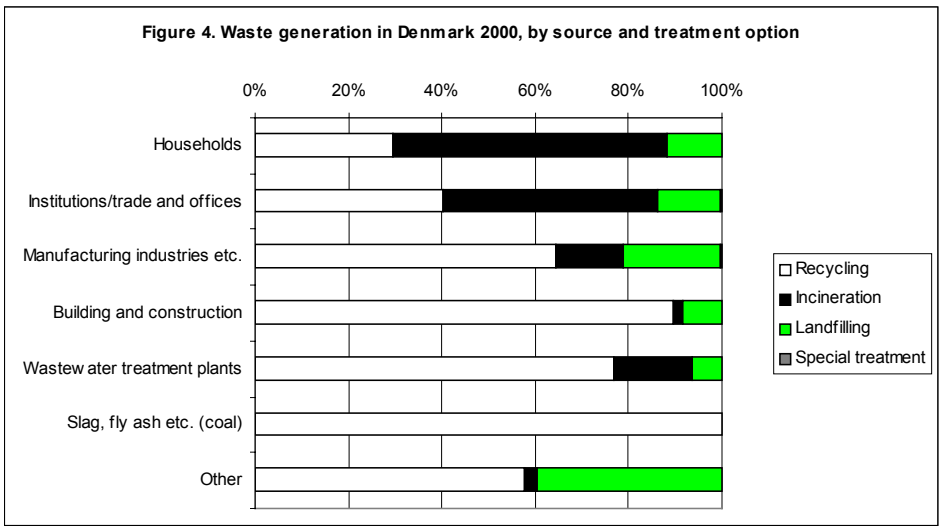
Figure 4 shows total waste generation in 2000 distributed on sources and treatment options. Figure 5 shows waste generation distributed on waste types and treatment options. Tables with detailed figures are given in Annex 1.

Figure 4 shows that especially waste from the building and construction sector, coal-fired power plants and wastewater treatment plants reach a very high rate of recycling. Waste 21 targets for recycling have been met for waste from these three sectors.

The rate of recycling of waste from industry is also relatively high: 64 per cent, and the target of a 65 per cent recycling rate has almost been met. The high rate of recycling, however, is especially attributable to recycling of ferrous metals. Still too much waste from this sector is led to landfill - 21 per cent against the target of only 15 per cent, and there is a challenge ahead to divert larger amounts of the other fractions from landfilling to incineration or recycling.

The rate of recycling of waste from the service sector is not sufficient compared to the target in Waste 21. In 2000, 40 per cent of waste was recycled compared to the target of 50 per cent. However, there was an increase in the rate of recycling of 3 percentage points from 1999.

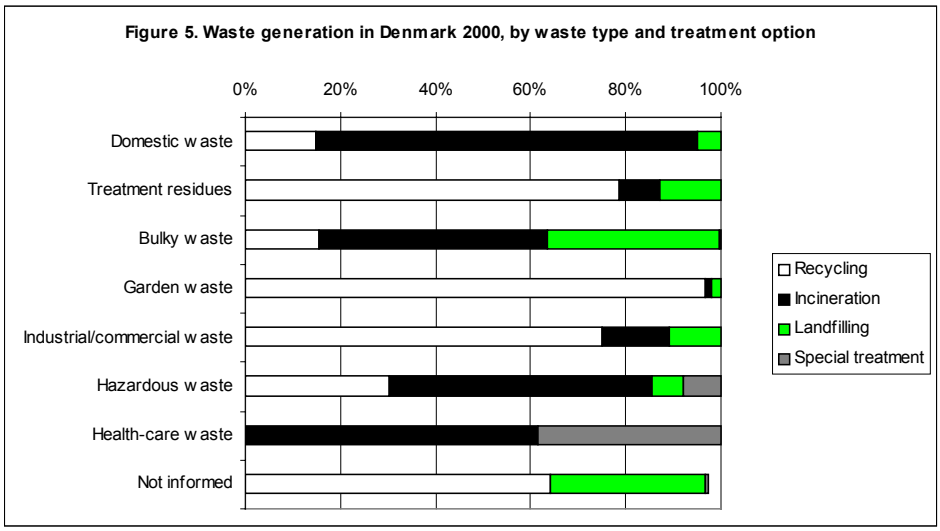
The target of 45 per cent incineration has been complied with, but also in this sector too much waste is led to landfill; 14 per cent compared to the target of 5 per cent. The challenge here is to divert more waste from landfilling to recycling.



Source: As Table 1 above.

Treatment of the waste type domestic waste does not comply with the targets in Waste 21, cf. Figure 5. Only 14 per cent of this waste was recycled in 2000. Actually, this is a decrease from 1998 and 1999 when the rate of recycling amounted to 17 per cent and 15 per cent respectively.

The target is to reach a rate of recycling of 30 per cent in 2004, whereas the targets for incineration and landfilling are 70 per cent and 0 per cent respectively. The rate of domestic waste incinerated in 2000 reached 81 per cent, whereas 5 per cent was led to landfill[6].



Source: As Table 1 above.

2.5 Developments in waste generation 1994 - 2000

Total waste generation in Denmark in the period 1994 – 2000 distributed on commercial sources is shown in Table 3.

[6] Note that organic domestic waste must be assigned to incineration. However, for islands that do not have land connection to the mainland there is an exemption from this duty of assignment.

As the table shows, the 2000 amounts of waste were the largest in the period 1994 – 2000. Until 2000, waste amounts peaked in 1996.

The large amounts in 1996 were primarily due to particularly high amounts of residues from coal-fired power plants in 1996 – which again was due to large exports of power to Sweden and Norway.

There was an increase of 16 per cent in amounts of waste from 1994 to 1996, after which amounts decreased up to 1999: by approximately 5 per cent.

Table 3. Total waste generation in Denmark	'000 tonnes							Development %
	1994	1995	1996	1997	1998	1999	2000	1994-2000
Households	2,575	2,610	2,767	2,776	2,796	2,963	3,084	20
Domestic waste	1,662	1,628	1,655	1,621	1,702	1,665	1,676	1
Bulky waste	606	618	639	588	572	672	730	21
Garden waste	286	326	401	443	438	464	519	81
Other	21	38	72	125	83	163	158	656
Institutions/trade and offices	656	834	851	861	955	955	1,119	71
Manufacturing industry etc.	2,309	2,563	2,632	2,736	2,783	2,653	2,948	28
Building and construction	2,433	2,559	3,088	3,427	2,962	2,968	3,223	32
Wastewater treatment plants	1,156	1,195	1,212	1,248	1,251	1,379	1,476	28
Slag, fly ash etc. (coal)	1,962	1,699	2,332	1,775	1,469	1,299	1,176	-40
Other	14	6	30	34	18	15	5	-61
Total	11,105	11,466	12,912	12,857	12,233	12,233	13,031	17

Source: As Table 1 above.

If the entire period from 1994 to 2000 is considered, waste amounts have increased by 17 per cent. Of this, 7 percentage points are explained by developments from 1999 to 2000 alone. The increase in the first half of the 1990s may be due partly to the fact that coverage of the ISAG system has increased and partly to real increases in waste amounts.

3 Recycling

3.1 Recycling distributed on fractions

Table 4 shows the share of the different waste fractions that are separated for recycling in the form of either reprocessing, composting or biogasification The table is not an outline of total amounts generated of each fraction.

Table 4. Recycling in Denmark in 1996 - 2000 of waste from primary sources, distributed on waste fractions. In '000 tonnes

	1996	1997	1998	1999	2000
Hazardous waste	53	72	56	80	51
Paper and cardboard	548	583	623	593	702
Bottles and glass	99	89	104	122	108
Plastic	29	28	33	38	40
Food waste/other organic	193	230	194	218	252
Branches, leaves, grass etc.	452	528	551	576	632
Ferrous metals (1) and (4)	899	1,004	968	973	1,192
Automobile tyres	8	20	31	27	34
Concrete	942	1,167	780	750	1,054
Tiles	93	125	123	126	227
Other construction and demolition waste	532	520	507	546	311
Asphalt	737	853	654	575	551
Wood	15	21	24	27	81
Soil and stone	391	353	388	398	460
Other recyclables	166	240	228	334	373
Fly ash/slag from coal-fired power plants, incl. bio-slag (2)	1,213	911	859	869	770
Fly ash and slag from other sources than waste incineration plants	2	2	2	2	1
Flue gas cl.products (gypsum, desulph., sulph. Acid) (2)	416	394	400	418	406
Sludge from municipal wastewater treatment plants applied to farmland, composting or biogasification (3)	918	872	875	1,071	1,132
Sludge from other sources	81	40	141	72	83
Total	**7,787**	**8,052**	**7,541**	**7,815**	**8,460**

Sources: ISAG and, (1) Association of Danish Recycling Industries and other large scrap dealers, (2) Elsam and Energi E2, (3) Reports to the Danish Environmental Protection Agency on sludge from municipal wastewater treatment plants applied to farmland etc. Figures from 1999 have been used. Sludge in long-term storage has been included in amounts for recycling, (4) Adjustment for ferrous metals removed from waste incineration plants has been made to avoid double counting. Some of the collective terms such as “Other recyclables”, “Other construction and demolition waste” and “Soil and stone” may contribute – after separation has been completed – to additional quantities of items such as tiles, wood etc.

As the table shows, 8,460,000 tonnes of waste were recycled in 2000, which is 8 per cent or 645,000 tonnes more than in 1999. This increase may be attributed to large increases in recycling of especially paper and cardboard, garden waste, ferrous metals, concrete and tiles. By contrast, there was a slight decrease in the recycling of hazardous waste, bottles and glass and fly ash and slag.

3.2 Paper and cardboard

Total collected waste paper in 2000 amounted to 735,000 tonnes. This is an increase of 142,000 tonnes from total amounts collected in 1999. Some of the increase from 1999 to 2000 is explained by a correction of reporting to the ISAG.

In the quality control of reports for 2000 it was seen that one plant until today has registered incorrectly the commercial source of collected paper.

The registration for 2000 from the plant was therefore changed so that around 100,000 tonnes were registered as paper from primary sources instead as from secondary sources.

The incorrect registration also took place in previous years, and this explains to a high extent the previous large difference between Waste paper collected and Danish waste paper sent to Danish paper mills + Net exports.

Table 5. Consumption and recycling of paper and cardboard 1995 - 2000. In '000 tonnes

	1995	1996	1997	1998	1999	2000
Consumption of virgin paper (1)	1,208	1,181	1,347	1,304	1,326	-
Waste paper collected in DK (2, 4)	557	548	583	623	593	735
Waste paper collected as a percentage of virgin paper	46	46	43	48	42	-
Danish waste paper sent to Danish paper mills (2)	332	318	335	334	411	424
Net exports of waste paper (3)	150	220	204	242	298	287

Sources: (1) Material stream analysis of waste paper. (2) ISAG reports. (3) Statistics Denmark. (4) There is still a minor discrepancy between waste paper collected, and Danish waste paper sent to Danish paper mills + net exports. This may be due to stock enlargement, and it may concern paper of poor quality that is led to other treatment than recycling after separation.

Table 6 shows the distribution of collected paper on sources. Not surprisingly, the largest amounts of waste paper are collected from households, the service sector[7] and industry.

Amounts of waste paper collected from households increased slightly by around 1,800 tonnes from 1999 to 2000. Since 1997, amounts of paper collected from households have remained stable at around 180,000 tonnes[8].

In the quality assurance of data for 2000 several plants have reported that they have seen a decrease in amounts collected from households.

One of the explanations is believed to be the establishment of more recycling centres for industry and the fact that local authorities to a higher extent enforce the ban on enterprises delivering waste to ordinary municipal recycling centres that are reserved for households.

In the ISAG, waste delivered to a recycling centre is registered with the commercial source ”recycling centre/transfer station”. Thus, it is not stated whether waste originated from households or other commercial sources.

Therefore, the ISAG secretariat has redistributed waste from ”recycling centres/ transfer stations”, cf. Annex 2. All bulky waste with the source ”recycling centres/ transfer stations” and covering the fraction “paper & cardboard” will have its source changed to “households”. This is done due to the assumption that recycling centres are reserved for households. However, there are indications that some of this paper and cardboard actually originates from industry.

[7] Institutions/trade and offices

[8] Amounts registered in 1998 are probably 20,000 tonnes too high due to double registration.

The enhanced focus from local authorities on reserving recycling centres for households may have led to a more "correct" distribution of collected paper on sources. However, this is only the present theory that must be verified when ISAG reports for 2001 have become available. In these, recycling centres themselves will distribute waste on sources, cf. the latest Statutory Order on Waste No. 619.

Amounts of waste paper collected from the service sector increased by around 6,200 tonnes. Amounts of paper collected from industry also increased. However, in the latter case the above-mentioned incorrect registration will explain around 100,000 tonnes of the increase.

Table 6. Collection of waste paper by source. 1996 - 2000. Tonnes.

	1996	1997	1998	1999	2000
Households (1)	160,469	183,116	208,486	179,477	181,315
Institutions/trade and offices	173,289	178,158	203,537	221,600	227,790
Manufacturing industries	214,015	220,935	210,278	191,264	325,455
Other	165	235	256	252	404
Not informed	213	731	0	0	0
Total	548,151	583,175	622,557	592,593	734,964

Source: ISAG reports 1996- 2000. (1) Note that a double registration seems to have taken place in 1998, leading to around 20,000 tonnes too high amounts.

Consumption of virgin paper and the rate of collection of waste paper in the period from 1995 to 1999 are shown in Table 5. Note that the statement of virgin paper consumption for 2000 is not yet available.[9]

3.3 Plastic

Plastic collected for recycling registered in the ISAG amounted in 2000 to 40,000 tonnes, which is an increase of 2,000 tonnes from 1999. However, it is assumed that some plastic has been collected and exported directly for recycling abroad without having been registered at a Danish treatment plant. It is therefore probable that larger amounts have been collected for recycling in Denmark than the 40,000 tonnes.

The fraction plastic covers both production waste and waste plastic packaging. Every year, detailed statistics are prepared for waste plastic packaging. Statistics for waste plastic packaging in 1999[10] show that in 1999 22,400 tonnes of waste plastic packaging were reprocessed in Denmark. A minor part of the waste was imported: 8,400 tonnes.

In 1999, 19,500 tonnes of waste plastic packaging were collected in Denmark. Of this, 19,000 tonnes were recycled, and 5,100 tonnes were exported for recycling abroad.

Total amounts collected correspond to 11 per cent of total Danish consumption of plastic packaging. This is a steep increase from 1998, when 7 per cent of waste plastic packaging was collected for recycling. Waste plastic of the type polyethylene (PE) accounted for 80 per cent of collected amounts.

[9] The statement is expected to be available by the end of 2001.
[10] Environmental Project No. 602, 2001

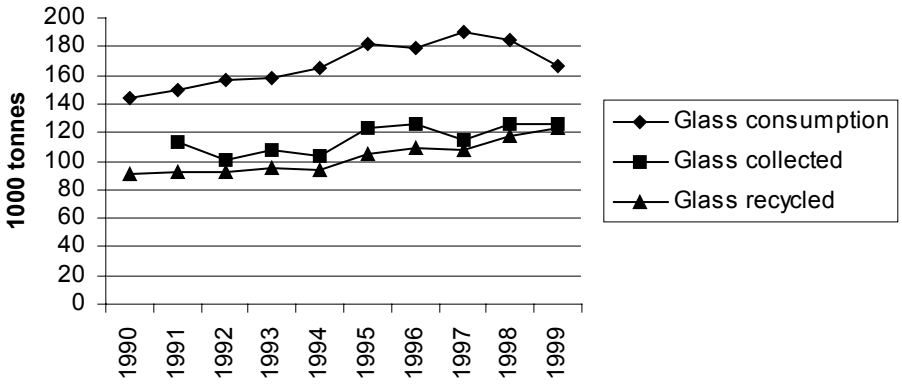
3.4 Bottles and glass

According to ISAG reports 108,000 tonnes of bottles and glass were collected for recycling in Denmark in 2000. This is 14,000 tonnes less than in 1999.

With the ISAG, however, a complete picture of total material streams is not obtained. Of special importance is recycling of glass during which several collection, reuse and treatment steps have been passed before glass becomes waste.

As a consequence, in the following description of total recycling of glass, ISAG information is supplemented with information from Statistics on glass packaging, 1999[11], cf. Figure 6.

Figure 6 . Consumption, collection and recycling of glass and bottles 1990-99.



Source: Statistics on glass packaging 1999, Ole Kaysen, Econet. Environmental Project No. 601, 2000.

Consumption of glass packaging has been on the increase throughout the 1990s, peaking in 1997 with 190,000 tonnes. Since then, consumption decreased to 167,000 tonnes in 1999.

Also collection and recycling of glass packaging have been increasing. In 1999, however, amounts of collected glass were unchanged from 1998: 126,000 tonnes. By contrast, amounts of recycled glass increased by 5,000 tonnes from 1998, up to 123,000 tonnes in 1999.

This means that the rate of collection of total consumption in 1999 reached 75 per cent – an increase of 7 percentage points compared to 1998. The rate of recycling of total consumption in 1999 reached 74 per cent, which is an increase of 10 percentage points compared to 1998.

Bottles for beer and soft drinks manufactured for reuse are not included in this statement. Refillable glass bottles, on average, make 30 trips. If these bottles were manufactured as single-use bottles, it would give an increase in waste glass of around 310,000 tonnes.

[11] The statement for 2000 is not yet available.

3.5 Ferrous metals

Table 7 shows amounts of ferrous scrap collected, distributed on consignees. For 2000, it is seen that 1,089,000 tonnes of ferrous scrap were recycled, and this is a significant increase of 124,000 tonnes compared to 1999.

Table 7. Recycling of ferrous scrap 1996 - 2000. In '000 tonnes					
	1996	**1997**	**1998**	**1999**	**2000**
I. Danish ferrous scrap sent to foundries and the Danish Steel Works (2)	356	406	462	417	416
II. Ferrous scrap exported by scrap dealers (2)	612	684	535	570	689
III. Ferrous scrap imported by scrap dealers (2)	35	78	26	22	16
Total recycling of Danish ferrous scrap I + II - III	**933**	**1,012**	**971**	**965**	**1,089**
Ferrous scrap imported by foundries and the Danish Steel Works (1)	263	210	216	230	220

Sources: (1) ISAG reports, (2) Information from the Association of Danish Recycling Industries and other large scrap dealers. Remark that the statement used in table 7 is slightly different from the statement in table 3. For example, the adjustment for ferrous scrap removed from waste incineration plants has not been made.

Total potential of ferrous scrap is not known precisely. Recycling industries normally estimate a recycling rate in excess of 90 per cent for ferrous scrap.

According to ISAG reports, the Danish Steel Works and other Danish foundries imported 220,000 tonnes of ferrous scrap in 2000, whereas scrap dealers imported around 16,000 tonnes. Total imports in 2000 thereby amounted to 236,000 tonnes of ferrous scrap, which is 16,000 tonnes less than in 1999.

Scrap dealers exported 689,000 tonnes of ferrous scrap in 2000, which adds up to net exports in 2000 of 673,000 tonnes.

3.6 Organic waste for composting, wood chipping and biogasification

Amounts of organic waste led to reprocessing in the form of either composting, wood chipping, biogasification or fodder production are shown in Table 8.

Organic waste led to reprocessing in 2000 amounted to 1,197,000 tonnes. This is 152,000 tonnes more than in 1999. This increase is particularly attributable to an increase in amounts of sludge for composting: 84,000 tonnes more in 2000 than in 1999 – but also to an increase of 43,000 tonnes in amounts of garden waste for composting/wood chipping.

Table 8. Amounts of organic waste 1995-2000 delivered to composting, wood chipping and biogasification, and removal from plants of compost, wood chips and screenings. Stated in '000 tonnes.

Material	1995	1996	1997	1998	1999	2000
Branches, leaves etc. for composting/wood chipping	376	452	528	551	634	677
Organic domestic waste for composting	34	36	46	42	48	38
Organic domestic waste for biogasification	5	10	1	9	14	7
Other organic waste for composting	6	2	1	1	1	9
Other organic waste for biogasification	120	111	139	96	133	165
Other organic waste for fodder production	32	34	42	44	48	48
Sludge for composting	7	6	7	57	134	218
Sludge for biogasification	59	92	52	91	33	35
Total	**639**	**743**	**816**	**891**	**1,045**	**1,197**
Removal from plants of bark/wood chips	49	34	44	15	11	13
Removal from plants of compost	102	162	214	197	249	293
Removal from plants of screenings	5	19	13	16	18	21

Source: ISAG reports do not include information whether organic material is reprocessed as compost,

wood chips or biogas. The table is designed on the basis of estimates and calculations from ISAG reports.

Amounts of organic domestic waste from households led to biogas plants have been halved from 1999. The reason is that local authorities in the area around the city of Elsinore no longer collect domestic waste for biogasification. By contrast, amounts of organic waste from other sources than households led to biogasification were 32,000 tonnes larger in 2000 than in 1999.

Quantities of bark/wood chips and compost removed from the plants do not reflect the quantities generated. This quantity should be considered as reflecting the quantity sold or delivered free.

It is seen from the table that amounts of sold/removed bark/wood chips were around 2,000 tonnes larger than in 1999, whereas amounts of sold/removed compost were 44,000 tonnes larger than in 1999.

3.7 Tyres

In 1995, the Minister for Environment and Energy entered an agreement with a number of organisations, on a take-back scheme for used tyres from cars, vans, and motorcycles.

The purpose of the agreement is to ensure collection and recycling of used tyres in Denmark. Landfilling is avoided and resource recovery ensured, whereby material recovery is prioritised to energy recovery.

The scheme started 1 April 1995 and is financed by a fee on tyres comprised by the agreement and marketed in Denmark.

According to the agreement, the target is a take-back rate of at least 80 per cent.

As per 1 April 2000 the scheme was extended to cover tyres for all types of motor vehicles. Therefore, there is a data leap from 1999 to 2000 in the statement in Table 9. The table shows that the 2000 collection rate reached around 99 per cent, and almost all tyres covered are thus collected.

Table 9. Collection of car, van and motorcycle tyres. Tonnes.

	2nd half 1995	1996	1997	1998	1999	2000
Used tyres covered by the scheme	8,725	16,705	18,405	19,378	19,816	34,776
Collected tyres	7,600	12,670	17,229	16,926	17,314	34,418
Of which for						
Retreading or continued use	*3,300*	*5,477*	*4,581*	*5,472*	*3,508*	*6,690*
Temporary storage	*955*	*1,133*	*0*	*0*	*0*	*0*
Rubber powder or incineration	*3,345*	*6,060*	*12,648*	*11,454*	*13,806*	*27,728*
Collection, % tyres covered by the scheme	87.1	75.8	93.8	87.3	87.4	98.9

Source: Statement from Danish Environmental Protection Agency for the period 1.7.95 - 31.12.95 and reports from the Danish Tyre Trade Environmental Foundation for 1996, 1997, 1998, 1999 and 2000. 2nd half 1995 includes 1,000 tonnes collected in the first half of 1995, thereby increasing the collection rate.

4 Hazardous waste

Table 10 shows generation and treatment of hazardous waste in 1999 and 2000 by main groups. The statement covers waste from both primary and secondary sources. A detailed statement by ISAG fractions is found in Annex 3.

Waste from secondary sources, such as waste from incineration plants, is not included in total waste generation, cf. Table 1. This is due to the fact that waste would otherwise be counted in statistics twice: the first time upon reception at the primary treatment plant and the second time as a residue. However, it is reasonable to include waste from both primary and secondary sources in the assessment of capacity needs for management of hazardous waste.

Table 10. Generation and treatment of hazardous waste in 1999 and 2000. Tonnes.

Fraction	Recycling		Incineration		Landfilling		Special treatment		Total	
	1999	2000	1999	2000	1999	2000	1999	2000	1999	2000
Primary sources										
Lead batteries (1)	15,231	16,517							15,231	16,517
Hermetically closed nickel-cadmium batteries (2)	66	58							120	120
Waste oil delivered to district heating plants (3)			14,528	0					14,528	0
Animal and vegetable fat	3		2,066	2,242	1	7	36	20	2,106	2,269
Organic halogen-containing compounds	1	11	1,278	1,252	8	12	33	119	1,320	1,394
Organic halogen-free compounds	614	612	30,234	34,744	41	39	4,428	3,212	35,317	38,607
Inorganic compounds	6,655	3,592	5,328	5,429	4,474	3,906	6,785	7,538	23,242	20,465
Waste oils	40,665	13,097	17,974	20,781	88	14	2,844	2,244	61,571	36,136
Cloths and rags polluted with organic solvents			191	169			6	4	197	173
Waste from prod./distrib.of chemical neutralising agents		86	1,163	802	4	2	76	43	1,243	933
Waste from medicines		0	728	838		1	557	595	1,285	1,434
Chemical waste from laboratories etc.	1	20	1,056	756	54	12	67	72	1,178	860
Glass and mineral waste containing phenols		0	54	28	2	1		4	56	33
Other hazardous waste	6,516	13,283	20,785	11,592	276	1,028	143	2,409	27,720	28,312
Oil and chemical waste	27,952	22,301					188	38	28,140	22,339
Health-care risk waste			1,267	1,165			2,767	2,485	4,034	3,650
Dust-emitting asbestos					12,748	8,812			12,748	8,812
CFC cooling agents		5						4	0	9
Sulphuric acid from coal-fired power plants (4)	1,000	1,300							1,000	1,300
Total primary sources	***98,704***	***70,882***	***96,652***	***79,798***	***17,696***	***13,834***	***17,930***	***18,787***	***231,036***	***183,363***
Secondary sources										
Filter dust from flue gas cleaning (1)	11,002	11,008							11,002	11,008
Fly ash from waste incineration (5)	376	218			29,392	30,767			29,768	30,985
Flue gas cleaning products from waste incineration (5)	5,170	3,583			70,178	58,552			75,348	62,135
Total secondary sources	***16,548***	***14,809***	***0***	***0***	***99,570***	***89,319***	***0***	***0***	***116,118***	***104,128***
Total	**115,252**	**70,882**	**96,652**	**79,798**	**117,266**	**103,153**	**17,930**	**18,787**	**347,154**	**287,491**

Sources: ISAG 1999 and 2000 as (1) Registrations according to EU Regulation 259/93 on shipments of waste, (2) Calculations by the Danish Environmental Protection Agency. The difference between potential (120 tonnes) and the amount collected (58 tonnes) is due to the fact that the batteries are not collected separately, but comprised by the general collection of waste. The collection potential for NiCd batteries may be described on the basis of calculations of number of batteries discarded, i.e. becoming defect every year, combined with an assessment of the period of time batteries are kept with the user after having become defect, i.e. a "hoarding effect" and how long time batteries are present in the collection system – the so-called "pipeline effect". (3) Payment of subsidies for recovery of waste oil, (4) Elsam, (5) ISAG and registrations according to EU Regulation 259/93 on shipments of waste. Remark that corrections have been made in the table compared to Table 11 of Waste Statistics 1999. Under the terms of Statutory Order no. 660 of 24th September 1986 on asbestos from the Ministry of Labour, asbestos is divided into three categories: I) dust emitting asbestos, II) asbestos that may emit dust, and III) non-dust emitting asbestos. Only asbestos of the first category is hazardous waste, but reports to the ISAG comprise asbestos of both categories I and II.

The table shows that hazardous waste from primary sources in 2000 amounted to 183,363 tonnes, which is a decrease of 47,000 tonnes from 1999. The decrease is mainly due to a decrease in amounts of waste oils: 40,000 tonnes less waste oil was registered in 2000 compared to 1999.

Hazardous waste from secondary sources amounted in 2000 to 104,000 tonnes, which is 12,000 tonnes less than in 1999. By far the major part – around 97,000 tonnes – were exported for landfilling or storage. In 1999 only around 67,000

tonnes were exported. The large increase in exported amounts is probably attributable to the introduction of a ban on landfilling of waste from flue gas cleaning in Denmark.

5 Imports and exports of waste

5.1 Imports

Table 11 shows amounts of waste imported in 1999 and 2000 distributed on waste fractions and treatment options. 556,000 tonnes of waste were imported in 2000, which is 66,000 tonnes more than in 1999.

Amounts of waste imported in 2000 correspond to around 4 per cent of total Danish waste generation.

Table 11. Imports of waste in 1999 and 2000 stated by fraction and in tonnes

Fraction	Recycling		Incineration		Landfilling		Special treatment		Total	
	1999	2000	1999	2000	1999	2000	1999	2000	1999	2000
Glass (2)	9.900	12.800							9.900	12.800
Paper and cardboard (2)	84.500	120.000							84.500	120.000
Plastic(2)	26.300	29.300							26.300	29.300
Ferrous metals (1 and 3)	251.700	235.900							251.700	245.000
Other combustible (4)			45.800	73.900					45.800	73.900
Health care risk waste (1)							2	0	2	0
Food waste/other organic (1)	14.200	14.500							14.200	14.500
Other recyclable (1)	27.100	26.900							27.100	26.900
Sludge (4)	7.100	9.900							7.100	9.900
Other notified waste (4)	23.000	23.700			90	240	9.600	8.200	23.000	23.700
Total	**443.800**	**473.000**	**45.800**	**73.900**	**90**	**240**	**9.602**	**8.200**	**489.602**	**556.000**

Source: (1) ISAG reports, (2) Statistics Denmark, (3) Association of Danish Recycling Industries and other large scrap dealers, (4) Registrations according to Council Regulation No. 259/93 on the supervision and control of shipments of waste within, into and out of the European Community.

80 per cent of waste imported is categorised under the EU regulation on shipments of waste[12] as so-called green waste for recovery. Green waste covers primarily glass, paper and cardboard, plastic, ferrous metals, as well as organic waste. Green waste is not subject to mandatory notification under the EU regulation on shipments of waste.

Waste imported of the category “other combustibleable” is destined for incineration with energy recovery and covers oil and chemical waste of different kinds. This type of waste is subject to mandatory notification and is consequently listed in Table 13.

5.2 Exports

Table 12 shows amounts of waste exported from Denmark in 1999 and 2000. Amounts of waste exported in 2000 corresponded to around 11 per cent of total Danish waste generation.

In 2000, waste exports amounted to 1,478,780 tonnes or around 186,000 tonnes more than in 1999. The increase is especially attributable to an increase in amounts of ferrous metals exported, residues from waste incineration plants and other waste subject to mandatory notification such as waste oil and residues from iron and steel manufacture. A detailed statement of amounts exported of waste subject to mandatory notification is found in Table 13.

[12] Council Regulation No. 259/93 on the supervision and control of shipments of waste within, into and out of the European Community

Around 77 per cent of waste exported from Denmark in 2000 belongs to the category green waste for recovery, concerning mainly the fractions paper and cardboard and ferrous metals.

Table 12. Exports of waste in 1999 and 2000 stated by fraction and in tonnes		
	1999	**2000**
Glass (2)	12.400	14.700
Paper and cardboard (2)	382.000	407.000
Plastic (2)	19.700	16.600
Ferrous metals (1 and 3)	572.200	690.200
Other combustible (1 and 4)	8.100	3.600
Fly ash and slag from coal-fired power plants (5)	146.200	121.600
Sulphuric acid from coal-fired power plants (5)	0	0
Slag and flue gas cleaning products from iron manufacture (1 and 4)	11.000	11.000
Lead batteries (4 and 6)	15.200	16.500
Nickel-cadmium batteries (4 and 6)	70	80
Residues from waste incineration plants (4)	56.400	92.300
Ferrous metals from waste incineration plants (4)	10.700	6.600
Other notified waste (4)	58.800	105.200
Total	**1.292.770**	**1.485.380**

Source: (1) ISAG reports, (2) Statistics Denmark, (3) Association of Danish Recycling Industries and other large scrap dealers, (4) Registrations according to Council Regulation No. 259/93 on the supervision and control of shipments of waste within, into and out of the European Community, (5) Elsam and Energi E2, (6) Collectors of nickel-cadmium batteries registered by the Danish Environmental Protection Agency.

5.3 Imports and exports of waste subject to mandatory notification

Table 13 shows countries of export and import of waste subject to mandatory notification. Waste subject to mandatory notification means waste that must be notified to the competent authorities of dispatch and the competent authorities of destination according to Council Regulation No. 259/93 on the supervision and control of shipments of waste within, into and out of the European Community.

It is seen from the table that in 2000 Denmark imported around 8,500 tonnes for disposal, which is 1,200 tonnes less than in 1999. Most of this waste originated from Ireland, concerning mainly different kinds of oil and chemical waste[13].

In 2000, Denmark imported around 107,600 tonnes of waste for recovery. This waste mainly came from Norway, Sweden and Germany and concerned mostly oil and chemical waste, but also sewage sludge and slag from iron manufacture.

Amounts of waste imported for recovery thereby increased considerably compared to 1999 with imports amounting to around 76,000 tonnes. The increase is due to considerable imports of oil emulsions from Sweden: around 40,000 tonnes.

Waste subject to mandatory notification exported for disposal in 2000 amounted to around 119,000 tonnes or 62,000 tonnes more than in 1999. This waste was exported to Norway and Germany and concerned mainly residues from incineration plants.

[13] Actually, this is an incorrect registration in the Danish Environmental Protection Agency's database of shipments – the waste from Ireland was imported for recovery at the hazardous waste treatment plant of Kommunekemi.

In addition, Denmark exported around 106,000 tonnes of waste subject to mandatory notification for recovery. This is an increase of 10,000 tonnes from 1999. Countries of destination of this waste were primarily Finland, Spain and Germany. This waste covered mainly metallic ashes and residues, waste oil, waste from processed cork and wood and lead batteries.

Table 13. Imports and exports in 2000 of waste subject to mandatory notification. Stated in tonnes.

Country	Disposal		Recovery	
OECD code	Exports from DK to:	Imports to DK from:	Exports from DK to:	Imports to DK from:
Belgium				
AC070	0	0	25	0
AC220	0	0	272	0
AA040	0	0	47	0
AA100	0	0	32	0
AA130	0	0	1,338	0
Total:	**0**	**0**	**1,715**	**0**
Great Britain				
AC160	0	0	13	0
AD090	0	0	26	0
AA060	0	0	2,147	0
AA120	0	0	467	0
Total:	**0**	**0**	**2,652**	**0**
Finland				
AA050	0	0	94	0
AA070	0	0	12,914	0
AA180	0	0	46	0
Total:	**0**	**0**	**13,054**	**0**
The Netherlands				
AB010	0	0	0	743
AB040	0	0	111	0
AD070	0	0	670	0
RX100	0	0	937	0
AA030	0	0	117	0
Total:	**0**	**0**	**1,834**	**743**
Ireland				
AC090	0	145	0	76
AC210	0	5,109	0	5,842
AC220	0	1,407	0	2,734
AD010	0	471	0	156
AD060	0	25	0	0
RA010	0	3	0	0
RX100	0	127	0	0
Total:	0	7,287	0	8,809
Iceland				
RX100	0	293	0	0
Total:	**0**	**293**	**0**	**0**
Latvia				
RX100	0	0	2,100	0
Total:	**0**	**0**	**2,100**	**0**

Continues overleaf.

Country	Disposal		Recovery	
OECD code	Exports from DK to:	Imports to DK from:	Exports from DK to:	Imports to DK from:
Norway				
AB020	71,128	0	0	0
AB040	0	0	0	306
AC030	0	0	0	2,154
AC080	0	0	0	1,699
AC210	0	0	0	7,651
AC270	0	0	0	60
AD060	0	0	0	15,508
AD070	0	0	0	215
AD090	0	830	0	823
AD140	95	0	0	0
RX100	15,415	0	0	0
AA020	0	0	1,162	0
AA050	94	0	4,899	0
AA060	5,931	0	0	0
AA100	318	0	0	0
AA110	252	0	0	0
Total:	**93,231**	**830**	**6,061**	**28,415**
Poland				
AA070	0	0	0	9
Total:	**0**	**0**	**0**	**9**
Spain				
AA010	0	0	11,008	0
Total:	**0**	**0**	**11,008**	**0**
Sweden				
AB070	0	0	1,373	0
AC030	0	0	0	6,951
AC150	0	20	0	0
AC170	0	0	9,993	0
AD020	0	13	0	0
AD060	0	0	0	40,389
AD070	0	0	0	1,490
AD160	0	0	3,023	0
RX100	0	5	3,714	844
AA030	0	0	61	0
AA100	0	0	1	0
AA130	0	0	0	29
AA170	0	0	16,470	0
AA180	0	0	35	0
Total:	**0**	**38**	**34,670**	**49,703**

Continues overleaf.

Country	Disposal		Recovery	
OECD code	Exports from DK to:	Imports to DK from:	Exports from DK to:	Imports to DK from:
Germany				
AB020	14,611	0	6,642	0
AB040	0	0	511	0
AC010	0	0	0	135
AC030	0	0	4,491	0
AC170	0	0	0	555
AC210	0	0	0	144
AC270	0	0	0	9,881
AD060	0	0	0	2,971
AD070	0	0	19	0
AD090	0	0	24	0
AD110	0	0	32	0
AD160	0	0	1,958	0
RC010	11,428	0	0	0
RX100	83	0	11,313	1,848
AA010	0	0	0	4,352
AA020	0	0	180	0
AA040	0	0	84	0
AA050	0	0	3,545	0
AA060	0	0	2,250	0
AA100	0	0	131	0
AA120	0	0	32	0
AA130	0	0	1,452	0
AA160	0	0	5	0
AA170	0	0	47	0
Total:	**26,122**	**0**	**32,714**	**19,886**
UK				
AA070	0	0	22	0
Total:	**0**	**0**	**22**	**0**
Total for all countries	**119,353**	**8,448**	**105,831**	**107,565**

Sources: Danish Environmental Protection Agency, database of shipments. The registration is made on the background of completed consignment notes under EU Regulation 259/93 on shipments of waste. The consignee must send a copy of the filled-in consignment note to the competent authorities within three working days after receipt of the waste. No later than 180 days after receipt, a certificate of recovery of the waste must be submitted. OECD-codes are defined in Commission Decision of 21st October 1994 (no. L 288/36, Official Journal of the European Communities of 9th November 1994).

5.4 OECD- codes

AA010 Dross, scalings and other wastes from the manufacture of iron and steel.
AA020 Zinc ashes and residues.
AA030 Lead ashes and residues.
AA040 Copper ashes and residues.
AA050 Aluminium ashes and residues.
AA060 Vanadium ashes and residues
AA070 Ashes and residues containing metals or metal compounds not elsewhere specified or included.
AA080 Thallium waste and residues.
AA090 Arsenic waste and residues.
AA100 Mercury waste and residues.
AA110 Residues from alumina production not elsewhere specified or included.
AA120 Galvanic sludge.
AA130 Liquors from the pickling of metals.
AA140 Leaching residues from zinc processing, dusts and sludges such as jarosite, hematite, goethite, etc.
AA150 Precious metal bearing residues in solid form which contain traces of inorganic cyanides
AA161 Ash from incineration of printed circuit boards
AA162 Photographic film ash.
AA170 Lead-acid batteries, whole or crushed.
AA180 Used batteries or accumulators, whole or crushed, other than lead-acid batteries and waste
and scrap arising from the production of batteries and accumulators, not otherwise specified or included.
AB010 Slag, ash and residues, not elsewhere specified or included.
AB020 Residues arising from the combustion of municipal/household wastes.
AB030 Waste from non-cyanide based systems which arise from surface treatment of metals.
AB040 Glass waste from cathode-ray tubes and other activated glasses.
AB050 Calcium fluoride sludge.
AB060 Other inorganic fluorine compounds in the form of liquids or sludges.
AB070 Sands used in foundry operations.
AB080 Waste catalysts not on the green list.
AB090 Waste hydrates of aluminium.
AB100 Waste alumina.
AB110 Basic solutions.
AB120 Inorganic halide compounds, not elsewhere specified or included.
AB130 Used blasting grit.
AB140 Gypsum arising from chemical industry processes.
AB150 Unrefined calcium sulphite and calcium sulphate from flue gas desulphurization (FGD).
AC010 Waste from the production/processing of petroleum coke and bitumen, excluding anode butts.
AC020 Asphalt cement wastes.
AC030 Waste oils unfit for their originally intended use.
AC040 Leaded petrol (gasoline) sludges.
AC050 Thermal (heat transfer) fluids.
AC060 Hydraulic fluids.
AC070 Brake fluids.
AC080 Antifreeze fluids.
AC090 Waste from production, formulation and use of resins, latex, plasticisers, glues and adhesives.

AC100 Nitrocellulose.
AC110 Phenols, phenol compounds including chlorophenol in the form of liquids or sludges.
AC 120 Polychlorinated naphtalenes.
AC130 Ethers.
AC140 Triethylamine catalyst for setting foundry sands.
AC150 Chlorofluorocarbons.
AC160 Halons.
AC170 Treated cork and wood wastes.
AC180 Leather dust, ash, sludges and flours.
AC190 Fluff light fraction from automobile shredding.
AC200 Organic phosphorous compounds.
AC210 Non-halogenated solvents.
AC220 Halogenated solvents.
AC230 Halogenated or unhalogenated non-aqueous distillation residues arising from organic solvent recovery operations.
AC240 Wastes arising from the production of aliphatic halogenated hydrocarbons.
AC250 Surface active agents (surfactants).
AC260 Liquid pig manure; faeces.
AC270 Sewage sludge.
AD010 Wastes from the production and preparation of pharmaceutical products.
AD020 Wastes from the production, formulation and use of biocides and phytopharmaceuticals.
AD030 Wastes from the manufacture, formulation and use of wood preserving chemicals.
AD040 Inorganic cyanides, excepting precious metal-bearing residues in solid form containing traces of inorganic cyanides.
AD050 Organic cyanides.
AD060 Waste oils/water, hydrocarbons/water mixtures, emulsions.
AD070 Wastes from production, formulation and use of inks, dyes, pigments, paints, lacquers, varnish.
AD080 Wastes of an explosive nature, when not subject to specific other legislation.
AD090 Wastes from production, formulation and use of reprographic and photographic chemicals and materials not elsewhere specified or included.
AD100 Wastes from non-cyanide based systems which arise from surface treatment of plastics.
AD110 Acidic solutions.
AD120 Ion exchange resins.
AD130 Single-use cameras with batteries.
AD140 Wastes from industrial pollution control devices for cleaning of industrial off-gases, not elsewhere specified or included.
AD150 Naturally occurring organic material used as a filter medium (such as bio-filters).
AD160 Municipal/household wastes.
RA010 Wastes, substances and articles containing, consisting of or contaminated with polychlorinated biphenyl (PCB) and/or polychlorinated terphenyl (PCT) and/or polybrominated biphenyl (PBB),
including any other polybrominated analogues of these compounds, at a concentration level of 50 mg/kg or more.
RA020 Waste tarry residues (excluding asphalt cements) arising from refining, distillation and any pyrolitic treatment.
RB010 Asbestos (dusts and fibres).

RB020	Ceramic-based fibres of physico-chemical characteristics similar to those of asbestos.
RC010	Any congenor of polychlorinated dibenzo-furan.
RC020	Any congenor of polychlorinated dibenzo-dioxin.
RC030	Leaded anti-knock compounds sludges.
RC040	Peroxides other than hydrogen peroxide.
RX100	Other wastes not specified with an OECD-code.

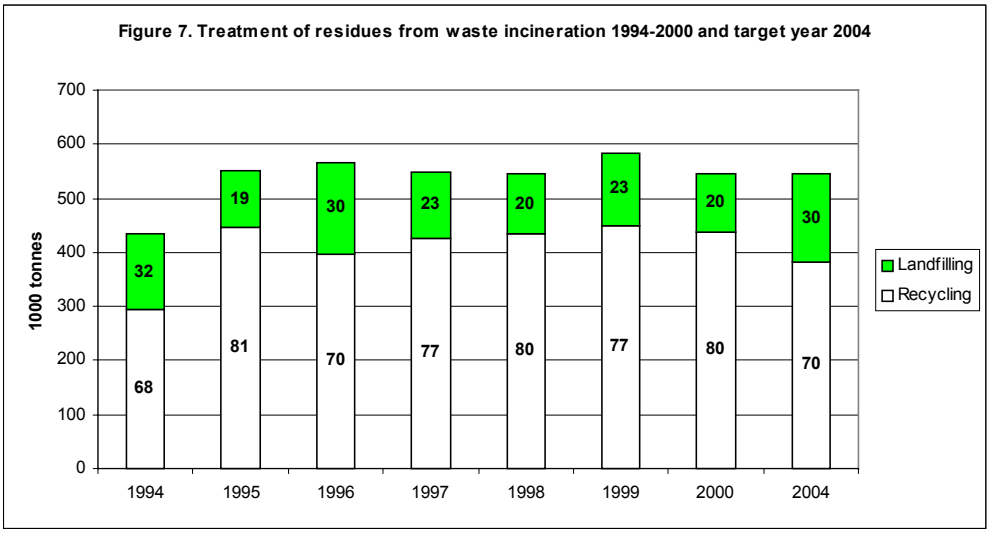
6 Waste sources and status compared to targets for 2004

6.1 Residues from waste incineration plants

Figure 7 shows amounts of residues (slag, fly ash, and flue gas cleaning products) from waste incineration in 1994 to 2000, stated in tonnes, as well as treatment option.

Residues from waste incineration plants have not been included in statements of total waste generation presented so far, as waste would otherwise be counted twice. However, residues constitute a significant waste fraction, and it is necessary to register amounts to ensure sufficient capacity for the management of residues.

Figure 7. Treatment of residues from waste incineration 1994-2000 and target year 2004



Source: See Tables 1 and 2. The figure has been designed in a way that total waste amounts year 2004 are similar to waste amounts in 2000. This should not be taken as an expression of projections of total waste amounts.

By far the largest proportion of residues is recycled – in 2000 the rate of recycling reached 80 per cent, which is 3 percentage points more than in 1999. However, residues cannot be recycled if there is a high risk of leaching of heavy metals – in that case they will be led to landfill.

According to Waste 21, environmental contaminants such as PVC, impregnated wood and waste electrical and electronic equipment may no longer be assigned to incineration. This means that heavy metal contents in slag will drop significantly.

However, at the same time requirements for recycling will become more stringent in consideration of groundwater, and therefore targets from the previous plan of action are maintained in Waste 21, which means a target recycling rate of 70 per cent.

Table 14 presents the use of residues from waste incineration. Amounts of residues from waste incineration naturally depend on amounts of waste incinerated. Slag

and flue gas cleaning products account for around 20 per cent and 3 per cent respectively of waste feed.

Table 14. Slag, fly ash and flue gas cleaning products removed from waste incineration plants in 1996 - 2000.					
Related to treatment option. In tonnes.	**1996**	**1997**	**1998**	**1999**	**2000**
Slag removed	509,200	493,800	468,500	519,479	494,055
Fly ash and flue gas cleaning products removed/exported	71,900	61,300	82,500	72,680	68,018
Total removed from waste incineration plants	*581,100*	*555,100*	*551,000*	*592,159*	*562,073*
Landfilled slag	126,300	87,100	76,400	92,302	106,265
Landfilled fly ash and flue gas cleaning products	45,300	36,600	33,300	43,102	3,478
Fly ash and flue gas cleaning products exported for landfilling	21,103	26,510	37,900	56,300	85,700
Total landfilled from waste incineration plants	*192,703*	*150,210*	*147,600*	*191,704*	*195,443*
Slag registered as delivered to reprocessing plants	101,800	106,100	115,200	108,742	131,201
Slag estimated as delivered directly to recycling	281,100	300,600	276,900	318,435	256,589
Total recycling from waste incineration plants	*382,900*	*406,700*	*392,100*	*427,177*	387,790
Fly ash and flue gas cleaning products estimated to be in storage	5,497	-1,810	11,300	-26,722	-21,160

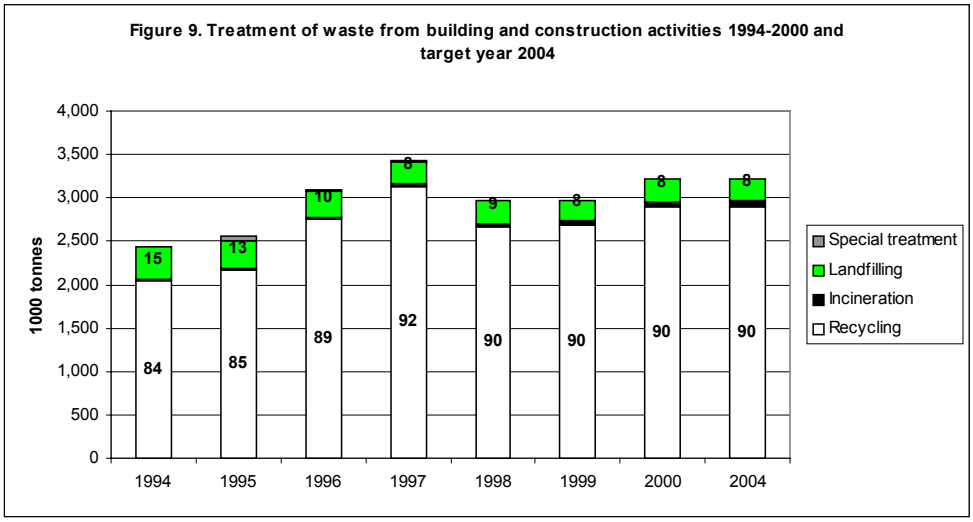
Source: Calculations based on ISAG reports and registrations according to the EU regulation on shipments of waste. Remark that Table 14 and Figure 7 cannot be compared directly, as exports are not included in Figure 7.

The table shows that residues from waste incineration in 2000 amounted to around 562,000 tonnes, which is 30,000 tonnes less than in 1999. Of the amount removed of 562,000 tonnes, 195,000 tonnes were landfilled and 388,000 tonnes were recycled. This means that amounts of fly ash and flue gas cleaning products in storage have been reduced by around 21,000 tonnes.

6.2 Waste from building and construction activities

Waste from the building and construction sector amounted in 2000 to 3,223,000 tonnes, which is an increase of 255,000 tonnes or 9 per cent.

By far the largest proportion of construction and demolition waste is recycled. The distribution of waste on the different treatment options in 2000 is unchanged from 1999; 90 per cent was recycled, whereas 2 per cent was incinerated and 8 per cent landfilled, cf. Figure 9.



Source: See Tables 1 and 2. The figure has been designed in a way that total waste amounts year 2004 are similar to waste amounts in 2000. This should not be taken as an expression of projections of total waste amounts.

The figure shows that recycling of construction and demolition waste increased by 6 percentage points in the period 1994 to 2000. Correspondingly, the rate of construction and demolition waste led to landfill decreased by 7 percentage points.

The figure also shows that the distribution among the different treatment options since 1997 has been in total compliance with the 2004 targets for treatment.

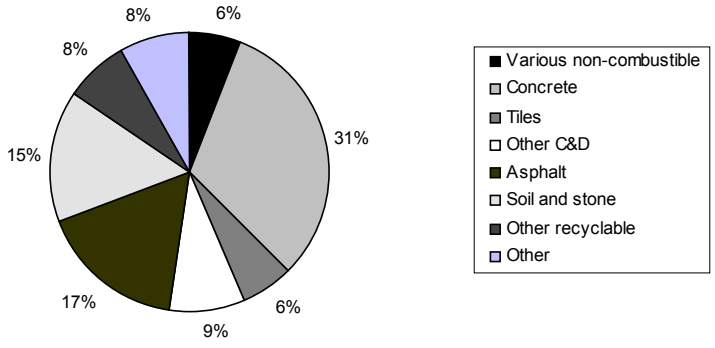
The high rate of recycling for construction and demolition waste is partly due to the fact that recycled waste is exempt from the waste tax, contrary to waste landfilled or incinerated. Furthermore, a circular[14] on municipal regulations regarding separation of construction and demolition waste with a view to recycling came into effect in 1995. And finally, the Ministry of Environment and Energy has entered an agreement with the Danish Contractors' Association on selective demolition of building materials.

There is, however, still scope for improving waste management. In future, special efforts shall be made to separate and treat the types of construction and demolition waste that are most harmful to the environment, such as PVC and impregnated wood.

Finally, "cradle-to-grave" assessments and environmentally correct design shall be used more extensively in connection with new building projects.

Figure 10 shows the distribution of construction and demolition waste among mixed and separated fractions in 2000. It is seen that the major part of separated waste consists of concrete, asphalt, soil and stone.

Figure 10. Waste from building and construction in 2000, by mixed and separated fractions.



Source: ISAG reports 2000. Legend: clock-wise from top.

The increase in C&D waste amounts is especially attributable to the separated fractions of tile and concrete as well as the mixed fraction "various non-combustibleable" that increased from 1999 by 94 per cent, 39 per cent and 50 per cent respectively.

Around half the increase in these fractions is explained by a decrease in the mixed fraction "other C&D waste". Conclusively, waste separation has improved.

A large proportion of construction and demolition waste is reprocessed in mobile crushing plants moved around the country for various assignments.

The owner of the mobile crushing plant is responsible for reporting to the ISAG, but in some cases also his client does so. The Danish Environmental Protection Agency is aware of this possible source of double counting, and great efforts are

[14] Circular No. 94 of June 21, 1995

made in co-operation with enterprises reporting to subject data to quality assurance in order to avoid double counting.

6.3 Waste from households

Waste from households covers primarily the waste types domestic waste, bulky waste, and garden waste, which again can be divided into waste fractions such as paper and cardboard, bottles and glass, and food waste/other organic waste. See also Table 15 where fractions are stated – mixed and separated - in so far as it has been possible to register them separately.

Amounts of, for example, paper and cardboard do not reflect the potential in household waste, but alone the amount separated for recycling. Other paper is covered by the fraction "various combustibleable".

Total waste generation in households in 2000 amounted to 3,084,000 tonnes, which is 121,000 tonnes or 4 per cent more than in 1999. Domestic waste amounts remained practically unchanged from 1999 – there has been a minor increase of 11,000 tonnes. The increase in total amounts of household waste is therefore especially attributable to bulky waste and garden waste amounts that increased by 9 per cent and 12 per cent respectively.

However, domestic waste still accounts for the major proportion of household waste: around 54 per cent.

Table 15. Waste generation in households. By fraction and stated in tonnes	**1996**	**1997**	**1998**	**1999**	**2000**	**% change 1999-2000**
Various combustible	1.800.752	1.784.342	1.775.930	1.926.756	1.985.975	3
Various non-combustible	164.356	155.590	146.707	145.669	154.482	6
Paper and cardboard separated for recycling	160.469	183.116	208.486	179.477	181.315	1
Bottles and glass separated for recycling	64.903	67.771	83.033	87.620	82.351	-6
Food waste/other organic separated for recycling	45.905	47.085	51.926	50.458	44.672	-11
Branches, leaves, grass cuttings etc. sep. for recycling	386.874	426.309	408.877	454.789	505.113	11
Hazardous waste	16.214	12.668	14.395	19.150	27.548	44
Ferrous metals (1) separated for recycling	-	12.610	11.926	12.495	16.768	34
Other	127.479	86.571	94.569	86.523	85.362	-1
Total	2.766.952	2.776.061	2.795.848	2.962.937	3.083.586	4

Source: ISAG reports. (1) Ferrous metals were included in the figure for "other" in 1996.

It is seen from the table that the increase in amounts of household waste is especially attributable to increases in the amounts of hazardous waste and garden waste. There were also minor increases in amounts of separated paper and cardboard and in the mixed fractions "various combustible" and "various non-combustible", whereas the amounts of separated fractions such as food waste/other organic waste and bottles and glass decreased by 11 per cent and 6 per cent respectively.

6.3.1 Household waste per capita and per household

Table 16 states the generation of household waste per capita and per household. The table covers both selected waste types and separated waste fractions.

Householders' total waste generation stated per capita in 2000 amounted to 578 kg, which is 20 kg more than in 1999. Stated per household householders' waste generation amounted to 1,294 kg in 2000, which is 44 kg more than in 1999.

Table 16. Householders' waste generation in 1998, 1999 and 2000 per capita and per household						
Stated in kg. Waste types and	1998		1999		2000	
fractions are included	Per capita	Per househ.	Per capita	Per househ.	Per capita	Per househ.
Households total	528	1,162	558	1,250	578	1,294
Domestic waste total	322	707	313	702	314	703
of which separately collected						
domestic waste/paper	*35*	*77*	*29*	*65*	*28*	*63*
domestic waste/glass	*15*	*33*	*16*	*35*	*14*	*32*
domestic waste/food waste	*10*	*22*	*9*	*21*	*8*	*19*
Hazardous waste from households	3	6	4	8	5	12
Garden waste from households	83	182	87	196	97	218
Bulky waste from households	108	238	126	283	137	306
of which						
paper separated for recycling	*5*	*10*	*5*	*11*	*6*	*13*
glass separated for recycling	*1*	*2*	*1*	*2*	*1*	*2*

Source: ISAG reports. Population figures and number of households from Statistics Denmark have been used. **Remark** that Tables 15 and 16 cannot be compared directly, as Table 15 concerns waste generation stated by fractions, whereas Table 16 also includes waste type.

Of this, domestic waste per capita and per household in 2000 amounted to 314 kg and 703 kg respectively, which is almost identical to amounts in 1999.

The table also shows that amounts of separately collected fractions per capita and per household were almost identical in 1999 and 2000.

6.3.2 Domestic waste

Domestic waste from households covers waste that results from normal consumption in private households, i.e. paper, bottles and glass, organic food waste, and residual waste, collected at the household at regular intervals, normally weekly or every second week.

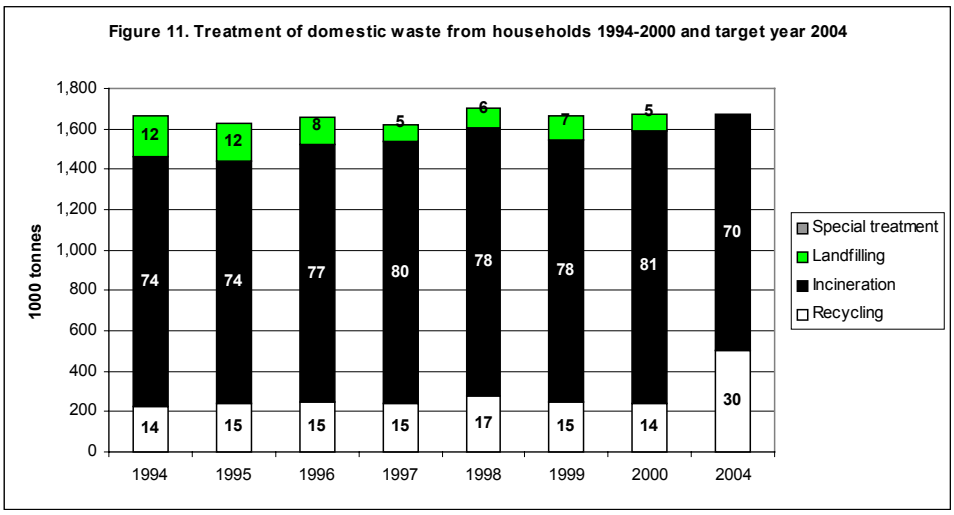
As mentioned above, domestic waste in 2000 amounted to 1,676,000 tonnes, which is 11,000 tonnes more than in 1999. Since 1994 amounts of domestic waste have varied from one year to the next without showing any clear trend – in the entire period the amounts have remained more or less stable, cf. Table 1.

In 2000, 14 per cent of domestic waste was recycled. 81 per cent was incinerated, and 5 per cent was landfilled.

As Figure 11 shows the distribution of domestic waste on the different treatment options has remained more or less stable in the period 1994 to 2000. Over the entire period the trend has been since 1996 to incinerate around 80 per cent of domestic waste and to recycle and landfill around 15 per cent and 5 per cent respectively.

This means that too much domestic waste goes to incineration and landfill compared to the targets in Waste 21.

It should be noted that organic domestic waste must be assigned to incineration. However, for islands that do not have land connection to the mainland there is an exemption from this duty of assignment.



Source: See Tables 1 and 2. The figure has been designed in a way that total waste amounts year 2004 are similar to waste amounts in 2000. This should not be taken as an expression of projections of total waste amounts.

To meet the target for recycling in year 2004 of 30 per cent a number of initiatives will be launched in the coming years. For example, separation and collection for recycling of glass, paper, and cardboard and plastic packaging will be extended.

Furthermore, initiatives will be launched with a view to recycling a larger proportion of organic domestic waste. Today, only around ½ per cent is recovered in biogas plants, cf. Table 8. The target is a recycling rate of 7 per cent of organic domestic waste in year 2004.

6.3.3 Bulky waste

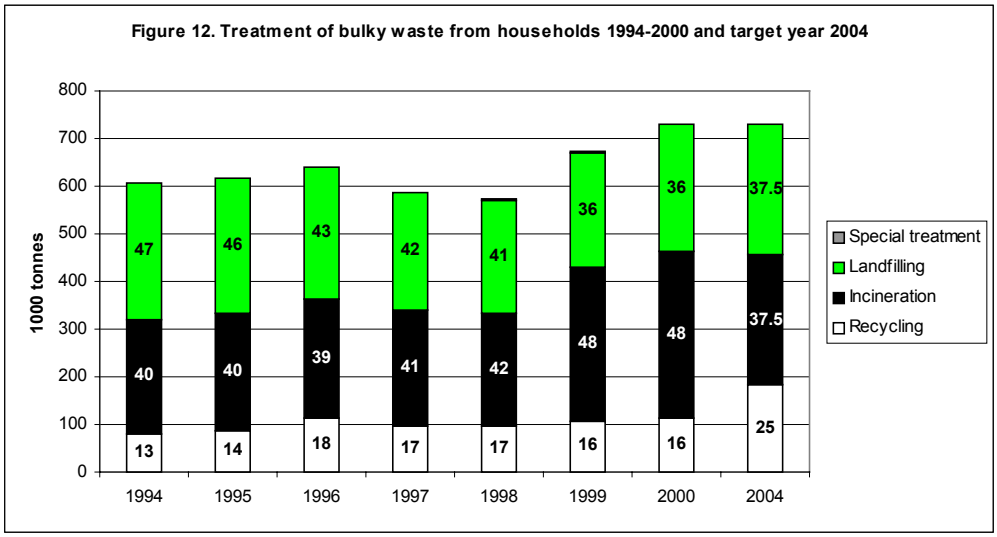
In 2000 Danish households generated 730,000 tonnes of bulky waste. This is 58,000 tonnes more than in 1999, corresponding to an increase of 9 per cent.

In the period 1994 – 2000 bulky waste amounts have increased by 21 per cent overall, with a minor decrease in amounts in 1997 and 1998, cf. Table 1. This is due to a real increase in bulky waste amounts, but for a major part also to the introduction of collection schemes and bring schemes for bulky waste.

Figure 12 shows that the distribution among treatment options in the period 1994 – 1998 has remained relatively stable. In 1999 and 2000 the rate of bulky waste incinerated increased to 48 per cent, whereas the rate for landfilling decreased to 36 per cent. This means that the rate for recycling only reached 16 per cent i 2000.

Thereby, the target of a rate of landfilling of a maximum of 37.5 per cent has been met. By contrast, still too much bulky waste is led to incineration and too little is recycled.

To comply with treatment targets in year 2004, many efforts are called for in relation to separate collection of more bulky waste fractions. A number of initiatives for, for example, cardboard, electrical and electronic products, impregnated wood, and PVC-containing waste have already been launched or are in the planning phase.



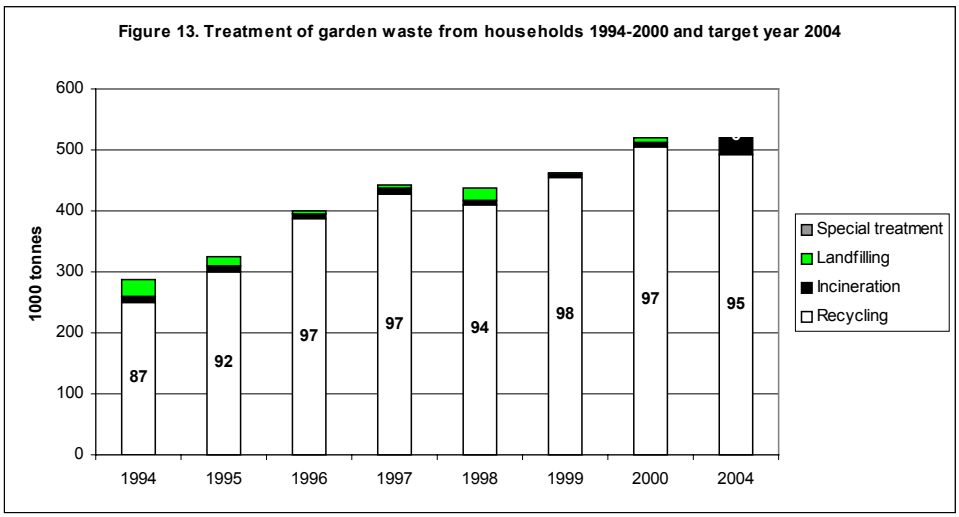
Source: See Tables 1 and 2. The figure has been designed in a way that total waste amounts year 2004 are similar to waste amounts in 2000. This should not be taken as an expression of projections of total waste amounts.

6.3.4 Garden waste

Garden waste collected from households in 2000 amounted to 519,000 tonnes, which is 55,000 tonnes more than in 1999. Garden waste amounts have been on a steady increase throughout the 1990s. Since 1994 the increase in garden waste amounts has been 81 per cent.

This increase not only reflects a real increase in garden waste amounts. It is rather the result of increasing opportunities for householders to dispose of garden waste at municipal treatment plants at the expense of home-composting of waste. This leads to larger amounts of waste treated in the municipal system.

Garden waste treatment is presented in Figure 13. 97 per cent of garden waste was recycled in 2000, whereas 1 per cent was incinerated and 1 per cent led to landfill.



Source: See Tables 1 and 2. The figure has been designed in a way that total waste amounts year 2004 are similar to waste amounts in 2000. This should not be taken as an expression of projections of total waste amounts.

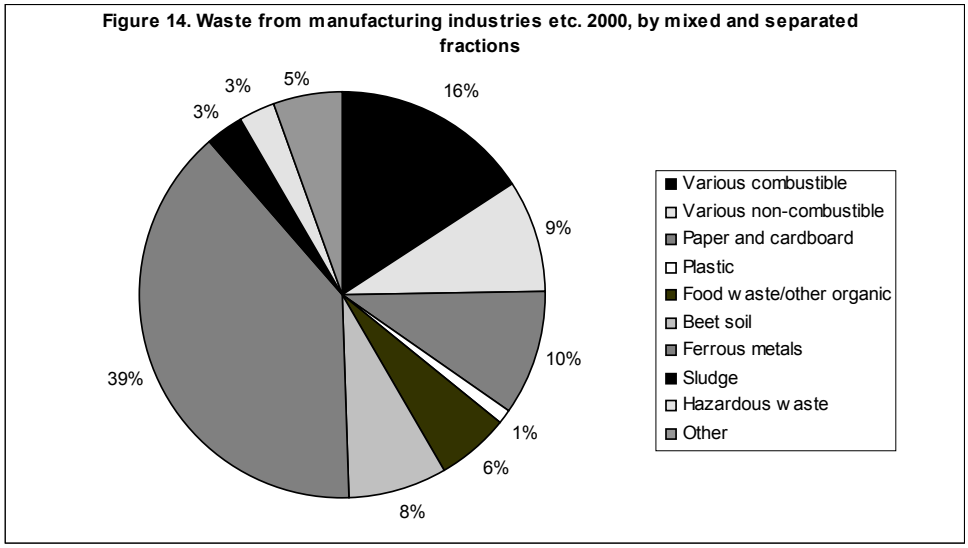
Thereby, targets for recycling and incineration of garden waste from households have been met with a good margin. It is estimated to be impossible to increase recycling further. Therefore, future efforts with respect to garden waste will concentrate on maintaining the present high recycling rate and to reduce amounts treated in the municipal waste management system.

6.4 Waste from manufacturing industries

Waste generation in industry in 2000 amounted to 2,948,000 tonnes, which is 295,000 tonnes or 11 per cent more than in 1999. A distribution of waste from industry on mixed and separated fractions is shown in Figure 14. It is seen that ferrous metals by far is the largest single fraction followed by the mixed fraction various combustible, separated paper and cardboard, various non- combustible and beet soil.

The relative distribution of total industrial waste on the different fractions remained almost unchanged in 2000 compared to 1999. However, as mentioned above there has been an increase in amounts of industrial waste of around 295,000 tonnes. This increase is particularly attributable to the separated fractions paper and cardboard, food waste/other organic, ferrous metals and the mixed fraction various non-combustible that increased by 53 per cent, 25 per cent, 21 per cent and 15 per cent respectively. However, it is important to note that around 100,000 tonnes of the increase is explained by a correction in the registration of the amounts of paper and cardboard collected for recycling, cf. Table 6.

By contrast there has been a decrease in the fractions various combustible, hazardous waste and beet soil: 14 per cent, 13 per cent and 2 per cent respectively. This indicates that in 2000 there was a better separation of recyclable waste such as paper and cardboard and food waste/other organic from the mixed fraction various combustible.



Source: ISAG reports 2000. Legend: clock-wise from top.

The treatment of waste from industry is shown in Figure 15. 64 per cent of the waste was recycled in 2000. This is 6 percentage points more than in 1999. In absolute figures it corresponds to an increase of 346,000 tonnes. A large part of this increase is attributable to larger amounts of separated waste for recycling, such as paper and cardboard and ferrous metals.

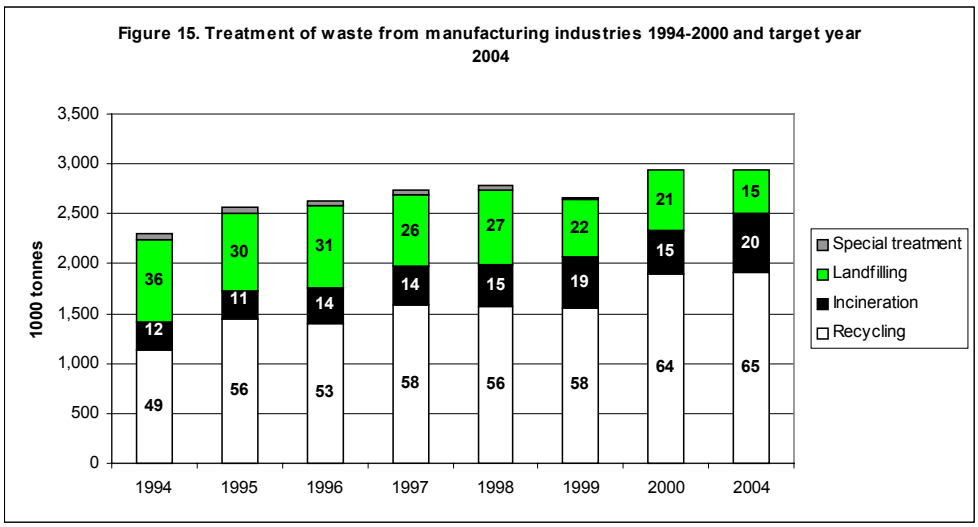
The rate of industrial waste incinerated in 2000 reached 15 per cent, which is 4 percentage points less than in 1999. The rate led to landfill remained almost unchanged from 1999: 21 per cent.

This means that the target of landfilling a maximum of 15 per cent of industrial waste has not been met. Still far too much of waste from industry is landfilled. Even if the rates of recycling and landfilling have taken a positive direction since 1994, there is still some way to go before the targets for these two treatment options have been met.

Amounts and composition of waste from manufacturing industries depend on the sector generating the waste, as well as size and number of enterprises. Possibilities of preventing or recycling waste will therefore differ from one waste fraction and sector to another.

The Danish Environmental Protection Agency has through the latest amendment to the Statutory Order on Waste implemented a number of changes to the ISAG system so that from year 2001 it will be possible to state waste from industry on eleven different sectors. In future, a number of enterprises [15] must furthermore in addition keep a register in a specific format with various information on their waste generation. This will enhance the possibility of conducting sector-specific analyses and initiatives in industry.

[15] Enterprises under the duty of notification and approval, cf. Appendix 1 to Statutory Order no. 367 of 10 May 1992 on other activities than listed activities and Appendix 1 to Statutory Order no. 807 of 25 October 1999 on approval of listed activities



Source: See Tables 1 and 2. The figure has been designed in a way that total waste amounts year 2004 are similar to waste amounts in 2000. This should not be taken as an expression of projections of total waste amounts.

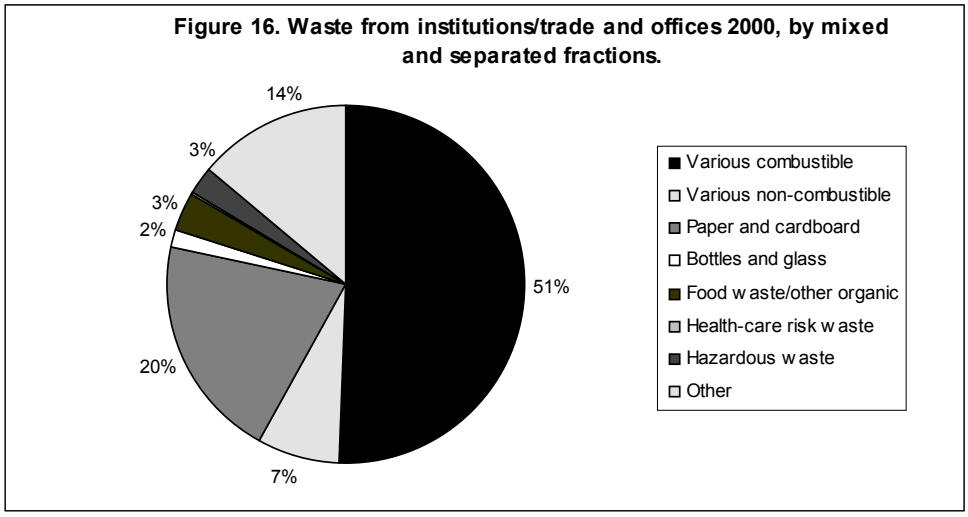
In order to meet targets in Waste 21, the Danish Environmental Protection Agency has selected a number of waste types from industry to come into focus. One such waste type is shredder waste. New treatment technologies shall contribute to diverting shredder waste from landfilling to recycling. Another waste type in focus is hazardous waste, for which collection schemes shall be established with a view to separation and recycling.

6.5 Waste from institutions, trade and offices

Waste from the service sector[16] in 2000 amounted to 1,119,000 tonnes, which is 164,000 tonnes or 17 per cent more than in 1999.

Waste from the service sector divided into mixed and separated fractions is shown in Figure 16. The relative distribution is almost the same in 2000 as in 1999. However, the rate of the mixed fraction other[17] increased by 6 percentage points to constitute today 14 per cent of the waste. This has taken place at the expense of the fractions various burnable, various non- combustible and separated paper and cardboard.

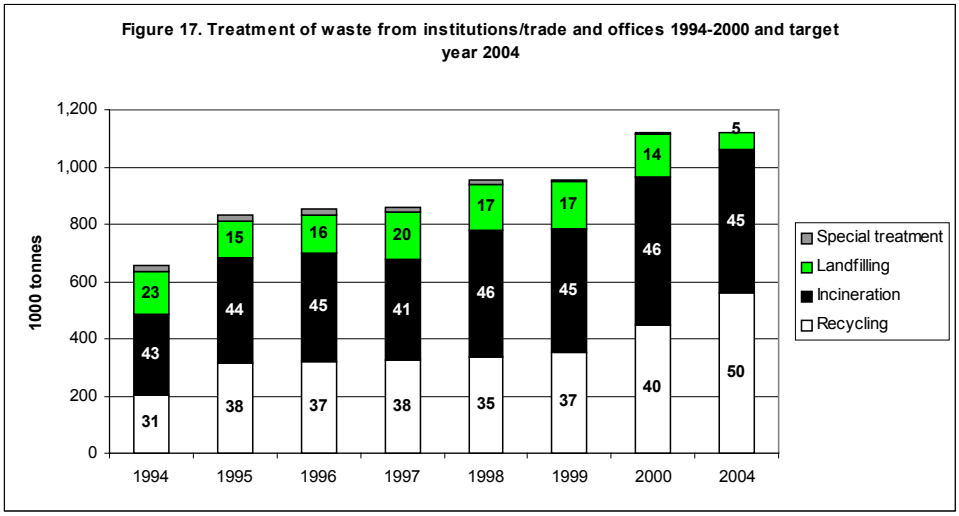
[16] The service sector covers institutions, trade and offices.
[17] Covers plastic, garden waste, sludge and the fraction ”other recyclable”



Source: ISAG reports 2000. Legend: clock-wise from top.

Of the 1,119,000 tonnes of waste generated in the service sector in 2000, 40 per cent was recycled, 46 per cent was incinerated, whereas 14 per cent was led to landfill, cf. Figure 17. The rate incinerated in 2000 is almost unchanged from 1999. In return, a diversion has taken place from landfilling to recycling, so that the rate for recycling increased by 3 percentage points.

Compared to targets for treatment in Waste 21 in year 2004 still too little waste was recycled and too much landfilled in 2000 from the service sector. If targets are to be met, separation and collection of waste must be improved so that a larger proportion of recyclable materials can be recycled and environmental contaminants separated and treated separately.



Source: See Tables 1 and 2. The figure has been designed in a way that total waste amounts year 2004 are similar to waste amounts in 2000. This should not be taken as an expression of projections of total waste amounts.

6.6 Residues from coal-fired power plants

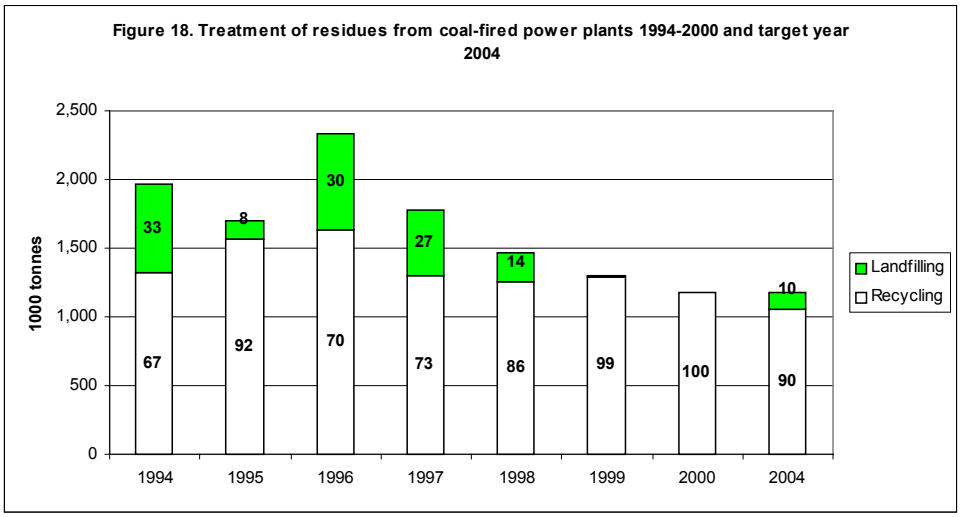
The generation of residues at coal-fired power plants varies from one year to the next due to variations in Danish imports/exports of power to and from Sweden and Norway. Imports/exports of power to and from Sweden and Norway depend

largely on precipitation in these countries – if there is much precipitation much power is generated from hydropower in Sweden and Norway, and Danish exports will be correspondingly lower.

For example, in 1996 exports of power were particularly high, which is reflected in amounts of residues in this year, cf. Figure 18. In 2000, there was much precipitation in Sweden which resulted in so much cheap power generated on the basis of hydropower that power plants in both Denmark and Norway had to cease operations temporarily.

Amounts of residues have decreased steadily since 1996. This decrease is explained partly by less power exports in the years since 1996, and partly by the Government's Energy Action Plan, "Energy 21", according to which natural gas and renewable energy sources, including bio-fuels, shall substitute coal in the long-term perspective. It is reflected in energy statistics[18] that a decreasing part of electricity generation is based on coal. Also in future, Energy 21 will result in a decrease in residues from coal-based energy generation, whereas there will be an increase in fly ash and bottom ash from bio-fuels.

Figure 18 shows that amounts of residues from coal-fired power plants in 2000 were at around 1,176,000 tonnes. 100 per cent was recycled. Actually, in 2000 residues were used to an extent that amounts landfilled in earlier years were excavated.



Source: See Tables 1 and 2. The figure has been designed in a way that total waste amounts year 2004 are similar to waste amounts in 2000. This should not be taken as an expression of projections of total waste amounts.

Table 17 states recovery of residues in 2000 in more detail. More than 80 per cent of residues is used as raw materials in industrial manufacture of, for example, cement, concrete and plaster board, whereas the remaining part is primarily used as backfilling either under the terms of Statutory Order no. 655 of 27 June 2001 from the Ministry of Environment and Energy, or as backfilling with special approval under the Danish Environmental Protection Act.

[18] The latest Energy Statistics are found on the homepage of the Danish Energy Agency www.ens.dk

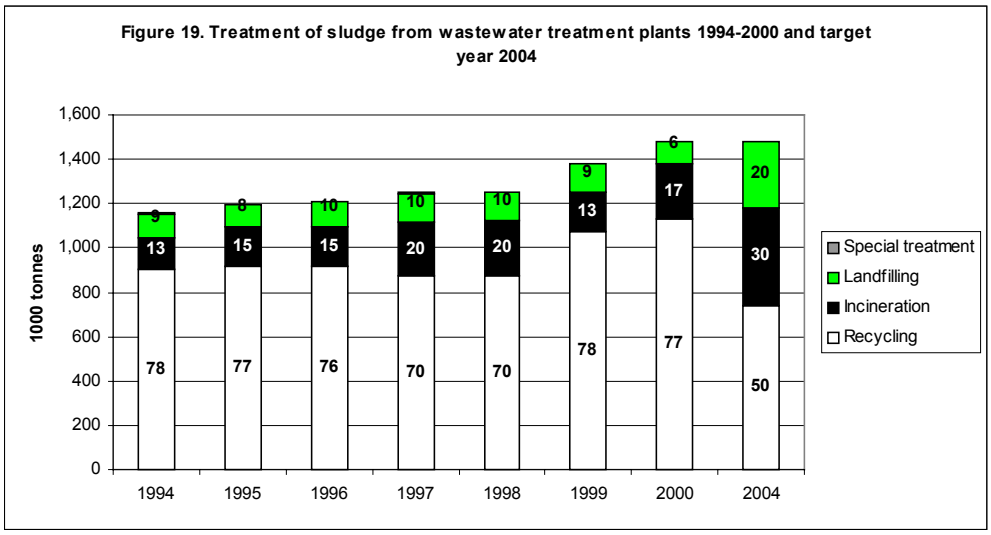
Table 17. Recovery of residues from coal-fired power plants 2000. '000 tonnes.	Fly ash incl. bio	Slag/bottom ash incl. bio	Gypsum	Dry de-sulph. prod.	Sulph. acid	Total
Cement	320		73			393
Concrete	254					254
Porous concrete	8					8
Asphalt	20					20
Roofing felt	0					0
Backfilling cf. Statutory Order 655	4	41				45
Backfilling cf. Part 5 approvals (Env. Prt. Act)	116	0				116
Granulates				2		2
Fertiliser		9		1		10
Backfilling				15		15
Plaster board			288			288
Various			0		1	1
Exports for recycling		33				
Desulphurisation				26		26
Landfilled, net	- 69		5			
For storage, net	35					
Total	**722**	**83**	**366**	**44**	**1**	**1,178**

Source: Reports from Elsam and Energi E2.

6.7 Sludge from municipal wastewater treatment plants

Sludge from municipal wastewater treatment plants in 2000 stated in wet weight amounted to 1,476,000 tonnes [19], which is 97,000 tonnes more than in 1999, cf. Figure 19. The statement only includes sludge, excluding sand and screenings.

Sludge statistics[20] for 1999 from the Danish Environmental Protection Agency show that total sludge amounts in 1999 were at 155,621 tonnes stated in dry weight. This is around 2,000 tonnes more than the previous year.



Source: See Tables 1 and 2. The figure has been designed in a way that total waste amounts year 2004 are similar to waste amounts in 2000. This should not be taken as an expression of projections of total waste amounts.
In amounts for recycling are included 510,155 tonnes in long-term storage, and in amounts for incineration are included 66,978 tonnes for other recovery (Carbogrit and cement manufacture)

[19] The statement for 2000 from municipal wastewater treatment plants of amounts of sludge applied to farmland and incineration of sludge at sludge incineration plants is not yet available. For recycling and incineration, therefore, figures from 1999 from the sludge statistics of the Danish Environmental Protection Agency have been used, whereas for landfilling ISAG figures for 2000 are used.
[20] Sewage sludge from municipal and private wastewater treatment plants in 1999. Environmental review No. 3, 2001.

The increase in sludge amounts stated in wet weight is primarily due to new treatment technologies for sludge and not to a general increase in sludge amounts.

In the treatment in sludge mineralisation plants (long-term storage) sludge is registered with around 0.5 – 1 per cent dry matter, whereas alternatives typically contain 20 per cent.

Based on amounts in wet weight the treatment of sludge is distributed by around 77 per cent for recycling, 17 per cent for incineration and 6 per cent for landfilling. In amounts for recycling are included 510,155 tonnes of sludge in wet weight treated in long-term storage with the objective of further mineralisation. Amounts are included in recycling as it is expected that this sludge will be recycled in some years.

Sewage sludge is mainly recovered as fertiliser on farmland. In future, more stringent requirements for the contents of certain organic and chemical substances will be made in relation to application to farmland. In the short-term perspective, the rate of recycling is therefore expected to decrease. However, in future, the quality of sludge is expected to improve due to the general policy of phasing-out of xenobiotic substances.

It seems furthermore that alternative methods for the recovery of sludge are being developed to a still larger extent. After sludge incineration, the inorganic residue is recovered in the production of, for example, sand blasting agents or cement. Sludge recovered in such alternative methods in 2000 amounted to around 67,000 tonnes[21]. In Figure 19 these 67,000 tonnes have been included in incineration, as these treatment methods are considered as recovery and not recycling.

[21] Cf. footnote 19 figures are from 1999.

7 Incineration plants and landfills

7.1 Incineration plants

In 1999, total waste incineration capacity was around 2,726,000 tonnes, distributed on 31 plants, cf. Table 18. This is an increase in capacity of 253,000 tonnes compared to the 1996 capacity.

In the beginning of the 1990s, an extensive conversion of waste incineration plants from heating generation to combined power and heating generation took place. In this connection, capacity adjustments were effected in relation to expected waste amounts for incineration in future.

As a result of the ban on landfilling of waste suitable for incineration that took effect on 1st January 1997, there is now increasing pressure on incineration capacity. Amounts of non-recyclable waste suitable for incineration will be surveyed regularly in order to ensure necessary incineration capacity.

Table 18. Number of incineration plants and available incineration capacity in 1989, 1993, 1994/95, 1996 and 1999	**1989**	**1993**	**1994/95**	**1996**	**1999**
Number of incineration plants	38	31	31	31	31
Theoretic capacity, '000 tonnes	2164	2329	DH: 1217 CPH: 1315	DH: 1060 CPH: 1413	DH: 992 CPH: 1734
Nominal capacity, tonnes/hour	313	335	DH: 174 CPH: 188	DH: 171 CPH: 194	DH: 166 CPH: 271

Sources: Rambøll & Hannemann 1990: Analysis of data for energy plants based on waste, for the Danish Environmental Protection Agency and the Danish Energy Agency. The Danish Environmental Protection Agency and the Danish Energy Agency 1994: Waste resources for waste incineration 1993 and 2000. The Danish Environmental Protection Agency and the Danish Energy Agency 1997: Waste amounts for incineration year 2000. The Danish Environmental Protection Agency and the Danish Energy Agency 2001: Waste incineration in 2004 and 2008. Amounts and capacities. Figures for 1989 and 1995 are calculated on the basis of nominal capacity at 7,000 hours/year. Figures for 1996 and 1999 are based on actual hours of operation of plants. District heating capacity (DH) may be subject to restrictions under the Act on heating supply. CPH = combined power and heating. In figures for 1999 the nominal capacity includes plants erected in 1999. This gives a larger nominal capacity as furnaces have not been fully implemented in 1999.

7.2 Landfills

According to a questionnaire study conducted by the Danish Environmental Protection Agency in February/March 2001 there are today 134 landfill facilities in Denmark with an environmental approval, cf. Table 19. In addition, there is a small number of landfill facilities for harbour sludge.

Of these, 100 facilities are owned by public authorities, whereas 34 are under private ownership. The 100 public facilities cover 51 landfills, 25 inert waste landfills and 24 mono-landfills.

The privately owned facilities cover 3 landfills, 10 inert waste landfills and 21 mono-landfills.

According to the study the legal protection period has expired for just below half of the 134 landfill facilities.

A landfill is defined as a site receiving waste that, immediately or over time, presents a risk of pollution of groundwater, surface water and/or air. A landfill for inert waste is a site receiving waste that does not, or only to a very limited extent presents a risk of pollution of groundwater, surface water and/or air. A mono-landfill is a site receiving only one or a limited range of waste types with known composition.

As a consequence of the above-mentioned ban on landfilling of waste suitable for incineration, in combination with an increased and further differentiated waste tax, a large drop in landfill capacity needs is expected.

However, this may be counterbalanced by more stringent requirements for dredging of harbour sludge and recycling of residues.

Table 19. Number of landfills, inert waste landfills and separately located mono-landfills and available landfill capacity in 1992 and 1994

	Landfills			Inert waste landfills			Mono-landfills	
	1992	1994	2001	1992	1994	2001	1994	2001
Number of sites	60	64	54	70	49	35	63	45
Remaining capacity, mio. tonnes	30.9	24.7	-	14.3	6.7	-	6.2	-
Annual filling rate, mio. tonnes	2.1	1.7	-	0.9	0.12	-	0.8	-

Sources: Danish Environmental Protection Agency. Working report no. 54, Landfill Capacity 1992, Danish Environmental Protection Agency 1997: Working report no. 33, Landfill sites in Denmark, and internal calculations. Questionnaire study carried out by the Danish Environmental Protection Agency in February/March 2001.

8 Projection of waste generation

8.1 Model suitability for describing historical developments

Section 8.2 presents a baseline projection of waste generation up to year 2020. The so-called Risø[22] model has been used for the projection.

The projection is based on the Budget Statement projection 2001, the latest projection from March 2001 from the Danish Energy Agency and a calibration of the model for ISAG data for 2000.

Before making the projection, the suitability of the model for describing historical developments in waste generation was evaluated. This was done by calibrating the model for the latest year's waste statistics, i.e. year 2000, and calculating developments in waste generation from 1994 to 2000 with the model.

Actual waste generation in the period 1995 - 2000 increased by around 14 per cent[23], but the model calculates total waste generation to be unchanged. A significant part of the deviation is due to the fact that the model calculates a larger decrease in the generation of residues from coal-fired power plants than what was actually the case.

As to generation stated endogenously[24] in the model, economic developments may explain around half of the increase in total generation from 1995 to 2000. Around 250,000 tonnes of the deviation of 977,000 tonnes in 1995 may be explained by a larger collection of garden waste which is described exogenously[25] in the model.

In addition, the increase in recyclable fractions is considerably larger than the decrease in the generation of "various non- combustible". A significant part of this increase is due to increased recycling of construction and demolition waste. If this is adjusted, there is a deviation in 1995 of around 400,000 tonnes between the model and actual generation registered. This deviation is due to significantly higher generation in 2000, particularly in the fractions ferrous metals, wood, soil and stone and sludge.

8.2 Baseline projection of waste generation 1994 – 2020

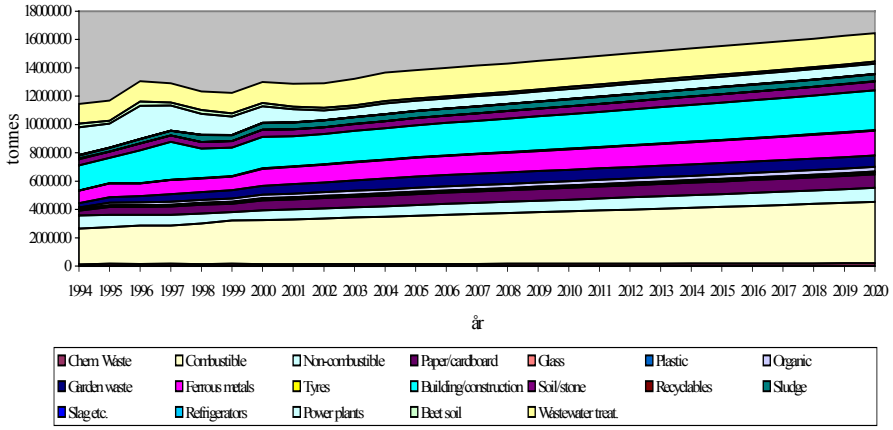
The baseline projection of waste generation estimates an increase in total waste generation from 2000 to 2020 of 27 per cent, corresponding to an increase from 13 million tonnes in 2000 to 16.5 million tonnes in 2020, cf. Figure 1[26].

[22] Risø is the Danish National Laboratory for research in science and technology
[23] Part of the increase is attributable to extension of the statistical basis.
[24] I.e. calculated within the assumptions of the model.
[25] I.e. fixed beyond the model.
[26] Note that e.g. amounts of paper and cardboard are not an expression of total potential of this fraction, but merely state amounts of paper and cardboard separated for recycling. The fraction "combustible" thus may also contain paper and cardboard and other recyclable fractions.

The baseline projection describes expected developments in waste generation on the basis of estimated economic activity. It is assumed that no new waste political initiatives are launched.

In comparison, an increase in production and consumption of 43 per cent and 53 per cent respectively is expected. Thus, the model projects waste generation to increase less than economic activity. Significant reasons for this are the decreasing use of coal at power plants and expected low growth in building and construction activities.

Figure 1. Developments in waste generation, historical data 1994-2000, projections 2001-2020



As Figure 1 shows, the baseline projection estimates a steeper increase in amounts of “combustible” waste and ”non- combustible” waste than in recyclable fractions such as paper and cardboard, glass and plastic.

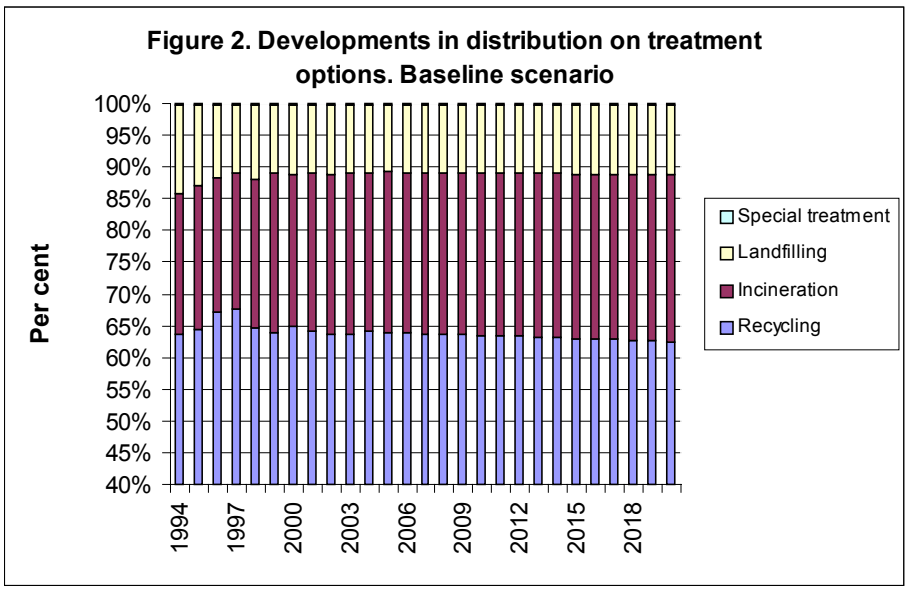
Amounts of ferrous metals and automobile tyres are expected to increase relatively much due to the expected increase in industrial production and the expected increase in private consumption of transport.

The modest increase in amounts of slag is due to an expectation of an almost constant use of coal in the period.

Amounts of beet soil are expected to decrease due to new technologies causing less soil to stick to the beets during harvesting. However, depending on weather conditions during harvesting there are normally large variations over the years.

Amounts of sludge from municipal wastewater treatment plants are expected to increase due to new treatment technologies causing water contents in the sludge to increase with unchanged amounts of dry matter. This is expected to lead to an increase of 500,000 tonnes in the next five years without a corresponding increase in dry matter amounts.

This means that the rate of waste for recycling decreases from around 64.8 per cent in 2000 to around 62.5 per cent in 2020. Correspondingly, the rate led to incineration passes from around 24 per cent in 2000 to around 26.4 per cent in 2020. The rate led to landfill will remain relatively constant around 11 per cent, cf. Figure 2.



8.3 Waste 21 projection 2000 – 2020

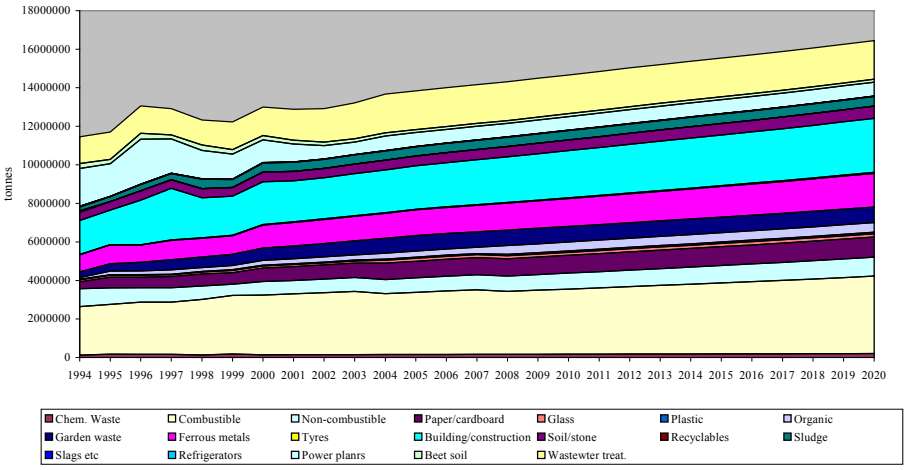
In the Danish Government's Waste Management Plan Waste 21 a number of targets for treatment of waste up to 2004 have been set. Many of the initiatives in Waste 21 focus on increased separation of specific waste fractions with a view to diverting waste from incineration to recycling. But an equally important target of Waste 21 is to stabilise total waste generation.

Based on the baseline projection, a Waste 21 scenario has been drawn up, cf. Figure 3.

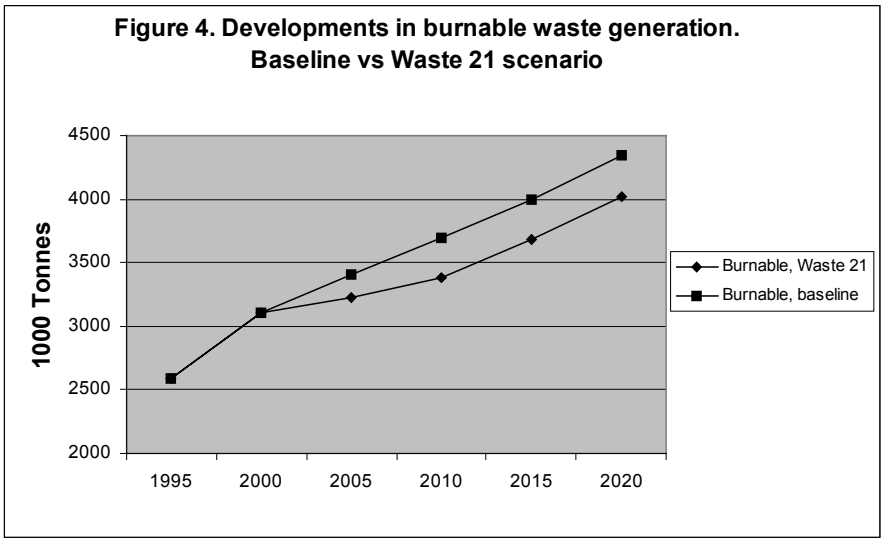
In the Waste 21 scenario the initiatives contained in Waste 21 for increased separation and recycling of paper and cardboard, glass, plastic and organic waste have been included for the years 2000 to 2004. No further assumptions for increased separation for the period 2004 – 2020 have been made. Therefore, based on the Waste 21 adjustments, this period is only based on the projection suitability of the model.

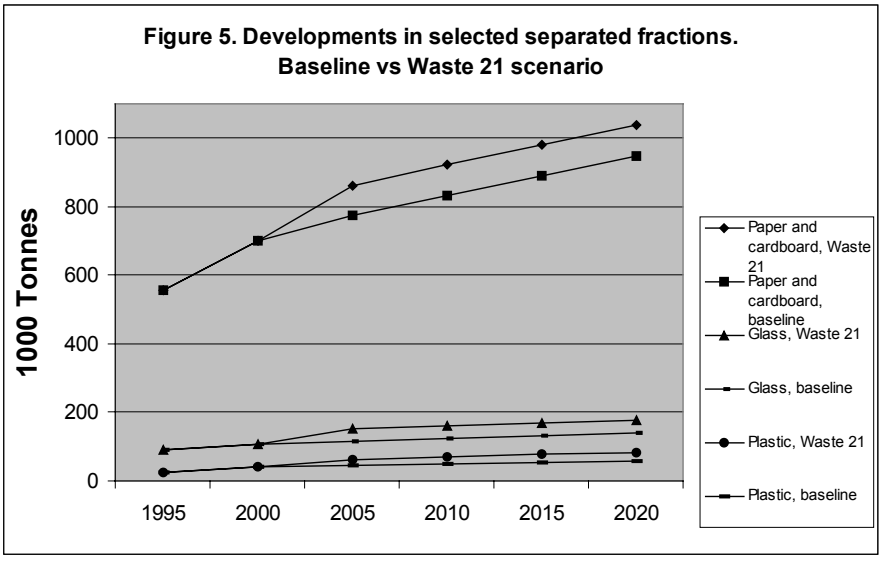
Initiatives relating to developments in total waste generation have not been included in the Waste 21 scenario, as a draft strategy for waste prevention is only expected to be available in early 2002.

Figure 3. Developments in waste generation, historical data 1994-2000, projections 2001-2020. Waste 21.



A comparison with the baseline projection of Figure 1 primarily shows a reduction in the generation of the mixed fraction "combustible" waste and an increase in the generation of the recyclable fractions paper and cardboard, glass and plastic, cf. Figures 4 and 5.



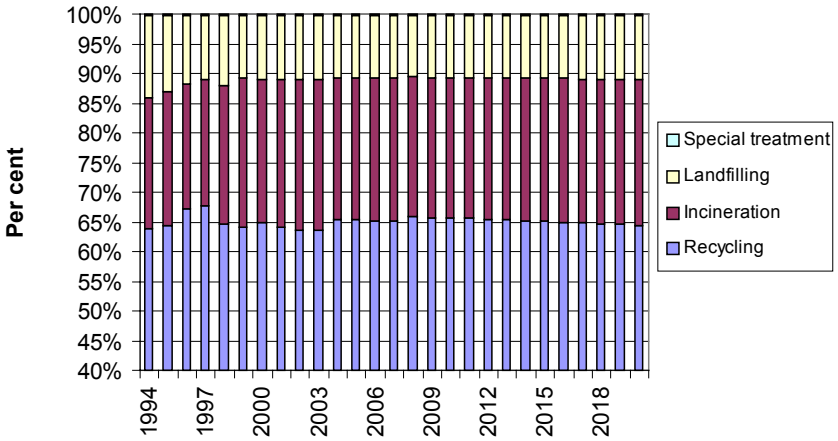


If no further measures are taken against developments in waste generation after 2004[27] the Waste 21 adjustments for 2000 – 2004 mean that the rate of waste in 2020 for incineration will be reduced from 26.4 per cent to 24.6 per cent, whereas the rate of waste for recycling will increase from 62.5 per cent to 64.4 per cent.

This means that Waste 21 will ensure that the rate of recyclable fractions will be the same in 2000 and 2020 causing the distribution on treatment options to be largely the same in 2000 and 2020, cf. Figure 6.

Without the initiatives in Waste 21, cf. the baseline projection there would be a decreasing rate of fractions for recycling.

Figure 6. Developments in distribution on treatment options. Waste 21 scenario



[27] However, further initiatives in the waste management area are expected for the period after 2004 with the successor of Waste 21 .

Annex 1. Tables of waste generation

Table 1. Waste generation in Denmark in 1998, 1999 and 2000, and target for year 2004. Stated by source and treatment option. Stated in '000 tonnes and in per cent.

ENTIRE COUNTRY	Recycling							Incineration							Landfilling							Special treatment							Total					
	1998		1999		2000		Targe	1998		1999		2000		Targe	1998		1999		2000		Targe	1998		1999		2000		Targe	1998		1999		2000	
Source	1000 t	%	1000 t	%	1000 t	%	%	1000 t	%	1000 t	%	1000 t	%	%	1000 t	%	1000 t	%	1000 t	%	%	1000 t	%	1000 t	%	1000 t	%	%	1000 t	%	1000 t	%	1000 t	%
Households	839	30	869	29	914	30	0	1,585	57	1,730	58	1,804	59	0	355	13	361	12	361	12	0	17	1	4	0	4	0	0	2,796	23	2,963	24	3,084	24
Domestic waste	281	17	247	15	240	14	30	1,324	78	1,301	78	1,352	81	70	98	6	117	7	85	5	0	0	0	0	0	0	0	0	1,702	14	1,665	14	1,676	13
Bulky waste	96	17	108	16	113	16	25	239	42	323	48	351	48	38	234	41	239	36	264	36	38	4	1	2	0	2	0	0	572	5	672	5	730	6
Garden waste	411	94	455	98	505	97	95	8	2	6	1	7	1	5	20	5	3	1	7	1	0	0	0	0	0	0	0	0	438	4	464	4	519	4
Other	51	62	60	37	56	36	0	14	17	99	61	95	60	0	3	4	2	1	4	3	0	14	16	2	1	2	1	0	83	1	163	1	158	1
Institutions/trade and offices	338	35	353	37	449	40	50	438	46	434	45	515	46	45	161	17	164	17	152	14	5	18	2	5	0	4	0	0	955	8	955	8	1,119	9
Manufacturing industries etc.	1,564	56	1,550	58	1,896	64	65	425	15	513	19	431	15	20	746	27	582	22	611	21	15	47	2	9	0	9	0	0	2,783	23	2,653	22	2,948	23
Building and construction	2,664	90	2,685	90	2,889	90	90	32	1	60	2	65	2	2	266	9	224	8	269	8	8	1	0	0	0	0	0	0	2,962	24	2,968	24	3,223	25
Wastewater treatment plants	875	70	1,071	78	1,132	77	50	252	20	182	13	249	17	30	124	10	126	9	94	6	20	0	0	0	0	0	0	0	1,251	10	1,379	11	1,476	11
Slag, fly ash etc. (coal)	1,259	86	1,287	99	1,176	100	90	0	0	0	0	0	0	0	210	14	12	1	0	0	10	0	0	0	0	0	0	0	1,469	12	1,299	11	1,176	9
Other	3	17	0	0	3	58	0	8	46	11	71	0	3	0	7	37	4	29	2	40	0	0	0	0	0	0	0	0	18	0	15	0	5	0
Total	7,542	63	7,815	62	8,461	65	64	2,740	22	2,929	24	3,064	24	24	1,868	15	1,472	12	1,489	11	12	84	1	17	0	17	0	0	12,233	100	12,233	100	13,031	100

Source: ISAG reports, Waste 21 – the Danish Government's Waste Management Plan 1998 – 2004, Danisco, Association of Danish Recycling Industries and other large scrap dealers, reports to the Danish Environmental Protection Agency on sludge applied to farmland etc. and incineration of sludge at sludge incineration plants (figures from 1999). Waste amounts from wastewater treatment plants include sand and screenings.

Table 2. Waste generation in Denmark in 1998, 1999 and 2000 stated by waste type and treatment option. Stated in '000 tonnes and in per cent.

ENTIRE COUNTRY	Recycling						Incineration						Landfilling						Special treatment						Total					
	1998		1999		2000		1998		1999		2000		1998		1999		2000		1998		1999		2000		1998		1999		2000	
Waste type	1000 t	%	1000 t	%	1000 t	%	1000 t	%	1000 t	%	1000 t	%	1000 t	%	1000 t	%	1000 t	%	1000 t	%	1000 t	%	1000 t	%	1000 t	%	1000 t	%	1000 t	%
Domestic waste	301	17	265	15	259	15	1,367	77	1,352	78	1,394	80	109	6	123	7	88	5	0	0	0	0	0	0	1,777	5	1,740	5	1,741	5
Treatment residue	2,150	70	2,328	79	2,262	79	261	8	190	6	248	9	678	22	414	14	371	13	0	0	0	0	0	0	3,089	3	2,931	4	2,881	4
Bulky waste	96	17	108	16	113	16	239	42	323	48	351	48	234	41	239	36	264	36	4	1	2	0	2	0	572	1	672	1	730	1
Garden waste	553	94	576	98	634	97	9	2	8	1	10	1	24	4	6	1	12	2	0	0	0	0	0	0	586	7	590	8	656	8
Ind./commercial waste	4,381	72	4,485	73	5,146	75	858	14	963	16	977	14	816	13	675	11	743	11	1	0	1	0	1	0	6,057	21	6,125	23	6,867	22
Hazardous waste	51	38	47	31	44	30	1	1	83	55	81	55	5	4	10	7	9	6	76	57	11	8	12	8	134	27	151	24	146	24
Health-care risk waste	0	0	0	0	0	0	4	58	5	64	4	61	0	1	0	0	0	0	3	42	3	35	2	38	7	10	8	10	6	11
Not informed	10	87	6	41	2	67	1	7	4	23	0	-3	1	6	6	36	1	34	0	0	0	0	0	1	12	14	16	12	4	11
Total	7,542	63	7,815	62	8,461	65	2,740	22	2,929	24	3,064	24	1,868	15	1,472	12	1,489	11	84	1	17	0	17	0	12,233	100	12,233	100	13,031	100

Source: ISAG reports, Waste 21 – the Danish Government's Waste Management Plan 1998 – 2004, Danisco, Association of Danish Recycling Industries and other large scrap dealers, reports to the Danish Environmental Protection Agency on sludge applied to farmland etc. and incineration of sludge at sludge incineration plants (figures from 1999). Waste amounts from wastewater treatment plants include sand and screenings.

Annex 2. Principles for distribution of waste received at recycling centres and transfer stations.

Recycling centres/transfer stations
The ISAG covers a commercial source "recycling centres/transfer stations". This means that waste, for example from households, delivered via transfer stations is not recorded as waste from "households".

The source "recycling centres/transfer stations" is therefore distributed on the original sources. This distribution is obviously based on estimates.

- All domestic waste from "recycling centres/transfer stations" is converted into domestic waste from the source "households".

- All bulky waste, apart from the fractions "paper and cardboard" and "bottles and glass", from "recycling centres/transfer stations" is converted into bulky waste from the source "households".

- All bulky waste covering the fractions "paper and cardboard" and "bottles and glass" is converted into "domestic waste" and transferred from the source "recycling centres/transfer stations" to the source "households".

- All garden waste from "recycling centres/transfer stations" is converted into garden waste from the source "households".

- All industrial and commercial waste from "recycling centres/transfer stations", apart from the fractions "concrete", "tiles", "other construction and demolition waste", "asphalt", "wood", and "asbestos", is converted into industrial and commercial waste from the source "institutions, trade and offices".

- All industrial and commercial waste from "recycling centres/transfer stations", covering the fractions "concrete", "tiles", "other construction and demolition waste", "asphalt", "wood", and "asbestos", is converted into industrial and commercial waste from the source "building and construction sector".

- All hazardous waste from "recycling centres/transfer stations" is converted into hazardous waste from the source "households".

- All waste of the type "treatment residues" and "not informed" from "recycling centres/transfer stations" is converted into a new source: "other".

<u>Bulky waste</u>
- All waste of the type "bulky waste" from the sources "institutions, trade and offices", "manufacturing industries", and "building and construction sector" is converted into "industrial and commercial waste", although deriving from the same sources.

Ferrous metals

- Reports to the ISAG on ferrous metals are made according to the Statutory Order on Waste by enterprises, including smelting works, that reprocess collected and separated ferrous metals by remelting. Scrap dealers that collect ferrous metals are not subject to mandatory reporting to the ISAG, but are requested to uphold a register in accordance with ISAG regulations.

- The Danish Environmental Protection Agency receives information from scrap dealers directly from the Association of Danish Recycling Industries and other large scrap dealers. In waste statistics, such ferrous scrap has been attributed to the source "manufacturing industries".

Annex 3 Hazardous waste generation

Generation and treatment of hazardous waste in 1999 and 2000. Tonnes										
Fraction	**Recycling**		**Incineration**		**Landfilling**		**Special treatment**		**Total**	
	1999	**2000**	**1999**	**2000**	**1999**	**2000**	**1999**	**2000**	**1999**	**2000**
Primary sources										
Lead batteries (1)	15,231	16,517							15,231	16,517
Hermetically closed nickel-cadmium batteries (2)	66	58							120	120
Waste oil delivered to district heating plants (3)			14,528	0					14,528	0
Washing and cleaning agent waste	3		2,066	2,242	1	7	36	20	2,106	2,269
Organic solvents w.org. halogen without inflam. solvents		2	426	286			16	40	442	328
Organic solvents w.org. halogen mixed with inflam. solvents			131	177			1		132	177
Organic solvents with org. halogen and/or sulphur	1	2	65	18				2	66	22
PCB and PCT waste			15	65			15	14	30	79
Liquid residues from org. synthesis w. toxic subs., hal./sulph.			130					47	130	47
Liquid residues from org. synthesis w. halogen/sulphur			358	536			1	16	359	552
Sludge from plastic coatings containing PVC			99	126	4	12			103	138
Solid residues from recovering solvents cont. halogen			21	20					21	20
Solid residues from recov. solvents w. toxic subs., hal./sulph.		7	15	7	1				16	14
Solid residues from organic synthesis w. org. halogen/sulphur			18	17	3				21	17
Organic aromatic solvents without org. halogen/sulphur		22	6,757	9,302			1	106	6,758	9,430
Org. solvents without aromatic solvents or halogen/sulphur		12	1,884	2,493			1,667	2	3,551	2,507
Printing inks, paint, varnish with organic solvents	14	51	10,640	9,720	2	2	815	1,535	11,471	11,308
Printing inks, paint, varnish without organic solvents		21	6,572	6,880	7	11	824	236	7,403	7,148
Tar and rust-protection oils	170		295	1,073					465	1,073
Alcohol/water mixtures from nylon plates			151	90					151	90
Residues from distillation of mixtures with acetone, styrene and unhardened polyesther		2	507	559					507	561
Organic metal compounds, except mercury compounds			112	67			1	1	113	68
Liquid organic residues from distillation without halogen/sulphur	34		1,119	2,337					1,153	2,337
Formaldehyde solvents < 30%			63	73					63	73
Aqueous phenol and formaldehyde emulsions			51	44			5		56	44
DI-isocyanides		7	122	135	1				123	142
Anti-freeze liquids	393	434	743	627			983	1,225	2,119	2,286
Latex and rubber sludge containing organic solvents			51	58					51	58
Acidic sludge from used oil refining			14	4			14	20	28	24
Waste glue with organic solvents/two-component glue	3	46	497	630				9	500	685
Solid residues from organic synthesis without org. halogen/sulphur		17	652	570	31	2	118	78	801	667
Slip from production of brake linings etc.				77		24			0	101
Beet pulp containing lead compounds			4	5					4	5
Acidic, aqueous solutions with chromium compounds	855	737	95	121	4	9	419	456	1,373	1,323
Acidic, aqueous solutions with nitric acid, without hydrofluoric acid	2		31	67	1	2	338	176	372	245
Acidic, aqueous solutions with hydrofluoric acid and/or nitric acid salts		1	21	40			338	473	359	514
Acidic, aqueous solutions with hydrochloric/ sulphuric/ phosphoric acid	21	2	613	581	9	18	3,625	4,311	4,268	4,912
Photograph developing baths	3,051	1,456	1,116	1,255	10		60	59	4,237	2,770
Photograph processing baths containing chromium			7	7					7	7
Fixing baths	1,293	273	20	15			963	1,002	2,276	1,290
Base aqueous solutions without cyanide	27	2	1,636	1,555	4	2	390	455	2,057	2,014
Base aqueous solutions with cyanide			79	32			152	93	231	125
Metal hydroxide and metal oxide sludge	1,266	1,036	1,306	1,396	3,683	3,611	145	90	6,400	6,133
Smoke rinsing sludge and smoke filter dust			369	341	743	248	203	287	1,315	876
Dye-works waste			2	0					2	0
Aqueous sludge from pressurised impregnation of wood		0	14	2			7	2	21	4
Hardening salts		2	15	5			52	45	67	52
Mercury waste	140	83	4	12	20	16	93	89	257	200
Cloths and rags polluted with organic solvents			191	169			6	4	197	173
Waste from production and distribution of chemical neutralising agents		86	1,163	802	4	2	76	43	1,243	933
Waste from medicines		0	728	838		1	557	595	1,285	1,434
Chemical waste from laboratories etc.	1	20	1,056	756	54	12	67	72	1,178	860
Glass and mineral waste containing phenols		0	54	28	2	1		4	56	33
Other hazardous waste	6,516	13,283	20,785	11,592	276	1,028	143	2,409	27,720	28,312
Motor oil	6,694	6,388	11,371	11,599		12	19	29	18,084	18,028
Gear and hydraulic oil	1	3	128	203					129	206
Hot transmission oil			42	28					42	28
Other lubricating oil		38	682	741					682	779
Oil and petrol separators	429	321	2,407	2,363			2,399	1,379	5,235	4,063
Drilling/cutting oil, unthinned	139	162	21	13				0	160	175
Oil emulsion	3,882	5,469	171	146					4,053	5,615
Lubricating grease		0	38	64					38	64

Continues overleaf

Cont'd

Fraction	Recycling		Incineration		Landfilling		Special treatment		Total	
	1999	2000	1999	2000	1999	2000	1999	2000	1999	2000
Motor petrol	69	0	52	61					121	61
Petroleum		0	5	9					5	9
Diesel oil	7,857		52	22					7,909	22
Gas oil			9	5					9	5
Fuel oil			118	224					118	224
Other products containing oil	21,594	716	2,786	5,164	88	2	426	830	24,894	6,712
Cutting oil			26	39					26	39
Cutting fluids			6	2					6	2
Mineral drilling/cutting oil in water			52	63					52	63
Synthetic drilling/cutting fluids in water			8	35				6	8	41
Oil and chemical waste	27,952	22,301					188	38	28,140	22,339
Health-care waste			1,267	1,165			2,767	2,485	4,034	3,650
Dust-emitting asbestos					12,748	8,812			12,748	8,812
CFC cooling agents		5						4	0	9
Sulphuric acid from coal-fired power plants (4)	1,000	1,300							1,000	1,300
Total primary sources	***100,703***	***72,882***	***98,651***	***81,798***	***19,695***	***15,834***	***19,929***	***20,787***	***233,035***	***185,363***
Secondary sources										
Filter dust from flue gas cleaning (1)	11,002	11,008							11,002	11,008
Fly ash (5)	376	218			29,392	30,767			29,768	30,985
Flue gas cleaning products (5)	5,170	3,583			70,178	58,552			75,348	62,135
Total secondary sources	***16,548***	***14,809***	***0***	***0***	***99,570***	***89,319***	***0***	***0***	***116,118***	***104,128***
Total	**117,251**	**72,882**	**98,651**	**81,798**	**119,265**	**105,153**	**19,929**	**20,787**	**349,153**	**289,491**