MONITORING OF SOLID WASTE IN HONG KONG

Waste Statistics for 2012

Environmental Protection Department

Monitoring of Solid Waste in Hong Kong
Waste Statistics for 2012

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Cover photos

Top left:	**Waste composition survey in progress**
Bottom left:	**Composting of food waste**
Top right:	**Waste composition survey in progress**
Bottom right:	**Locally collected recyclables**

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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**
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 2012. 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.

In this report, figures of various plates may not add up to total and percentages may not add up to 100 due to rounding off.

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 2012

Waste type[1]		Average daily quantity (tpd)
a.	Domestic waste	6,286
b.	Commercial waste	2,260
c.	Industrial waste	732
d.	Municipal solid waste (a+b+c)	9,278
e.	Overall construction waste	3,440
f.	Special waste[2]	1,127
g.	All waste received at landfills (d+e+f) Total	13,844

Notes:

(1) Please refer to Appendix 1 for classification of solid waste.

(2) 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 2011 and 2012

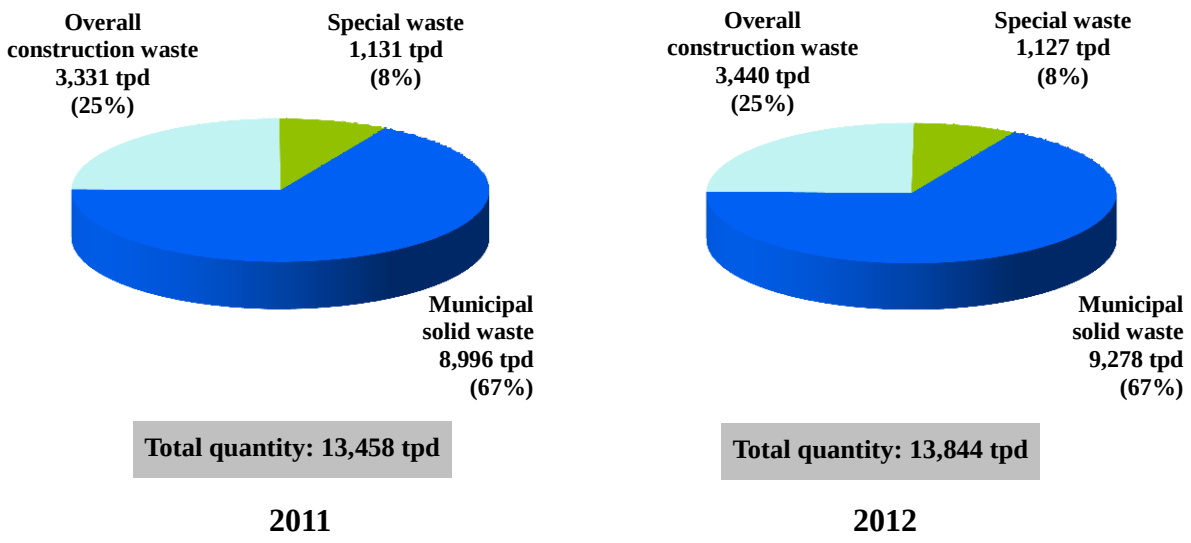


Plate 2.3 Disposal of solid waste at landfills in 2008 – 2012

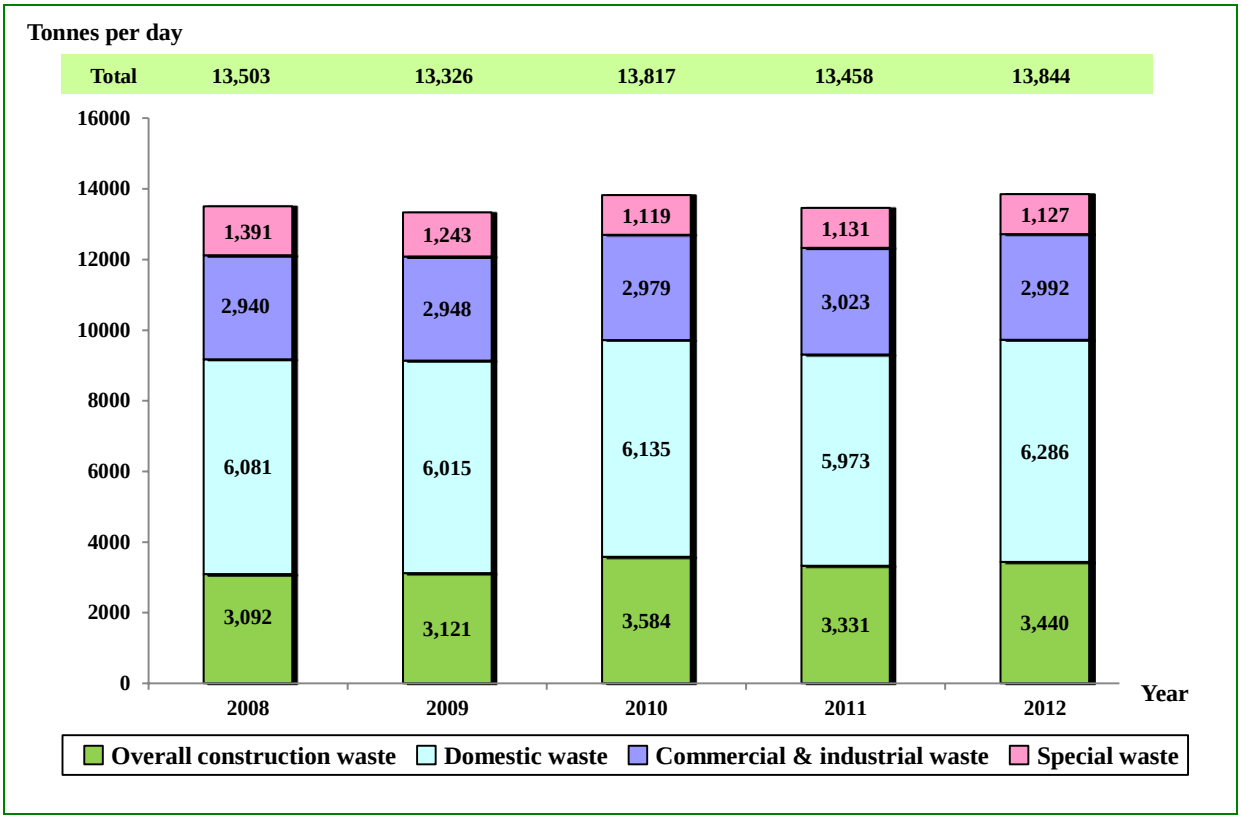
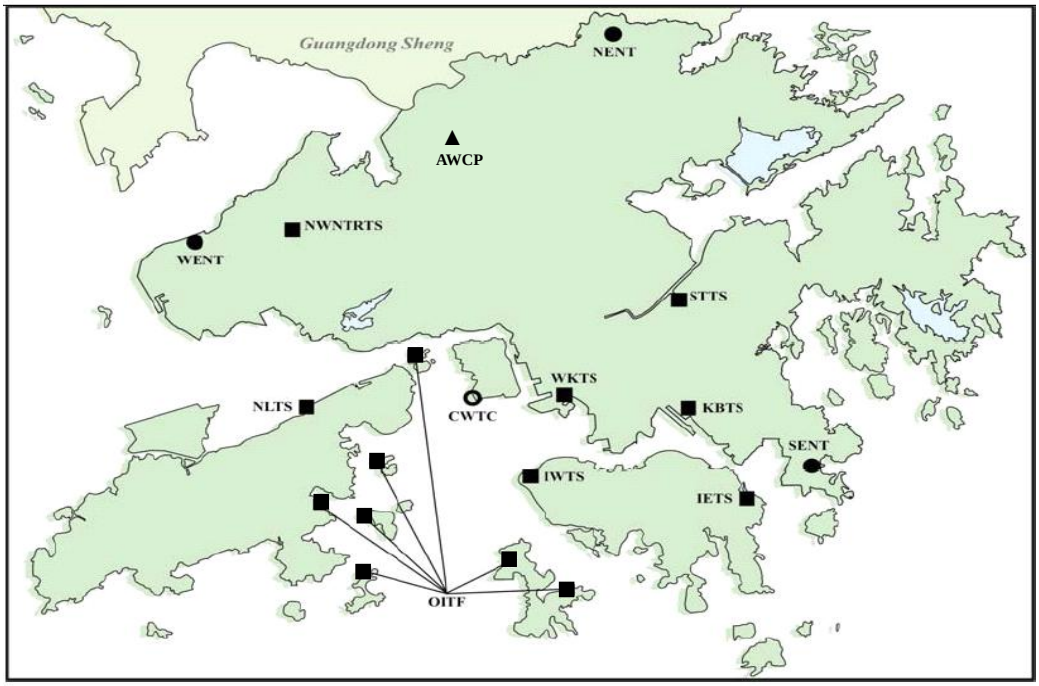


Plate 2.4 Waste management facilities in Hong Kong



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

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 RTS and landfills in 2012

Disposal facility [1]	Average daily quantity (tpd)			
	MSW	Overall construction waste	Special waste	Total
IETS - Island East Transfer Station	797	-	-	797
STTS - Sha Tin Transfer Station	998	-	-	998
IWTS - Island West Transfer Station	531	-	-	531
WKTS - West Kowloon Transfer Station	2,331	-	448	2,778
OITF - Outlying Islands Transfer Facilities	82	25	4	111
NLTS - North Lantau Transfer Station	178	-	0.65	179
NWNTRTS - North West New Territories Refuse Transfer Station	993	-	-	993
WENT - West New Territories Landfill	5,257[2]	603[2]	499	6,359[2]
SENT - South East New Territories Landfill	2,079	2,320	405	4,804
NENT - North East New Territories Landfill	1,942[2]	516	223	2,681[2]
Total	9,278	3,440	1,127	13,844

Notes:

(1) Please refer to Plate 2.12 for solid waste delivered to other waste management facilities and outlets.

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

Plate 2.6 Arisings of solid waste by district in 2012

District	Average daily quantity[1] [2] (tpd)			
	Domestic waste (a)	C&I waste (b)	Municipal solid waste (c) =(a)+(b)	Overall construction waste (d)
Central & Western	279	86	366	152
Wanchai	261	135	396	105
Eastern	434	121	555	68
Southern	236	83	319	141
Hong Kong Island Sub-total	**1,211**	**424**	**1,636**	**466**
Yau Tsim Mong	519	211	729	152
Sham Shui Po	346	141	487	74
Kowloon City	313	167	480	469
Wong Tai Sin	293	142	435	30
Kwun Tong	537	216	752	441
Kowloon Sub-total	**2,008**	**876**	**2,883**	**1,166**
Kwai Tsing	322	152	474	139
Tsuen Wan	259	146	405	48
Tuen Mun	374	288	662	387
Yuen Long	587	329	916	148
North	357	168	525	72
Tai Po	270	87	357	129
Sha Tin	414	179	593	149
Sai Kung	327	222	548	687
NT- Mainland Sub-total	**2,909**	**1,571**	**4,481**	**1,761**
Cheung Chau	28	-	-	-
Mui Wo	24	-	-	-
Peng Chau	7	-	-	-
Ma Wan	12	-	-	-
Lamma Island	9	-	-	-
Hei Ling Chau	3	-	-	-
North Lantau	77	-	-	-
NT-Outlying Islands Sub-total	**159**	**120[3]**	**279 [3]**	**47[3]**
Total	**6,286**	**2,992**	**9,278**	**3,440**

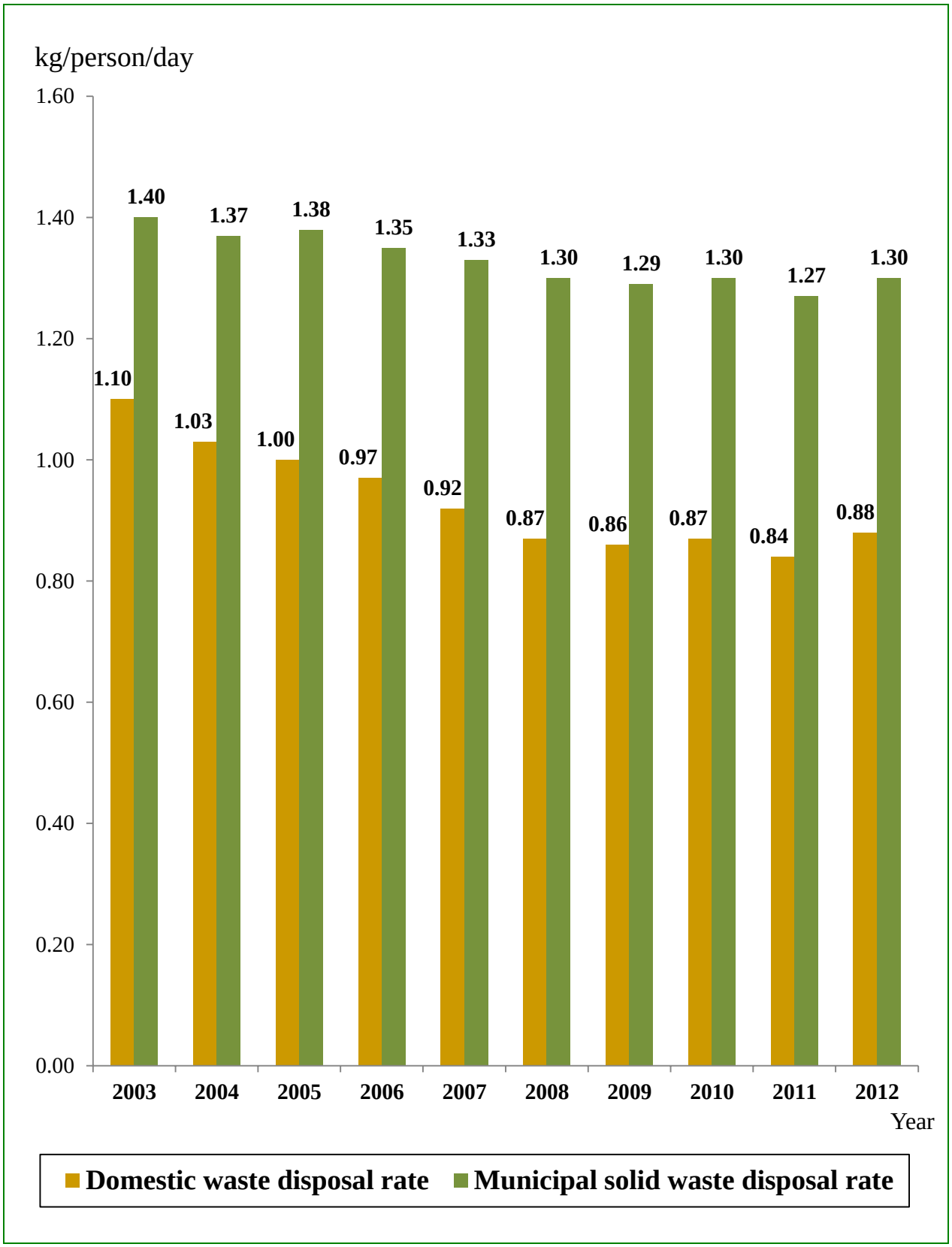
Notes:

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

(2) Special waste is not included.

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

Plate 2.7 Per capita disposal rates of municipal solid waste and domestic waste in 2003 – 2012



Remark: The per capita disposal rates are calculated based on the population (mid-year) updated by the C&SD in August 2013.

Plate 2.8 Composition of municipal solid waste in 2012

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)
Glass	220 (3.5%)	53 (2.3%)	17 (2.3%)	70 (2.3%)	289 (3.1%)
Metals	174 (2.8%)	48 (2.1%)	17 (2.3%)	65 (2.2%)	239 (2.6%)
Paper	1,154 (18.4%)	659 (29.1%)	92 (12.5%)	750 (25.1%)	1,905 (20.5%)
Plastics	1,144 (18.2%)	540 (23.9%)	141 (19.3%)	681 (22.8%)	1,826 (19.7%)
Putrescibles	2,995 (47.6%)	759 (33.6%)	112 (15.3%)	871 (29.1%)	3,865 (41.7%)
Textiles	223 (3.5%)	51 (2.3%)	19 (2.6%)	70 (2.3%)	293 (3.2%)
Wood/Rattan	117 (1.9%)	33 (1.5%)	230 (31.4%)	263 (8.8%)	380 (4.1%)
Household hazardous wastes (HHWs)[(1)]	85 (1.4%)	27 (1.2%)	8 (1.1%)	35 (1.2%)	120 (1.3%)
Others[(2)]	175 (2.8%)	90 (4.0%)	96 (13.1%)	186 (6.2%)	361 (3.9%)
Sub total	6,286 (100%)	2,260 (100%)	732 (100%)	2,992 (100%)	9,278 (100%)

Remark: Figures denote quantities and percentages by wet weight.

Notes:

(1) Household hazardous wastes (HHWs) include paints, 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 2012 – Breakdown of major components

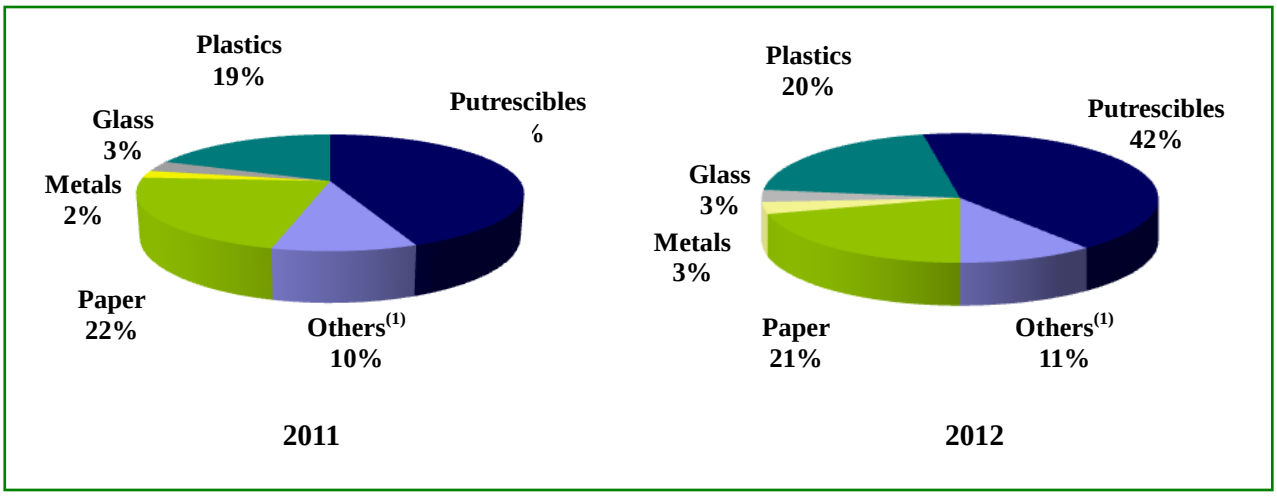
Composition	Average daily quantity (tpd) and percentage by weight		
	Domestic waste (a)	Commercial & industrial waste (b)	Municipal solid waste (c) (a) + (b)
Glass			
~ Glass bottles	177 (2.8%)	52 (1.7%)	229 (2.5%)
~ Other glass	43 (0.7%)	18 (0.6%)	61 (0.7%)
(Glass) Sub-total	220 (3.5%)	70 (2.3%)	289 (3.1%)
Metals			
~ Ferrous metals	143 (2.3%)	47 (1.6%)	190 (2.1%)
~ Aluminium cans	18 (0.3%)	10 (0.3%)	28 (0.3%)
~ Other non-ferrous metals	13 (0.2%)	8 (0.3%)	21 (0.2%)
(Metals) Sub-total	174 (2.8%)	65 (2.2%)	239 (2.6%)
Paper			
~ Cardboard	227 (3.6%)	197 (6.6%)	424 (4.6%)
~ Newsprint	375 (6.0%)	134 (4.5%)	509 (5.5%)
~ Office paper	90 (1.4%)	101 (3.4%)	191 (2.1%)
~ Others(1)	463 (7.4%)	318 (10.6%)	781 (8.4%)
(Paper) Sub-total	1,154 (18.4%)	750 (25.1%)	1,905 (20.5%)
Plastics			
~ Plastic bags	523 (8.3%)	235 (7.9%)	758 (8.2%)
~ Polyfoam - dining wares	32 (0.5%)	21 (0.7%)	52 (0.6%)
~ Polyfoam – others	22 (0.4%)	26 (0.9%)	48 (0.5%)
~ PET plastic bottles	80 (1.3%)	52 (1.7%)	132 (1.4%)
~ Non-PET plastic bottles	56 (0.9%)	28 (0.9%)	84 (0.9%)
~ Others(2)	432 (6.9%)	319 (10.7%)	751 (8.1%)
(Plastics) Sub-total	1,144 (18.2%)	681 (22.8%)	1,826 (19.7%)
Putrescibles			
~ Food waste	2,528 (40.2%)	809 (27.0%)	3,337 (36.0%)
~ Yard waste(3)	143 (2.3%)	13 (0.4%)	156 (1.7%)
~ Others(4)	324 (5.2%)	48 (1.6%)	372 (4.0%)
(Putrescibles) Sub-total	2,995 (47.6%)	871 (29.1%)	3,865 (41.7%)

Remark: Figures denote quantities and percentages by wet weight.

Notes:

(1) Other paper waste includes drink packs (e.g. tetrapaks), tissue paper, etc.
(2) Other plastics waste includes household utensils, packaging materials, toys, off-cuts, scrap, etc.
(3) The quantity does not include yard waste collected by government departments.
(4) Other putrescibles waste includes personal care cotton products, such as diapers.

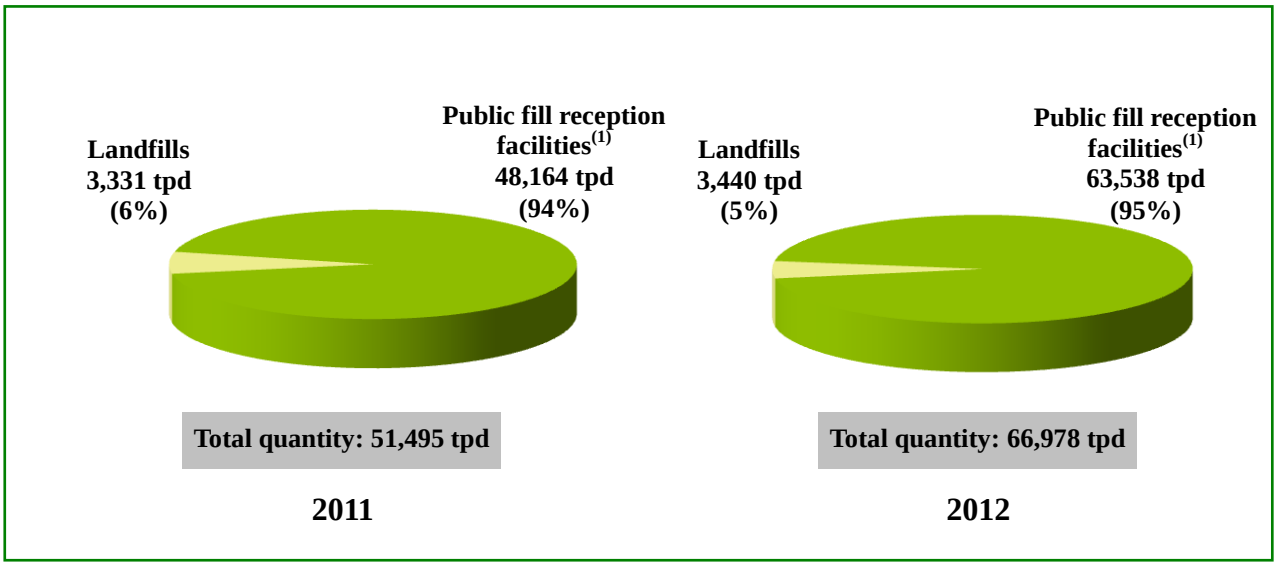
Plate 2.10 Composition of municipal solid waste in 2011 and 2012 – Major waste types



Note:

(1) Others include textile, wood/rattan, household hazardous wastes and miscellaneous waste.

Plate 2.11 Disposal of construction waste by destination in 2011 and 2012



Note:

(1) Public fill reception facilities are managed by CEDD for receiving inert fill materials for reuse. In 2012, two major public fill reception facilities are in operation at Tseung Kwan O and Tuen Mun.

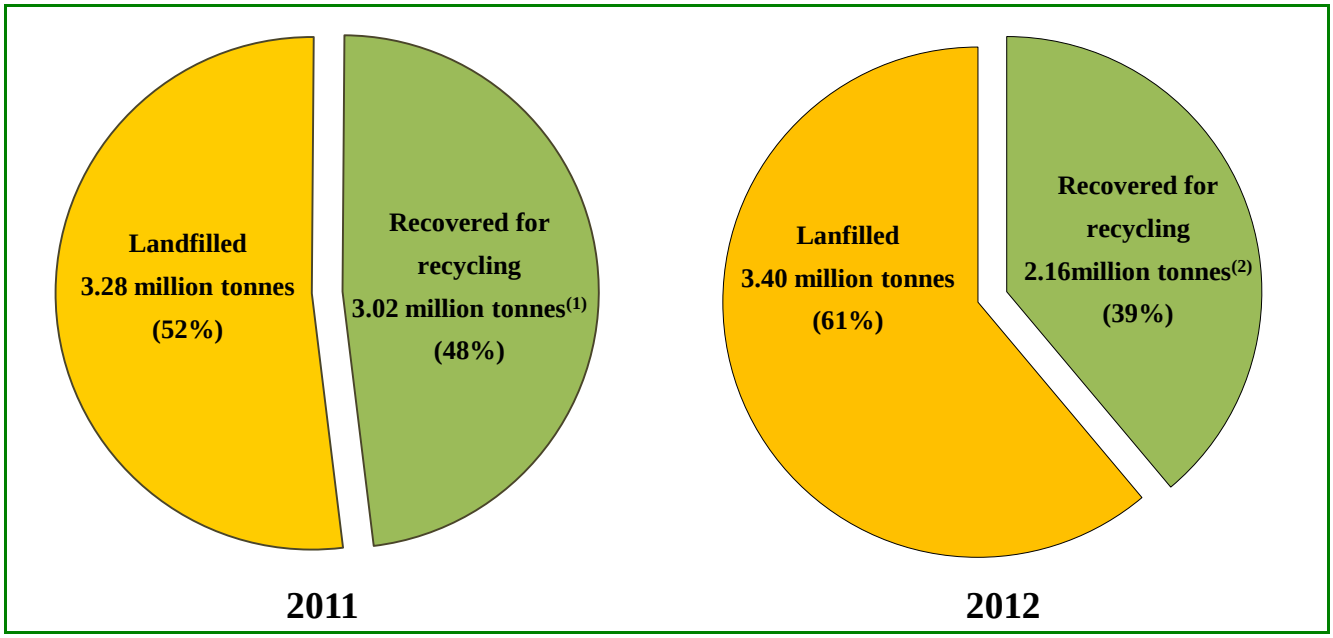
Plate 2.12 Disposal of special waste in 2012

Waste type	Disposal method	Average daily quantity[1] (tpd)
Abattoir waste	Landfill	9
Animal carcasses and kennel waste	Landfill	8
Asbestos waste	Landfill	3
Chemical waste other than asbestos waste	Landfill	7
Clinical waste (with packaging material)	Landfill	1
Condemned goods	Landfill	23
CWTC stabilised residue and incineration ash	Landfill	11
Dewatered dredged materials	Landfill	0
Dewatered sewage sludge	Landfill	895
Dewatered waterworks sludge	Landfill	46
Livestock waste	Landfill	57
Sewage works screenings	Landfill	62
Waste tyres	Landfill[2]	5
	Landfill Sub-total	1,127
Chemical waste other than asbestos waste	CWTC	27
Clinical waste	CWTC	5
Grease trap waste	WKTS	448[3]
Horse stable waste	AWCP	12
Livestock waste	Other environmentally acceptable means[4]	166
Dredged mud and excavated materials	Marine dumping	81,694[5]
Furnace bottom ash	Concrete manufacturing, stored in lagoon[6]	166
Pulverised fuel ash	Concrete manufacturing, stored in lagoon[6]	1,362

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) Waste Tyres are shredded or cut prior to disposal.
(3) The figure is the quantity of grease trap waste treated by the Grease Trap Waste Treatment Facility at WKTS.
(4) Examples of environmentally acceptable means include on-site composting, aerobic treatment, dry muck-out, etc.
(5) The figure is calculated by assuming the density of the dredged mud and excavated materials to be one tonne per cubic metre.
(6) The figures are calculated by making reference to the information provided by the power companies.

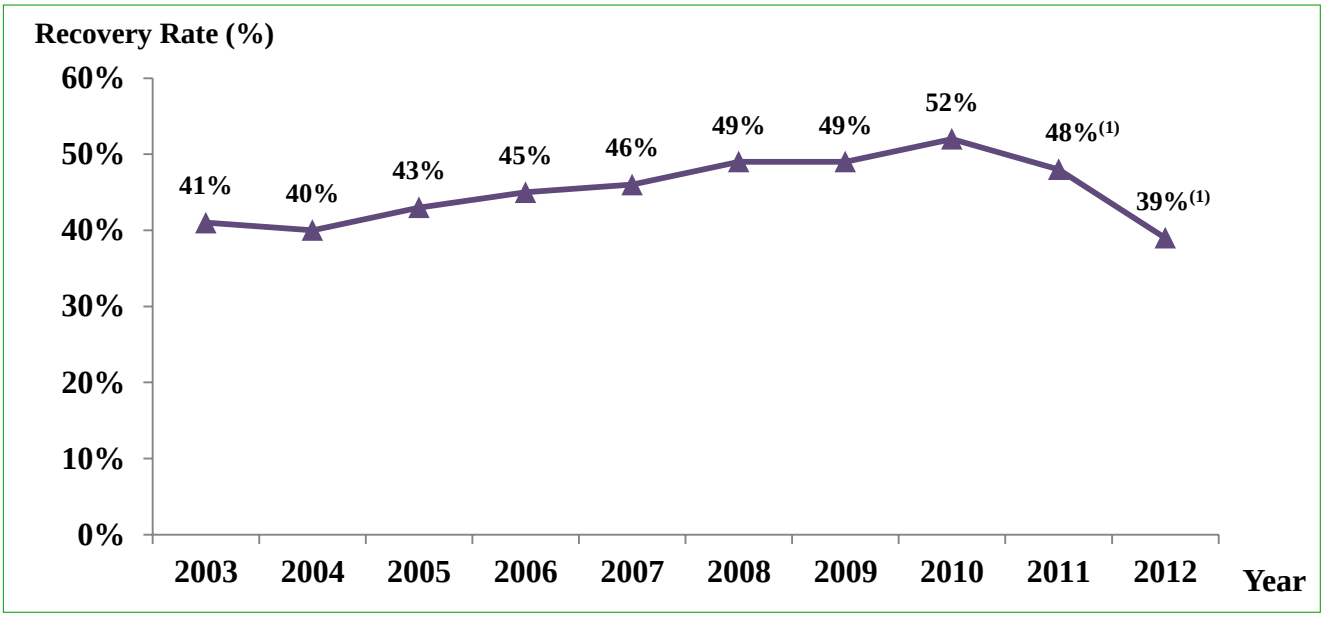
3. Waste Recovery and Recycling Estimate

Plate 3.1 Recovery of municipal solid waste in 2011 and 2012



Note:
(1) A total of 3.02 million tonnes of recyclable materials were recovered for recycling in 2011, of which, 2.98 million tonnes (99%) were exported for recycling and 0.04 million tonnes (1%) recycled locally.
(2) A total of 2.16 million tonnes of recyclable materials were recovered for recycling in 2012, of which, 2.10 million tonnes (97%) were exported for recycling and 0.06 million tonnes (3%) recycled locally.

Plate 3.2 Municipal solid waste recovery rates in 2003 – 2012



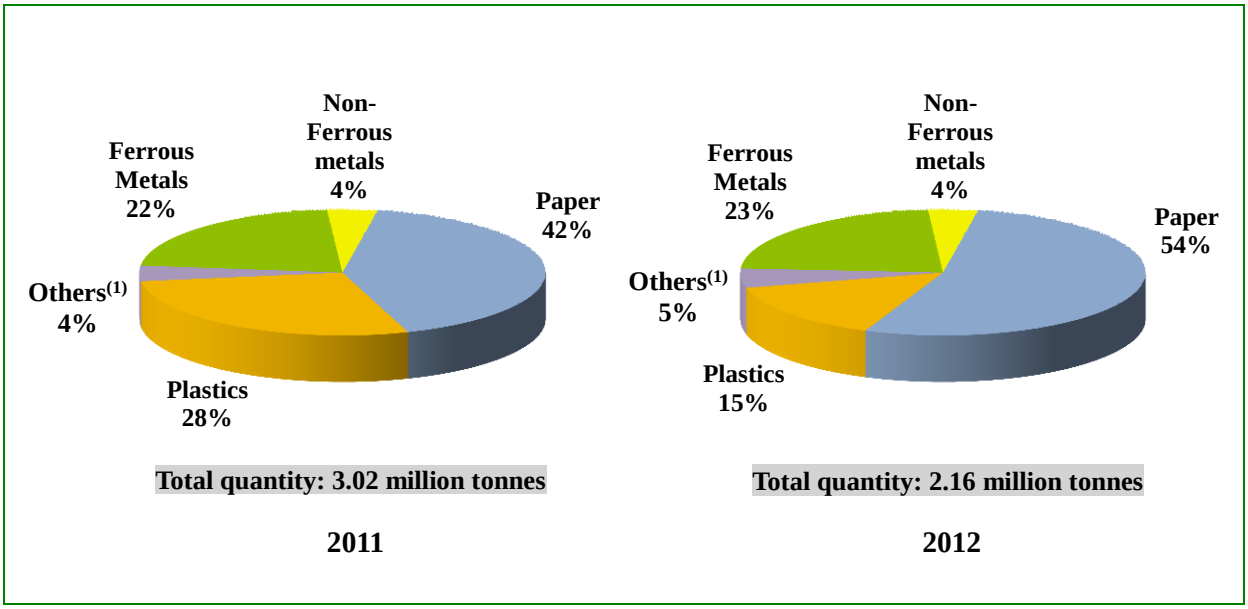
Note:
(1) The apparent decreases in MSW recovery rate in 2011 and 2012 are mainly due to substantial fluctuations in export statistics of waste plastics, whereas waste disposal quantities remained at a steady level without significant increase (see Plates 2.3 and 2.7).

Plate 3.3 Recovered recyclable materials by type in 2012

Material type	Quantity of recovered recyclable materials (thousand tonnes)		
	Exported for recycling (a)	Recycled locally (b)	Total recovered for recycling (c) (a) + (b)
Paper	1,162.3	0	1,162.3
Plastics	308.0	8.6	316.6
Ferrous metals	493.3	6.6	499.8
Non-ferrous metals	76.7	1.4	78.2
Glass	0.1	18.2(1)	18.3
Rubber tyres	0	12.0(2)	12.0
Textiles	3.8	0	3.8
Wood	8.3	0.7	9.0
Food waste	0	6.7	6.7
Electrical and electronic equipment	49.8	6.2	56.0
Total	2,102.4	60.3	2,162.8

Notes:
(1) The quantity does not include glass beverage bottles recovered through deposit-and-refund system operated by local beverage manufacturers.
(2) The 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 2011 and 2012



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

Plate 3.5 Total quantities and export values of recovered recyclable materials in 2008 – 2012

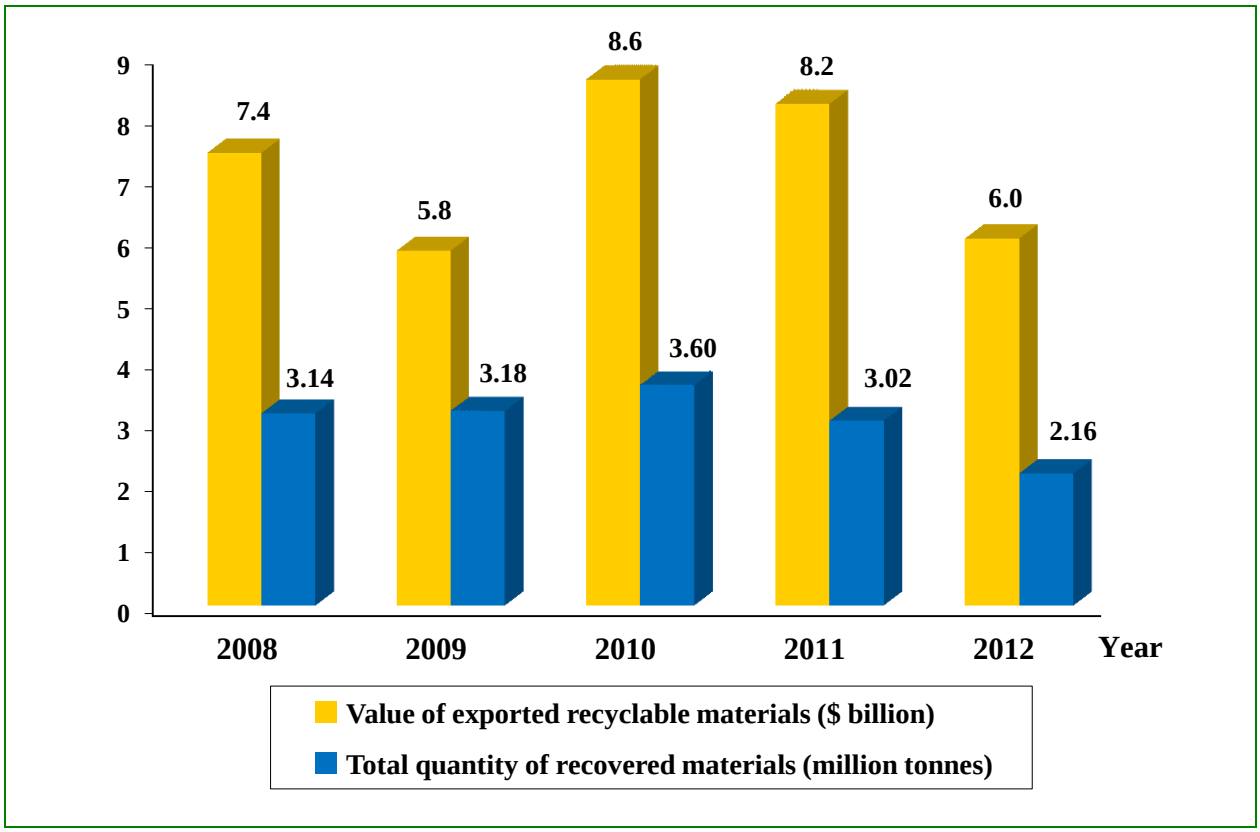
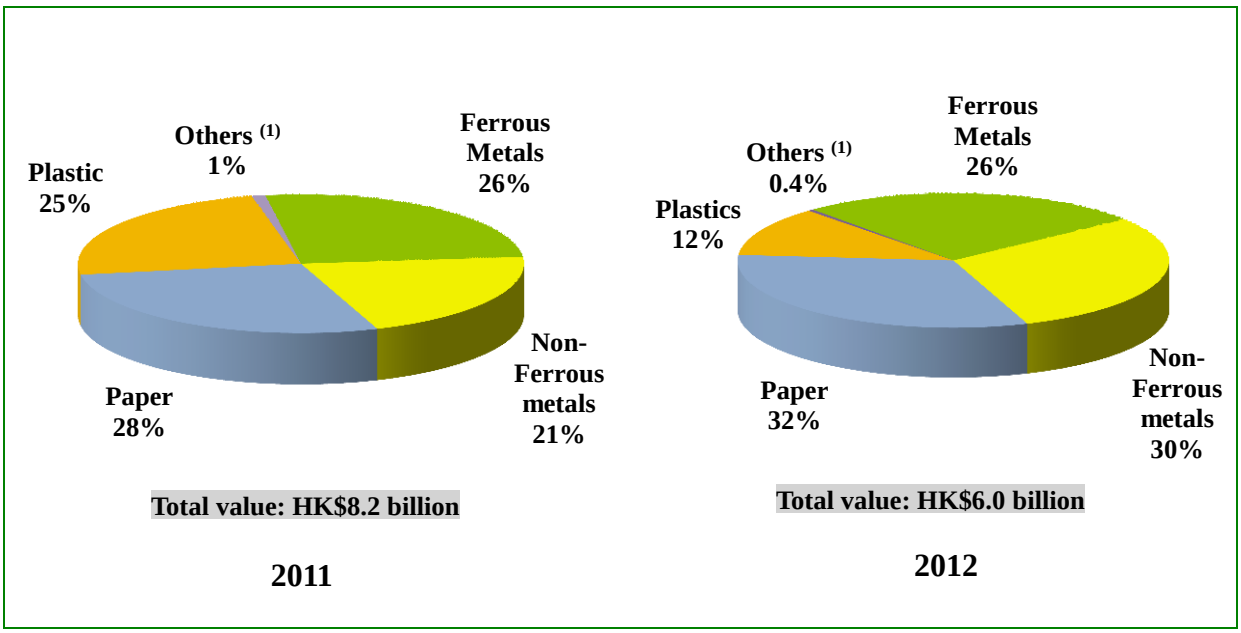


Plate 3.6 Values of exported recyclable materials in 2011 and 2012



Notes:
(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	15,094	202,494	13,416
~ Pig or cast iron	0	0	0
~ Tinplate	0	0	0
~ Other scraps	478,190	1,367,369	2,859
(Ferrous metals) Sub-total	493,284	1,569,864	3,182
b. Non-ferrous metals			
~ Aluminium	45,242	252,265	5,576
~ Copper & alloys	31,224	1,161,493	37,198
~ Lead	61	517	8,502
~ Metal ash & residues	78	1,486	19,107
~ Nickel	48	2,683	56,444
~ Precious metal (without scrap gold)	53	358,810	6,749,373
~ Tin	0	0	0
~ Zinc	22	253	0
(Non-ferrous metals) Sub-total	76,728	1,777,506	23,166
c. Plastics			
~ Polyethylene	43,097	139,026	3,226
~ Polystyrene & copolymers	1,411	9,629	6,824
~ Polyvinyl chloride	38,926	123,959	3,184
~ Others	224,583	455,601	2,029
(Plastics) Sub-total	308,016	728,215	2,364
d. Textiles			
~ Cotton	1,202	6,947	5,778
~ Man-made fibres	0	0	0
~ Old clothing & other textile articles, rags, etc.	2,589	11,233	4,338
(Textiles) Sub-total	3,791	18,180	4,795
e. Wood & paper			
~ Paper	1,162,294	1,912,082	1,645
~ Wood (include sawdust)	8,327	8,327	1,000
(Wood & paper) Sub-total	1,170,621	1,920,409	1,641
f. Glass			
~ Glass	148	220	1,487
(Glass) Sub-total	148	220	1,487
g. Electrical and electronic equipment	49,831	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, overall 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.

- **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.

- Municipal solid waste contains a small portion of 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.

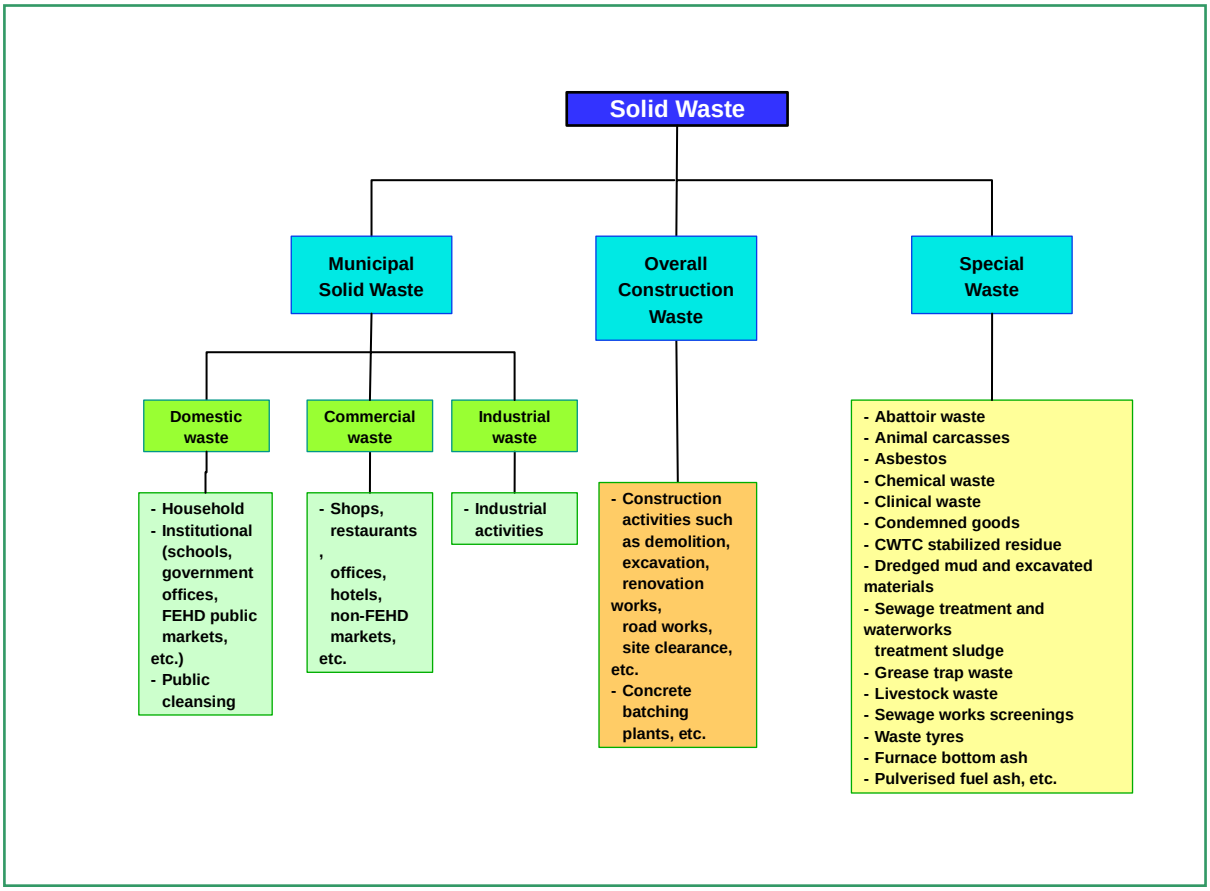
Overall construction waste is a mixture of waste or surplus materials arising from construction activities such as site clearance, excavation, refurbishment, renovation, demolition and road works. It also includes waste concrete that is generated from concrete batching plants and cement plaster/mortar manufacturing plants not set up inside construction sites. Overall construction waste may comprise a fraction of inert materials such as debris, rubble, earth and concrete, which, after proper sorting, can be recycled for use in site formation, land reclamation and construction.

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



Methodology

Solid waste data are mainly collected by the following sources:

- Waste intake records taken at waste management facilities;
- Results of annual survey on waste composition conducted in October - December 2012 at landfills and RTS;
- Results of waste recovery survey conducted in February - May 2013 by MVA Hong Kong Limited;
- Statistics provided by relevant groups of EPD, and
- Statistics provided by other departments including FEHD, CEDD and C&SD.