EPR Design and Guidelines

- Case of Japan for Packaging, Home Appliances and Batteries -

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Introduction

■ Changes in Municipal Solid Waste Generation in Japan

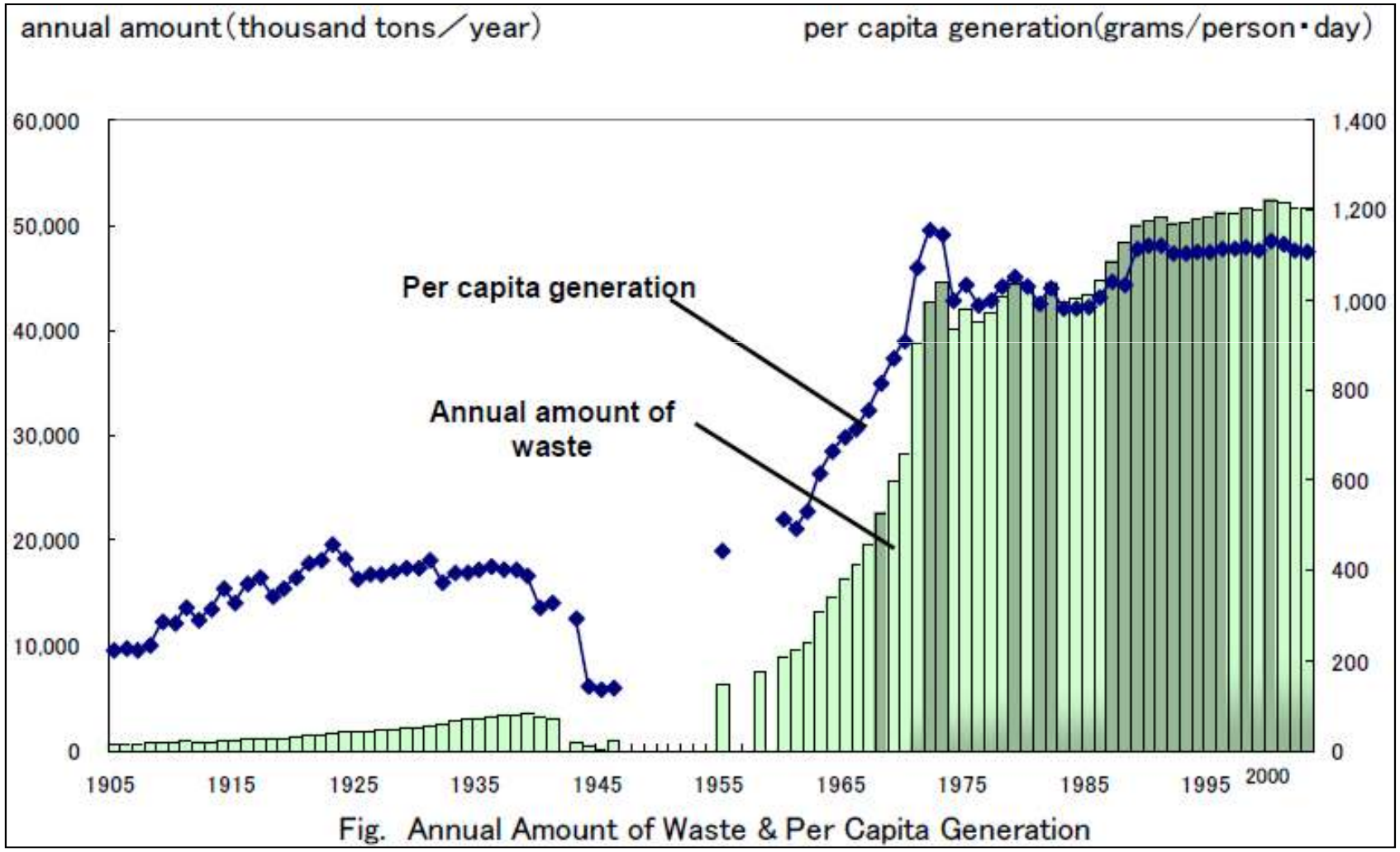


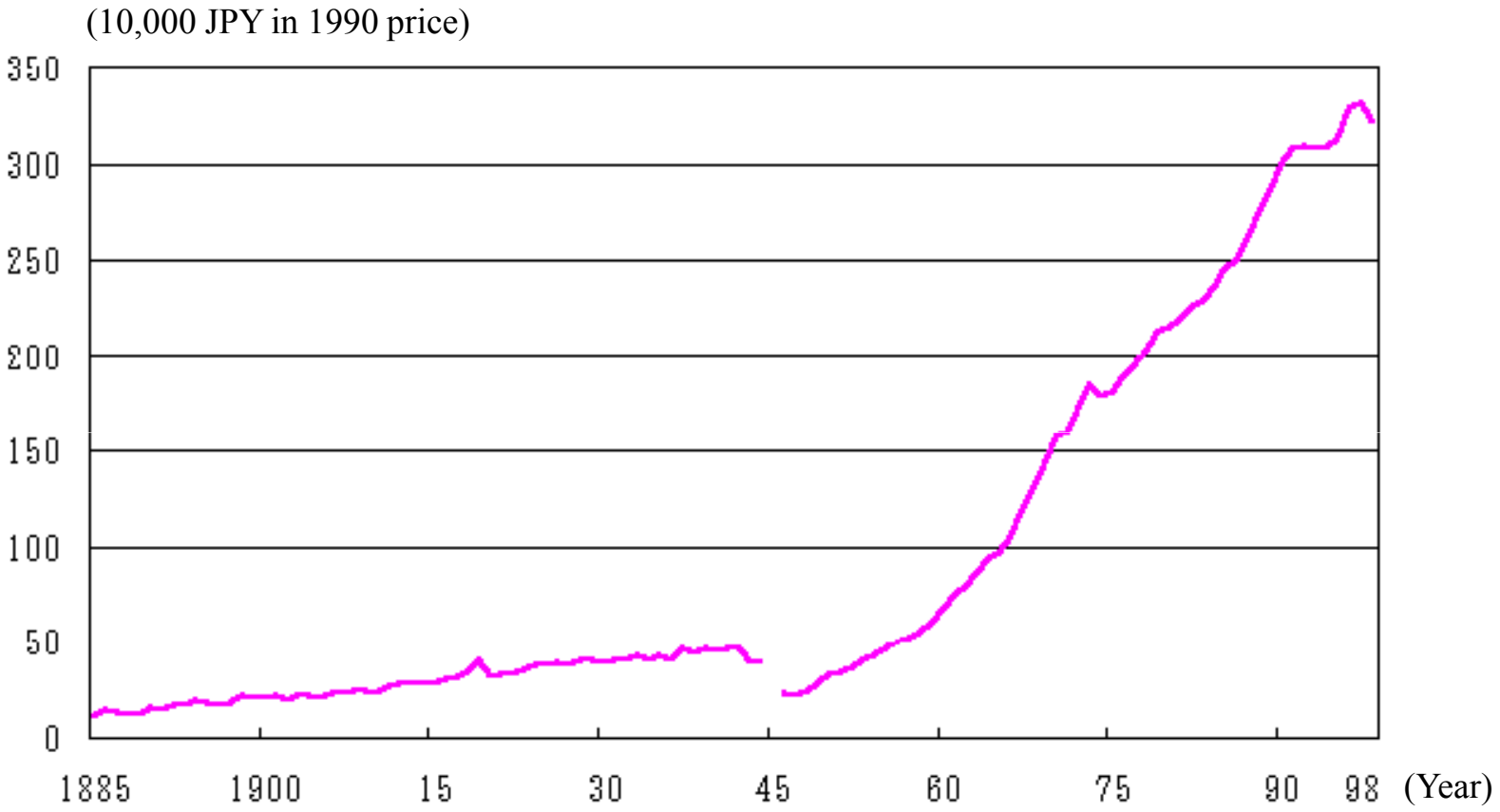
Fig. Annual Amount of Waste & Per Capita Generation

Introduction

- Rapid increase in municipal solid waste (MSW) witnessed for 1955 – 1970, in terms of annual amount of generation and per-capita generation
- This is closely related to the initial economic growth
- Change in life-style and population increase, caused by the economic growth, also had great effects on the volume and composition of MSW
- Similar changes are taking place in Industrial Waste

- Clarify problems caused by changes regarding waste and how Japan addressed to those problems
- Examine what we need to do in order to make appropriate waste management, based on such experiences

Changes in Real National Income per Capita

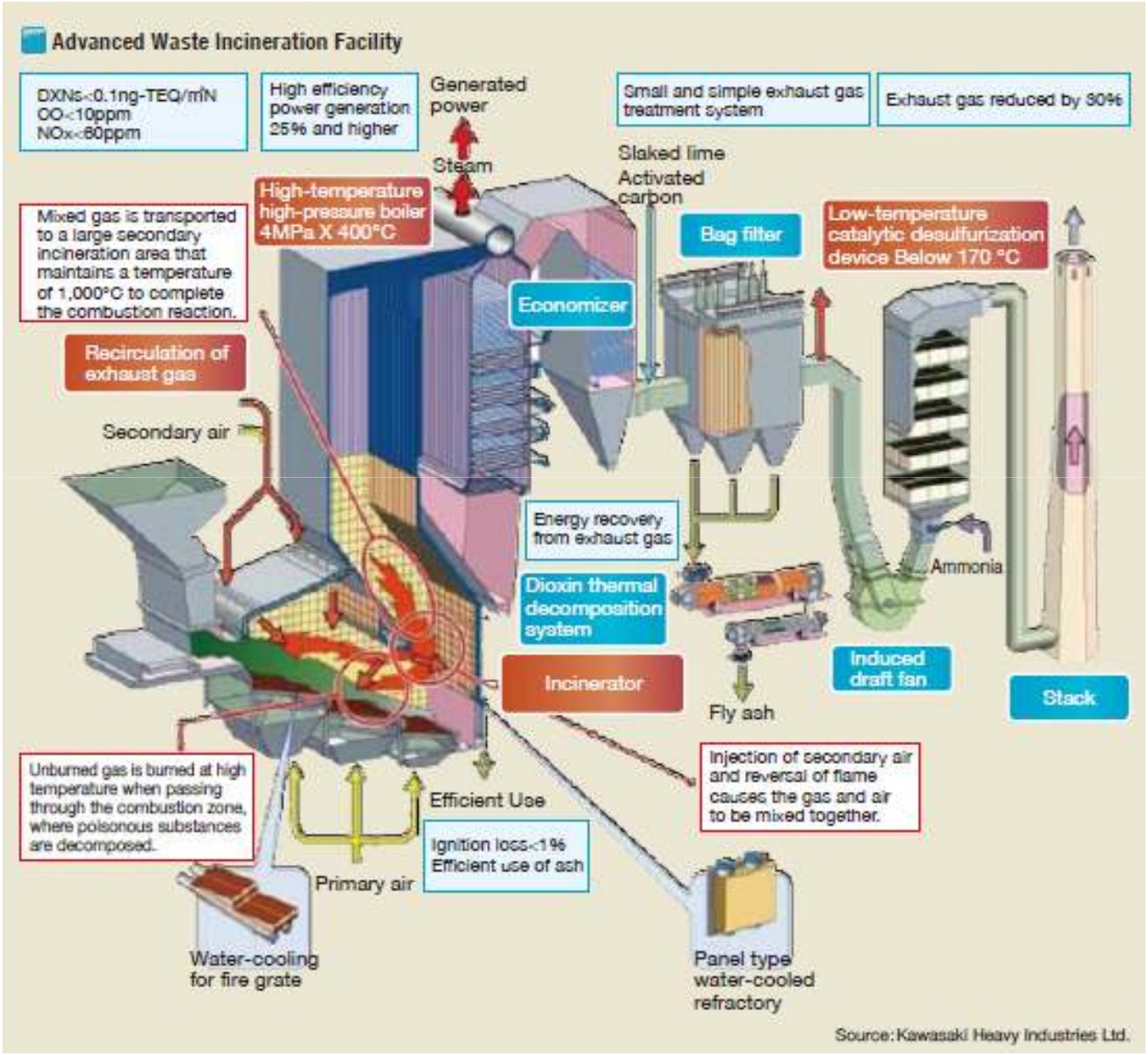


Tokyo Garbage War

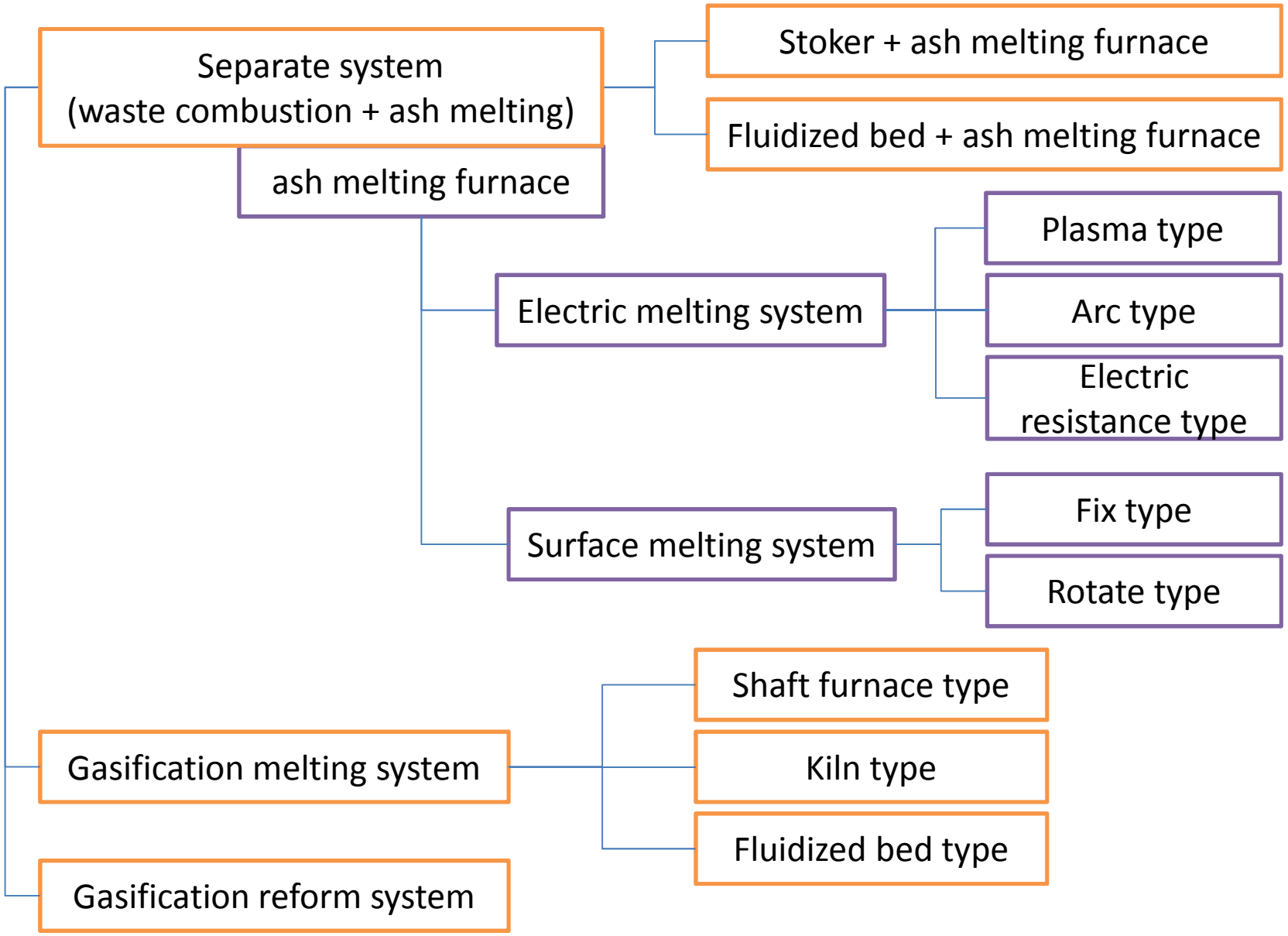
Landfill

Koto Ward residents block a garbage truck (1971)

Municipal Waste Incineration Technology



Classification of “waste-to-energy” incineration technology



Waste incineration facilities in residential and commercial areas

Shibuya Incineration Plant
Constructed in 2001

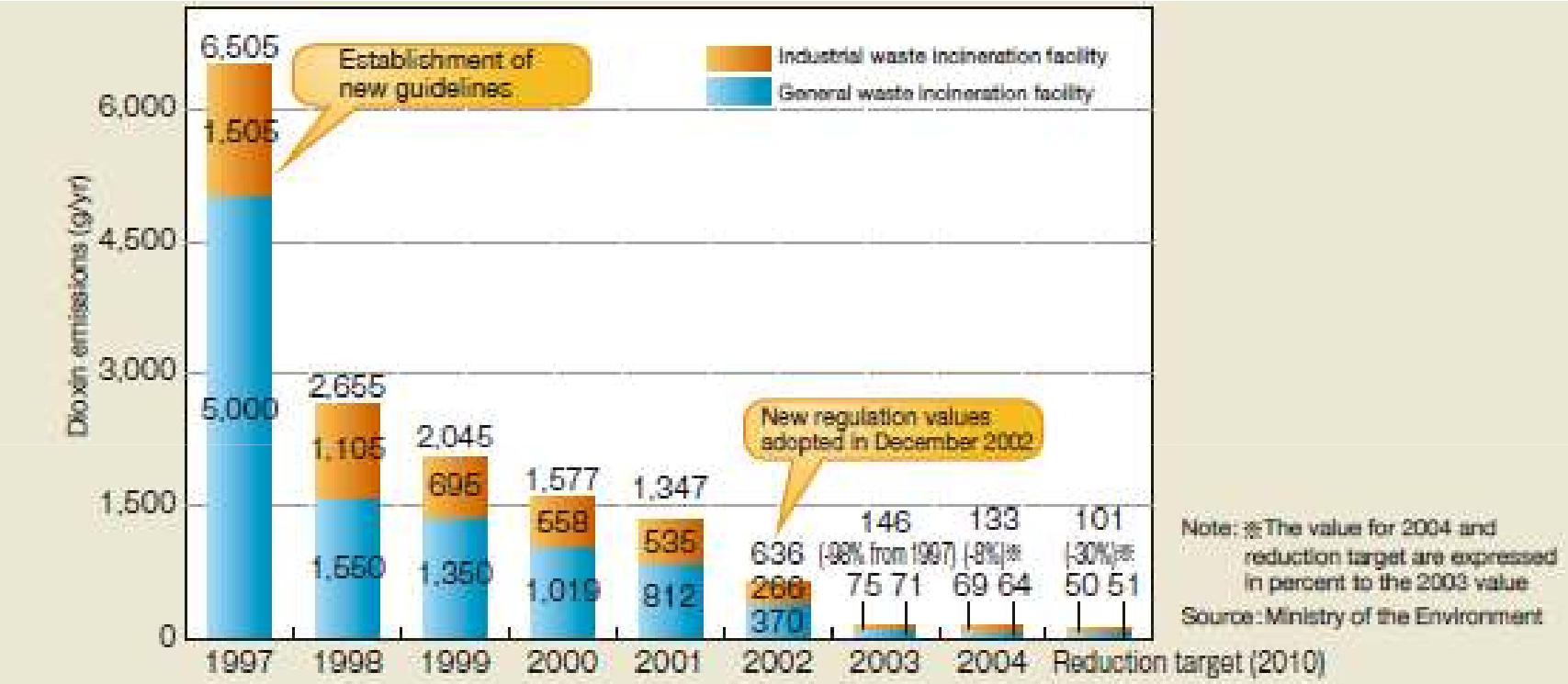
- located near Shibuya Station
- a high technology with a capacity of 200t/day
- strict gas emission regulations for NOx, SOx, smoke, dioxin and other gases
- A steam turbine generator that generates a maximum of 4,200kW.
- Excess electricity being sold to Tokyo Electric Power Company.

Shinagawa Incineration Plant

- Operation under automatic control

Source: Clean Association of TOKYO 23

Solution to poisonous gas and dioxin emissions



Reduced dioxin emissions by 98% compared to 1997 from incineration plants in Japan

Japanese Incineration Technology Transferred to the Asian Region

The largest scale plant with the capacity to handle 4320t/day was built in Singapore by Mitsubishi Heavy Industries Environmental & Chemical Engineering Co., Ltd.

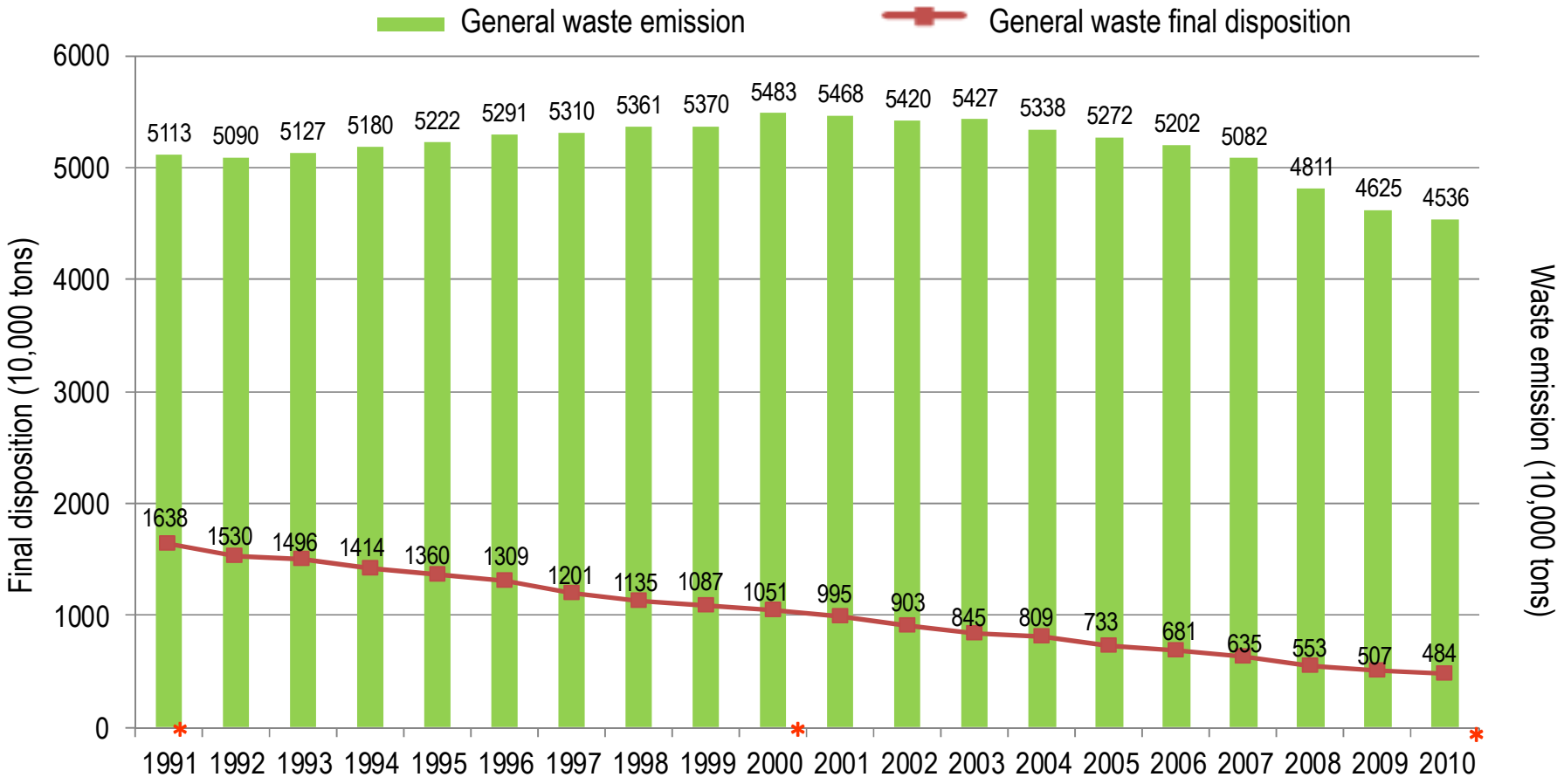
In Taipei delivered by Hitachi Zosen Corporation

An industrial waste incinerator by JFE Engineering Corporation has been operating in Thailand since 2006. Its treatment capacity is 100t/day.

An electric generating facility with the capacity of 30,000 KW and steam condition of 4MPa and 400℃ has been delivered to the incineration plant in Beijing, with capacity to handle 1,600t/day, by Takuma Co., Ltd.

Changes in general waste emission and in final disposition

The emission of general waste, after recording a peak of 54.8 million ton in 2000, continues to decrease. The amount of final disposition tends to decrease along with progress in recycling and reduction.

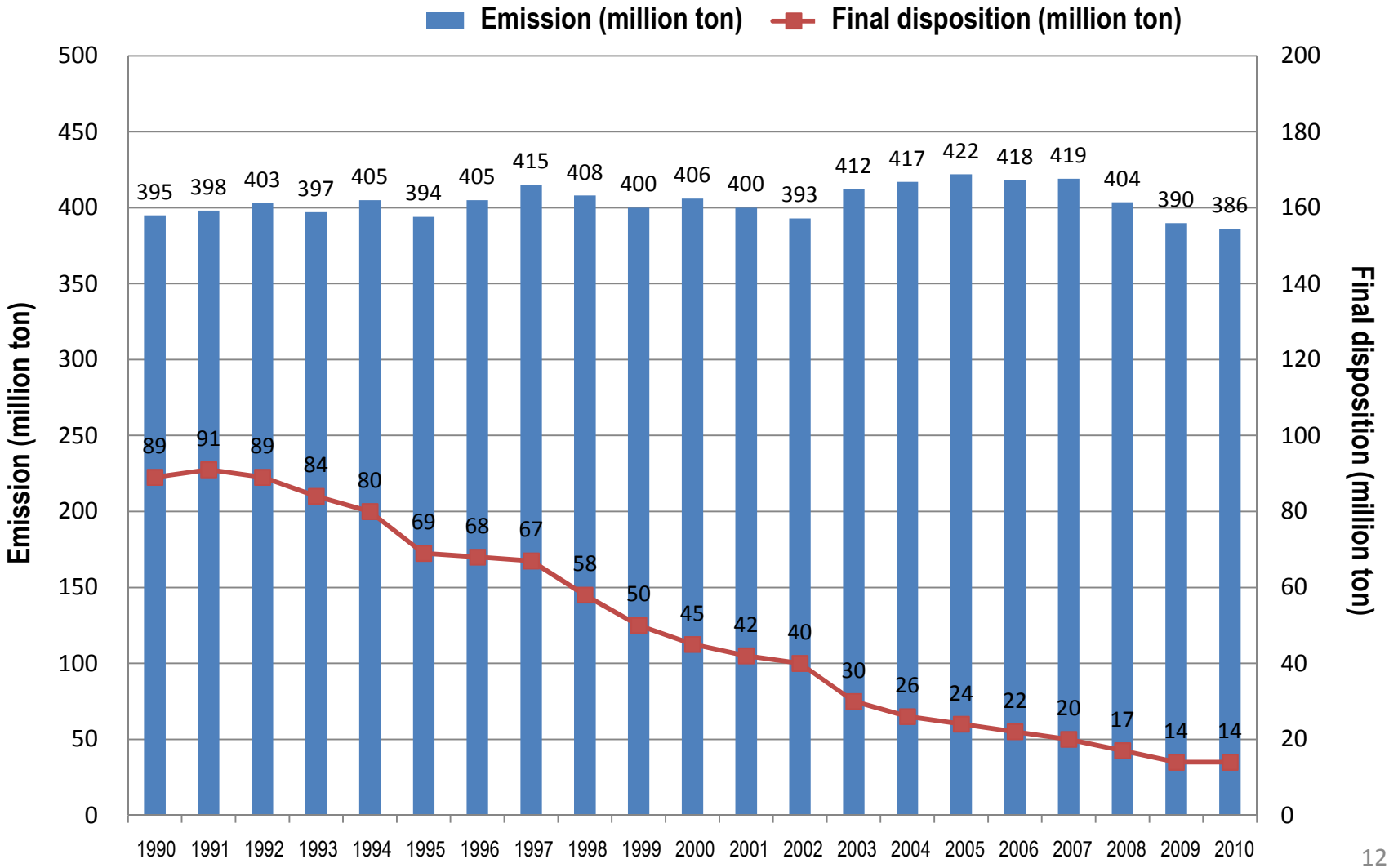


* **Waste emission per day per head (g/man–day)**

- 1991	**1,118**	**(g/man–day)**
- 2000	**1,185**	**(g/man–day)**
- 2010	**976**	**(g/man–day)**

Changes in industrial waste emission and in final disposition

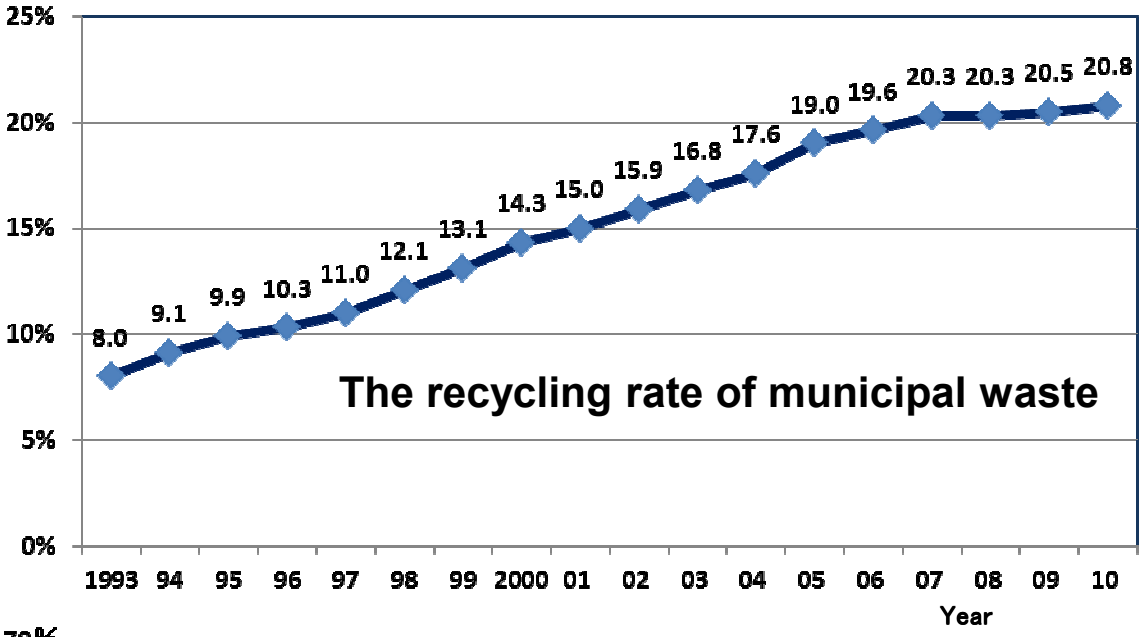
The total emission of industrial waste in 2010 is 390 million tons, and since 1990, has almost no changes in this level. The final disposition also tends to decrease with progress in recycling and reduction.



Trend of the waste recycling rate

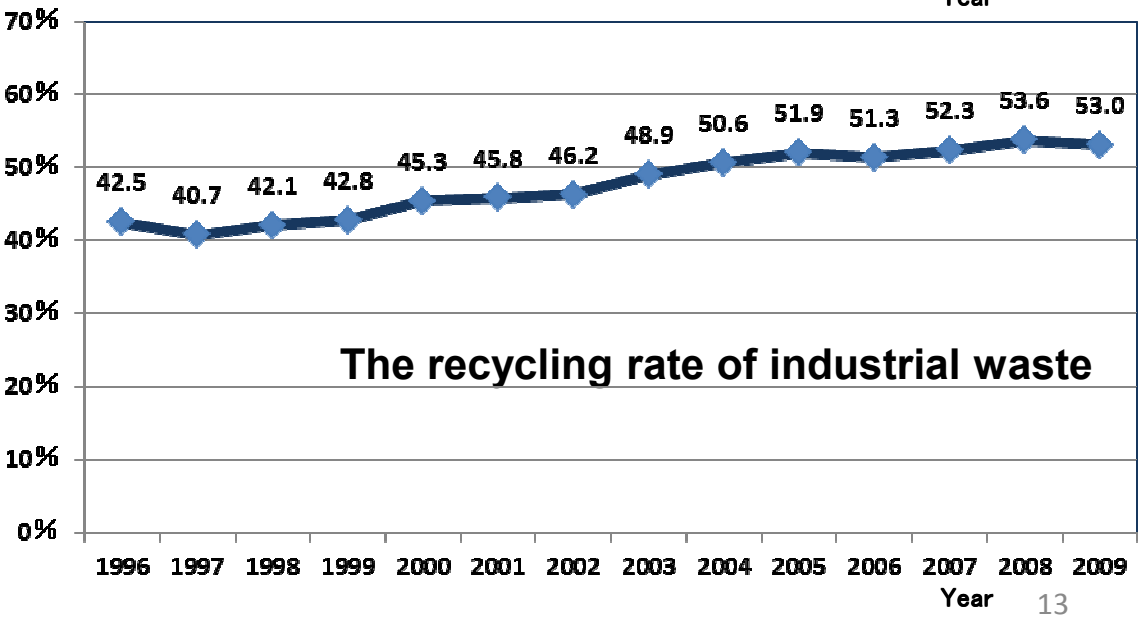
The recycling rate of municipal waste is 20.8% (FY2010).

The recycling rate of municipal waste was rising steadily, and exceeded 20% in both FY2007 and FY2008.



The recycling rate of industrial waste is 53.0% (FY2009).

The recycling rate of industrial waste, which was rising gradually, exceeded 50% since FY2004.



Legal systems for establishing a Sound Material-Cycle Society

The Basic Environment Law
Completely enforced in August 1994

Basic Environment Plan
Completely amended and announced in April 2006

Basic Act for Establishing a Sound Material-Cycle Society (Basic Framework Act)
Completely enforced in January 2001

Ensuring material cycle in society
Reducing consumption of natural resources
Lowering environmental load

Fundamental Plan for Establishing a sound material-cycle society
Officially announced in March 2003
Amended in March 2008
The fundamentals for other plans designed by the State

< Proper treatment of waste >

Waste Management Law
Partially amended in February 2006

①Reduction of waste generation
②Proper treatment of waste (including recycling)
③Regulation for establishment of waste treatment facilities
④Regulation for waste treatment operators
⑤Establishment of waste treatment standards, etc.

< Promotion of recycling >

Law for the Promotion of Effective Utilization of Resources
Completely amended and enforced in April 2001

①Recycling of recycled resources
②Ingenuity and innovation to create structures and use materials to facilitate recycling
③Labeling for sorted collection
④Promotion of effective utilization of by-products

reduce
recycle → reuse
recycle
(１Ｒ) (３Ｒ)

Regulations according to characteristics of individual articles

Law for the Promotion of Sorted Collection and Recycling of Containers and Packaging

Completely enforced in April 2000
Partially amended in June 2006

Bottles, PET bottles, paper or plastic containers and packages

Law for the Recycling of Specified Kinds of Home Appliances

Completely enforced in April 2001

Air conditioners, refrigerators, freezers, TVs, washing machines, drying machines

Law for the promotion of the Utilization of Recyclable Food Resources

Completely enforced in May 2001
Partially amended in June2007

Food residues

Construction Materials Recycling Law

Completely enforced in May 2002

Timber, concrete, asphalt

Law for the Recycling of End-of-Life Vehicles

Completely enforced in January 2005

Vehicles

Small Home Appliance Recycling Law

Announced in August 2012

WEEE

Green Purchasing Law (The State takes the initiative to promote the procurement of recycled items)
Completely enforced in April 2001

Definition of a “sound material-cycle society”

A society in which used products would be reused, recycled, or converted into heat as much as possible to prevent them from becoming waste, and those not put to such cyclical use would be disposed properly without fail, so as to reduce the consumption of natural resources and minimize the burden on the environment.

Creation of a sound material-cycle society

The creation of a sound material-cycle society should undertaken with an aim to promote the realization of a society that can develop sustainably while at the same time pursuing sound economic development with minimum impact on the environment, with relevant actions taken voluntarily and proactively in accordance with the technological and economic potential of such actions.

Point related EPR in the Basic Act for Establishing a Sound Material-Cycle Society

Clarification of the roles of the national government, local public entities, companies and the citizens

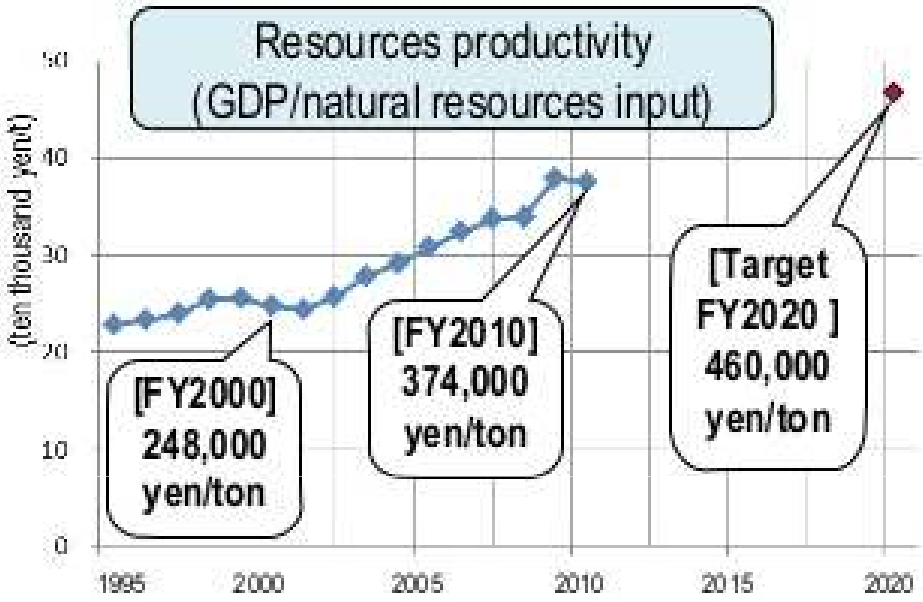
For building the sound material-cycle society, in order to work with the national government, local public entities, companies and the citizens altogether, their responsibilities are clarified, particulary

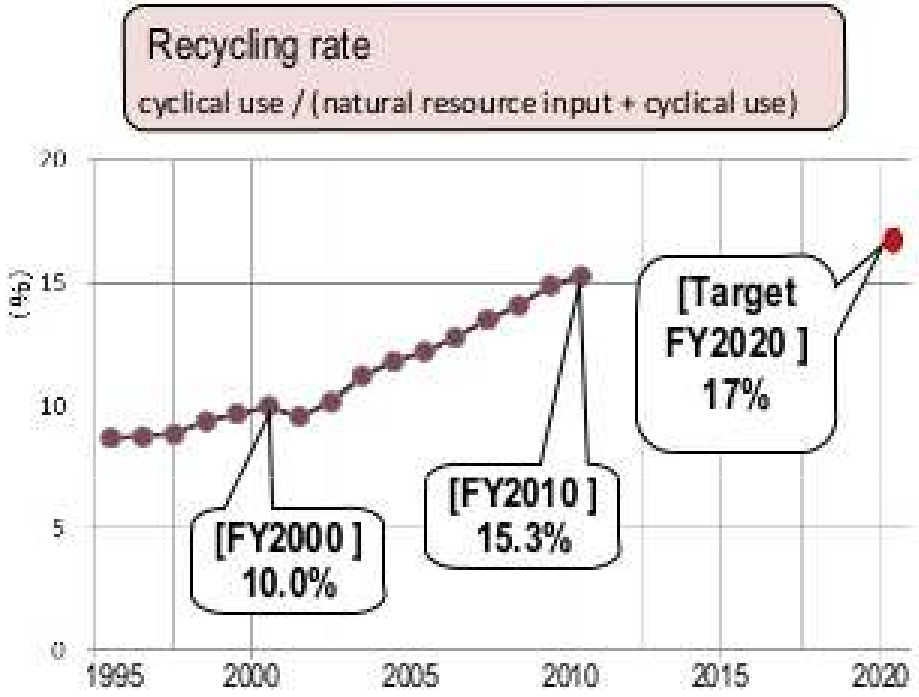
(1) Clarify "the producer responsibility" of businesses and citizens

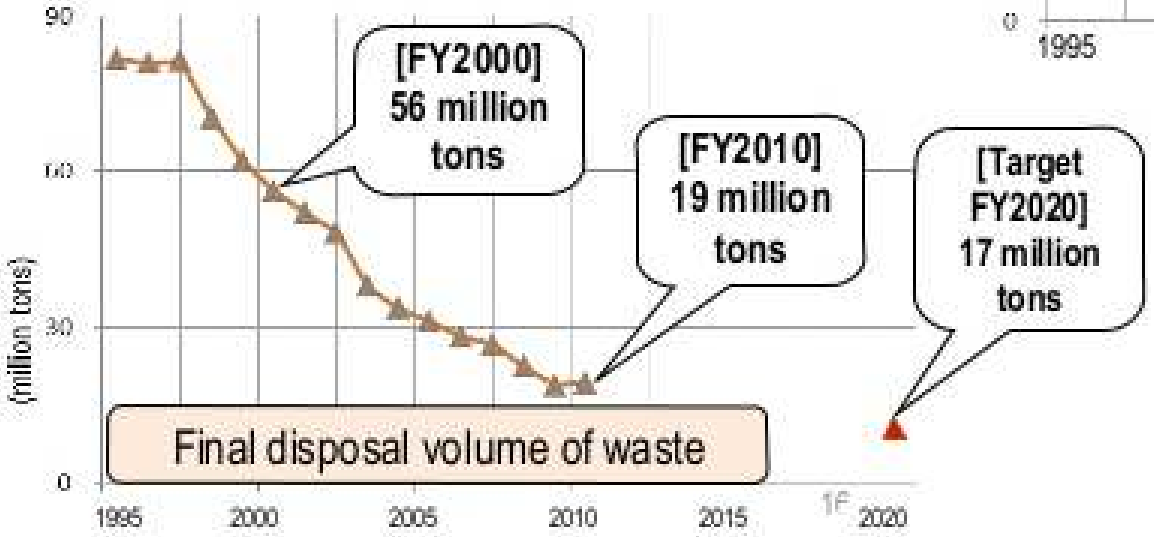
(2) Establishment of general principle of "the extended producer responsibility" in which the producer takes certain responsibility of its products produced even after the products are disposed.

Japan's progress towards establishing a SMC society

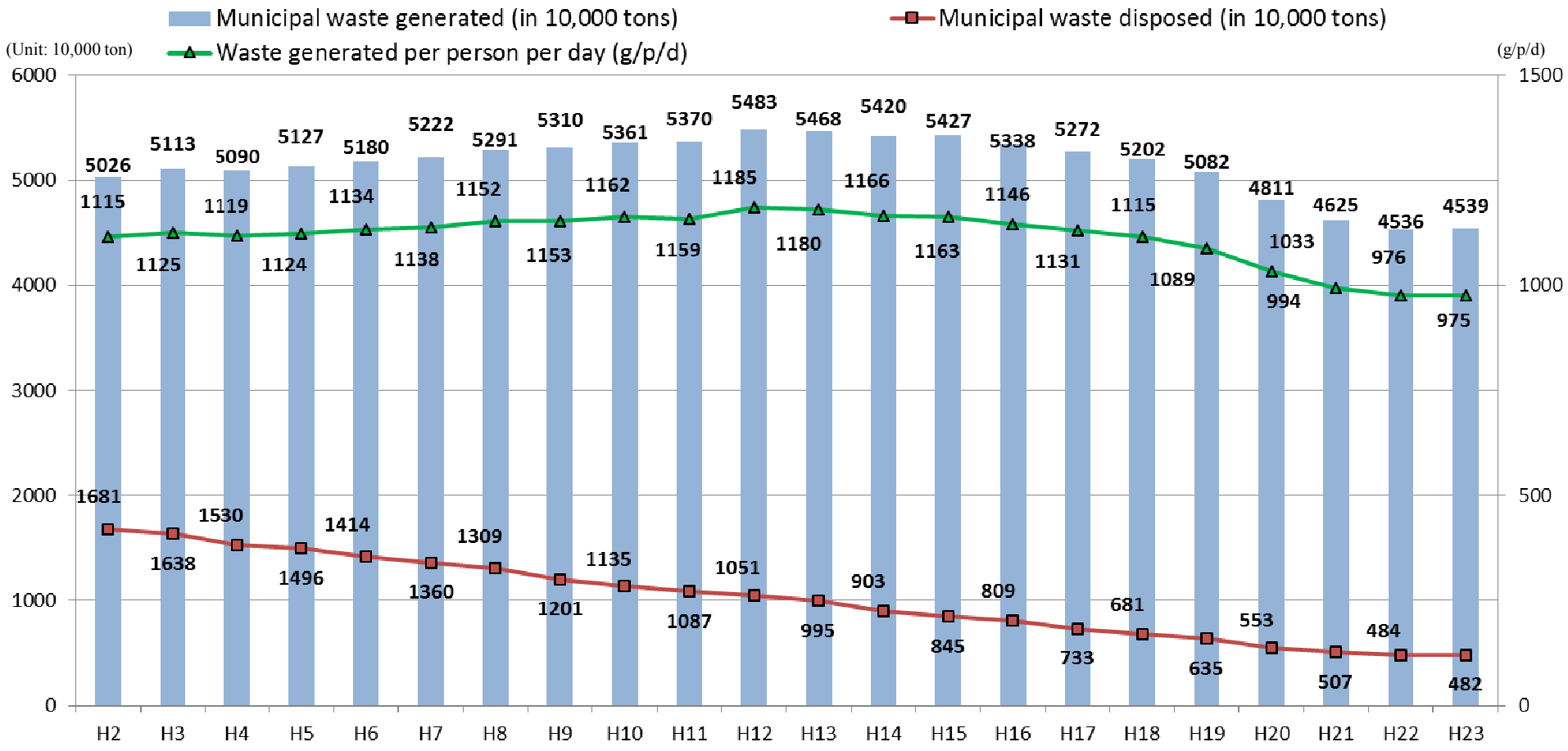
– changes in major indexes and goals targeted by the 3rd Fundamental Plan –





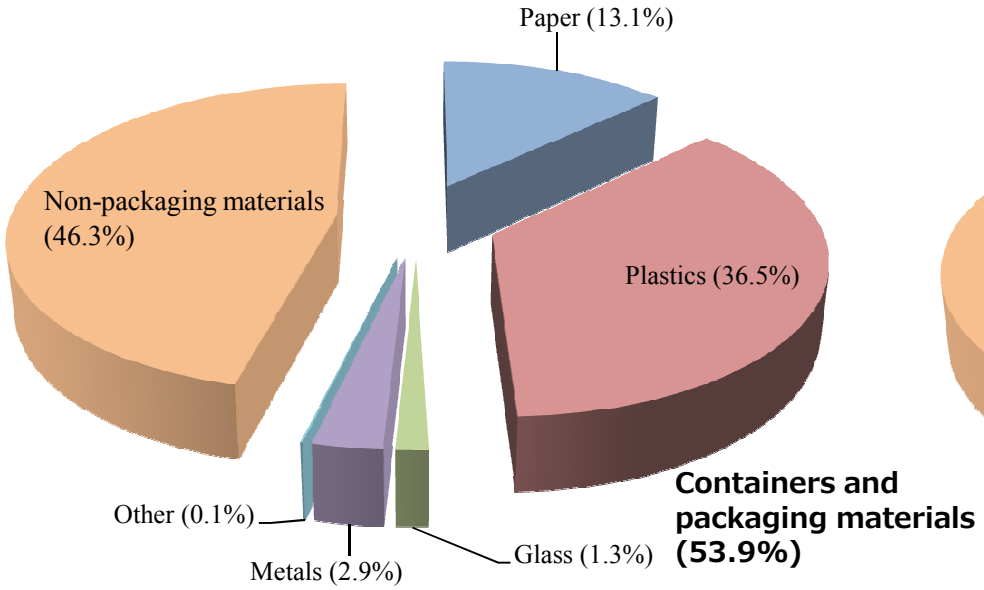


Progress in recycling of containers and packaging materials

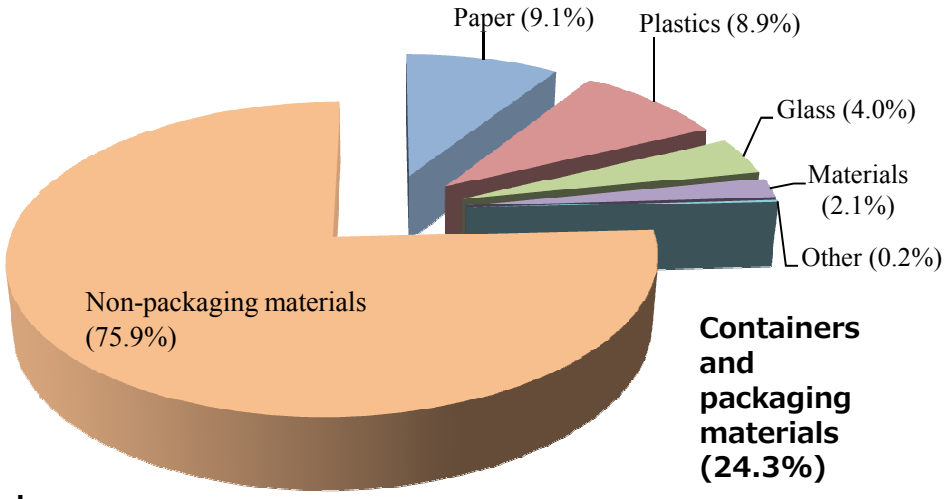


Source: Ministry of the Environment, "*Nihon no Haikibutsu Shori* [Waste Disposal in Japan]"

(1) Waste composition by volume



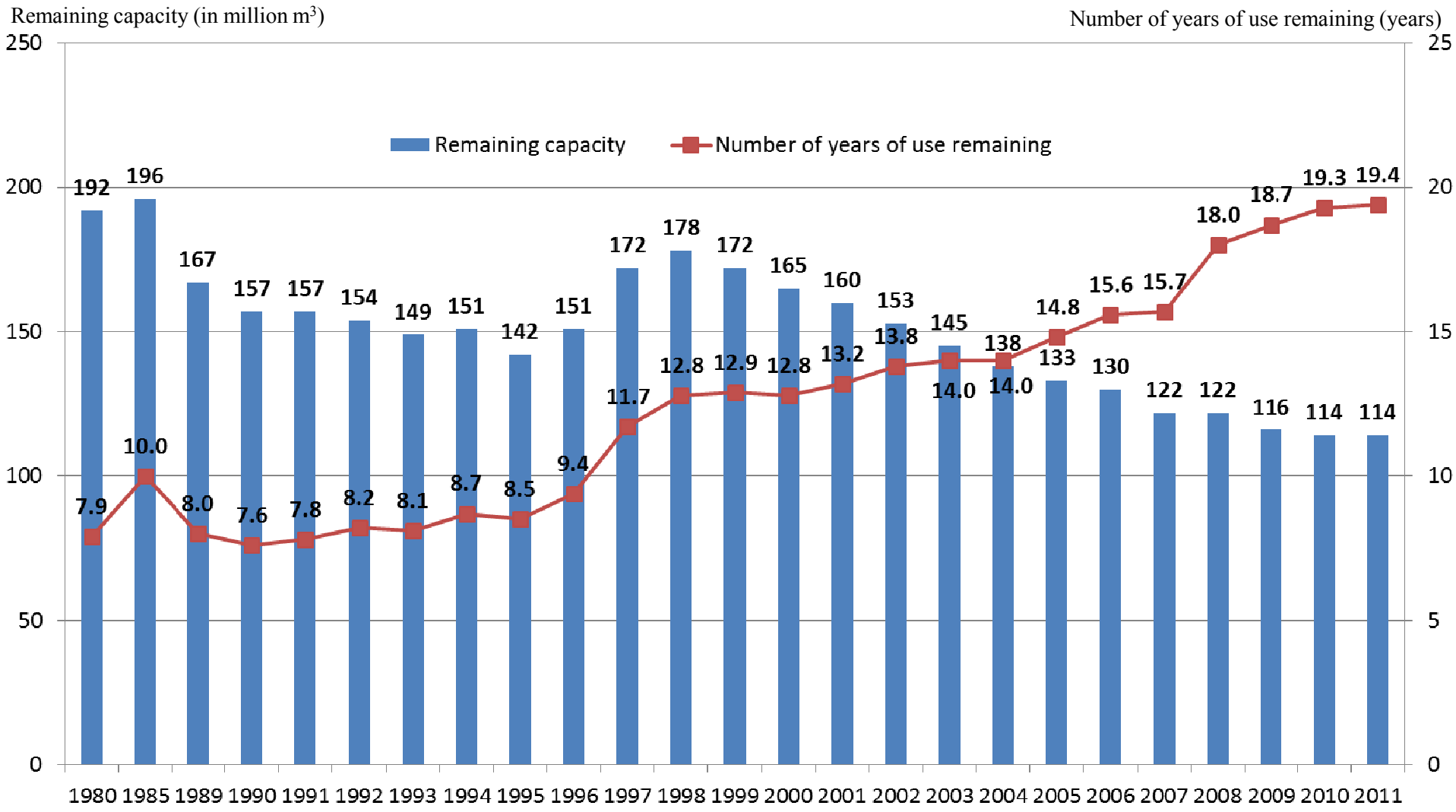
(2) Waste composition by wet weight



* Percentage figures are rounded and do not necessarily add up to 100%.

Source: Ministry of the Environment, "*Yoki-Hoso-Haikibutsu no Shiyo-Haishutsu Jittai Chosa* [Survey on the Use and Generation of Container and Packaging Waste]"

Status of Disposal Sites for Municipal Waste



Source: Ministry of the Environment, "*Nihon no Haikibutsu Shori* [Waste Disposal in Japan]"

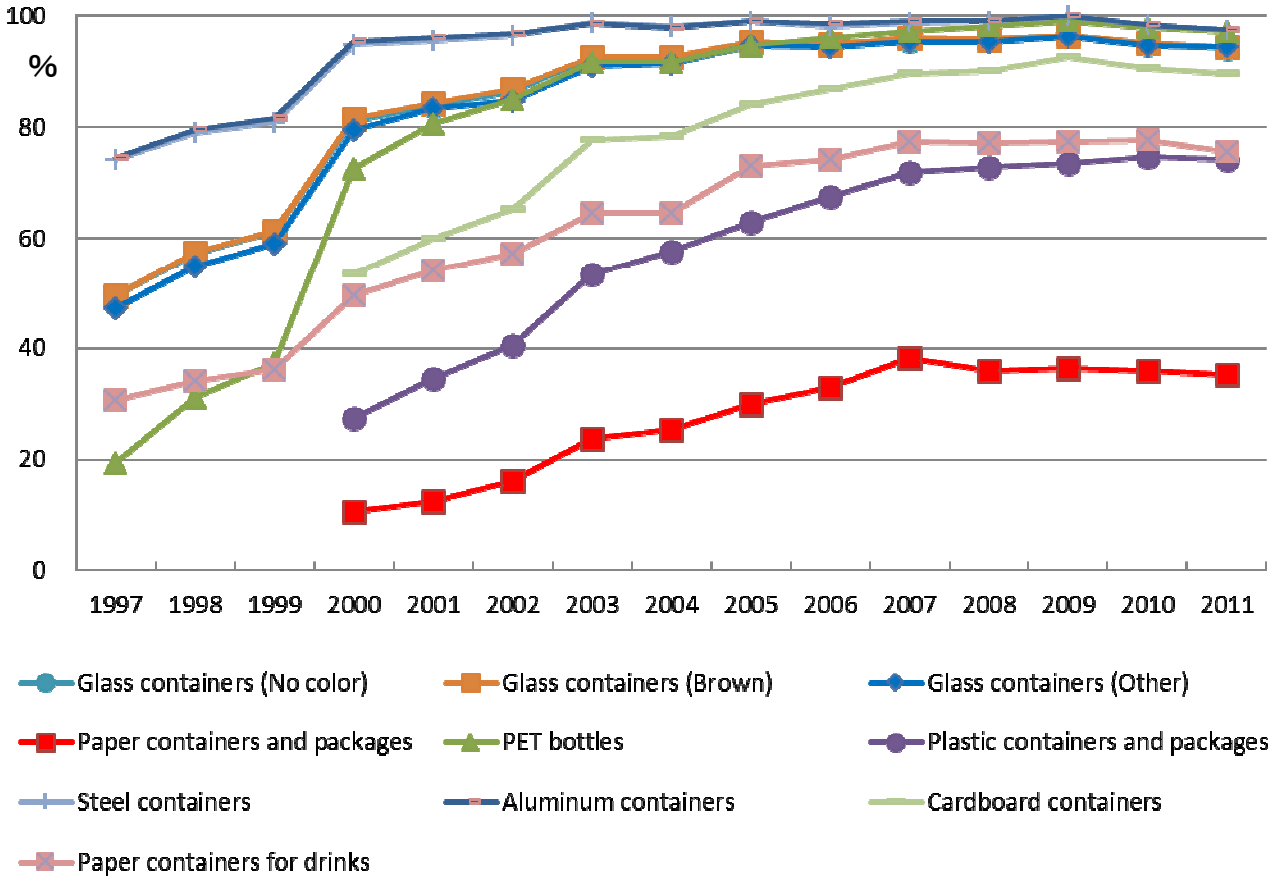
Items subject to recycling requirements

Glass containers	(No color)
	(Brown)
	(Other)
Paper containers and packages	
PET bottles	
Plastic containers and packages	
Steel containers	
Aluminum containers	
Cardboard containers	
Paper containers for drinks	

Six items subject to recycling requirements

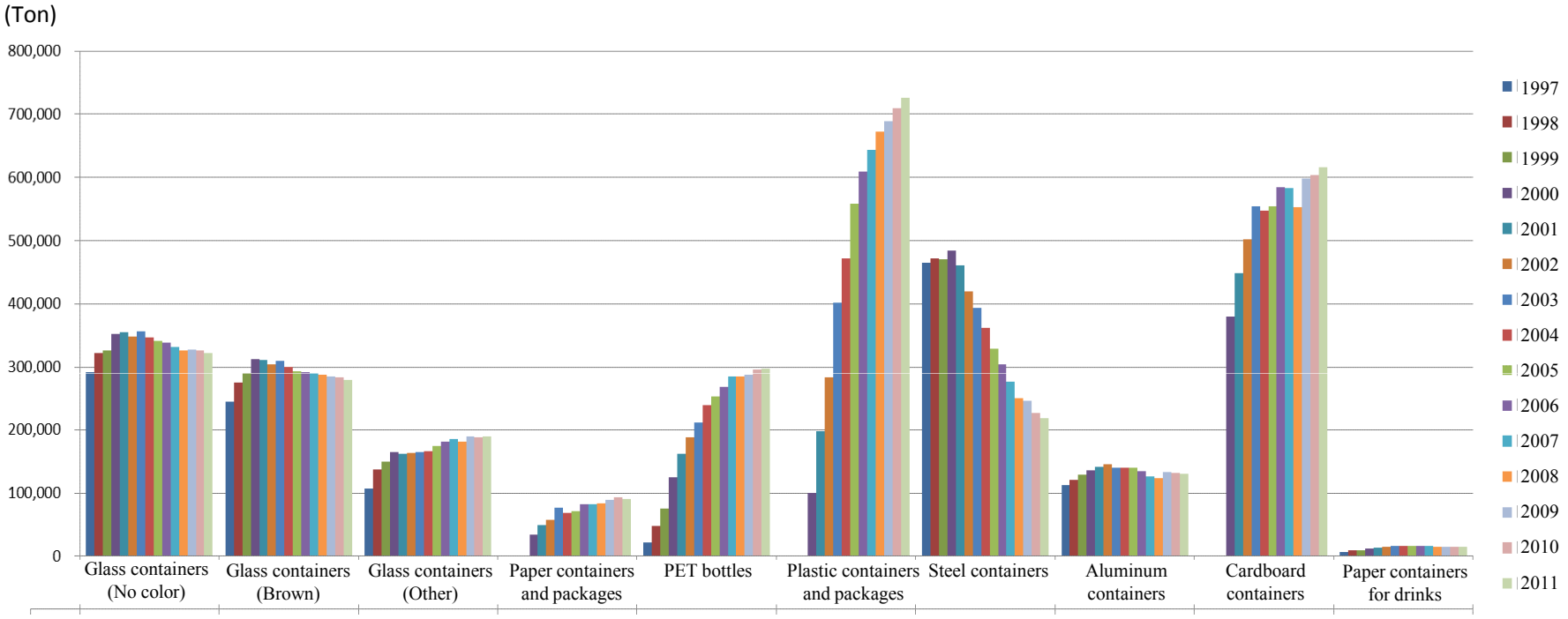
Municipalities conducting sorted waste collection

(% against the total number of municipalities)



Item	Implementation rate in FY2011 (%)
Glass containers (No color)	94.1
Glass containers (Brown)	94.3
Glass containers (Other)	94.5
Paper containers and packages	35.2
PET bottles	97.2
Plastic containers and packages	74.2
(Of which white trays)	29.1
Steel containers	97.5
Aluminum containers	97.5
Cardboard containers	89.6
Paper containers for drinks	75.4

Volume of recyclable materials collected through sorted collection by fiscal year



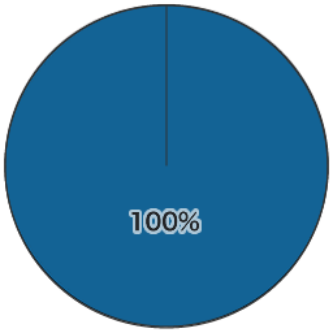
Recycled products made from waste glass containers

Recycled products

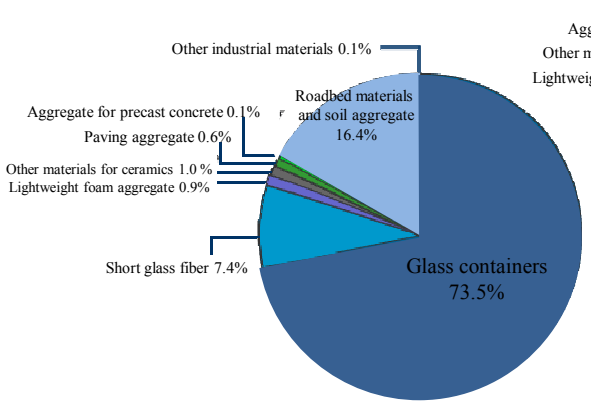
Cullet, which refers to crushed glass readily usable as materials, accounts for 100% of materials for recycled glass products. Cullet making is a recycling technique that involves removing labels and other foreign materials from waste glass bottles, sorting the bottle by color, and turning them into finely crushed glass pieces called cullet.

Cullet

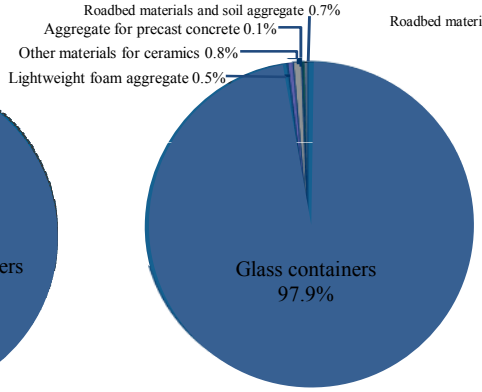
Cullet produced in FY2012 (Total)



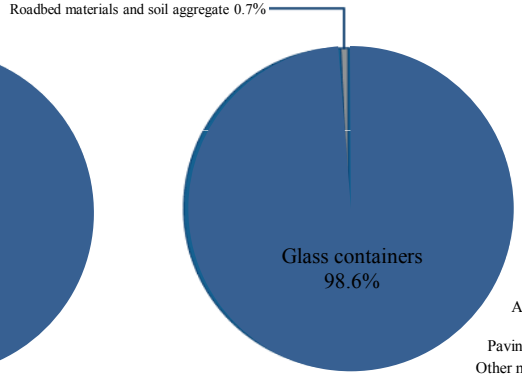
Products containing recycled materials



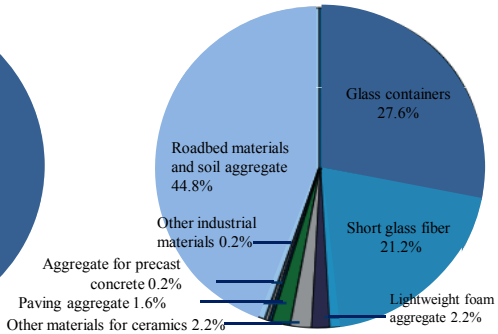
Glass containers (Total) by use in FY2012



Glass containers (No color)



Glass containers (Brown)



Glass containers (Other colors)

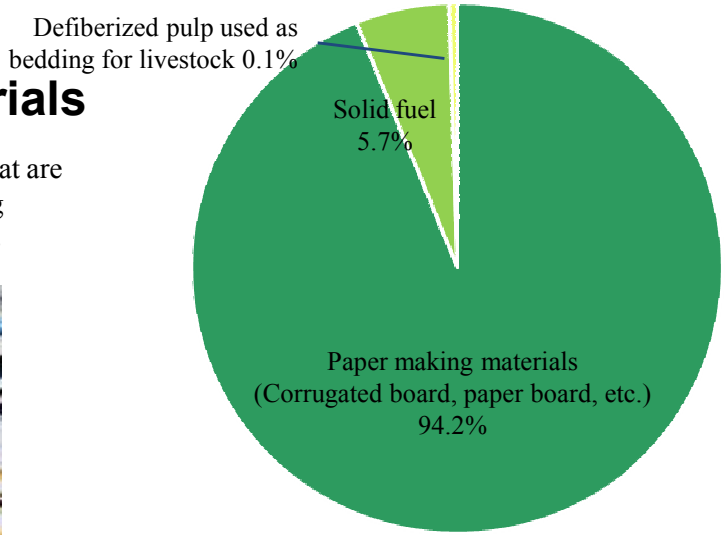
Glass containers

Short glass fiber (Insulators, etc.)

Roadbed materials and soil aggregate (Building foundation, etc.)

Source: Japan Containers and Packaging Recycling Association's homepage

Recycled products made from waste paper containers and packages



FY2012

Paper making materials

Waste paper containers and packages that are considered to be usable as paper making materials after removing foreign objects

Used as materials for paper board and corrugated board medium by paperboard mills, etc.

Solid fuel

Waste paper containers and packages that are considered to be not usable as paper making materials are allowed to be recycled into solid fuel containing paper and waste plastics only when combined with a material recycling process such as the one for paper making materials.

Used as a substitute for coal by paper manufacturers, cement producers, etc.

Defiberized pulp

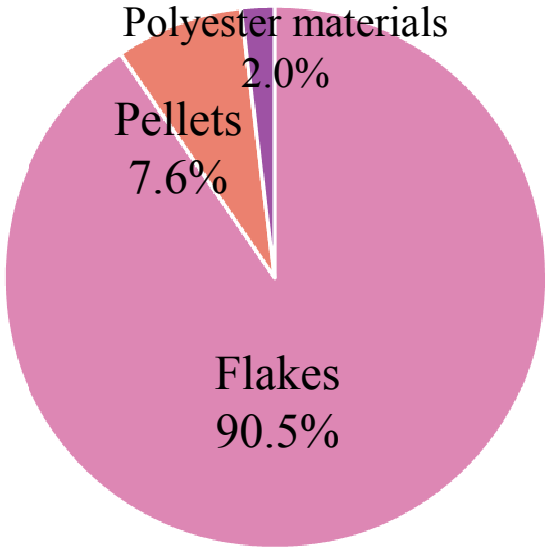
Produced by shredding and defiberizing waste paper containers and packages after removing foreign objects, and typically used as bedding for livestock because of excellent water absorption and aeration properties

Typically used as bedding for livestock because of excellent water absorption and aeration properties

Source: Japan Containers and Packaging Recycling Association's homepage

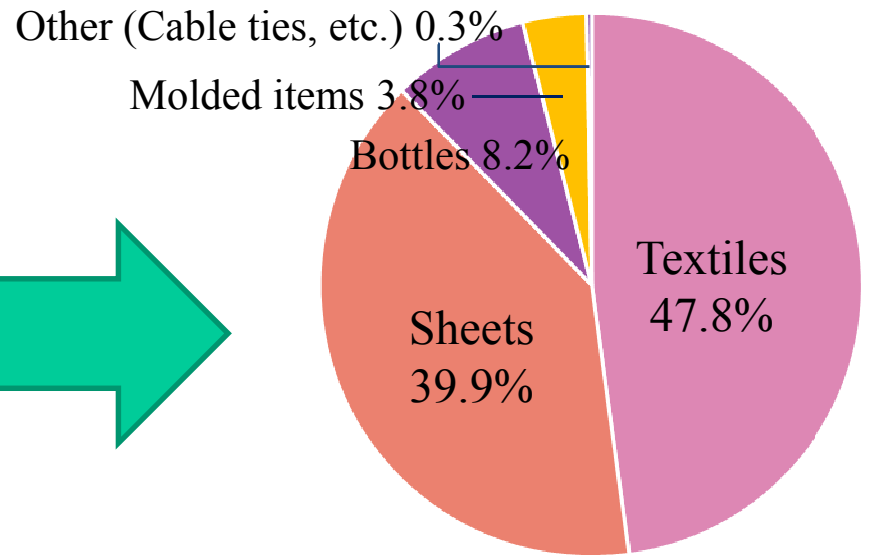
Recycled products made from PET bottles

Recycled products



FY2012

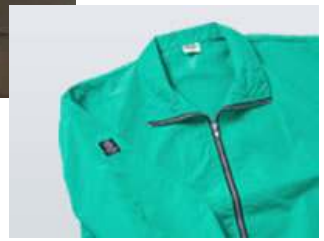
Products containing recycled products



FY2012

Textiles

← Car interiors (e.g. ceilings, floors) and acoustic absorbing materials



Uniforms →

Sheets

← Egg containers

Blister packs →

Bottles

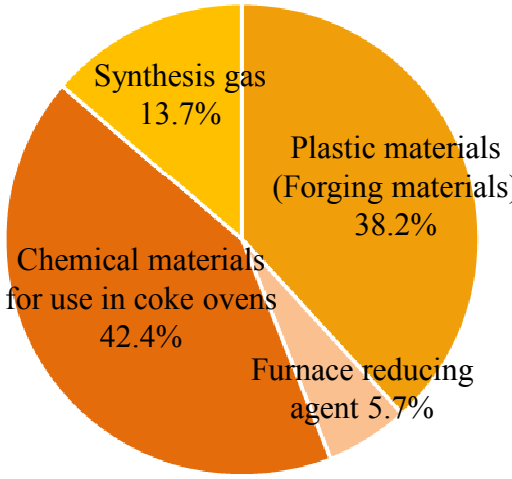
← Detergent bottles

Beverage bottles →

Source: Japan Containers and Packaging Recycling Association's homepage

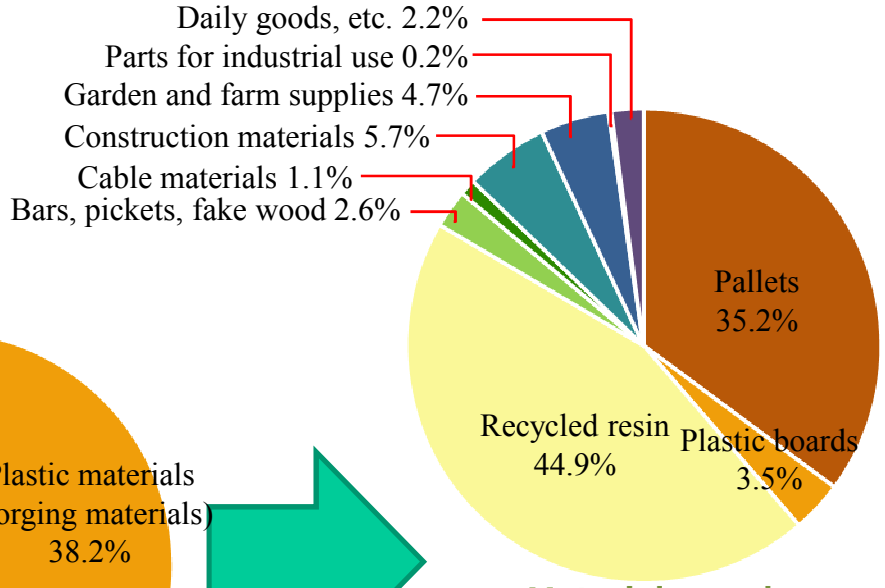
Recycled products made from plastic containers and packaging materials

Recycled products

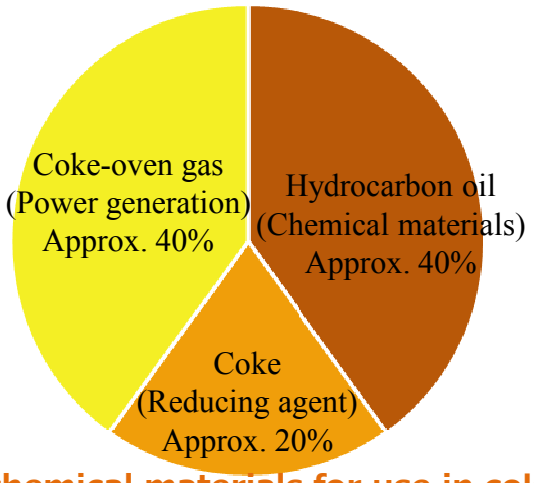


FY2012

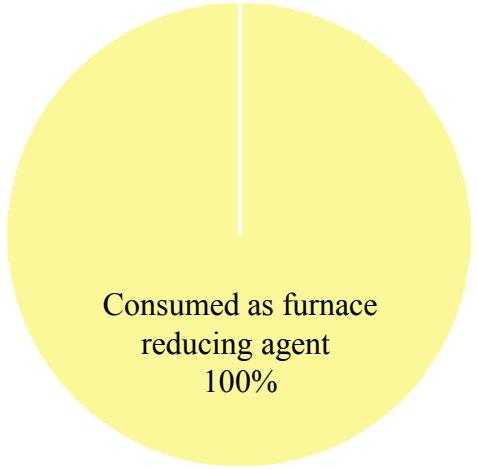
Products containing recycled products



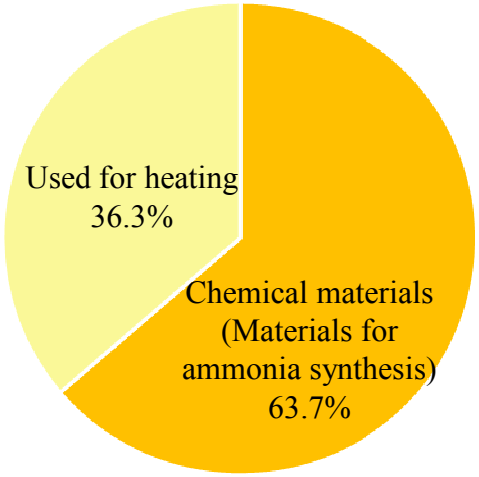
Material recycle



Used as chemical materials for use in coke ovens



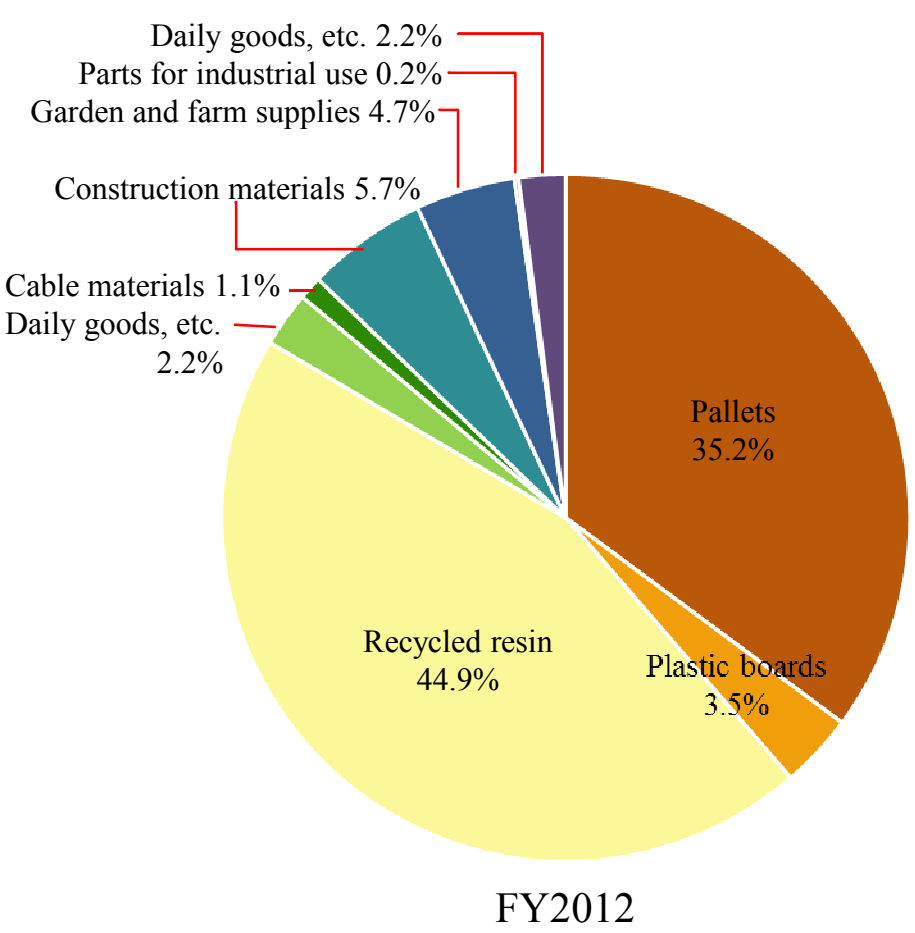
Used as furnace reducing agent



Used as gas

Source: Japan Containers and Packaging Recycling Association's homepage

Usages of recycled products in a material recycle



Hangers

Pallets

Recycled resin

Garbage pails

Fake wood

Construction materials (e.g. Car stops)

Cable troughs

Garden and farm supplies (e.g. Planters)

Daily goods, etc. (e.g., Garbage bags)

Sources: Japan Containers and Packaging Recycling Association's homepage and Hiroshima Recycle Center

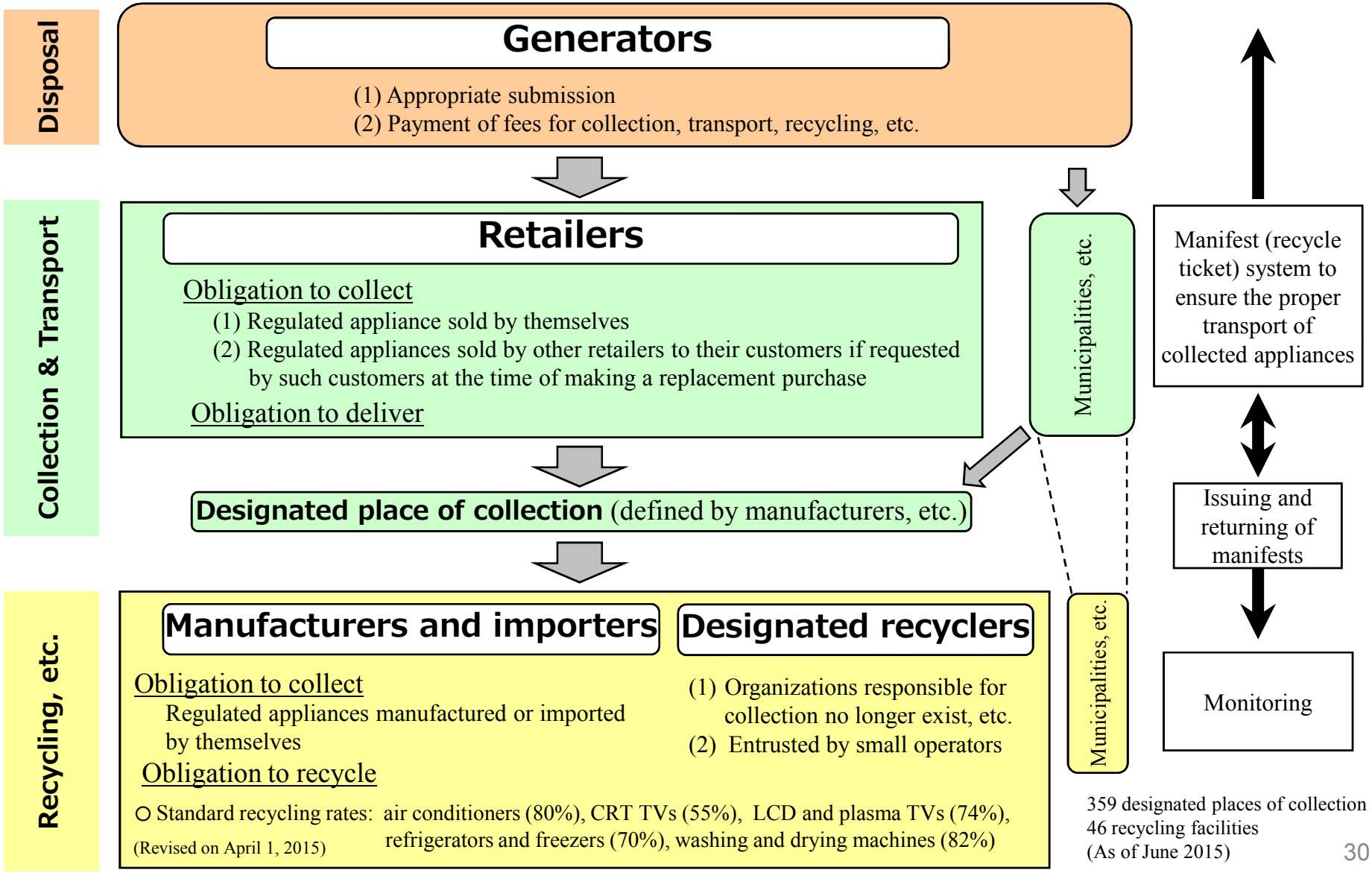
Recycling of Home Appliances

Outline of the home appliance recycling system in Japan

Regulated items: Air conditioners; TVs (CRT TVs, LCD TVs(*), plasma TVs); refrigerators and freezers; washing and drying machines

(Promulgated in June 1998 and fully enforced in April 2001)

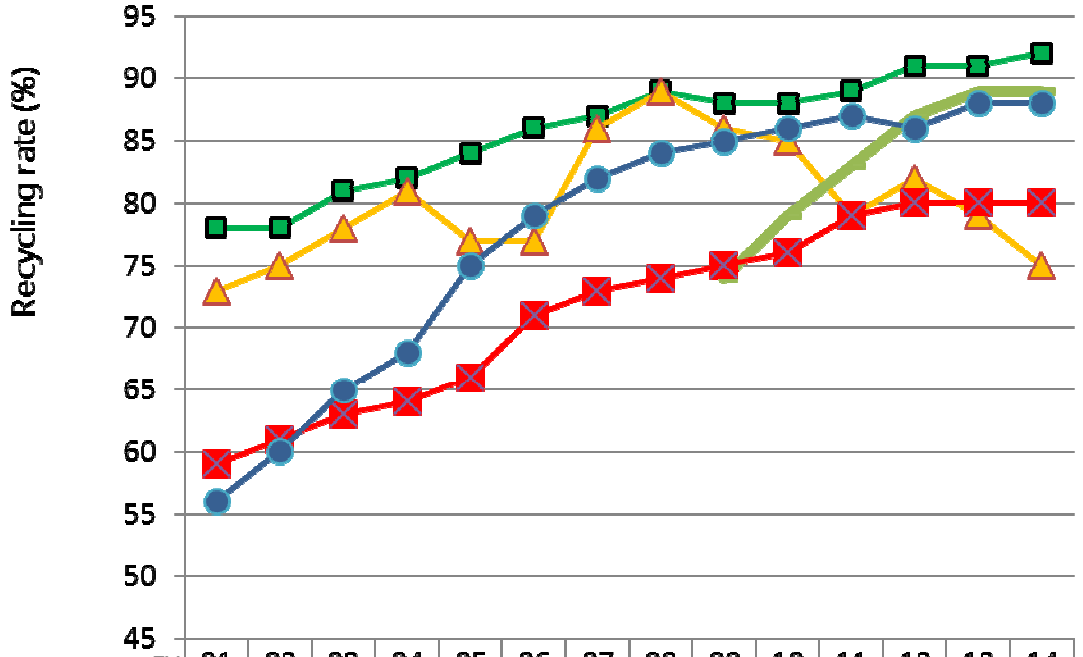
(*) Excluding portable TVs, car TVs, bathroom TVs, etc.



Changes in recycling rates

<Recycling rate>

Proportion of waste home appliances recycled by manufacturers, etc. into components or materials usable by themselves or transferrable to a third party for value or for free as a percentage of total waste home appliances collected by type of appliances. (Manufacturers, etc. will be subject to advisory instructions or admonishment by the government if they fail achieve the standard recycling rates.)



FY	01	02	03	04	05	06	07	08	09	10	11	12	13	14	(Standard recycling rates)
Air conditioners	78	78	81	82	84	86	87	89	88	88	89	91	91	92	60% in 2008 and before; 70% as from 2009
CRT TVs	73	75	78	81	77	77	86	89	86	85	79	82	79	75	55%
LCD and plasma TVs									74	79	83	87	89	89	50% as from 2009
Refrigerators and freezers	59	61	63	64	66	71	73	74	75	76	79	80	80	80	50% in 2008 and before; 60% as from 2009
Washing and drying machines	56	60	65	68	75	79	82	84	85	86	87	86	88	88	50% in 2008 and before; 65% as from 2009

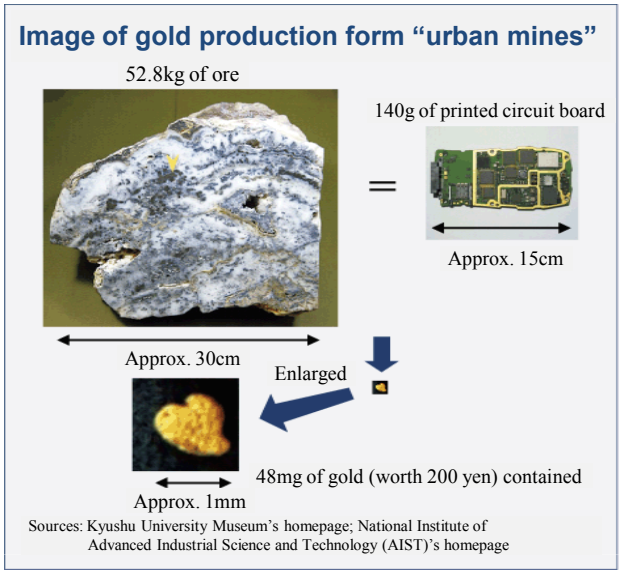
Note 1: LCD and plasma TVs and drying machines were added in 2009.

Note 2: A sharp drop in the recycling rate for CRT TVs from FY2009 to FY2011 was because certain types of CRT glass became valuable waste and costs on the side of collectors.

Recycling of Small Appliances and Batteries

Backgrounds to the introduction of the Act on Recycling of Small Appliances

Certain metals that are contained in large amount and easy to separate from others, such as iron, aluminum, copper, and lead, are already being recycled fairly extensively. However, those other metals, which would involve complex collection technologies and processes have been hardly recycled.



Collection of valuable metals by municipalities

Metal	Recycling rate
Iron	66.8%
Copper	21.7%
Silver	4.0%
Gold	4.6%
Aluminum	52.9%
Stainless steel	16.5%
Rare metals	2.6%

* The recycling rate shown above represents the proportion of municipalities collecting each metal.
(As a percentage of total 1,748 municipalities that responded.)

Source: Ministry of the Environment

If exported to developing countries, used electronic products may be dismantled without any safety protection to collect useful metals. There have been reports on the improper handling of harmful materials and increasing levels of lead and cadmium found in local residents in developing countries.

Outline of the Act on Recycling of Small Appliances

[Outline of the recycling system]

- It will be possible to recycle used small electronic devices in an economically viable manner because such devices have significant resource potential and, as such, economies of scale will kick in once a broad-based efficient collection mechanism is put in place. Therefore, the recycling system for small appliances has been designed as a facilitation mechanism that promotes voluntary joint efforts by parties concerned to develop and implement their own collection and recycling system suitable to their respective circumstances.

[Items recycled]

- Among electronic devices and other appliances meant for ordinary use by general consumers, those that allow for efficient collection and transport, and are specified by a relevant Cabinet ordinance as particularly requiring recycling.
- The Cabinet ordinance has specified 28 types of items excluding those covered by the Act on Recycling of Specified Kinds of Home Appliances.

Outline of the Act on Recycling of Small Appliances

Manufacturers are obliged to:

- Minimize the cost of recycling by adopting easy-to-recycle design, components, and materials
- Utilize products or materials derived from recycling

Retailers are obliged to:

- Cooperate with one another to ensure that consumers submit waste appliances properly

Central government is obliged to:

- Secure necessary funds
- Collect information and promote relevant research and development
- Provide education and enhance public awareness

Manufacturing and sales → Generation → People

Collection by municipalities

Collection boxes, new categories of recyclable waste, or pick-up

Collection → Collection point

Delivery → Collection point

Delivery

Reverse logistics → Intermediate processing facility

Intermediate processing → Metal refining

Retrieval of metals → Cyclical use

Consumers are obliged to:

- Sort out and submit recyclables separately from other waste

Municipalities are obliged to:

- **Implement a sorted collection**
- **Deliver collected recyclables to designated recyclers or those other entities capable of proper recycling**

* Items recycled and collection methods are determined by municipalities according to their circumstances

Examples of small appliances

Mobile phones, game consoles, digital cameras, etc.

Designated recyclers

- **Persons wishing to engage in recycling business may develop, and obtain the competent minister's approval for, plans for the implementation of such business to be designated as recyclers.**
- **Those having obtained such approval for their business plans or persons entrusted by such designated recyclers do not need to obtain permission for waste disposal business from the head of municipalities, etc. for conducting activities necessary for the recycling of used small electronic devices, etc.**
- **Designated recyclers must take in used small electronic devices, etc. sorted and collected by municipalities located within areas in which they plan to operate, if so requested by such municipalities, unless they have justifiable reasons to refuse to do so.**

Application for designation →

← Designation Instructions, advices, etc.

Central government

- **Give approval for recycling business plans**
- **Provide instructions and advices to, demand reports from, and conduct on-site inspection of, designated recyclers**
- **Repeal the designated recycler status**

Collection methods

Pick-up

Small appliances are picked up from non-combustible garbage collected and put for recycling

Collection of non-combustible garbage

Small appliances picked up at a collection point

Collection box

People deposit used small appliances in collection boxes placed in community centers and municipal offices for people to deposit.

Sample collection box

A collection box placed inside a convenient store

Events

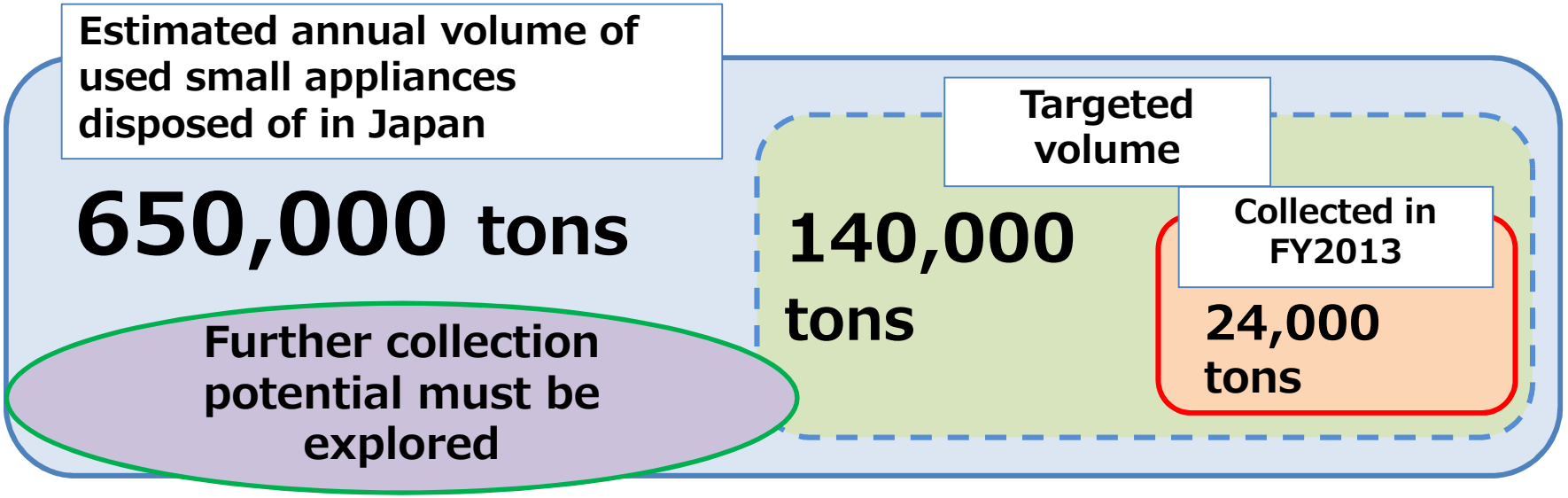
Collection boxes are placed at storefronts, etc. temporarily in irregular occasions to collect used small appliances from local residents.

Collection of used small appliances during a public awareness event at a supermarket

Collection of used small appliances at the site of a professional football game

For further recycling efforts

- After the implementation of the relevant law in FY2013, the number of municipalities working on the recycling of small appliances has increased steadily, with 1,031 municipalities, or approximately 60% of all municipalities in Japan, already taking measures or preparing to do so.
- However, although the collection of used small appliances by municipalities is making progress, only 24,000 tons of such appliances were collected in FY2013 and further efforts must be made to achieve the target volume of 140,000 tons per year.
- A total of 650,000 tons of used small appliances are estimated to be disposed of every years in Japan and it is necessary to increase the volume so as to ensure the stable operation of recycling business.



For the realization of a resource-efficient society and sustainable tourism development in the Asia-Pacific region

Thank you for your attention.