MONITORING OF SOLID WASTE IN HONG KONG

Waste Statistics for 2007

Environmental Protection Department

Monitoring of Solid Waste in Hong Kong
Waste Statistics for 2007

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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
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
PET	Polyethylene Terephthalate
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 2007. It aims to provide 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, and the classification of solid waste and the methodology adopted in 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 Disposal of solid waste at landfills in 2007

Waste type[1]	Average daily quantity (tpd)			Change from 2006	
	Public[2]	Private[3]	Total	Quantity (tpd)	Percentage
a. Domestic waste					
– waste from household, public cleansing	5,237	1,093	6,331		
– bulky waste[4]	2	40	42		
Sub-total	**5,239**	**1,133**	**6,372**	**-262**	**-3.9%**
b. Commercial waste					
– mixed waste from commercial activities	-	2,117	2,117		
– bulky waste[4]	-	73	73		
Sub-total	**-**	**2,190**	**2,190**	**128**	**6.2%**
c. Industrial waste					
– mixed waste from industrial activities[5]	-	602	602		
– bulky waste[4]	-	20	20		
Sub-total	**-**	**622**	**622**	**38**	**6.5%**
d. Municipal solid waste[5] (a+b+c)	5,239	3,945	9,184	-96	-1.0%
e. Overall construction waste[6]	-	3,158	3,158	-967	-23.4%
f. Special waste[7]	966	594	1,559	-75	-4.6%
g. All waste received at landfills (d+e+f) Total	**6,205**	**7,697**	**13,901**	**1,138**	**-7.6%**

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

Notes:

(1) 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.

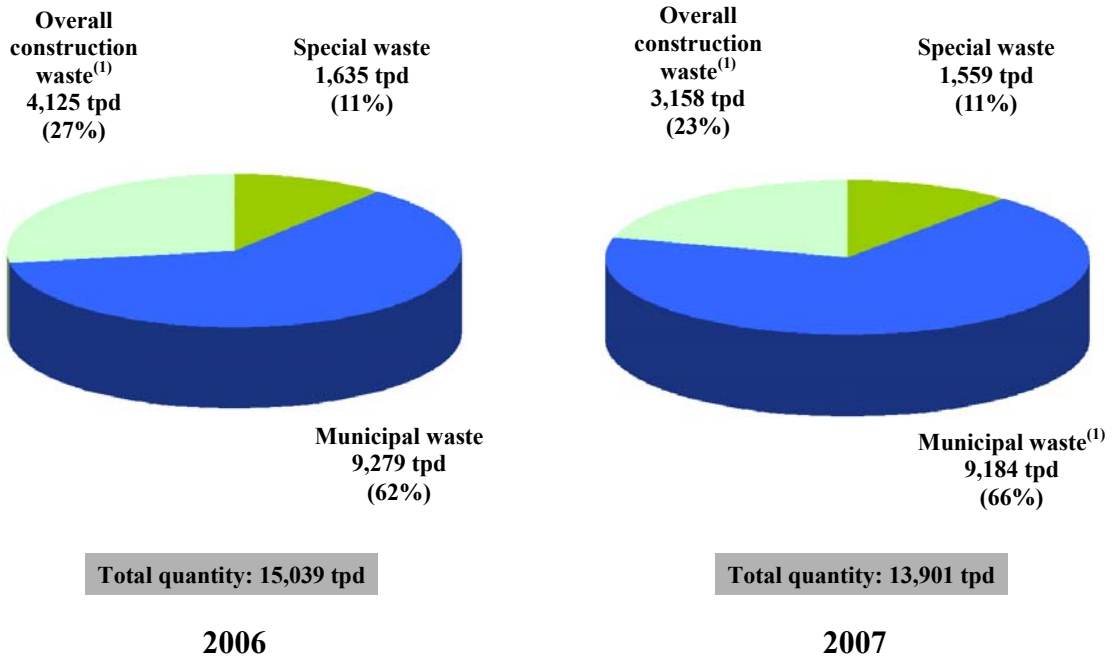
(4) Bulky items like furniture and domestic appliances which cannot be handled by conventional compactor type refuse collection vehicles are usually collected separately. The quantity reported here includes only the bulky waste delivered to landfills by waste collectors directly.

(5) Waste concrete delivered to landfills as industrial waste since 2007 was re-grouped under overall construction waste. Its corresponding quantities have been deducted from municipal solid waste.

(6) The quantity does not include construction waste that is reused or disposed of at other outlets.

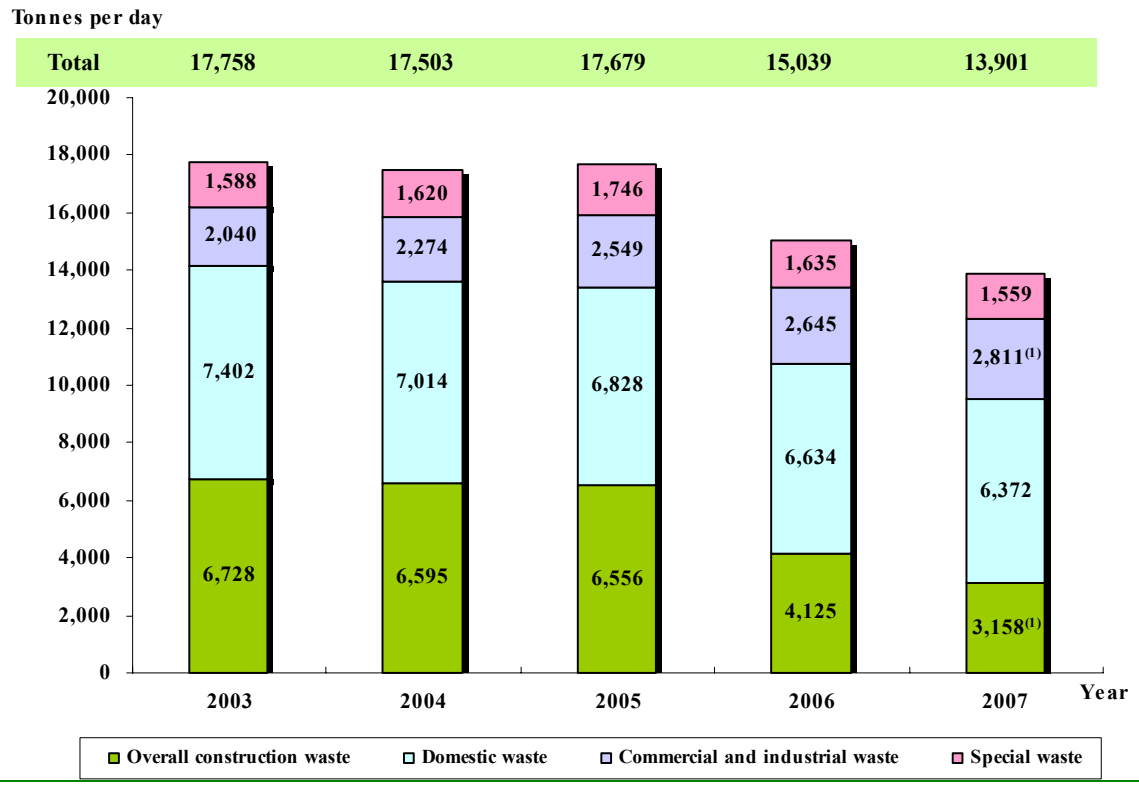
(7) The quantity does not include special waste that is treated or disposed of at other outlets.

Plate 2.2 Disposal of solid waste at landfills in 2006 and 2007



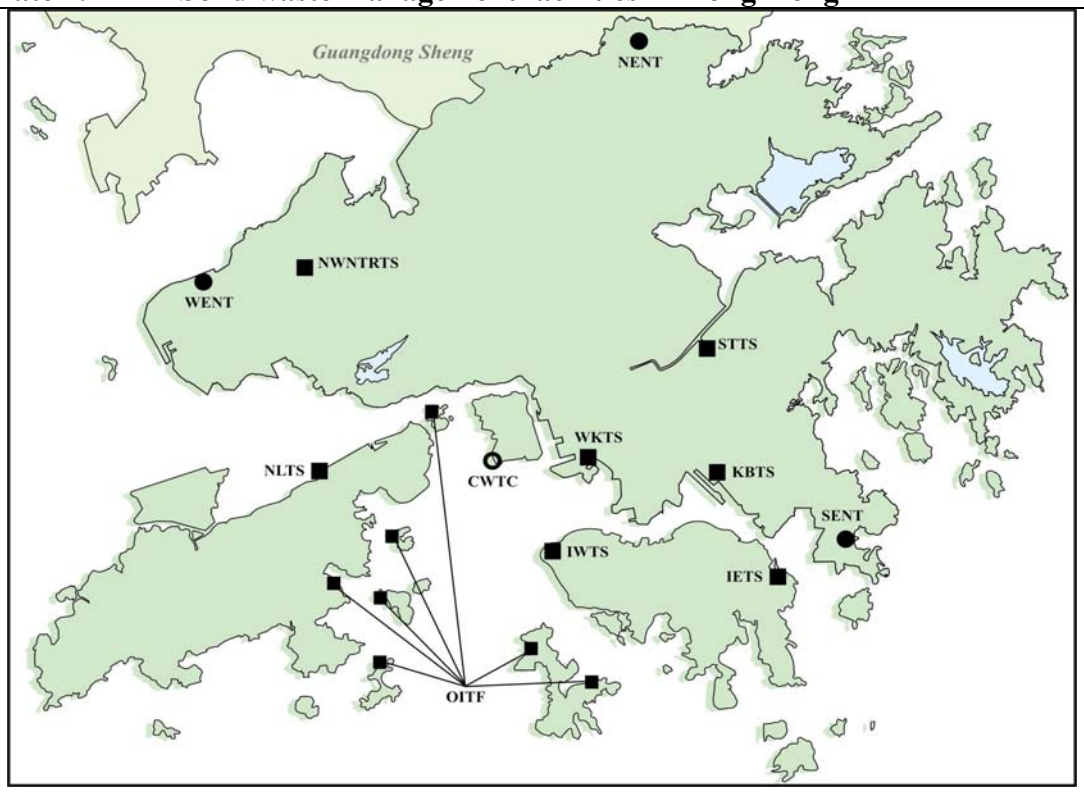
Note: (1) Waste concrete delivered to landfills as industrial waste since 2007 was re-grouped under overall construction waste. Its corresponding quantities have been deducted from municipal solid waste.

Plate 2.3 Disposal of solid waste at landfills in 2003 – 2007



Note: (1) Waste concrete delivered to landfills as industrial waste since 2007 was re-grouped under overall construction waste. Its corresponding quantities have been deducted from commercial and industrial waste.

Plate 2.4 Solid waste management facilities in Hong Kong



Landfill ●
- WENT - West New Territories Landfill
- SENT - South East New Territories Landfill
- NENT - North East New Territories Landfill

RTS ■
- IETS - Island East Transfer Station(1)
- IWTS - Island West Transfer Station(1)
- WKTS - West Kowloon Transfer Station(1)
- OITF - Outlying Islands Transfer Facilities(1)
- NLTS - North Lantau Transfer Station(1)
- STTS - Sha Tin Transfer Station(2)
- NWNTRTS - North West New Territories Refuse Transfer Station(3)
- KBTS - Kowloon Bay Transfer Station(4)

○ CWTC - Chemical Waste Treatment Centre

Notes:
(1) Waste from IETS, IWTS, WKTS, OITF and NLTS was transferred to WENT by sea.
(2) Waste from STTS was transferred to NENT by road.
(3) Waste from NWNTRTS was transferred to WENT by road.
(4) KBTS was temporarily closed in April 2005 and converted to a waste recycling centre.

Plate 2.5 Solid waste delivered to waste facilities in 2007

Disposal facility	Average daily quantity (tpd)				
	MSW		Overall construction waste	Special waste	Total
	Public[1]	Private[2]			
IETS - Island East Transfer Station	739	95	-	-	834
STTS - Sha Tin Transfer Station	942	-	-	-	942
IWTS - Island West Transfer Station	431	69	-	-	500
WKTS - West Kowloon Transfer Station	1,857	221	-	-	2,078
OITF - Outlying Islands Transfer Facilities	78	6	-	3	87[3]
NLTS - North Lantau Transfer Station	61	104	-	1	165
NWNTRTS - North West New Territories Refuse Transfer Station	808	39	-	-	847
WENT - West New Territories Landfill	3,954[4]	938[4]	487	887[4]	6,265[4]
SENT - South East New Territories Landfill	181	2,367	2,369	469	5,386
NENT - North East New Territories Landfill	1,103[4]	640	303	204	2,250[4]
Sub-total	5,239	3,945	3,158	1,559	13,901
Total	9,184		3,158	1,559	13,901

Remark: Figures may not add up to total due to rounding off. Please refer to Plate 2.12 for solid waste delivered to waste facilities other than landfills and RTS.

Notes:

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

(2) Waste collected by private waste collectors.

(3) The quantity does not include construction waste received by OITF (85 tpd).

(4) The quantity includes the waste transferred from the RTS.

Plate 2.6 Arisings of solid waste by district in 2007

District	Average daily quantity[1] (tpd)					
	Domestic waste		C&I waste	Municipal solid waste	Overall construction waste	Total[4]
	Public[2] (a)	Private[3] (b)	(c)	(d) =(a)+(b)+(c)	(e)	(f) =(d)+(e)
Central & Western	295	27	100	421	39	461
Wanchai	260	42	154	456	31	486
Eastern	371	53	119	543	50	593
Southern	244	15	65	325	35	360
Hong Kong Island Sub-total	1,170	138	438	1,745	155	1,900
Yau Tsim Mong	476	58	192	726	97	823
Sham Shui Po	277	76	203	556	45	601
Kowloon City	251	76	148	475	78	553
Wong Tai Sin	268	40	101	409	24	434
Kwun Tong	359	118	254	731	198	929
Kowloon Sub-total	1,632	367	899	2,898	442	3,340
Kwai Tsing	321	25	146	491	68	559
Tsuen Wan	227	58	136	422	44	466
Tuen Mun	338	28	216	582	340	922
Yuen Long	499	33	178	711	83	793
North	160	237	138	534	77	611
Tai Po	207	66	54	326	71	397
Sha Tin	375	78	184	636	108	744
Sai Kung	184	88	282	555	1,707	2,262
NT- Mainland Sub-total	2,310	613	1,333	4,257	2,497	6,754
Cheung Chau	27	-	-	-	-	-
Mui Wo	22	-	-	-	-	-
Peng Chau	6	-	-	-	-	-
Ma Wan	5	-	-	-	-	-
Lamma Island	9	-	-	-	-	-
Hei Ling Chau	4	-	-	-	-	-
North Lantau	56	-	-	-	-	-
NT-Outlying Islands Sub-total	127	16[5]	142[5]	284[5]	64[5]	348[5]
Total	5,239	1,133	2,811	9,184	3,158	12,342

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

Notes:

(1) The geographical distribution of solid waste arisings is estimated from weighbridge records at waste facilities and should be regarded as indicative reference only.

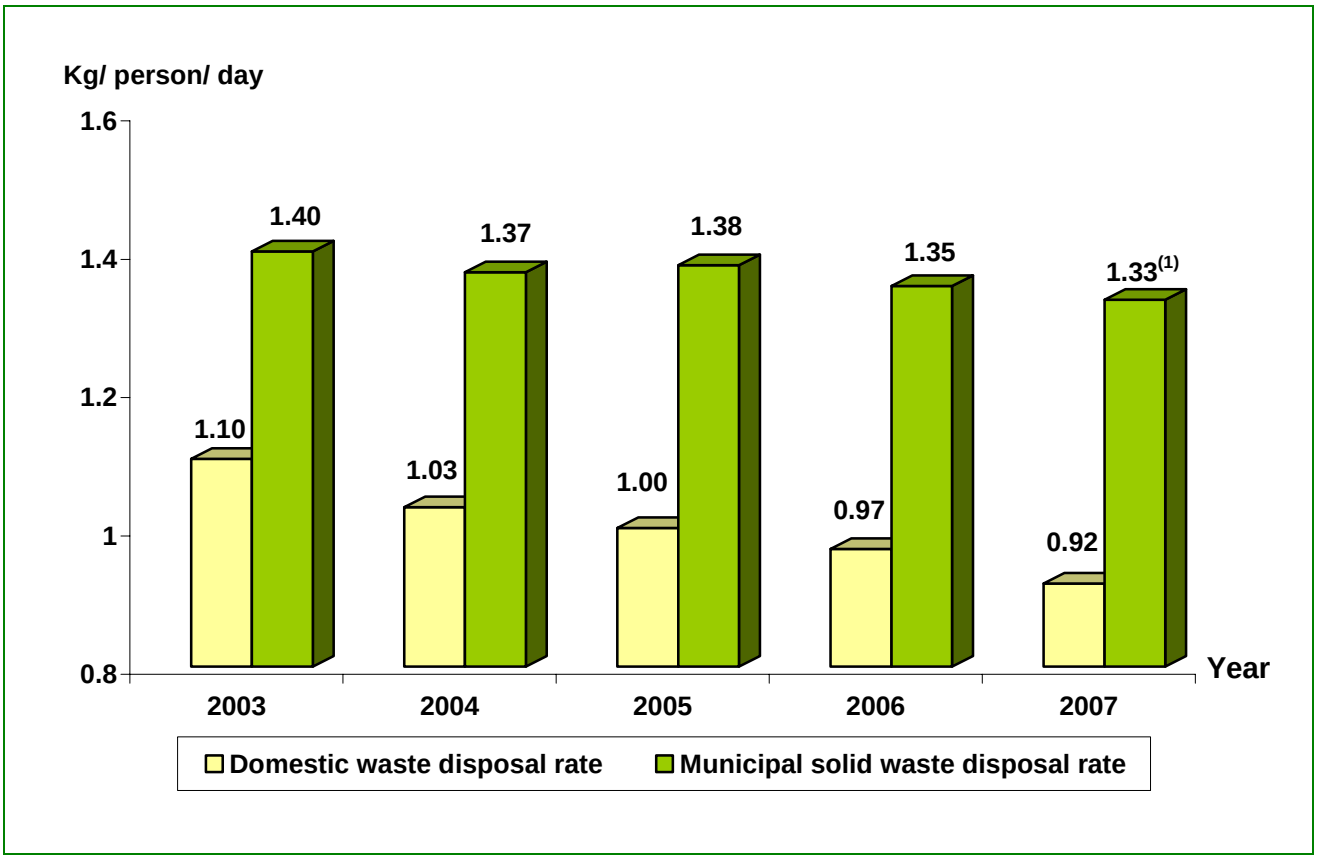
(2) Waste collected by the FEHD, FEHD contractors and other government vehicles, including public cleansing waste.

(3) Waste collected by private waste collectors

(4) Special waste is not included.

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

Plate 2.7 Per capita disposal rates of municipal solid waste and domestic waste in 2003 – 2007



Remark: Mid-year population figures are used in the calculation of per capita disposal rates. As the mid-year population figures from 2001 to 2005 have been revised in the 2006 Population By-Census, the per capita disposal rates reported in this table have been updated and differ slightly from the corresponding figures in previous reports.

Note:

(1) The waste concrete delivered to landfills as industrial waste since 2007 was re-grouped under overall construction waste. Its corresponding quantities have been deducted from municipal solid waste, and the associated per capita disposal rate in 2007 has been updated accordingly.

Plate 2.8 Composition of municipal solid waste in 2007

Composition	Average daily 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	42 (0.7%)	73 (3.3%)	20 (3.2%)	93 (3.3%)	135 (1.5%)
Glass	309 (4.9%)	43 (2.0%)	11 (1.7%)	54 (1.9%)	363 (4.0%)
Metals	128 (2.0%)	50 (2.3%)	10 (1.7%)	61 (2.2%)	189 (2.1%)
Paper	1,614 (25.3%)	690 (31.5%)	61 (9.8%)	751 (26.7%)	2,365 (25.7%)
Plastics	1,104 (17.3%)	457 (20.9%)	95 (15.2%)	552 (19.6%)	1,656 (18.0%)
Putrescibles	2,808 (44.1%)	785 (35.9%)	73 (11.8%)	859 (30.5%)	3,666 (39.9%)
Textiles	149 (2.3%)	37 (1.7%)	44 (7.1%)	81 (2.9%)	229 (2.5%)
Wood	53 (0.8%)	15 (0.7%)	276 (44.3%)	291 (10.4%)	344 (3.7%)
Household hazardous wastes (HHWs)(1)	73 (1.1%)	6 (0.3%)	13 (2.1%)	19 (0.7%)	92 (1.0%)
Others	93 (1.5%)	33 (1.5%)	19 (3.1%)	52 (1.8%)	145 (1.6%)
Sub-total	6,372 (100%)	2,190 (100%)	622 (100%)	2,811 (100%)	9,184 (100%)

Remark: Figures denote quantities and percentages by wet weight, they 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 Composition of municipal solid waste in 2007 – Breakdown of major components

Composition	Domestic waste		Commercial & industrial waste	
	Quantity (tpd)	% by weight	Quantity (tpd)	% by weight
Glass				
- Glass bottles	215	(3.4%)	46	(1.6%)
- Other glass	94	(1.5%)	8	(0.3%)
(Glass) Sub-total	309	(4.9%)	54	(1.9%)
Metals				
- Ferrous metals	97	(1.5%)	45	(1.6%)
- Aluminium cans	16	(0.3%)	6	(0.2%)
- Other non-ferrous metals	15	(0.2%)	11	(0.4%)
(Metals) Sub-total	128	(2.0%)	61	(2.2%)
Paper				
- Cardboard	283	(4.4%)	152	(5.4%)
- Newsprint	632	(9.9%)	113	(4.0%)
- Office paper	84	(1.3%)	72	(2.6%)
- Others[(1)]	615	(9.7%)	414	(14.7%)
(Paper) Sub-total	1,614	(25.3%)	751	(26.7%)
Plastics				
- Plastic bags	602	(9.5%)	258	(9.2%)
- Polyfoam - dining wares	41	(0.6%)	28	(1.0%)
- Polyfoam - others	34	(0.5%)	18	(0.6%)
- PET plastic bottles	59	(0.9%)	25	(0.9%)
- Non-PET plastic bottles	56	(0.9%)	12	(0.4%)
- Others[(2)]	312	(4.9%)	210	(7.5%)
(Plastics) Sub-total	1,104	(17.3%)	552	(19.6%)
Putrescibles				
- Food waste	2,444	(38.4%)	823	(29.3%)
- Yard waste	72	(1.1%)	14	(0.5%)
- Others[(3)]	291	(4.6%)	21	(0.8%)
(Putrescibles) Sub-total	2,808	(44.1%)	859	(30.5%)

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

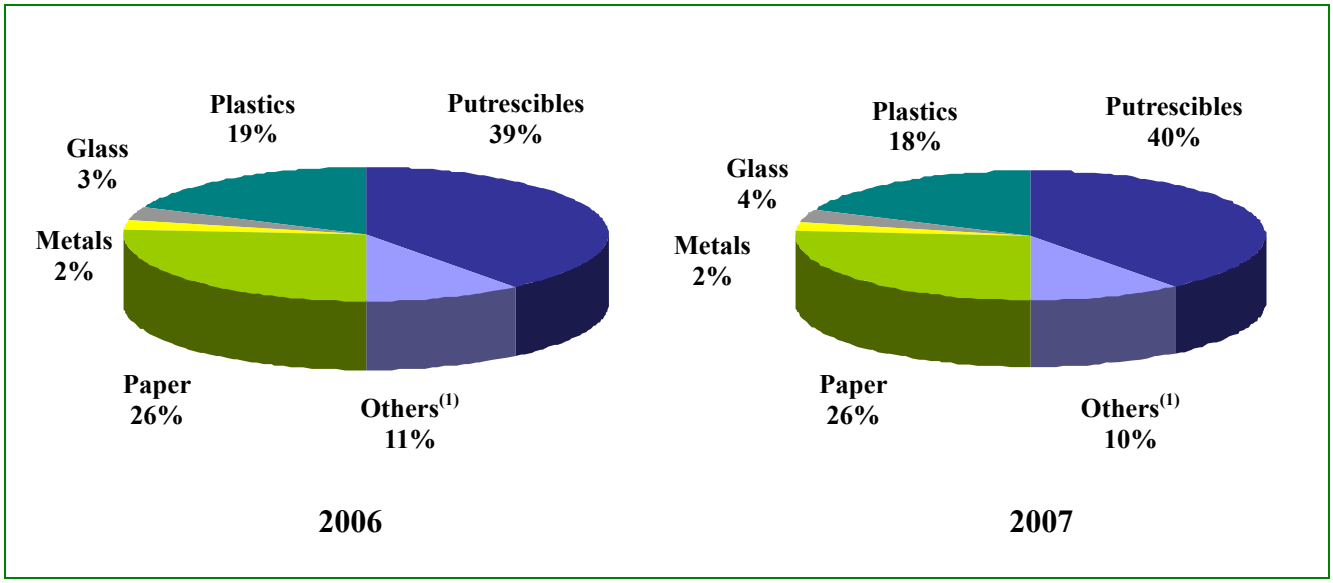
Notes:

(1) Other paper waste includes drink pack (tetrapak), tissue paper, etc.

(2) Other plastics waste includes household utensils, packaging materials, toys, off-cuts, scrap, etc.

(3) Other putrescible waste includes cotton balls, other organic waste, etc.

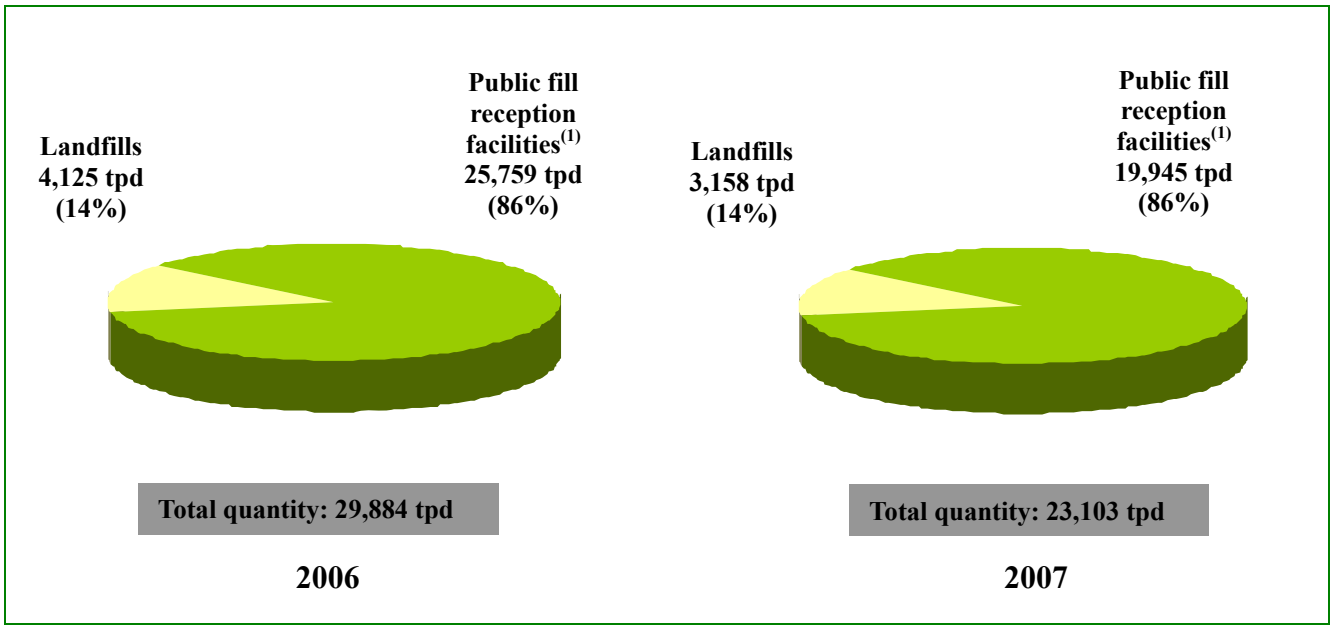
Plate 2.10 Composition of municipal solid waste in 2006 and 2007 – Major waste types



Notes:

(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 2006 and 2007



Note:

(1) Public fill reception facilities are managed by CEDD for receiving inert fill materials for reuse.

Plate 2.12 Disposal of special waste in 2007

Waste type	Disposal method	Average daily quantity[1] (tpd)
Abattoir waste	Landfill	13
Animal carcasses and kennel waste	Landfill	12
Asbestos waste	Landfill[2]	4
Chemical waste other than asbestos waste	Landfill[2]	7
Clinical waste	Landfill[2]	5
Condemned goods	Landfill	14
CWTC stabilised residue	Landfill	21
Dewatered dredged materials	Landfill	0
Dewatered sewage sludge	Landfill	871
Dewatered waterworks sludge	Landfill	14
Grease trap waste	Landfill[3]	448[4]
Livestock waste	Landfill[5]	80
Sewage works screenings	Landfill	59
Waste tyres	Landfill[6]	12
	Landfill sub-total	1,559
Chemical waste other than asbestos waste	CWTC	125
Dredged mud and excavated materials	Marine dumping	24,110[7]
Furnace bottom ash	Concrete manufacturing, stored in lagoon[8]	160
Livestock waste	Composting and other environmentally acceptable means[9]	361
Pulverised fuel ash	Concrete manufacturing, stored in lagoon[8]	1,444

Notes:

(1) Some types of special waste may not arise daily throughout the whole year. The average daily quantity is the total amount of waste generated in the year divided by the number of days in that year.

(2) Disposed of at SENT and WENT.
Disposed of at WENT after treatment.

(3) The figure is the quantity of grease trap waste received at WENT before processing in the Interim Grease Trap Waste Treatment Facility.

(4) Disposed of at WENT and NENT.

(5) Shredded or cut prior to disposal.

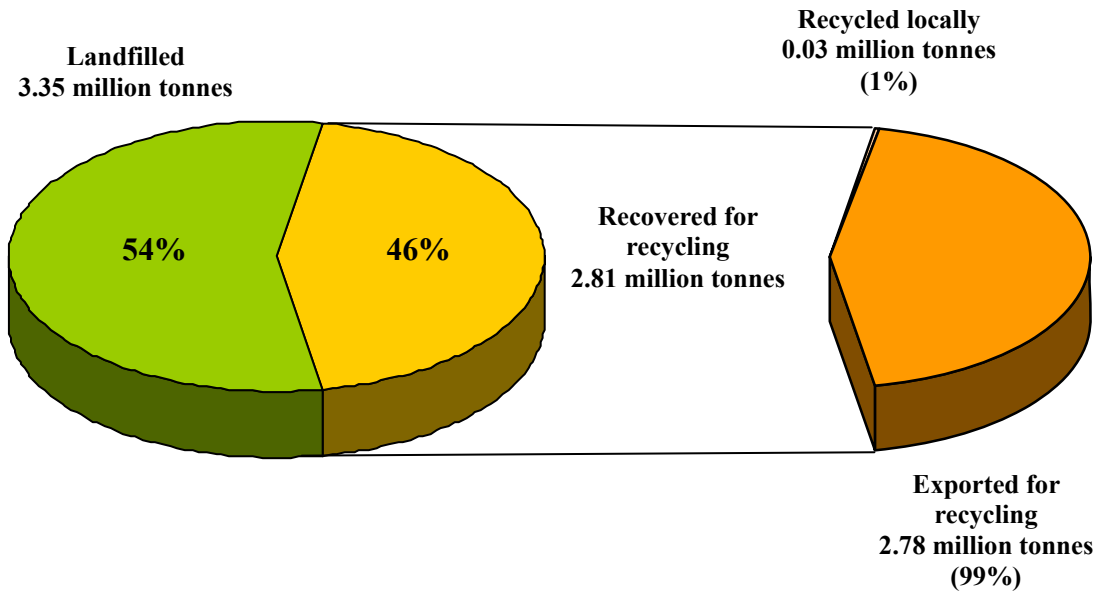
(6) Assuming the density of the dredged mud and excavated materials to be one tonne per cubic metre.

(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.

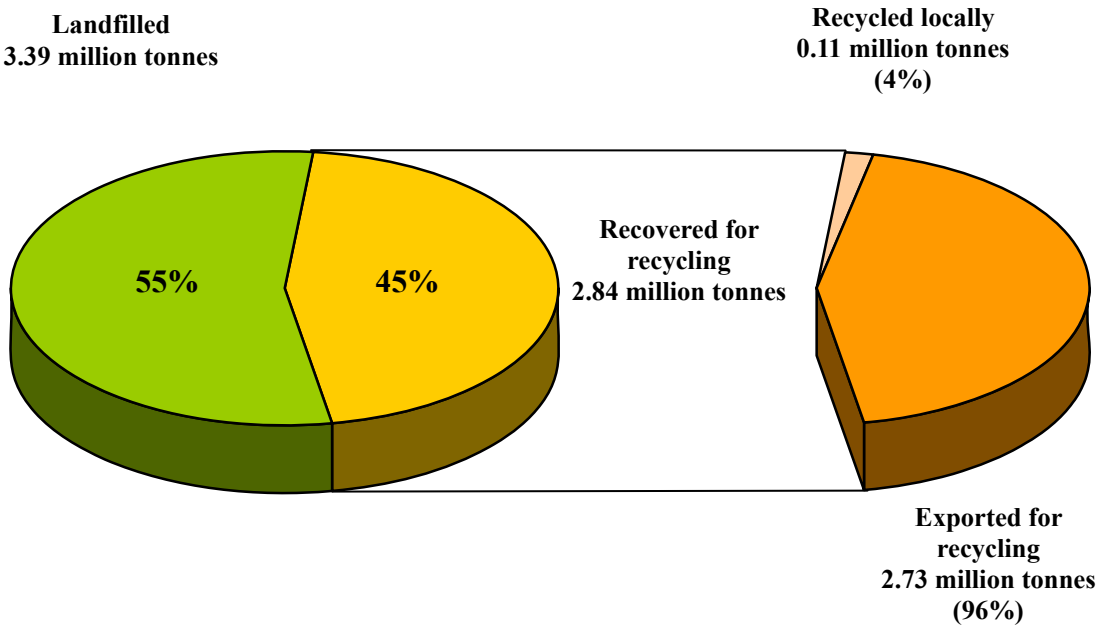
3. Waste Recovery and Recycling

Plate 3.1 Recovery of municipal solid waste in 2006 and 2007



2007

Remark: The waste concrete delivered to landfills as industrial waste since 2007 was regrouped under overall construction waste. Its corresponding quantities have been deducted from municipal solid waste.



2006

Plate 3.2 Municipal solid waste recovery rates in 2003 – 2007

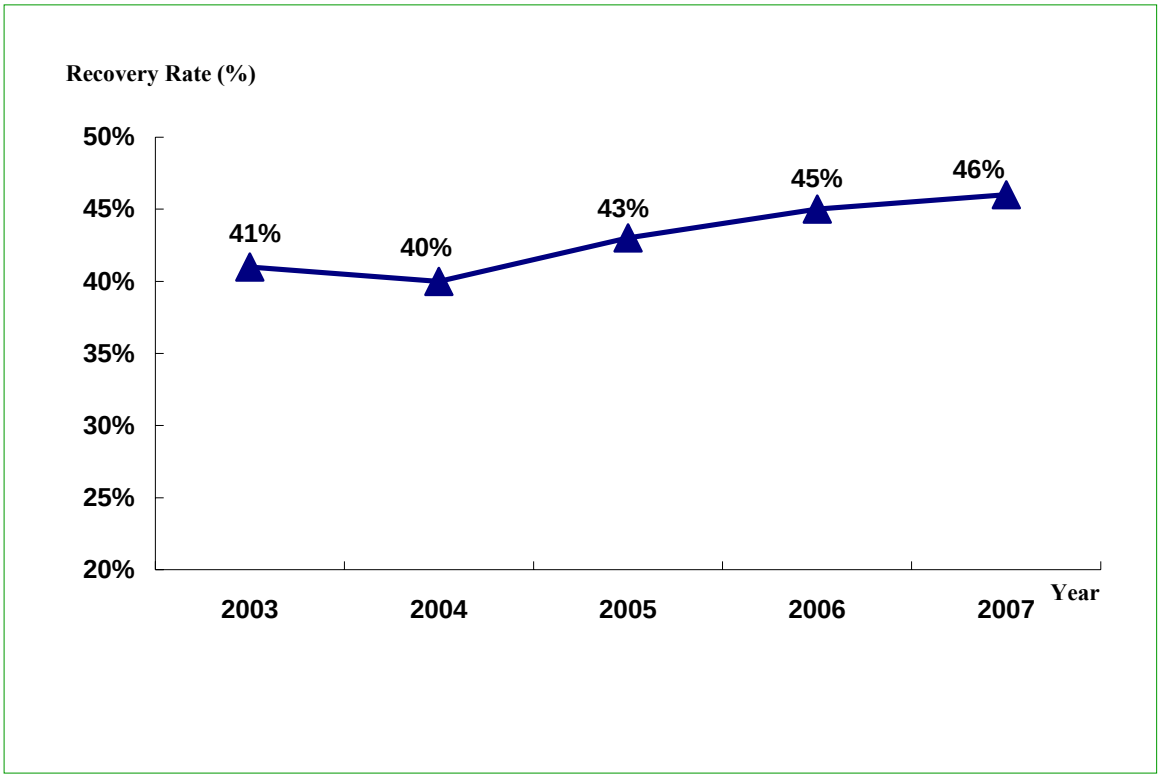


Plate 3.3 Recovered recyclable materials by type in 2007

Material type	Quantity of recovered recyclable materials (thousand tonnes)[1]		
	Exported for recycling (a)	Recycled locally (b)	Total recovered for recycling (c) = (a) + (b)
Paper	1,102	0	1,102
Plastics	818	2	820
Ferrous metals	594	0	594
Non-ferrous metals	181	6	187
Glass	0	1[2]	1
Rubber tyres	0	13[3]	13
Textiles	15	0	15
Wood	20	1	21
Electrical and electronic equipment	53	6	59
Total	2,782	29	2,811

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

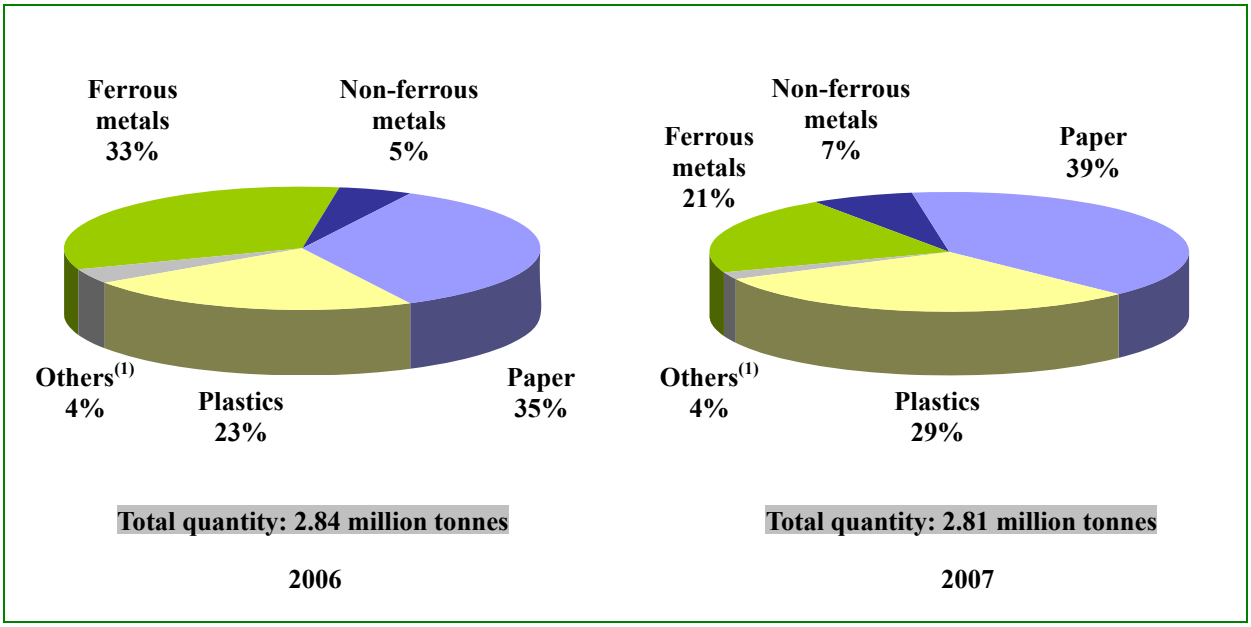
Notes:

(1) Figures are rounded off to the nearest thousand tonne.

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

(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 2006 and 2007



Note:
(1) Others include glass, wood, rubber tyres, textiles, and WEEE.

Plate 3.5 Total quantities and export values of recovered recyclable materials in 2003 – 2007

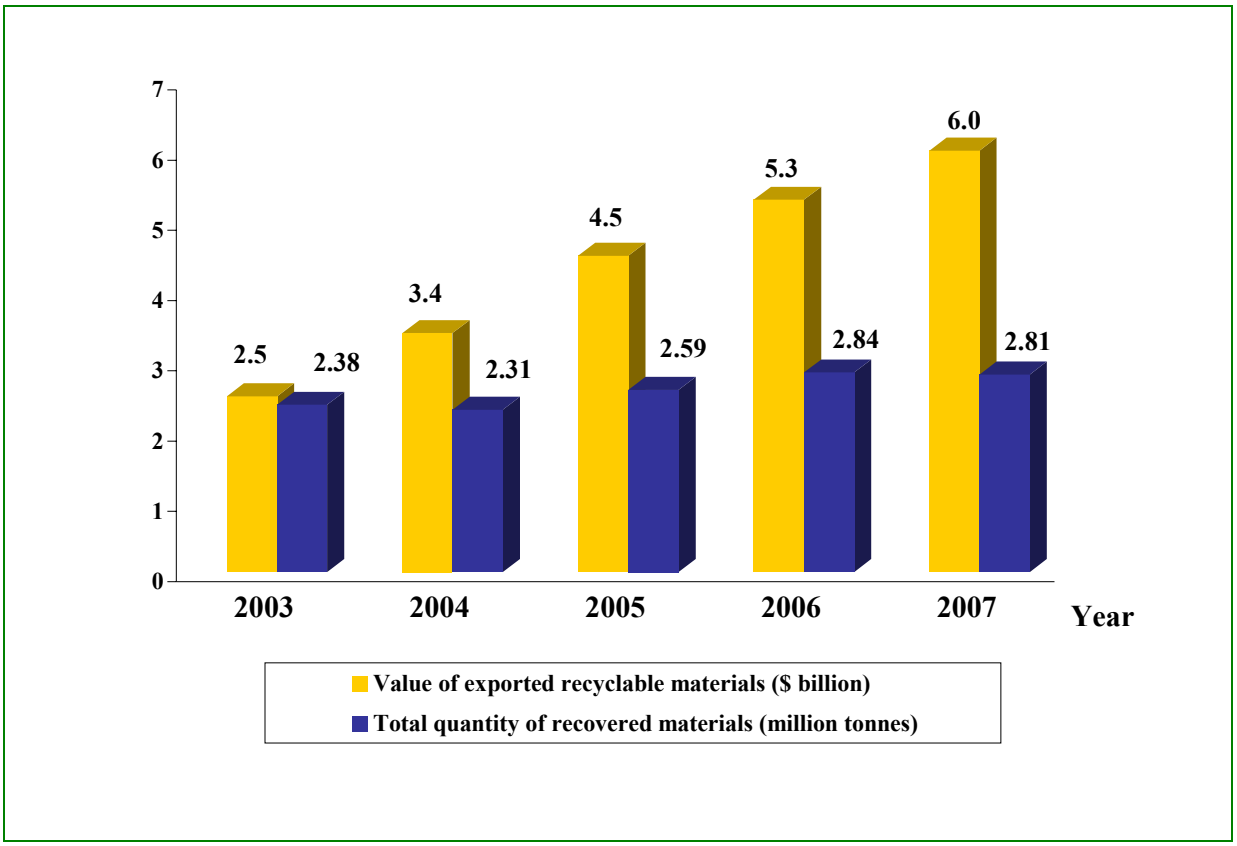
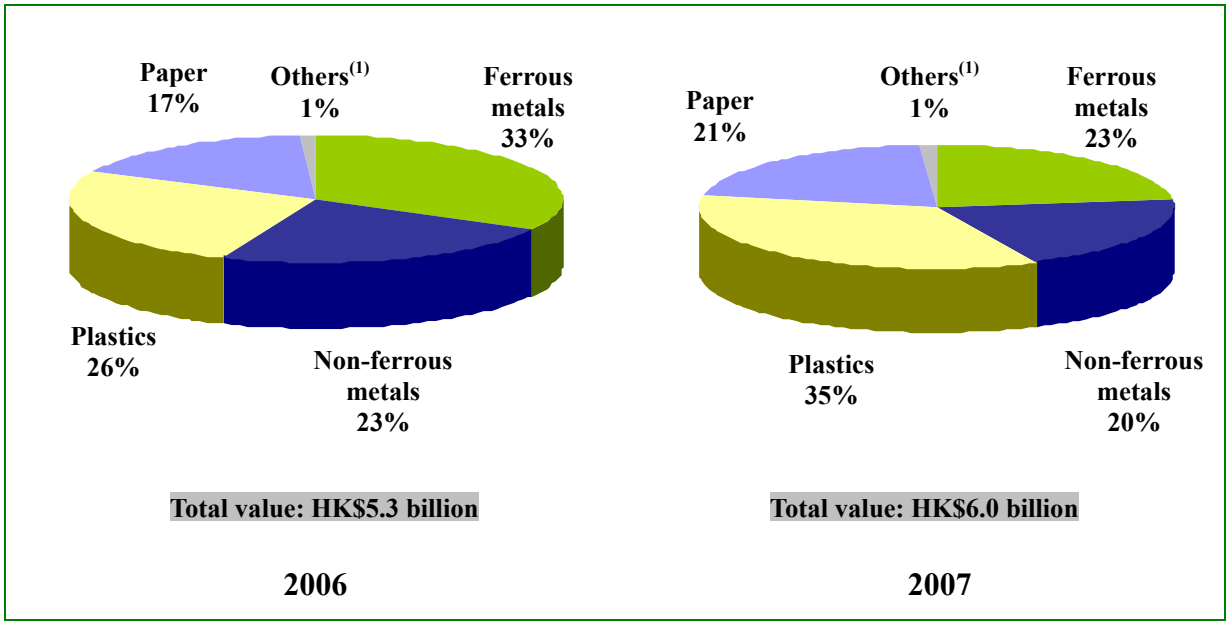


Plate 3.6 Value of exported recyclable materials in 2006 and 2007



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	12,343	169,735	13,752
~ Pig or cast iron	4	26	6,078
~ Tinplate	0	0	0
~ Other scraps	581,714	1,215,922	2,090
(Ferrous metals) Sub-total	594,061	1,385,683	2,333
b. Non-ferrous metals			
~ Aluminium	76,223	303,764	3,985
~ Copper & alloys	104,457	815,756	7,809
~ Lead	25	47	1,911
~ Metal ash & residues	12	1,049	87,636
~ Nickel	22	960	44,215
~ Precious metal (without scrap gold)	52	59,839	1,142,467
~ Tin	0	0	0
~ Zinc	0	0	0
(Non-ferrous metals) Sub-total	180,791	1,181,415	6,535
c. Plastics			
~ Polyethylene	503,731	1,551,162	3,079
~ Polystyrene & copolymers	54,397	91,252	1,678
~ Polyvinyl chloride	9,318	14,228	1,527
~ Others	250,307	401,870	1,606
(Plastics) Sub-total	817,752	2,058,512	2,517
d. Textiles			
~ Cotton	6,632	17,657	2,662
~ Man-made fibres	20	45	2,250
~ Old clothing & other textile articles, rags, etc.	7,850	23,581	3,004
(Textiles) Sub-total	14,502	41,283	2,847
e. Wood & paper			
~ Paper	1,101,969	1,276,778	1,159
~ Wood (include sawdust)	19,808	19,826	1,001
(Wood & paper) Sub-total	1,121,777	1,296,604	1,156
f. Glass			
~ Glass	70	21	301
(Glass) Sub-total	70	21	301
g. Electrical and electronic equipment	53,000	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.

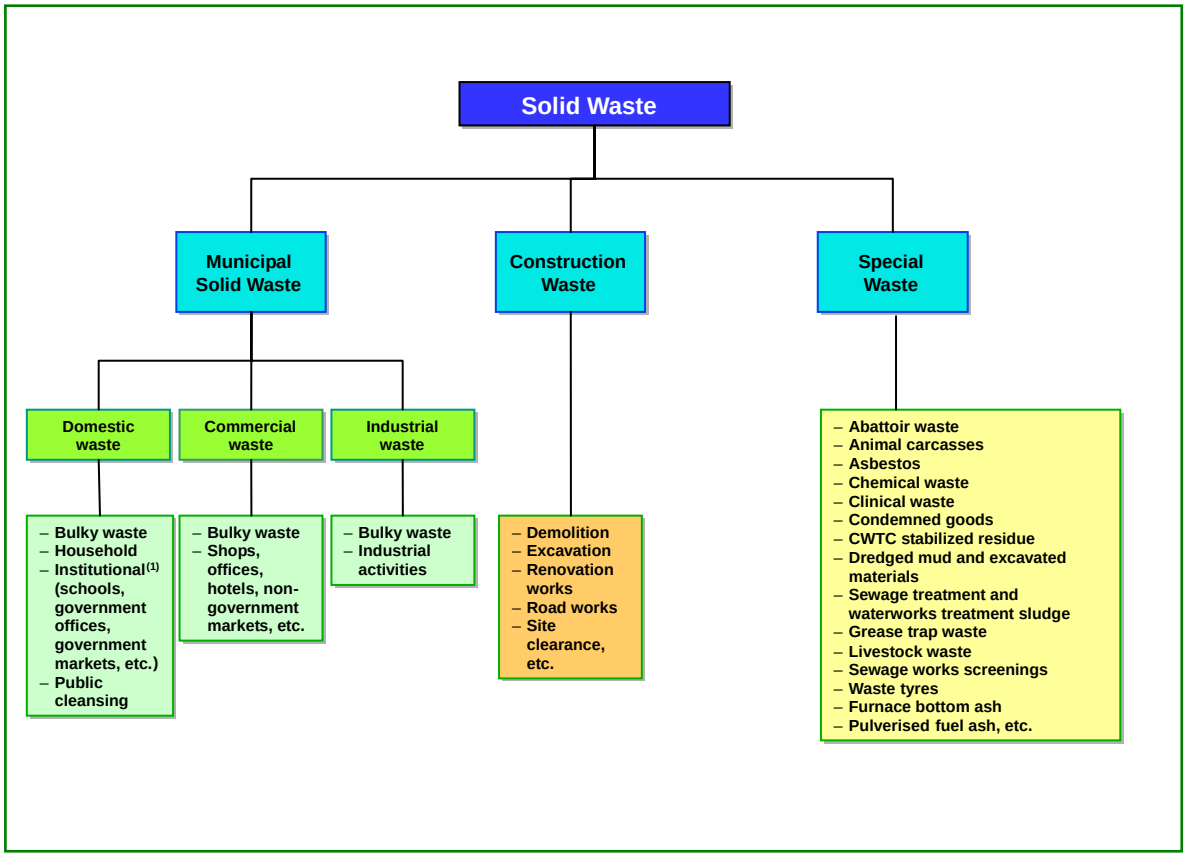
Construction waste (previously known as construction & demolition waste) is a mixture of surplus materials arising from site clearance, excavation, construction, refurbishment, renovation, demolition and road works. Over 80% of construction wastes are inert, which include debris, rubble, earth and concrete, are suitable for site formation and land reclamation. 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 site formation or land reclamation and are disposed of at landfills. Overall construction waste received at landfills includes construction waste from construction sites and waste concrete that is generated from concrete batching plants and cement plaster/mortar manufacturing plants not set up inside construction sites.

Special waste is waste that requires special disposal arrangement. It includes abattoir waste, animal carcasses, asbestos, chemical waste, clinical waste, condemned goods, CWTC

stabilized residue, dredged mud and excavated materials, sewage treatment and waterworks treatment sludge, grease trap waste, livestock waste, sewage works screenings, waste tyres, furnace bottom ash, pulverised fuel ash, etc.

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.

Current classification of solid waste



Note:

(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 2007 at landfills and RTS;
- Results of waste recovery survey conducted in December 2007 – February 2008 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.