MONITORING OF SOLID WASTE IN HONG KONG

Waste Statistics for 2005

Environmental Protection Department

Monitoring of Solid Waste in Hong Kong
Waste Statistics for 2005

Date:	**May 2006**
Author:	**Mr. Steven. H.L. Wong, Mr. Wilson C.K. Tam, Mr. Alan H.L. Yim, Mr. Nelson H.Y. Ip**
Work done by:	**Mr. W.K Luk, Mr. T.K. Yuen, Mr. C.K. Low, Mr. C.M. Lok, Ms. Y.M. Yuen**
Approved by:	**Dr. Ellen Y.L. Chan**
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Content

Abbreviations

C&I	**Commercial and Industrial**
CEDD	**Civil Engineering and 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 2005. 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 2005

Waste type [1]	Quantity (tpd)			Change from 2004	
	Public[2]	Private[3]	Total	Quantity (tpd)	Percentage
a. Domestic waste					
- waste from household, public cleansing	5,344	1,410	6,753		
- bulky waste [4]	22	52	74		
Sub-total	5,366	1,461	6,828	-186	-2.7%
b. Commercial waste					
- mixed waste from commercial activities	-	1,809	1,809		
- bulky waste [4]	-	86	86		
Sub-total		1,895	1,895	+222	+13.3%
c. Industrial waste					
- mixed waste from industrial activities	-	628	628		
- bulky waste [4]	-	26	26		
Sub-total		654	654	53	+8.8%
d. Municipal solid waste received at disposal facilities (a+b+c)	5,366	4,010	9,377	+89	+1.0%
e. Landfilled construction waste	-	6,556	6,556	-38	-0.6%
f. Special waste	1,059	687	1,746	+126	+7.8%
g. All waste received at landfills (d+e+f)	6,426	11,254	17,679	+177	+1.0%

Remark: (1) 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 2004 & 2005

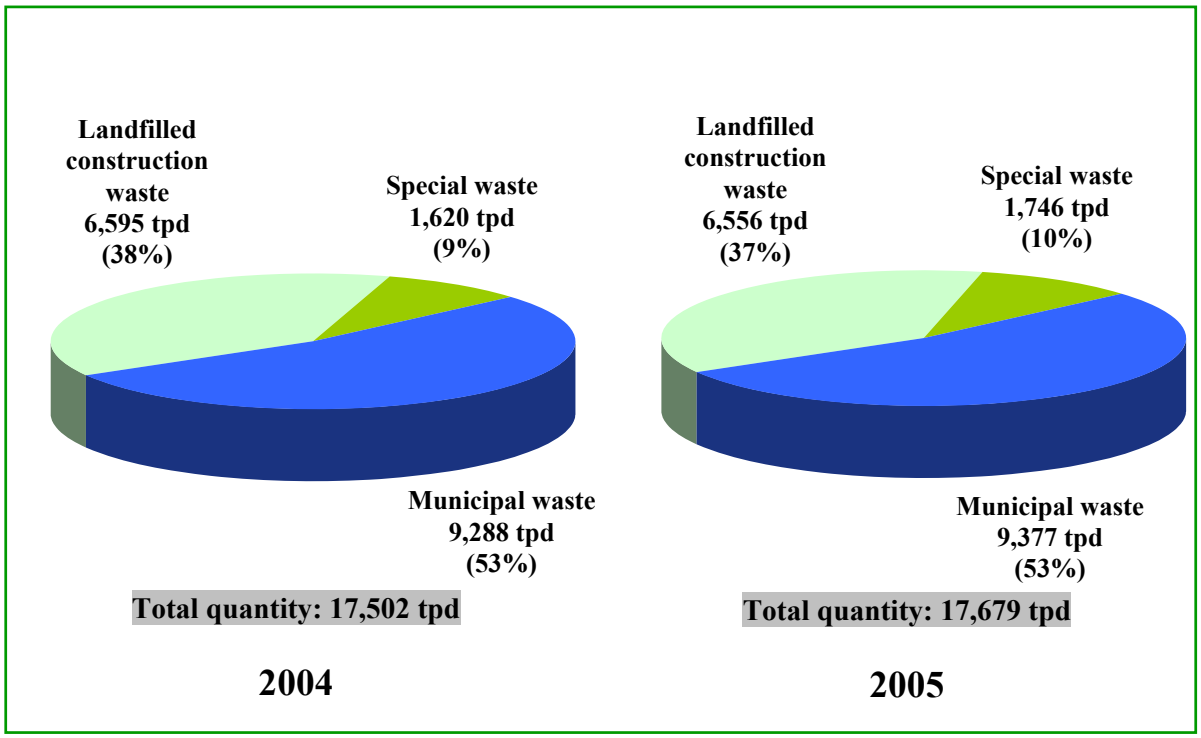


Plate 2.3 Solid waste disposal in 2000-2005

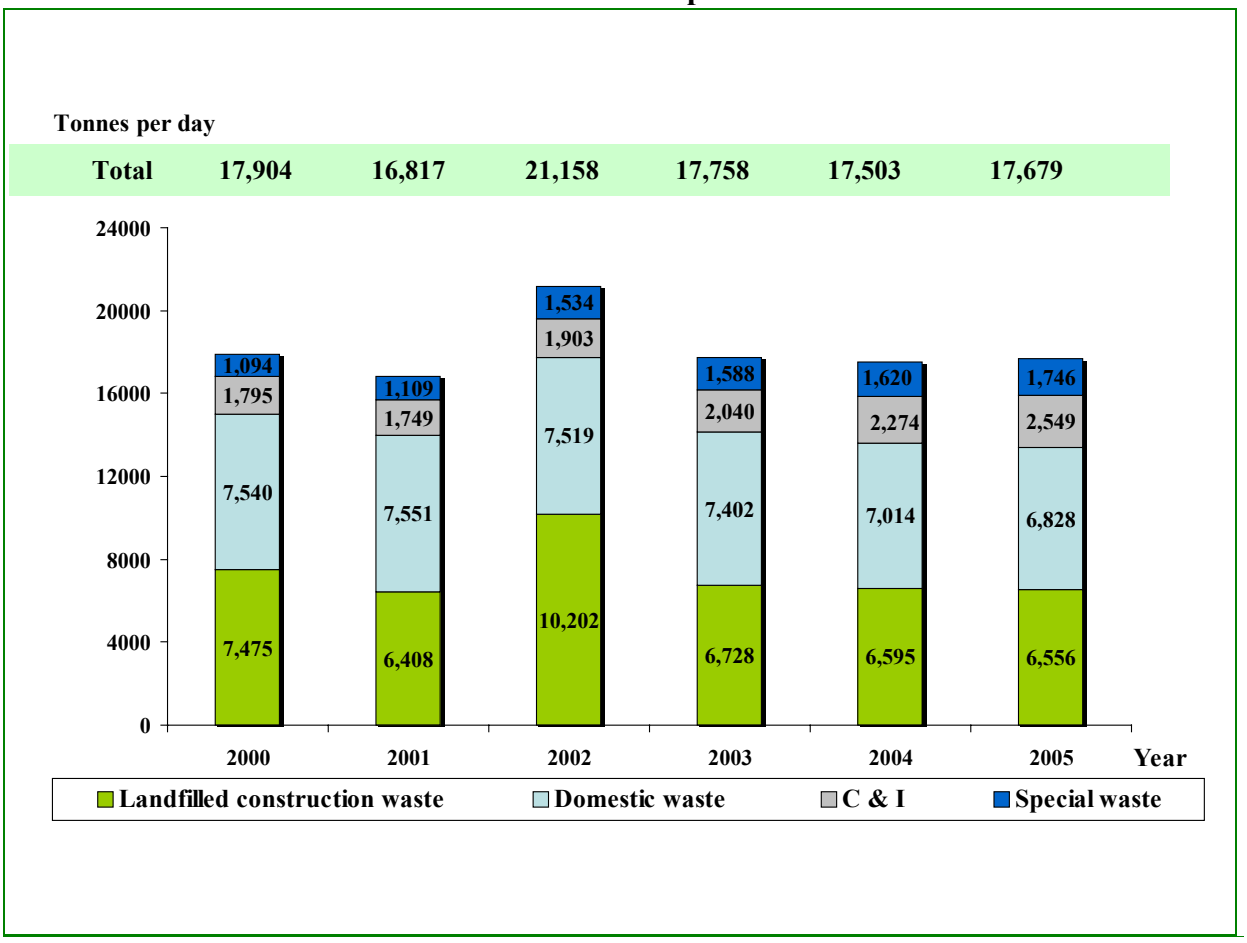
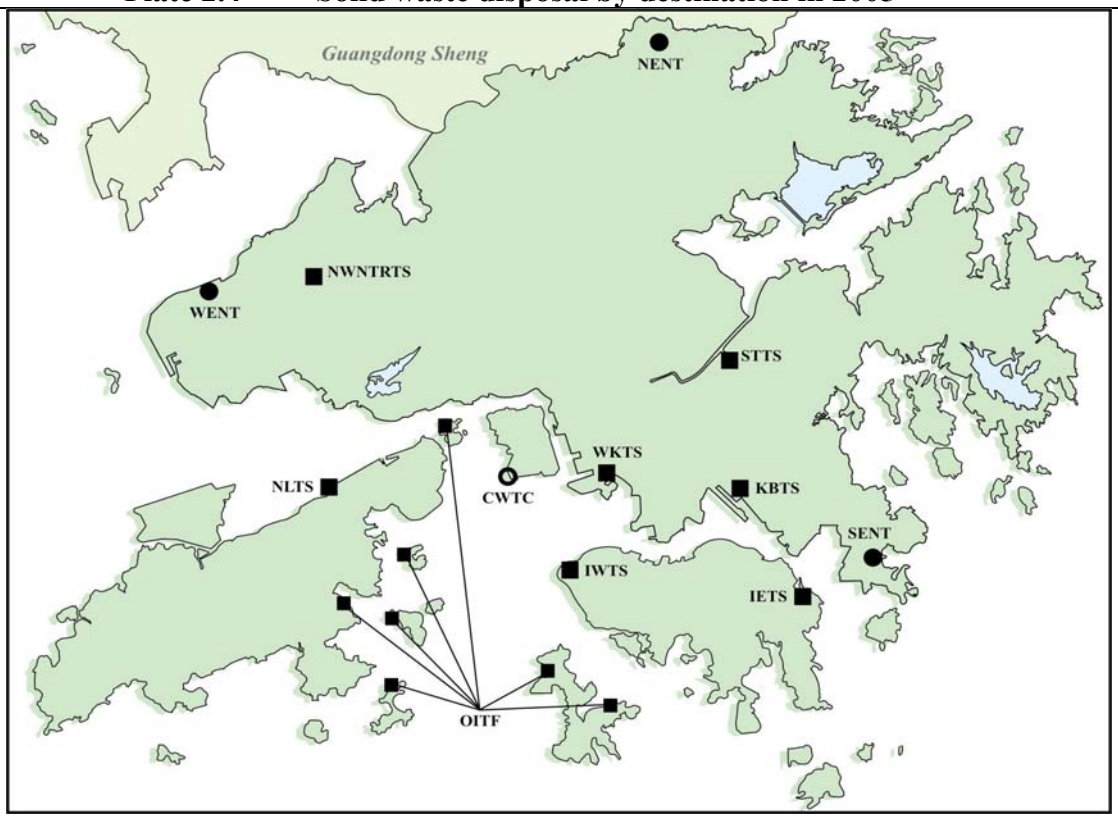


Plate 2.4 Solid waste disposal by destination in 2005



Landfill ●

WENT	SENT	NENT		
6,619 tpd	8,101 tpd	2,959 tpd		
(+2.4%)	(0%)	(+0.8%)		
IETS [1]	IWTS [1]	WKTS [1]	OITF [1]	NLTS [1]
863 tpd	486 tpd	2,053 tpd	88 tpd [2]	148 tpd
(+2.5%)	(+6.8%)	(+2.4%)	(-4.3%)	(+7.2%)

RTS ■

KBTS [1]	STTS [1]	NWNTRTS [1]
79 tpd	910 tpd	774 tpd
(-79.4%)	(-44.9%)	(+1.4%)

CWTC ○

103 tpd

(+7.7%)

Remarks:

(1) Figures may not add up to total due to rounding off.

(2) Percentage increase/decrease of waste quantity over previous year is shown.

Note:

(1) Waste fro 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 (85 tpd).

(3) The quantity shown here does not include waste tyre from other Departments to KBTS (2 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 2005

Disposal facilities	Average daily waste intake by waste type in 2005(tpd)				
	MSW		Landfilled construction waste	Special waste	Total
	Public[1]	Private[2]			
KBTS - Kowloon Bay Refuse Transfer Station [3]	78			1[8]	79
IETS - Island East Refuse Transfer Station [4]	776	87			863
STTS - Sha Tin Refuse Transfer Station [3]	910	-	-	-	910
IWTS - Island West Refuse Transfer Station [4]	430	56			486
WKTS - West Kowloon Refuse Transfer Station [4]	1,902	151	-	-	2,053
OITF - Outlying Islands Refuse Transfer Facilities[4]	80	4		4	88 [5]
NLTS - North Lantau Refuse Transfer Stations [4]	56	91	-	1	148
NWNTRTS-North West New Territories Refuse Transfer Station [6]	762	12			774
WENT - West New Territories Landfill	4,035[7]	851[7]	755	978 [7]	6,619 [7]
SENT - South East New Territories Landfill	185	2,502	4,950	465	8,101
NENT - North East New Territories Landfill	1,147[7]	657	852	303	2,959 [7]
Sub-total	5,362	4,014			
Total	9,377		6,556	1,746	17,679

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 (85 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 (2 tpd).

Plate 2.6 Origin of solid waste by district in 2005

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	294	71	134	499	287	785
Wanchai	252	76	132	460	172	631
Eastern	401	98	125	623	195	819
Southern	243	13	58	315	148	462
Hong Kong Island Sub-total	**1,189**	**258**	**449**	**1,896**	**801**	**2,697**
Yau Tsim Mong	481	70	220	770	511	1,281
Sham Shui Po	279	88	190	557	345	902
Kowloon City	263	83	100	446	375	820
Wong Tai Sin	288	32	49	369	119	489
Kwun Tong	379	196	301	876	1,370	2,246
Kowloon Sub-total	**1,691**	**468**	**860**	**3,019**	**2,719**	**5,739**
Kwai Tsing	316	29	105	451	231	682
Tsuen Wan	228	71	144	442	279	720
Tuen Mun	300	53	226	579	275	854
Yuen Long	544	55	164	763	346	1,109
North	162	252	118	531	452	983
Tai Po	217	71	33	321	163	484
Sha Tin	387	101	178	666	337	1,003
Sai Kung	185	97	162	444	735	1,179
NT- Mainland Sub-total	**2,339**	**729**	**1,130**	**4,198**	**2,817**	**7,015**
Cheung Chau[4]	33	-	-	-	-	-
Mui Wo[4]	25	-	-	-	-	-
Peng Chau[4]	7	-	-	-	-	-
Ma Wan [4]	9	-	-	-	-	-
Lamma Island[4]	10	-	-	-	-	-
Hei Ling Chau[4]	4	-	-	-	-	-
North Lantau[4]	59	-	-	-	-	-
NT-Outlying Islands Sub-total	**147**	**6**	**110**	**263**	**219[5]**	**483**
Total	**5,366**	**1,461**	**2,549**	**9,377**	**6,556**	**15,933**

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 – 2005

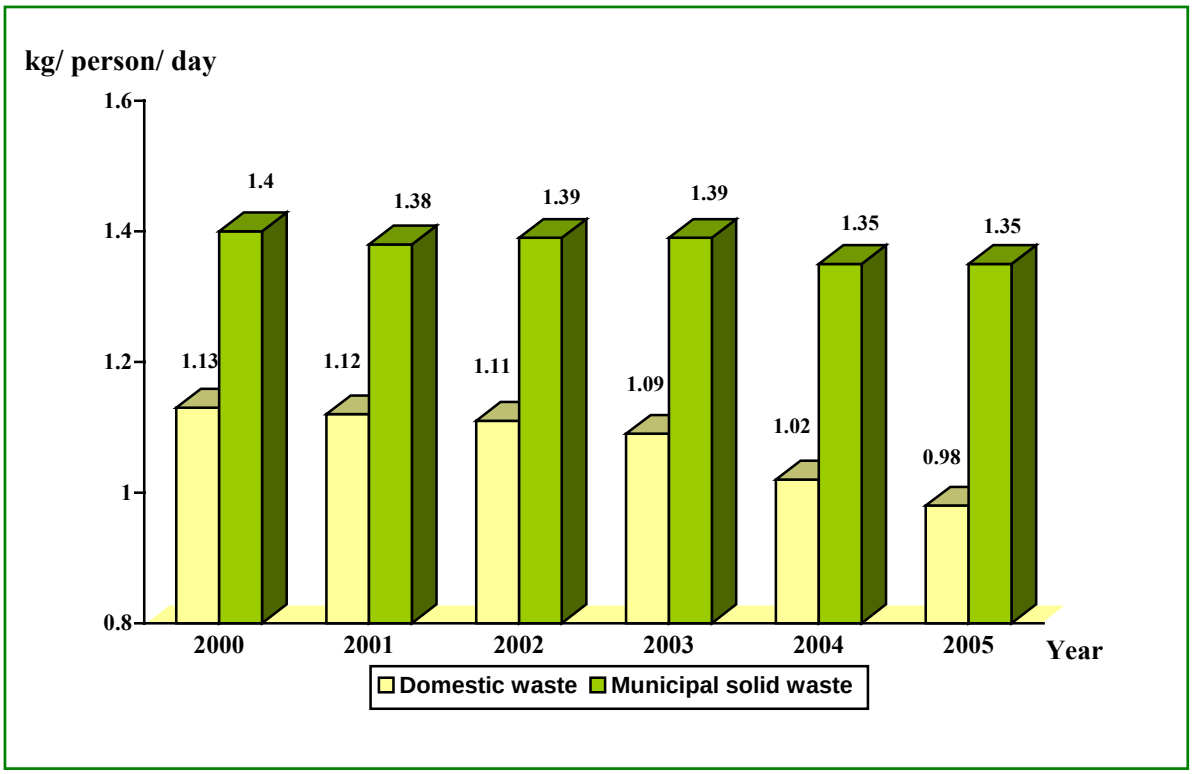


Plate 2.8 Composition of municipal solid waste in 2005

	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	74 (1.1%)	86 (4.6%)	26 (4.0%)	112 (4.4%)	187 (2.0%)
Glass	275 (4.0%)	67 (3.5%)	8 (1.2%)	74 (2.9%)	349 (3.7%)
Metals	144 (2.1%)	45 (2.4%)	48 (7.3%)	93 (3.7%)	237 (2.5%)
Paper	1,821 (26.7%)	521 (27.5%)	79 (12.1%)	600 (23.5%)	2,421 (25.8%)
Plastics	1,327 (19.4%)	356 (18.8%)	63 (9.6%)	419 (16.4%)	1,746 (18.6%)
Putrescibles	2,844 (41.6%)	683 (36.0%)	47 (7.1%)	730 (28.6%)	3,573 (38.1%)
Textiles	193 (2.8%)	53 (2.8%)	31 (4.7%)	84 (3.3%)	277 (2.9%)
Wood/ Rattan	38 (0.5%)	41 (2.1%)	269 (41.2%)	310 (12.2%)	347 (3.7%)
Household Hazardous Wastes (HHWs) (1)	68 (1.0%)	14 (0.7%)	13 (2.0%)	26 (1.0%)	95 (1.0%)
Others	44 (0.6%)	30 (1.6%)	71 (10.9%)	101 (3.9%)	145 (1.5%)
Total	6,828	1,895	654	2,549	9,377
	(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 2005

Waste Type	Domestic Waste		C&I Waste	
	Quantity (tpd)	% by weight	Quantity (tpd)	% by weight
Glass				
- Clear Glass Bottles	103	(1.5%)	26	(1.0%)
- Brown Glass Bottles	23	(0.3%)	12	(0.5%)
- Green Glass Bottles	57	(0.8%)	23	(0.9%)
- Other Glass	92	(1.3%)	13	(0.5%)
(Glass) Sub-total	275	(4.0%)	74	(2.9%)
Metals				
- Ferrous Metals	115	(1.7%)	82	(3.2%)
- Aluminium Cans	17	(0.3%)	5	(0.2%)
- Other Non-ferrous Metals	13	(0.2%)	7	(0.3%)
(Metals) Sub-total	144	(2.1%)	93	(3.7%)
Paper				
- Cardboard	283	(4.1%)	130	(5.1%)
- Newsprint	728	(10.7%)	112	(4.4%)
- Office Paper	185	(2.7%)	64	(2.5%)
- Others [(1)]	624	(9.1%)	294	(11.5%)
(Paper) Sub-total	1,821	(26.7%)	600	(23.5%)
Plastics				
- Clear Plastic Bags	106	(1.6%)	45	(1.8%)
- Colour Bags (white, red, yellow, etc)	656	(9.6%)	185	(7.2%)
- Polyfoam-Dining Wares	73	(1.1%)	21	(0.8%)
- Polyfoam-Other	17	(0.2%)	19	(0.7%)
- PET Bottles	52	(0.8%)	21	(0.8%)
- Other Plastic Bottles	116	(1.7%)	11	(0.4%)
- Off-cuts & Scrap	0	(0.0%)	0	(0.0%)
- Others [(2)]	307	(4.5%)	118	(4.6%)
(Plastics) Sub-total	1,327	(19.4%)	419	(16.4%)
Putrescibles				
- Food Waste	2,453	(35.9%)	701	(27.5%)
- Yard Waste	25	(0.4%)	13	(0.5%)
- Others [(3)]	366	(5.4%)	15	(0.6%)
(Putrescibles) Sub-total	2,844	(41.6%)	730	(28.6%)

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

Notes:

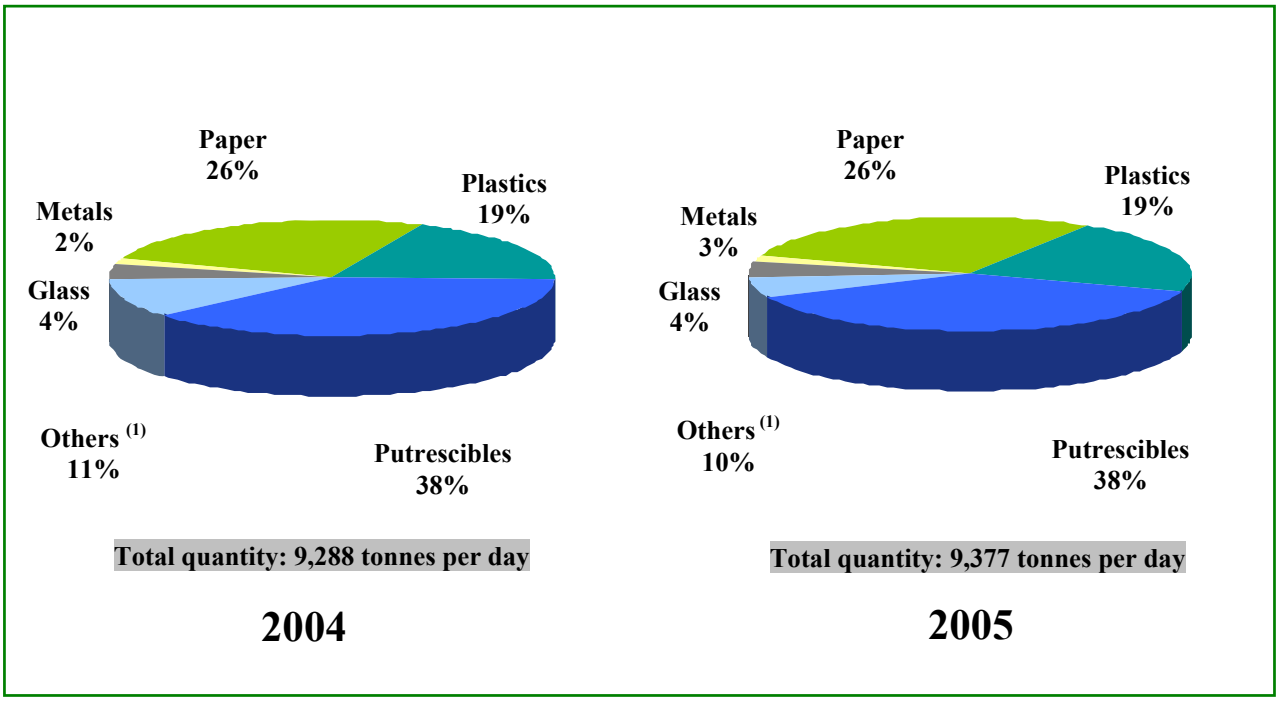
(1) Other paper sub-components are drink pack (tetrapak), tissue paper, etc.

(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 2004 & 2005



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 2004 & 2005

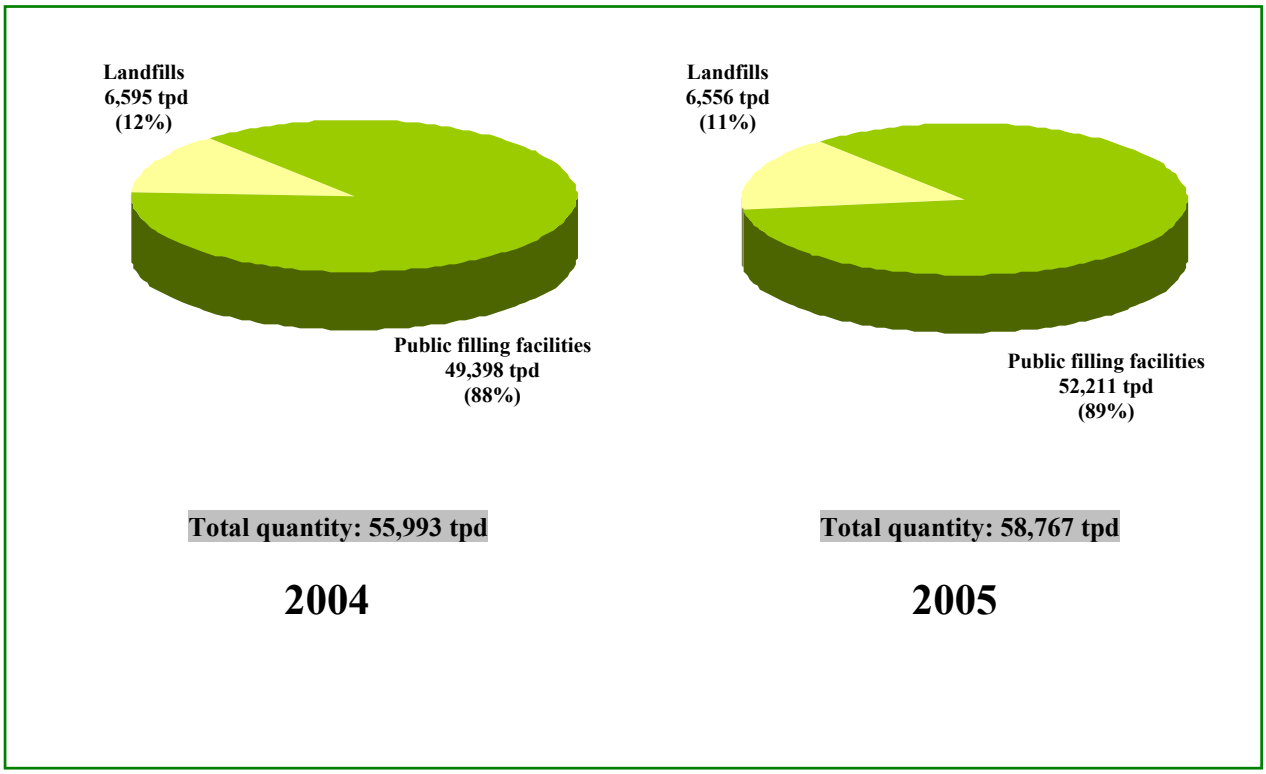


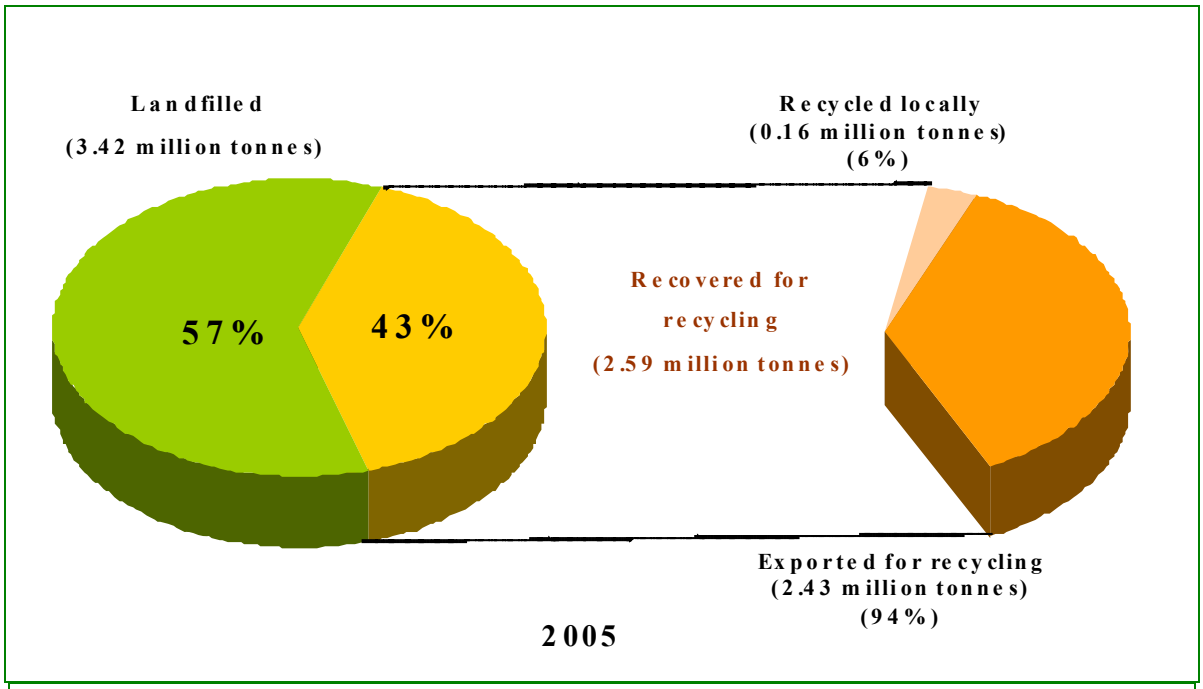
Plate 2.12 Disposal of special and other waste by type in 2005

Waste type	Disposal method	Quantity disposed of (tpd)
Special Waste		
Abattoir waste	Landfilling	16
Animal waste	Landfilling	19
Asbestos waste	Co-disposal at landfills (1)	3
Chemical waste other than asbestos waste	Co-disposal at landfills (1)	7
Clinical waste	Co-disposal at landfills (1)	5
Condemned goods	Landfilling	19
CWTC stabilised residue	Landfilling	20
Dewatered dredged materials	Landfilling	60
Dewatered sewage sludge	Landfilling	902
Dewatered waterworks sludge	Landfilling	15
Grease trap waste	Co-disposal at landfill (2)	404(3)
Livestock waste	Landfilling (4)	161
Sewage works screenings	Landfilling	63
Waste tyres (5)	Landfilling	50
Other Waste		
Chemical waste other than asbestos waste	CWTC	103
Dredged mud and Excavated materials (6)	Marine dumping	54,247
Furnace bottom ash	Concrete manufacturing, stored in lagoon(7)	191
Livestock waste	Composting and other environmentally acceptable means (8)	727
Pulverised fuel ash	Concrete manufacturing, stored in lagoon(7)	1,743

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) At the WENT Landfill and NENT landfill.
(5) Waste tyres were shredded or cut prior to disposal.
(6) Assuming the density of the dredged mud and excavated materials to be one tonne per cubic metre.
(7) Information provided by CLP Power Hong Kong Limited and the Hongkong Electric Company Limited
(8) 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 2004 & 2005



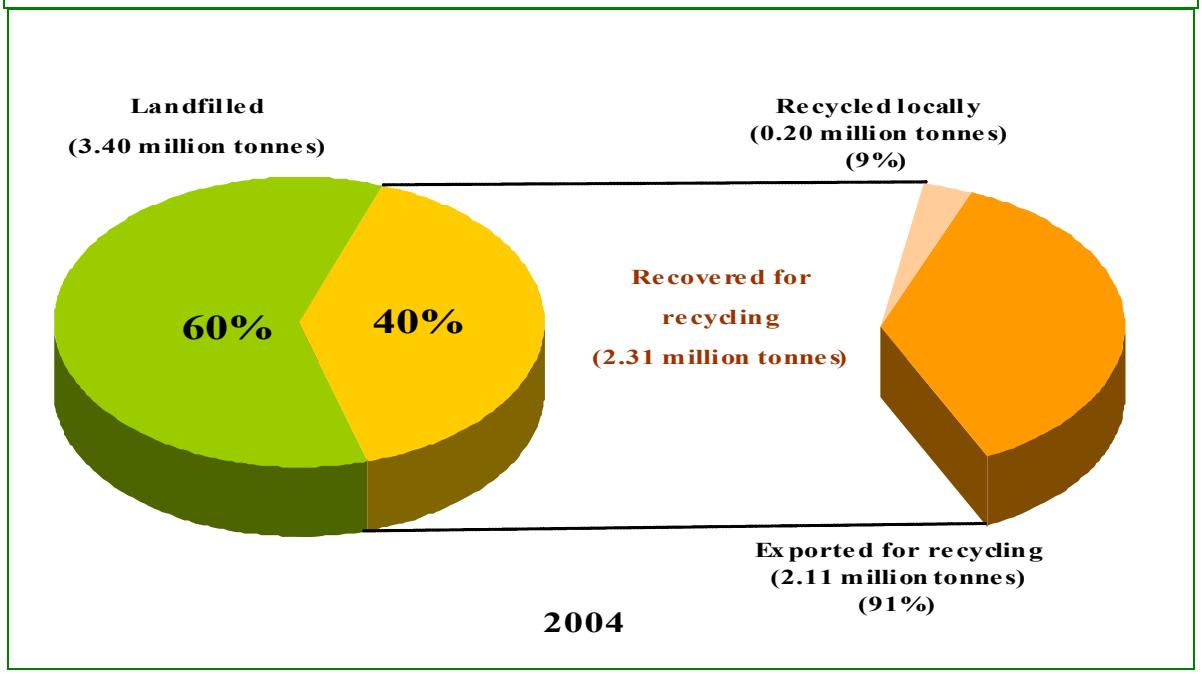


Plate 3.2 Municipal solid waste recovery rates in 2000 – 2005

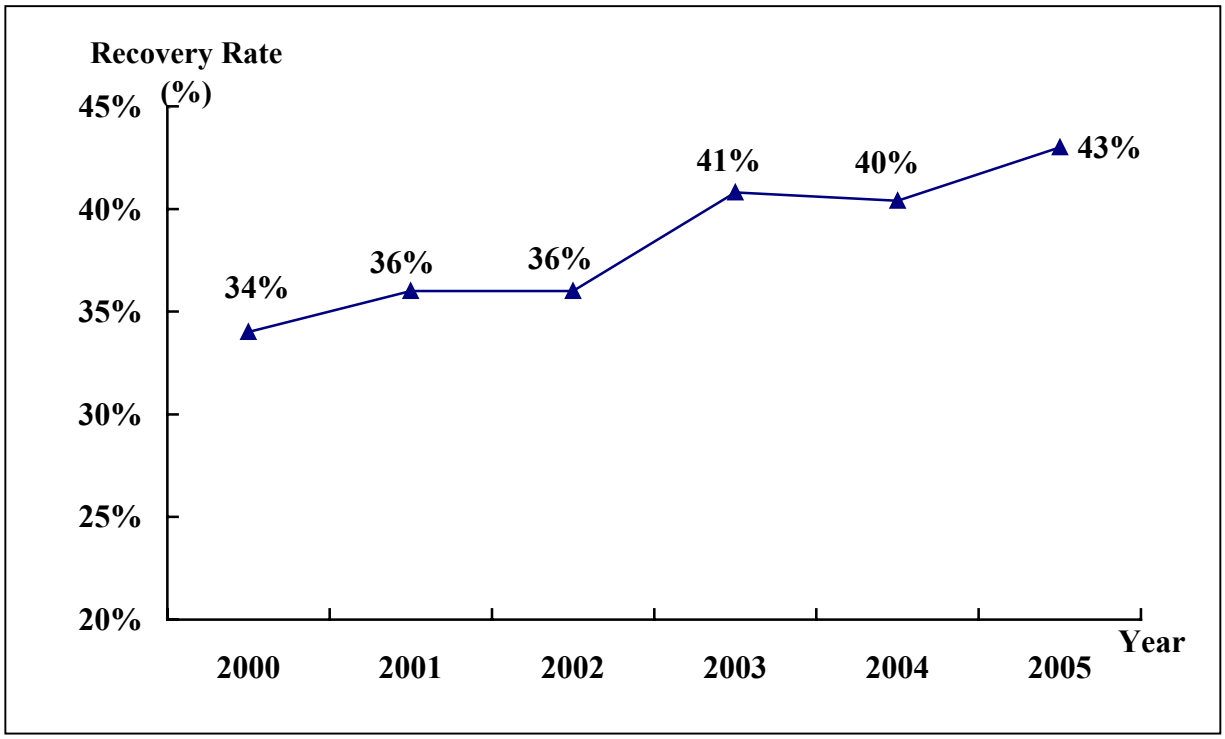


Plate 3.3 Recovered recyclable materials by type in 2005

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	829	0	829
Glass	0	2[(1)]	2
Non-ferrous metals	102	6	108
Paper	792	116	908
Plastics	637	8	644
Rubber tyres	0	21[(2)]	21
Textiles	12	3	15
Wood	13	1	14
Electrical and Electronic equipment	47	6	53
Total	2,433	162	2,594

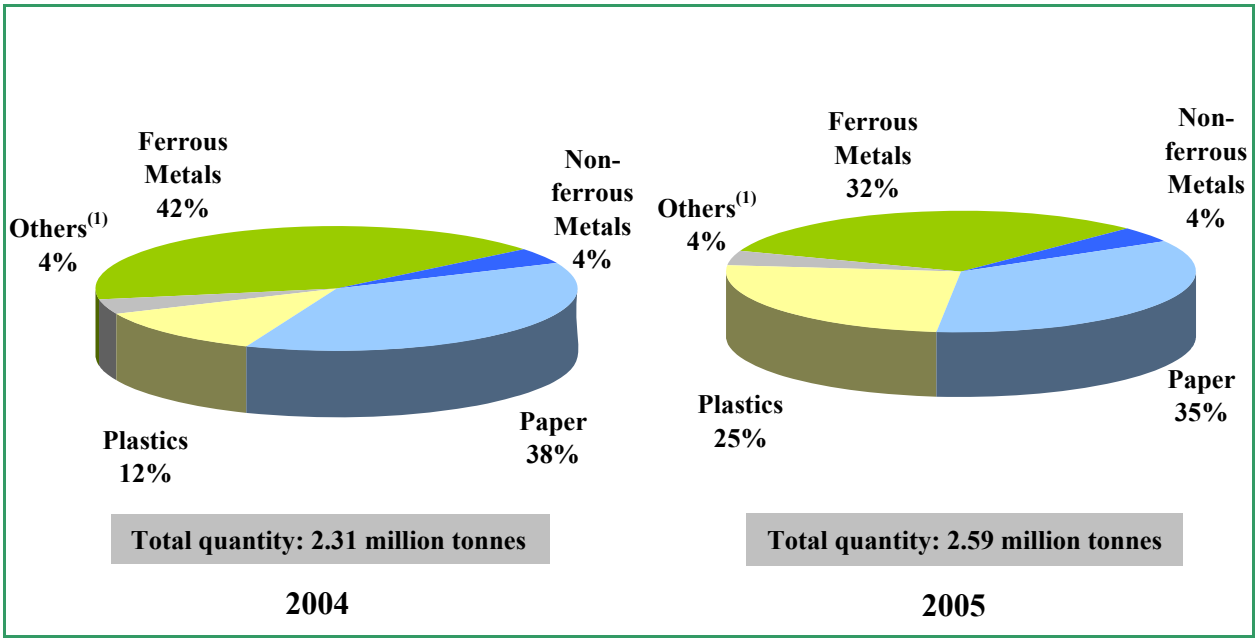
Remark: Figures may not add up to total due to rounding off.

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 (15,600 tonnes) and retreading of aircraft tyres in Hong Kong (5,400 tonnes).

Plate 3.4 Recovered recyclable materials by type in 2004 & 2005



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 – 2005

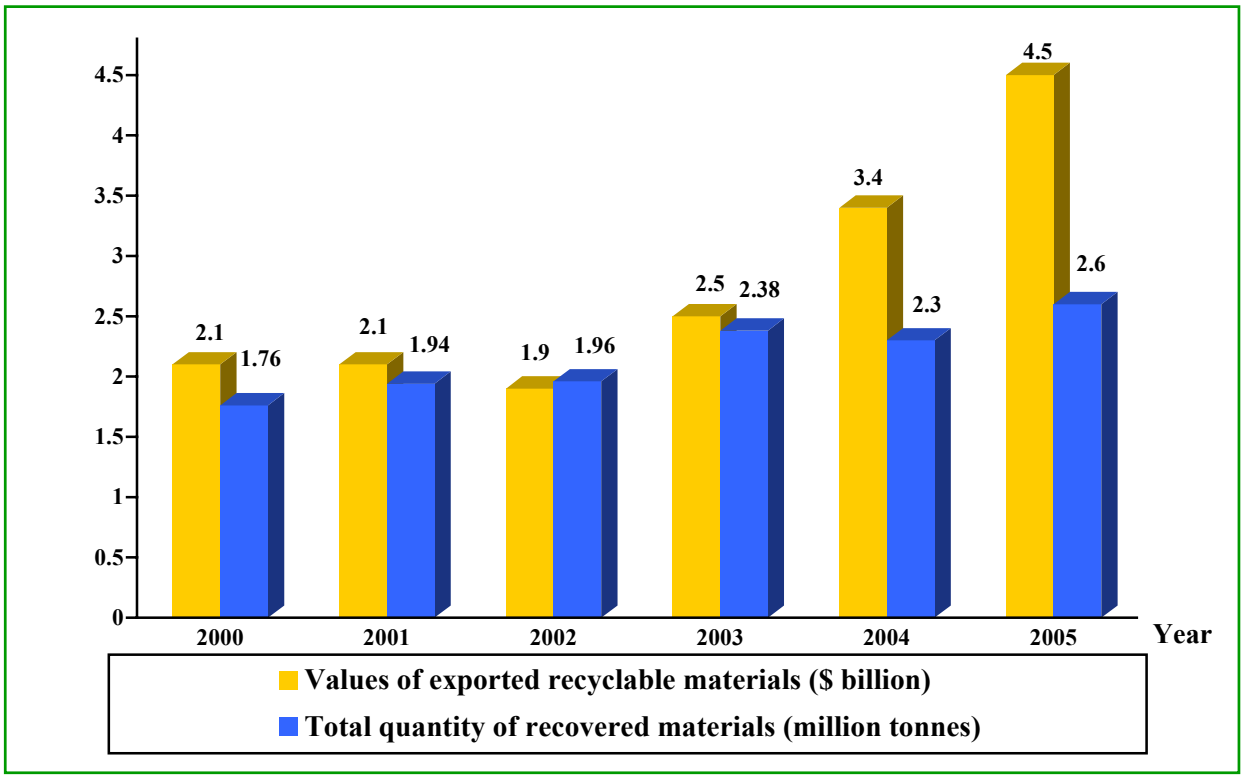
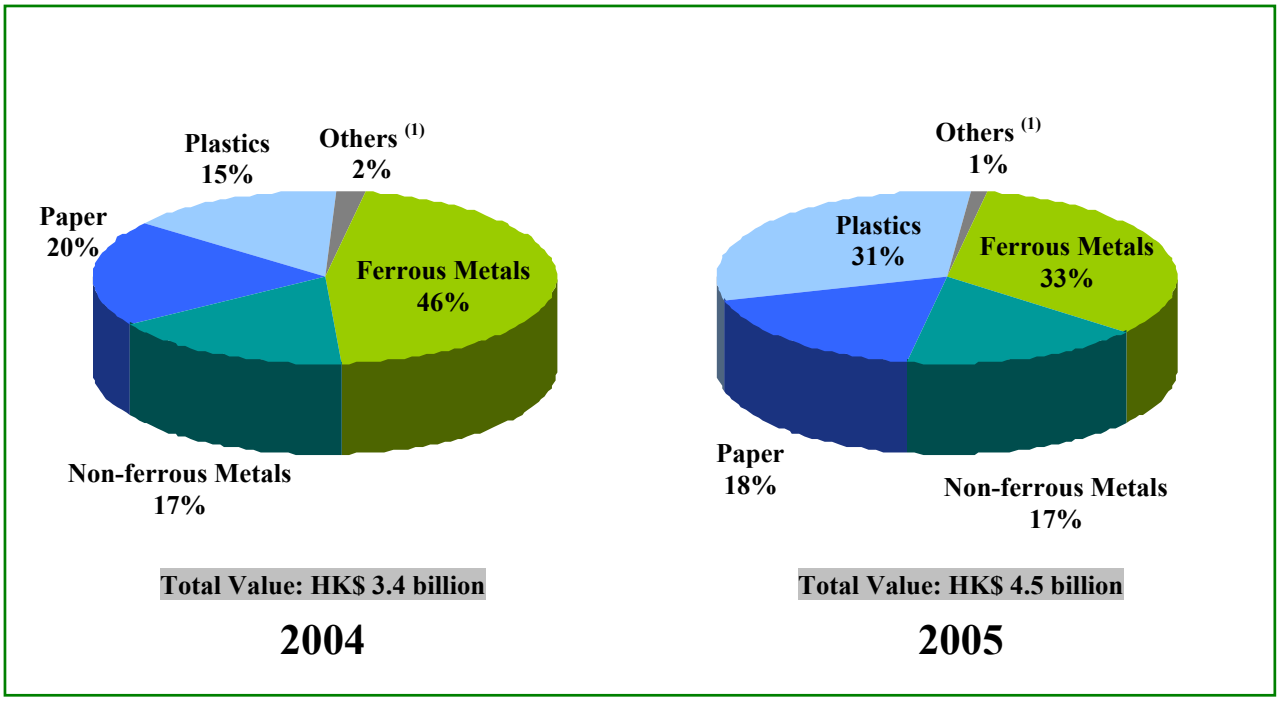


Plate 3.6 Values of exported recyclable materials in 2005



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	22,375	187,280	8,370
~ pig or cast iron	2,883	5,883	2,041
~ tinplate	0	0	0
~ other scraps	803,890	1,302,261	1,620
Sub-total:	**829,148**	**1,495,424**	**1,804**
b. Non-ferrous metals			
~ aluminium	40,550	202,013	4,982
~ copper & alloys	61,381	517,557	8,432
~ lead	0	0	0
~ metal ash & residues	102	657	6,469
~ nickel	20	1,396	70,505
~ precious metal (without scrap gold)	45	21,723	486,441
~ tin	0	0	0
~ zinc	125	751	6,001
Sub-total:	**102,222**	**744,097**	**7,279**
c. Plastics			
~ polyethylene	79,320	154,212	1,944
~ polystyrene & copolymers	27,960	72,985	2,610
~ polyvinyl chloride	44,951	83,267	1,852
~ others	484,369	1,083,345	2,237
Sub-total:	**636,599**	**1,393,809**	**2,189**
d. Textiles			
~ cotton	8,087	14,197	1,756
~ man-made fibres	0	0	0
~ old clothing & other textile articles, rags, etc.	3,992	13,268	3,324
Sub-total:	**12,079**	**27,465**	**2,274**
e. Wood & paper			
~paper	792,458	813,018	1,026
~wood (include sawdust)	13,318	13,354	1,003
Sub-total:	**805,776**	**826,372**	**1,026**
f. Electrical & Electronic equipment	**46,807**	**N/A**	**N/A**
Total:	**2,432,631**	**4,487,167**	**1,881**

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.

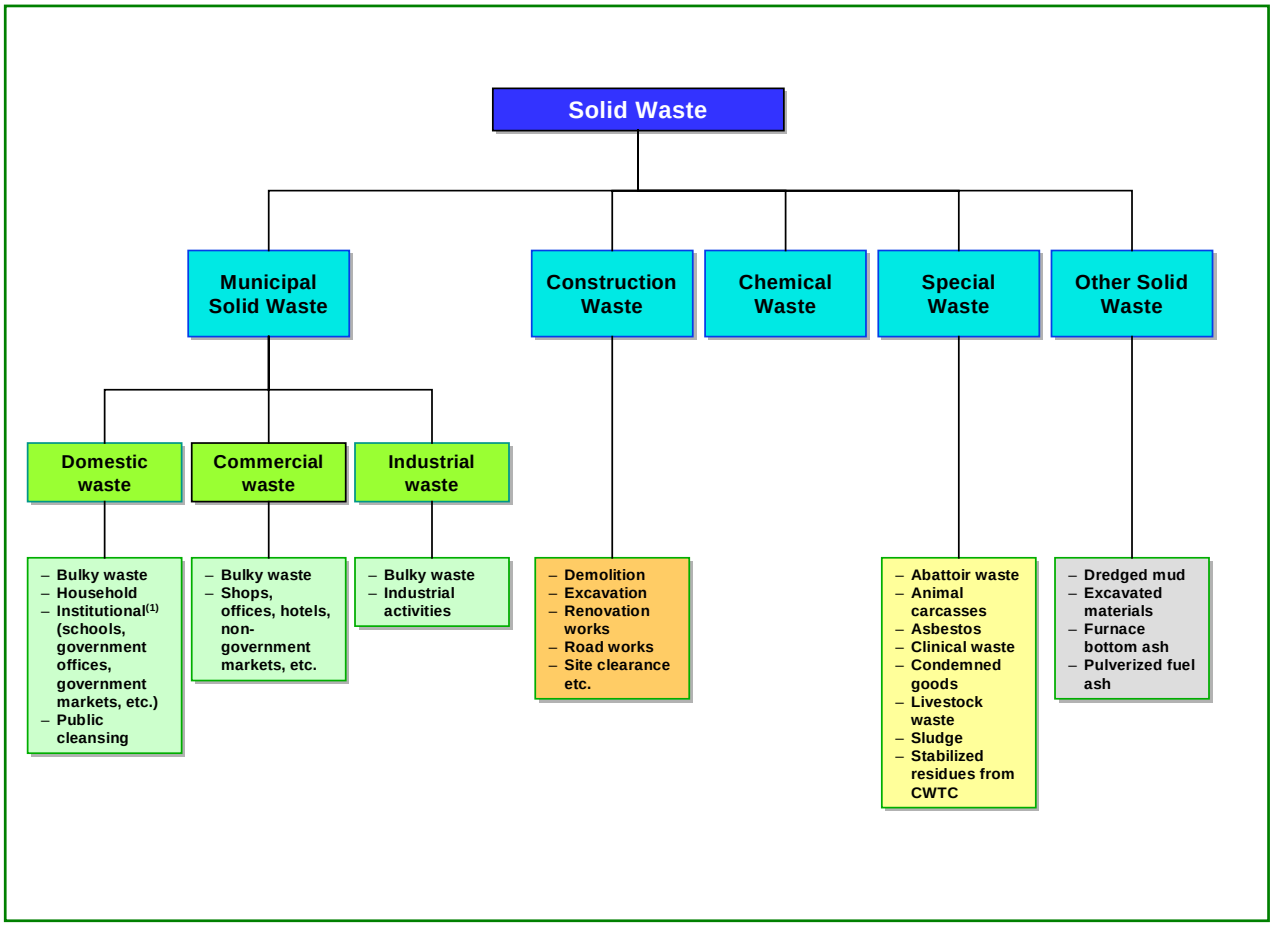
Construction waste (previously known as construction & demolition waste) is a mixture of surplus materials arising from site clearance, excavation, construction, refurbishment, renovation, demolition and road works. Over 80% of construction wastes are inert, which include debris, rubble, earth and concrete, 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 2005 at landfills and RTS;
- Results of waste recovery survey conducted in January 2006 by MVA Hong Kong 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.