MONITORING OF SOLID WASTE IN HONG KONG

Waste Statistics for 2003

Environmental Protection Department

Monitoring of Solid Waste in Hong Kong
Waste Statistics for 2003

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Content

Abbreviations

C&I	**Commercial and Industrial**
CED	**Civil Engineering Department**
CWTC	**Chemical Waste Treatment Centre**
EPD	**Environmental Protection Department**
EPS	**Expanded Polystyrene**
FEHD	**Food and Environmental Hygiene Department**
IETS	**Island East Refuse Transfer Station**
IWTS	**Island West Refuse Transfer Station**
KBTS	**Kowloon Bay Refuse Transfer Station**
MSW	**Municipal Solid Waste**
NENT	**North East New Territories Landfill**
NLTS	**North Lantau Refuse Transfer Station**
NT	**New Territories**
NWNTRTS	**North West New Territories Refuse Transfer Station**
OITF	**Outlying Islands Refuse Transfer Facilities**
RTS	**Refuse Transfer Station(s)**
SENT	**South East New Territories Landfill**
STTS	**Sha Tin Refuse Transfer Station**
tpd	**tonnes per day**
WENT	**West New Territories Landfill**
WKTS	**West Kowloon Refuse Transfer Station**

1. Introduction

This report presents the statistics on disposal and recovery/ recycling of solid waste generated in Hong Kong in the year 2003.

The information contained in this report is compiled from the data collected from various sources throughout the year, including the ongoing solid waste monitoring work at waste facilities undertaken by the Environmental Protection Department.

The statistics on waste disposal and recovery/ recycling are presented in Chapters 2 and 3 respectively, whereas the classification of solid waste and the methodology adopted in the data collection are explained in Appendix 1.

Abbreviations that are used in the report are listed on page iv for ease of reference.

2. Waste Quantities and Characteristics

Plate 2.1 Solid waste disposal by category in 2003

Waste type [1]	Quantity (tpd)			Change from 2002	
	Public[2]	Private[3]	Total	Quantity (tpd)	Percentage
a. Domestic waste					
- waste from household, public cleansing	5,892	1,422	7,314		
- bulky waste [4]	25	63	88		
Sub-total	5,917	1,485	7,402	-117	-1.6%
b. Commercial waste					
- mixed waste from commercial activities	-	1,337	1,337		
- bulky waste [4]	-	91	91		
Sub-total		1,428	1,428	+86	+6.4%
c. Industrial waste					
- mixed waste from industrial activities	-	581	581		
- bulky waste [4]	-	31	31		
Sub-total		612	612	+51	+9.0%
d. Municipal solid waste received at disposal facilities (a+b+c)	5,917	3,525	9,441	+19	+0.2%
e. Landfilled construction waste	-	6,728	6,728	-3,474	-34.1%
f. Special waste	939	649	1,588	+54	+3.5%
g. All waste received at landfills (d+e+f)	6,855	10,902	17,757	-3,401	-16.1%

Remark: Figures may not add up to total due to rounding off.

Notes:

(1) Please refer to Appendix 1 for classification of solid waste.

(2) Waste collected by the FEHD, FEHD contractors and other government vehicles.

(3) Waste collected by private waste collectors.

(4) These are bulky items like furniture and domestic appliances which cannot be handled by conventional compactor type refuse collection vehicles and are usually collected separately.

Plate 2.2 Solid waste disposal by category in 2002 & 2003

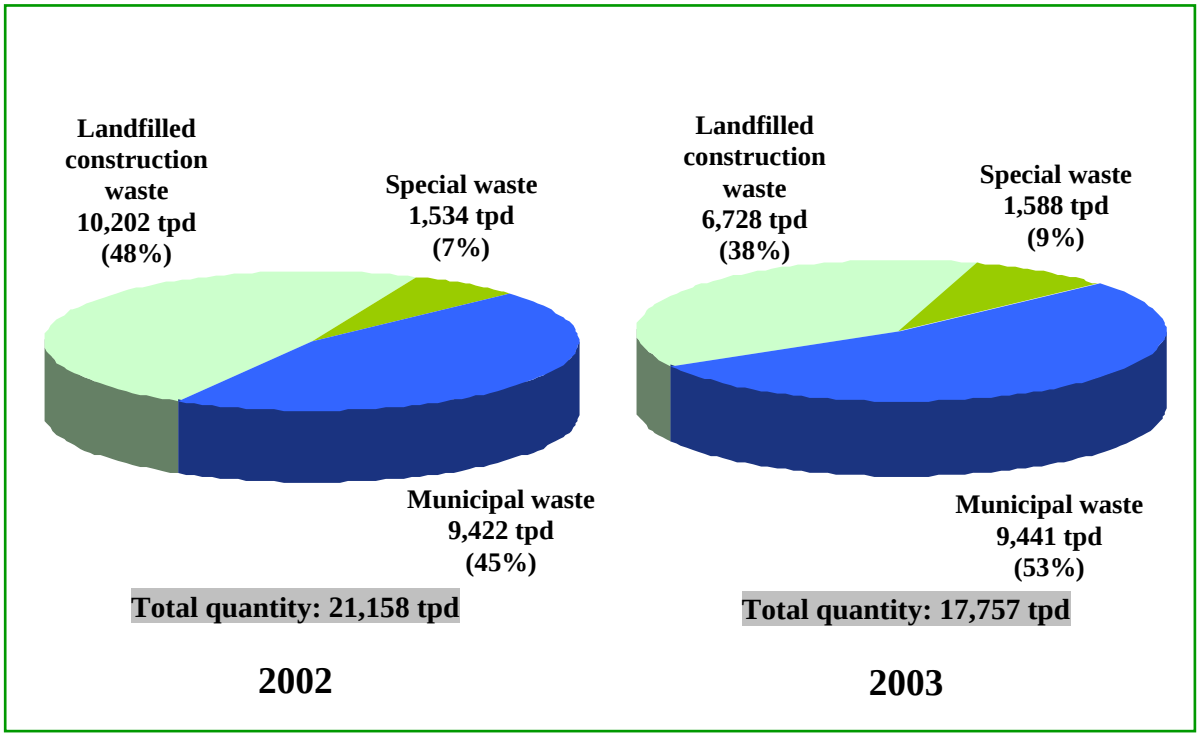


Plate 2.3 Solid waste disposal in 1999-2003

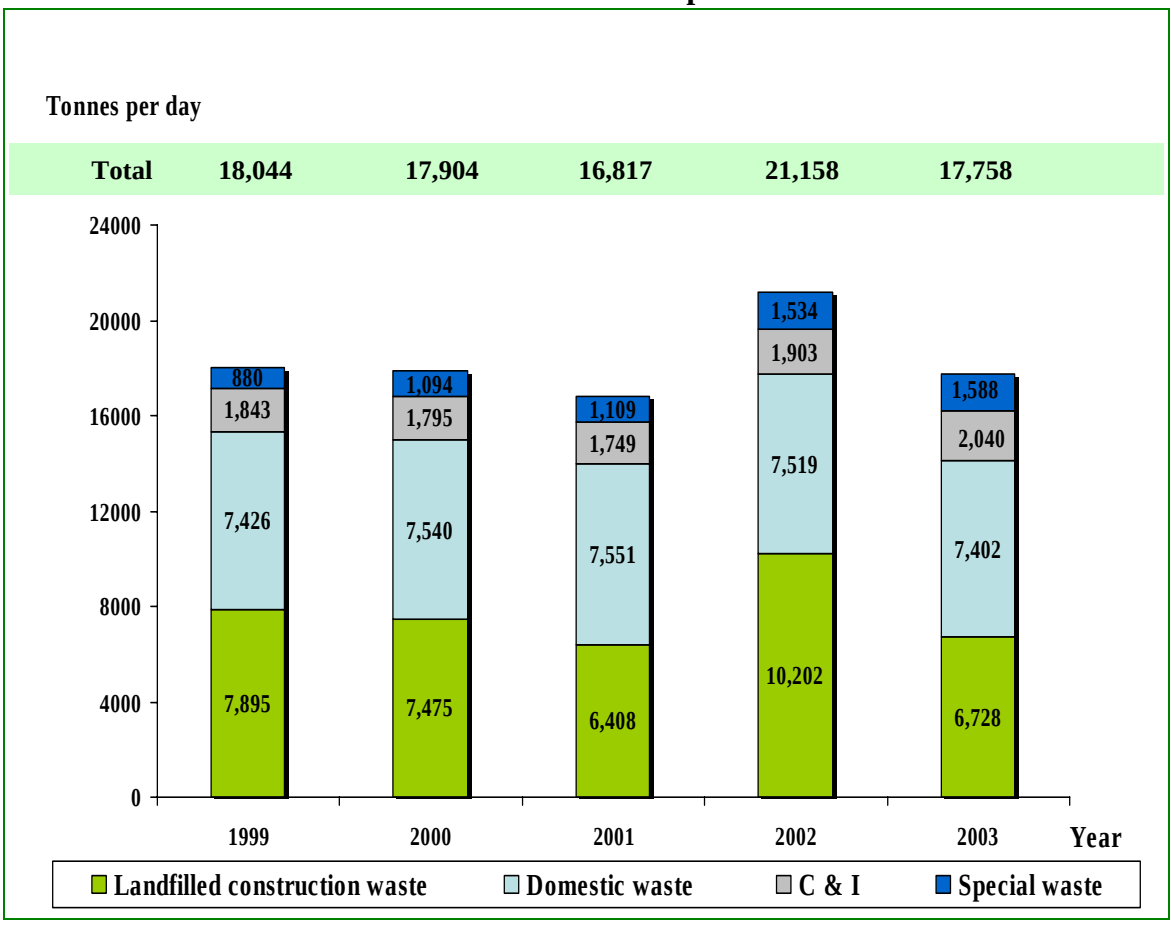
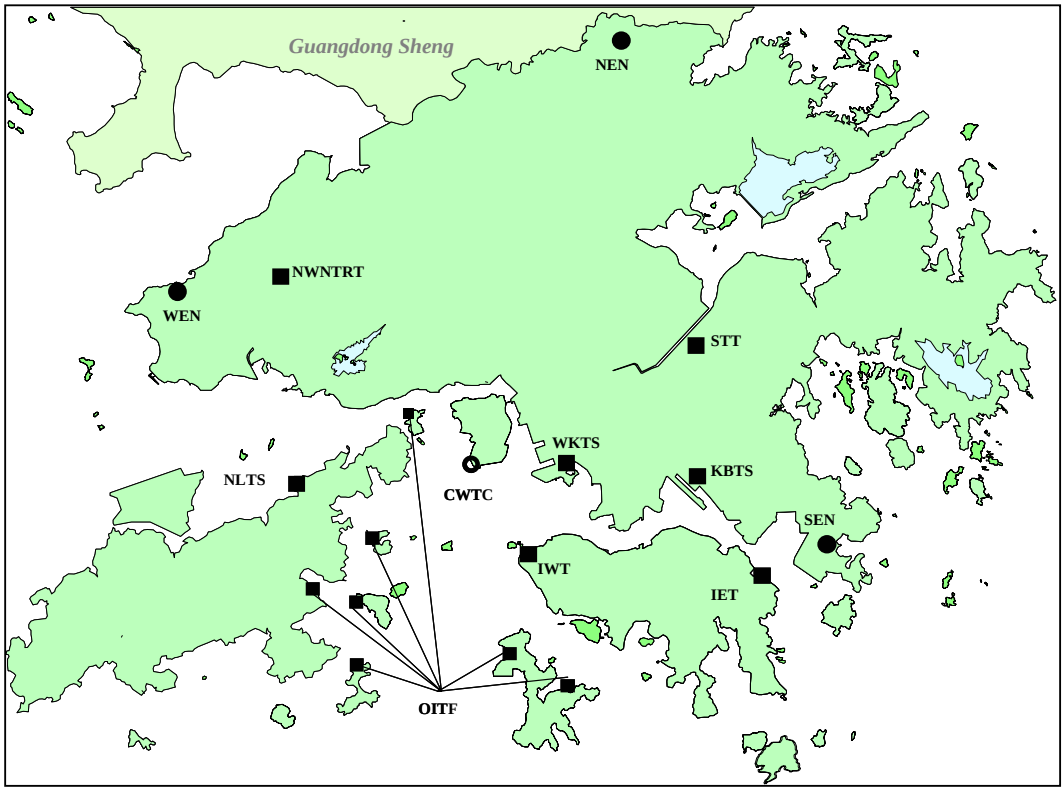


Plate 2.4 Solid waste disposal by destination in 2003



Landfill

WENT	SENT	NENT
6,538 tpd	7,969 tpd	3,250 tpd
(+2.8%)	(-28.3%)	(-11.7%)

RTS

IETS [1]	IWTS [1]	WKT [1]	OITF [1]	NLT [1]
898 tpd	488 tpd	2,032 tpd	101 tpd [2]	123 tpd
(-2.0%)	(-2.2%)	(+24.3%)	(+7.4%)	(-4.7%)

KBTS [3]	STTS [3]	NWNTRTS [4]
567 tpd	725 tpd	796 tpd
(-44.7%)	(-6.0%)	(+11.2%)

Remarks:

Percentage increase/decrease of waste quantity over previous year is shown in brackets.

Notes

(1) Waste from IETS, IWTS, WKTS, OITF and NLTS was transferred to WENT by sea.
(2) The quantity shown here does not include inert construction waste received by OITF.
(3) Waste from KBTS and STTS was transferred to NENT by road.
(4) Waste from NWNTRTS was transferred to WENT by road.

Plate 2.5 Solid waste delivered to RTS and landfills in 2003

Disposal facilities	Average daily waste intake by waste type in 2003(tpd)				
	MSW		Landfilled construction waste	Special waste	Total
	Public[1]	Private[2]			
KBTS - Kowloon Bay Refuse Transfer Station [3]	562	-	-	5[8]	567
IETS - Island East Refuse Transfer Station [4]	847	51	-	-	898
STTS - Sha Tin Refuse Transfer Station [3]	725	-	-	-	725
IWTS - Island West Refuse Transfer Station [4]	456	32	-	-	488
WKTS - West Kowloon Refuse Transfer Station [4]	1,929	103	-	-	2,032
OITF - Outlying Islands Refuse Transfer Facilities [4]	98	-	-	3	101[5]
NLTS - North Lantau Refuse Transfer Stations [4]	51	72	-	0.4	123
NWNTRTS-North West New Territories Refuse T	788	8	-	-	796
WENT - West New Territories Landfill	4,214[7]	655[7]	755	914[7]	6,538[7]
SENT - South East New Territories Landfill	227	2,227	5,027	488	7,969
NENT - North East New Territories Landfill	1,475[7]	643	946	186	3,250[7]
Sub-total	5,917	3,525			
Total	9,441		6,728	1,588	17,757

Remark: Figures may not add up to total due to rounding off.

Notes:
(1) Waste collected by the FEHD, FEHD contractors and other government vehicles.
(2) Waste collected by private waste collectors.
(3) Waste from KBTS, and STTS (except special waste) was transferred to NENT by road.
(4) Waste from IETS, IWTS, WKTS, OITF and NLTS was transferred to WENT by sea.
(5) The quantity shown here does not include inert construction waste received by OITF (38 tpd).
(6) Waste from NWNTRTS was transferred to WENT by road.
(7) The quantity shown here includes the waste transferred from the RTS/OITF.
(8) For KBTS, the quantity shown here does not include waste tyres from other departments to KBTS (7 tpd).

Plate 2.6 Origin of solid waste by district in 2003

Districts	Quantity[1] (tpd)					
	Domestic waste		C&I waste	Municipal solid waste	Landfilled construction waste	Total[3]
	Publicly collected[2] (a)	Privately collected (b)	(c)	(d) =(a)+(b)+(c)	(e)	(f) =(d)+(e)
Central & Western	331	77	93	500	398	898
Wanchai	263	73	91	428	230	658
Eastern	419	112	109	641	255	896
Southern	278	10	36	324	100	424
Hong Kong Island Sub-total	**1,292**	**272**	**329**	**1,893**	**982**	**2,875**
Yau Tsim Mong	495	67	134	696	520	1,216
Sham Shui Po	306	155	247	708	545	1,253
Kowloon City	281	101	84	466	360	826
Wong Tai Sin	336	47	53	436	183	618
Kwun Tong	420	134	210	764	1,023	1,787
Kowloon Sub-total	**1,837**	**504**	**728**	**3,069**	**2,631**	**5,700**
Kwai Tsing	344	23	97	464	247	711
Tsuen Wan	246	69	143	459	323	782
Tuen Mun	370	66	120	556	297	853
Yuen Long	552	58	158	767	411	1,179
North	174	264	81	519	461	980
Tai Po	256	63	31	350	196	546
Sha Tin	478	73	153	703	324	1,027
Sai Kung	225	89	120	435	738	1,172
NT- Mainland Sub-total	**2,645**	**705**	**903**	**4,253**	**2,998**	**7,251**
Cheung Chau[4]	35	-	-	-	-	-
Mui Wo[4]	32	-	-	-	-	-
Peng Chau[4]	8	-	-	-	-	-
Ma Wan [4]	5	-	-	-	-	-
Lamma Island[4]	11	-	-	-	-	-
Hei Ling Chau[4]	4	-	-	-	-	-
North Lantau[4]	49	-	-	-	-	-
NT-Outlying Islands Sub-total	**143**	**4**	**79**	**227**	**116[5]**	**343**
Total	**5,917**	**1,485**	**2,040**	**9,441**	**6,728**	**16,169**

Remark: Figures may not add up to total due to rounding off.

Notes:

(1) The geographical distribution of solid waste origin is based on weighbridge records at waste facilities and should be regarded as indicative reference only.

(2) Publicly collected domestic waste also included public cleansing waste as well as some mixed non-domestic waste.

(3) Special waste is not included in this Plate.

(4) These islands/areas are aggregated to form the waste arising district "Outlying Islands".

(5) Breakdown into individual islands/areas is not available.

Plate 2.7 Per capita disposal rates of municipal solid waste and domestic waste in 1999 – 2003

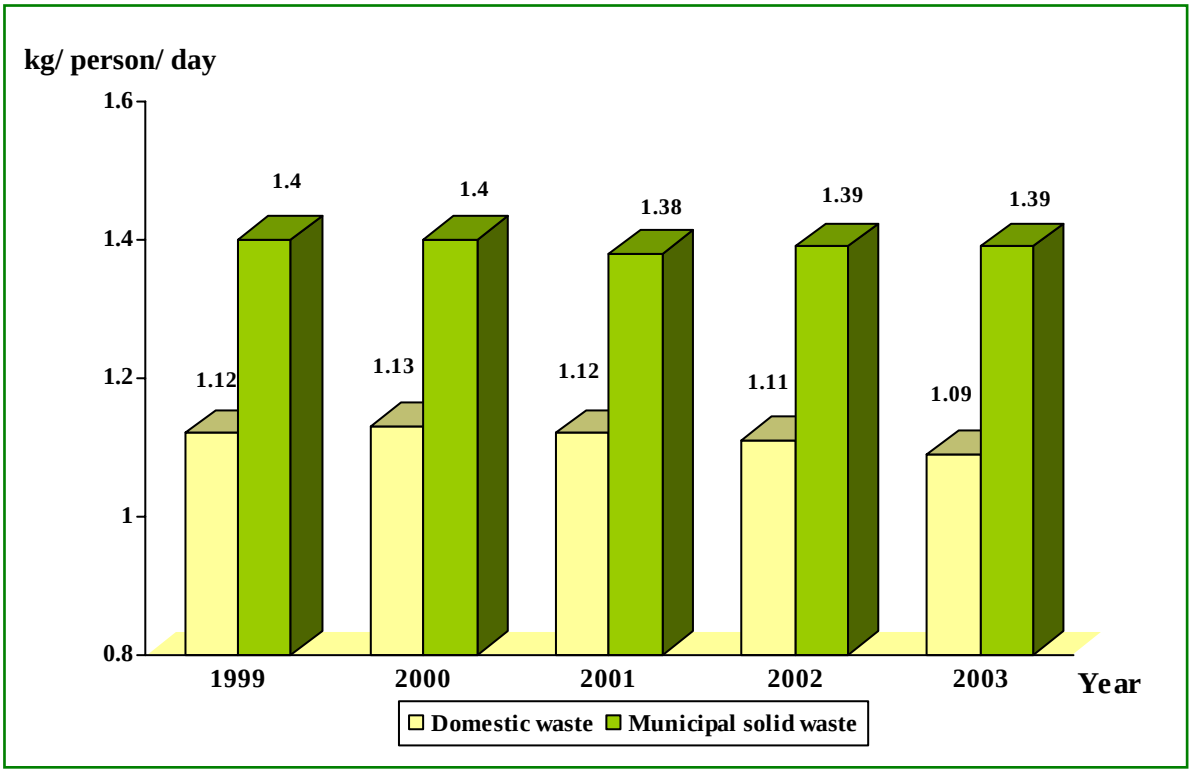


Plate 2.8 Composition of municipal solid waste in 2003

	Quantity (tpd) and percentage by weight				
	Domestic Waste (a)	Commercial Waste (b)	Industrial Waste (c)	Commercial & Industrial Waste (d)=(b)+(c)	Municipal Solid Waste (e)=(a)+(b)
Bulky waste	88 (1.2%)	91 (6.4%)	31 (5.1%)	122 (6.0%)	210 (2.2%)
Glass	285 (3.9%)	40 (2.8%)	8 (1.3%)	48 (2.4%)	333 (3.5%)
Metals	194 (2.6%)	52 (3.7%)	9 (1.5%)	62 (3.0%)	255 (2.7%)
Paper	1,897 (25.6%)	403 (28.2%)	49 (7.9%)	452 (22.2%)	2,349 (24.9%)
Plastics	1,382 (18.7%)	326 (22.8%)	55 (9.0%)	381 (18.7%)	1,762 (18.7%)
Putrescibles	3,120 (42.2%)	438 (30.7%)	39 (6.4%)	477 (23.4%)	3,597 (38.1%)
Textiles	178 (2.4%)	26 (1.8%)	59 (9.6%)	85 (4.2%)	263 (2.8%)
Wood/ Rattan	74 (1.0%)	27 (1.9%)	269 (43.9%)	295 (14.5%)	369 (3.9%)
Household Hazardous Wastes (HHWs) (1)	89 (1.2%)	13 (0.9%)	3 (0.5%)	16 (0.8%)	105 (1.1%)
Others	96 (1.3%)	12 (0.9%)	89 (14.6%)	102 (5.0%)	198 (2.1%)
Total	7,402	1,428	612	2,040	9,441
	(100%)	(100%)	(100%)	(100%)	(100%)

Remark: Figures indicate the quantities and percentages by wet weight, and may not add up to total due to rounding-off.

Note :

(1) Household Hazardous Wastes (HHWs) include paints, cleaning solvents, pesticides, cylinders, batteries, electrical appliances, computer products, mercury-containing fluorescent lamps and medicine, etc.

Plate 2.9 Domestic waste and C&I waste by major waste type in 2003

Waste Type	Domestic Waste		C&I Waste	
	Quantity (tpd)	% by weight	Quantity (tpd)	% by weight
Glass				
- Clear Glass Bottles	116	(1.6%)	25	(1.3%)
- Brown Glass Bottles	31	(0.4%)	5	(0.3%)
- Green Glass Bottles	35	(0.5%)	10	(0.5%)
- Other Glass	104	(1.4%)	8	(0.4%)
(Glass) Sub-total	285	(3.9%)	48	(2.4%)
Metals				
- Ferrous Metals	160	(2.2%)	47	(2.3%)
- Aluminium Cans	20	(0.3%)	4	(0.2%)
- Other Non-ferrous Metals	13	(0.2%)	10	(0.5%)
(Metals) Sub-total	194	(2.6%)	62	(3.0%)
Paper				
- Cardboard	295	(4.0%)	102	(5.0%)
- Newsprint	763	(10.3%)	111	(5.5%)
- Office Paper	206	(2.8%)	59	(2.9%)
- Others [(1)]	634	(8.6%)	180	(8.8%)
(Paper) Sub-total	1,897	(25.6%)	452	(22.2%)
Plastics				
- Clear Plastic Bags	188	(2.5%)	66	(3.3%)
- Colour Bags (white, red, yellow, etc)	640	(8.7%)	125	(6.1%)
- Polyfoam-Dining Wares	62	(0.8%)	16	(0.8%)
- Polyfoam-Others	27	(0.4%)	9	(0.5%)
- PET Bottles	67	(0.9%)	36	(1.7%)
- Other Plastic Bottles	82	(1.1%)	16	(0.8%)
- Off-cuts & Scrap	0		4	(0.2%)
- Others [(2)]	316	(4.3%)	109	(5.4%)
(Plastics) Sub-total	1,382	(18.7%)	381	(18.7%)
Putrescibles				
- Food Waste	2,794	(37.8%)	463	(22.7%)
- Yard Waste	64	(0.9%)	3	(0.1%)
- Others [(3)]	262	(3.5%)	11	(0.6%)
(Putrescibles) Sub-total	3,120	(42.2%)	477	(23.4%)

Remark: Figures indicate the quantities and percentages by wet weight, and may not add up to total due to rounding-off.

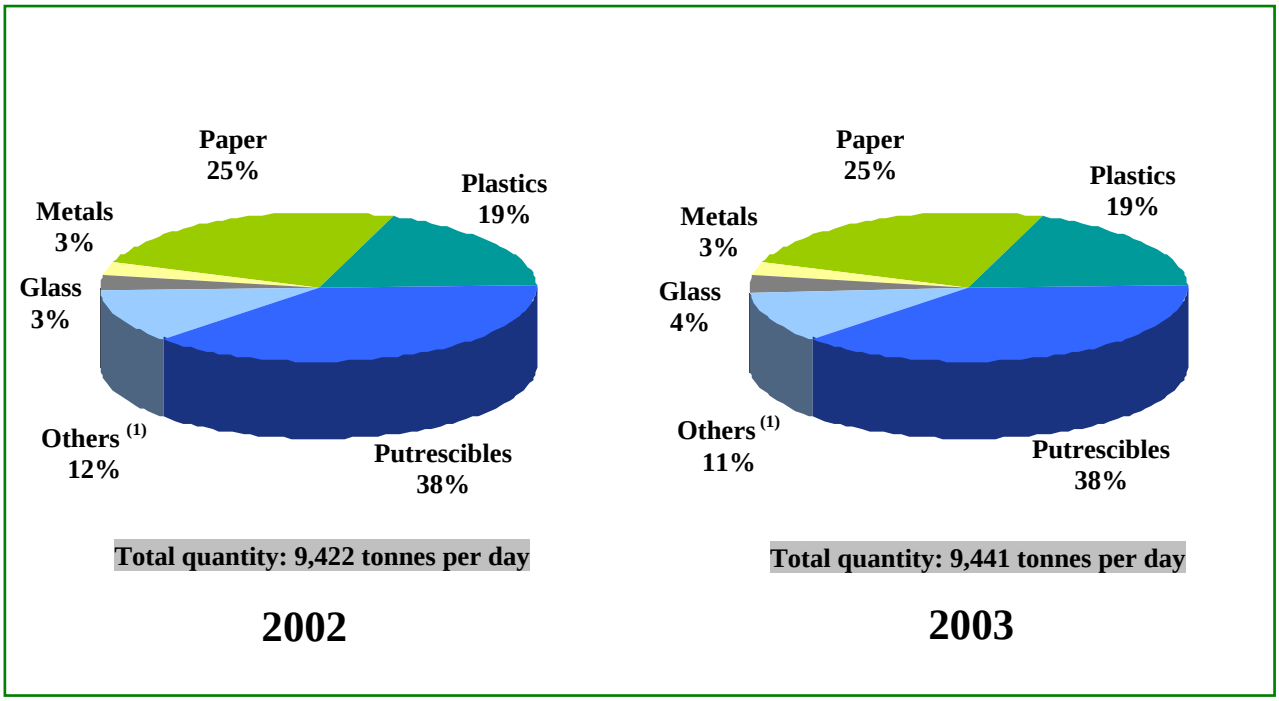
Notes:

(1) Other paper sub-components are drink pack (tetrapak), tissue paper, etc.

(2) Other plastics sub-components are household utensils, packaging materials, toys, etc.

(3) Other putrescible waste includes other organic waste.

Plate 2.10 Municipal solid waste by waste type in 2002 & 2003



Note:
(1) Others include bulky waste, textile, wood / rattan, household hazardous wastes and other unclassified waste.

Plate 2.11 Disposal of construction waste by destination in 2002 & 2003

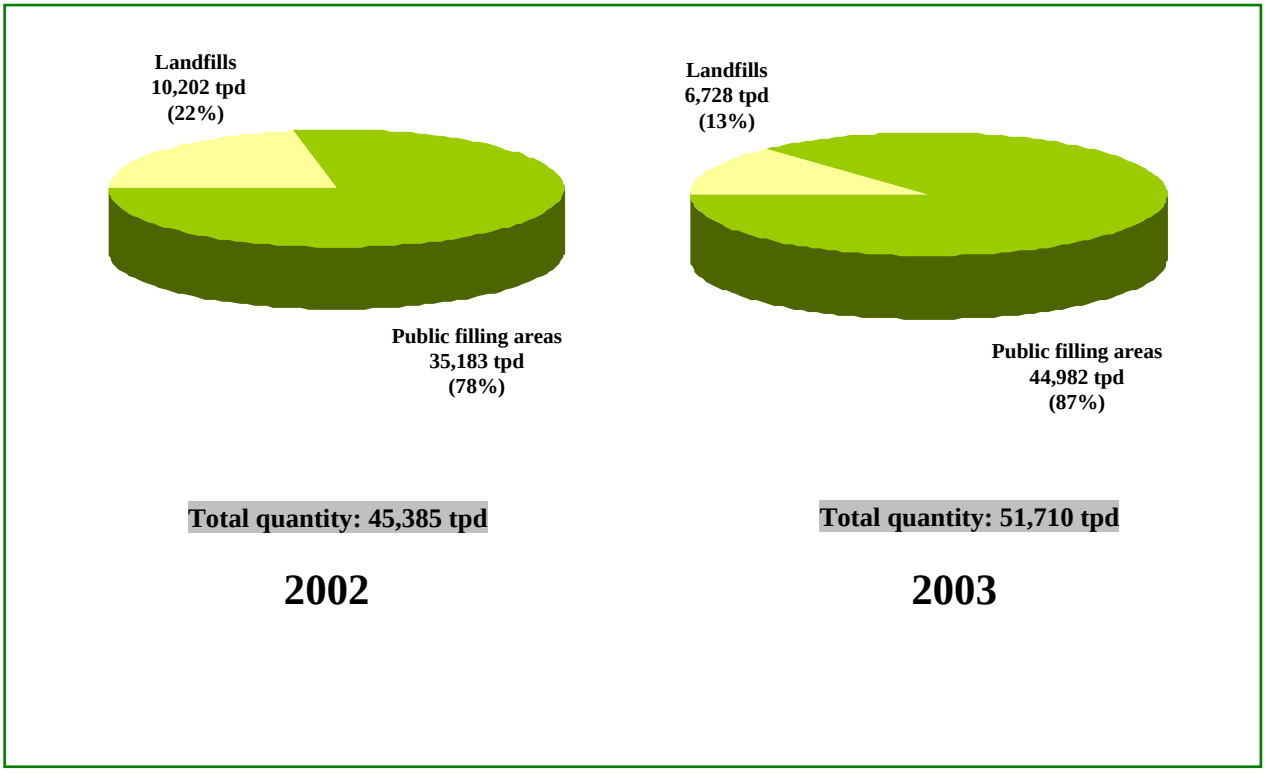


Plate 2.12 Disposal of special and other waste by type in 2003

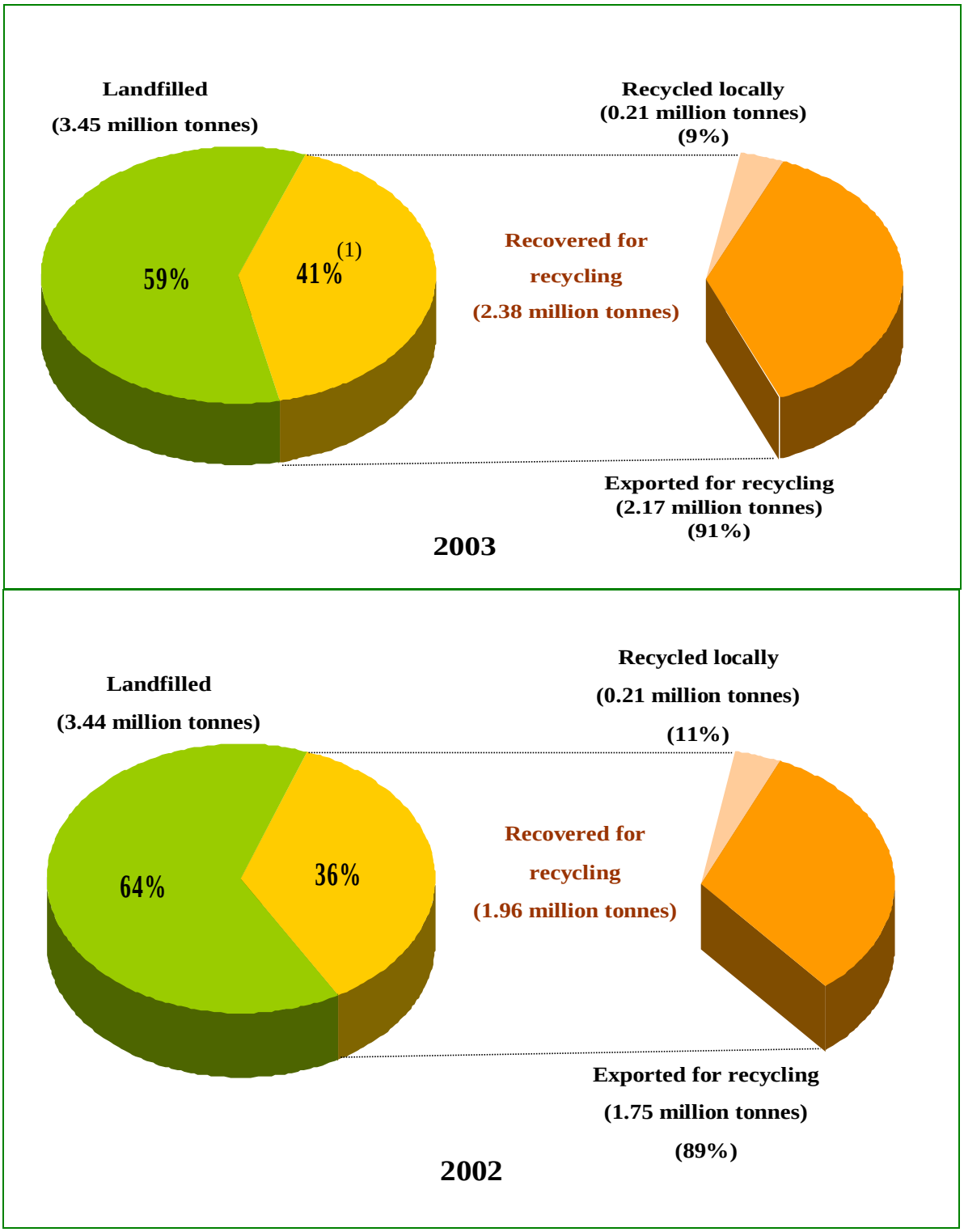
Waste type	Disposal method	Quantity disposed of (tpd)
Special Waste		
Abattoir waste	Landfilling	50
Animal carcasses	Landfilling	18
Asbestos waste	Co-disposal at landfills (1)	17
Chemical waste other than asbestos waste (2)	Co-disposal at landfills (1)	6
Clinical waste	Co-disposal at landfills (1)	8
Condemned goods	Landfilling	16
CWTC stabilised residue	Landfilling	22
Dewatered dredged materials	Landfilling	23
Dewatered sewage sludge	Landfilling	828
Dewatered waterworks sludge	Landfilling	13
Grease trap waste	Co-disposal at landfill (3)	360(4)
Livestock waste	Landfilling (5)	122
Sewage works screenings	Landfilling	62
Waste tyres (6)	Landfilling	41
Other Waste		
Chemical waste other than asbestos waste (7)	CW TC	117
Dredged mud and Excavated materials (8)	Marine dumping	104,932
Furnace bottom ash	Concrete manufacturing, stored in lagoon(9)	125
Livestock waste	Composting and other environmentally acceptable means (10)	693
Pulverised fuel ash	Concrete manufacturing, stored in lagoon(9)	1,621

Notes

(1) Co-disposal at SENT and WENT Landfills.
(2) Examples include chemical sludge, chemical containers, etc.
(3) Co-disposal at WENT Landfill after treatment.
(4) The figure is the quantity of grease trap waste received at WENT Landfills before processing in the Interim Grease Trap Waste Treatment Facility.
(5) At the WENT Landfill.
(6) Waste tyres were shredded or cut prior to disposal.
(7) Examples include ammonical and non-ammonical etchants, acids and alkalis, organic solvent, MARPOL waste, etc.
(8) Assuming the density of the dredged mud and excavated materials to be one tonne per cubic metre.
(9) Information provided by CLP Power Hong Kong Limited and the Hongkong Electric Company Limited.
(10) Examples of environmentally acceptable means include on-site composting, aerobic treatment, dry muck-out, etc.

3. Waste Recovery and Recycling

Plate 3.1 Recovery of municipal solid waste in 2002 & 2003



(1) The increase in 2003 is mainly attributed to an unusual surge in metal recovery for the year as a result of a strong demand for waste metals in Mainland China.

Plate 3.2 Municipal solid waste recovery rates in 1999 – 2003

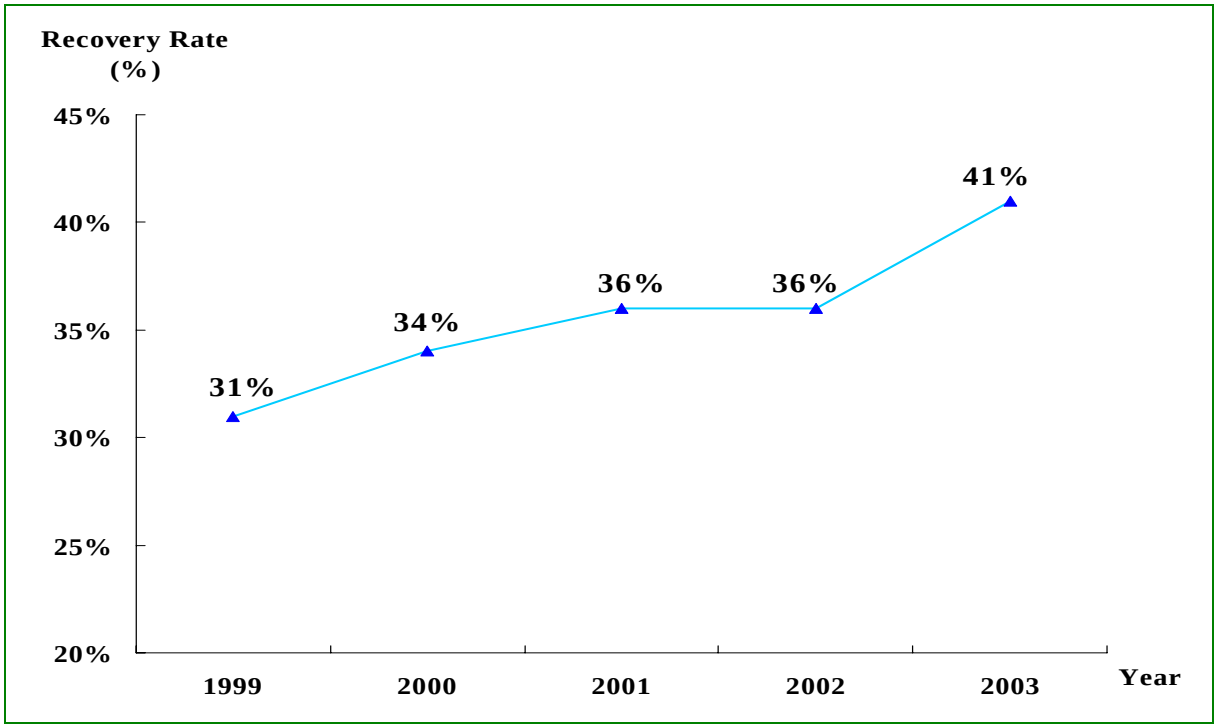


Plate 3.3 Recovered recyclable materials by type in 2003

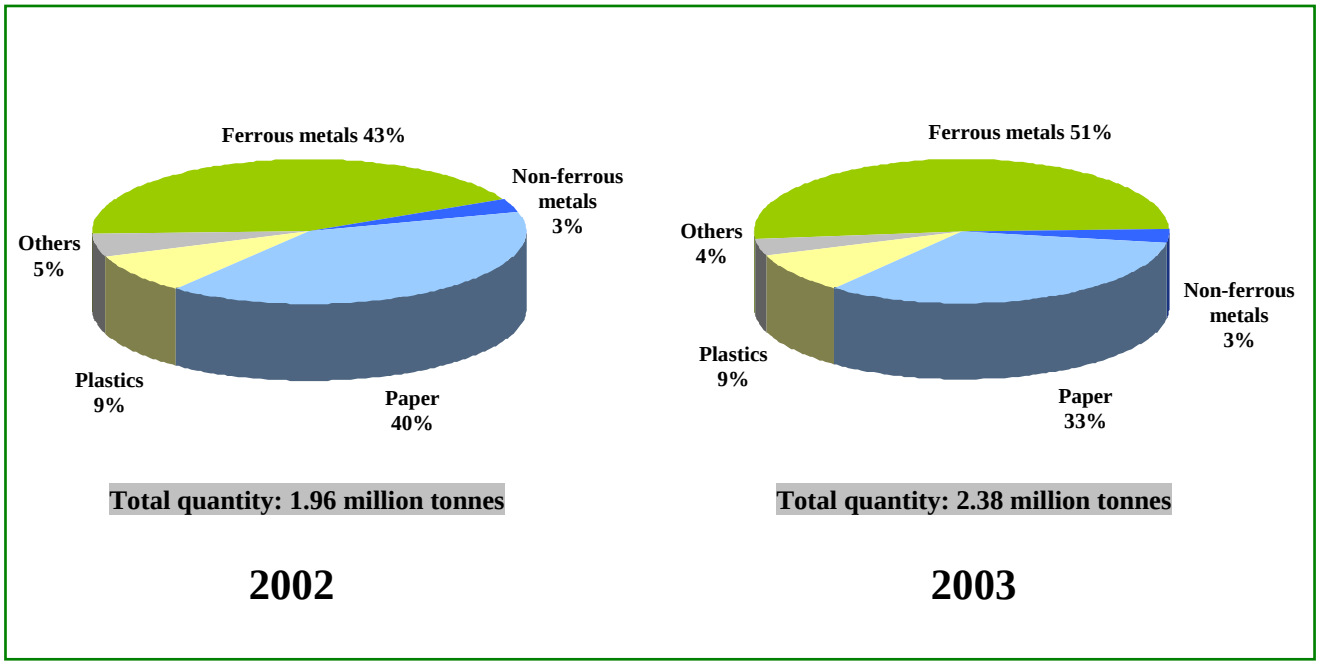
Waste Type	Quantity of recovered recyclable materials (thousand tonnes)		
	Exported for Recycling (a)	Recycled Locally (b)	Total recovered for recycling (c) = (a) + (b)
Ferrous metals	1,202	0	1,202
Glass	0	2[(1)]	2
Non-ferrous metals	73	7	80
Paper	633	149	782
Plastics	188	19	207
Rubber tyres	0	20[(2)]	20
Textiles	20	6	26
Wood	24	1	25
Electrical and Electronic equipment	29	4	33
Total	2,170	208	2,378

Notes:

(1) Excluding glass beverage bottles recovered through deposit-and-refund system operated by local beverage manufacturers. According to a survey performed by Hong Kong Beverage Association, about 5,000 tonnes of glass beverage bottles are reused / recycled every year.

(2) Quantity includes reuse, retreading and recycling of vehicle tyres (14,600 tonnes) and retreading of aircraft tyres in Hong Kong (5,400 tonnes).

Plate 3.4 Recovered recyclable materials by type in 2002 & 2003



Notes:

(1) "Others" include glass, wood, rubber tyres, textiles and electrical & electronic equipment.

Plate 3.5 Total quantities and export value of recovered recyclable materials in 1999 – 2003

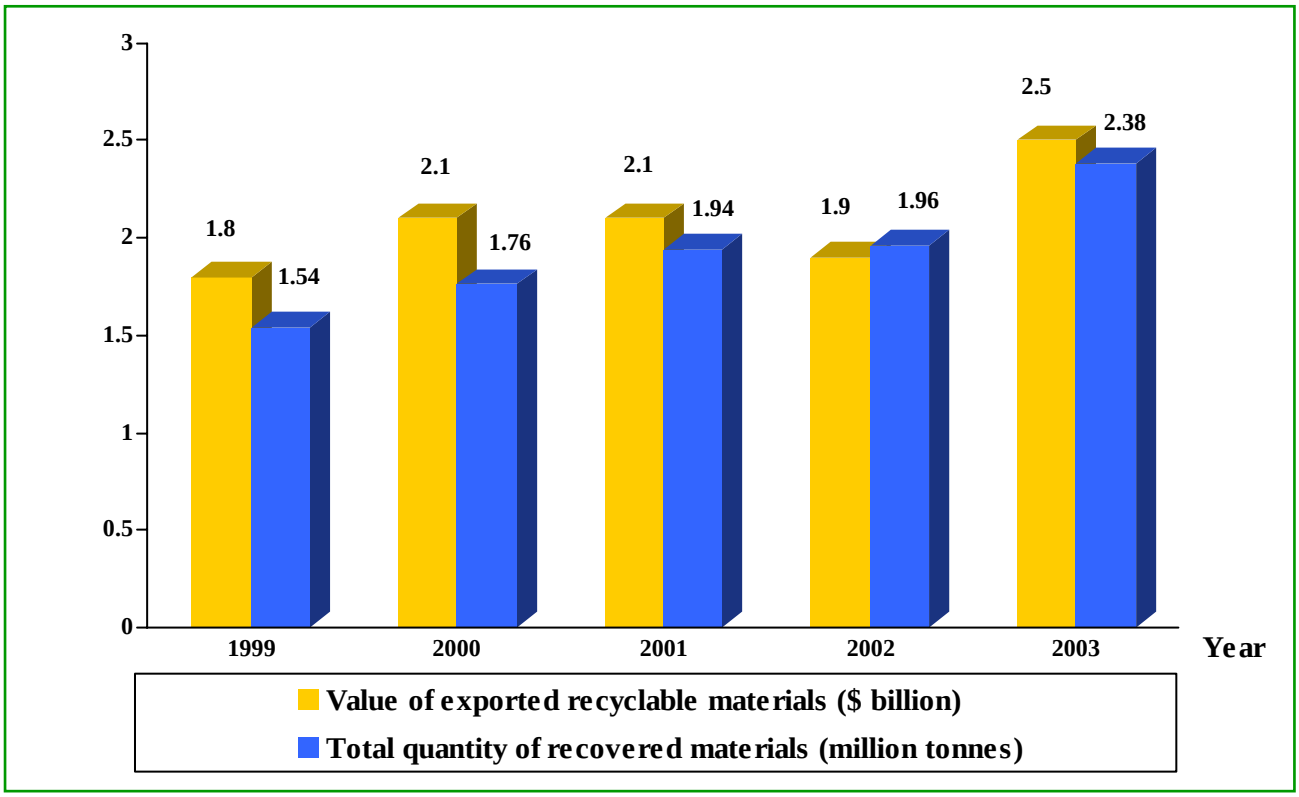


Plate 3.6 Value of exported recyclable materials in 2002 & 2003

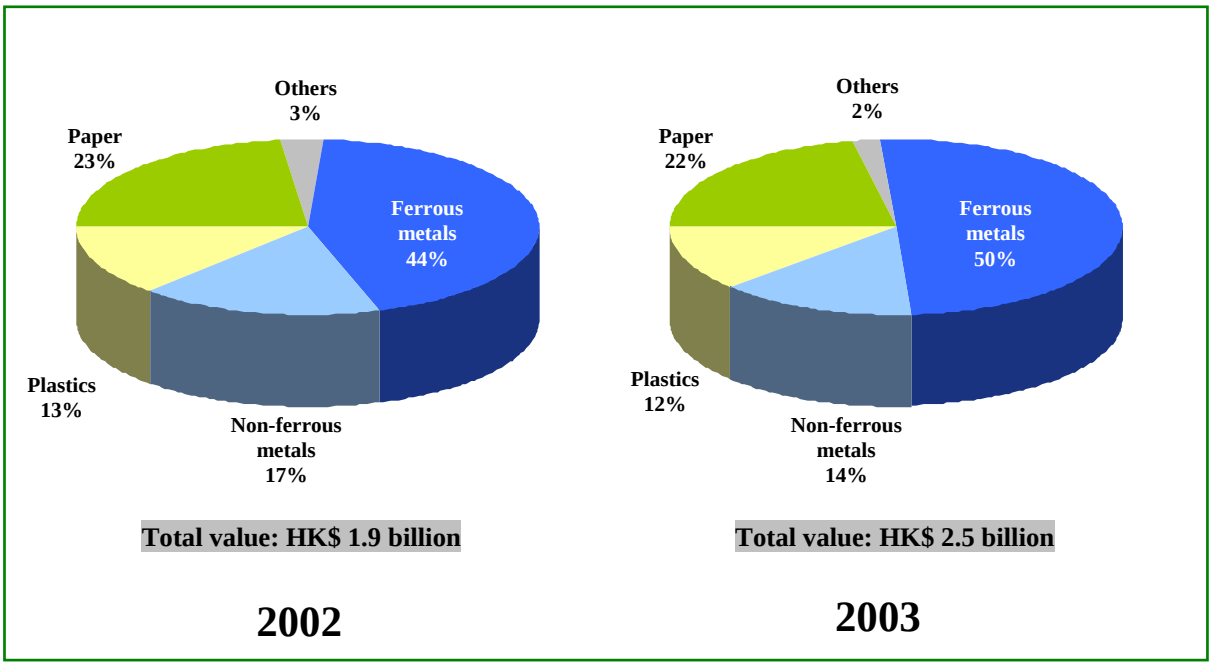


Plate 3.7 Quantities and value of exported recyclable materials by type

Category of recyclable materials	Quantity (tonnes)	Value ($ thousand)	Value per Unit Weight ($/ tonne)
a. Ferrous metals			
~ alloy steel scrap	10,067	53,239	5,289
~ pig or cast iron	41,816	32,056	767
~ tinplate	610	1,305	2,141
~ other scraps	1,149,431	1,180,660	1,027
b. Non-ferrous metals			
~ aluminium	16,640	50,428	3,031
~ copper & alloys	55,091	260,756	4,733
~ lead	0	0	0
~ metal ash & residues	326	1,222	3,752
~ nickel	20	297	14,824
~ precious metal (without scrap gold)	75	43,301	575,421
~ tin	0	0	0
~ zinc	487	3,987	8,193
c. Plastics			
~ polyethylene	115,438	172,858	1,497
~ polystyrene & copolymers	5,693	15,405	2,706
~ polyvinyl chloride	19,771	38,999	1,972
~ others	47,077	78,328	1,664
d. Textiles			
~ cotton	14,435	17,828	1,235
~ man-made fibres	85	541	6,342
~ old clothing & other textile articles, rags, etc.	5,699	16,313	2,862
e. Wood & paper			
~paper	633,307	553,265	874
~wood (include sawdust)	24,343	23,191	953
f. Electrical & Electronic equipment	29,096	N/A	N/A

Appendix 1: Classification of Solid Waste and Monitoring Methodology

Waste Classification and Terminology

Solid waste is classified into five main types by making reference to the sources of waste and the institutional arrangements for waste collection and disposal. These five types of solid waste are municipal solid waste, construction waste, chemical waste, special waste and other solid waste. The detailed interpretations of some commonly used terms are described below.

Municipal solid waste includes domestic waste, commercial waste and industrial waste.

- ***Domestic waste*** refers to household waste, waste generated from daily activities in domestic and institutional premises and refuse collected from public cleansing services. Public cleansing waste includes dirt and litter collected by the Food and Environmental Hygiene Department (FEHD), marine refuse collected by the Marine Department and waste from country parks collected by the Agriculture, Fisheries and Conservation Department.

- ***Commercial waste*** is waste arising from commercial activities taking place in shops, restaurants, hotels, offices, markets in private housing estates, etc. It is collected mainly by private waste collectors. However, some commercial waste is mixed with domestic waste and collected by the FEHD.

- ***Industrial waste*** is waste arising from industrial activities and does not include construction waste and chemical waste. It is usually collected by private waste collectors. However, some industries may deliver their industrial waste directly to landfills for disposal.

- It should be noted that there are bulky items like furniture and domestic appliances which cannot be handled by conventional compactor type refuse collection vehicles. These items are regarded as bulky waste and are usually collected separately. They may come from residential premises, commercial and industrial activities.

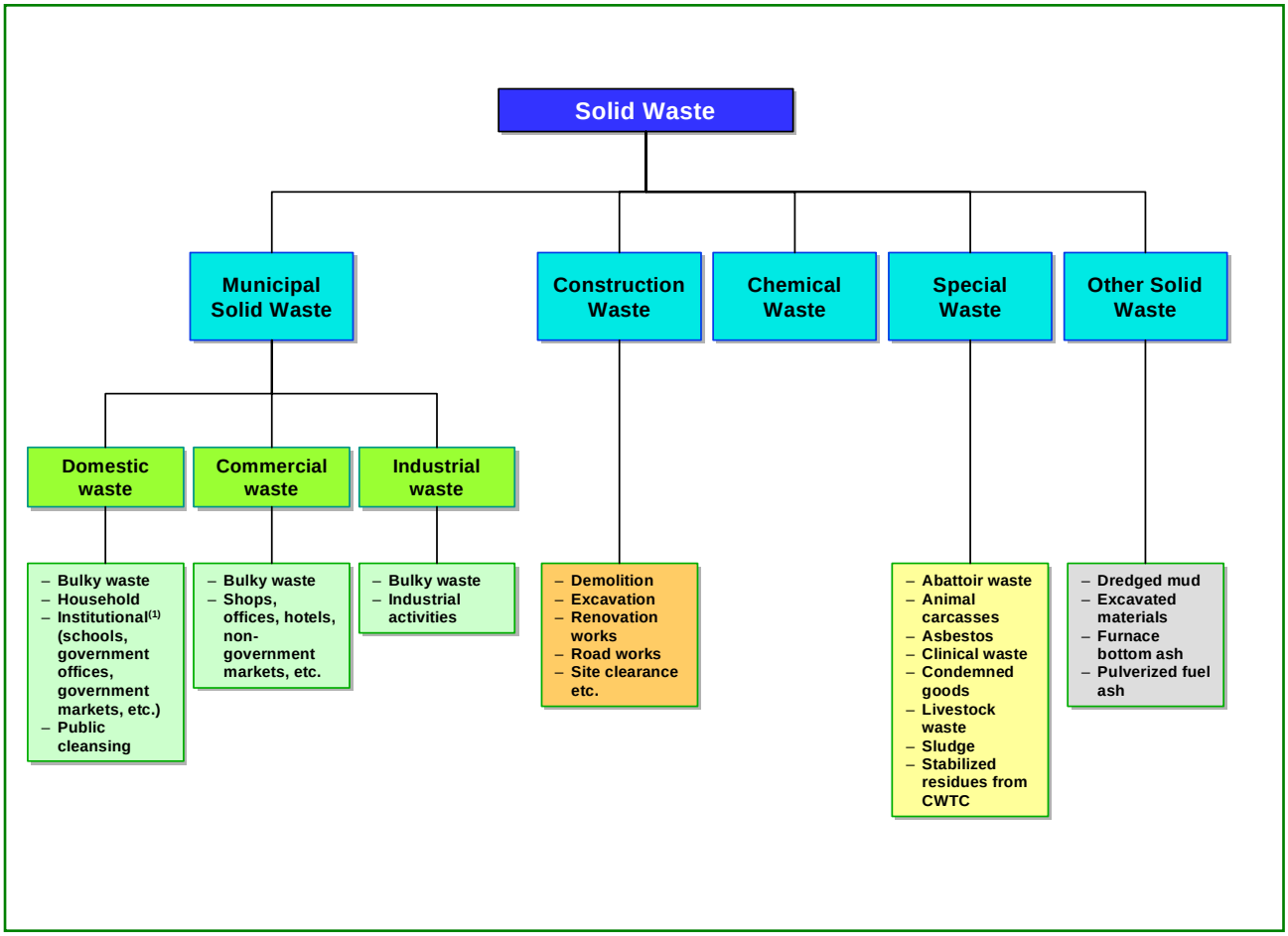
Construction waste (previously known as construction & demolition waste) is a mixture of surplus materials arising from site clearance, excavation, construction, refurbishment, renovation, demolition and road works. Over 80% of construction wastes are inert, which include debris, rubble, earth and concrete, are suitable for land reclamation and site formation. When properly sorted, materials such as concrete and asphalt can be recycled for use in construction. The remaining non-inert substances in construction waste, which include bamboo, timber, vegetation, packaging waste and other organic materials, are not suitable for land reclamation and are disposed of at landfills.

Chemical waste is defined in the Waste Disposal (Chemical Waste) (General) Regulation under the Waste Disposal Ordinance (Cap. 354). Chemical waste can be any substance arising from any process or trade activity which contains chemical in such form, quantity or concentration that can cause pollution to the environment or become a risk to health.

Special waste includes abattoir waste, animal carcasses, asbestos, clinical waste, condemned goods, livestock waste, sewage treatment and waterworks treatment sludge, sewage works screenings and stabilized residues from Chemical Waste Treatment Centre.

Other solid waste refers to solid waste types not covered by the above descriptions. These include coal ash, dredged mud and excavated materials disposed of at marine dumping sites.

Current classification of solid waste



Notes:
(1) Part of the waste generated from schools, government offices, government markets, etc. was mixed with household waste and/or public cleansing refuse during the process of collection carried out by the FEHD.

Methodology

Solid waste data are mainly collected from the following sources:

- Waste intake records taken at weighbridges of landfills and refuse transfer stations (RTS);
- Results of annual survey on waste composition conducted in October - December 2003 at landfills and RTS;
- Results of waste recovery survey conducted in December 2003 - January 2004 by ACNielsen (China) Ltd.;
- Monthly statistics provided by other departments including FEHD, Civil Engineering Department and Census and Statistics Department; and
- Statistics on special and other wastes (Plate 2.12) provided by relevant specialist groups of EPD and concerned government departments.