MONITORING OF SOLID WASTE IN HONG KONG

Waste Statistics for 2015

Environmental Protection Department

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Cover photos

Top left: Bird's eye view of T·PARK in Tuen Mun

Bottom left: Disassembling WEEE in progress at EcoPark

Top right: Bird's eye view of West Kowloon Transfer Station

Bottom right: Waste composition survey in progress under supervision of the EPD supervisor

Contents

Abbreviations

AFCD	Agriculture, Fisheries and Conservation Department
AWCP	Animal Waste Composting Plant
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
N/A	Not Available
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
OWTF	Organic Waste Treatment Facilities
PET	Polyethylene Terephthalate
RTS(s)	Refuse Transfer Station(s)
SENT	South East New Territories Landfill
SLCP	Shaling Composting Plant
STTS	Sha Tin Transfer Station
tpd	tonnes per day
WEEE	Waste electrical and electronic equipment
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 2015. The information contained in this report is compiled from the data collected from various sources, including the ongoing solid waste monitoring work at waste treatment facilities undertaken by the Environmental Protection Department (EPD). The classification of solid waste and the methodology adopted in data collection are explained in Appendix 1. The revised per capita disposal rates in this report are calculated based on the population data (mid-year) updated by the Census and Statistics Department (C&SD) in February 2017. Abbreviations used in this report are listed on page iv for ease of reference. Readers may wish to note that figures of various plates may not add up to total and percentages may not add up to 100 due to rounding off.

We have summarised the key observations of the local waste disposal and resource recovery scene in the ensuing paragraphs. This aims to facilitate readers to have a quick overview of the achievements and challenges of our waste management efforts. Detailed statistics are provided in Chapters 2 and 3 for readers' reference.

Waste Disposal in 2015

Total Solid Waste

Solid waste comprises municipal solid waste (MSW), overall construction waste, dewatered sludge and others. In 2015, the total quantity of solid waste disposed of at the strategic landfills was 5.51 million tonnes, which has increased by 1.6% as compared to 2014 (**Plate 2.1**). This rate of increase was lower than the figures as reported in the 2014 report (3.8%) and the 2013 report (3.1%).

Municipal Solid Waste

Municipal solid waste includes three categories: domestic waste, commercial waste and industrial waste.

The major component of MSW is domestic waste. Its quantity of disposal was 2.36 million tonnes in 2015, which has been relatively stable and increased only by 0.7% as compared to 2014. Separately, the quantity of commercial and industrial (C&I) waste being disposed was 1.35 million tonnes in 2015, which increased by 9.8% when compared to 2014.

In 2015, the quantity of MSW disposal was 3.71 million tonnes, which represented an increase of 3.9% as compared to 2014. Discounting the factor of population growth, the disposal rate of MSW was 1.39 kg/person/day, as compared to 1.35 kg/person/day in 2014. The increase in the MSW disposal rate was mainly due to the increase in the disposal of C&I waste, which rose by 9.8% as compared to 2014 to reach 1.35 million tonnes in 2015. Generally, since commercial waste arising correlates closely with the level of consumption activities, the relatively large increase in commercial waste disposal reflected a relatively buoyant local economy in 2015 and a strong domestic and external demand for commercial consumption in Hong Kong. In parallel, the disposal rate of domestic waste, being 0.89 kg/person/day, remained at about the same level in the past few years, implying that the growth in domestic waste disposal has broadly been in

line with the growth in population.

It is useful to look at the movement of MSW disposal rates from a medium-term perspective for a more comprehensive analysis. In the past ten years, the MSW disposal rate was actually on the decline from 2006 to 2011 (from 1.35 kg/person/day in 2006 to 1.27 kg/person/day in 2011), but has been picking up again thereafter. As shown in **Plate 2.7**, the relatively stable trend of MSW disposal rate could largely be attributed to the continuous drop in the disposal rate of domestic waste (0.97 kg/person/day in 2006 to 0.89 kg/person/day in 2015). Nevertheless, the disposal rate of C&I waste (from 0.39 kg/person/day in 2006 to 0.51 kg/person/day in 2015) has gradually ascended alongside the increase in the level of consumption and production activities underpinned by economic growth, which has counteracted the reduction in domestic waste.

The three largest constituents of MSW are food waste, waste paper and waste plastics.

Food waste - Of the 10,159 tonnes of MSW landfilled each day in 2015, some 3,382 tonnes (33% of MSW) were food waste. The Government has been implementing multiple initiatives to reduce and recycle food waste and has made some initial achievements in this respect. In 2015, food waste disposal at landfills had dropped by 7.1% as compared to 2014. In particular, the drop in domestic food waste disposal was more notable (-8.1%) than that in the commercial and industrial (C&I) sectors (-4.6%).

Discounting the factor of population growth, the municipal food waste disposal rate dropped from 0.50 kg/person/day in 2014 to 0.46 kg/person/day in 2015, registering a year-on-year decrease of 7.9%. The reduction in domestic food waste disposal rate was more notable (-8.9%), from 0.36 kg/person/day in 2014 to 0.33 kg/person/day in 2015. The C&I food waste disposal rate decreased by 5.4% to 0.14 kg/person/day in 2015.

It is noteworthy that the quantity of food waste generated (i.e. disposal plus recovery) in 2015 was 1,248 thousand tonnes, which decreased by 6.5% as compared to 1,336 thousand tonnes in 2014. This has demonstrated that Government's food waste reduction target is gradually brought to fruition through various efforts to promote food waste avoidance, reduction and recycling.

Waste paper - some 2,257 tonnes per day (22% of MSW) were disposed of at landfills in 2015, which represented an increase of 17.5% as compared to 2014. This partly reflected a weak demand for paper recyclables in recent years, as witnessed by a relatively low level of local paper recyclables exported for recycling (0.9 million tonnes in 2015 as compared to 1.2 million tonnes in 2012).

Waste plastics - some 2,183 tonnes per day (21% of MSW) were disposed of at landfills in 2015, which represented an increase of 8.3% as compared to 2014. The growth in disposal quantity was consequential to a declining recovery rate of waste plastics, which is attributable to a persistently weak demand for recycled plastic materials in the international markets.

Overall Construction Waste

The quantity of overall construction waste being disposed of at landfills in 2015 stood at 64 per cent of the level before the implementation of the Construction Waste Disposal Charging Scheme in 2006. The quantity in 2015 was 1.53 million tonnes, which has increased by 6.6% as compared to 2014. That said, in recent years, the reuse rate of inert materials sorted out from construction waste has remained at above 90% and even reached 94% in 2015. These materials were delivered to the public fill reception facilities and other outlets for beneficial direct reuse. Looking ahead, the construction waste disposal charges will be increased with effect from April

2017 and will continue to provide incentives for the trade to reduce and reuse construction waste.

Special Waste

In 2015, the quantity of special waste disposed of at landfills was 0.27 million tonnes, which has decreased markedly by 34.5% as compared to the 0.41 million tonnes in 2014. This was mainly attributable to the commissioning of T·PARK in Tuen Mun in April 2015. This facility treats dewatered sewage sludge from sewage treatment plants by incineration, leaving only the residue and ash, with 63% reduction in weight, to be landfilled. On average, 801 tonnes of dewatered sewage sludge per day was treated at the T·PARK in 2015.

Resource Recovery in 2015

Hong Kong relies heavily on services industries, and hence it has very limited capacity to utilize raw or recycled materials in local production. As a result, over 90% of MSW recyclables locally recovered are exported for recycling outside Hong Kong.

Similar to other industries that constitute our economy, the local recycling industry is not immune to fluctuations induced by business cycles and market conditions. The challenging conditions of international markets that lasted for years have had a dampening effect on the demand and thus prices of local recyclables. These would continue to affect the overall performance of the recycling industry.

In 2015, the quantity of MSW recyclables recovered was 2.03 million tonnes, which decreased by 1.0% as compared to 2014. Most of the recovered materials (98%) were exported to the Mainland and other countries for recycling, and the export value of which in 2015 was $4.6 billion, as compared to $5.5 billion in 2014 (**Plate 3.7**). The overall MSW recovery rate was 35%, which decreased from 37% in 2014 (**Plate 3.2**). The major reasons for this decline are twofold. First, against falling global crude oil prices in the past few years more producers have opt for virgin raw materials rather than recycled materials in their production processes, resulting in a weak demand for recyclables from Hong Kong. Second, the authorities in nearby cities and countries have tightened their import control regimes in recent years. Local recyclables falling short of a good quality could no longer easily enter such places for further processing.

The recovery performance of major types of recyclables is summarized below.

Metal recyclables have the highest recovery rate at 92% in 2015 among all recyclable types, as they are highly reusable and relatively valuable in international markets. There is a strong economic incentive for the recycling industry to recover metal waste as far as practicable.

Waste electrical and electronic equipment (WEEE) has the second highest recovery rate among MSW recyclables, at 79% in 2015. Similar to metal recyclables, the recyclable value of WEEE is relatively high which attracts local recyclers to actively engage in WEEE recycling and reuse.

Paper recyclables' recovery rate has been on the decline in recent years, at 52% in 2015, as compared to 63% in 2012. The weak demand for paper recyclables has been attributable to a reduced scale and level of economic activities of the importing countries generally.

Plastics recyclables' recovery rate has also been on a declining trend in recent years, at 11% in 2015 as compared to 32% in 2012. A number of factors have contributed to the fluctuations in local recycling business and in turn the declining recovery rate of waste plastics, including a

persistently weak demand for raw plastic materials by the manufacturing sector in the Mainland, stricter control imposed by the Mainland authorities on import of plastic recyclables, and continuing decline in crude oil feedstock prices in the past few years, leading to a corresponding decline in the market value of plastic recyclables.

2. Waste Quantities and Characteristics

Plate 2.1 Disposal of total solid waste at landfills in 2015 - By main waste category

Waste category[1]			Average daily quantity (tpd)	
a.	**Municipal solid waste**		**10,159**	(3.9%)
	(i)	**Domestic waste**	**6,464**	(0.7%)
	(ii)	**Commercial waste**	**2,803**	(9.2%)
	(iii)	**Industrial waste**	**892**	(11.6%)
b.	**Overall construction waste[2]**		**4,200**	(6.6%)
c.	**Special waste[3]**		**743**	(-34.5%)
d.	**All waste received at landfills (a+b+c)**	**Total**	**15,102**	(1.6%)

Notes:

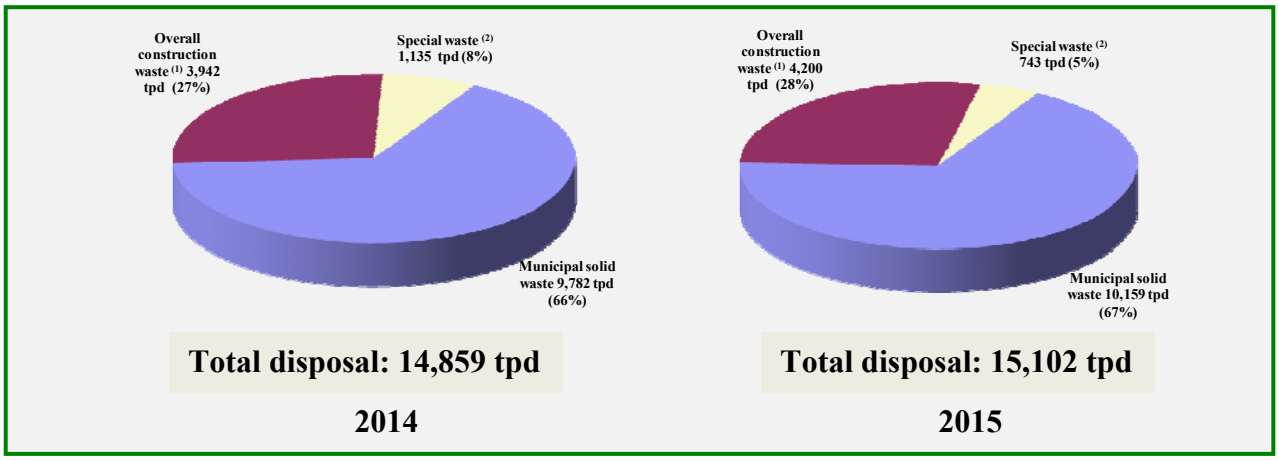
(1) Please refer to Appendix 1 for classification of solid waste.

(2) Overall construction waste includes waste or surplus materials arising from construction activities such as site clearance, refurbishment, renovation, demolition, land excavation and road works. It also includes waste concrete that is generated from concrete batching plants, cement plaster/mortar plants not set up inside construction sites. The overall construction waste is sorted into inert materials (called public fill) and construction and demolition (C&D) waste (basically non-inert waste), where inert materials like debris, rubble, concrete and earth are reused in construction sites, or as fill in reclamation sites when available. C&D waste are disposed of at landfills.

(3) The quantity does not include special waste not disposed of at landfills. From April 2015 onwards, dewatered sludge from sewage treatment plants has been treated by incineration at T ₱ARK in Tuen Mun. The residue and ash of incineration are disposed of at landfills.

(4) Figures in brackets refer to year-on-year (y-o-y) growth rates.

Plate 2.2 Disposal of total solid waste at landfills in 2014 and 2015 - By main waste category

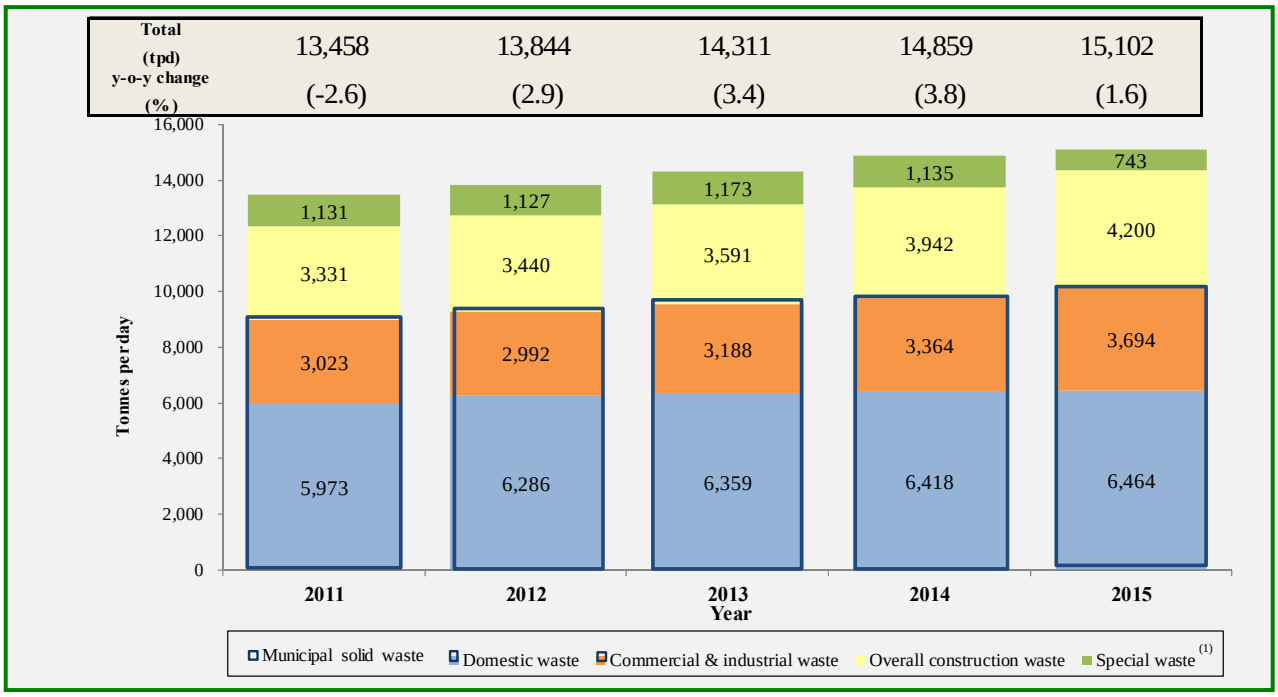


Notes:

(1) Overall construction waste includes waste or surplus materials arising from construction activities such as site clearance, refurbishment, renovation, demolition, land excavation and road works. It also includes waste concrete that is generated from concrete batching plants, cement plaster/mortar plants not set up inside construction sites. The overall construction waste is sorted into inert materials (called public fill) and construction and demolition (C&D) waste (basically non-inert waste), where inert materials like debris, rubble, concrete and earth are reused in construction sites, or as fill in reclamation sites when available. C&D waste are disposed of at landfills.

(2) The quantity does not include special waste not disposed of at landfills. From April 2015 onwards, dewatered sludge from sewage treatment plants has been treated by incineration at T·PARK in Tuen Mun. The residue and ash of incineration are disposed of at landfills.

Plate 2.3 Disposal of total solid waste at landfills from 2011 to 2015 - By main waste category



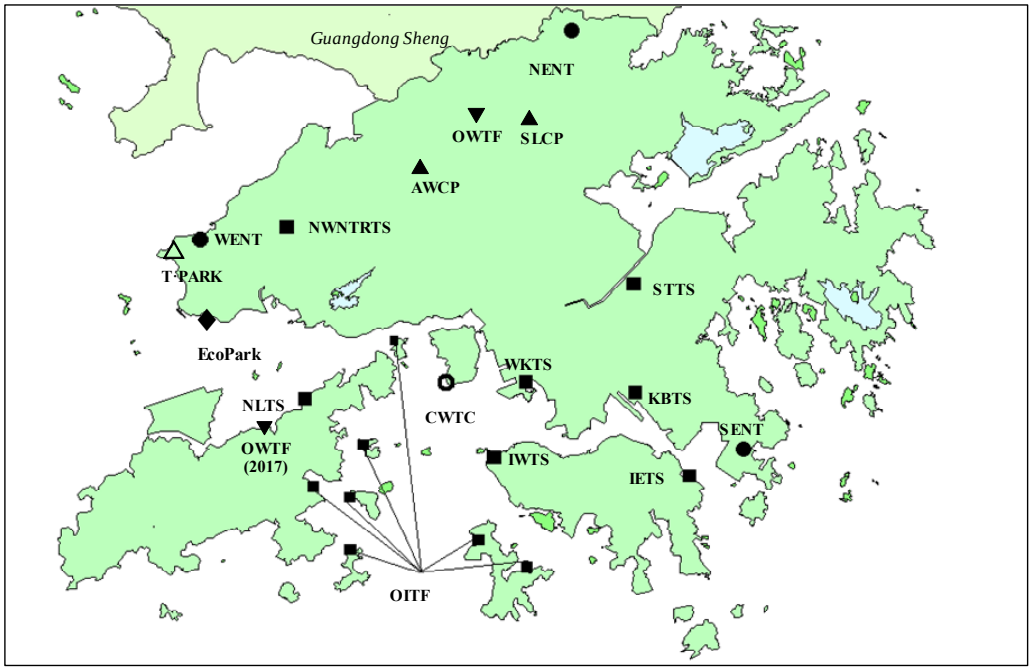
Notes:

(1) From April 2015 onwards, dewatered sludge from sewage treatment plants has been treated by incineration at T·PARK in Tuen Mun. The residue and ash of incineration are disposed of at landfills.

(2) In 2007, waste concrete delivered to landfills was classified as industrial waste since 2007. In 2009, it was re-classified under overall construction waste. The corresponding quantity had then been deducted from commercial and industrial waste accordingly.

(3) There were 366 days for year 2012.

Plate 2.4 Waste management facilities in Hong Kong



Landfill
- WENT - West New Territories Landfill
- SENT - South East New Territories Landfill [1]
- NENT - North East New Territories Landfill

RTS
- IETS - Island East Transfer Station[2]
- IWTS - Island West Transfer Station[2]
- WKTS - West Kowloon Transfer Station[2]
- OITF - Outlying Islands Transfer Facilities[2]
- NLTS - North Lantau Transfer Station[2]
- STTS - Sha Tin Transfer Station[3]
- NWNTRTS - North West New Territories Refuse Transfer Station[4]
- KBTS - Kowloon Bay Transfer Station[5]

- CWTC - Chemical Waste Treatment Centre
- SLCP - Shaling Composting Plant[6]
- AWCP - Animal Waste Composting Plant
- EcoPark
- OWTF - Organic Waste Treatment Facilities [7]
- T • PARK [8]

Notes:

(1) From 6 January 2016 onwards, SENT Landfill is designated to accept only construction waste.

(2) Waste from IETS, IWTS, WKTS, OITF and NLTS was transferred to WENT by sea.

(3) Waste from STTS was transferred to NENT by road.

(4) Waste from NWNTRTS was transferred to WENT by road.

(5) KBTS was closed in April 2005 and converted to a waste recycling centre.

(6) SLCP has stopped operation since October 2010.

(7) Phase 1 of the OWTF at Siu Ho Wan will be commissioned in 2017, whilst Phase 2 of the OWTF at Shaling will commence tendering in 2016/17 for commencing operation in 2021.

(8) As from April 2015, dewatered sludge from sewage treatment plants has been treated by incineration at T•PARK at Tuen Mun. The residue of incineration has been disposed of at landfills.

Plate 2.5 Total solid waste delivered to RTSs and landfills in 2015 - By main waste category

Disposal facility	Average daily quantity (tpd)							
	MSW		Overall construction waste		Special waste[1]		Total	
IETS - Island East Transfer Station	897	(8.3%)	-	-	-	-	897	(8.3%)
STTS - Sha Tin Transfer Station	1,168	(6.6%)	-	-	-	-	1,168	(6.6%)
IWTS - Island West Transfer Station	859	(43.4%)	-	-	-	-	859	(43.4%)
WKTS - West Kowloon Transfer Station	2,376	(-10.0%)	-	-	411	(7.2%)	2,786	(-7.8%)
OITF - Outlying Islands Transfer Facilities	82	(-1.8%)	54	(29.7%)	4	(21.3%)	140	(9.0%)
NLTS - North Lantau Transfer Station	363	(84.6%)	-		1	(-5.8%)	364	(84.1%)
NWNTRTS - North West New Territories Refuse Transfer Station	1,118	(3.4%)	-	-	-	-	1,118	(3.4%)
WENT - West New Territories Landfill	6,170[3]	(6.1%)	956[3]	(9.5%)	459	(-19.2%)	7,585[3]	(4.6%)
SENT - South East New Territories Landfill [2]	1,507	(-12.0%)	2,509	(0.3%)	82	(-72.3%)	4,098	(-9.1%)
NENT - North East New Territories Landfill	2,482[3]	(10.0%)	735	(29.4%)	202	(-25.2%)	3,419[3]	(10.5%)
Landfills' total	10,159	(3.9%)	4,200	(6.6%)	743	(-34.5%)	15,102	(1.6%)

Notes:

(1) Please refer to Plate 2.13b for special waste not disposed of at landfills. From April 2015 onwards, dewatered sludge from sewage treatment plants have been treated by incineration at T·PARK in Tuen Mun. The residue and ash of incineration are disposed of at landfills.

(2) From 6 January 2016 onwards, SENT Landfill has been designated to accept only construction waste. During 2015, various measures were put in place to assist the trade and the public to gradually adapt to the changes, and to facilitate a smooth diversion of waste from SENT to RTSs and the other two landfills.

(3) Solid waste delivered to RTSs will be transferred to specified landfills after compression. The quantities include solid waste directly delivered to landfills and those transferred from RTSs to landfills.

(4) Figures in brackets refer to year-on-year (y-o-y) growth rates.

Plate 2.6 Arisings of solid waste disposed of at landfills in 2015 - By district by main waste category

District	Average daily quantity[1] [2] (tpd)							
	Domestic waste (a)		Commercial & industrial waste (b)		Municipal solid waste (c) =(a)+(b)		Overall construction waste (d)	
Eastern	388	(-10.5%)	167	(4.5%)	555	(-6.4%)	94	(-3.3%)
Central & Western	318	(14.6%)	130	(26.0%)	448	(17.6%)	151	(4.5%)
Wanchai	209	(-10.7%)	171	(0.3%)	380	(-6.1%)	92	(20.7%)
Southern	253	(7.3%)	115	(14.4%)	369	(9.4%)	87	(-33.5%)
Hong Kong Island Sub-total	**1,169**	(-1.1%)	**583**	(9.2%)	**1,752**	(2.1%)	**425**	(-5.5%)
Yau Tsim Mong	540	(2.7%)	243	(3.3%)	784	(2.9%)	241	(12.6%)
Kwun Tong	503	(-2.1%)	268	(22.4%)	771	(5.2%)	381	(-0.3%)
Sham Shui Po	366	(-0.6%)	210	(13.2%)	575	(4.1%)	120	(17.2%)
Kowloon City	313	(-1.5%)	221	(15.1%)	534	(4.8%)	331	(13.6%)
Wong Tai Sin	296	(1.2%)	180	(9.2%)	476	(4.1%)	36	(26.8%)
Kowloon Sub-total	**2,018**	(0.0%)	**1,122**	(12.6%)	**3,140**	(4.2%)	**1,108**	(8.9%)
Yuen Long	628	(1.0%)	456	(13.4%)	1,084	(5.9%)	225	(19.9%)
Tuen Mun	423	(3.7%)	307	(0.3%)	730	(2.2%)	642	(10.0%)
Sha Tin	436	(1.8%)	194	(33.8%)	630	(9.9%)	175	(31.3%)
Sai Kung	406	(8.5%)	210	(0.3%)	616	(5.6%)	1,086	(6.4%)
North	308	(-7.1%)	228	(17.7%)	536	(2.0%)	88	(-9.5%)
Kwai Tsing	333	(-0.1%)	189	(9.8%)	522	(3.3%)	174	(-0.2%)
Tai Po	353	(7.7%)	92	(-17.7%)	445	(1.2%)	102	(15.9%)
Tsuen Wan	229	(-1.8%)	188	(15.1%)	417	(5.2%)	70	(-19.9%)
NT- Mainland Sub-total	**3,116**	(1.9%)	**1,864**	(9.4%)	**4,980**	(4.6%)	**2,563**	(8.0%)
North Lantau	82	(3.0%)	-	-	-	-	-	-
Cheung Chau	27	(-1.0%)	-	-	-	-	-	-
Mui Wo	24	(-3.2%)	-	-	-	-	-	-
Ma Wan	11	(-3.2%)	-	-	-	-	-	-
Lamma Island	9	(-1.5%)	-	-	-	-	-	-
Peng Chau	6	(-2.2%)	-	-	-	-	-	-
Hei Ling Chau	3	(-6.9%)	-	-	-	-	-	-
NT-Outlying Islands Sub-total	**162**	(0.3%)	**124[3]**	(-3.9%)	**286[3]**	(-1.6%)	**104[3]**	(2.6%)
Total	**6,464**	(0.7%)	**3,694**	(9.8%)	**10,159**	(3.8%)	**4,200**	(6.6%)

Notes:

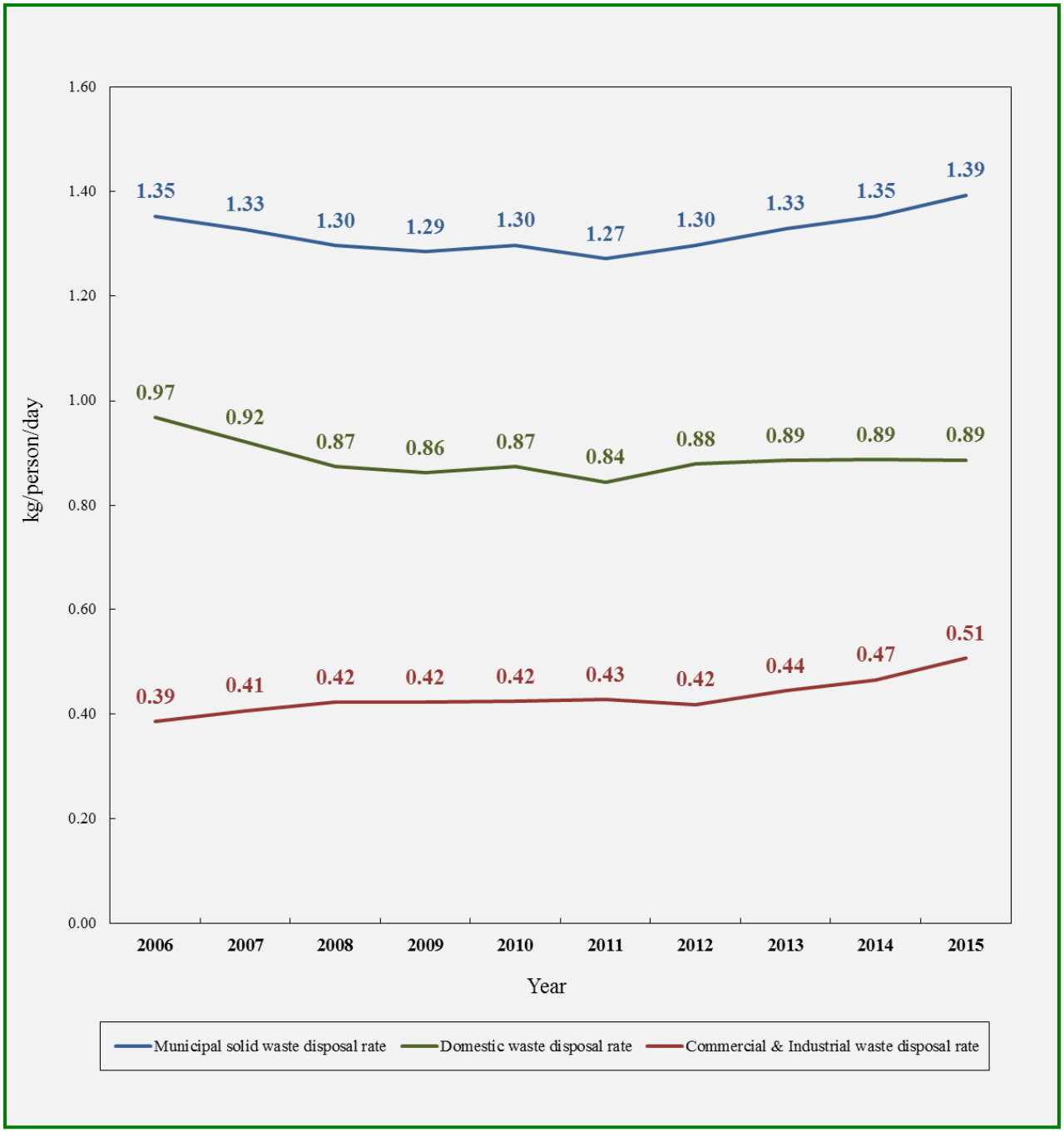
(1) The geographical distribution of solid waste arisings is mainly estimated from waste intake records taken at waste treatment facilities and should be regarded as indicative reference only.

(2) Special waste is not included.

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

(4) Figures in brackets refer to year-on-year (y-o-y) growth rates.

Plate 2.7 Per capita disposal rates of MSW, domestic waste and commercial & industrial waste from 2006 to 2015



Notes:

(1) The revised per capita disposal rates are calculated based on the population data (mid-year) updated by the C&SD in February 2017.

(2) There were 366 days for years 2008 and 2012.

Plate 2.8 Composition of MSW disposed of at landfills in 2015 - By waste type

Composition	Average daily quantity (tpd) and percentage shares by weight				
	Domestic waste (a)	Commercial waste (b)	Industrial waste (c)	Commercial & industrial waste (d)=(b)+(c)	Municipal solid waste (e)=(a)+(d)
Glass	**242** (3.7%)	**88** (3.2%)	**37** (4.1%)	**125** (3.4%)	**367** (3.6%)
Metals	**123** (1.9%)	**86** (3.1%)	**27** (3.0%)	**113** (3.1%)	**236** (2.3%)
Paper	**1,339** (20.7%)	**785** (28.0%)	**132** (14.9%)	**918** (24.8%)	**2,257** (22.2%)
Plastics	**1,351** (20.9%)	**606** (21.6%)	**226** (25.3%)	**832** (22.5%)	**2,183** (21.5%)
Putrescibles	**2,840** (43.9%)	**1,000** (35.7%)	**77** (8.7%)	**1,078** (29.2%)	**3,917** (38.6%)
Textiles	**221** (3.4%)	**49** (1.7%)	**36** (4.0%)	**84** (2.3%)	**306** (3.0%)
Wood/Rattan	**88** (1.4%)	**85** (3.0%)	**225** (25.2%)	**310** (8.4%)	**398** (3.9%)
Household hazardous wastes (HHWs)[(1)]	**84** (1.3%)	**28** (1.0%)	**13** (1.5%)	**42** (1.1%)	**125** (1.2%)
Others[(2)]	**176** (2.7%)	**74** (2.6%)	**118** (13.3%)	**193** (5.2%)	**369** (3.6%)
Total	**6,464** (100%)	**2,803** (100%)	**892** (100%)	**3,694** (100%)	**10,159** (100%)

Notes:

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

(2) Others include bulky items directly disposed of at landfills and other miscellaneous waste materials.

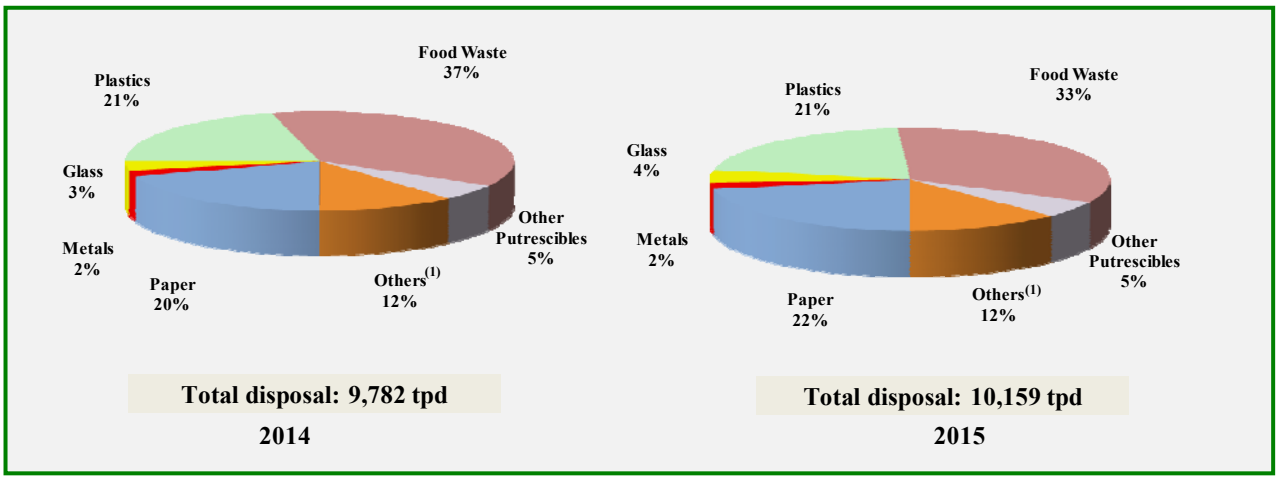
(3) Figures in brackets refer to percentage shares by weight.

Plate 2.9 Composition of MSW disposed of at landfills in 2015 – By major waste type

Composition	Average daily quantity (tpd) and percentage shares by weight					
	Domestic waste (a)		Commercial & industrial waste (b)		Municipal solid waste (c) = (a) + (b)	
Glass						
- Glass bottles	**196**	(3.0%)	**79**	(2.1%)	**275**	(2.7%)
- Other glass	**46**	(0.7%)	**46**	(1.2%)	**92**	(0.9%)
(Glass) Sub-total	**242**	**(3.7%)**	**125**	**(3.4%)**	**367**	**(3.6%)**
Metals						
- Ferrous metals	**95**	(1.5%)	**72**	(1.9%)	**167**	(1.6%)
- Aluminium cans	**17**	(0.3%)	**24**	(0.7%)	**41**	(0.4%)
- Other non-ferrous metals	**11**	(0.2%)	**18**	(0.5%)	**28**	(0.3%)
(Metals) Sub-total	**123**	**(1.9%)**	**113**	**(3.1%)**	**236**	**(2.3%)**
Paper						
- Cardboard	**259**	(4.0%)	**244**	(6.6%)	**503**	(5.0%)
- Newsprint	**327**	(5.1%)	**105**	(2.8%)	**432**	(4.3%)
- Office paper	**91**	(1.4%)	**87**	(2.4%)	**178**	(1.8%)
- Tetrapak	**51**	(0.8%)	**40**	(1.1%)	**91**	(0.9%)
- Others [(1)]	**611**	(9.4%)	**442**	(12.0%)	**1,053**	(10.4%)
(Paper) Sub-total	**1,339**	**(20.7%)**	**918**	**(24.8%)**	**2,257**	**(22.2%)**
Plastics						
- Plastic bags	**461**	(7.1%)	**189**	(5.1%)	**649**	(6.4%)
- PET plastic bottles	**78**	(1.2%)	**58**	(1.6%)	**136**	(1.3%)
- Plastic dining wares	**73**	(1.1%)	**58**	(1.6%)	**131**	(1.3%)
- Non-PET plastic bottles	**53**	(0.8%)	**18**	(0.5%)	**70**	(0.7%)
- Polyfoam-others	**42**	(0.6%)	**23**	(0.6%)	**64**	(0.6%)
- Polyfoam-dining wares	**31**	(0.5%)	**17**	(0.5%)	**48**	(0.5%)
- Others [(2)]	**613**	(9.5%)	**471**	(12.7%)	**1,084**	(10.7%)
(Plastics) Sub-total	**1,351**	**(20.9%)**	**832**	**(22.5%)**	**2,183**	**(21.5%)**
Putrescibles						
- Food waste	**2,397**	(37.1%)	**985**	(26.7%)	**3,382**	(33.3%)
- Yard waste[(3)]	**124**	(1.9%)	**34**	(0.9%)	**157**	(1.5%)
- Others[(4)]	**319**	(4.9%)	**59**	(1.6%)	**378**	(3.7%)
(Putrescibles) Sub-total	**2,840**	**(43.9%)**	**1,078**	**(29.2%)**	**3,917**	**(38.6%)**

Notes:
(1) Other paper waste includes tissue paper and paper bags etc.
(2) Other plastics waste includes packaging materials, toys, off-cuts, scrap, etc.
(3) Yard waste not disposed of at landfills is not included. For example, part of the yard waste collected by AFCD is treated in country parks managed by the Department.
(4) Other putrescibles waste includes cotton products, other organic waste, etc.
(5) Figures in brackets refer to percentage shares by weight.

Plate 2.10 Composition of MSW disposed of at landfills in percentages in 2014 and 2015 – By major waste type



Note:

(1) Others include textiles, wood/rattan, household hazardous wastes, bulky items directly disposed of at landfills, and miscellaneous waste materials.

Plate 2.11 Composition of municipal food waste disposed of at landfills in percentages in 2014 and 2015 - By waste category

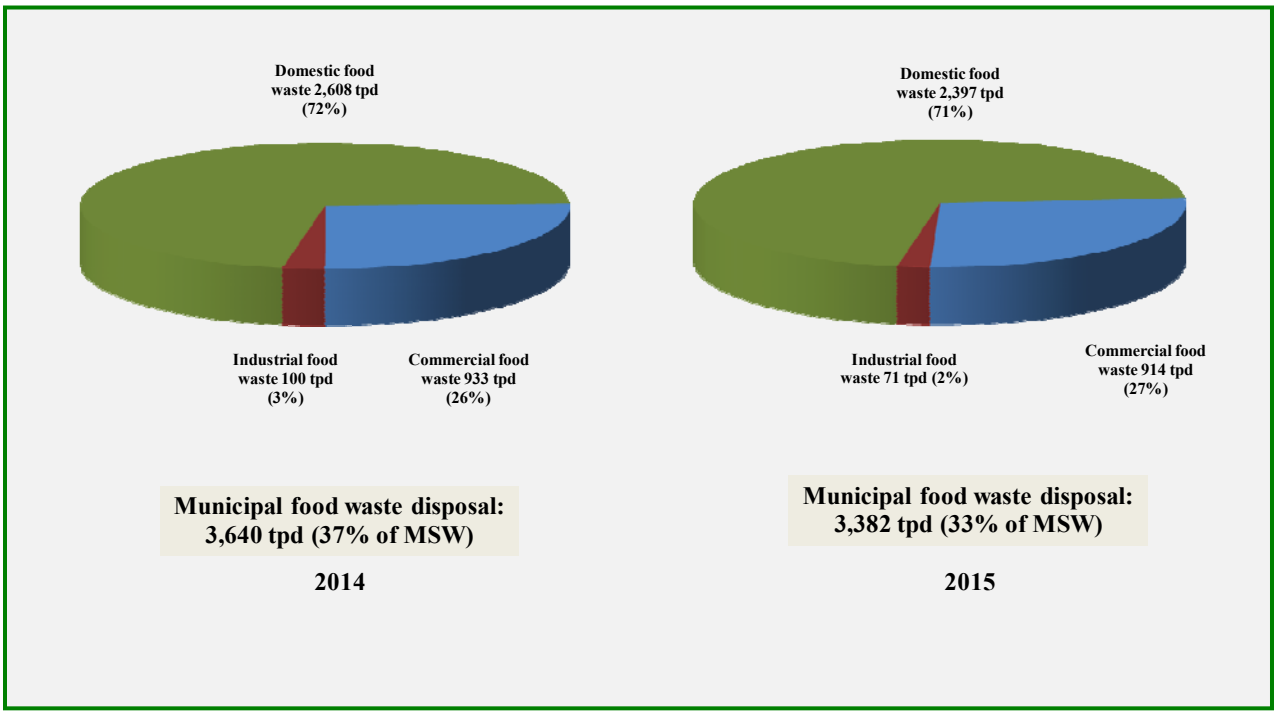
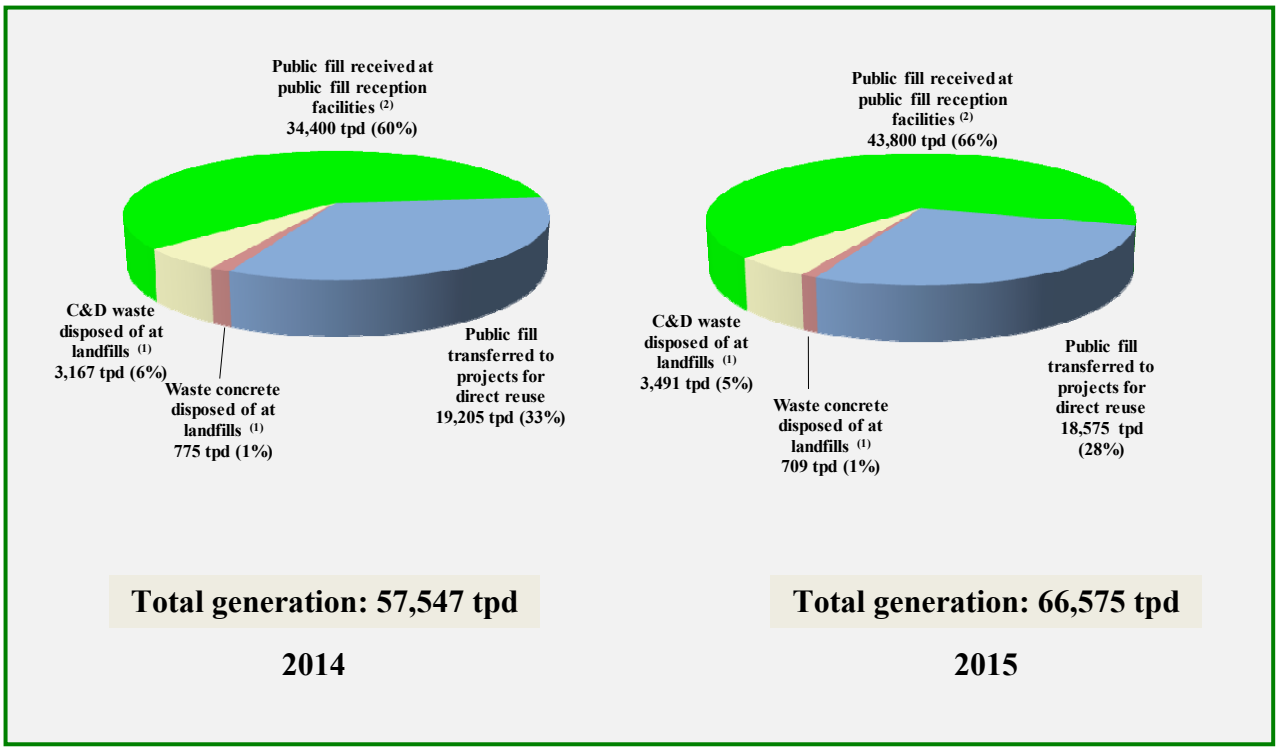


Plate 2.12 Disposal and reuse of overall construction waste in 2014 and 2015



Notes:

(1) Overall construction waste includes waste or surplus materials arising from construction activities such as site clearance, refurbishment, renovation, demolition, land excavation and road works. It also includes waste concrete that is generated from concrete batching plants, cement plaster/mortar plants not set up inside construction sites. The overall construction waste is sorted into inert materials (called public fill) and construction and demolition (C&D) waste (basically non-inert waste), where inert materials like debris, rubble, concrete and earth are reused in construction sites, or as fill in reclamation sites when available. C&D waste are disposed of at landfills.

(2) Public fill reception facilities (PFRFs) are managed by CEDD for receiving inert construction waste (also known as public fill) appropriate for reuse. At present, four PFRFs are in operation, namely Tseung Kwan O Area 137 Fill Bank, Tuen Mun Area 38 Fill Bank, Chai Wan Public Fill Barging Point and Mui Wo Temporary Public Fill Reception Facility.

Plate 2.13a Disposal of special waste at landfills in 2015 - By special waste type

Special waste type	Average daily quantity[1] (tpd)	
Abattoir waste	**8**	(-3.2%)
Animal carcasses and kennel waste	**9**	(-11.3%)
Asbestos waste	**3**	(-29.1%)
Chemical waste other than asbestos waste	**4**	(-36.8%)
Clinical waste (with packaging material) [2]	**1**	(-26.1%)
Condemned goods	**44**	(77.1%)
Dewatered dredged materials	**0.2**	(-98.3%)
Dewatered sewage sludge[3]	**304**	(-63.1%)
Dewatered waterworks sludge	**58**	(0.3%)
Incineration ash and stabilised residue [3]	**138**	(292.1%)
Livestock waste[4]	**61**	(6.5%)
Sewage works screenings	**64**	(-7.1%)
Waste tyres[5]	**49**	(93.9%)
Disposal at Landfills Sub-total	**743**	(-34.5%)

Notes:

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

(2) Clinical waste is incinerated at CWTC except during normal maintenance or emergency shut-down maintenance of the incineration treatment system for more than two days. During the shutdown, clinical waste is packed and transferred to designated landfill for disposal in accordance with the Clinical Waste Disposal License of CWTC.

(3) From April 2015 onwards, dewatered sludge from sewage treatment plants has been treated by incineration at T PARK in Tuen Mun. The residue and ash of incineration are disposed of at landfills.

(4) In 2015, the generation of livestock waste amounted to 160 tpd, out of which 61 tpd were disposed of at landfills. The remaining livestock waste was treated by other environmentally-acceptable means such as on-site composting, aerobic treatment, and dry muck-out.

(5) Waste tyres are shredded or cut prior to disposal at landfills.

(6) Figures in brackets refer to year-on-year (y-o-y) growth rates.

Plate 2.13b Treatment of special waste in 2015 (Not disposed of at landfills) - By special waste type

Special waste type	Treatment method	Average daily quantity[1] (tpd)	
Chemical waste other than asbestos waste	**CWTC**	**31**	(19.1%)
Clinical waste	**CWTC**	**6**	(7.5%)
Grease trap waste	**WKTS**[2]	**411**	(7.2%)
Horse stable waste	**AWCP**	**20**	(-8.8%)
Dredged mud and excavated materials	**Marine dumping**[3]	**73,973**	(-29.3%)
Dewatered sludge	**Incineration at T PARK**	**801**	(N/A)
Furnace bottom ash	**Concrete manufacturing, stored in lagoon**[4]	**108**	(-23.4%)
Pulverised fuel ash	**Concrete manufacturing, stored in lagoon**[4]	**1,126**	(-23.2%)

Notes:

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

(2) The figure is the quantity of grease trap waste treated by the Grease Trap Waste Treatment Facility at WKTS.

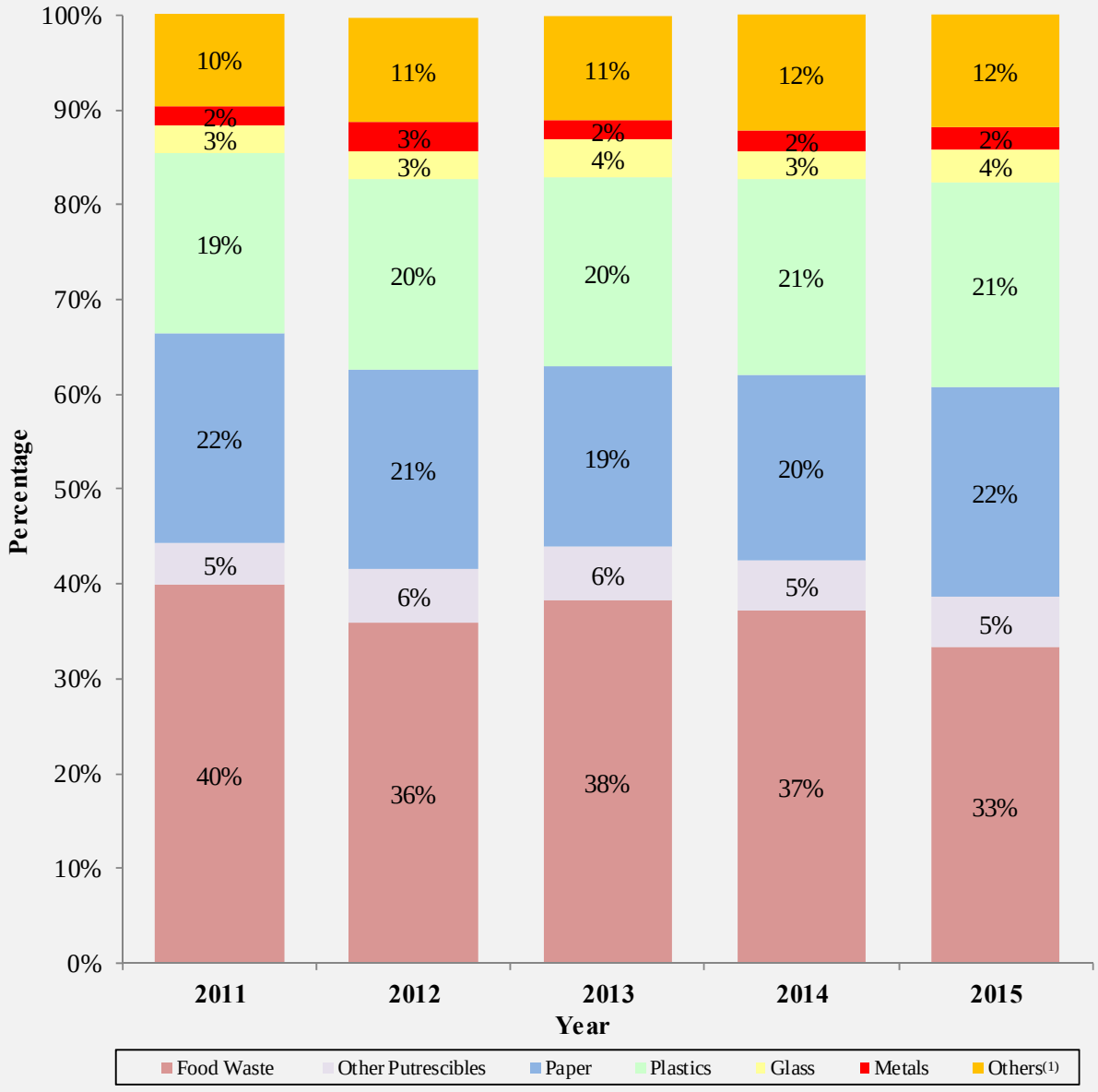
(3) The density of the dredged mud and excavated materials is assumed to be one tonne per cubic metre.

(4) Figures provided by the Power Companies.

(5) Figures in brackets refer to year-on-year (y-o-y) growth rates.

Plate 2.14 Composition of MSW disposed of at landfills in percentages from 2011 to 2015 – By major waste type

	2011	2012	2013	2014	2015
Total (tpd)	8,996	9,278	9,547	9,782	10,159
y-o-y change (%)	(-1.3%)	(3.1%)	(2.9%)	(2.5%)	(3.9%)

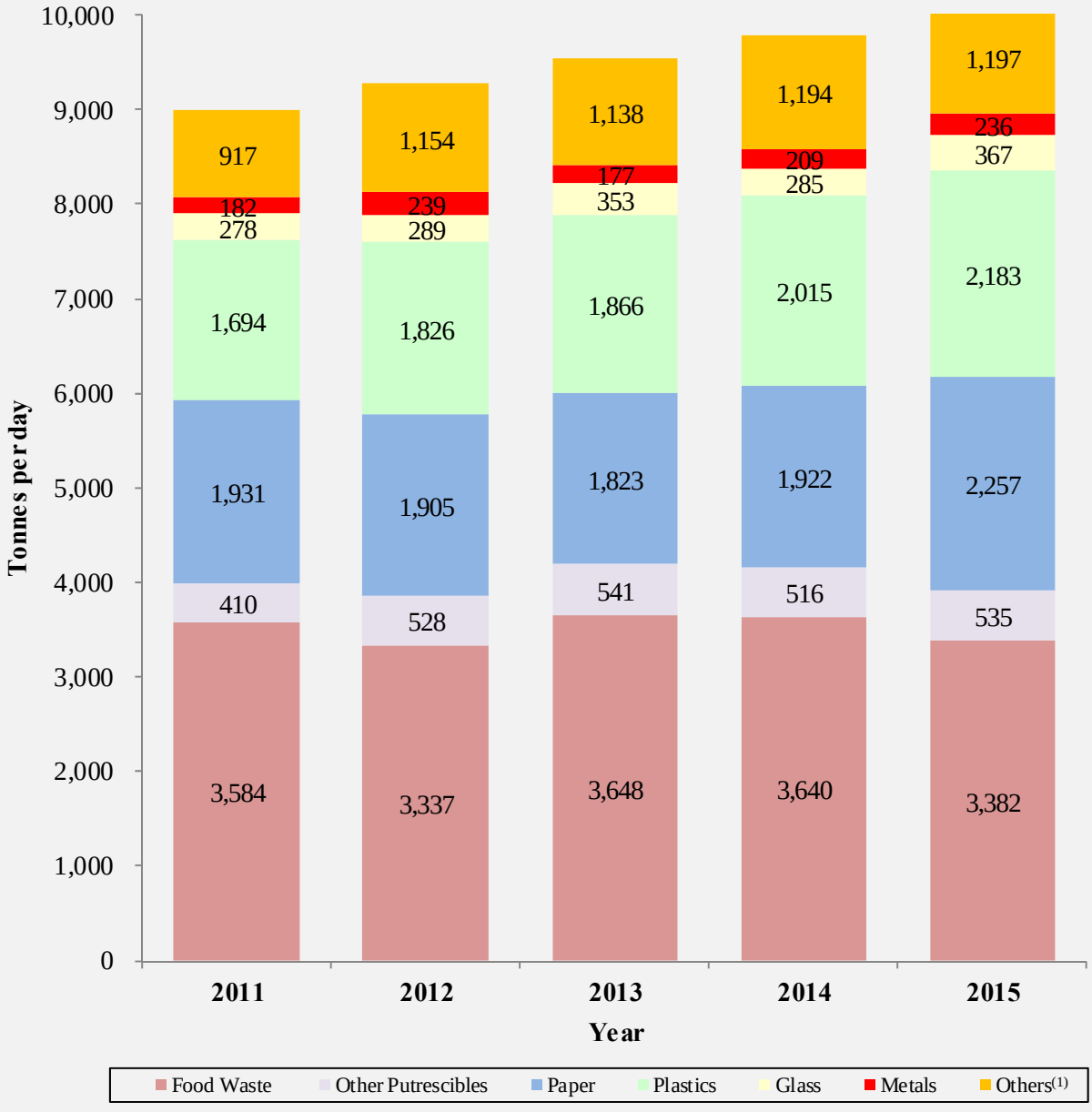


Note:

(1) Others include textiles, wood/rattan, household hazardous wastes, bulky items directly disposed of at landfills, and miscellaneous waste materials.

Plate 2.15 Composition of MSW disposed of at landfills in quantities from 2011 to 2015 – By major waste type

	2011	2012	2013	2014	2015
Total (tpd)	8,996	9,278	9,547	9,782	10,159
y-o-y change (%)	(-1.3%)	(3.1%)	(2.9%)	(2.5%)	(3.9%)

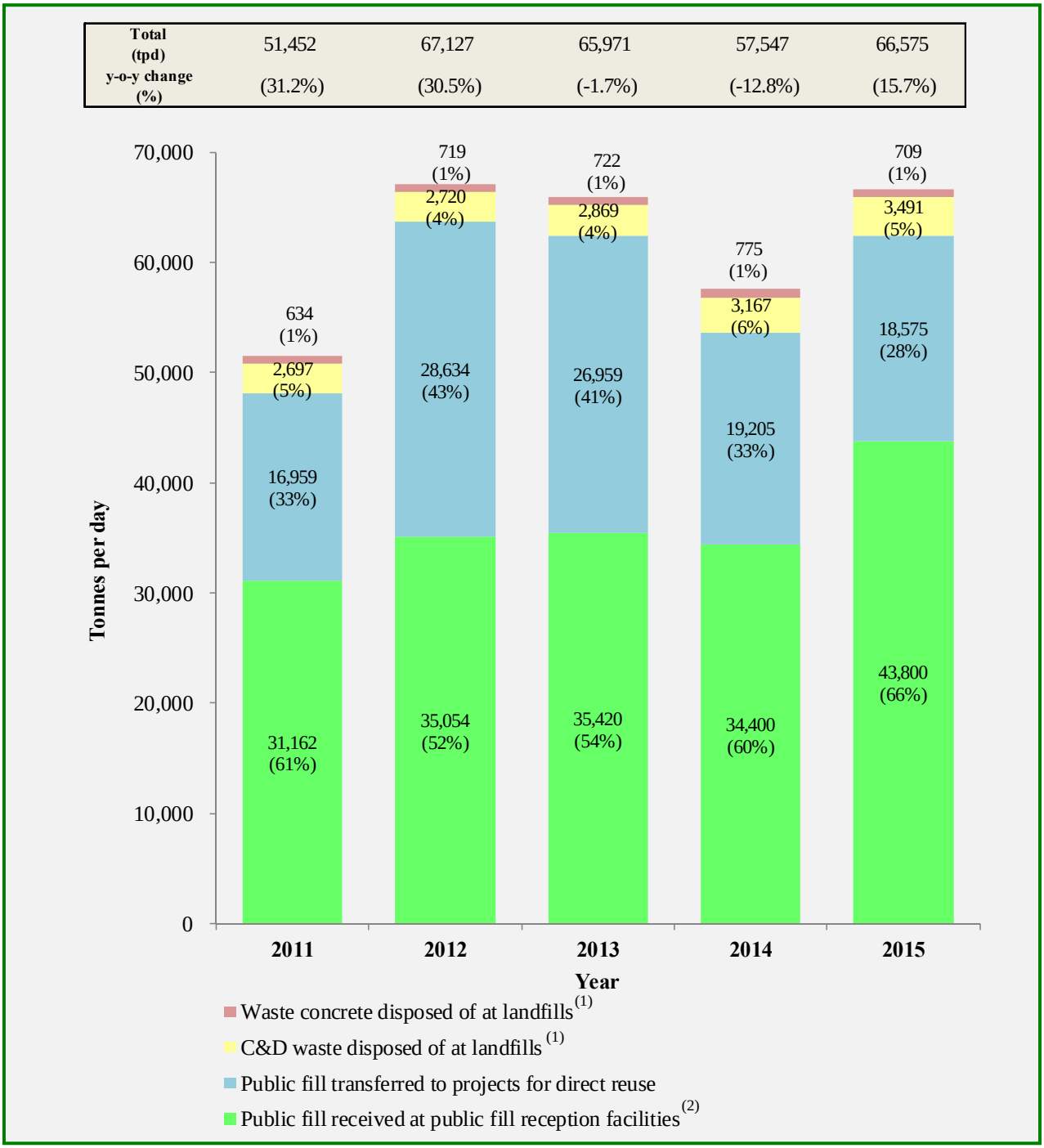


Notes:

(1) Others include textiles, wood/rattan, household hazardous wastes, bulky items directly disposed of at landfills and miscellaneous waste materials.

(2) There were 366 days for year 2012.

Plate 2.16 Disposal and reuse of overall construction waste from 2011 to 2015



Notes:

(1) Overall construction waste includes waste or surplus materials arising from construction activities such as site clearance, refurbishment, renovation, demolition, land excavation and road works. It also includes waste concrete that is generated from concrete batching plants, cement plaster/mortar plants not set up inside construction sites. The overall construction waste is sorted into inert materials (called public fill) and construction and demolition (C&D) waste (basically non-inert waste), where inert materials like debris, rubble, concrete and earth are reused in construction sites, or as fill in reclamation sites when available. C&D waste are disposed of at landfills.

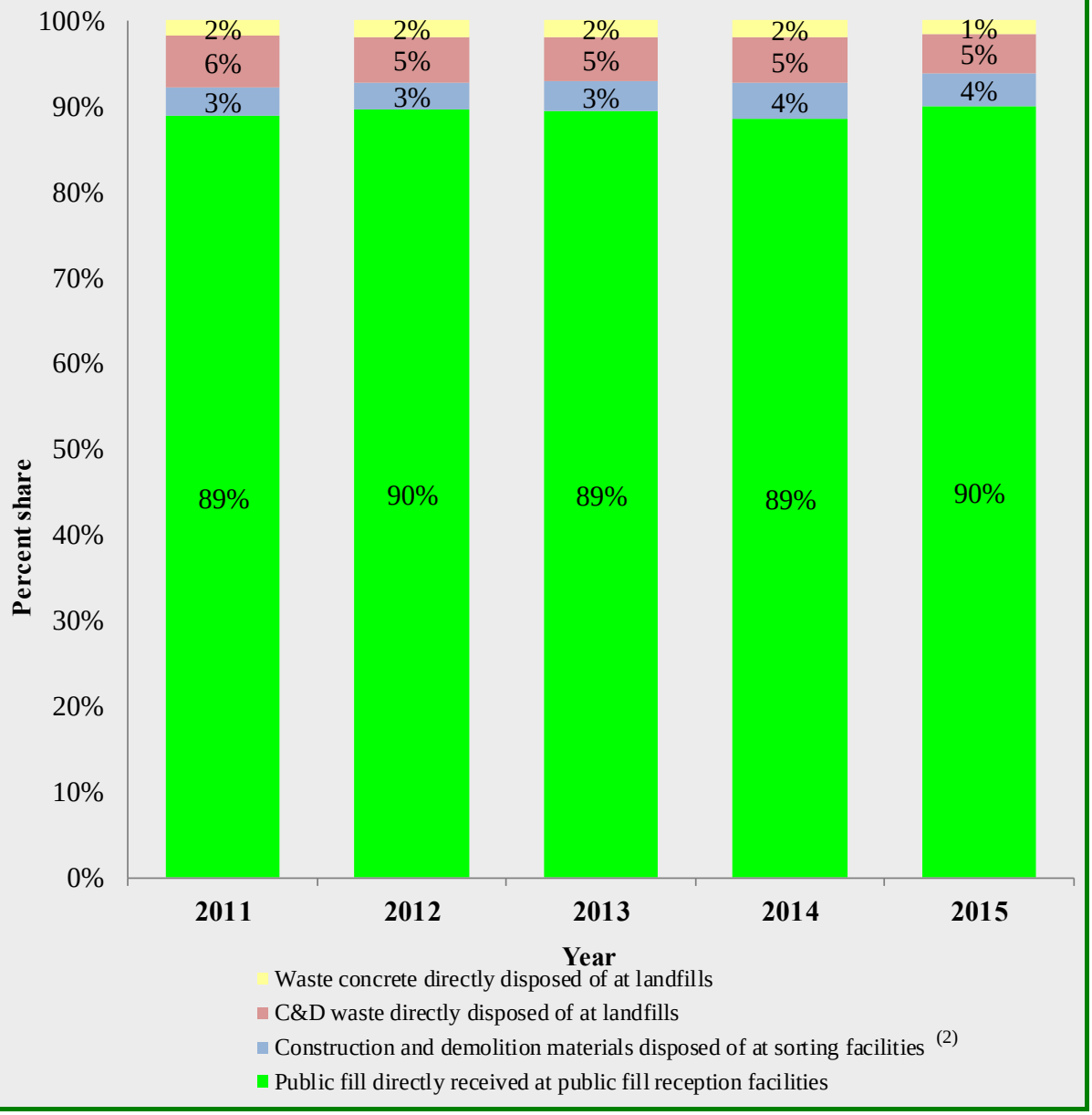
(2) Public fill reception facilities (PFRFs) are managed by CEDD for receiving inert construction waste (also known as public fill) appropriate for reuse. At present, four PFRFs are in operation, namely Tseung Kwan O Area 137 Fill Bank, Tuen Mun Area 38 Fill Bank, Chai Wan Public Fill Barging Point and Mui Wo Temporary Public Fill Reception Facility.

(3) Figures in brackets refer to percentage shares by weight.

(4) There were 366 days for year 2012.

Plate 2.17 Overall construction waste disposed of at treatment facilities from 2011 to 2015

	2011	2012	2013	2014	2015
Public fill reception facilities (tpd)	30,688	34,529	34,867	33,947	43,211
Sorting facilities (tpd)	1,156	1,197	1,361	1,591	1,863
Landfills (tpd)	2,681	2,764	2,759	2,811	2,917
Waste concrete (tpd)	*634*	*719*	*722*	*775*	*709*
C&D waste (tpd)	*2,047*	*2,044*	*2,037*	*2,037*	*2,208*



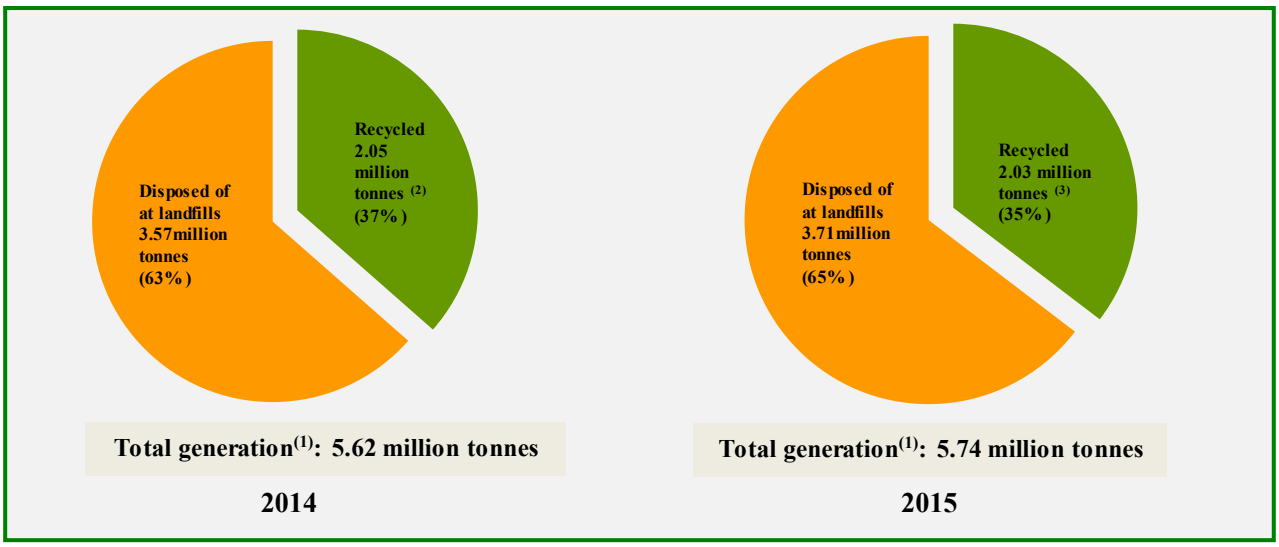
Notes:

(1) Under the Construction Waste Disposal Charging Scheme, 27 dollars will be charged per tonne of public fill disposed of at public fill reception facilities, 100 dollars per tonne of construction waste at sorting facilities and 125 dollars per tonne of construction waste at landfills.

(2) After sorting, inert material will be transferred from sorting facilities to public fill banks, and non-inert construction and demolition waste (C&D waste) to landfills.

3. Resource Recovery and Recycling

Plate 3.1 Generation, disposal and recovery of MSW in 2014 and 2015



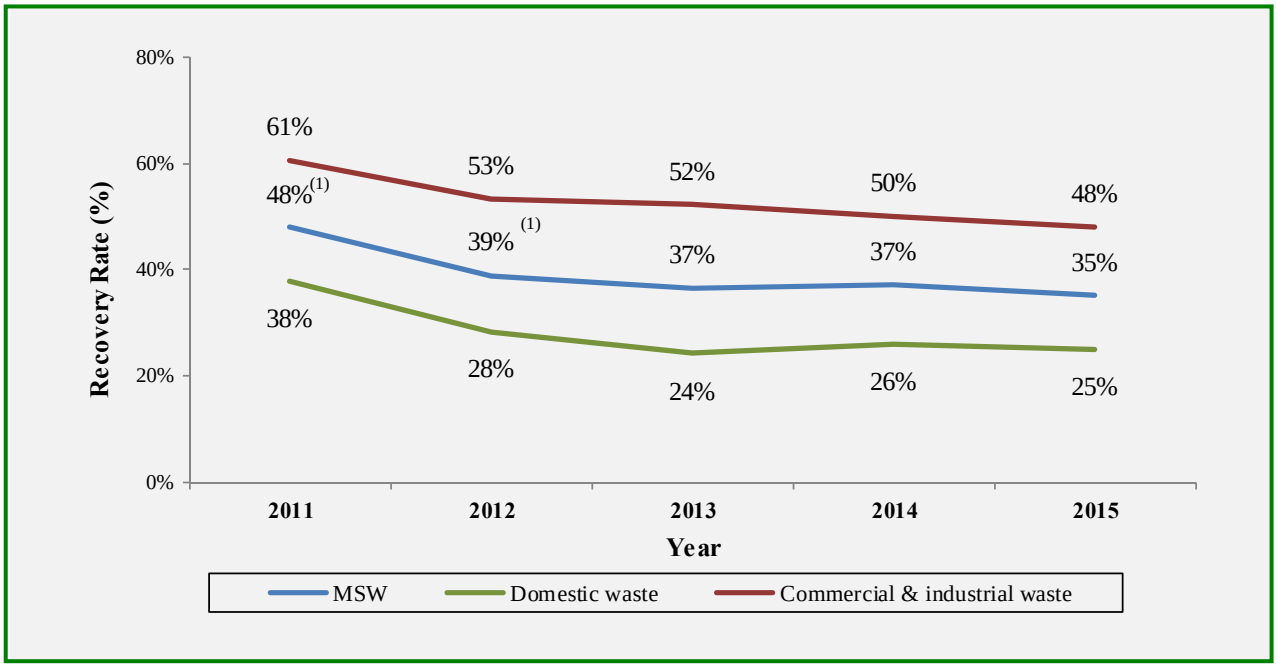
Notes:

(1) Generation of MSW is the sum of MSW disposed of at landfills and MSW recovered for recycling.

(2) A total of 2.05 million tonnes of recyclables were recovered for recycling in 2014, of which, 2.01 million tonnes (98%) were exported for recycling and 0.05 million tonnes (2%) recycled locally.

(3) A total of 2.03 million tonnes of recyclables were recovered for recycling in 2015, of which, 1.99 million tonnes (98%) were exported for recycling and 0.05 million tonnes (2%) recycled locally.

Plate 3.2 Recovery rates of MSW, domestic waste, and commercial and industrial waste from 2011 to 2015



Note:

(1) The apparent decreases in MSW recovery rate from 2011 to 2012 were mainly due to substantial fluctuations in local plastics waste exported for recycling. Nevertheless, the quantities of MSW disposed of at landfills remained steady in the same period (see Plates 2.3 and 2.7).

Plate 3.3 Recyclables recovered from MSW in 2015 - By type of recyclable

Recyclable type	Quantity of recovered recyclables (thousand tonnes)					
	Exported for recycling (a)		Recycled locally (b)		Total recovered for recycling (c) = (a) + (b)	
Paper	**896.3**	(45.1%)	**0.0**	(0.0%)	**896.3**	(44.1%)
Plastics	**88.5**	(4.5%)	**5.4**	(11.8%)	**93.9**	(4.6%)
Ferrous metals	**863.6**	(43.5%)	**0.0**	(0.0%)	**863.6**	(42.5%)
Non-ferrous metals	**84.3**	(4.2%)	**0.1**	(0.2%)	**84.4**	(4.2%)
Glass(1)	**0.0**	(0.0%)	**9.3**	(20.4%)	**9.3**	(0.5%)
Rubber tyres(2)	**0.0**	(0.0%)	**6.8**	(14.8%)	**6.8**	(0.3%)
Textiles	**0.2**	(0.0%)	**4.5**	(10.0%)	**4.8**	(0.2%)
Wood	**0.2**	(0.0%)	**1.0**	(2.2%)	**1.2**	(0.1%)
Food waste(3)	**0.0**	(0.0%)	**14.0**	(30.7%)	**14.0**	(0.7%)
Electrical and electronic equipment(4)	**54.0**	(2.7%)	**4.5**	(9.9%)	**58.5**	(2.9%)
Total	**1,987.2**	(100.0%)	**45.5**	(100.0%)	**2,032.8**	(100.0%)

Notes:

(1) Glass beverage bottles recovered for reuse through deposit-and-refund system operated by local beverage manufacturers are not included.

(2) The quantity includes reuse, retreading and recycling of vehicle tyres and retreading of aircraft tyres in Hong Kong.

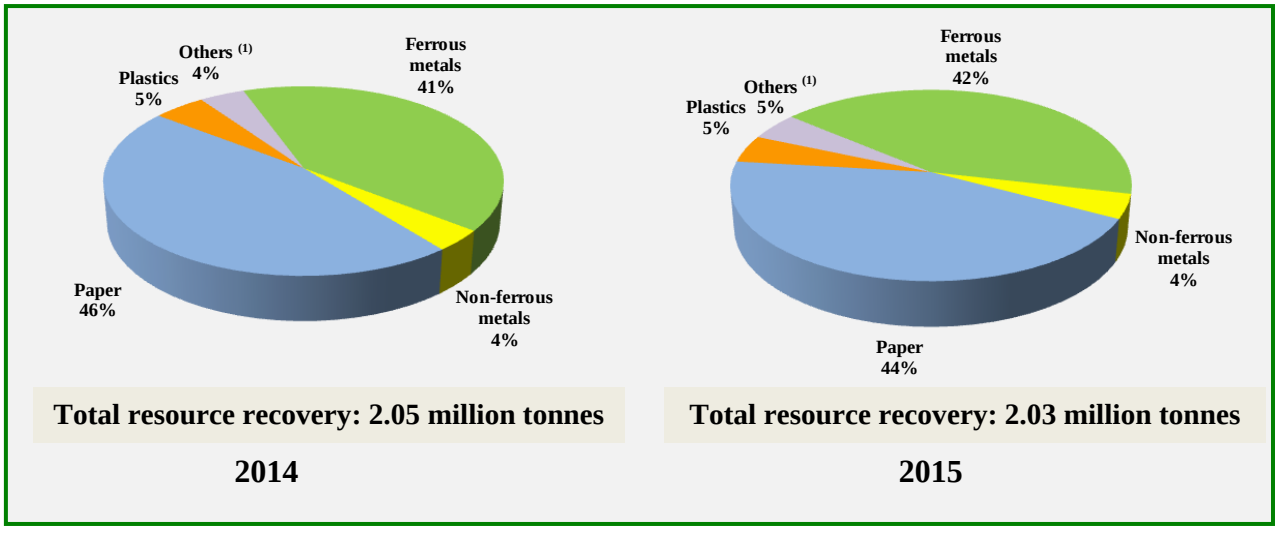
(3) The quantity of food waste recycled locally includes those recycled by industrial operators, those recycled on-site at OITF, and those recycled at EPD's composting facilities at Kowloon Bay.

(4) The volume of waste electrical and electronic equipment recovered for recycling is compiled from results of a biennial survey on "Generation & Disposal Practice of Used/ End-of-Life Electrical & Electronic Equipment and Batteries in Hong Kong" commissioned by EPD.

(5) Figures less than 50 tonnes are shown as 0.0.

(6) Figures in brackets refer to percentage shares.

Plate 3.4 Recyclables recovered from MSW in percentages in 2014 and 2015 - By type of recyclable



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 recyclable materials recovered from MSW from 2011 to 2015

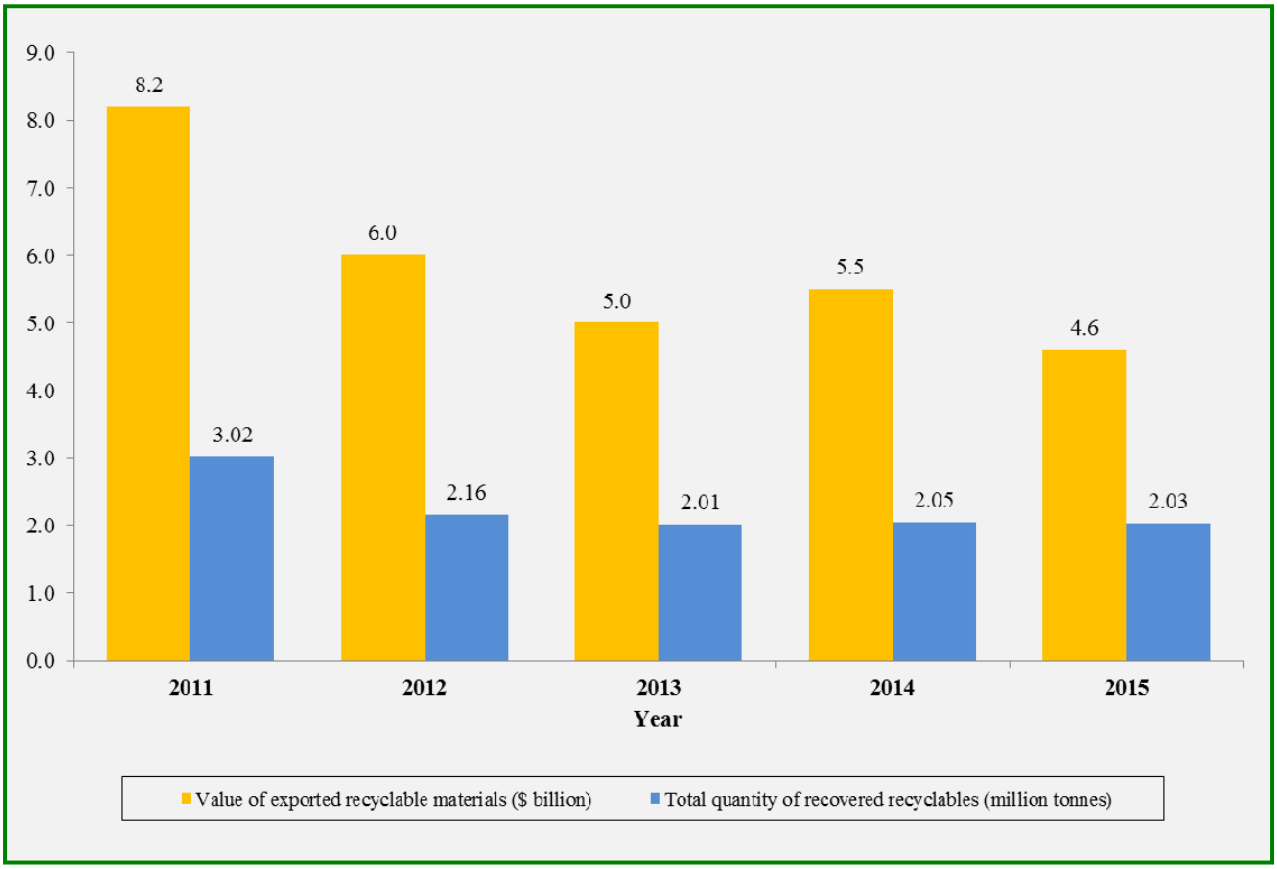
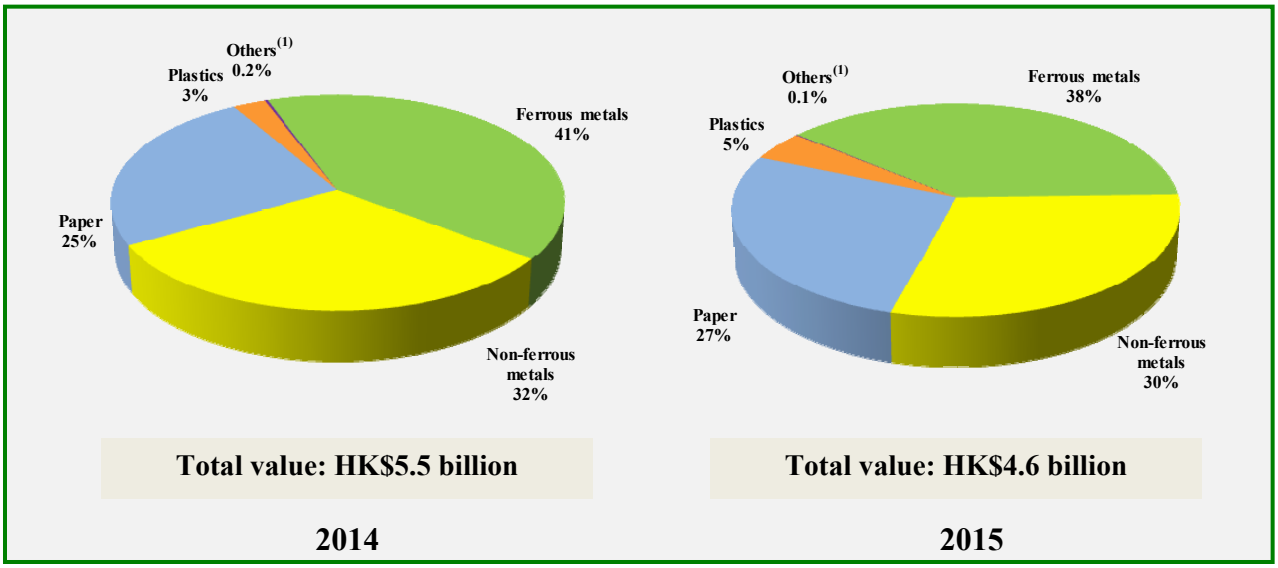


Plate 3.6 Values of exported recyclable materials recovered from MSW in percentages in 2014 and 2015 - By major type of recyclable material



Note:

(1) Others include glass, wood, textiles and rubber tyres only.

Plate 3.7 Quantities and values of exported recyclable materials recovered from MSW in 2015 - By major type of recyclable material

Recyclable type	Quantity (tonnes)		Value ($ thousand)		Value per unit ($ / tonne)
a. Ferrous metals					
- Alloy steel scrap	**16,789**	(1.9%)	**158,919**	(9.1%)	**9,466**
- Pig or cast iron	**0**	(0.0%)	**0**	(0.0%)	**-**
- Tinplate	**0**	(0.0%)	**0**	(0.0%)	**-**
- Other scraps	**846,834**	(98.1%)	**1,591,351**	(90.9%)	**1,879**
(Ferrous metals) Sub-total	**863,622**	(100.0%)	**1,750,270**	(100.0%)	**2,027**
b. Non-ferrous metals					
- Aluminium	**50,336**	(59.7%)	**351,920**	(26.1%)	**6,991**
- Copper & alloys	**29,653**	(35.2%)	**719,943**	(53.4%)	**24,279**
- Precious metal	**3,500**	(4.2%)	**269,925**	(20.0%)	**77,119**
- Metal ash & residues	**354**	(0.4%)	**3,951**	(0.3%)	**11,157**
- Lead	**302**	(0.4%)	**1,027**	(0.1%)	**3,401**
- Nickel	**108**	(0.1%)	**1,451**	(0.1%)	**13,478**
- Zinc	**36**	(0.0%)	**250**	(0.0%)	**6,874**
- Tin	**0**	(0.0%)	**0**	(0.0%)	**-**
(Non-ferrous metals) Sub-total	**84,289**	(100.0%)	**1,348,466**	(100.0%)	**15,998**
c. Plastics					
- Polyethylene (PE)	**14,821**	(16.8%)	**50,884**	(24.6%)	**3,433**
- Polystyrene & copolymers (PS)	**7,908**	(8.9%)	**19,743**	(9.6%)	**2,497**
- Polyvinyl chloride (PVC)	**9,856**	(11.1%)	**26,954**	(13.0%)	**2,735**
- Polypropylene (PP)	**4,148**	(4.7%)	**14,111**	(6.8%)	**3,402**
- Polyethylene terephthalate (PET)	**4,079**	(4.6%)	**14,540**	(7.0%)	**3,565**
- Others[(1)]	**47,663**	(53.9%)	**80,425**	(38.9%)	**1,687**
(Plastics) Sub-total	**88,475**	(100.0%)	**206,658**	(100.0%)	**2,336**
d. Textiles					
- Cotton	**0**	(0.0%)	**0**	(0.0%)	**-**
- Man-made fibres	**0**	(0.0%)	**0**	(0.0%)	**-**
- Old clothing & other textile articles, rags, etc.	**238**	(100.0%)	**4,287**	(100.0%)	**18,044**
(Textiles) Sub-total	**238**	(100.0%)	**4,287**	(100.0%)	**18,044**
e. Wood & paper					
- Paper	**896,339**	(100.0%)	**1,243,903**	(100.0%)	**1,388**
- Wood (include sawdust)	**207**	(0.0%)	**65**	(0.0%)	**312**
(Wood & paper) Sub-total	**896,546**	(100.0%)	**1,243,968**	(100.0%)	**1,388**
f. Glass					
(Glass) Sub-total	**0.3**	(100.0%)	**11**	(100.0%)	**40,000**
g. Electrical and electronic equipment					
(Electrical and electronic equipment) Sub-total	**54,045**	(100.0%)	**N/A**		**N/A**

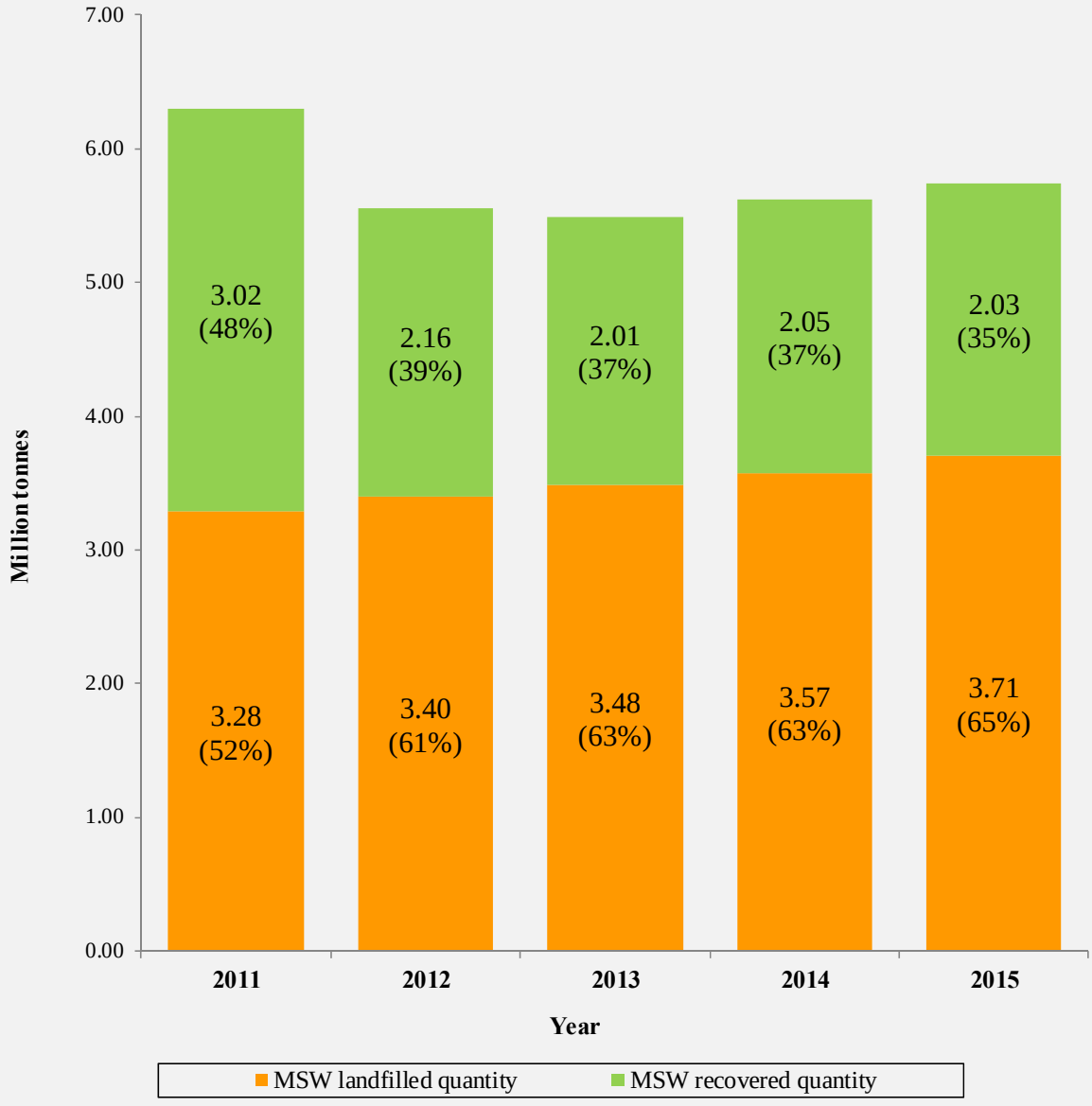
Notes:

(1) Other recyclable plastics include waste, parings and scrap not elsewhere classified.

(2) Figures in brackets refer to percentage shares.

Plate 3.8 Generation, disposal and recovery of MSW from 2011 to 2015

	2011	2012	2013	2014	2015
Total (million tonnes)	6.30	5.56	5.49	5.62	5.74
y-o-y change (%)	(-9.1%)	(-11.8%)	(-1.2%)	(2.4%)	(2.1%)

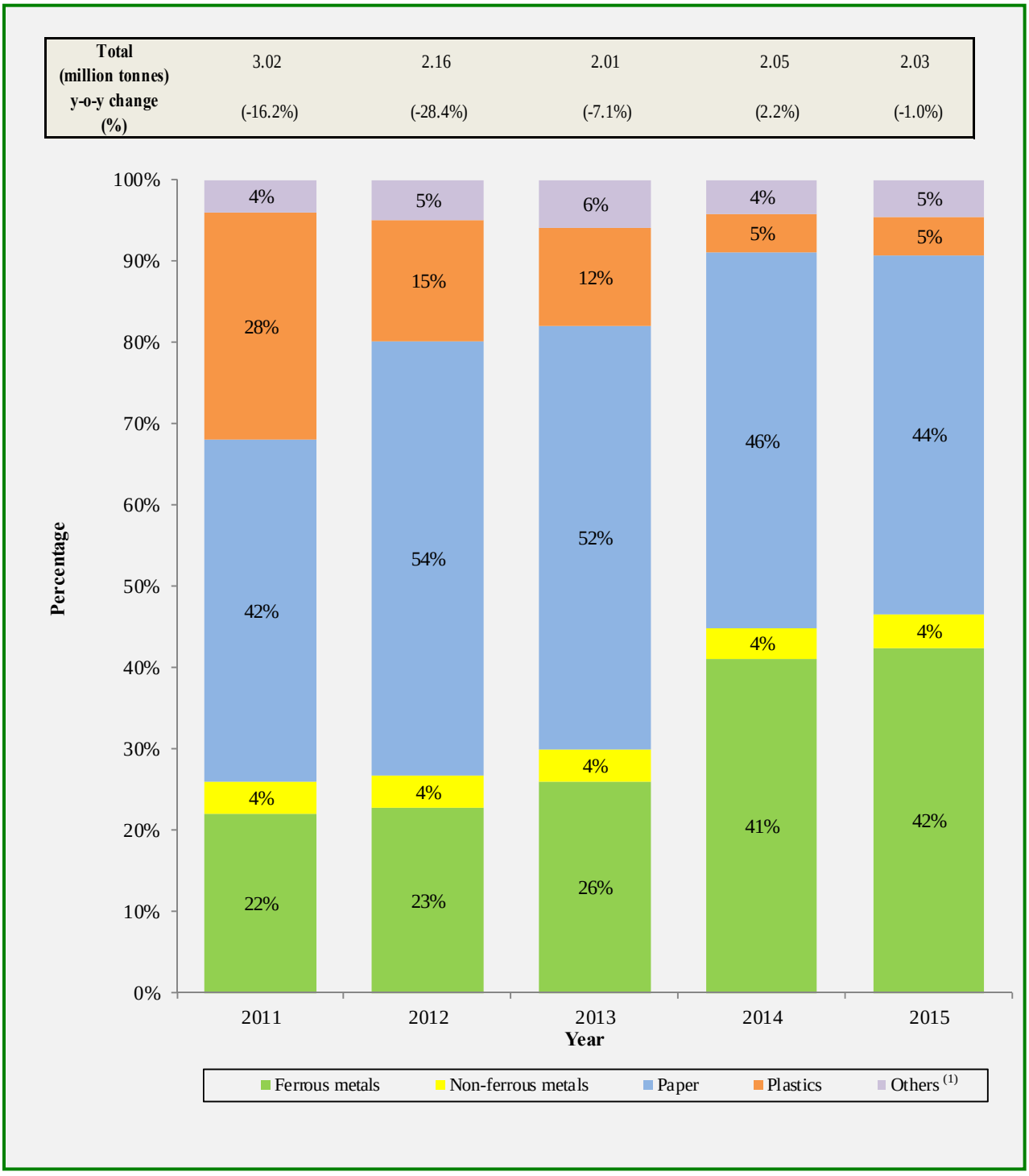


Note:

(1) Generation of MSW is the sum of MSW disposed of at landfills and MSW recovered for recycling.

Plate 3.9 Recyclables recovered from MSW in percentages from 2011 to 2015 - By major type of recyclable

	2011	2012	2013	2014	2015
Total (million tonnes)	3.02	2.16	2.01	2.05	2.03
y-o-y change (%)	(-16.2%)	(-28.4%)	(-7.1%)	(2.2%)	(-1.0%)

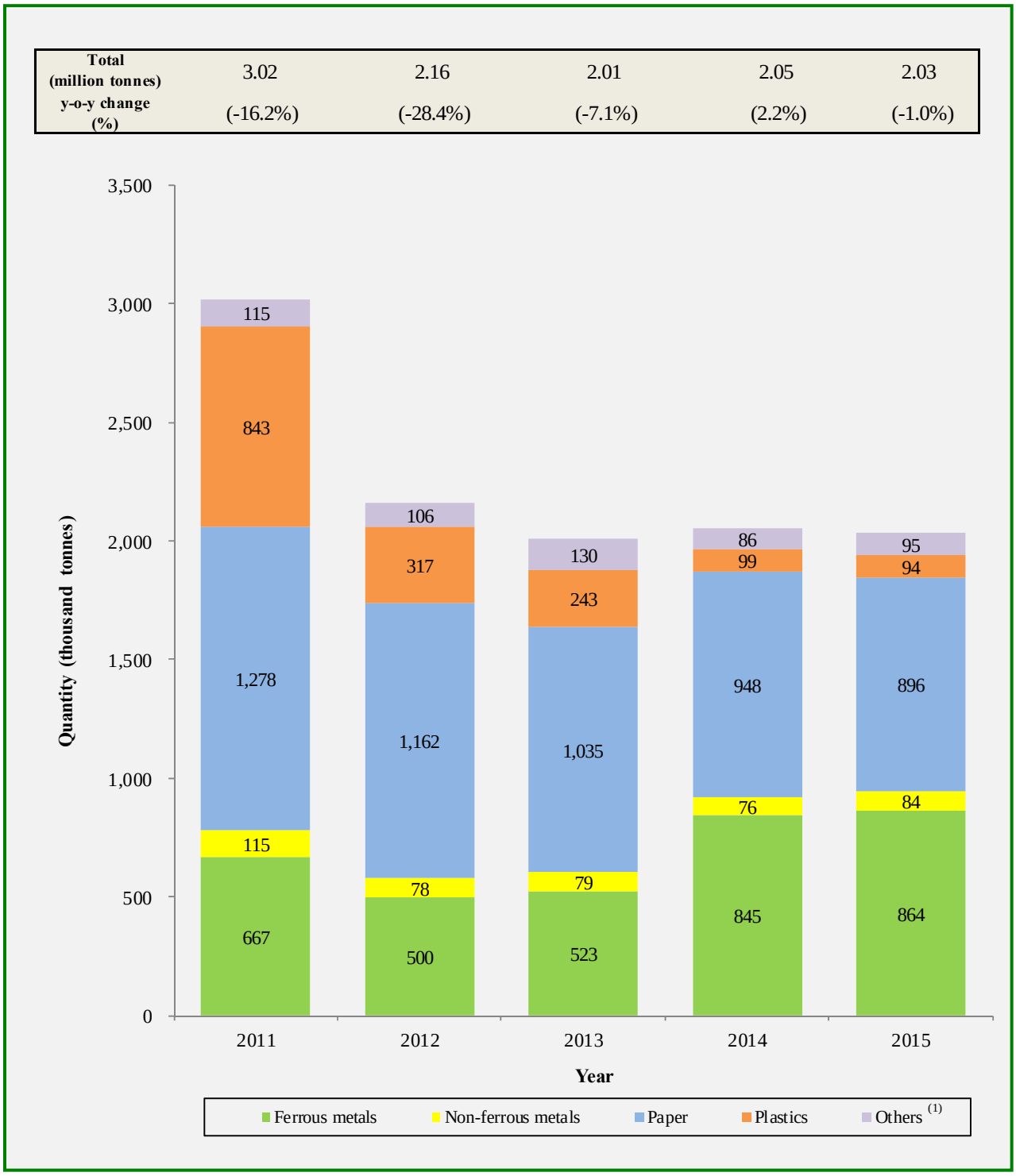


Note:

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

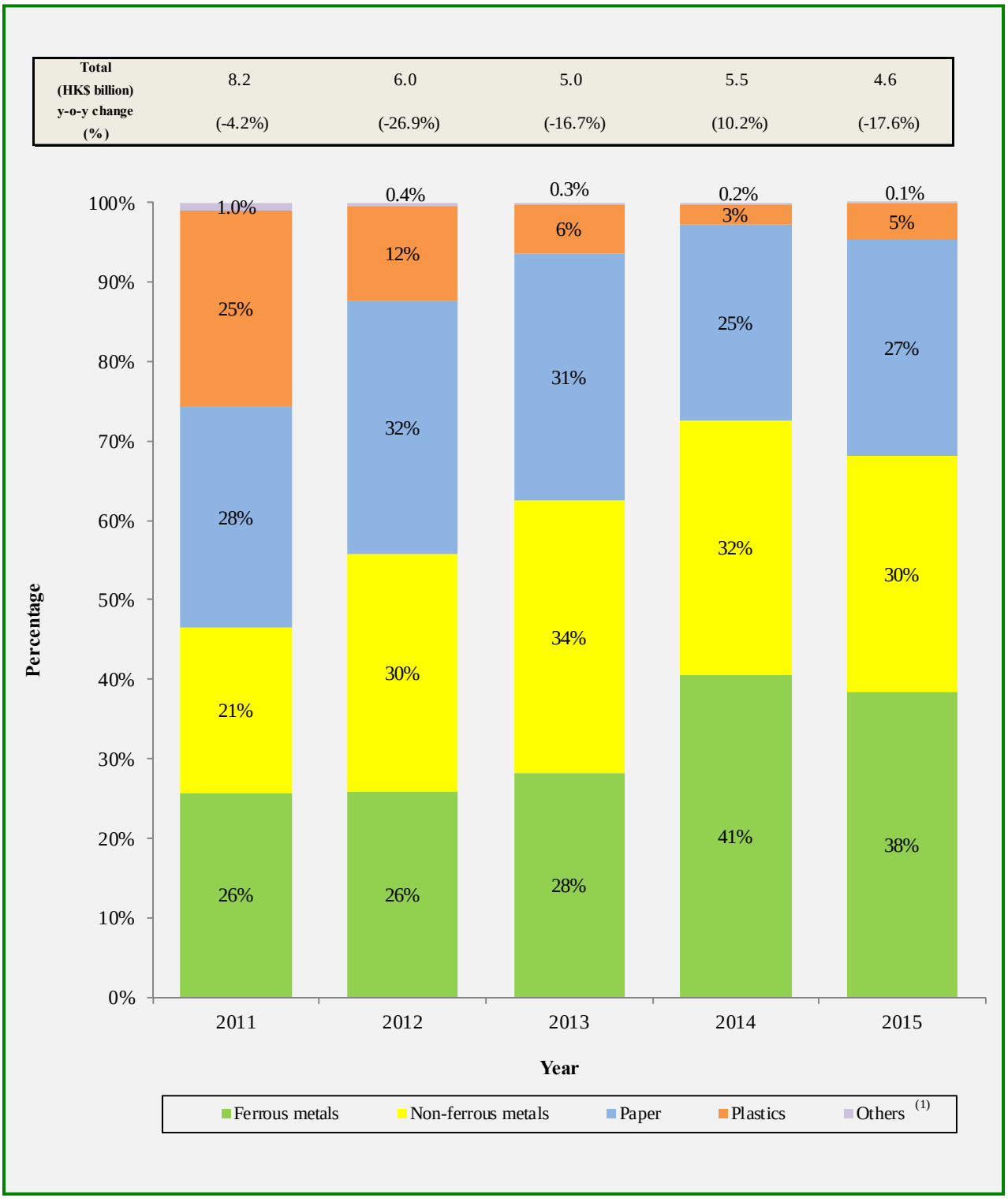
Plate 3.10 Recyclables recovered from MSW in quantities from 2011 to 2015 - By major type of recyclable

	2011	2012	2013	2014	2015
Total (million tonnes)	3.02	2.16	2.01	2.05	2.03
y-o-y change (%)	(-16.2%)	(-28.4%)	(-7.1%)	(2.2%)	(-1.0%)



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

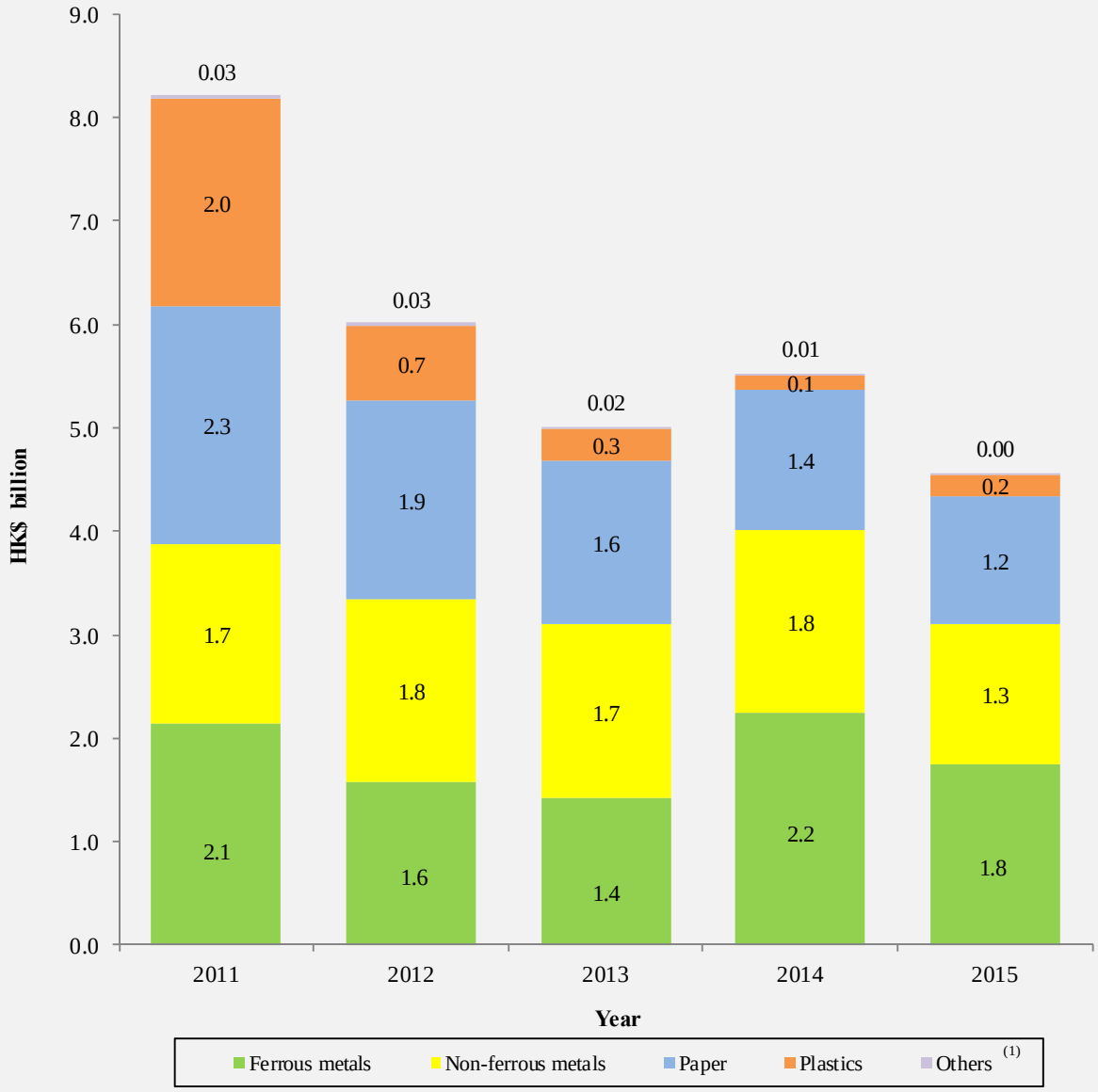
Plate 3.11 Values of exported recyclable materials recovered from MSW in percentages from 2011 to 2015 – By major type of recyclable material



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

Plate 3.12 Values of exported recyclable materials recovered from MSW from 2011 to 2015 - By major type of recyclable material

	2011	2012	2013	2014	2015
Total (HK$ billion)	8.2	6.0	5.0	5.5	4.6
y-o-y change (%)	(-4.2%)	(-26.9%)	(-16.7%)	(10.2%)	(-17.6%)



Notes:

(1) Others include glass, wood, textiles and rubber tyres only.

(2) Values less than HK$5 million are shown as 0.00.

Appendix 1: Classification of Solid Waste and Monitoring Methodology

Waste Classification and Terminology

Solid waste is classified into three main categories by making reference to the sources of waste and the institutional arrangements for waste collection and disposal. These three main categories 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 three categories: domestic waste, commercial waste and industrial waste.

- **Domestic waste** refers to household waste, waste generated from daily activities in institutional premises (e.g. schools, government offices) and refuse collected from public cleansing services. Public cleansing waste includes dirt and litter collected by the Food and Environmental Hygiene Department, 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.

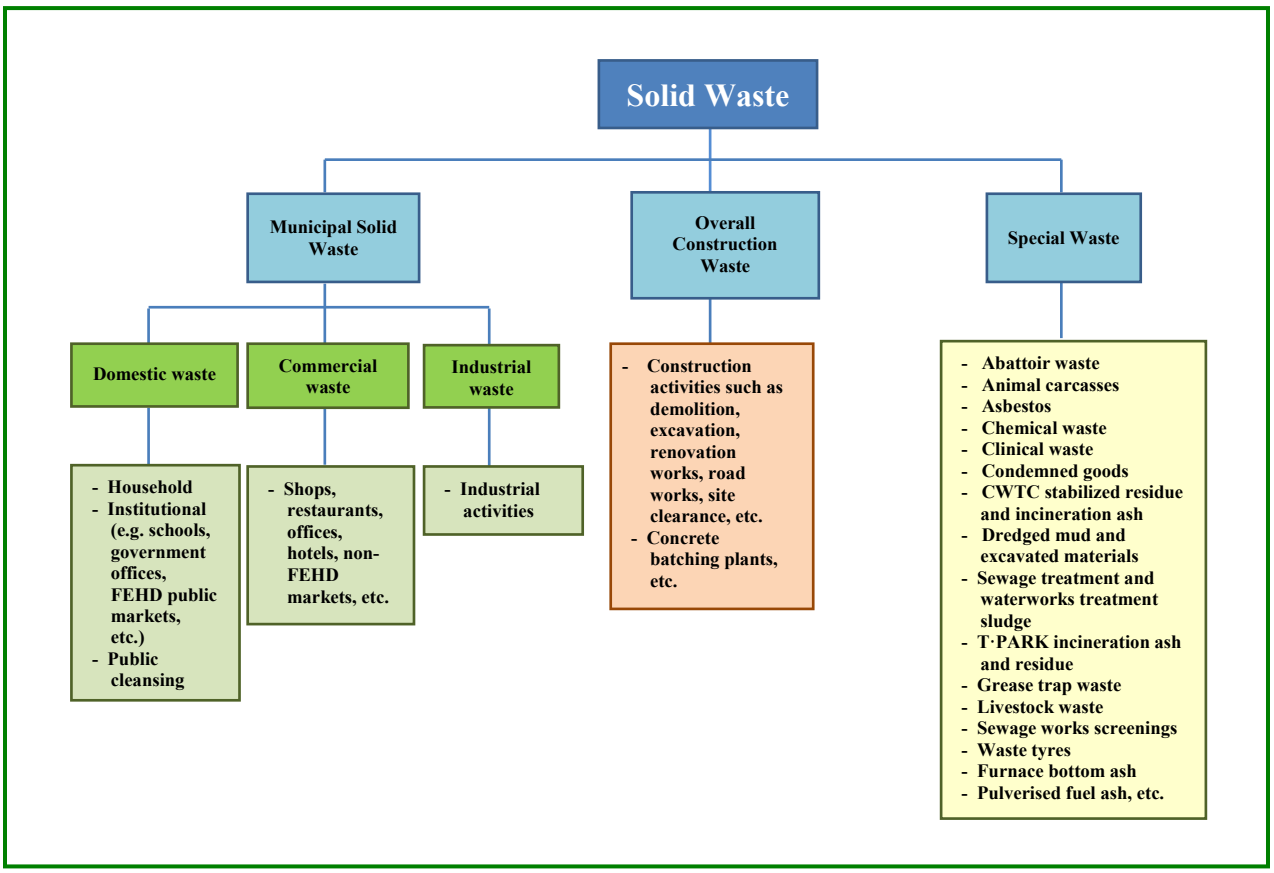
- Municipal solid waste contains a small portion of bulky items like furniture and domestic appliances which cannot be handled by conventional compactor type refuse collection vehicles. These items are regarded as bulky waste and are usually collected separately.

Overall construction waste includes waste or surplus materials arising from construction activities such as site clearance, refurbishment, renovation, demolition, land excavation and road works. It also includes waste concrete that is generated from concrete batching plants, cement plaster/mortar plants not set up inside construction sites. The overall construction waste is sorted into inert materials (called public fill) and construction and demolition (C&D) waste (basically non-inert waste), where inert materials like debris, rubble, concrete and earth are reused in construction sites, or as fill in reclamation sites when available. C&D waste are disposed of at landfills.

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 and incineration ash, dredged mud and excavated materials, sewage treatment and waterworks treatment sludge, T·PARK incineration ash and residue, 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 from the following sources:

- Waste intake records taken at waste management facilities;
- Results of annual survey on waste composition conducted at landfills and RTSs;
- Results of waste recovery survey conducted on the local recycling industry;
- Statistics provided by relevant groups of EPD; and
- Statistics provided by other departments including FEHD, CEDD and C&SD.