MONITORING OF SOLID WASTE IN HONG KONG

Waste Statistics for 2006

Environmental Protection Department

Monitoring of Solid Waste in Hong Kong
Waste Statistics for 2006

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Content

Abbreviations

C&I	Commercial and Industrial
C&SD	Census and Statistics Department
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 Transfer Station
IWTS	Island West Transfer Station
KBTS	Kowloon Bay Transfer Station
MSW	Municipal Solid Waste
NENT	North East New Territories Landfill
NLTS	North Lantau Transfer Station
NT	New Territories
NWNTRTS	North West New Territories Refuse Transfer Station
OITF	Outlying Islands Transfer Facilities
RTS	Refuse Transfer Station(s)
SENT	South East New Territories Landfill
STTS	Sha Tin Transfer Station
tpd	tonnes per day
WENT	West New Territories Landfill
WKTS	West Kowloon Transfer Station

1. Introduction

This report presents the statistics on disposal and recovery/ recycling of solid waste generated in Hong Kong in the year 2006. 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 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 2006

Waste type [1]	Quantity (tpd)			Change from 2005	
	Public[2]	Private[3]	Total	Quantity (tpd)	Percentage
a. Domestic waste					
- waste from household, public cleansing	5,349	1,247	6,595		
- bulky waste [4]	3	36	39		
Sub-total	5,352	1,282	6,634	-194	-2.8%
b. Commercial waste					
- mixed waste from commercial activities	-	1,990	1,990		
- bulky waste [4]	-	71	71		
Sub-total		2,062	2,062	+167	+8.8%
c. Industrial waste					
- mixed waste from industrial activities	-	566	566		
- bulky waste [4]	-	18	18		
Sub-total		583	583	-71	-10.7%
d. Municipal solid waste received at disposal facilities (a+b+c)	5,352	3,927	9,279	-98	-1.0%
e. Landfilled construction waste	-	4,125	4,125	-2,431	-37.1%
f. Special waste	995	639	1,635	-111	-6.4%
g. All waste received at landfills (d+e+f)	6,347	8,692	15,039	-2,640	-14.9%

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 2005 & 2006

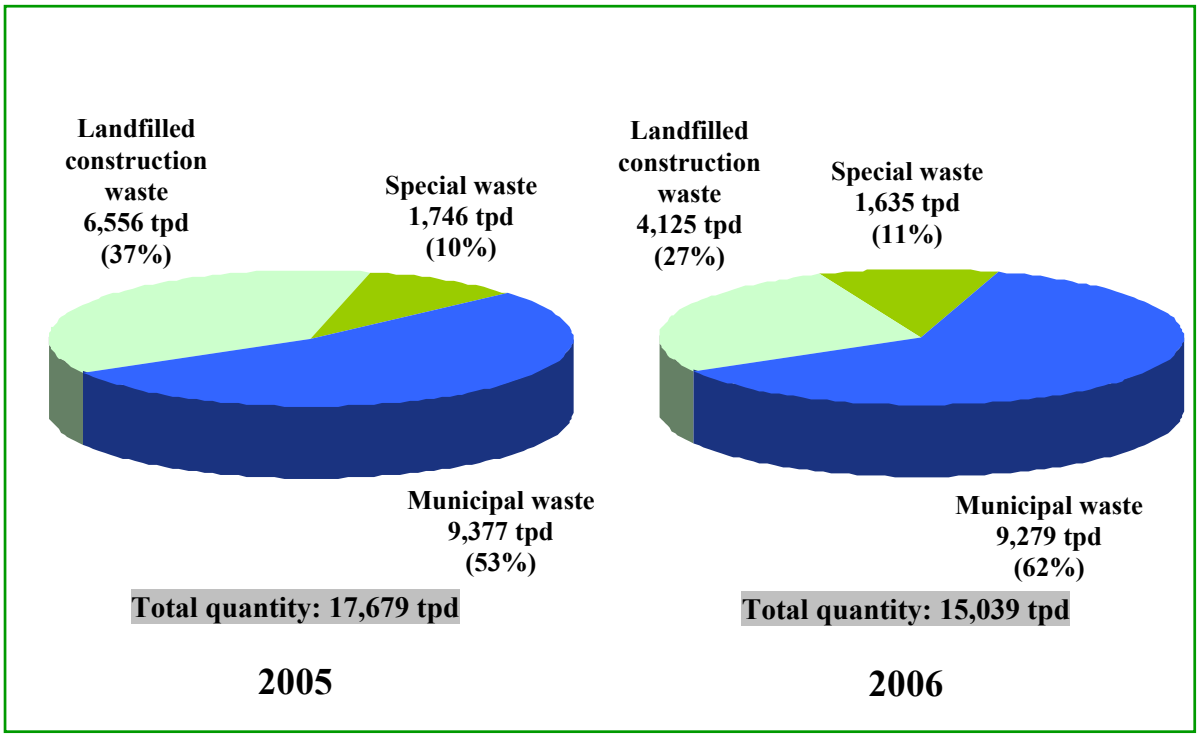


Plate 2.3 Solid waste disposal in 2001-2006

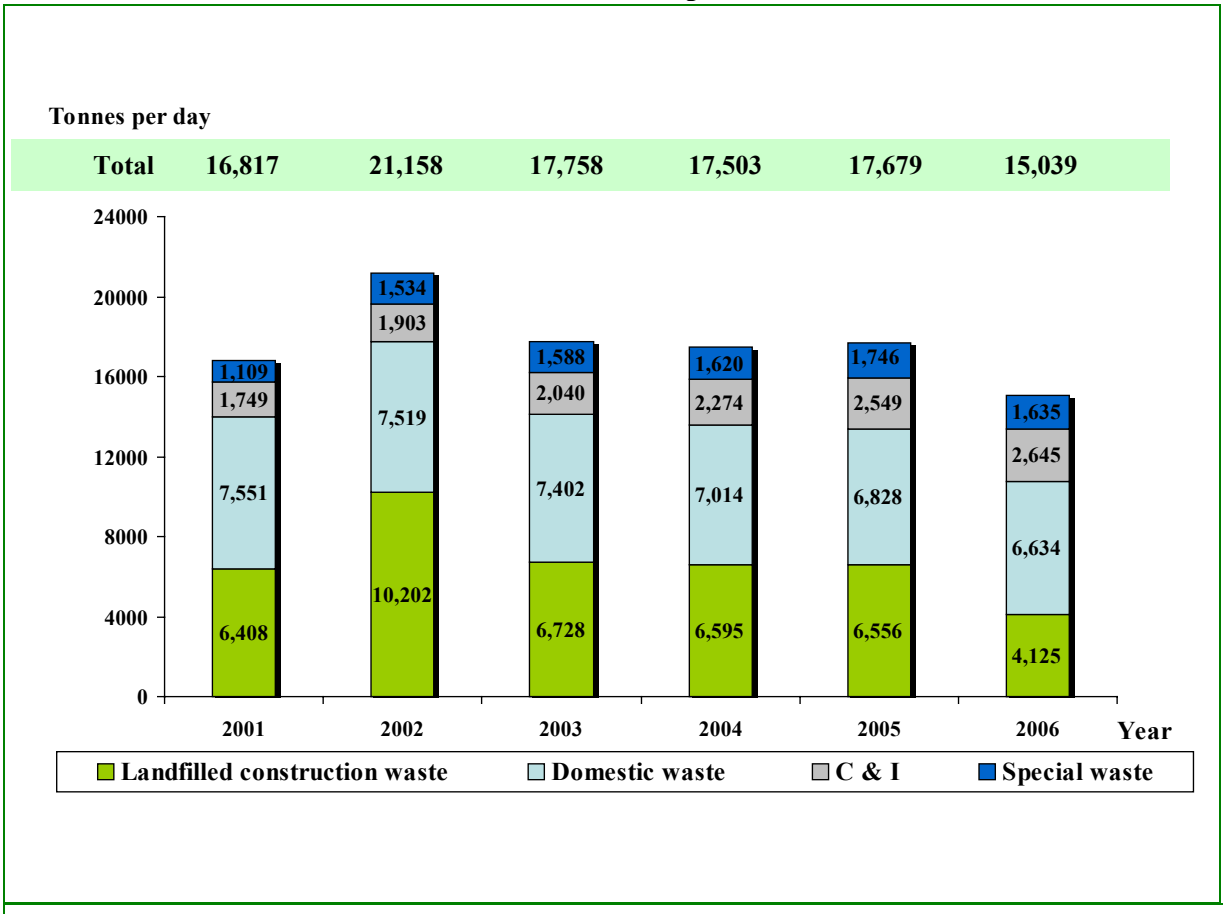
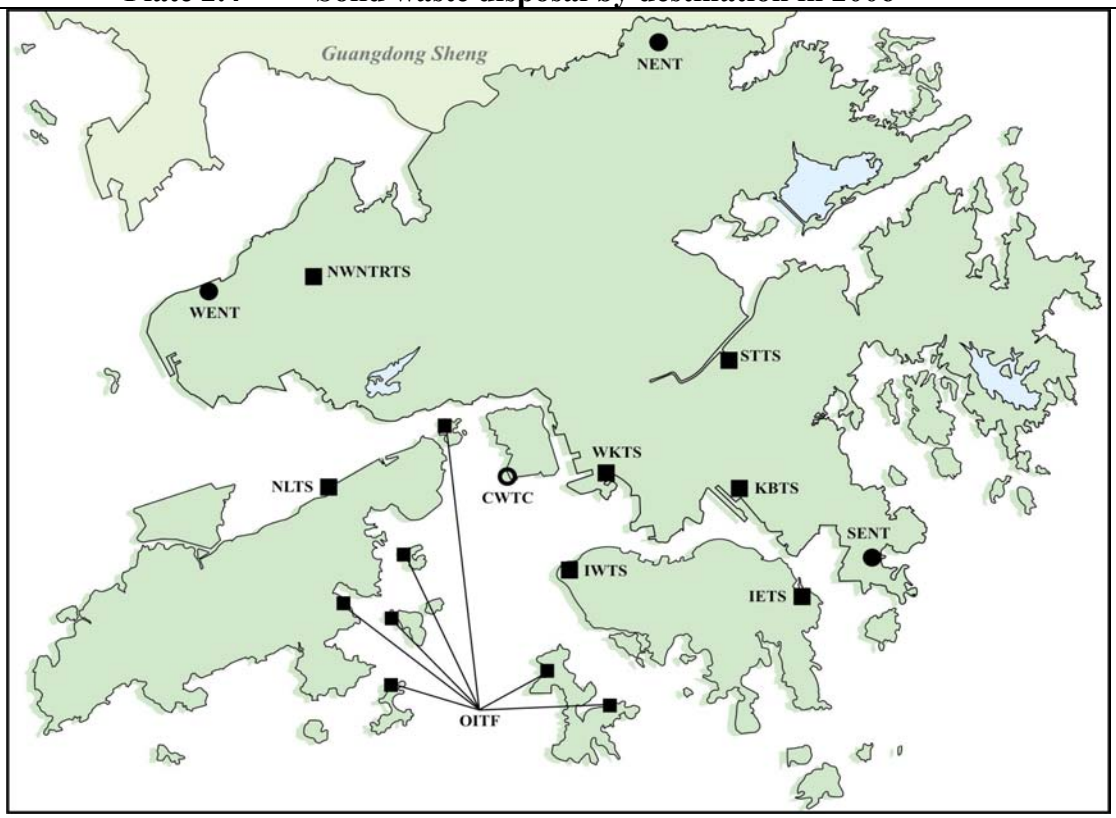


Plate 2.4 Solid waste disposal by destination in 2006



Landfill	●	WENT	SENT	NENT		
		6,577 tpd	6,211 tpd	2,252 tpd		
		(-0.6%)	(-23.3%)	(-23.9%)		
RTS	■	IETS (1)	IWTS (1)	WKTS (1)	OITF (1)	NLTS (1)
		860 tpd	497 tpd	2,064 tpd	89 tpd (2)	152 tpd
		(-0.3%)	(+2.3%)	(+0.6%)	(+1.1%)	(+2.7%)
		KBTS (3)	STTS (4)	NWNTRTS (5)		
		0 tpd	972 tpd	831 tpd		
		(closed)	(+6.8%)	(+7.3%)		
CWTC	○	129 tpd				
		(+25.6%)				

Remarks:
Figures may not add up to total due to rounding off.
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 construction waste received by OITF (116 tpd).
(3) KBTS was temporarily closed in April 2005 and is converted to a waste recycling centre.
(4) Waste from 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 2006

Disposal facilities	Average daily waste intake by waste type in 2006(tpd)				
	MSW		Landfilled construction waste	Special waste	Total
	Public[1]	Private[2]			
KBTS - Kowloon Bay Transfer Station [8]	-	-	-	-	0
IETS - Island East Transfer Station [4]	763	97	-	-	860
STTS - Sha Tin Transfer Station [3]	972	-	-	-	972
IWTS - Island West Transfer Station [4]	430	67	-	-	497
WKTS - West Kowloon Transfer Station [4]	1,893	171	-	-	2,064
OITF - Outlying Islands Transfer Facilities[4]	81	5	-	3	89 [5]
NLTS - North Lantau Transfer Stations [4]	59	93	-	1	152
NWNTRTS-North West New Territories Refuse Transfer Station [6]	804	27	-	-	831
WENT - West New Territories Landfill	4,033 [7]	878 [7]	758	908 [7]	6,577 [7]
SENT - South East New Territories Landfill	192	2,448	3,089	482	6,211
NENT - North East New Territories Landfill	1,127 [7]	601	278	244	2,251 [7]
Sub-total	5,352	3,927	4,125	1,635	15,039
Total	9,279		4,125	1,635	15,039

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 STTS 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 construction waste received by OITF (116 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) KBTS was temporarily closed in April 2005 and is converted to a waste recycling centre.

Plate 2.6 Origin of solid waste by district in 2006

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	292	44	95	430	79	509
Wanchai	239	58	140	437	46	483
Eastern	394	81	126	600	59	660
Southern	252	14	62	328	54	382
Hong Kong Island Sub-total	**1,177**	**197**	**422**	**1,796**	**238**	**2,034**
Yau Tsim Mong	496	59	197	752	125	877
Sham Shui Po	264	77	161	503	77	580
Kowloon City	262	78	141	481	83	564
Wong Tai Sin	280	39	80	400	28	427
Kwun Tong	368	118	295	781	138	919
Kowloon Sub-total	**1,671**	**371**	**874**	**2,916**	**452**	**3,368**
Kwai Tsing	326	34	127	488	69	557
Tsuen Wan	231	94	171	496	61	557
Tuen Mun	347	29	202	578	624	1,203
Yuen Long	508	37	150	695	104	798
North	163	215	99	477	98	576
Tai Po	213	88	41	343	95	438
Sha Tin	380	98	193	671	116	787
Sai Kung	193	101	246	540	2,227	2,767
NT- Mainland Sub-total	**2,362**	**695**	**1,230**	**4,287**	**3,395**	**7,682**
Cheung Chau	31	-	-	-	-	-
Mui Wo	26	-	-	-	-	-
Peng Chau	6	-	-	-	-	-
Ma Wan	5	-	-	-	-	-
Lamma Island	10	-	-	-	-	-
Hei Ling Chau	4	-	-	-	-	-
North Lantau	60	-	-	-	-	-
NT-Outlying Islands Sub-total	**142[4]**	**19[5]**	**117[5]**	**278[5]**	**40[5]**	**318[5]**
Total	**5,352**	**1,283**	**2,643**	**9,277**	**4,125**	**13,402**

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.

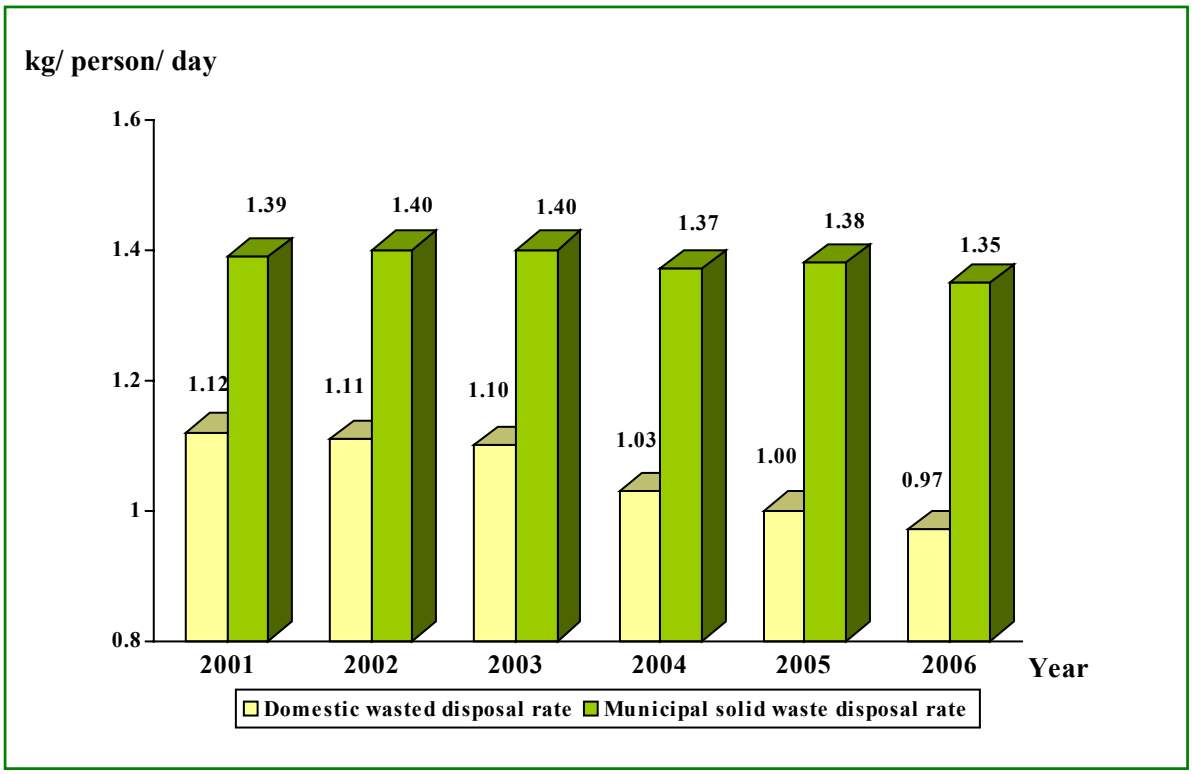
(2) Publicly collected domestic waste included public cleansing waste as well as some commercial and industrial waste.

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

(4) These islands/areas are combined 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 2001 – 2006



Remark: Mid-year population figure is used in the calculation of per capita disposal rate. As the mid-year population figures from 2001 to 2005 have been revised in the 2006 Population By-Census, it has caused the updated per capita disposal rate reported in this table to differ slightly from what has been reported in the previous " Monitoring of Solid Waste in Hong Kong".

Plate 2.8 Composition of municipal solid waste in 2006

	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)+(d)
Bulky waste	39 (0.6%)	71 (3.5%)	18 (3.1%)	89 (3.4%)	128 (1.4%)
Glass	225 (3.4%)	76 (3.7%)	5 (0.9%)	82 (3.1%)	307 (3.3%)
Metals	136 (2.1%)	53 (2.6%)	26 (4.4%)	79 (3.0%)	216 (2.3%)
Paper	1,740 (26.2%)	614 (29.8%)	55 (9.4%)	669 (25.3%)	2,408 (26.0%)
Plastics	1,227 (18.5%)	383 (18.6%)	98 (16.9%)	482 (18.2%)	1,709 (18.4%)
Putrescibles	2,884 (43.5%)	722 (35.0%)	50 (8.6%)	772 (29.2%)	3,656 (39.4%)
Textiles	219 (3.3%)	69 (3.3%)	60 (10.2%)	128 (4.8%)	347 (3.7%)
Wood/ Rattan	44 (0.7%)	45 (2.2%)	236 (40.4%)	281 (10.6%)	325 (3.5%)
Household Hazardous Wastes (HHWs) (1)	63 (1.0%)	9 (0.4%)	1 (0.2%)	10 (0.4%)	73 (0.8%)
Others	57 (0.9%)	18 (0.9%)	34 (5.8%)	52 (2.0%)	109 (1.2%)
Total	6,634	2,062	583	2,645	9,279
	(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 2006

Waste Type	Domestic Waste		C&I Waste	
	Quantity (tpd)	% by weight	Quantity (tpd)	% by weight
Glass				
- Clear Glass Bottles	102	(1.5%)	32	(1.2%)
- Brown Glass Bottles	23	(0.3%)	11	(0.4%)
- Green Glass Bottles	38	(0.6%)	23	(0.9%)
- Other Glass	63	(1.0%)	16	(0.6%)
(Glass) Sub-total	225	(3.4%)	82	(3.1%)
Metals				
- Ferrous Metals	104	(1.6%)	61	(2.3%)
- Aluminium Cans	16	(0.2%)	12	(0.4%)
- Other Non-ferrous Metals	16	(0.2%)	6	(0.2%)
(Metals) Sub-total	136	(2.1%)	79	(3.0%)
Paper				
- Cardboard	228	(3.4%)	137	(5.2%)
- Newsprint	659	(9.9%)	134	(5.1%)
- Office Paper	99	(1.5%)	52	(2.0%)
- Others [(1)]	754	(11.4%)	346	(13.1%)
(Paper) Sub-total	1,740	(26.2%)	669	(25.3%)
Plastics				
- Clear Plastic Bags	45	(0.7%)	29	(1.1%)
- Colour Bags (white, red, yellow, etc)	656	(9.9%)	162	(6.1%)
- Polyfoam-Dining Ware	78	(1.2%)	19	(0.7%)
- Polyfoam-Others	24	(0.4%)	14	(0.5%)
- PET Bottles	40	(0.6%)	20	(0.8%)
- Other Plastic Bottles	74	(1.1%)	15	(0.6%)
- Off-cuts & Scrap	0	(0.0%)	1	(0.04%)
- Others [(2)]	310	(4.7%)	221	(8.3%)
(Plastics) Sub-total	1,227	(18.5%)	482	(18.2%)
Putrescibles				
- Food Waste	2,473	(37.3%)	727	(27.5%)
- Yard Waste	57	(0.9%)	26	(1.0%)
- Others [(3)]	355	(5.3%)	20	(0.7%)
(Putrescibles) Sub-total	2,844	(43.5%)	772	(29.2%)

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

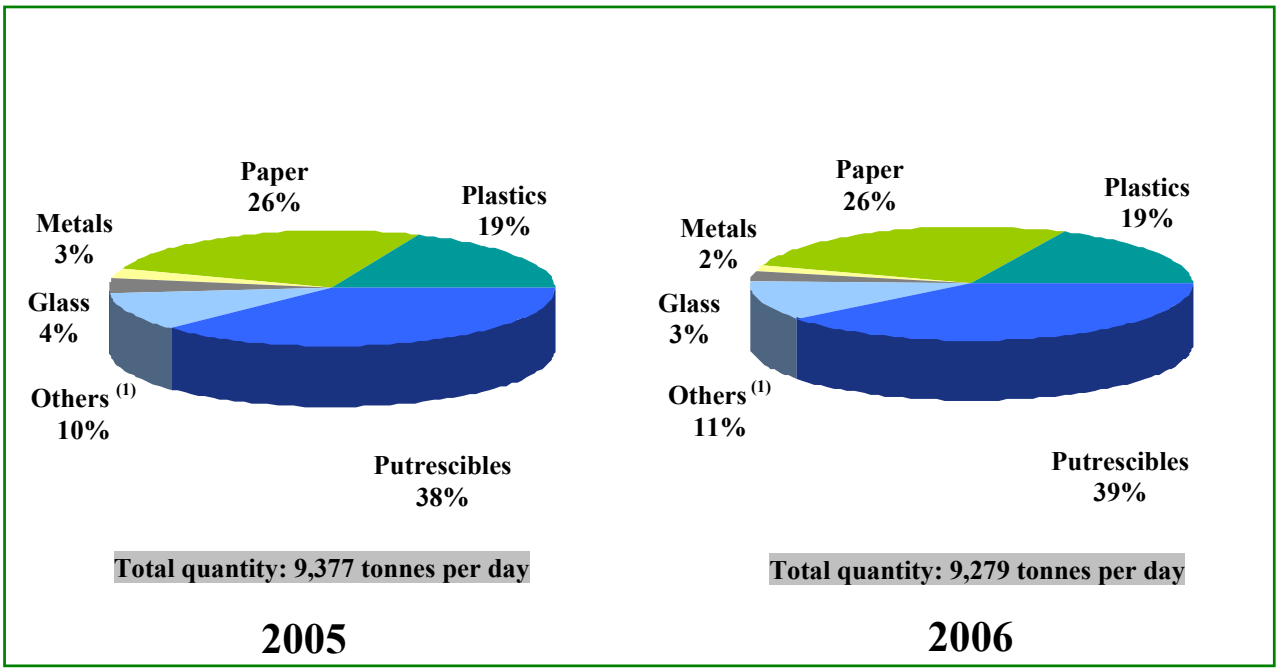
Notes:

(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.

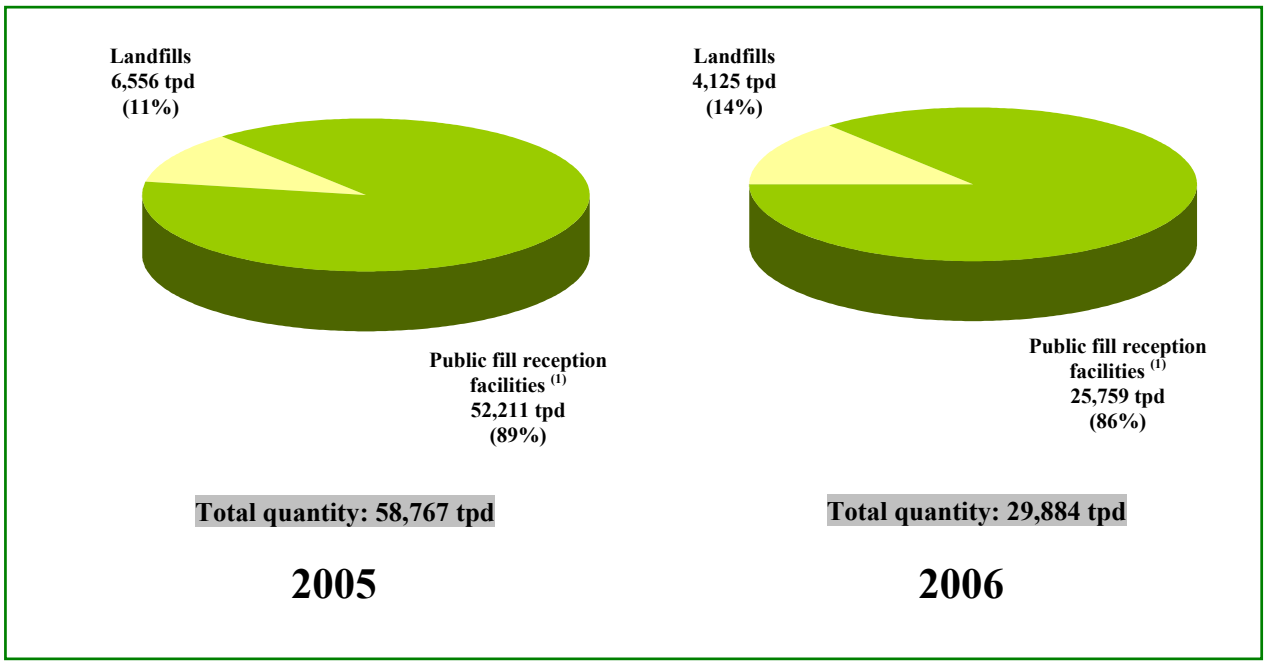
Plate 2.10 Municipal solid waste by waste type in 2005 & 2006



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 2005 & 2006



Note:

(1) Include direct on-site re-use.

Plate 2.12 Disposal of special and other waste by type in 2006

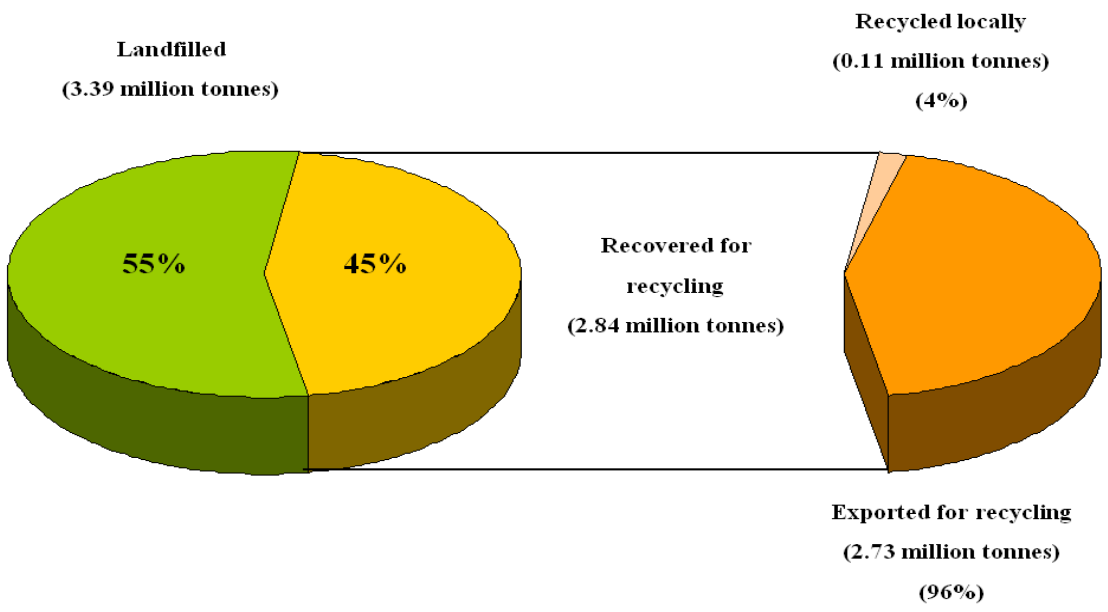
Waste type	Disposal method	Quantity disposed of (tpd)
Special Waste		
Abattoir waste	Landfilling	15
Animal carcasses and kennel waste	Landfilling	19
Asbestos waste	Co-disposal at landfills (1)	4
Chemical waste other than asbestos waste	Co-disposal at landfills (1)	10
Clinical waste	Co-disposal at landfills (1)	5
Condemned goods	Landfilling	14
CWTC stabilised residue	Landfilling	20
Dewatered dredged materials	Landfilling	0
Dewatered sewage sludge	Landfilling	893
Dewatered waterworks sludge	Landfilling	13
Grease trap waste	Co-disposal at landfill (2)	428(3)
Livestock waste	Landfilling (4)	131
Sewage works screenings	Landfilling	61
Waste tyres (5)	Landfilling	20
Other Waste		
Chemical waste other than asbestos waste	CWTC	129
Dredged mud and Excavated materials (6)	Marine dumping	25,205
Furnace bottom ash	Concrete manufacturing, stored in lagoon(7)	200
Livestock waste	Composting and other environmentally acceptable means (8)	640
Pulverised fuel ash	Concrete manufacturing, stored in lagoon(7)	1,579

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 2005 & 2006



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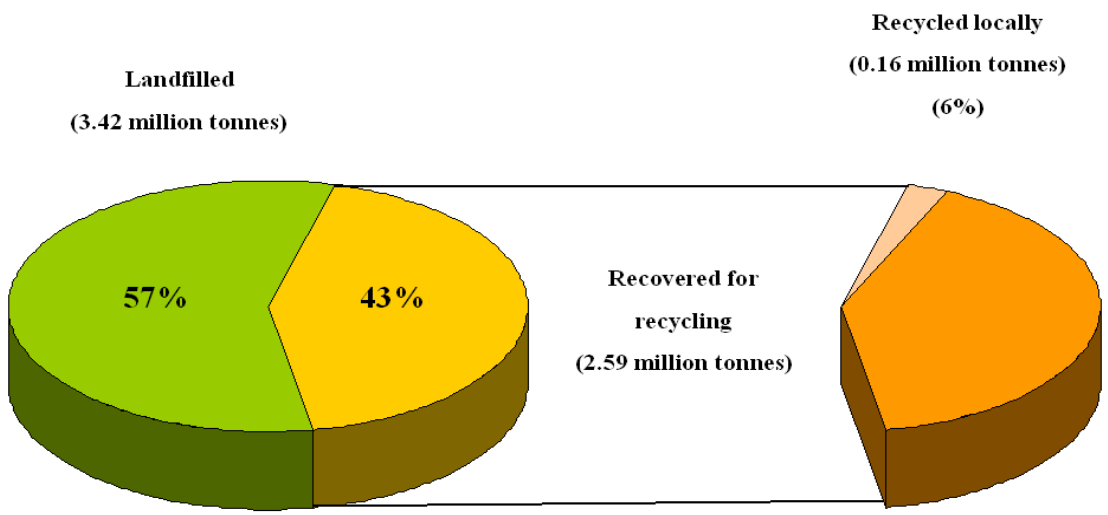

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Plate 3.2 Municipal solid waste recovery rates in 2001 – 2006

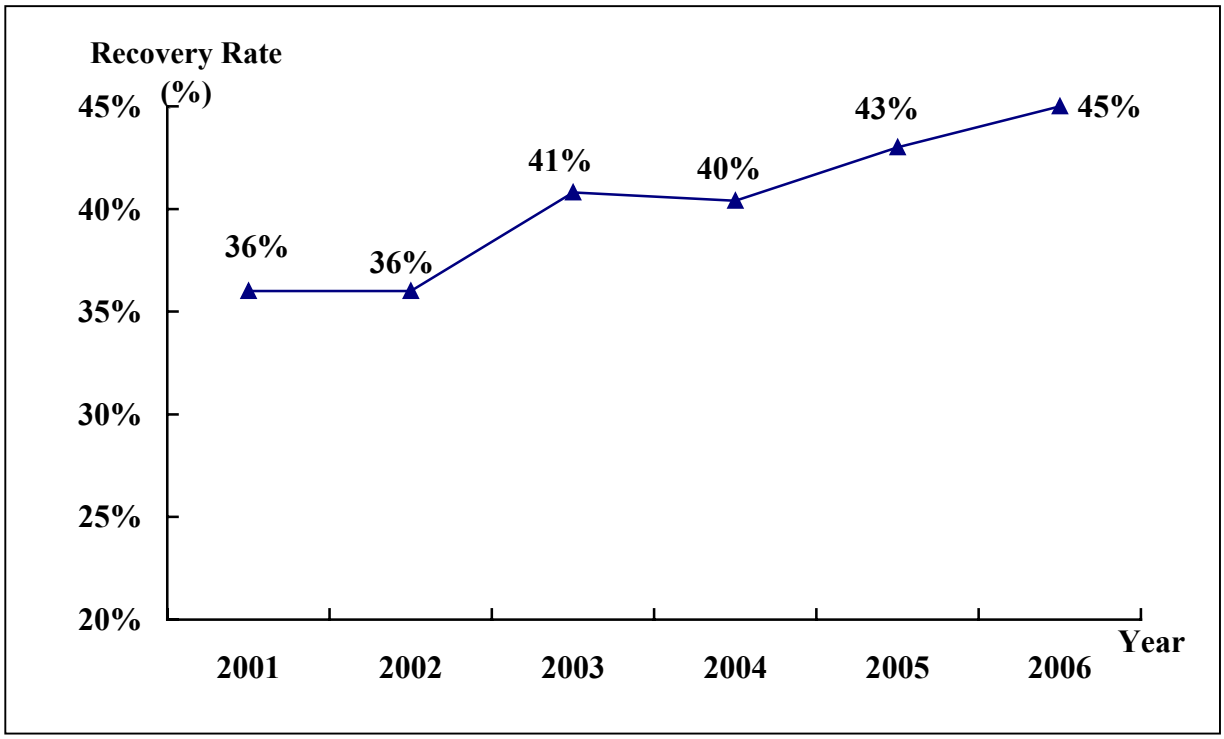


Plate 3.3 Recovered recyclable materials by type in 2006

Waste Type	Quantity of recovered recyclable materials (thousand tonnes)		
	Exported for Recycling (a)	Recycled Locally (b)	Total recovered for recycling (c) = (a) + (b)
Paper	934	69	1,003
Plastics	640	6	646
Ferrous metals	923	0	923
Non-ferrous metals	135	5	140
Glass	0 (1)	3 (2)	3
Rubber tyres	0	22 (3)	22
Textiles	24	3	26
Wood	18	1	19
Electrical and electronic equipment	52	6	58
Total	2,727	114	2,841

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

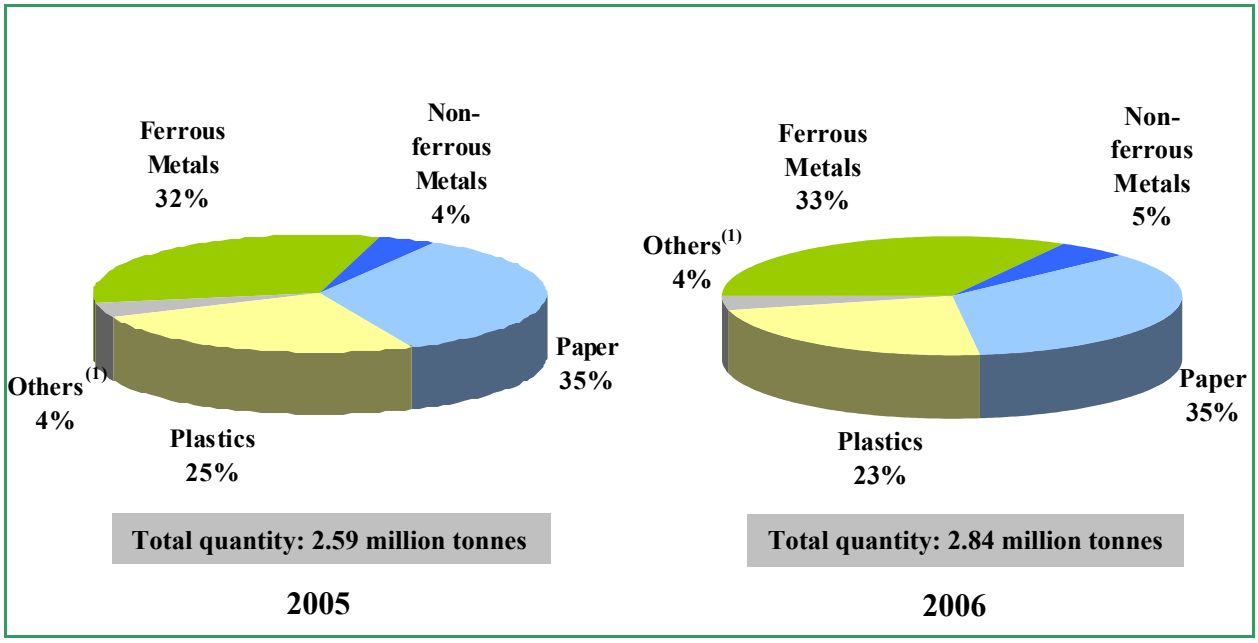
Notes:

(1) Figure round off to nearest 1.

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

(3) Quantity includes reuse, retreading and recycling of vehicle tyres and retreading of aircraft tyres in Hong Kong.

Plate 3.4 Recovered recyclable materials by type in 2005 & 2006



Note:
(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 2001 – 2006

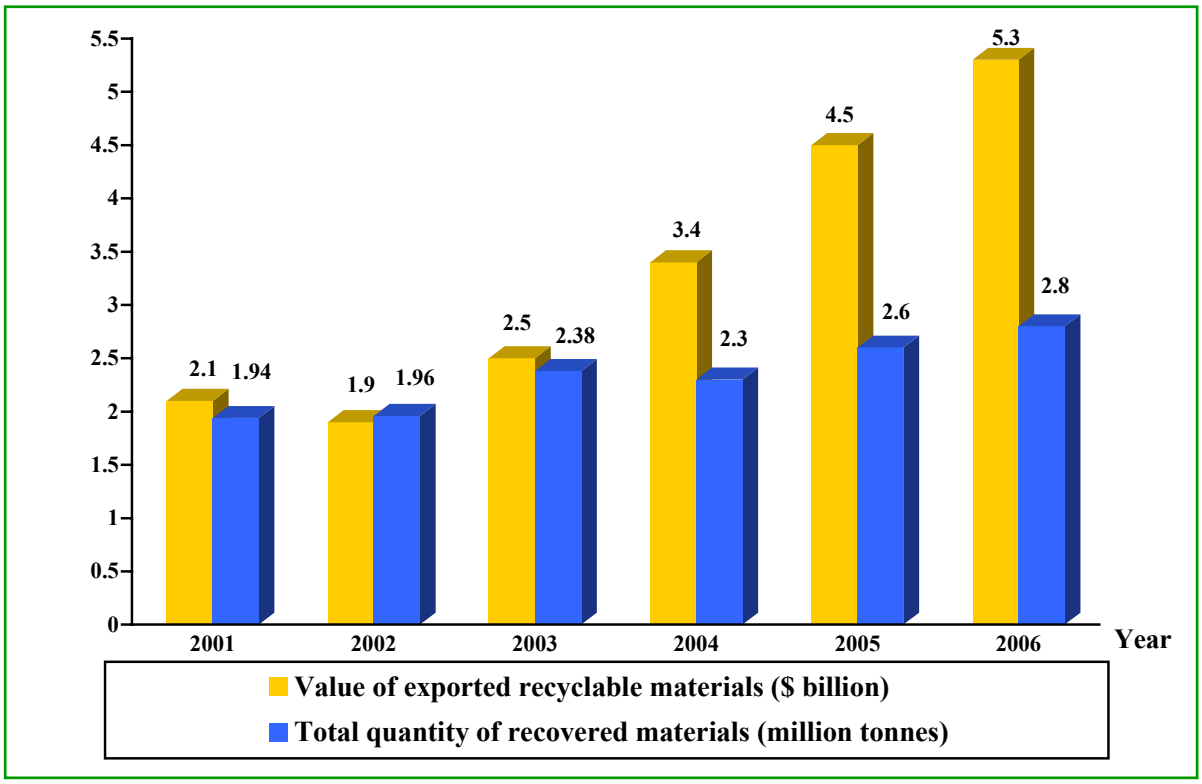
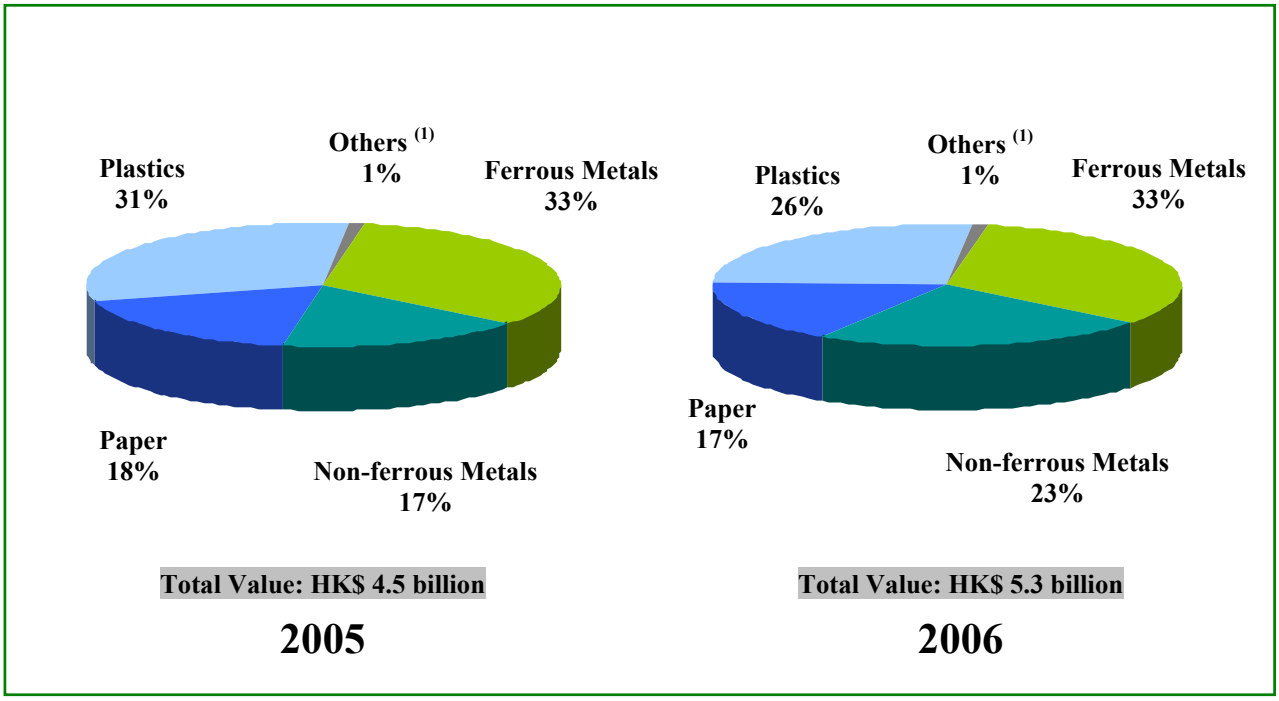


Plate 3.6 Value of exported recyclable materials in 2005 & 2006



Note:
(1) "Others" include glass, wood and textiles.

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	24,300	228,631	9,409
~ pig or cast iron	227	380	1,671
~ tinplate	24	36	1,520
~ other scraps	898,834	1,517,747	1,689
Sub-total:	**923,385**	**1,746,794**	**1,892**
b. Non-ferrous metals			
~ aluminium	57,409	247,003	4,302
~ copper & alloys	77,207	861,713	11,161
~ lead	163	268	1,640
~ metal ash & residues	0	0	0
~ nickel	8	551	68,875
~ precious metal (without scrap gold)	72	82,565	1,143,544
~ tin	0	0	0
~ zinc	24	136	5,624
Sub-total:	**134,884**	**1,192,236**	**8,839**
c. Plastics			
~ polyethylene	115,011	322,689	2,806
~ polystyrene & copolymers	18,846	49,627	2,633
~ polyvinyl chloride	47,384	88,868	1,877
~ others	459,093	907,460	1,977
Sub-total:	**640,298**	**1,368,644**	**2,138**
d. Textiles			
~ cotton	9,100	20,634	2,268
~ man-made fibres	0	0	0
~ old clothing & other textile articles, rags, etc.	14,470	34,873	2,410
Sub-total:	**23,570**	**55,507**	**2,355**
e. Wood & paper			
~paper	934,041	911,602	976
~wood (include sawdust)	18,380	18,551	1,009
Sub-total:	**952,421**	**930,153**	**977**
f. Glass	**2.6**	**11**	**4,231**
g. Electrical & Electronic equipment	**52,133**	**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 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.

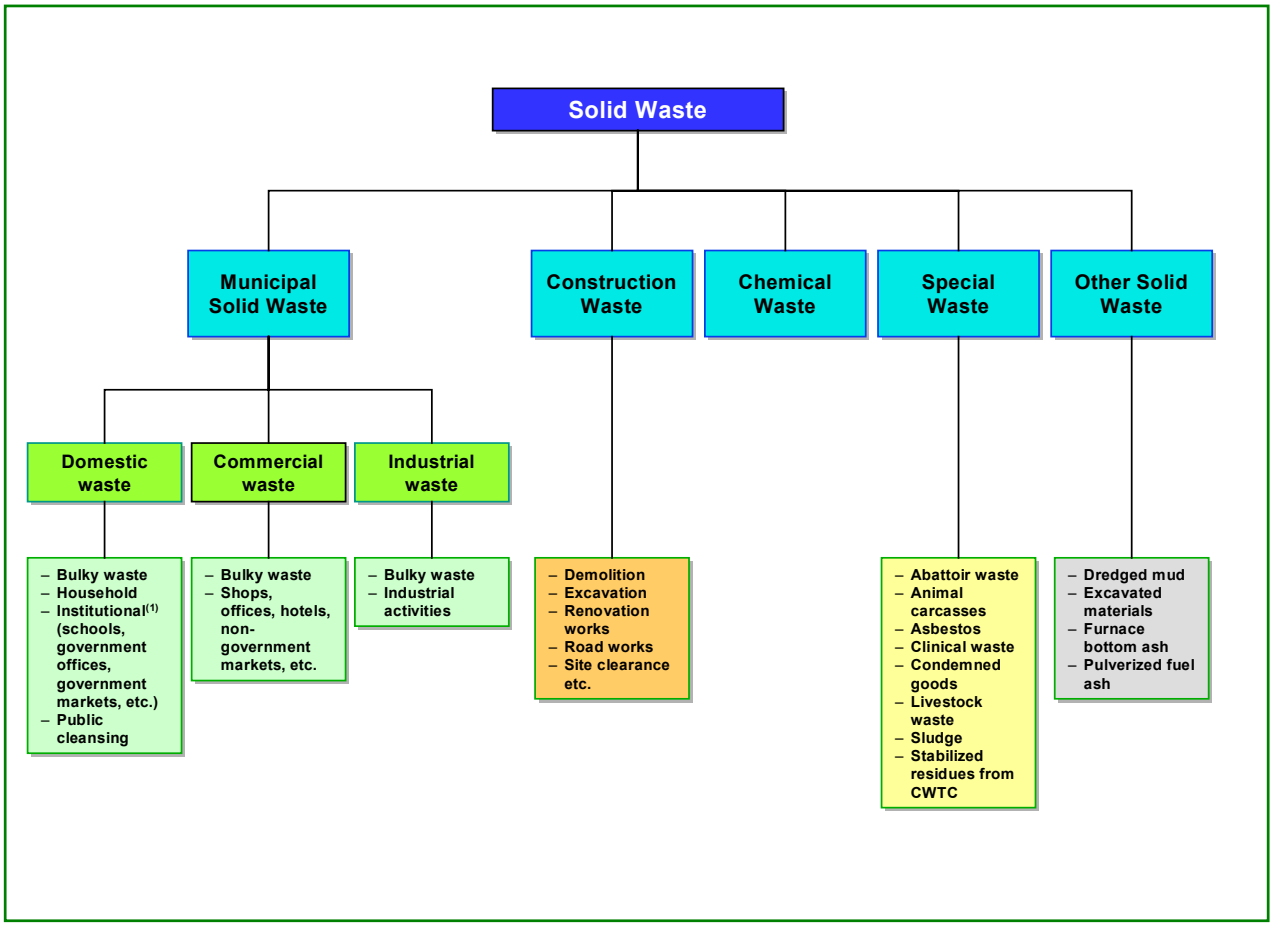
Construction waste (previously known as construction & demolition waste) is a mixture of surplus materials arising from site clearance, excavation, construction, refurbishment, renovation, demolition and road works. Over 80% of construction wastes are inert, which include debris, rubble, earth and concrete, 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 2006 at landfills and RTS;
- Results of waste recovery survey conducted in December 2006 – January 2007 by MVA Hong Kong Ltd.;
- Monthly statistics provided by other departments including FEHD, CEDD and C&SD; and
- Statistics on special and other wastes (Plate 2.12) provided by relevant specialist groups of EPD and concerned government departments.