MONITORING OF SOLID WASTE IN HONG KONG

Waste Statistics for 2011




Environmental Protection Department

Monitoring of Solid Waste in Hong Kong
Waste Statistics for 2011

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Work done by:	**Refuse Transfer Station Development Group, Waste Reduction and EcoPark Group, Environmental Infrastructure Division Environmental Protection Department**
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Cover photos

Top left: Waste composition survey in progress.

Bottom left: Plastics recycling at EcoPark.

Top right: Waste disposal at a landfill.

Bottom right: Composting of food waste.

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**
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 2011. 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 2011

Waste type[1]		Average daily quantity (tpd)
a.	Domestic waste	5,973
b.	Commercial waste	2,360
c.	Industrial waste	663
d.	Municipal solid waste (a+b+c)	8,996
e.	Overall construction waste	3,331
f.	Special waste[2]	1,131
g.	All waste received at landfills (d+e+f) Total	13,458

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 2010 and 2011

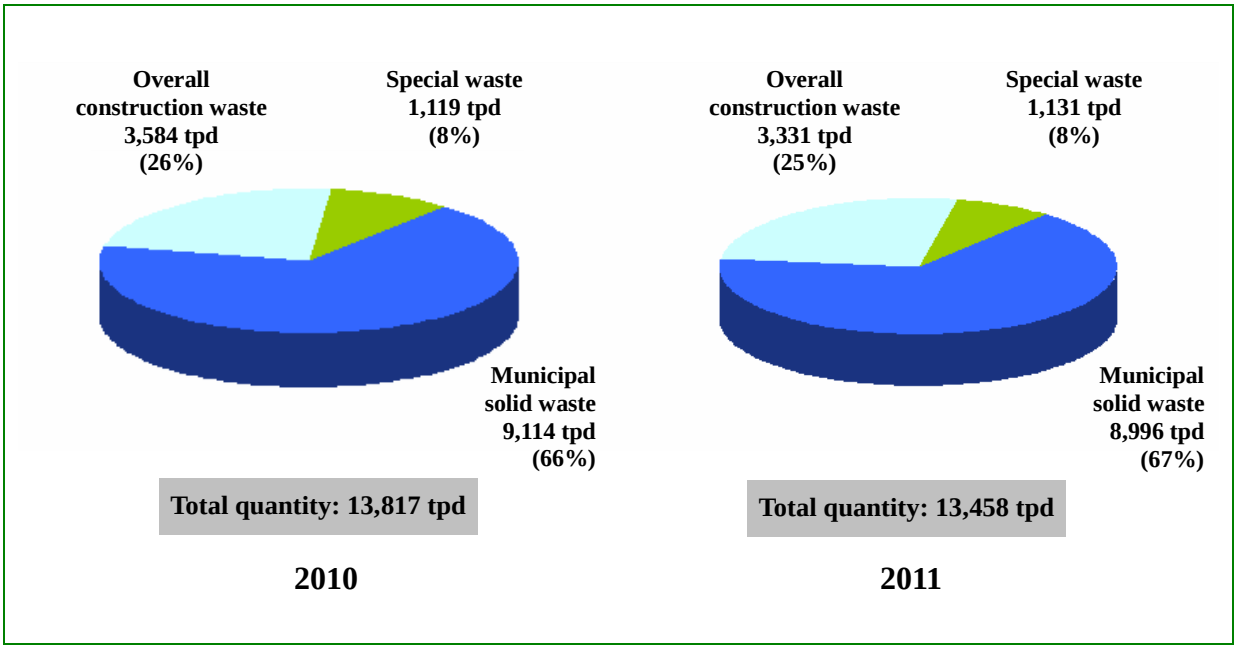


Plate 2.3 Disposal of solid waste at landfills in 2007 – 2011

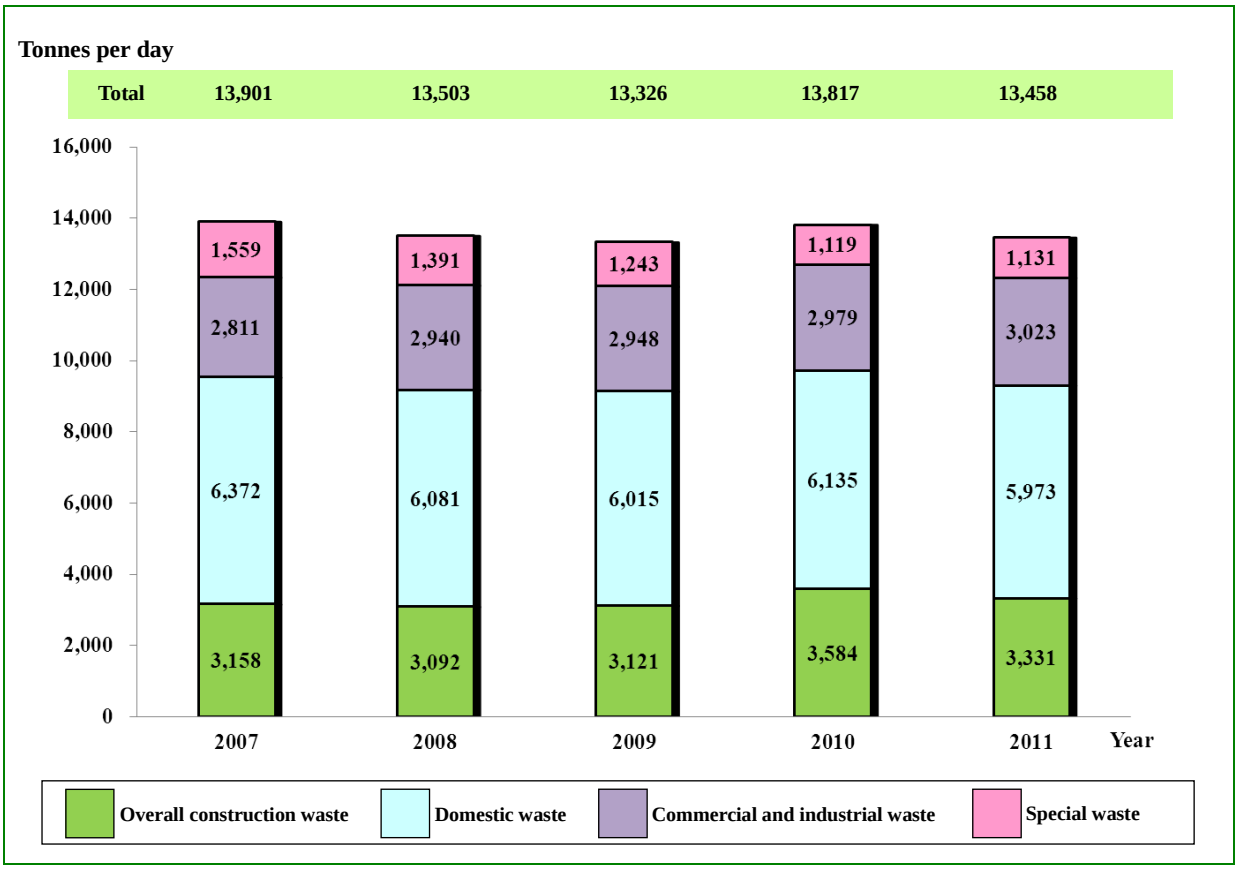
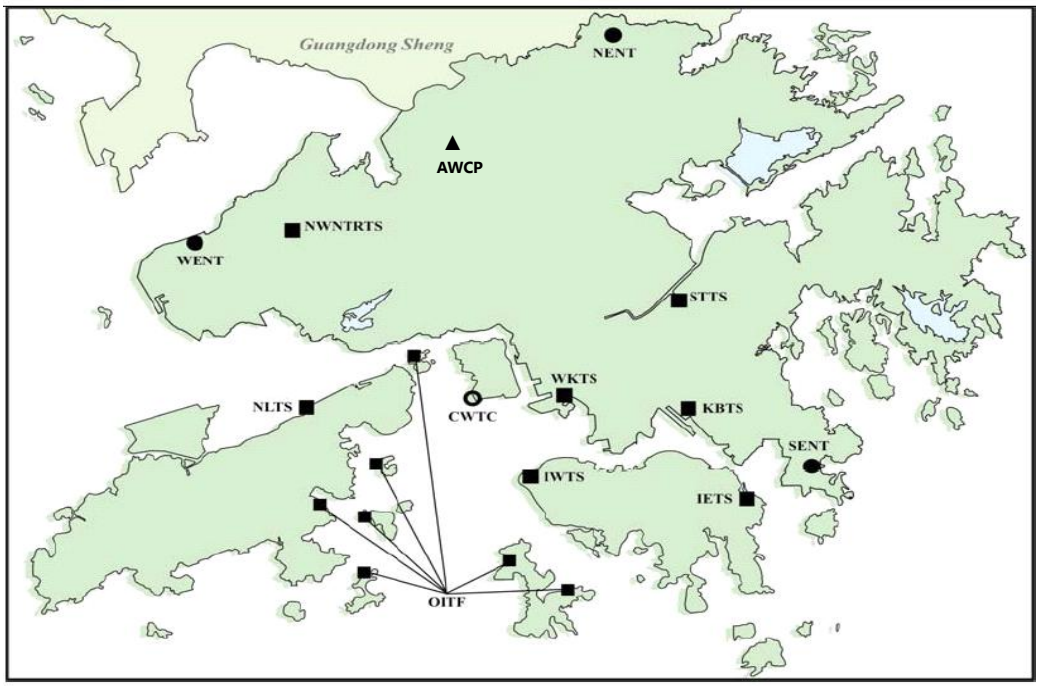


Plate 2.4 Waste management facilities in Hong Kong



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 2011

Disposal facility [1]	Average daily quantity (tpd)			
	MSW	Overall construction waste	Special waste	Total
IETS - Island East Transfer Station	789	-	-	789
STTS - Sha Tin Transfer Station	939	-	-	939
IWTS - Island West Transfer Station	520	-	-	520
WKTS - West Kowloon Transfer Station	2,252	-	484	2,736
OITF - Outlying Islands Transfer Facilities	81	26	3	109
NLTS - North Lantau Transfer Station	170	-	0.51	170
NWNTRTS - North West New Territories Refuse Transfer Station	924	-	-	924
WENT - West New Territories Landfill	5,082[2]	549[2]	500	6,131[2]
SENT - South East New Territories Landfill	2,085	2,325	404	4,814
NENT - North East New Territories Landfill	1,829[2]	458	227	2,513[2]
Total	8,996	3,331	1,131	13,458

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 2011

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	288	87	375	202
Wanchai	250	149	398	87
Eastern	412	105	517	54
Southern	241	77	318	109
Hong Kong Island Sub-total	1,190	418	1,608	452
Yau Tsim Mong	502	210	712	178
Sham Shui Po	313	142	455	77
Kowloon City	305	158	463	432
Wong Tai Sin	279	132	411	37
Kwun Tong	465	272	737	486
Kowloon Sub-total	1,864	914	2,779	1,211
Kwai Tsing	321	164	484	161
Tsuen Wan	259	141	400	41
Tuen Mun	396	273	669	341
Yuen Long	547	304	850	129
North	339	161	500	69
Tai Po	237	88	325	77
Sha Tin	408	188	596	121
Sai Kung	287	233	520	650
NT- Mainland Sub-total	2,794	1,550	4,344	1,589
Cheung Chau	24	-	-	-
Mui Wo	20	-	-	-
Peng Chau	6	-	-	-
Ma Wan	4	-	-	-
Lamma Island	8	-	-	-
Hei Ling Chau	3	-	-	-
North Lantau	61	-	-	-
NT-Outlying Islands Sub-total	124	140[3]	264[3]	79[3]
Total	5,973	3,023	8,996	3,331

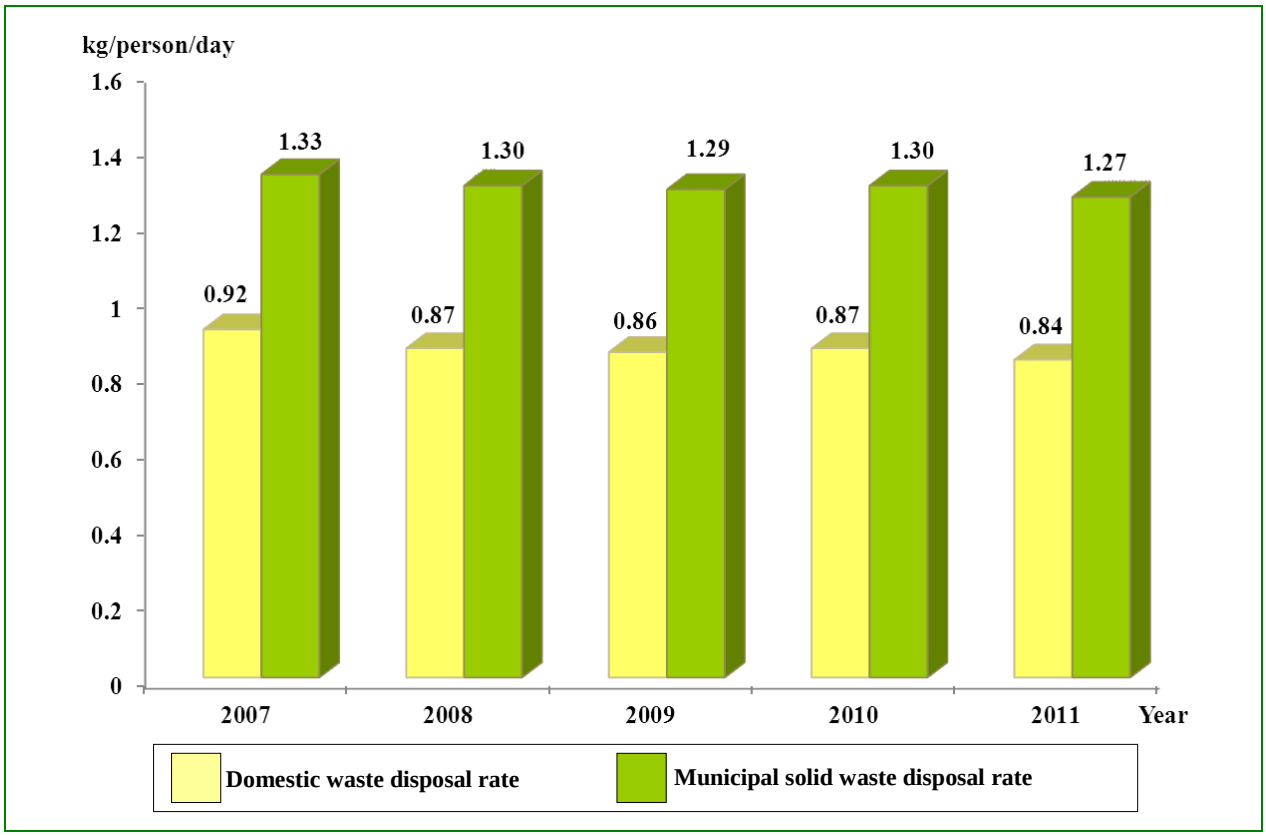
Notes:

(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 2007– 2011



Remark: The per capita disposal rates are calculated based on the population (mid-year) updated by the C&SD in February 2012.

Plate 2.8 Composition of municipal solid waste in 2011

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	189 (3.2%)	78 (3.3%)	10 (1.5%)	88 (2.9%)	278 (3.1%)
Metals	129 (2.2%)	36 (1.5%)	17 (2.6%)	53 (1.7%)	182 (2.0%)
Paper	1,259 (21.1%)	569 (24.1%)	103 (15.5%)	672 (22.2%)	1,931 (21.5%)
Plastics	1,107 (18.5%)	464 (19.7%)	123 (18.5%)	587 (19.4%)	1,694 (18.8%)
Putrescibles	2,868 (48.0%)	1,014 (43.0%)	113 (17.0%)	1,126 (37.3%)	3,994 (44.4%)
Textiles	141 (2.4%)	56 (2.4%)	20 (3.0%)	76 (2.5%)	217 (2.4%)
Wood/Rattan	91 (1.5%)	40 (1.7%)	187 (28.2%)	227 (7.5%)	318 (3.5%)
Household hazardous wastes (HHWs)(1)	64 (1.1%)	14 (0.6%)	5 (0.7%)	19 (0.6%)	83 (0.9%)
Others(2)	122 (2.0%)	90 (3.8%)	86 (13.0%)	176 (5.8%)	298 (3.3%)
Sub-total	5,973 (100%)	2,360 (100%)	663 (100%)	3,023 (100%)	8,996 (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.

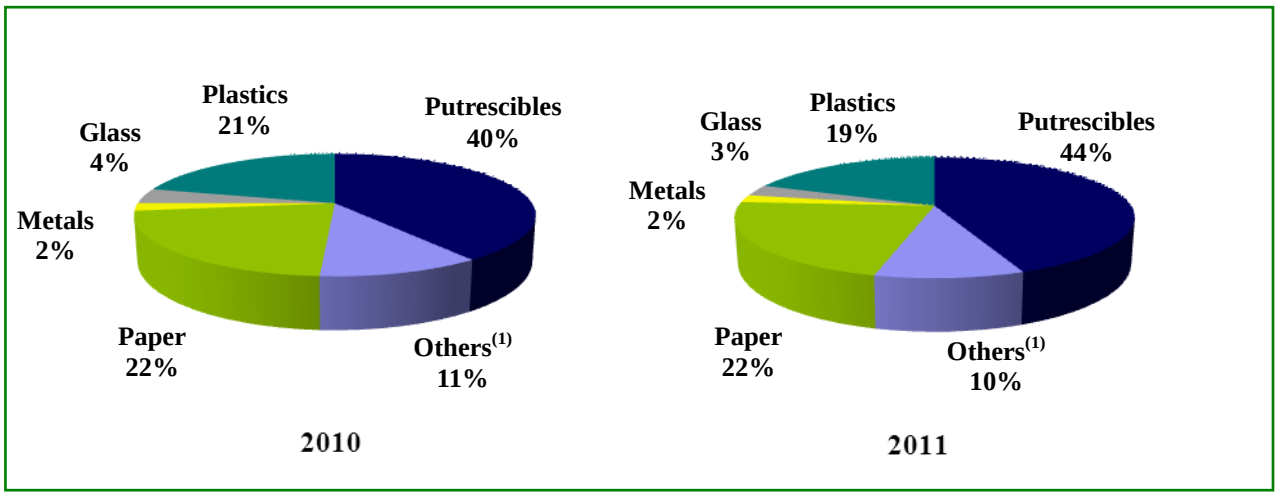
Plate 2.9 Composition of municipal solid waste in 2011 – Breakdown of major components

Composition	Domestic waste		Commercial & industrial waste	
	Quantity (tpd)	% by weight	Quantity (tpd)	% by weight
Glass				
~ Glass bottles	154	(2.6%)	78	(2.6%)
~ Other glass	36	(0.6%)	11	(0.3%)
(Glass) Sub-total	189	(3.2%)	88	(2.9%)
Metals				
~ Ferrous metals	102	(1.7%)	41	(1.4%)
~ Aluminium cans	15	(0.3%)	8	(0.2%)
~ Other non-ferrous metals	12	(0.2%)	4	(0.1%)
(Metals) Sub-total	129	(2.2%)	53	(1.7%)
Paper				
~ Cardboard	213	(3.6%)	150	(5.0%)
~ Newsprint	412	(6.9%)	83	(2.7%)
~ Office paper	86	(1.4%)	49	(1.6%)
~ Others[(1)]	549	(9.2%)	390	(12.9%)
(Paper) Sub-total	1,259	(21.1%)	672	(22.2%)
Plastics				
~ Plastic bags	528	(8.8%)	212	(7.0%)
~ Polyfoam - dining wares	34	(0.6%)	16	(0.5%)
~ Polyfoam – others	19	(0.3%)	35	(1.2%)
~ PET plastic bottles	74	(1.2%)	26	(0.9%)
~ Non-PET plastic bottles	48	(0.8%)	10	(0.3%)
~ Others[(2)]	404	(6.8%)	287	(9.5%)
(Plastics) Sub-total	1,107	(18.5%)	587	(19.4%)
Putrescibles				
~ Food waste	2,528	(42.3%)	1,056	(34.9%)
~ Yard waste	82	(1.4%)	15	(0.5%)
~ Others[(3)]	258	(4.3%)	56	(1.9%)
(Putrescibles) Sub-total	2,868	(48.0%)	1,126	(37.3%)

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) Other putrescible waste includes personal care cotton products, such as diapers.

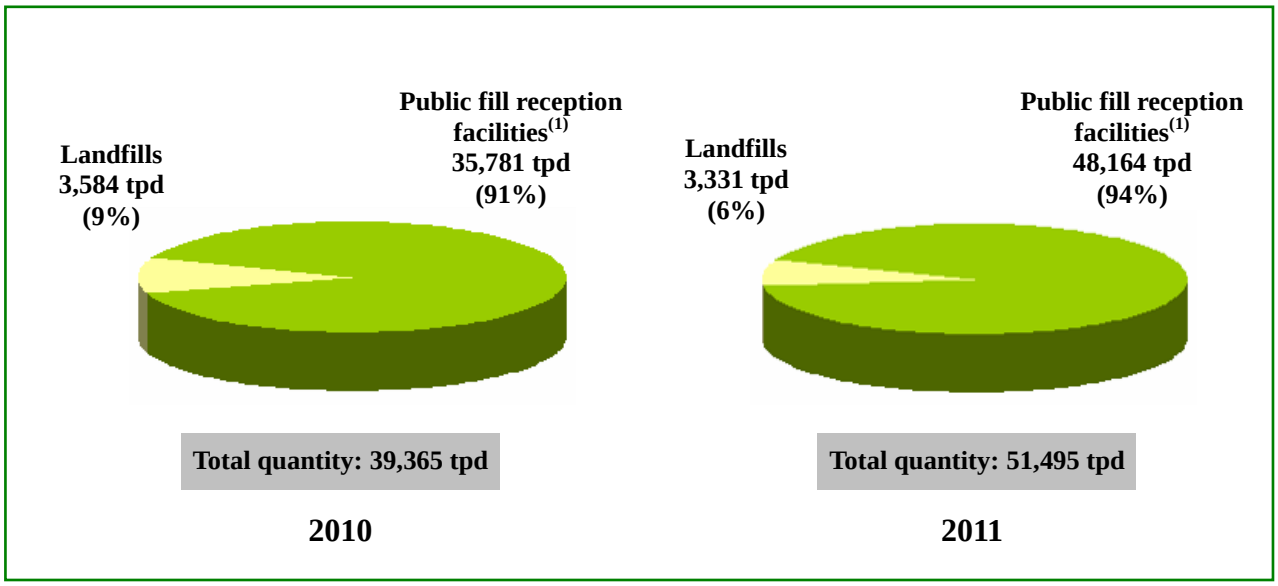
Plate 2.10 Composition of municipal solid waste in 2010 and 2011 – Major waste types



Note:

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

Plate 2.11 Disposal of construction waste by destination in 2010 and 2011



Note:

(1) Public fill reception facilities are managed by CEDD for receiving inert fill materials for reuse. In 2011, two major public fill reception facilities are in operation at Tseung Kwan O and Tuen Mun.

Plate 2.12 Disposal of special waste in 2011

Waste type	Disposal method	Average daily quantity[1] (tpd)
Abattoir waste	Landfill	10
Animal carcasses and kennel waste	Landfill	7
Asbestos waste	Landfill	6
Chemical waste other than asbestos waste	Landfill	6
Clinical waste (with packaging material)	Landfill	4
Condemned goods	Landfill	16
CWTC stabilised residue and incineration ash	Landfill	11
Dewatered dredged materials	Landfill	5
Dewatered sewage sludge	Landfill	893
Dewatered waterworks sludge	Landfill	52
Livestock waste	Landfill	61
Sewage works screenings	Landfill	60
Waste tyres	Landfill[2]	2
	Landfill Sub-total	1,131
Chemical waste other than asbestos waste	CWTC	33
Clinical waste	CWTC	2
Grease trap waste	WKTS	484[3]
Horse stable waste	AWCP	8
Livestock waste	Other environmentally acceptable means[4]	163
Dredged mud and excavated materials	Marine dumping	84,110[5]
Furnace bottom ash	Concrete manufacturing, stored in lagoon[6]	115
Pulverised fuel ash	Concrete manufacturing, stored in lagoon[6]	1,374

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.

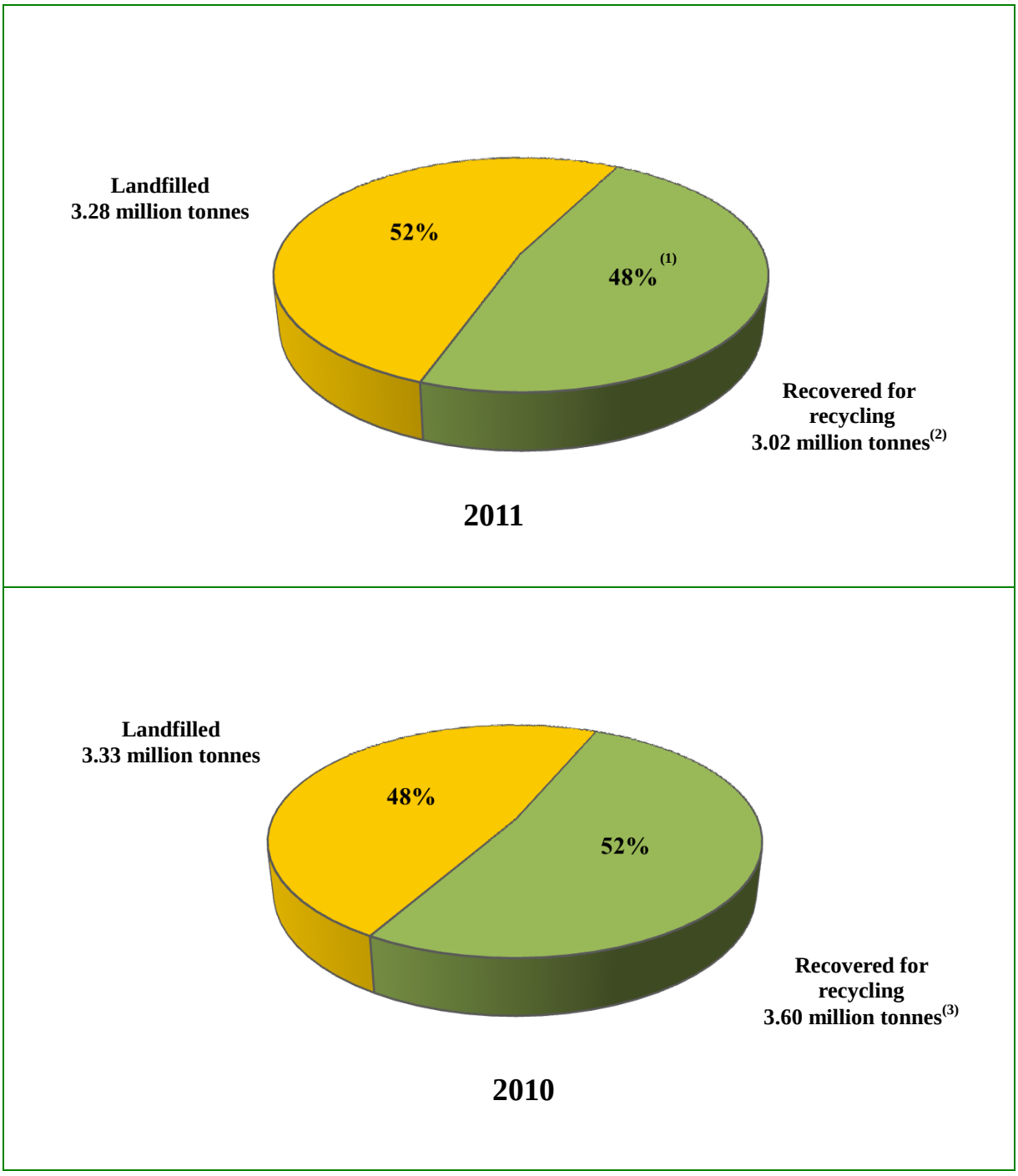
(4) Examples of environmentally acceptable means include on-site composting, aerobic treatment, dry muck-out, etc.

(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

Plate 3.1 Recovery of municipal solid waste in 2010 and 2011



Notes:

(1) The apparent 4% decrease in the MSW recovery rate in 2011 is mainly due to a substantial decrease in plastic waste generation. Compared to 2010, the quantity of waste plastics exported for recycling decreased by 0.73 million tonnes or 47%, and the quantity disposed of at landfills decreased by 0.09 million tonnes or 13%.

(2) 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 tonne (1%) was recycled locally.

(3) 3.60 million tonnes of recyclable materials were recovered for recycling in 2010 of which 3.57 million tonnes (99%) were exported for recycling and 0.03 million tonne (1%) was recycled locally.

Plate 3.2 Municipal solid waste recovery rates in 2007 – 2011

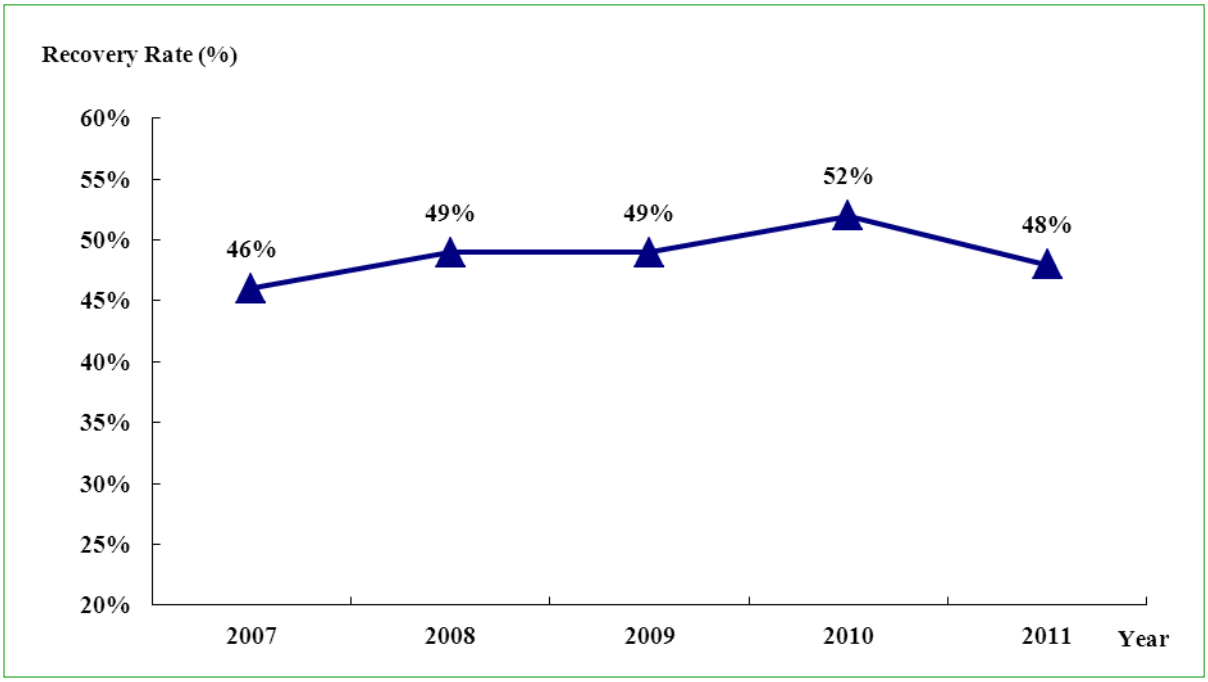
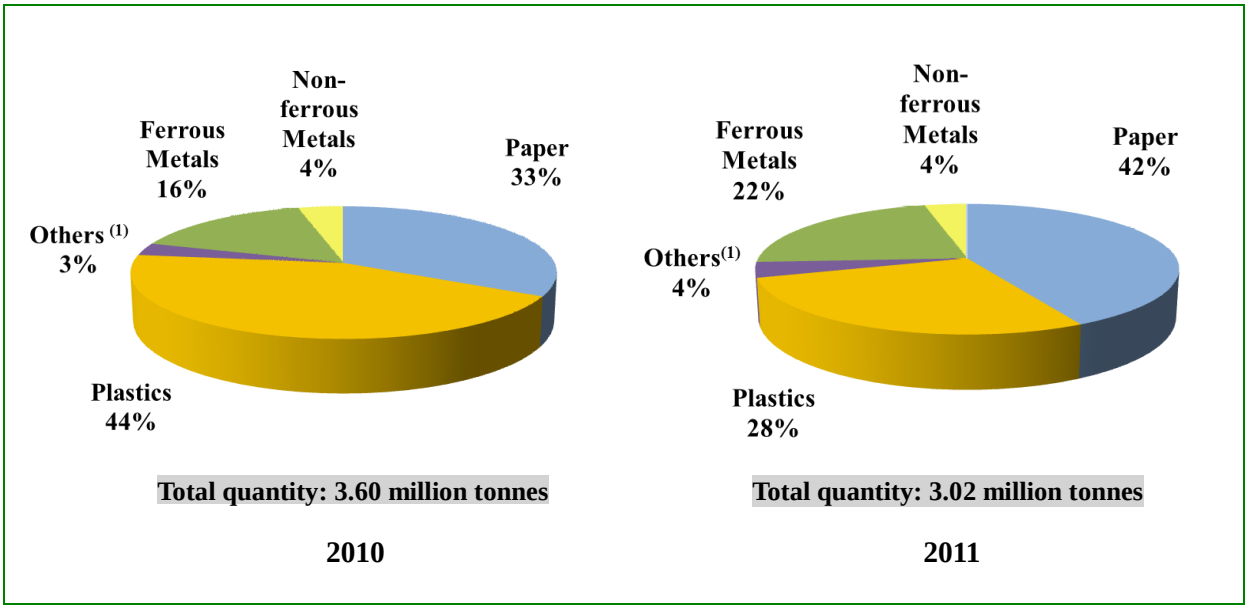


Plate 3.3 Recovered recyclable materials by type in 2011

Material type	Quantity of recovered recyclable materials (thousand tonnes)		
	Exported for recycling (a)	Recycled locally (b)	Total recovered for recycling (c) = (a) + (b)
Paper	1,278.4	0	1,278.4
Plastics	839.3	3.9	843.2
Ferrous metals	667.3	0	667.3
Non-ferrous metals	105.5	9.6	115.1
Glass	0.2	4.6(1)	4.8
Rubber tyres	0	14.8(2)	14.8
Textiles	10.8	0	10.8
Wood	17.6	0.1	17.7
Food waste	0	0.6(3)	0.6
Electrical and electronic equipment	56.1	10.6	66.7
Total	2,975.1	44.3	3,019.3

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.
(3) The quantity refers to food waste recycled at EPD's pilot composting facility at Kowloon Bay. There is also limited food waste recycling practised by industrial operators and a number of residential and commercial establishments that use small plants of capacities ranging from 5 kg per day to 200 kg per day.

Plate 3.4 Recovered recyclable materials by type in 2010 and 2011



Note:
(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 2007 – 2011

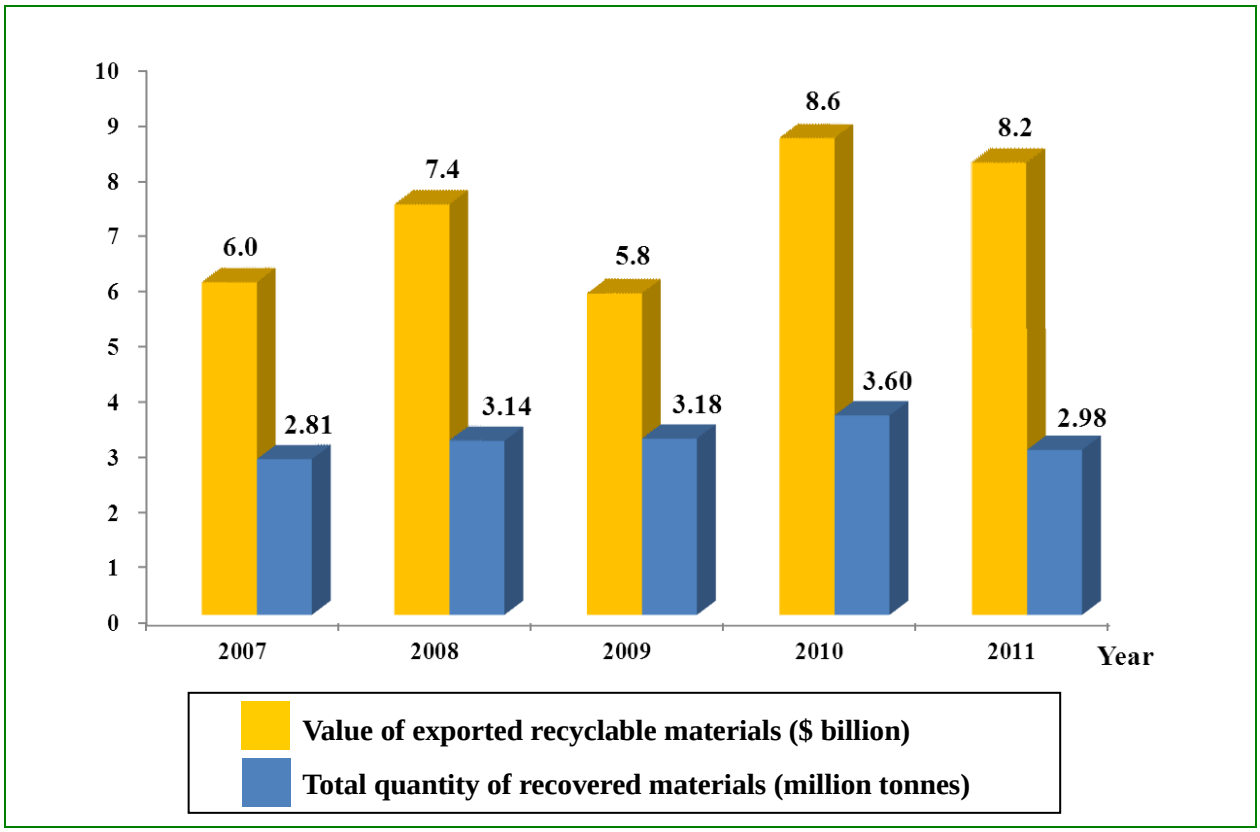
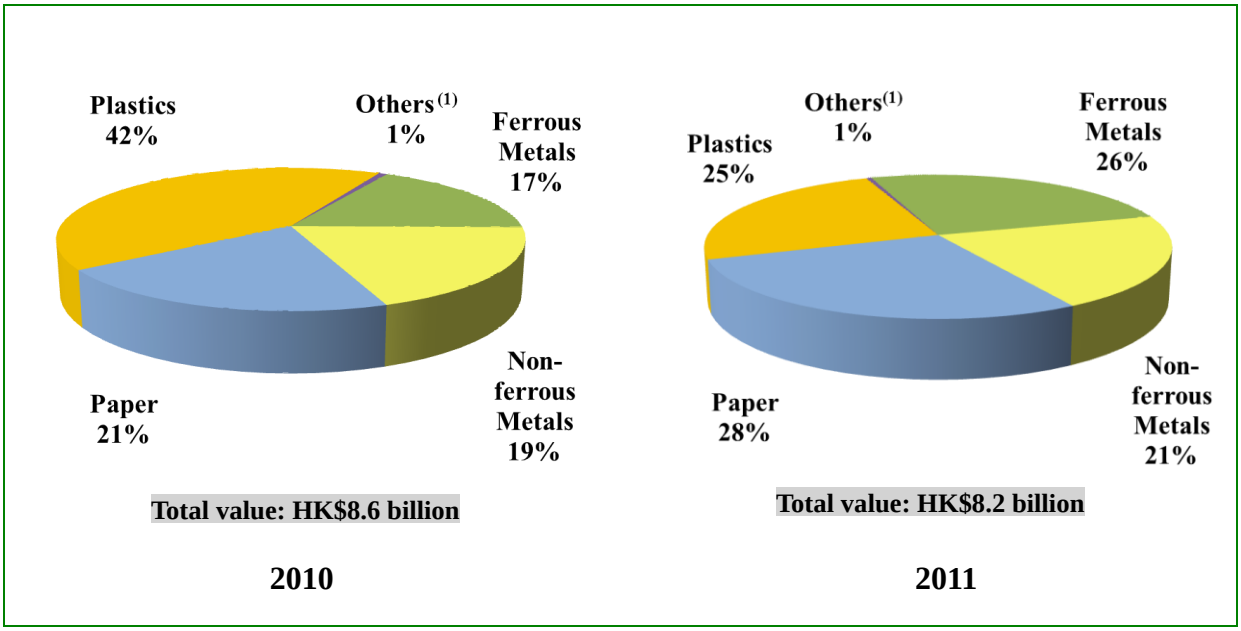


Plate 3.6 Values of exported recyclable materials in 2010 and 2011



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	14,940	243,749	16,316
~ Pig or cast iron	0	0	0
~ Tinplate	0	0	0
~ Other scraps	652,406	1,896,525	2,907
(Ferrous metals) Sub-total	667,346	2,140,274	3,207
b. Non-ferrous metals			
~ Aluminium	73,933	597,905	8,087
~ Copper & alloys	31,220	882,793	28,277
~ Lead	63	816	13,015
~ Metal ash & residues	47	525	11,231
~ Nickel	81	6,839	84,464
~ Precious metal (without scrap gold)	53	244,222	4,636,395
~ Tin	61	1,559	0
~ Zinc	0	0	0
(Non-ferrous metals) Sub-total	105,456	1,734,659	16,449
c. Plastics			
~ Polyethylene	241,442	813,698	3,370
~ Polystyrene & copolymers	34,192	61,678	1,804
~ Polyvinyl chloride	14,843	47,015	3,167
~ Others	548,797	1,092,092	1,990
(Plastics) Sub-total	839,273	2,014,482	2,400
d. Textiles			
~ Cotton	4,547	4,547	1,000
~ Man-made fibres	16	69	4,212
~ Old clothing & other textile articles, rags, etc.	6,231	15,683	2,517
(Textiles) Sub-total	10,794	20,299	1,881
e. Wood & paper			
~ Paper	1,278,366	2,298,915	1,798
~ Wood (include sawdust)	17,573	14,428	821
(Wood & paper) Sub-total	1,295,939	2,313,342	1,785
f. Glass			
~ Glass	152	135	891
(Glass) Sub-total	152	135	891
g. Electrical and electronic equipment	56,100	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.

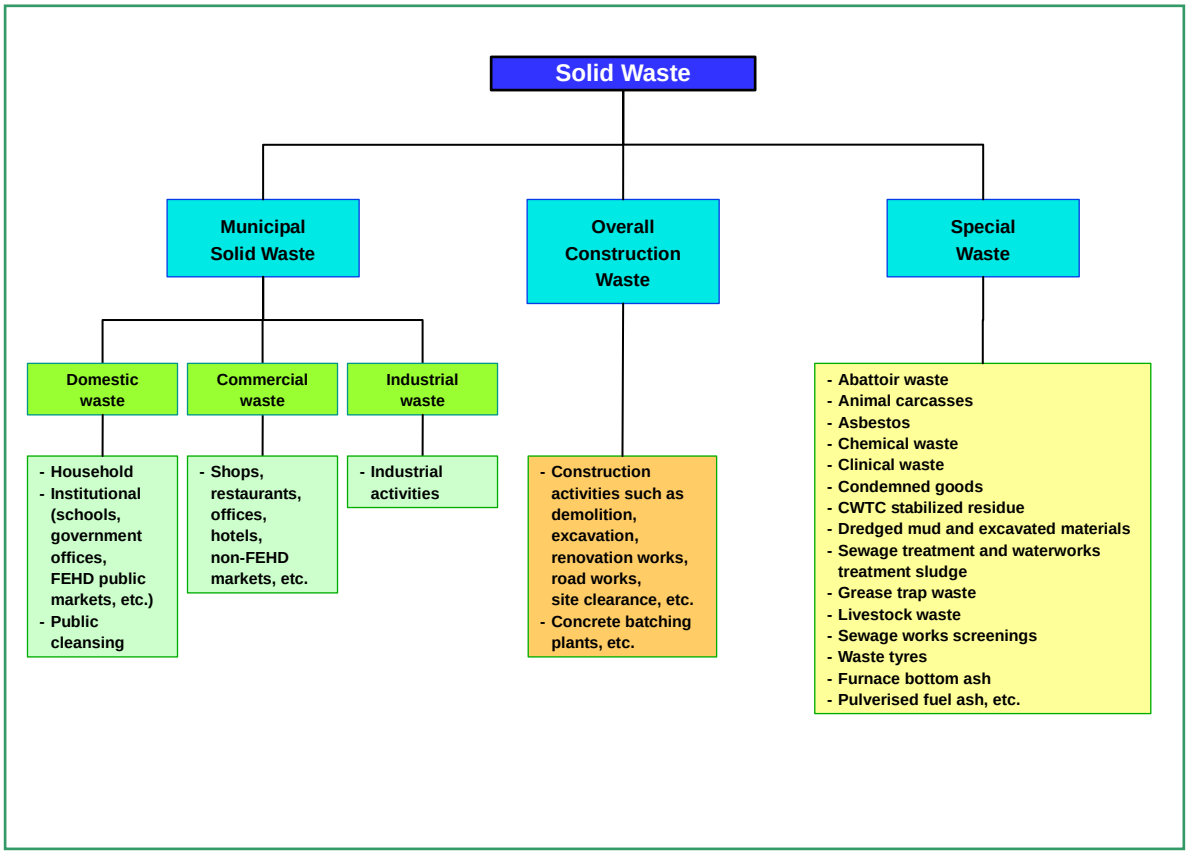
Overall construction waste is a mixture of waste or surplus materials arising from construction activities such as site clearance, excavation, refurbishment, renovation, demolition and road works. It also includes waste concrete that is generated from concrete batching plants and cement plaster/mortar 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 2011 at landfills and RTS;
- Results of waste recovery survey conducted in February - May 2012 by MVA Hong Kong Limited;
- Statistics provided by relevant groups of EPD, and
- Statistics provided by other departments including FEHD, CEDD and C&SD.