MONITORING OF SOLID WASTE IN HONG KONG

Waste Statistics for 2009

Environmental Protection Department

Monitoring of Solid Waste in Hong Kong
Waste Statistics for 2009

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Remark: This report is re-issued in November 2010 with correction in Plate 2.12.

Content

Abbreviations

AWCP	Animal Waste Composting Plant
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
SLCP	Shaling Livestock Waste Composting Plant
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 2009. 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 2009

Waste type[1]		Average daily quantity (tpd)		
		Public[2]	Private[3]	Total
a.	Domestic waste	5,113	901	6,015
b.	Commercial waste	-	2,319	2,319
c.	Industrial waste[4]	-	629	629
d.	Municipal solid waste[4] (a+b+c)	5,113	3,849	8,963
e.	Overall construction waste[4] [5]	-	3,121	3,121
f.	Special waste[6]	903	340	1,243
g.	All waste received at landfills (d+e+f) Total	5,916	7,410	13,326

Remark: Figures may not add up to total due to rounding off.
Please refer to Plate 2.3 for the figures from 2005 to 2009.

Notes:

(1) Refer to Appendix 1 for classification of solid waste.

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

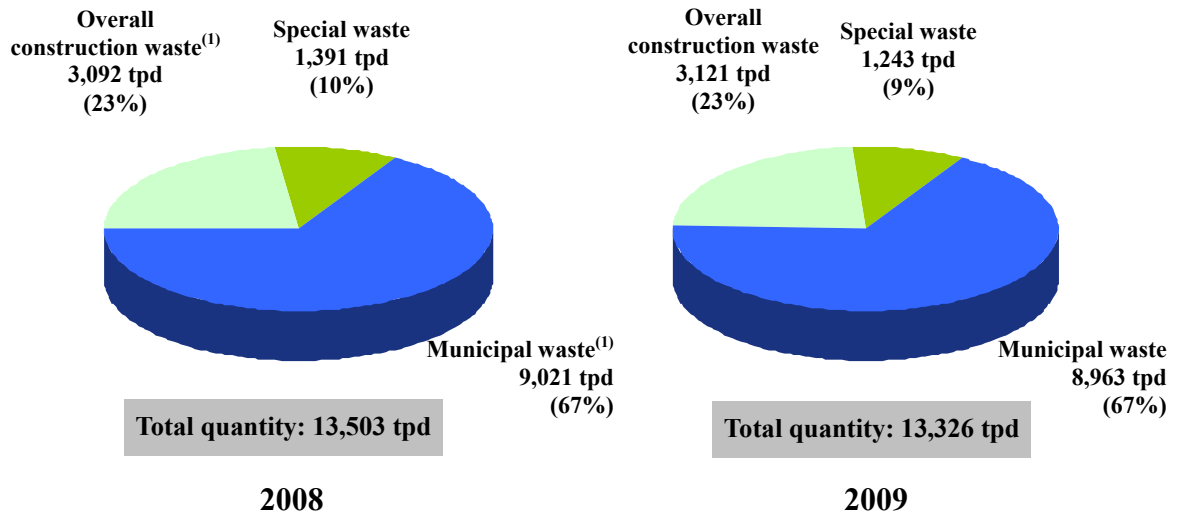
(3) Waste collected by private waste collectors.

(4) 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.

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

(6) 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 2008 and 2009

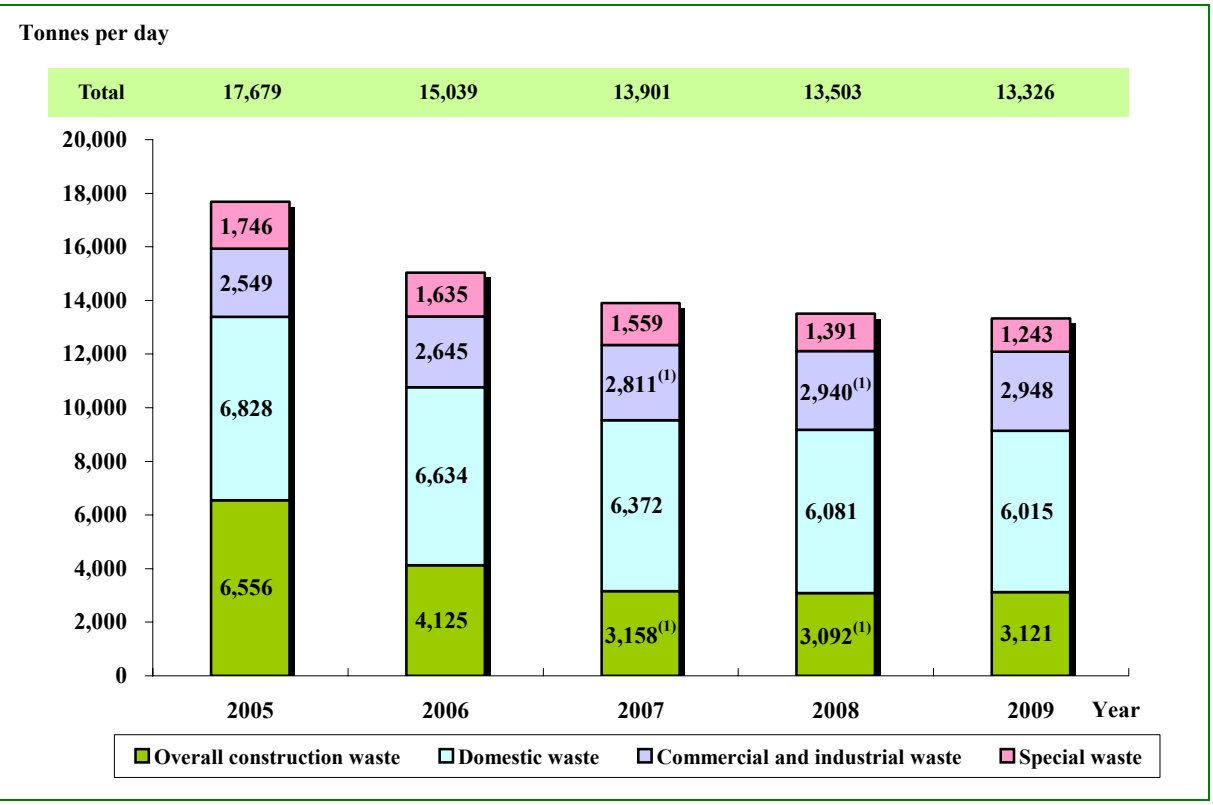


Remark: Figures may not add up to total due to rounding off.

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.

Remark: Percentages may not add up to 100 due to rounding off.

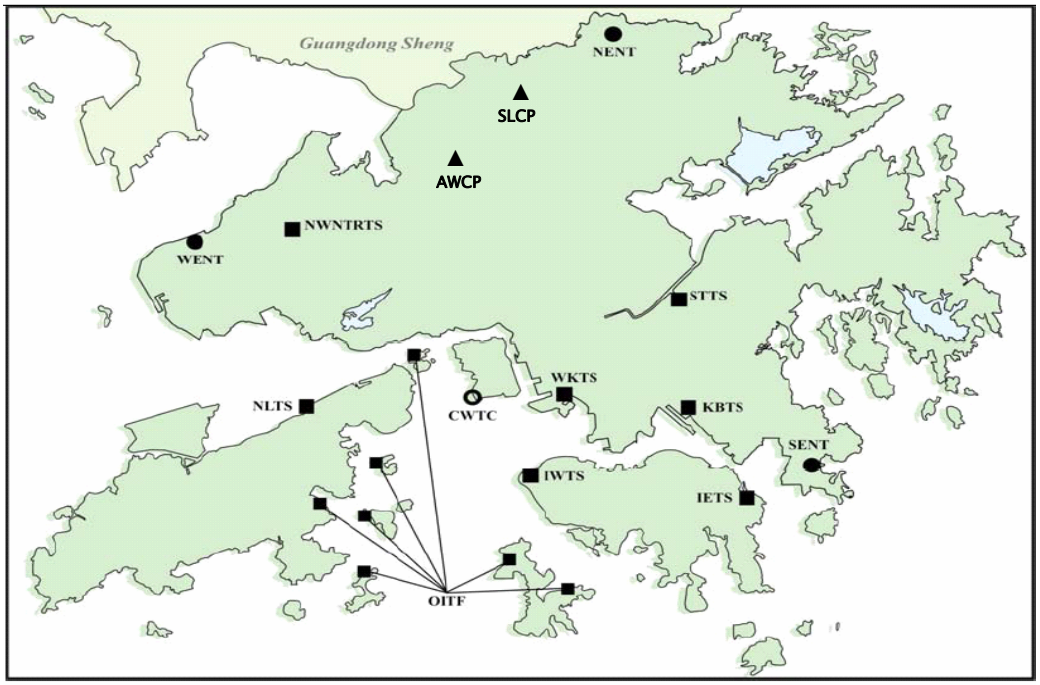
Plate 2.3 Disposal of solid waste at landfills in 2005 – 2009



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

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

▲
- SLCP - Shaling Livestock Waste Composting Plant
- AWCP - Animal Waste Composting Plant

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 2009

Disposal facility	Average daily quantity (tpd)				
	MSW		Overall construction waste	Special waste	Total
	Public[1]	Private[2]			
IETS - Island East Transfer Station	691	132	-	-	823
STTS - Sha Tin Transfer Station	1,100	-	-	-	1,100
IWTS - Island West Transfer Station	427	72	-	-	499
WKTS - West Kowloon Transfer Station	1,261	270	-	168	1,699
OITF - Outlying Islands Transfer Facilities	81	8	52	3	144
NLTS - North Lantau Transfer Station	118	94	-	1	213
NWNTRTS - North West New Territories Refuse Transfer Station	829	96	-	-	925
WENT - West New Territories Landfill	3,506[3]	999[3]	469[3]	668	5,643[3]
SENT - South East New Territories Landfill	365	2,130	2,255	438	5,187
NENT - North East New Territories Landfill	1,243[3]	721	396	137	2,496[3]
Sub-total	5,113	3,849	3,121	1,243	13,326
Total	8,963		3,121	1,243	13,326

Remark: Figures may not add up to total due to rounding off. Please refer to Plate 2.12 for solid waste delivered to

Notes:

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

(2) Waste collected by private waste collectors.

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

Plate 2.6 Arisings of solid waste by district in 2009

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	271	24	97	391	48	439
Wanchai	242	31	157	430	48	478
Eastern	384	47	131	562	58	620
Southern	217	9	82	308	55	364
Hong Kong Island Sub-total	1,114	111	467	1,692	209	1,901
Yau Tsim Mong	394	25	214	633	64	697
Sham Shui Po	256	46	144	446	31	476
Kowloon City	238	52	136	427	108	535
Wong Tai Sin	258	24	116	398	34	433
Kwun Tong	381	79	267	727	310	1,037
Kowloon Sub-total	1,526	227	878	2,631	547	3,178
Kwai Tsing	285	19	151	456	94	549
Tsuen Wan	296	63	155	514	29	543
Tuen Mun	357	38	240	634	326	961
Yuen Long	468	28	225	721	92	813
North	153	212	149	514	96	610
Tai Po	214	50	79	343	45	388
Sha Tin	392	55	188	634	112	746
Sai Kung	187	93	291	572	1,527	2,099
NT- Mainland Sub-total	2,353	558	1,478	4,389	2,320	6,710
Cheung Chau	17	-	-	-	-	-
Mui Wo	14	-	-	-	-	-
Peng Chau	4	-	-	-	-	-
Ma Wan	6	-	-	-	-	-
Lamma Island	6	-	-	-	-	-
Hei Ling Chau	2	-	-	-	-	-
North Lantau	71	-	-	-	-	-
NT-Outlying Islands Sub-total	120	5[5]	125[5]	250[5]	44[5]	247[5]
Total	5,113	901	2,948	8,963	3,121	12,083

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.

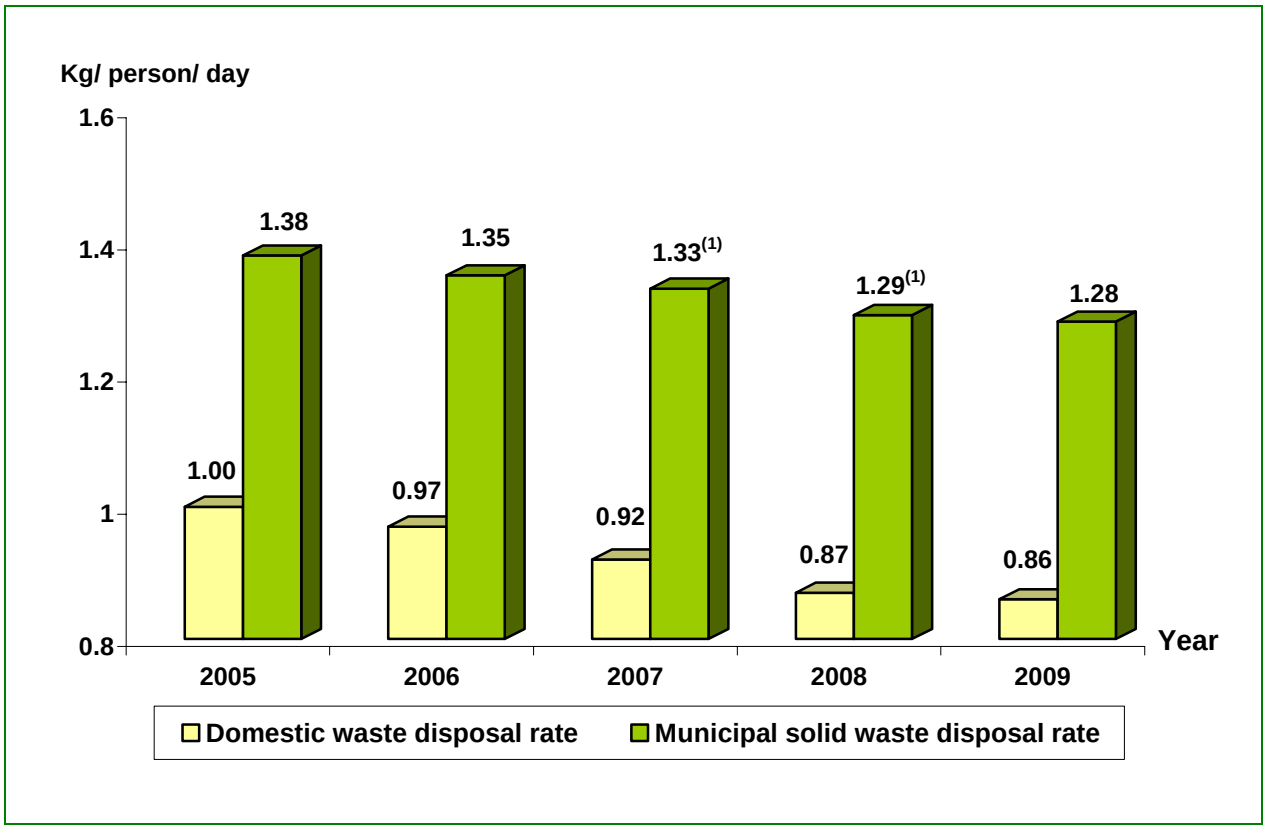
(2) Waste collected by the FEHD, FEHD contractors and other government vehicles, including public cleansing waste.

(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 2005– 2009



Remark: Mid-year population figures are used in the calculation of per capita disposal rates.

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, and the associated per capita disposal rates in 2007 and 2008 have been updated accordingly.

Plate 2.8 Composition of municipal solid waste in 2009

Composition	Average daily 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)
Glass	213 (3.5%)	94 (4.1%)	14 (2.2%)	108 (3.7%)	321 (3.6%)
Metals	95 (1.6%)	45 (1.9%)	30 (4.7%)	74 (2.5%)	169 (1.9%)
Paper	1,471 (24.5%)	545 (23.5%)	48 (7.6%)	592 (20.1%)	2,064 (23.0%)
Plastics	1,123 (18.7%)	475 (20.5%)	107 (17.0%)	581 (19.7%)	1,705 (19.0%)
Putrescibles	2,671 (44.4%)	987 (42.6%)	57 (9.1%)	1,044 (35.4%)	3,715 (41.4%)
Textiles	180 (3.0%)	48 (2.0%)	25 (4.0%)	73 (2.5%)	253 (2.8%)
Wood/Rattan	81 (1.3%)	26 (1.1%)	219 (34.9%)	245 (8.3%)	326 (3.6%)
Household hazardous wastes (HHWs)(1)	68 (1.1%)	17 (0.7%)	11 (1.7%)	28 (1.0%)	96 (1.1%)
Others(2)	113 (1.9%)	83 (3.6%)	118 (18.8%)	201 (6.8%)	314 (3.5%)
Sub-total	6,015 (100%)	2,319 (100%)	629 (100%)	2,948 (100%)	8,963 (100%)

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

Notes:

(1) Household hazardous wastes (HHWs) include paints, detergents, pesticides, fuels, cylinders, batteries, electrical appliances, computer products, mercury-containing fluorescent lamps and medicines, etc.

(2) Other waste includes bulky items and other miscellaneous materials.

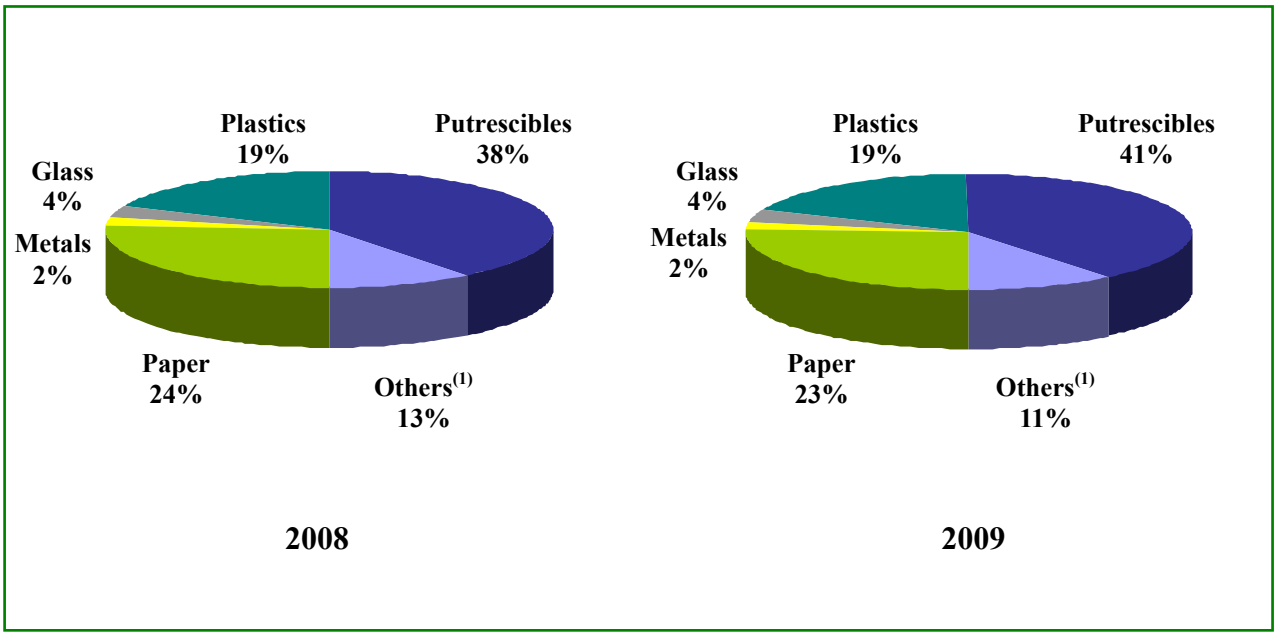
Plate 2.9 Composition of municipal solid waste in 2009– Breakdown of major components

Composition	Domestic waste		Commercial & industrial waste	
	Quantity (tpd)	% by weight	Quantity (tpd)	% by weight
Glass				
~ Glass bottles	168	(2.8%)	87	(3.0%)
~ Other glass	45	(0.8%)	21	(0.7%)
(Glass) Sub-total	213	(3.5%)	108	(3.7%)
Metals				
~ Ferrous metals	69	(1.2%)	62	(2.1%)
~ Aluminium cans	16	(0.3%)	5	(0.2%)
~ Other non-ferrous metals	10	(0.2%)	7	(0.2%)
(Metals) Sub-total	95	(1.6%)	74	(2.5%)
Paper				
~ Cardboard	263	(4.4%)	139	(4.7%)
~ Newsprint	508	(8.4%)	76	(2.6%)
~ Office paper	89	(1.5%)	68	(2.3%)
~ Others[(1)]	612	(10.2%)	309	(10.5%)
(Paper) Sub-total	1,471	(24.5%)	592	(20.1%)
Plastics				
~ Plastic bags	484	(8.0%)	197	(6.7%)
~ Polyfoam - dining wares	33	(0.5%)	12	(0.4%)
~ Polyfoam - others	31	(0.5%)	16	(0.6%)
~ PET plastic bottles	58	(1.0%)	29	(1.0%)
~ Non-PET plastic bottles	53	(0.9%)	14	(0.5%)
~ Others[(2)]	465	(7.7%)	313	(10.6%)
(Plastics) Sub-total	1,123	(18.7%)	581	(19.7%)
Putrescibles				
~ Food waste	2,316	(38.5%)	964	(32.7%)
~ Yard waste	57	(1.0%)	25	(0.9%)
~ Others[(3)]	297	(4.9%)	54	(1.8%)
(Putrescibles) Sub-total	2,671	(44.4%)	1,044	(35.4%)

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 putrescibles waste includes cotton balls, other organic waste, etc.

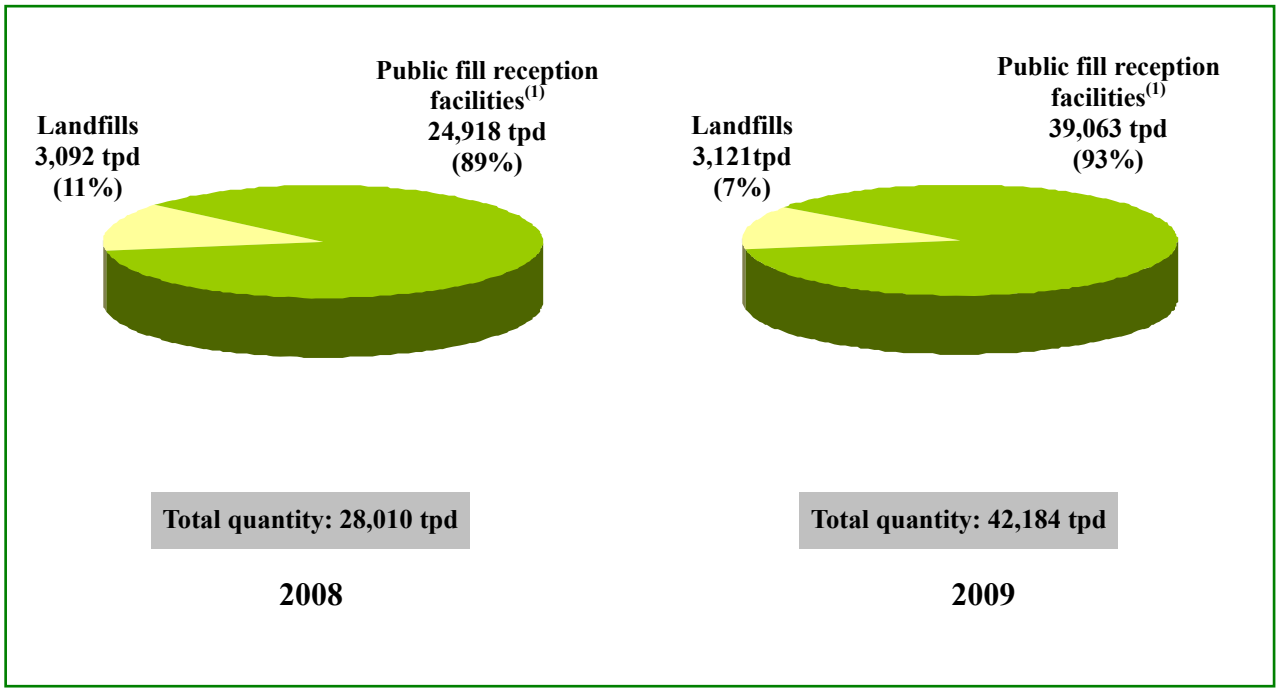
Plate 2.10 Composition of municipal solid waste in 2008 and 2009 – Major waste types



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 2008 and 2009



Remark: Waste concrete delivered to landfills as industrial waste since 2007 was re-grouped under overall construction waste.

Note:

(1) Public fill reception facilities are managed by CEDD for receiving inert fill materials for reuse. In the year two major public fill reception facilities are in operation at Tseung Kwan O and Tuen Mun.

Plate 2.12 Disposal of special waste in 2009

Waste type	Disposal method	Average daily quantity[1] (tpd)
Abattoir waste	Landfill	10
Animal carcasses and kennel waste	Landfill	8
Asbestos waste	Landfill[2]	7
Chemical waste other than asbestos waste	Landfill[2]	7
Clinical waste	Landfill[2]	6
Condemned goods	Landfill	16
CWTC stabilised residue	Landfill	18
Dewatered dredged materials	Landfill	2
Dewatered sewage sludge	Landfill	806
Dewatered waterworks sludge	Landfill	28
Grease trap waste	Landfill[3]	230[4]
Livestock waste	Landfill[5]	41
Sewage works screenings	Landfill	58
Waste tyres	Landfill[6]	7
	Landfill Sub-total	1,243
Chemical waste other than asbestos waste	CWTC	107
Grease trap waste	WKTS	168[7]
Horse stable waste	AWCP	7
Livestock waste	SLCP and other environmentally acceptable means[8]	171
Dredged mud and excavated materials	Marine dumping	65,205[9]
Furnace bottom ash	Concrete manufacturing, stored in lagoon[10]	131
Pulverised fuel ash	Concrete manufacturing, stored in lagoon[10]	1,286

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.
(3) Disposed of at WENT after treatment.
(4) The figure is the quantity of grease trap waste received at WENT before processing in the Interim Grease Trap Waste Treatment Facility.
(5) Disposed of at WENT and NENT.
(6) Shredded or cut prior to disposal.
(7) The figure is the quantity of grease trap waste treated by the Grease Trap Waste Treatment Facility at WKTS.
(8) Examples of environmentally acceptable means include on-site composting, aerobic treatment, dry muck-out, etc.
(9) Assuming the density of the dredged mud and excavated materials to be one tonne per cubic metre.
(10) The figures are calculated by making reference to the information provided by CLP Power Hong Kong Limited and The Hongkong Electric Company, Limited.

3. Waste Recovery and Recycling

Plate 3.1 Recovery of municipal solid waste in 2008 and 2009

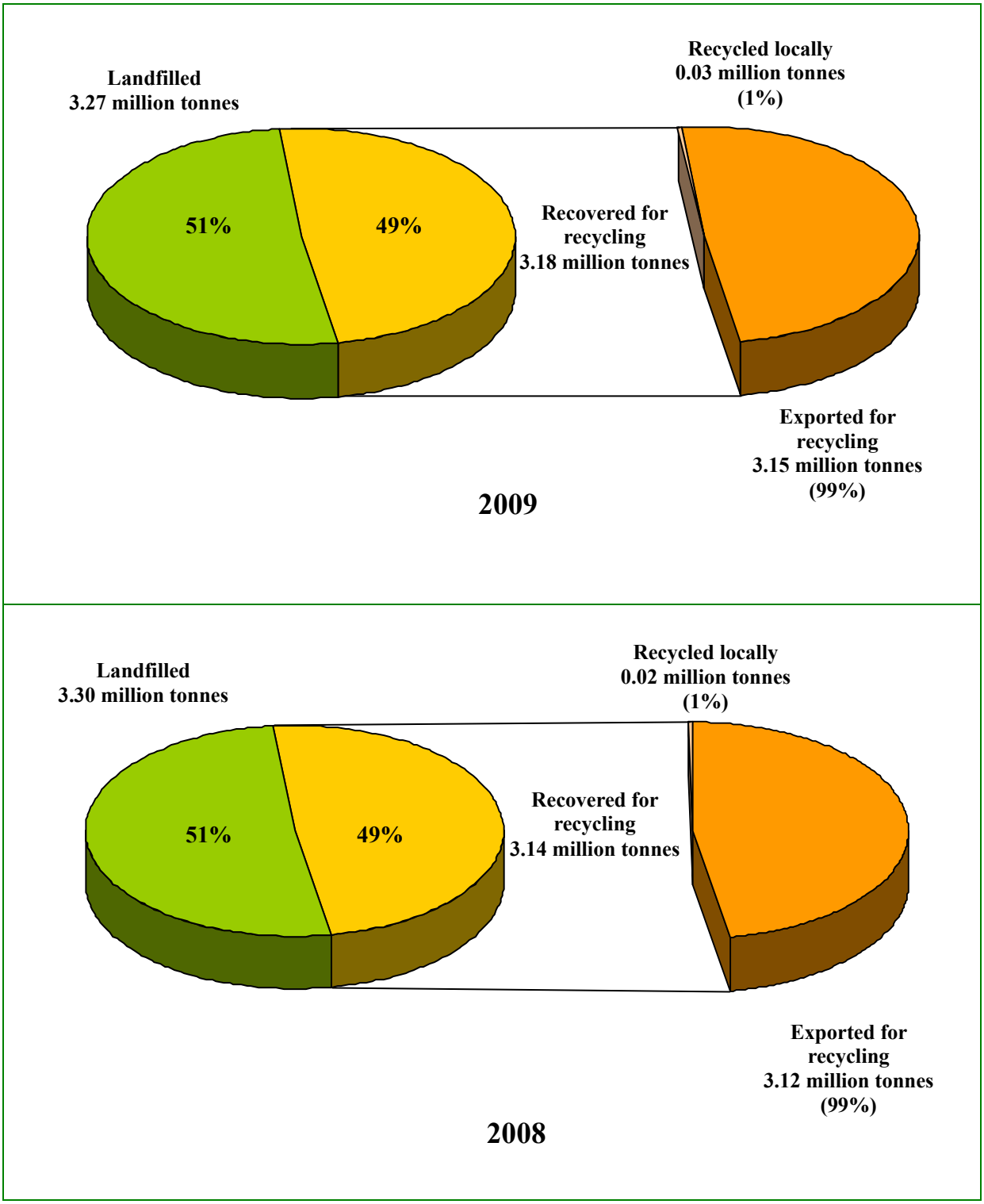


Plate 3.2 Municipal solid waste recovery rates in 2005 – 2009

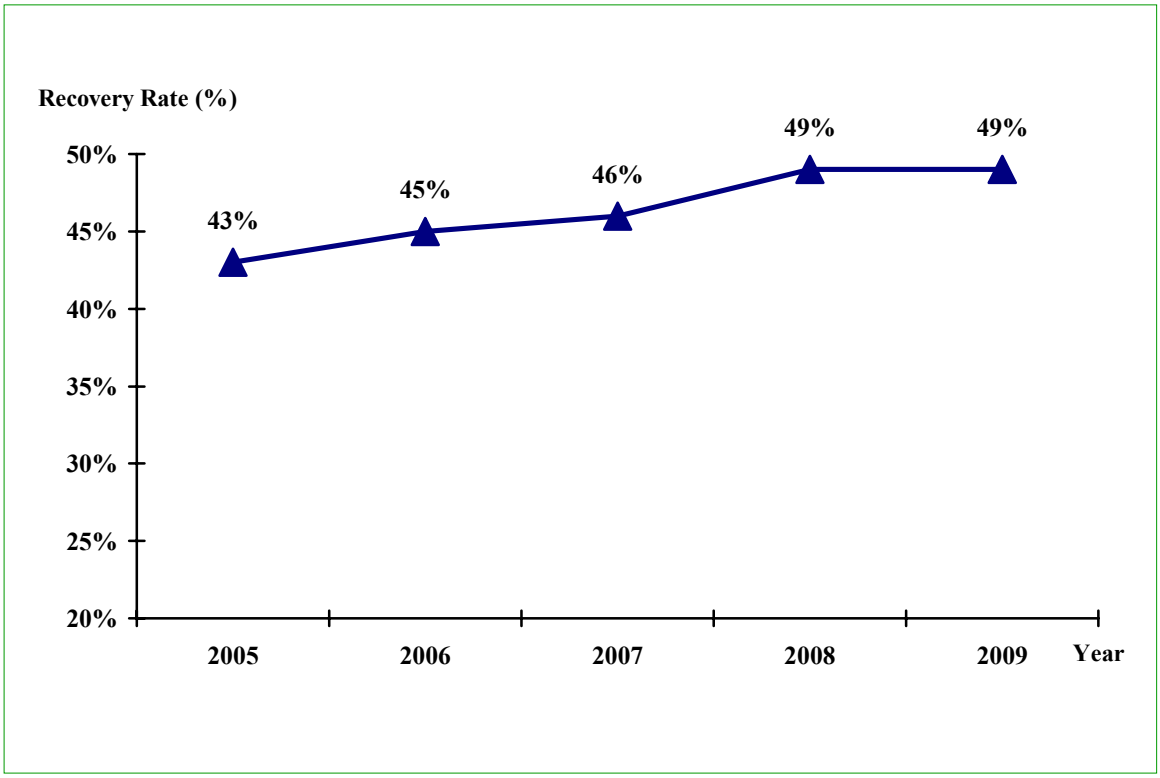


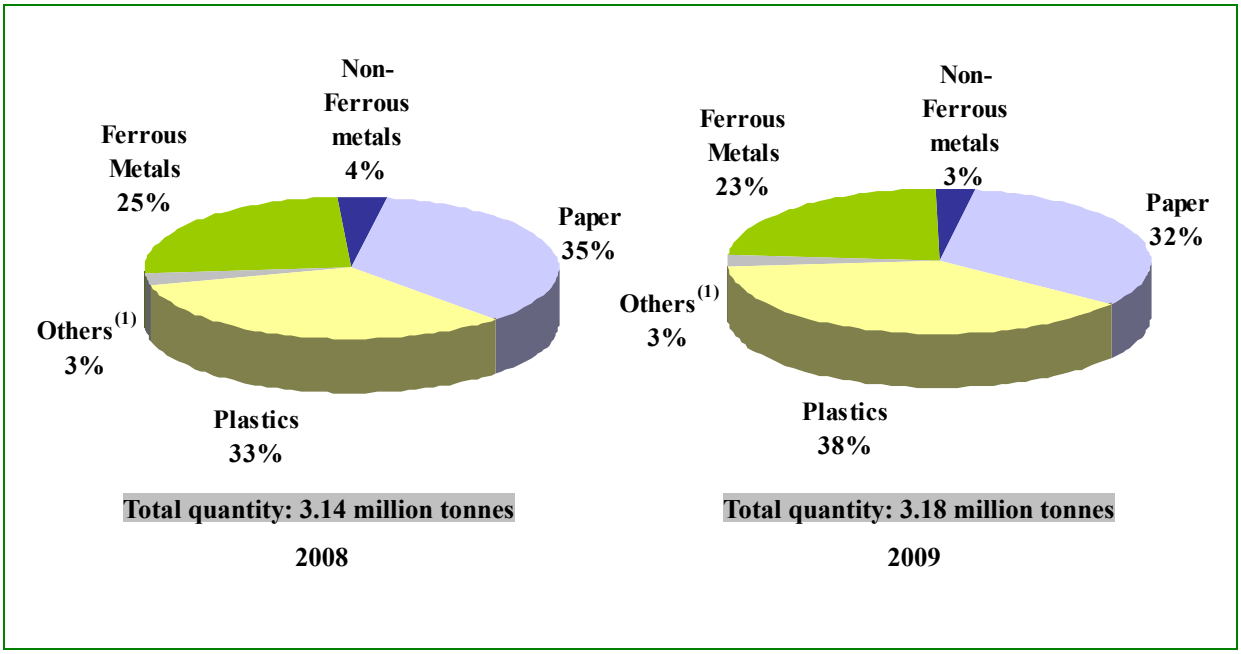
Plate 3.3 Recovered recyclable materials by type in 2009

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	1,027	0	1,027
Plastics	1,208	3	1,211
Ferrous metals	733	0	733
Non-ferrous metals	101	0	101
Glass	0	3[2]	3
Rubber tyres	0	9[3]	9
Textiles	16	1	16
Wood	16	1	17
Electrical and electronic equipment	50	14	64
Total	3,151	30	3,181

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 2008 and 2009



Remark: Percentages may not add up to 100 due to rounding off.

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

Plate 3.5 Total quantities and export values of recovered recyclable materials in 2005 – 2009

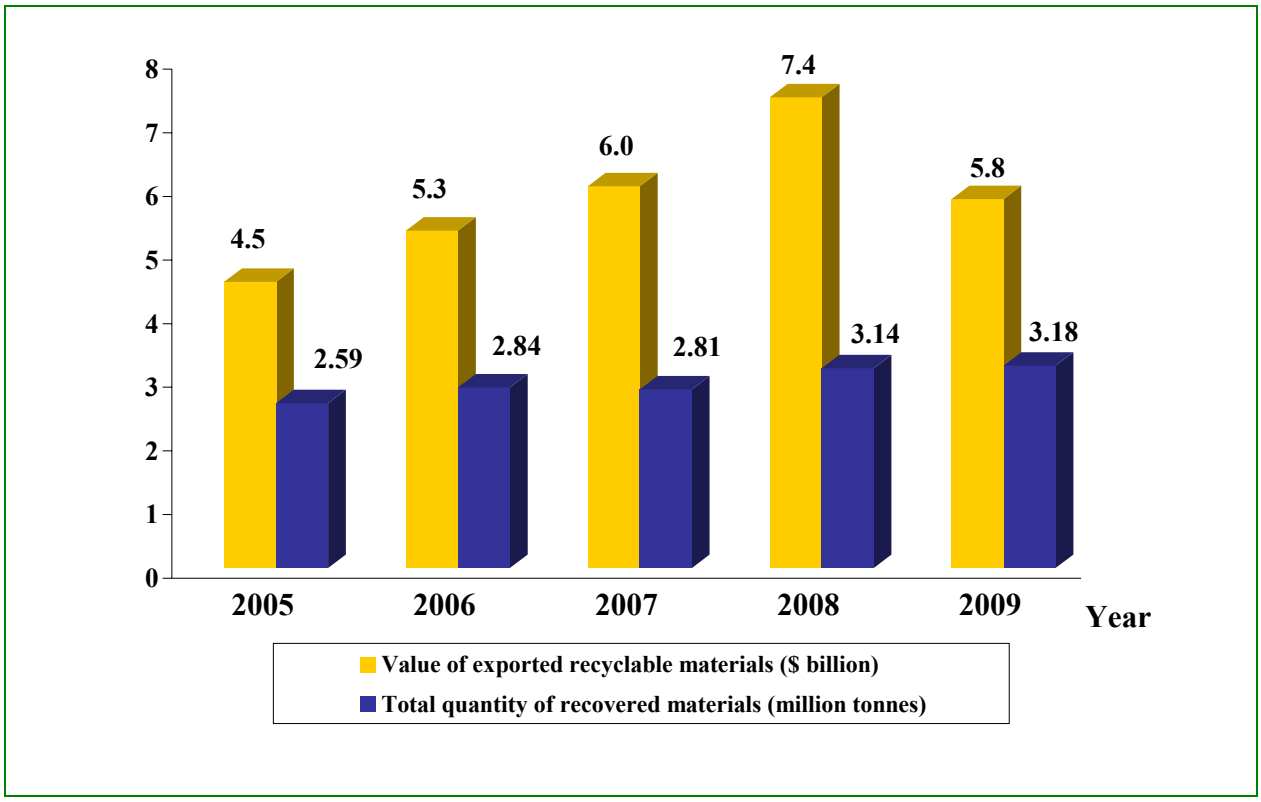
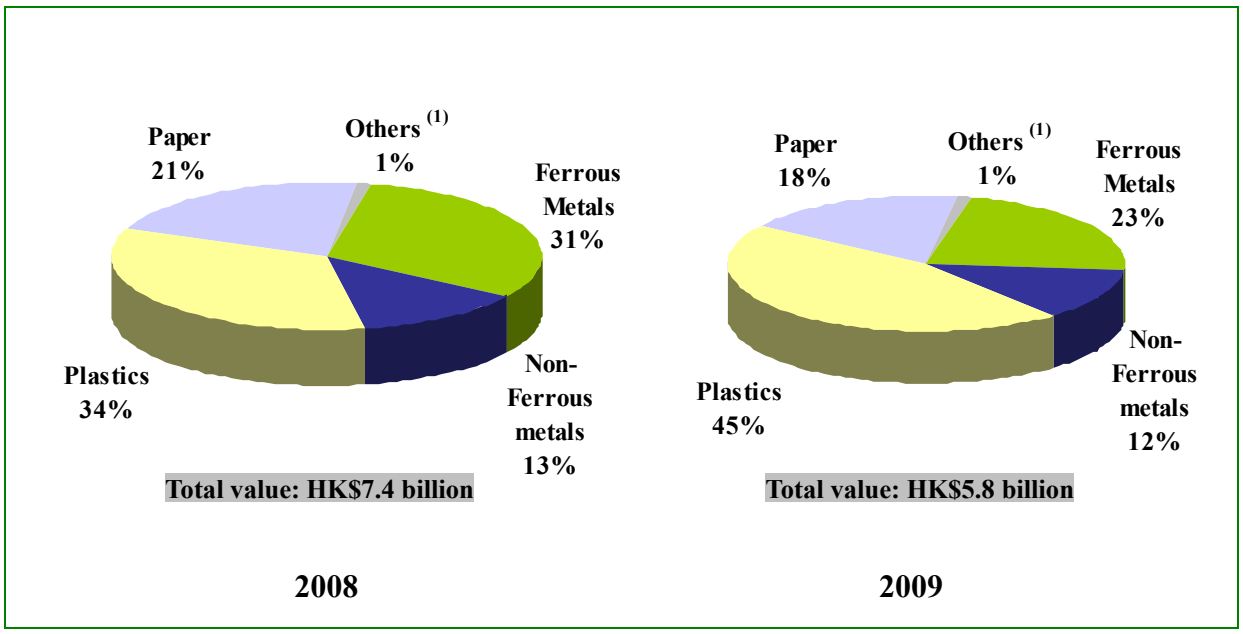


Plate 3.6 Values of exported recyclable materials in 2008 and 2009



Remark: Percentages may not add up to 100 due to rounding off.

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	6,273	71,651	11,422
~ Pig or cast iron	2	5	2,400
~ Tinplate	0	0	0
~ Other scraps	726,769	1,258,673	1,732
(Ferrous metals) Sub-total	733,044	1,330,330	1,815
b. Non-ferrous metals			
~ Aluminium	72,565	253,221	3,490
~ Copper & alloys	28,270	339,285	12,002
~ Lead	20	184	9,121
~ Metal ash & residues	34	1,273	37,273
~ Nickel	37	316	8,527
~ Precious metal (without scrap gold)	33	121,440	3,661,471
~ Tin	0	0	0
~ Zinc	82	409	5,000
(Non-ferrous metals) Sub-total	101,041	716,304	7,089
c. Plastics			
~ Polyethylene	333,691	963,273	2,887
~ Polystyrene & copolymers	48,562	77,574	1,597
~ Polyvinyl chloride	45,507	43,399	954
~ Others	779,962	1,534,662	1,968
(Plastics) Sub-total	1,207,721	2,618,909	2,168
d. Textiles			
~ Cotton	8,144	20,303	2,493
~ Man-made fibres	584	1,319	2,260
~ Old clothing & other textile articles, rags, etc.	7,063	14,413	2,041
(Textiles) Sub-total	15,791	36,036	2,282
e. Wood & paper			
~ Paper	1,027,229	1,045,908	1,018
~ Wood (include sawdust)	16,408	16,248	990
(Wood & paper) Sub-total	1,043,637	1,062,156	1,018
f. Glass	0	0	0
~ Glass	0	0	0
(Glass) Sub-total	0	0	0
g. Electrical and electronic equipment	50,200	N/A	N/A

Appendix 1: Classification of Solid Waste and Monitoring Methodology

Waste Classification and Terminology

Solid waste is classified into three main types by making reference to the sources of waste and the institutional arrangements for waste collection and disposal. These three types of solid waste are municipal solid waste, construction waste and special 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.

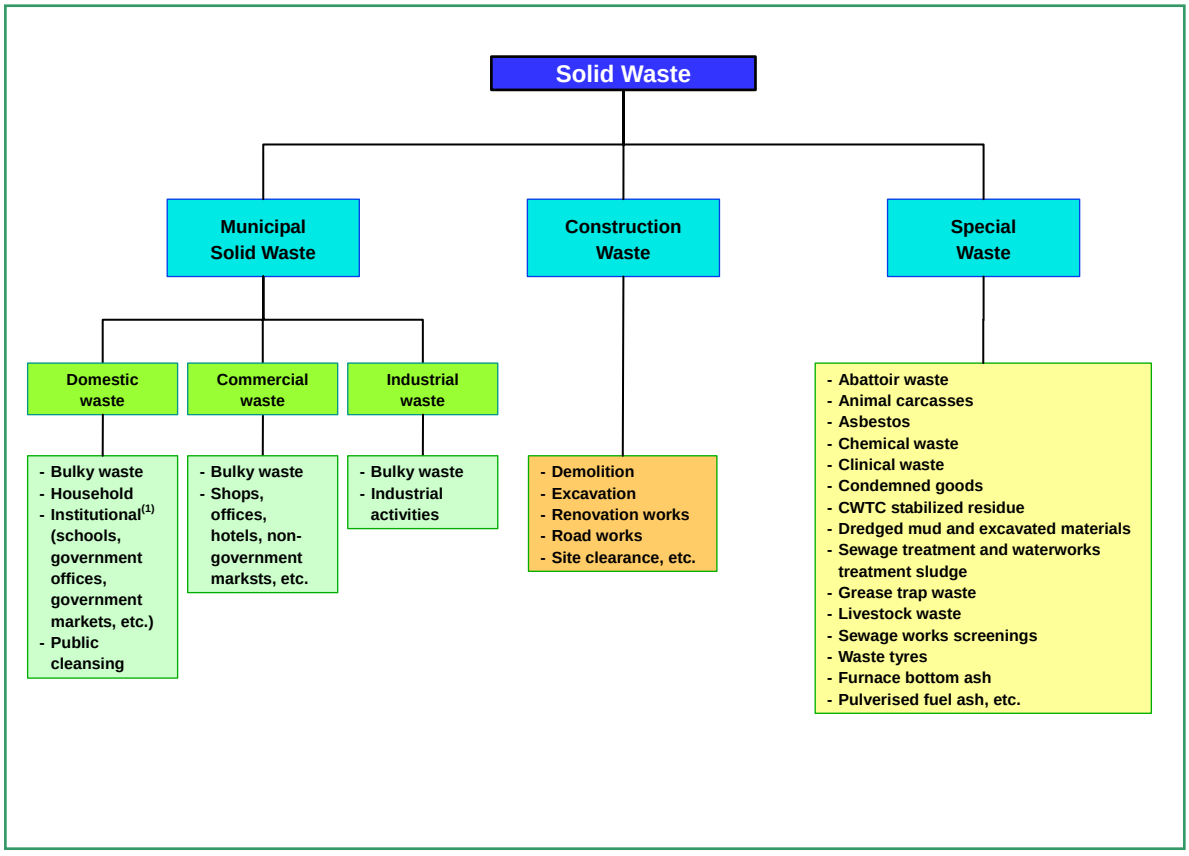
Construction waste (previously known as construction & demolition waste) is a mixture of surplus materials arising from site clearance, excavation, construction, refurbishment, renovation, demolition and road works. Over 80% of construction wastes are inert, which include debris, rubble, earth and concrete, 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 2009 at landfills and RTS;
- Results of waste recovery survey conducted in December 2009 - February 2010 by The Nielsen Company (Hong Kong) Limited;
- 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.