MONITORING OF SOLID WASTE IN HONG KONG

Waste Statistics for 2004

Environmental Protection Department

Monitoring of Solid Waste in Hong Kong
Waste Statistics for 2004

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Content

Abbreviations

C&I	**Commercial and Industrial**
CEDD	**Civil Engineering Development 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 2004. It aims to provide the readers with the latest information available on solid waste.

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 the solid waste and the methodology adopted in the data collection are explained in Appendix 1.

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

2. Waste Quantities and Characteristics

Plate 2.1 Solid waste disposal by category in 2004

Waste type [1]	Quantity (tpd)			Change from 2003	
	Public[2]	Private[3]	Total	Quantity (tpd)	Percentage
a. Domestic waste					
- waste from household, public cleansing	5,356	1,580	6,937		
- bulky waste [4]	22	56	77		
Sub-total	5,378	1,636	7,014	-388	-5.2%
b. Commercial waste					
- mixed waste from commercial activities	-	1,593	1,593		
- bulky waste [4]	-	80	80		
Sub-total		1,673	1,673	+245	+17.2%
c. Industrial waste					
- mixed waste from industrial activities	-	573	573		
- bulky waste [4]	-	28	28		
Sub-total		601	601	-11	-1.9%
d. Municipal solid waste received at disposal facilities (a+b+c)	5,378	3,909	9,288	-154	-1.6%
e. Landfilled construction waste	-	6,595	6,595	-133	-2.0%
f. Special waste	954	665	1,620	+32	+2.0%
g. All waste received at landfills (d+e+f)	6,333	11,169	17,502	-256	-1.4%

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 2003 & 2004

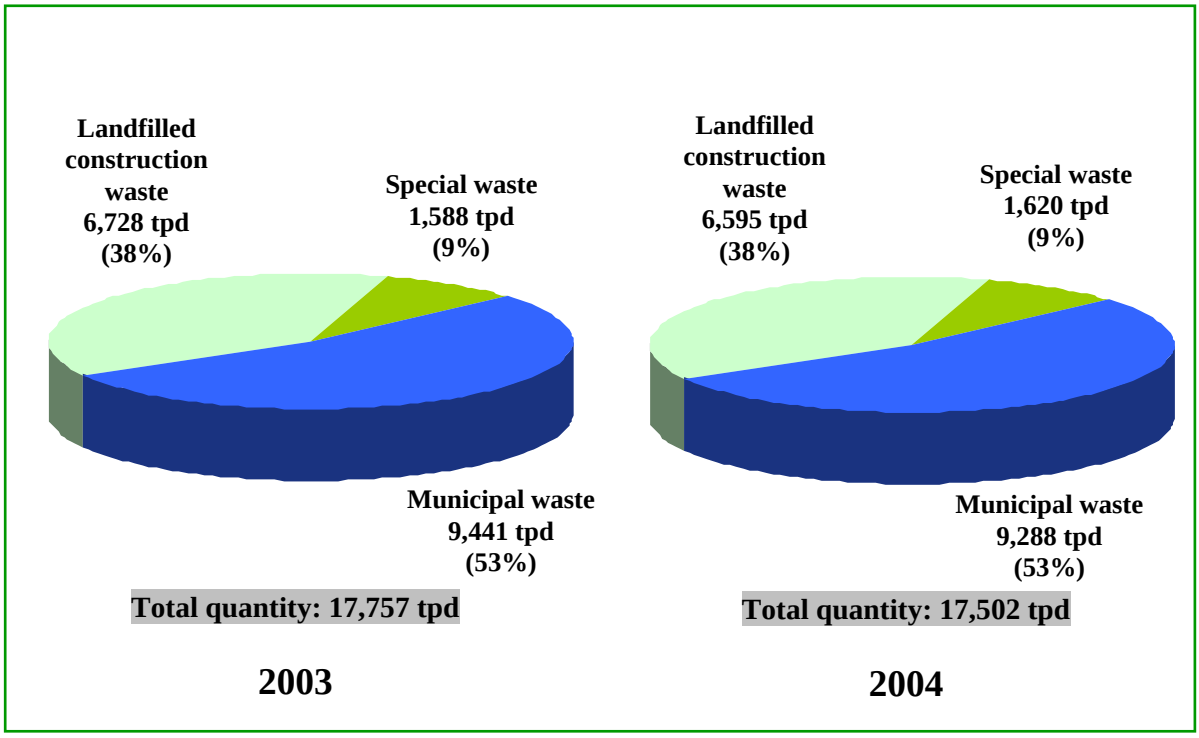


Plate 2.3 Solid waste disposal in 2000-2004

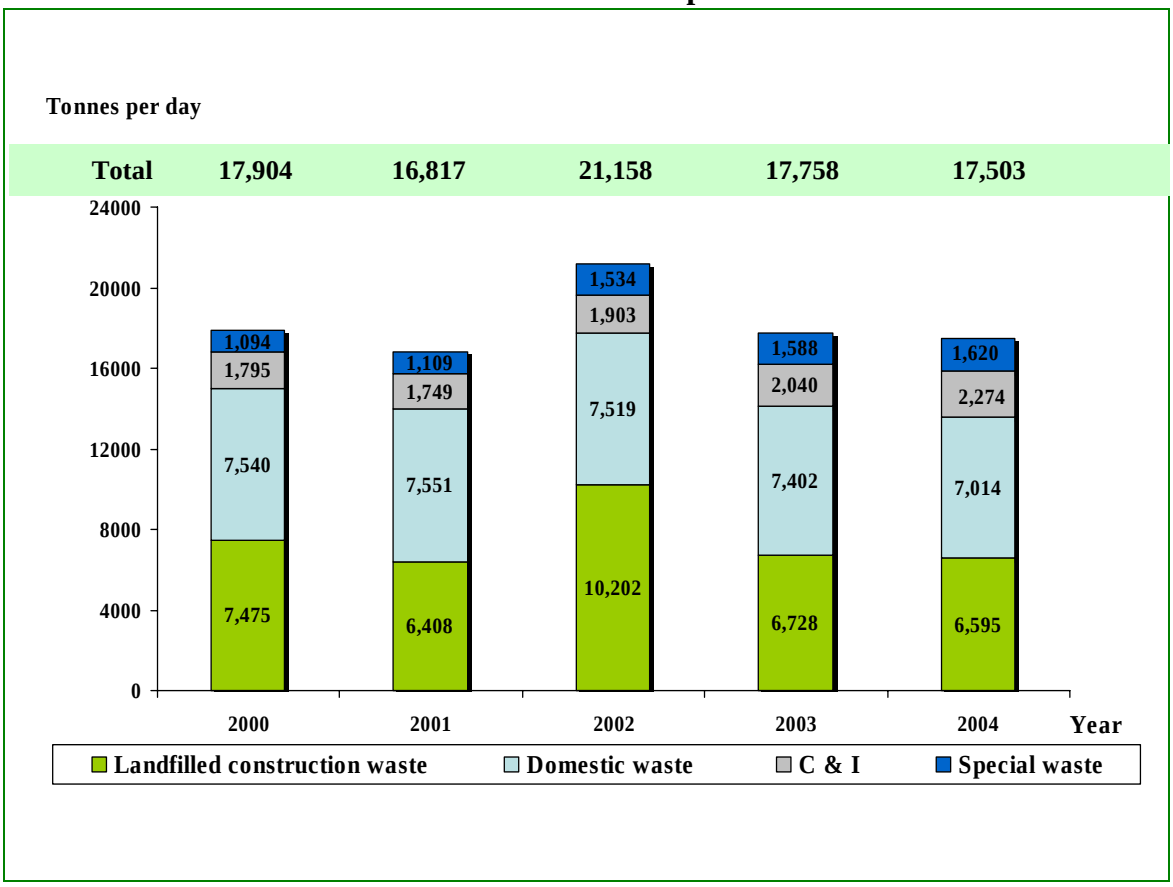
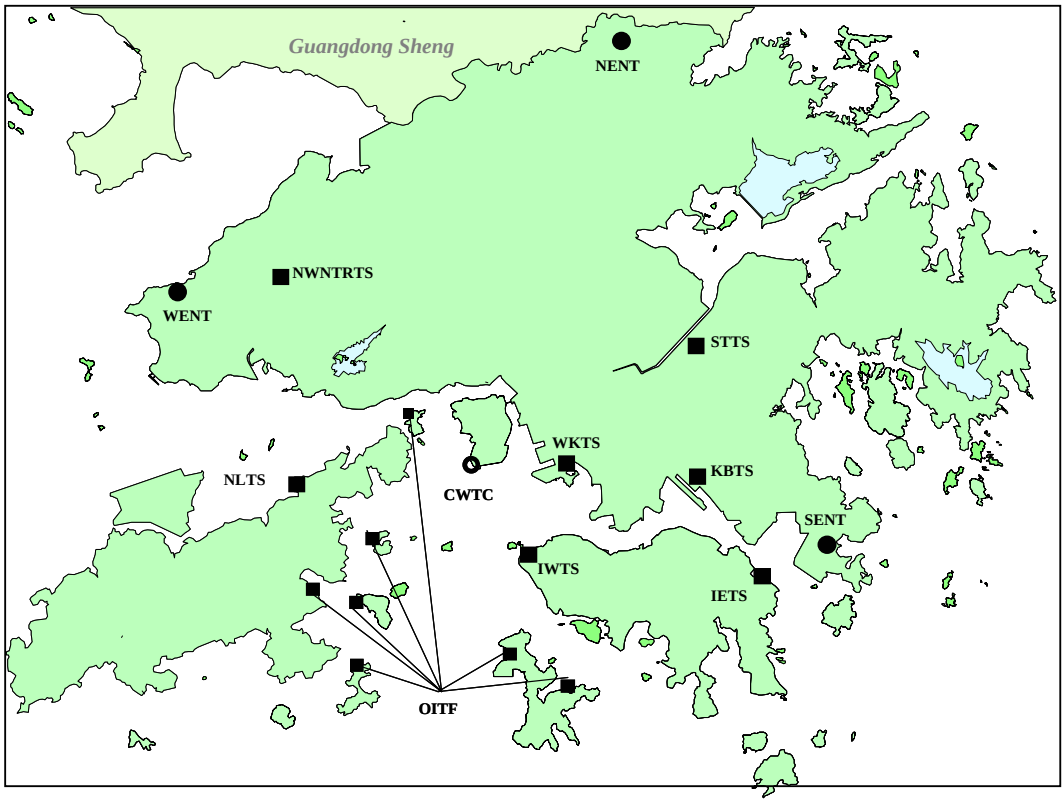


Plate 2.4 Solid waste disposal by destination in 2004



Landfill	●	WENT 6,464 tpd (-1.1%)	SENT 8,102 tpd (+1.7%)	NENT 2,936 tpd (-9.7%)		
RTS	■	IETS [1] 842 tpd (-6.2%)	IWTS [1] 455 tpd (-6.8%)	WKTS [1] 2,005 tpd (-1.3%)	OITF [1] 92 tpd [2] (-9.1%)	NLTS [1] 138 tpd (+12.0%)
		KBTS [3] [4] 383 tpd (-32.5%)	STTS [4] 628 tpd (-13.4%)	NWNTRTS [5] 763 tpd (-4.1%)		
CWTC	○	95 tpd (-18.6%)				

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
(3) The quantity shown here does not include waste tyre from other Departments to KBTS (12 tpd).
(4) Waste from KBTS and STTS was transferred to NENT by road.
(5) Waste from NWNTRTS was transferred to WENT by road.

Plate 2.5 Solid waste delivered to RTS and landfills in 2004

Disposal facilities	Average daily waste intake by waste type in 2004(tpd)				
	MSW		Landfilled construction waste	Special waste	Total
	Public[1]	Private[2]			
KBTS - Kowloon Bay Refuse Transfer Station [3]	379	-	-	4[8]	383
IETS - Island East Refuse Transfer Station [4]	780	62	-	-	842
STTS - Sha Tin Refuse Transfer Station [3]	628	-	-	-	628
IWTS - Island West Refuse Transfer Station [4]	421	34	-	-	455
WKTS - West Kowloon Refuse Transfer Station [4]	1,894	110	-	-	2,005
OITF - Outlying Islands Refuse Transfer Facilities [4]	89	-	-	3	92[5]
NLTS - North Lantau Refuse Transfer Stations [4]	52	85	-	0.9	138
NWNTRTS-North West New Territories Refuse Transfer Station [6]	757	7	-	-	763
WENT - West New Territories Landfill	4,020[7]	749[7]	765	930[7]	6,464[7]
SENT - South East New Territories Landfill	189	2,495	4,944	474	8,102
NENT - North East New Territories Landfill	1,170[7]	665	886	215	2,936[7]
Sub-total	5,378	3,909			
Total	9,288		6,595	1,620	17,502

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 (43 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 tyre from other departments to KBTS (12 tpd).

Plate 2.6 Origin of solid waste by district in 2004

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	293	81	144	518	407	924
Wanchai	254	78	108	440	190	630
Eastern	399	110	112	621	193	814
Southern	248	15	40	303	152	456
Hong Kong Island Sub-total	1,193	284	405	1,882	942	2,824
Yau Tsim Mong	476	81	171	728	473	1,201
Sham Shui Po	295	115	215	625	427	1,052
Kowloon City	258	105	93	456	284	740
Wong Tai Sin	286	51	65	402	168	570
Kwun Tong	376	206	241	822	1,232	2,055
Kowloon Sub-total	1,690	558	785	3,033	2,584	5,617
Kwai Tsing	302	29	99	430	314	744
Tsuen Wan	220	80	135	436	300	736
Tuen Mun	303	60	196	559	284	843
Yuen Long	551	79	160	791	329	1,119
North	165	270	89	524	465	988
Tai Po	218	80	34	332	150	483
Sha Tin	408	103	156	667	331	998
Sai Kung	189	90	120	399	690	1,089
NT- Mainland Sub-total	2,356	791	991	4,138	2,864	7,001
Cheung Chau[4]	32	-	-	-	-	-
Mui Wo[4]	28	-	-	-	-	-
Peng Chau[4]	7	-	-	-	-	-
Ma Wan [4]	8	-	-	-	-	-
Lamma Island[4]	9	-	-	-	-	-
Hei Ling Chau[4]	4	-	-	-	-	-
North Lantau[4]	51	-	-	-	-	-
NT-Outlying Islands Sub-total	139	3	93	235	205[5]	440
Total	5,378	1,636	2,274	9,288	6,595	15,882

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-domesti c 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 2000 – 2004

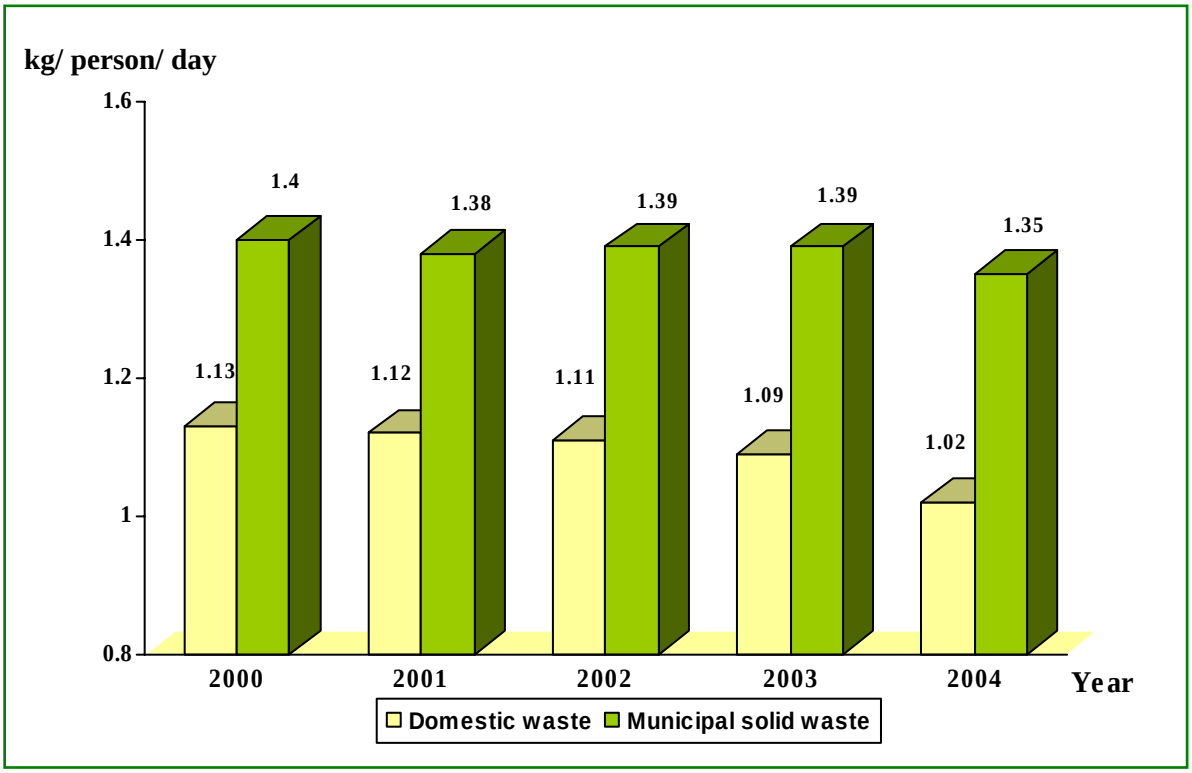


Plate 2.8 Composition of municipal solid waste in 2004

	Quantity (tpd) and percentage by weight				
	Domestic Waste	Commercial Waste	Industrial Waste	Commercial & Industrial Waste	Municipal Solid Waste
	(a)	(b)	(c)	(d)=(b)+(c)	(e)=(a)+(d)
Bulky waste	77 (1.1%)	80 (4.8%)	28 (4.6%)	108 (4.8%)	185 (2.0%)
Glass	248 (3.5%)	81 (4.8%)	8 (1.3%)	89 (3.9%)	337 (3.6%)
Metals	150 (2.1%)	37 (2.2%)	22 (3.7%)	60 (2.6%)	210 (2.3%)
Paper	1,820 (26.0%)	526 (31.4%)	37 (6.2%)	563 (24.8%)	2,384 (25.7%)
Plastics	1,362 (19.4%)	345 (20.6%)	77 (12.9%)	423 (18.6%)	1,784 (19.2%)
Putrescibles	3,000 (42.8%)	495 (29.6%)	51 (8.4%)	546 (24.0%)	3,546 (38.2%)
Textiles	184 (2.6%)	29 (1.8%)	38 (6.4%)	68 (3.0%)	252 (2.7%)
Wood/ Rattan	41 (0.6%)	40 (2.4%)	259 (43.1%)	299 (13.2%)	341 (3.7%)
Household Hazardous Wastes (HHWs) (1)	65 (0.9%)	12 (0.7%)	3 (0.5%)	15 (0.7%)	80 (0.9%)
Others	66 (0.9%)	26 (1.5%)	77 (12.9%)	103 (4.5%)	169 (1.8%)
Total	7,014	1,673	601	2,274	9,288
	(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, detergents, pesticides, fuels, cylinders, batteries, electrical appliances, computer products, mercury-containing fluorescent lamps and medicines, etc.

Plate 2.9 Domestic waste and C&I waste by major waste type in 2004

Waste Type	Domestic Waste		C&I Waste	
	Quantity (tpd)	% by weight	Quantity (tpd)	% by weight
Glass				
- Clear Glass Bottles	120	(1.7%)	31	(1.4%)
- Brown Glass Bottles	27	(0.4%)	14	(0.6%)
- Green Glass Bottles	36	(0.5%)	29	(1.3%)
- Other Glass	64	(0.9%)	15	(0.7%)
(Glass) Sub-total	248	(3.5%)	89	(3.9%)
Metals				
- Ferrous Metals	107	(1.5%)	41	(1.8%)
- Aluminium Cans	21	(0.3%)	7	(0.3%)
- Other Non-ferrous Metals	22	(0.3%)	12	(0.5%)
(Metals) Sub-total	150	(2.1%)	60	(2.6%)
Paper				
- Cardboard	313	(4.5%)	124	(5.4%)
- Newsprint	664	(9.5%)	82	(3.6%)
- Office Paper	186	(2.6%)	65	(2.9%)
- Others [(1)]	657	(9.4%)	292	(12.8%)
(Paper) Sub-total	1,820	(26.0%)	563	(24.8%)
Plastics				
- Clear Plastic Bags	124	(1.8%)	61	(2.7%)
- Colour Bags (white, red, yellow, etc)	693	(9.9%)	129	(5.7%)
- Polyfoam-Dining Wares	68	(1.0%)	20	(0.9%)
- Polyfoam-Other	17	(0.2%)	25	(1.1%)
- PET Bottles	100	(1.4%)	32	(1.4%)
- Other Plastic Bottles	70	(1.0%)	8	(0.4%)
- Off-cuts & Scrap	0		4	(0.2%)
- Others [(2)]	290	(4.1%)	144	(6.3%)
(Plastics) Sub-total	1,362	(19.4%)	423	(18.6%)
Putrescibles				
- Food Waste	2,695	(38.4%)	532	(23.4%)
- Yard Waste	21	(0.3%)	6	(0.3%)
- Others [(3)]	284	(4.1%)	8	(0.4%)
(Putrescibles) Sub-total	3,000	(42.8%)	546	(24.0%)

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

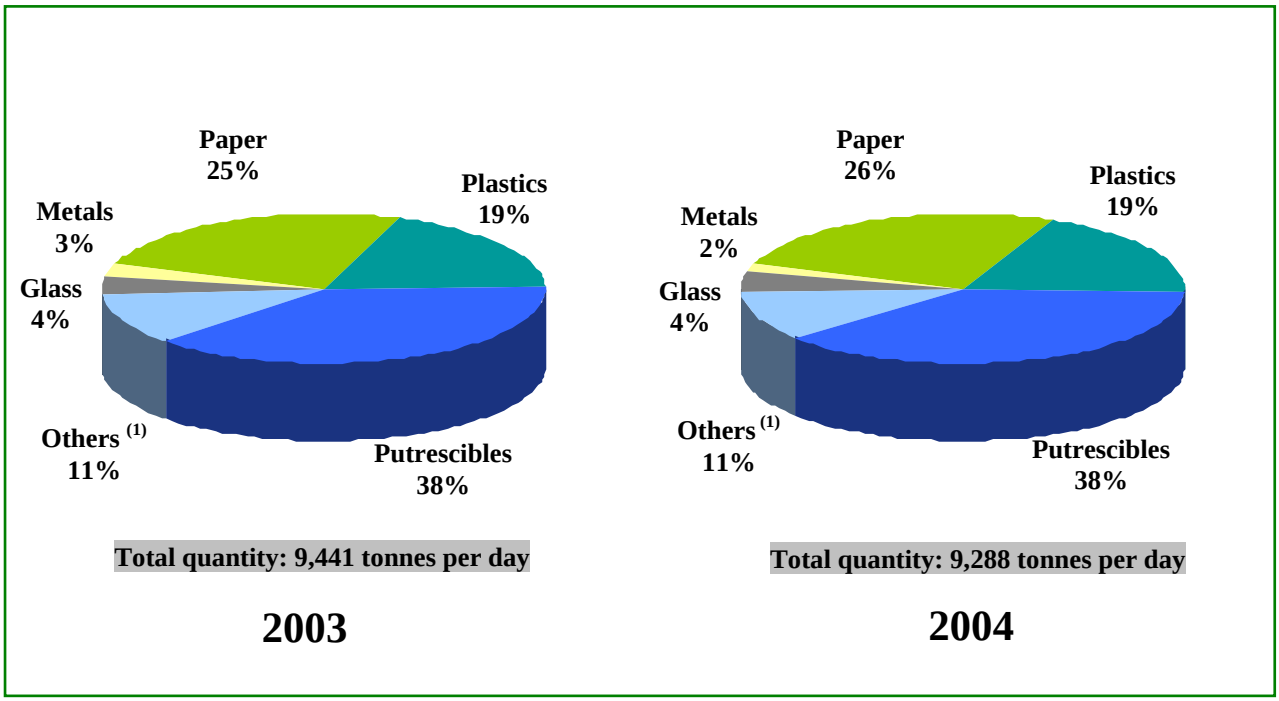
Notes:

(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 nappies and other organic waste.

Plate 2.10 Municipal solid waste by waste type in 2003 & 2004



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 2003 & 2004

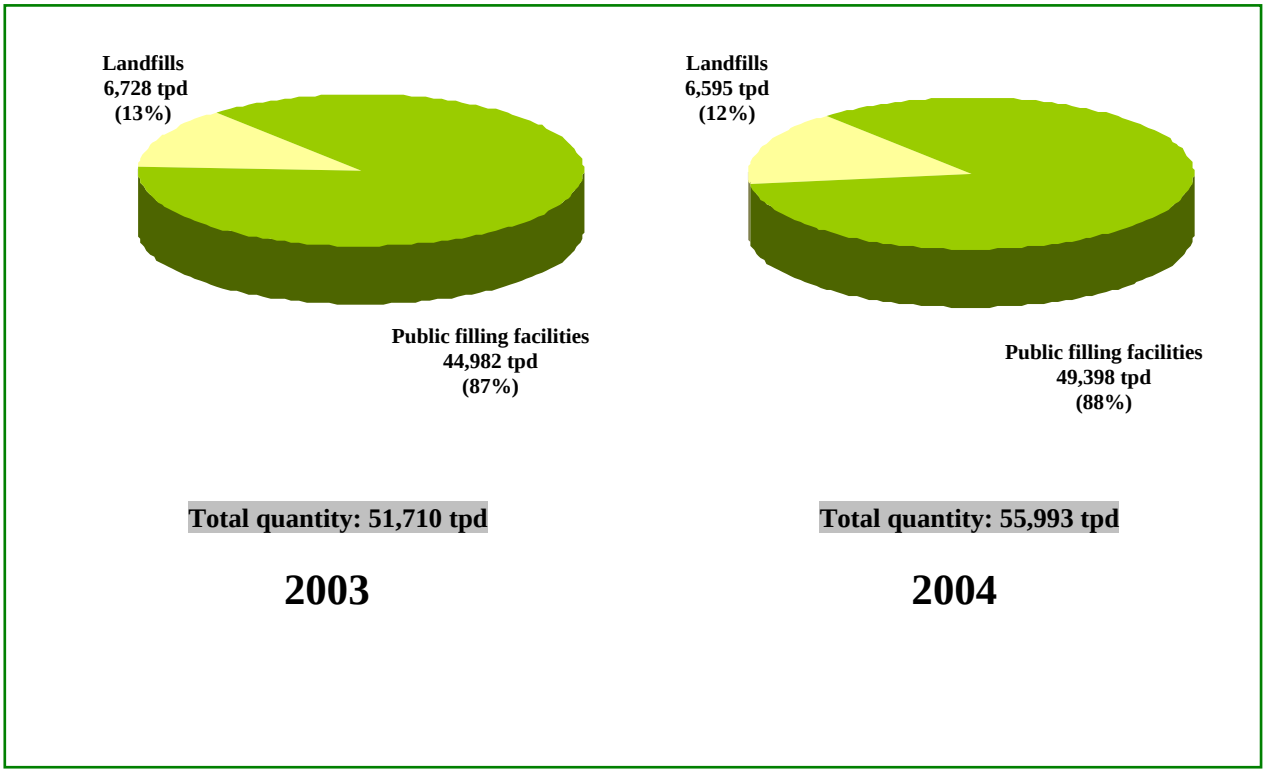


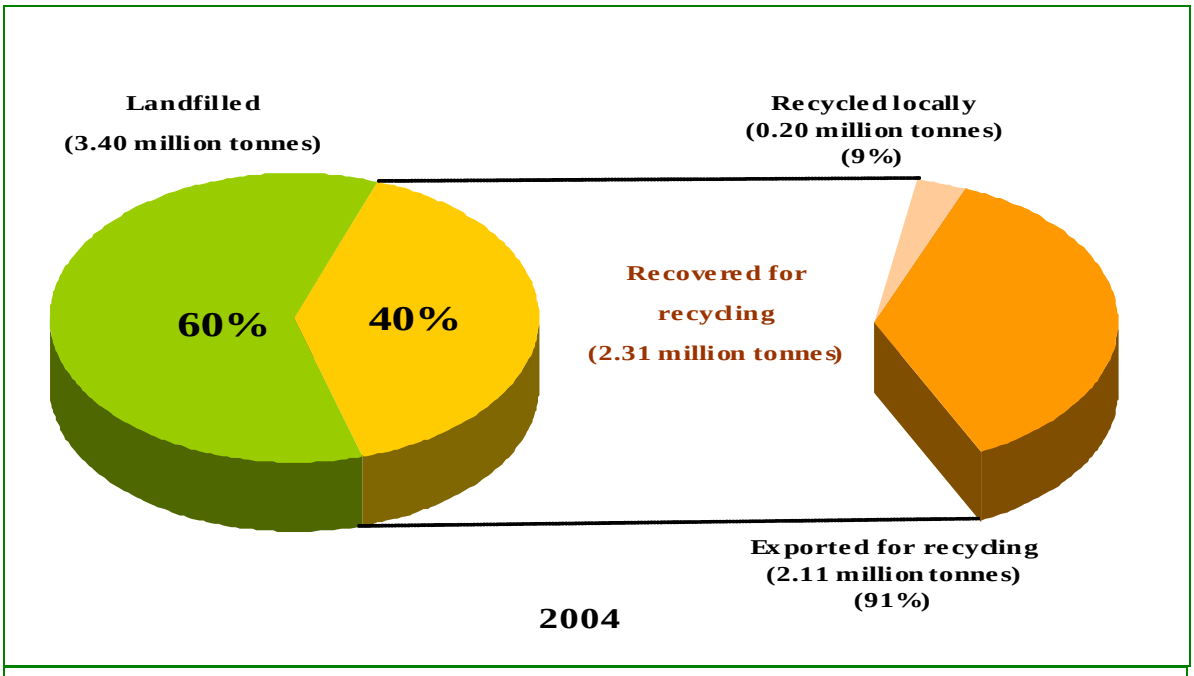
Plate 2.12 Disposal of special and other waste by type in 2004

Waste type	Disposal method	Quantity disposed of (tpd)
Special Waste		
Abattoir waste	Landfilling	18
Animal waste	Landfilling	19
Asbestos waste	Co-disposal at landfills (1)	6
Chemical waste other than asbestos waste	Co-disposal at landfills (1)	7
Clinical waste	Co-disposal at landfills (1)	6
Condemned goods	Landfilling	23
CWTC stabilised residue	Landfilling	22
Dewatered dredged materials	Landfilling	33
Dewatered sewage sludge	Landfilling	836
Dewatered waterworks sludge	Landfilling	14
Grease trap waste	Co-disposal at landfill (2)	388(3)
Livestock waste	Landfilling	145
Sewage works screenings	Landfilling	64
Waste tyres (4)	Landfilling	37
Other Waste		
Chemical waste other than asbestos waste	CW TC	95
Dredged mud and Excavated materials (5)	Marine dumping	104,645
Furnace bottom ash	Concrete manufacturing, stored in lagoon(6)	202
Livestock waste	Composting and other environmentally acceptable means (7)	699
Pulverised fuel ash	Concrete manufacturing, stored in lagoon(6)	2,000

Notes
(1) Co-disposal at SENT and WENT Landfills.
(2) Co-disposal at WENT Landfill after treatment.
(3) The figure is the quantity of grease trap waste received at WENT Landfills before processing in the Interim Grease Trap Waste Treatment Facility.
(4) Waste tyres were shredded or cut prior to disposal.
(5) Assuming the density of the dredged mud and excavated materials to be one tonne per cubic metre.
(6) Information provided by CLP Power Hong Kong Limited and the Hongkong Electric Company Limited
(7) 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 2003 & 2004



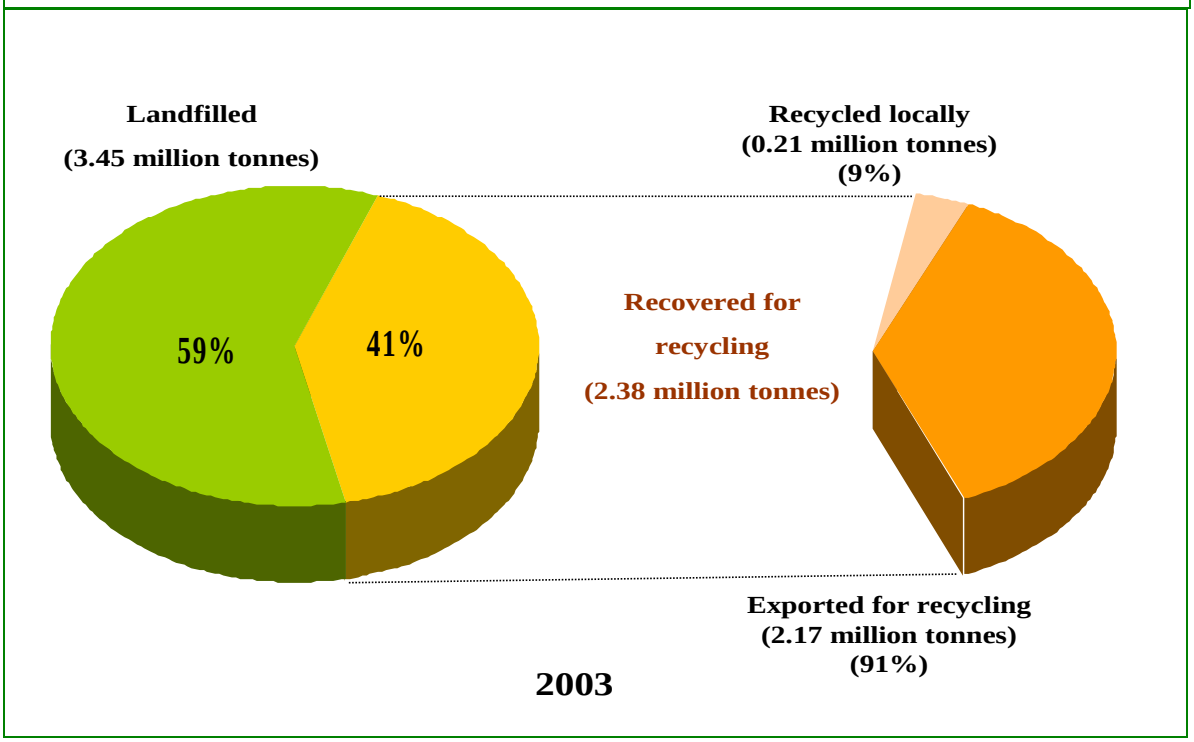


Plate 3.2 Municipal solid waste recovery rates in 2000 – 2004

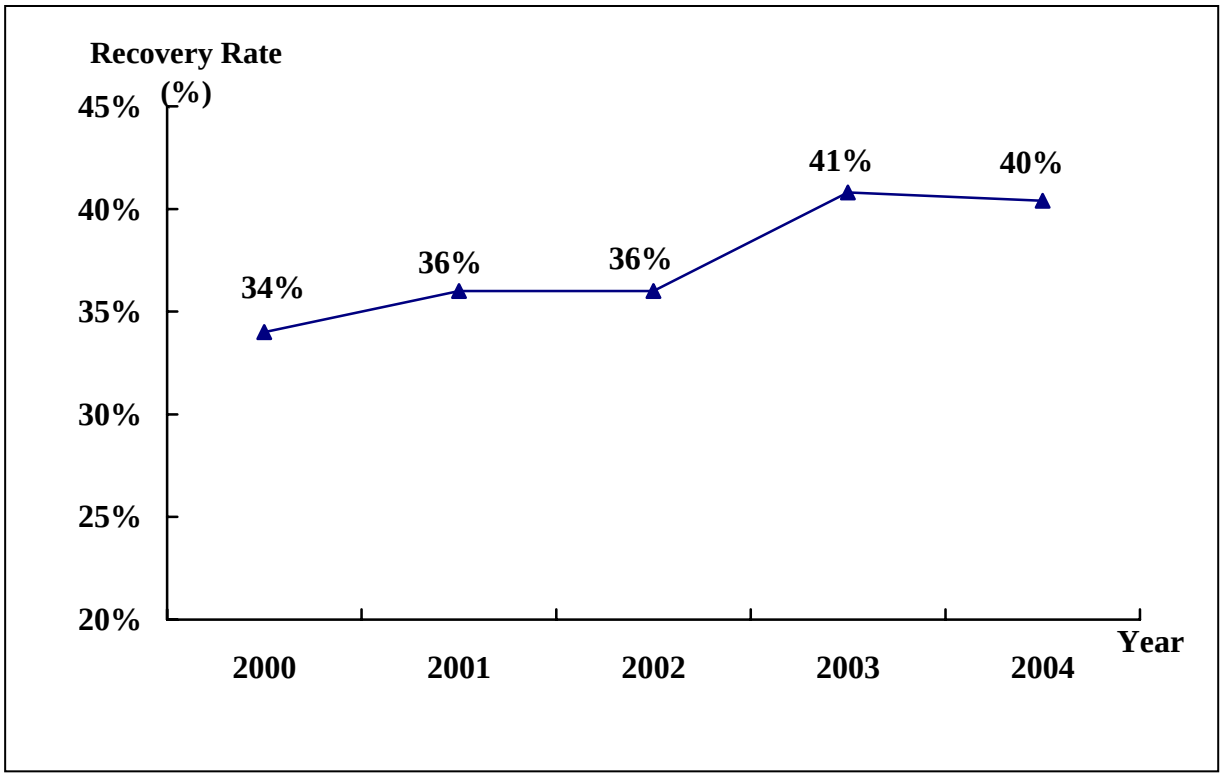


Plate 3.3 Recovered recyclable materials by type in 2004

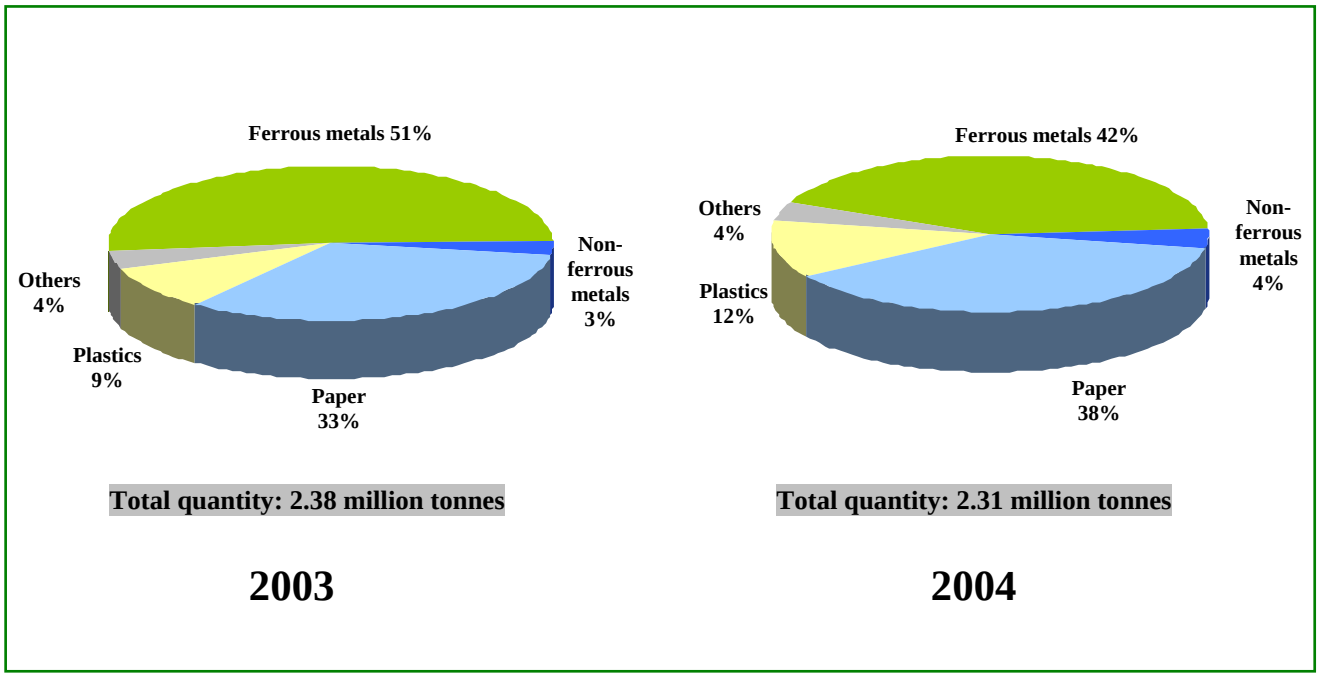
Waste Type	Quantity of recovered recyclable materials (thousand tonnes)		
	Exported for Recycling (a)	Recycled Locally (b)	Total recovered for recycling (c) = (a) + (b)
Ferrous metals	956	0	956
Glass	0	2(1)	2
Non-ferrous metals	92	7	99
Paper	731	152	883
Plastics	258	7	265
Rubber tyres	0	21(2)	21
Textiles	14	4	18
Wood	21	1	22
Electrical and Electronic equipment	32	6	37
Total	2,106	200	2,305

Notes:

(1) Excluding glass beverage bottles recovered through deposit-and-refund system operated by local beverage manufacturers.

(2) Quantity includes reuse, retreading and recycling of vehicle tyres (16,200 tonnes) and retreading of aircraft tyres in Hong Kong (5,200 tonnes).

Plate 3.4 Recovered recyclable materials by type in 2003 & 2004



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

Plate 3.5 Total quantities and export values of recovered recyclable materials in 2000 – 2004

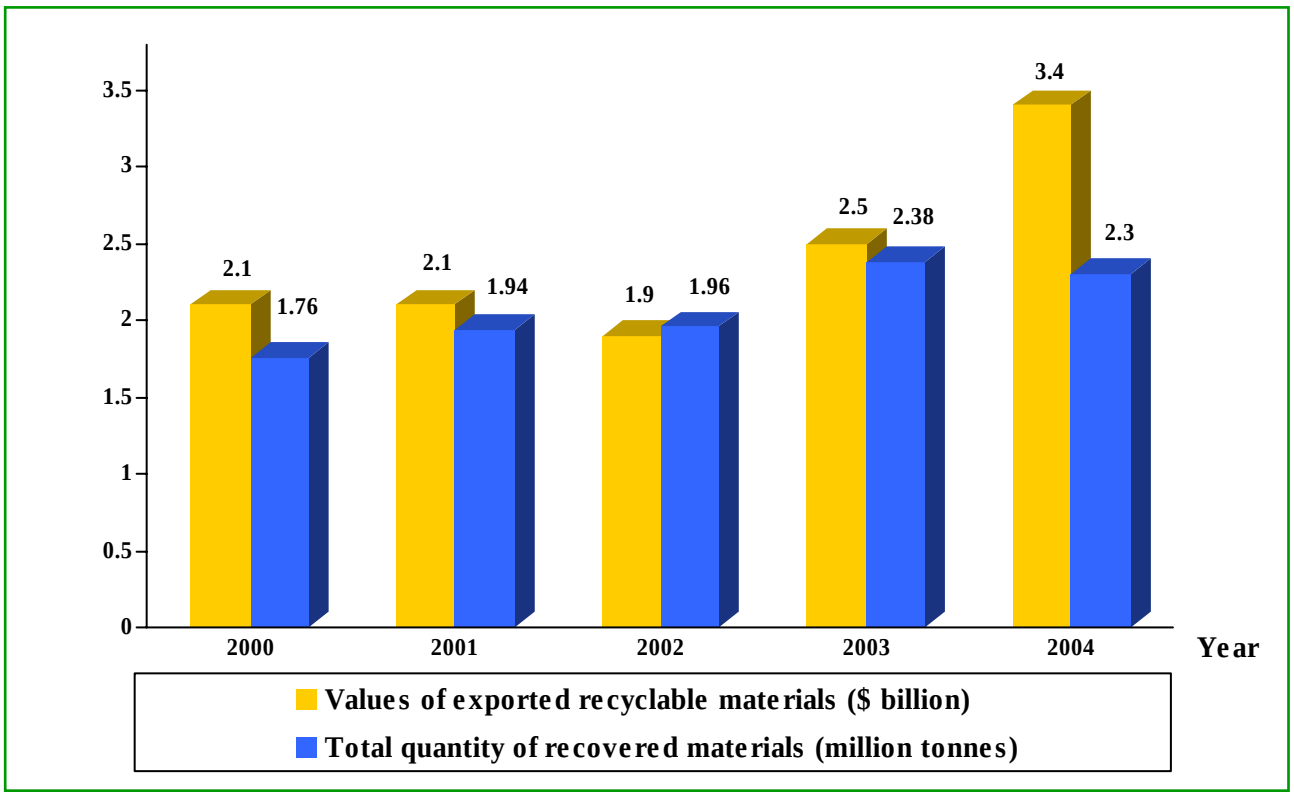
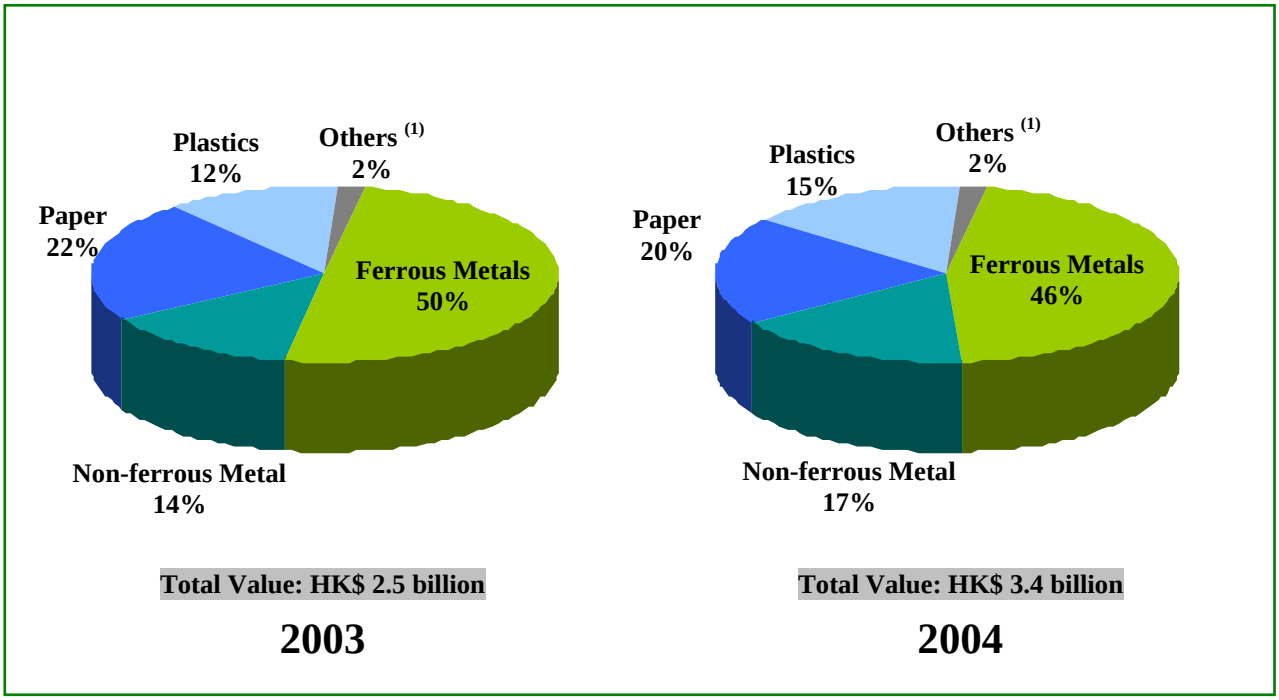


Plate 3.6 Values of exported recyclable materials in 2004



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

Plate 3.7 Quantities and values 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	15,403	141,444	9,183
~ pig or cast iron	9,105	17,633	1,937
~ tinplate	0	0	0
~ other scraps	931,353	1,410,792	1,515
Sub-total:	**955,861**	**1,569,869**	**1,642**
b. Non-ferrous metals			
~ aluminium	29,845	116,930	3,918
~ copper & alloys	61,858	442,799	7,158
~ lead	0	0	0
~ metal ash & residues	182	838	4,596
~ nickel	27	1,017	37,078
~ precious metal (without scrap gold)	57	46,549	816,907
~ tin	0	0	0
~ zinc	207	1,210	5,838
Sub-total:	**92,177**	**609,343**	**6,611**
c. Plastics			
~ polyethylene	71,675	132,573	1,850
~ polystyrene & copolymers	11,784	25,205	2,139
~ polyvinyl chloride	32,017	58,212	1,818
~ others	142,503	282,432	1,982
Sub-total:	**257,979**	**498,422**	**1,932**
d. Textiles			
~ cotton	8,059	14,630	1,815
~ man-made fibres	93	131	1,404
~ old clothing & other textile articles, rags, etc.	6,211	14,832	2,388
Sub-total:	**14,363**	**29,593**	**2,060**
e. Wood & paper			
~paper	731,446	690,740	944
~wood (include sawdust)	21,427	21,375	998
Sub-total:	**752,873**	**712,115**	**946**
f. Electrical & Electronic equipment	**31,801**	**N/A**	**N/A**
Total:	**2,105,054**	**3,419,342**	**1,649**

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 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.

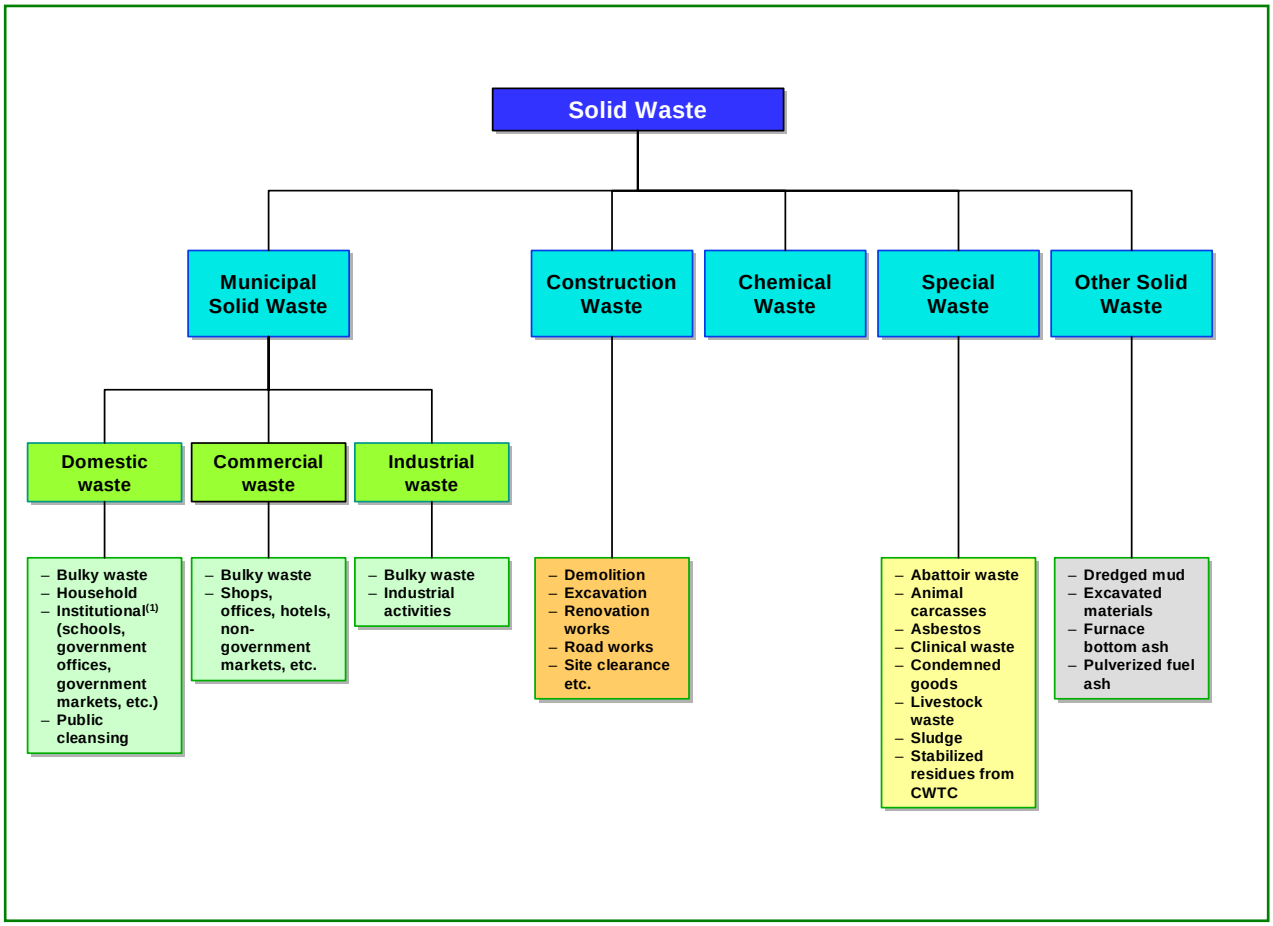
Construction waste (previously known as construction & demolition waste) is a mixture of surplus materials arising from site clearance, excavation, construction, refurbishment, renovation, demolition and road works. Over 80% of construction wastes are inert, which include debris, rubble, earth and concrete, 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 by 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 2004 at landfills and RTS;
- Results of waste recovery survey conducted in January 2005 by ACNielsen (China) Ltd.;
- Monthly statistics provided by other departments including FEHD, Civil Engineering Development 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.