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Disclaimer

This country chapter for Japan was prepared as an input for the 8th 3R Forum in Asia and the Pacific. The purpose of the report is to assess the status of 3R implementation in Asia and the Pacific and to share knowledge on 3R activities in the region.

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This publication is intended to provide expert-based assessment of regional progress of 3R policy implementation in selected countries and regions in Asia and the Pacific, particularly in response to the Hanoi 3R Goals (2013-2023) adopted at the 4th Regional 3R Forum in Asia and the Pacific in Hanoi in March 2013.

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ABBREVIATION

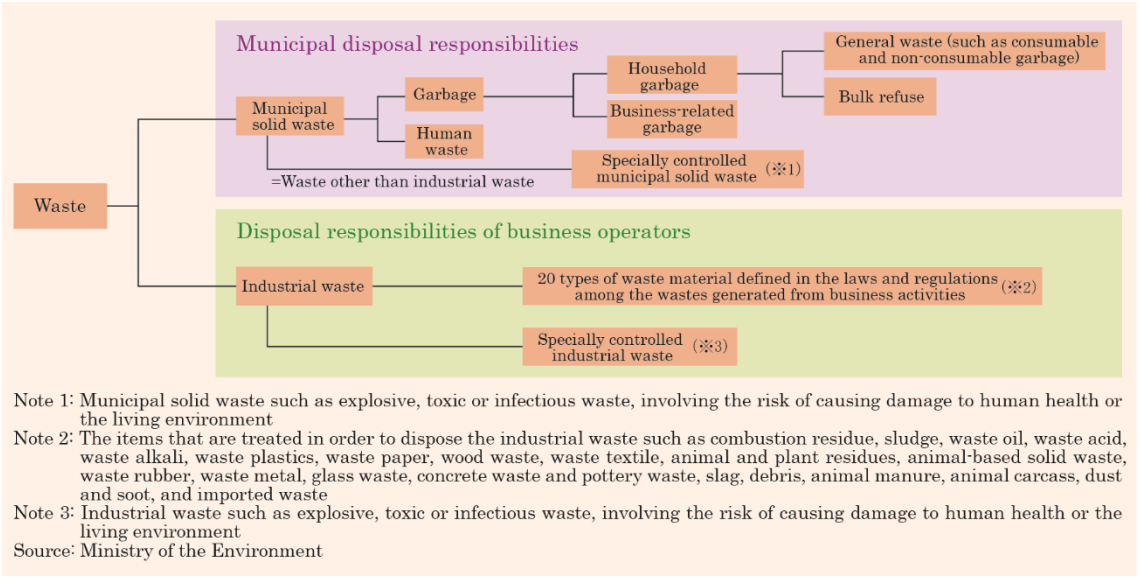
3Rs	Reduce, Reuse, Recycle
CRT	Cathode Ray Tube
ELV	End-of-Life Vehicle
EPR	Extended Producer Responsibility
E-waste	Electronic Waste
FY	Fiscal Year
GHG	GreenHouse Gases
LCD	Liquid Crystal Display
MSW	Municipal Solid Waste
PCB	PolyChlorinated Biphenyl
PFOS	Perfluorooctane Sulfonate
POPs	Persistent Organic Pollutants
TMR	Total Material Requirement

CONTENTS

A: WASTE DEFINITION AND CATEGORIZATION

In the Waste Management and Public Cleansing Law (1970) (Waste Management Law), “Waste” refers to refuse, bulky refuse, ashes, sludge, excreta, and other filthy and unnecessary objects, which are in solid or liquid state. “Waste” also refers to items that cannot be used by the possessor or items that cannot be handed over to others for compensation.

Waste is widely divided into two types — “general waste (municipal solid waste)” and “industrial waste”. Industrial waste refers to the 20 types of waste material defined in the Enforcement Ordinance of the Waste Management and Public Cleansing Law among all the wastes generated from business activities and imported waste. General waste (municipal solid waste) refers to waste other than industrial waste. It consists of household garbage mainly generated from homes, but not including human waste and business-related garbage generated from the offices and restaurants (Figure A-1).



Source: Translated from Annual Report on the Environment in Japan 2015

Figure A-1 Flow of MSW in Japan (FY2013)

In the Waste Management Law, waste processing standards have been set depending on the properties of industrial waste. For example, for the landfilled process, final disposal sites have been classified into three types — stabilization type, managed type and isolated type. Structure standards and maintenance standards have been set for each type. A decision on the type of final disposal site waste processing is made by considering the properties of waste.

“Specially Controlled Waste” is consided as hazardous waste. "specially controlled municipal solid waste" refer to those municipal solid waste specified by a Cabinet Order as wastes which are explosive, toxic, infectious or of a nature otherwise harmful to human health or the living environment. Also, "specially controlled industrial waste" refer to those industrial wastes specified by a Cabinet Order as wastes which are explosive, toxic, infectious or of a nature otherwise harmful to human health and the living environment (WASTE MANAGEMENT AND PUBLIC CLEANSING LAW). As special processing standards are determined according to the types of

specially controlled waste, the proper process has to be ensured when processing this type of waste. The process can be outsourced to an operator who has permission for specially controlled waste.

Any waste material that comes under the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal is defined as 'specified hazardous waste' according to Law for Control of Export, Import and Others of Specified Hazardous Waste and Other Waste, and management of import and export of hazardous waste is carried out.

Although there is no legal category for E-Waste, from the viewpoint of promoting recycling, categories namely home air-conditioners, televisions, refrigerators & freezers, and washing machines & dryers are handled by Home Appliance Recycling Law. Personal computers and compact secondary batteries are handled under the Law for Promotion of Effective Utilization of Resources. To promote the recycling of metals used in compact electronic devices, the Small Home Appliance Recycling Law has been enforced since 2013. Compact electrical products such as personal computers, mobile phones (excluding the items subject to the Home Appliance Recycling Law) are subject to the law.

In the Waste Management Law, animal manure (and animal carcasses) related to livestock agriculture is considered to be industrial waste, but there is no agricultural biomass category. However, from the perspective of preventing global warming, promoting a sound material-cycle society, and revitalizing rural areas and industrial development, the "Basic Law for Promotion of Utilization of Biomass" was enacted in 2009 and utilization of biomass is promoted by this law and by the "Basic Plan for Promotion of Utilization of Biomass" which is based on this law. Biomass is considered to be a "Resource that is an organic substance derived from plants and animals (excluding fossil resources)" and it is not restricted to items related to agriculture, forestry, and livestock industries.

3Rs indicates Reduce, Reuse and Recycle, but there is no legal definition.

In the Basic Law for Establishing a Sound Material-cycle Society, a 'Sound Material-cycle Society' is considered to be 'the society wherein wasting of products is controlled and with it carrying out appropriate cyclical use is promoted when products are circulative resources, appropriate disposal (called as disposal for waste material.) is assured for the circulative resources that are not used cyclically, consumption of natural resources is controlled and the load on the environment is reduced as far as possible.'

In Third Fundamental Plan for Establishing a Sound Material-cycle society (2015) based on Basic Law for Establishing a Sound Material-cycle Society, efforts were delayed for Reduce and Reuse that have comparatively higher priority compared to Recycle among the 3Rs. In fact, those were specifically removed and were collectively referred to as '2R'.

B: JAPAN'S BASIC POLICY DIRECTION: PAST AND FUTURE

There was active interaction with foreign countries during the late 19th century which resulted in epidemics of cholera and plague brought from overseas. With the plague outbreak at the end of 1887 as the turning point, disposal of waste and human waste was covered from the viewpoint of public health and in 1900, the 'Filth Cleaning Law' was established, clarifying that disposal of waste was the responsibility of the municipal government.

In Tokyo, municipal authorities has started the direct operation from 1911 and the discharged waste amount in Tokyo was about 651 tonnes per day (about 341 g/cap./day) with a population of 1.97 million the city at that time (Bureau of Public Cleaning, Tokyo Metropolitan Government ed. 2000). The subsequent development of the Japanese economy saw the quantity of waste rising exponentially, and to deal with this, a garbage incineration plant was constructed in 1924 in the adjacent Osaki Town (transferred to Tokyo City in 1932).

After World War II, the Japanese economy entered the post-war reconstruction period and the disposal of waste became an even greater problem with the development of urbanization. Although the increased quantity of waste in the city was proportional to the rise in population, it increased further as economic growth began and after that, it started increasing proportionally with the Gross National Product.

In 1963, the 'Law on Emergency Measures for the Development of Environment Sanitation Facilities' was announced and based on that, the Ministry of Health and Welfare formulated the First Five Year Plan on the Development of Environment Sanitation Facilities in 1965, outlining a policy that the disposal of city waste will be carried out by incineration as a general rule, and any residue would be disposed of at landfill sites. Accordingly, progress was made in the construction of garbage incineration plants in each city, due to the great increase in the quantity of plastics. However, garbage calorific value also increased significantly and the construction of incineration plants could not keep up with the increase in the calorific value generated in each local public body.

With economic growth came the problem of discharged waste that accompanies business activity, for example, contamination of water areas due to the unauthorized dumping of waste oil. In the "the Antipollution Diet" of 1970, the Public Cleansing Law was revised to become the 'Waste Management and Public Cleaning Law (Waste Management Law)' that was enforced in 1971. In this revision, waste material was classified as industrial waste and general waste, and the general rule was that while general waste was to be disposed of by the municipal government as before, business operators should dispose of the industrial waste. This became the foundation of the current waste management system.

With public concern about soil contamination due to hexavalent chromium in 1977 as the turning point, regulations for business operators and disposal services were strengthened, and regulations concerned with final disposal site were newly established. Final disposal sites for industrial waste are classified into three types — isolated type for carrying out landfill disposal of harmful industrial waste, stabilization type for carrying out landfill disposal of industrial waste wherein the properties of waste plastics / waste rubber/ waste metal have been stabilized, and managed type for carrying out landfill disposal of industrial waste for which it is necessary to take measures to prevent hindrance to conservation of the living environment. General waste is disposed of at the final disposal site of managed type.

Rapid-growth and economic expansion brought with it material affluence, increased consumption of goods, general availability of disposable commodities, an increase in waste material and diversification of quality. This meant that appropriate disposal of waste material became difficult. Cases emerged of general waste from the Kanto area being taken to Tohoku district for disposal, as well as cases of unauthorized dumping of large quantities of harmful industrial waste. These cases arose due to inadequate general waste incineration facilities and difficulties in assuring the final disposal site. The Waste Management Law was therefore revised in 1991, so that aspects of controlling the discharge of waste material, classification/recycling of waste material were placed as objectives of the law, the harmful waste material was classified as waste material to be specifically managed and a system was introduced for the specifically managed industrial waste.

Over the years, it became difficult to assure the disposal facility such as final disposal site for general waste, focusing on the metropolitan area and for the first time, in 1995 Japan required manufacturers to promote recycling of waste containers and packaging, which makes up a large proportion of general waste. The Law for the Promotion of Sorted Collection and Recycling of Containers and Packaging (Containers and Packaging Recycling Law) was established, including planned efforts for sorted collection by the municipal government. In 1998, the Law for Recycling of Specified Kinds of Home Appliances (Home Appliance Recycling Law) was established, requiring manufacturers to recycle home appliances.

The Basic Law for Establishing a Sound Material-Cycle Society was enacted in 2000 and forms the basis for promoting the establishment of a sound material-cycle society. This law establishes the foundation for the comprehensive and systematic promotion of measures for waste management and recycle, and aims to promote effective efforts for a sound material-cycle society in combination with related individual laws.

This law states that ‘priority’ of disposal should be in the sequence [1] reduce, [2] reuse, [3] recycling, [4] heat recovery, and [5] appropriate disposal. It also clarifies that the measures to regulate the thoroughness of the ‘discharger responsibility’ and the measures based on the ‘extended producer responsibility’ should be taken as national policy for forming a sound material-cycle society.

Based on this law, the Government formulated the ‘Fundamental Plan for Establishing a Sound Material-Cycle Society’.

The Third Fundamental Plan for Establishing a Sound Material-Cycle Society began in 2013.

In this plan, the current conditions and issues have been understood as follows:

- Efforts are being steadily developed to establish a sound material-cycle society such as implementing a significant reduction of final disposal quantity by development of efforts on 3R and maintenance of individual recycling laws.
- As observed in the rising prices of national resources, while resource constraints are expected to be strengthened across the entire world on the one hand, many noble metals and rare metals are disposed of in landfills as waste material.
- Increased awareness on safety and recovery of citizens related to the Great East Japan Earthquake and the accident at Fukushima Daiichi Nuclear Power Station.
- With economic growth and increased population in developing countries, the quantity of generated waste material has increased globally. About 40% is generated in Asia and it is predicted that by 2050, there will be twice as much waste as in 2010.

As a result, in addition to the policy of paying attention to the quantity of waste material developed up to now such as a reduction of final disposal quantity, attention was paid even to the circulation quality in the Third Fundamental Plan for Establishing a Sound Material-Cycle Society. In addition, the following are considered as the new pillars of policy.

- Strengthening efforts to reduce/reuse that have been delayed as compared to recycling
- Recovery of useful metals
- Strengthening efforts for recovery/safety
- Promotion of 3R international co-operation

In the same plan, the following targets are set for 'Resource productivity', 'Cyclic usage rate' and 'Final disposal quantity' representing three sections of the material flow, with FY2020 as the target year. (Table B-1)

Table B-1 Targets of Material Flow of Third Fundamental Plan for Establishing a Sound Material-Cycle Society

	FY2000	FY2010	FY2020
Resource productivity	JPY250,000 /Ton (USD2300/Ton)	JPY 370,000 /Ton (USD 3400/Ton)	JPY 460,000 /Ton (+85%) (USD 4200/Ton)
Cyclic usage rate	10%	15%	17%(+7 Points)
Final disposal quantity	56 Million Tons	19 Million Tons	17 Million Tons (▲70%)

(USD1=JPY109.75, Average for 2014)
For the comparison targets in the ( ), 2000
Source: Based on 'Outline of the Basic Plan for Establishing the Recycling-Oriented Society' (Ministry of the Environment)

In Waste Management Law, the Minister of the Environment determined the 'Basic policy for promoting measures comprehensively and systematically on restrain of the waste discharge, waste reduction by recycling and other proper management of waste' and as of December 2015, the policy is being revised. According to the draft policy of November 2015, the quantity of discharge of waste material, recycling rate, target quantity of final disposal quantity published in the same policy is determined by considering the consistency with targets of Third Fundamental Plan for Establishing a Sound Material-Cycle Society. The concept used for setting the targets is set out according to Table B-2.

Table B-2 Proposed Targets of Basic Policy based on Waste Management Law (2020)

	General waste	Industrial waste
Discharged quantity	Reduction of approximately 12% (Compared to FY 2012)	Increase controlled to approximately 3% (Compared to FY2012)
Recycling rate	Increase from approximately 21% (FY2012) to approximately 27%	Increase from approximately 55% (FY 2012) to approximately 56%
Final disposal quantity	Reduction of approximately 14% (Compared to FY2012)	Reduction of approximately 1% (Compared to FY2012)

Source: Ministry of the Environment

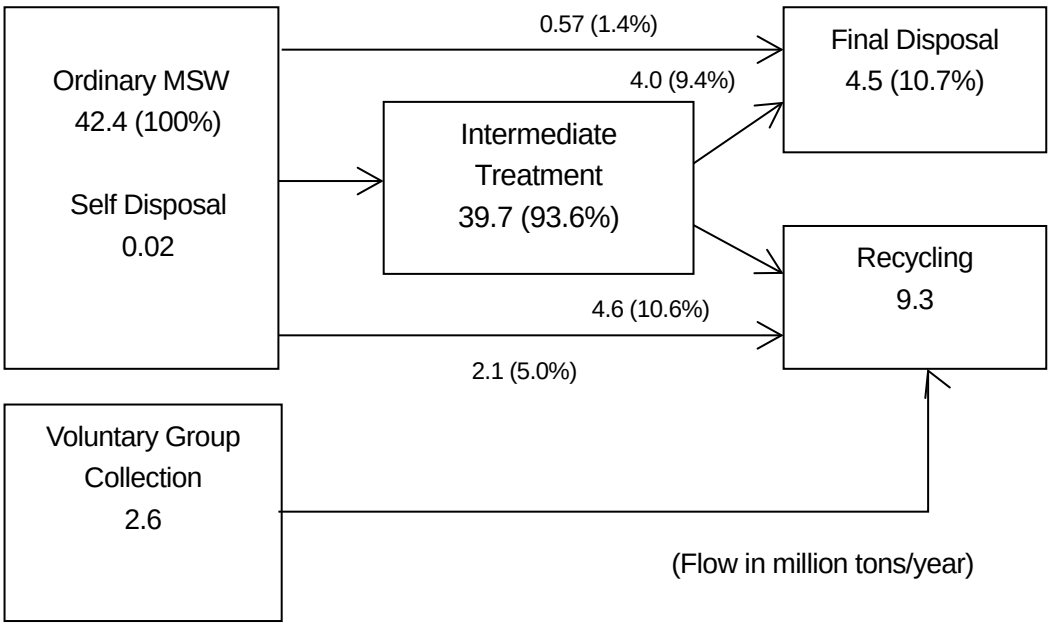
In the Waste Management Law, "Waste disposal facility development plan" is formulated every five years in line with the Basic policy for implementing the maintenance of the waste disposal facility carried out by public institutions such as local public authorities. Substituting the contents with

former ‘Project quantity’ (Project cost) and changing to ‘Accomplished achievements’ (Outcome targets) have been reviewed from 2003 for the plan concerned with facility maintenance. The latest plan was formulated in May 2013 and as regards the significant targets of facility maintenance for the five years from FY2013 to FY2017, the target for the waste recycling rate and the average value of power generation efficiency of incineration facility were changed from 22% (FY2012) to 26% (FY2017) and 16% (FY2012) to 21% (FY2017) respectively. The remaining years of the final disposal site for general waste was kept in line with the target for FY2012 (20 years).

C: 3R INDICATORS – COUNTRY-SPECIFIC BASED ON NINE CORE INDICATORS PROPOSED AT THE REGIONAL 3R FORUM IN SURABAYA-

I. Total MSW Generated and Disposed and MSW Generation per Capita (by Weight)

The total quantity of MSW generated in Japan was 44.9 million tons FY2013 and the quantity of waste collected or disposed of by municipalities add up to approximately 42.4 million tons. That is about 0.97kg of waste per capita per day. A total of 71% of MSW is generated by households and the rest by business. From the total MSW generated, 94% went through intermediate treatments, mainly incineration in 2013. Material recovery by voluntary groups in local communities was 2.6 million tons. Promotion of intermediate processing led to a decrease in the quantity of waste disposed of at landfill sites to 4.5 million tons (Ministry of the Environment 2012) (Figure C-1, Table C-1, Figure C-2)



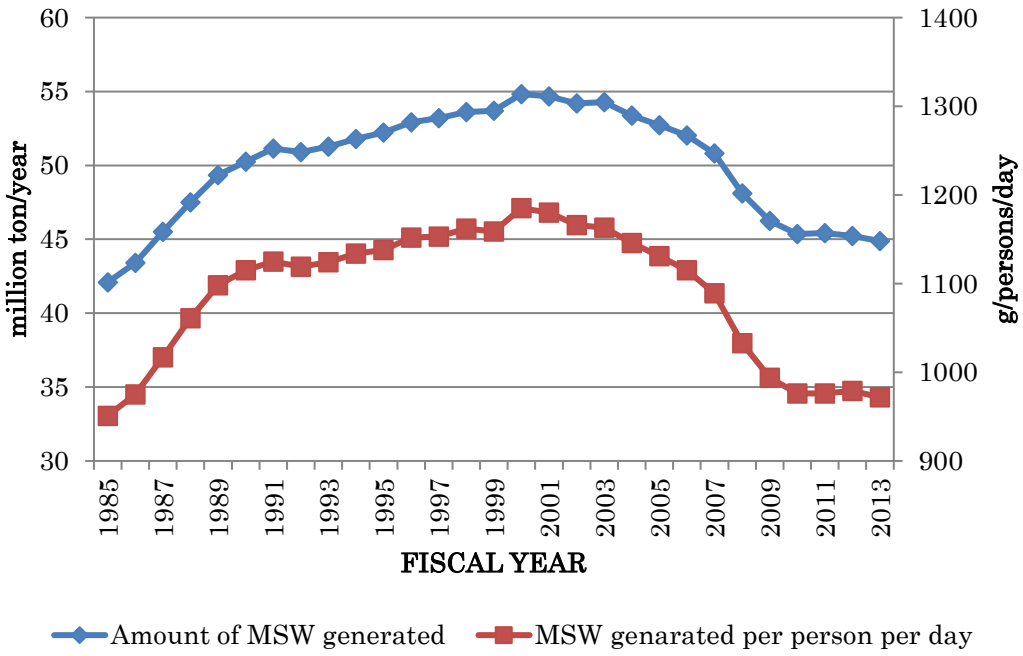
Source: Ministry of the Environment 2015

Figure C-1 Flow of MSW in Japan (FY2013)

Table C-1 MSW generation in Japan

FY	MSW generation (Million ton)	MSW generated per person per day (g/person day)
1985	42.09	951
1990	50.26	1115
1995	52.22	1138
2000	54.83	1185
2005	52.72	1131
2006	52.02	1115
2007	50.82	1089
2008	48.11	1033
2009	46.25	994
2010	45.36	976
2011	45.43	976
2012	45.23	964
2013	44.87	958

Source: Ministry of the Environment



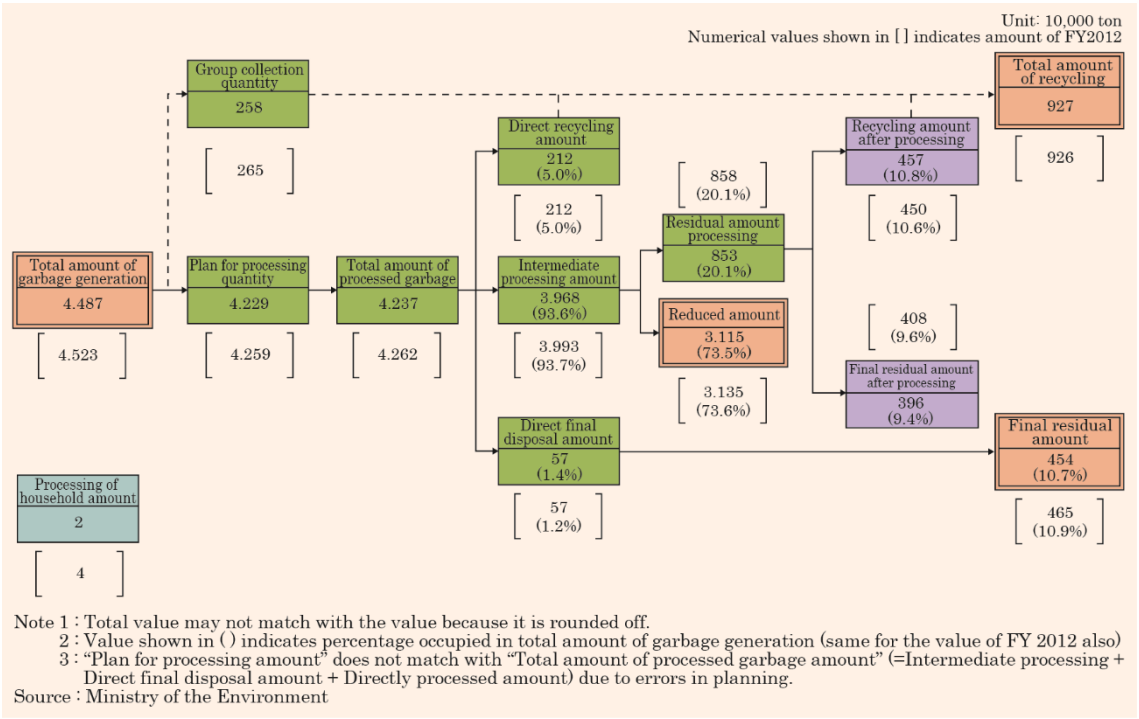
Source: Ministry of the Environment (2015)

Figure C-1 Trend of MSW generation in Japan

II. Overall Recycling Rate and Target (%) and Recycling Rate of Individual Component of MSW.

1. Processing status of general waste (garbage)

Garbage disposal flow in FY2013 is shown in Figure C-3. Amongst the total amount of processing garbage, the garbage that is to be processed intermediately comes to 39.68 million tons of garbage which is approximately 94% of the total quantity of garbage. The total recycled garbage will be 9.27 million tons after processing the garbage loaded in the plant for intermediate treatment by combining 4.57 million tons of recycled garbage and garbage that was recycled directly or recovered collectively. The recycling rate has significantly increased from FY1990 (5.3%) to FY2013 (20.6%) (Table C-2). In the basic policy established by the Minister of the Environment in December 2010 on the basis of the Waste Management Law, the target for recycling in 2015 is 25%.



Source: Translated from Annual Report on the Environment in Japan 2015

Figure C-3 Garbage disposal flow in Japan (FY 2013)

Table C-2 Recycling rate for general waste

FY	Total amount of processing garbage (in million ton)	Group collection quantity (in million ton)	Total amount of recycling (in million ton)	Recycling rate
2000	52.09	2.77	7.86	14.3
2005	49.75	3.00	10.03	19.0
2010	42.79	2.73	9.45	20.8
2011	42.85	2.68	9.38	20.6
2012	42.62	2.65	9.26	20.5
2013	42.37	2.58	9.27	20.6

Note)

$$\bullet \text{ Recycling rate (\%)} = \frac{\text{Direct recycling amount + Recycling amount after intermediate processing + Group collection quantity}}{\text{Total amount of processing garbage + Group collection quantity}} \times 100$$

Source: Created based on Japan Waste Disposal (Ministry of the Environment) (Each year)

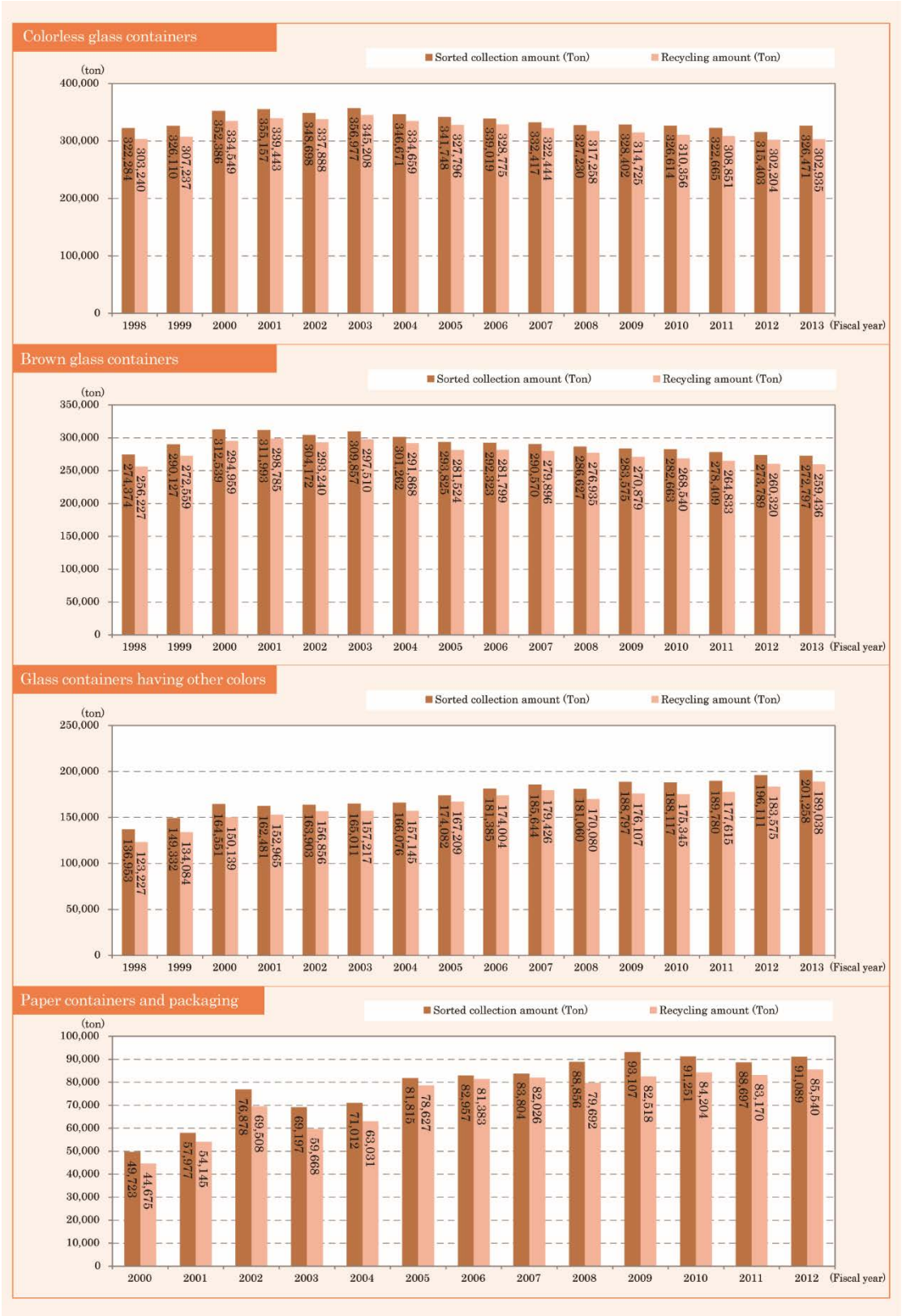
2. Cyclical use rate according to products

A) Containers packaging (glass containers, pet bottles, plastic container packaging, paper container packs, etc.)

Sorted collection and recycling of containers are carried out based on the Container and Packaging Recycling Law and its performance is shown in Figure C-4, C-5 and C-6.

From the covered items of the Containers and Packaging Recycling Law, the recycling rate of steel cans, aluminum cans, beverage paper packs and cardboard is as follows:

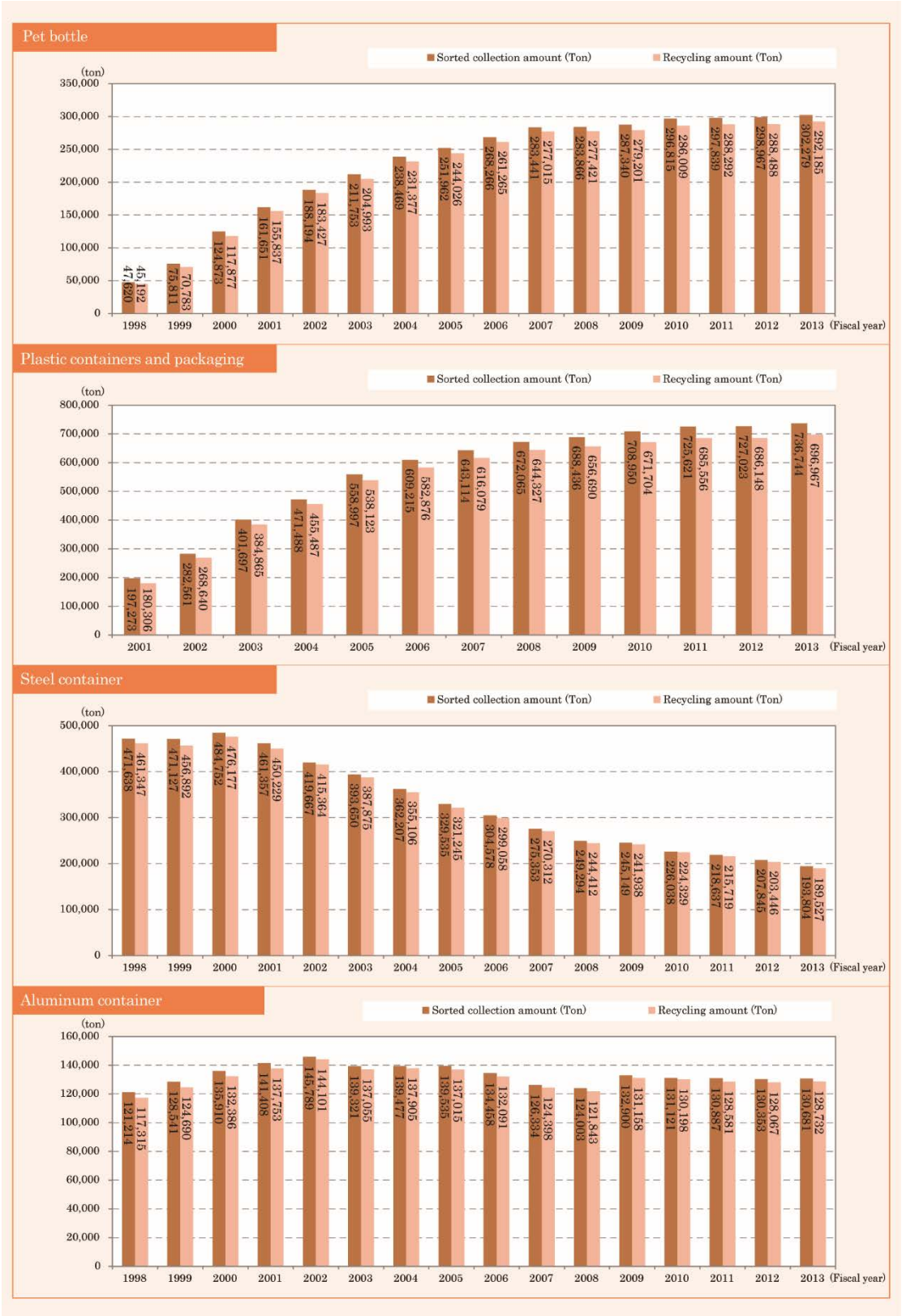
- Steel cans
  Consumption weight of steel cans saw a downward trend and it was 0.571 million tons in FY2014. According to the Steel Can Recycling Association, the cyclical use rate (recycling quantity rate for consumption (the quantity to be recycled as a recycled iron scrap)) was 92.0% in FY2014.
- Aluminum cans
  Consumption weight of aluminum cans has levelled off in recent years and was 0.313 million tons in FY2014. According to the Aluminum Can Recycling Association, the cyclical use rate of aluminum cans (recycling quantity rate for consumption weight) reached 87.4% in FY2014. In addition, there is a 63.4% rate of “CAN TO CAN” meaning recycling aluminum cans by turning them into more aluminum cans.
- Paper packs
  According to the National Milk Container Environment Council, the shipping volume of paper packs for beverages in FY2012 was 0.202 million tons. Out of this, 34.9% of used paper packs were taken by community collection, store collection and group collection.
- Cardboard
  According to the Japan Corrugated Case Association, the collection rate for cardboard (the actual proportion of collected amount of recycled waste paper of cardboard and the consumed amount of base paper for cardboard (export/import portion is provided)) in 2014 was 96.7%.



Source: Translated from Annual Report on the Environment in Japan 2015

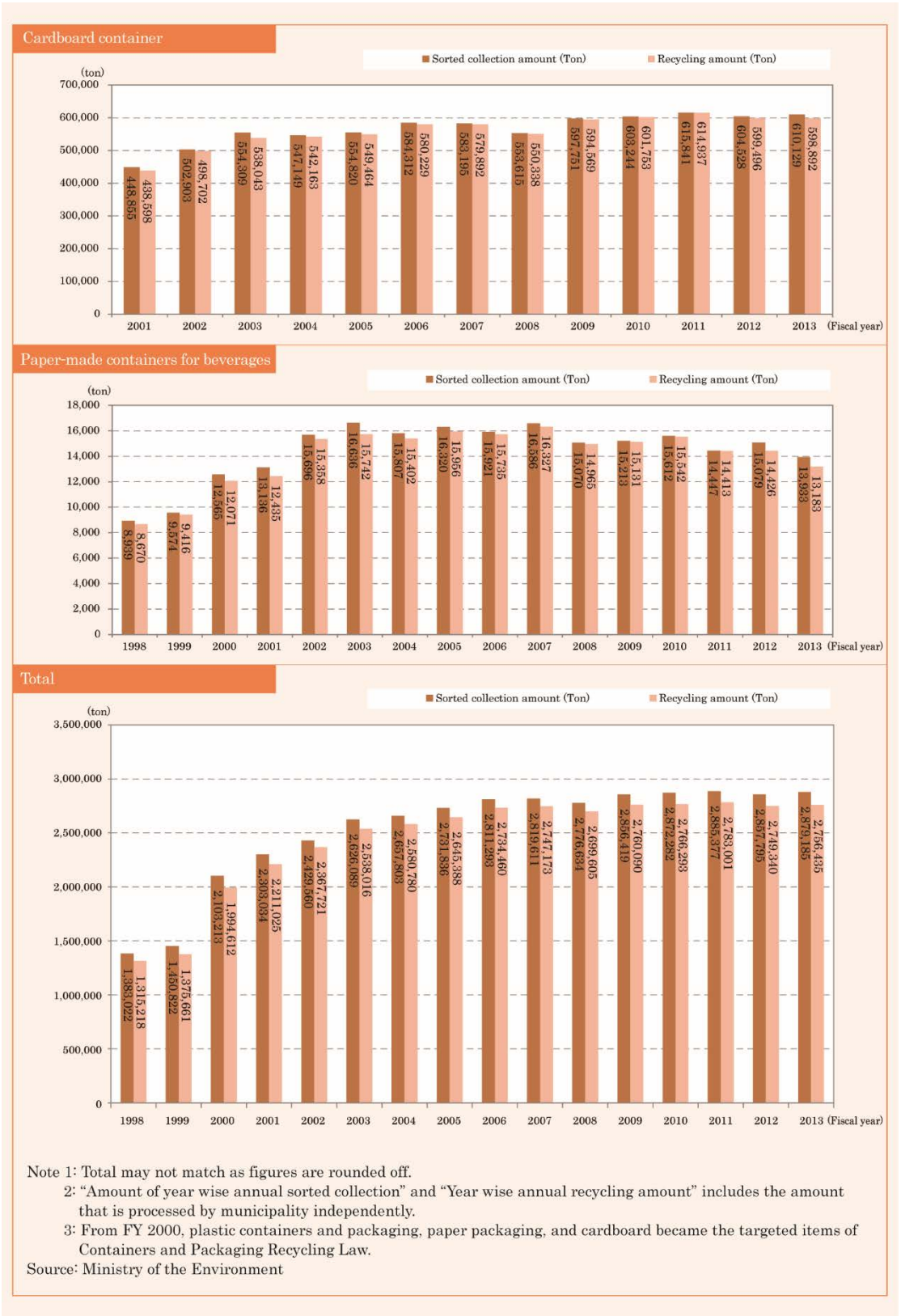
Figure C-4 Implementation of sorting, collection and recycling based on the law of Container and Packaging Recycling

Source: Translated from Annual Report on the Environment in Japan 2015



Source: Translated from Annual Report on the Environment in Japan 2015

Figure C-2 Implementation of sorting, collection and recycling based on the law of Container and Packaging Recycling



Note 1: Total may not match as figures are rounded off.
2: "Amount of year wise annual sorted collection" and "Year wise annual recycling amount" includes the amount that is processed by municipality independently.
3: From FY 2000, plastic containers and packaging, paper packaging, and cardboard became the targeted items of Containers and Packaging Recycling Law.
Source: Ministry of the Environment

Source: Translated from Annual Report on the Environment in Japan 2015

Figure C-6 Implementation of sorting, collection and recycling based on the law of Container and Packaging Recycling

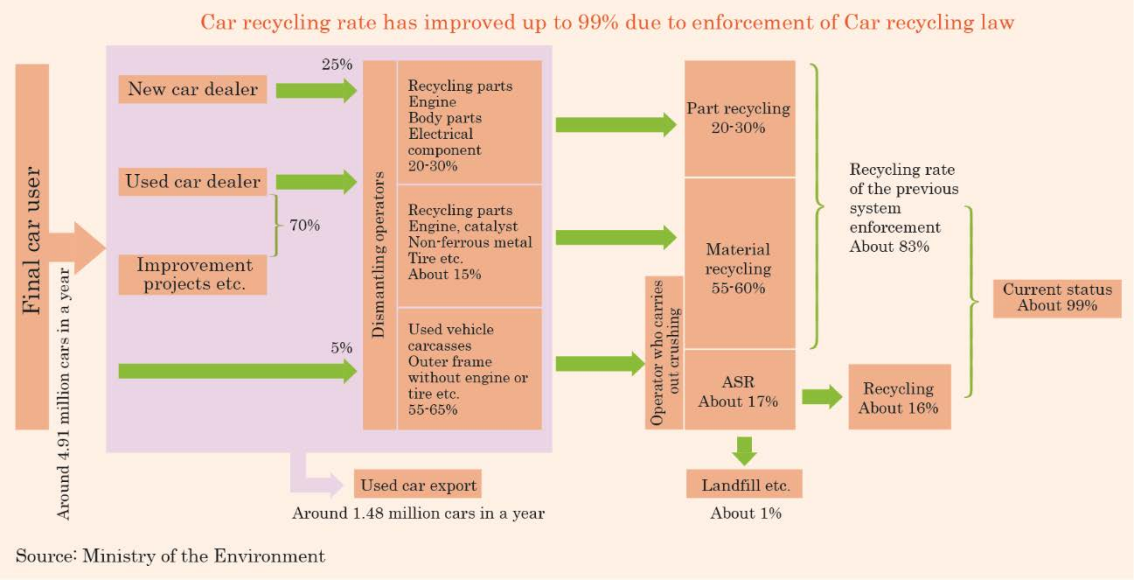
B) Plastics

According to the Plastic Waste Management Institute, plastic production was assumed to be 10.6 million tons and the amount consumed domestically was assumed to be 9.66 million tons in 2013. The effective utilization ratio for emissions is assumed to be approximately 79% for general waste and approximately 84% for industrial waste. It is assumed that the method of processing items that are not recycled is simple incineration for approximately 15%, landfill disposal for approximately 6% for general waste, and for industrial waste, incineration for approximately 6% and landfill disposal for approximately 10%.

C) Cars

- Cars

  First of all, based on the End-of Life Vehicles Recycling Law, used cars are handed over from the collection operators of car dealers to the fluorocarbons recovery operators. CFCs that are used in car air-conditioner are recovered by these operators. After that, the cars are handed over to car dismantlers, where useful parts such as engines, doors etc. are recovered. Finally the remaining waste car scrap is handed over to the crushing suppliers. Here, useful metal such as iron etc. is recovered and the crushed metal (shredded dust) generated at that time is recycled by automobile manufacturers. About 20-30% of the weight of each car is recovered (reusable parts) by dismantlers and 50~55% is recycled as an element (material recycling). (Figure C-7).



Source: Translated from Annual Report on the Environment in Japan 2015

Figure C-3 Processing flow of used cars (FY2013)

- Tires

  According to Japan Car Tire Association, out of the 1.052 million tons (1.021 million tons in FY2013) of waste tires in FY2014, 0.306 million tons (0.221 million tons in FY2013) was used in the original/processed form for export, as well as for regenerating tires and rubber/rubber powder, A further 0.615 million tons (0.578 million tons in FY2013) was used for smelting or cement firing, and for power generation.

D) Home appliances, Personal computers, Small-size secondary batteries, Small-size electronic devices

Matters concerning home appliances, personal computers, small-size secondary batteries and small-size electronic devices can be referred to in '7. Amount of E-waste Generation, Disposal and Recycling. Existence of policies and guidelines for E-waste management'.

III. Amount of Hazardous Waste Generated and Disposed in Environmentally Sound Manner

1. Specially controlled waste

Explosive, toxic, or infectious waste which is hazardous to health or living environment has been specified in specially controlled waste (specially controlled municipal sold waste and specially controlled industrial waste). As special processing standards are determined according to the types of specially controlled waste, the proper process has to be ensured when processing this type of waste. Also if generators want to outsource the process, they should outsource it to operators who have permission for dealing with specially controlled waste.

The specially controlled waste specified so far is shown in Table C-3.

Table C-3 Specially controlled waste

Category	Main Type		Summary
Municipal Solid Waste	Parts used in PCB		Parts of PCB of air conditioner, TV and Microwave
	Dust		Amongst the garbage treatment facility, the things produced in incineration facility
	Dust, ash , mud		Dioxin type things that are produced by burning general waste of special facility set according to Dioxin special measures law
	Infectious municipal waste		There is a fear that infectious pathogen may have present or attached in/to general waste that is discharged from medical institutions.
Industrial Waste	Waste oil		Volatile oil, Kerosene, diesel compounds (excluding flame-retardant tar pitch type)
	Waste acid		Waste acid of pH less than 2.0 to have significant corrosive
	Waste alkali		Waste alkali of pH more than 12.5 to have a significant corrosive
	Infectious industrial waste		There is a fear that infectious pathogen may have present or attached in/to industrial waste that is discharged from medical institutions.
	Certain hazardous industrial waste	Waste PCB	Waste oil having waste PCB and PCB
		PCB contamination	PCB with stains, PCB with stained waste paper , PCB having stained wood chips or fiber scraps, metal strap or plastic material with attached or enclosed PCB, ceramic waste or debris with attached PCB
		PCB treated things	PCB is included in the things that were processed in order to dispose of waste such as PCB or PCB contamination
		Specified sewage sludge	Sludge that is specified in Article 13 rule 4 of Sewerage Law Enforcement Ordinance
		Slag	Materials containing multiple metals with constant or higher concentration
		Waste asbestos etc.	The thing that is generated from the business place where special dust generation facility is installed as per Air Pollution Control Act, may be scattered or things related to asbestos building materials removal business.
		Ash	Ash of heavy metals or things that contains dioxins of certain concentration
		Dust	Heavy metals, 1.4-Dioxin, Dioxin type with constant or higher concentration
		Waste oil	Things that contains organic chlorine compounds
		Mud, waste acid, waste alkali	Heavy metals, PCB, organic chlorine compounds, pesticides, things having Dioxin type with constant or higher concentration

Source: [Law related to waste management and cleaning] as per the creation of Ministry of the Environment.

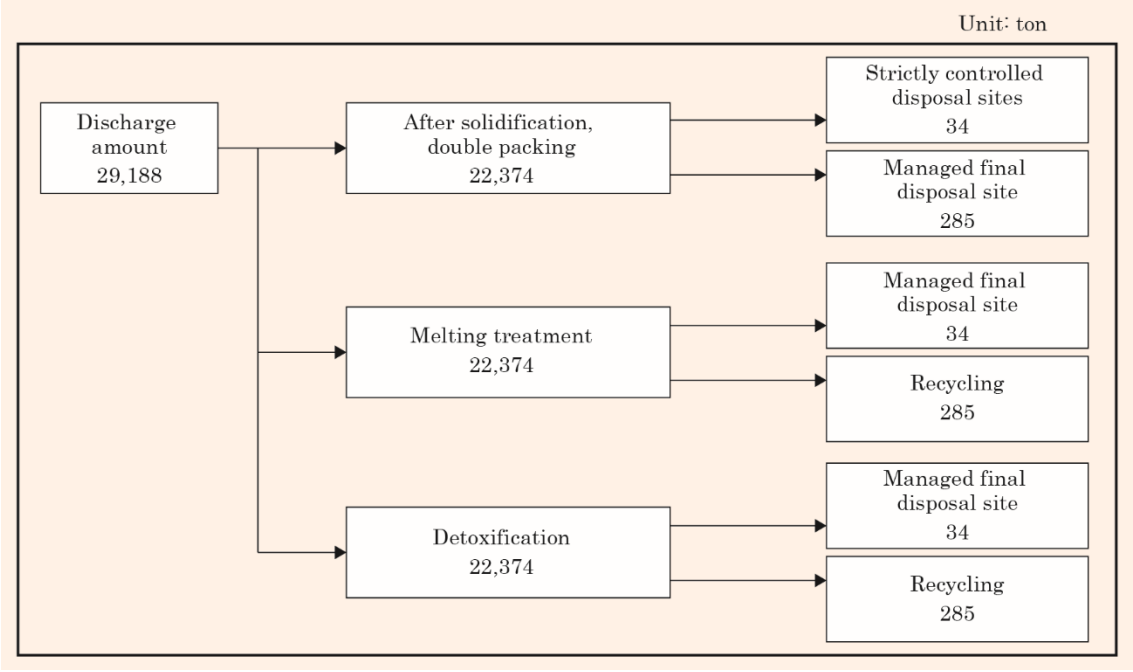
Source: Translated from Annual Report on the Environment in Japan 2015

2. Measures for processing individual hazardous waste

A) Measures for processing asbestos

The Law to Amend the Part in the Air Pollution Control Law for the Prevention of Damage to Health due to Asbestos was fully enforced in April 2007. In order to promote safe and quick processing of asbestos-containing waste across the country, the Minister of the Environment has started certifying the operator who performs the detoxification process using advanced technology such as melting etc. A system has also started in which permission from the prefectural governor for business and facilities is not required (detoxification certification system). In addition, landfill disposal standards for waste asbestos that is a special management industrial waste have been enhanced as per the amendment to the Enforcement Ordinance of Waste Management Law in 2010.

According to a survey by the Ministry of the Environment, in FY2013, the amount of waste asbestos treated was 29,188 tons. Among that, solidified and double packed landfill disposal was 22,374 tons, melting treatment was 6,269 tons and detoxification was 545 tons. (Figure C-8)



Source: Ministry of the Environment, 2013

Figure C-8 Treating conditions for friable asbestos waste (waste asbestos, etc.)

B) Treatment of polychlorinated biphenyl (PCB) waste

As for polychlorinated biphenyl (hereinafter referred to as "PCB".) waste, according to the Law on Special Measures concerning the Promotion of Proper Treatment of PCB Waste (2001), the operators must dispose of them before 31st March, 2027.

With the help of intermediate storage and the cooperation of the Environmental Safety Corporation, Japan has established a system for treating high-voltage transformers, capacitors, etc. that use PCB,

in five regional processing facilities across the nation (Kitakyushu, Toyota, Tokyo, Osaka, and Hokkaido (Muroran)) and has been promoting this system. In addition, the treatment of ballast such as contaminants began in Kitakyushu in 2009 and started in Hokkaido in September 2013.

As for the treatment of electrical equipment contaminated with traces of PCB, traces of PCB contaminated electrical equipment subject to the special system for detoxification treatment were added according to Waste Management Law in November 2009, and by March 2015, 22 operators were certified in the ongoing process.

The PCB waste treatment plan was revised on June 6, 2014, and according to this plan, the prospective amounts of PCB waste, storage amount, and disposal volume are as follows.

- Based on the provisions of the law, the current storage amount according to the different types of PCB waste as reported by the storage operators on March 31, 2012 is given in Table C-4 and the amount of PCB being used in products that use PCB is given in Table C-5.

Table C-4 Storage amount of PCB waste

Type of waste	Storage amount
High-voltage transformer	30,633 units
High-voltage capacitor	204,580 units
Low-voltage transformer	36,752 units
Low- voltage capacitor	1,705,610 units
Pole-mounted transformer	1,656,450 units
Ballast	5,906,205 units
Waste polychlorinated biphenyl	137 ton
Waste oil that includes polychlorinated biphenyl	87,799 ton
pressure sensitive copying paper	710 ton
Waste	682 ton
sludge	20,977 ton
Other equipment	520,129 units

Source: Translated from Annual Report on the Environment in Japan 2015

Table C-5 Usage amount of products that use PCB

Type of product	Usage amount
High-voltage transformer	9193 units
High-voltage capacitor	12,250 units
Low-voltage transformer	1,011 units
Low- voltage capacitor	22,691 units
Pole-mounted transformer	439,421 units
Ballast	178,445 units
Waste polychlorinated biphenyl	505 kg
Waste oil that includes polychlorinated biphenyl	36,367 kg
Other equipment	34,062 units

Source: Translated from Annual Report on the Environment in Japan 2015

- The expectations regarding the emissions from the high voltage transformers and other items that use PCB and high-voltage capacitors, storage amount and disposal volume could be according to the results that were estimated based on the storage amount of polychlorinated biphenyl waste, etc. which have been put forth in Table C-6.

Table C-6 The potential generation amount, storage amount and disposal volume of high-voltage transformer and such, high-voltage capacitor and such that use PCB

Year	Emissions	Disposal volume	Storage volume
Until FY 2012	—	High-voltage transformer 9,965 units High-voltage capacitors 146,237 units	High-voltage transformer, etc. Around 7,100 units High-voltage capacitors around 156,000 units
FY 2013 onwards	High-voltage transformer around 700 units High-voltage capacitors around 28,000 units	High-voltage transformer around 7,800 units High-voltage capacitors around 183,000 units	—

Source: Translated from Annual Report on the Environment in Japan 2015

C) Other hazardous waste management

Regarding infectious waste, it is well known that the "Infectious waste treatment manual based on Waste Management Law" was revised in May 2012. Technical considerations concerned with the disposal of waste that contains PFOS were summarized in September 2010 and were revised and published in March 2011 for the waste that includes chemical material with harmful characteristics such as persistent organic pollutants (POPs).

'Future countermeasures for Mercury based on the Minamata convention concerned with Mercury' were reported by the President of the Central Environment Council to the Minister of the Environment in February 2015 in relation to mercury waste.

Further, an information management system is in operation, requiring traceability for waste that is below the clearance level and that has no safety issues with regards to radiation protection out of waste emitted based on the Law related to Restrictions for Nuclear Source Material, Nuclear Fuel Material and Reactors and Law related to Prevention of Radiation Damage as per Radioisotope.

D) Transboundary movement of hazardous waste

"The Basel Convention on the Control of Movements of Hazardous Wastes and Their Disposal, (Basel Convention)" was adopted in order to address the problem of environmental pollution caused by the transboundary movement of hazardous waste. Japan formulated the Law for control of Export, Import and Others of Specified Hazardous Waste and Other Waste (Japanese Basel Law) in 1992. Moreover, import and export restrictions are also followed for waste which is mainly processed domestically according to Waste Management Law. Management of the import and export of hazardous waste is strictly carried out according to these laws. Import and export status based in FY2014 on the Basel Law is shown in Table C-7.

Table C-7 Import and Export scenario based on the Basel Law (2014)

	Weight (t)	Partner countries or regions	Item	Purpose of export and import
Exported	180,035 (200,307)	Korea Hong Kong Singapore USA, etc.	・ Lead scrap (Lead-acid batteries) ・ Coal ash ・ lead ash, etc.	Metal recovery, etc
Imported	29,904 (32,222)	Hong Kong Taiwan Thailand Philippines Singapore, etc.	・ Electronic component scrap ・ Metal-containing sludge ・ Battery scrap (nickel-cadmium battery), etc.	Metal recovery

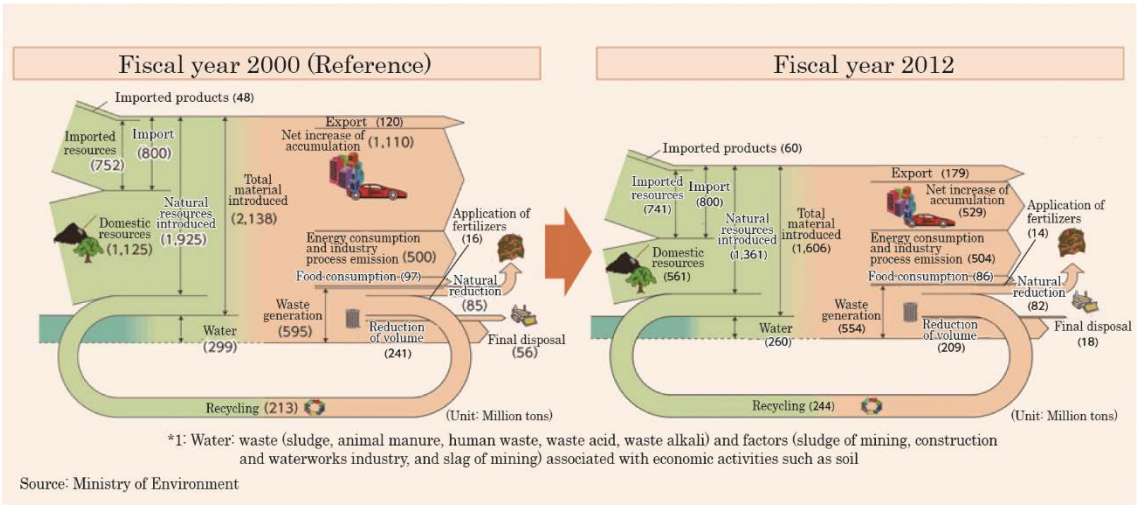
Numerical values indicates amount of FY2013.

Source: Translated from Annual Report on the Environment in Japan 2015

According to the revision of rules on waste disposal for 2010, entrusting the disposal of overseas waste to industrial waste disposal contractors can import the waste when it is recognized that there is adequate reason for disposing of overseas waste in the country.

IV. Indicator Based on Macro-level Material Flows (Secondary Indicator)

In the Third Fundamental Plan for Establishing a Sound Material-Cycle Society (Cabinet Decision) (2013), a target was set for indicators related to 'entrance', 'cycle' and 'exit' which are a different section of this material flow in order to form a recycling society that has developed a good balance between each measure such as prevention, reuse, recycle and disposal. Material flow of Japan (FY2012) is shown in Figure C-9.



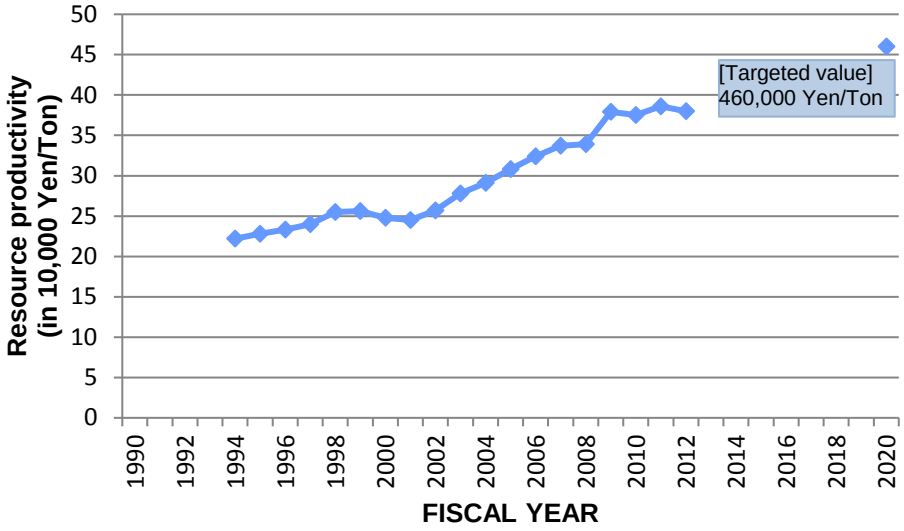
Source: Translated from Annual Report on the Environment in Japan 2015

Figure C-9 Material flow in Japan (FY 2012)

The target year will be 2020 for three indicators and one can see the latest progress of each indicator as follows.

1. Productivity of resources (= GDP / input of natural resources)

Our target (approximately 80% increase from the year 2000; approximately JPY250,000/ton (USD2300/ton)) for productivity for the year 2020 is JPY460,000n/ton. Moreover, it was JPY380,000/ton (USD3500/ton) in 2012 (**Figure C-10**). It increases 54% compared with FY2000, but it remains at the same level in and after FY2010 (USD1= JPY109.75 (FY2014)).

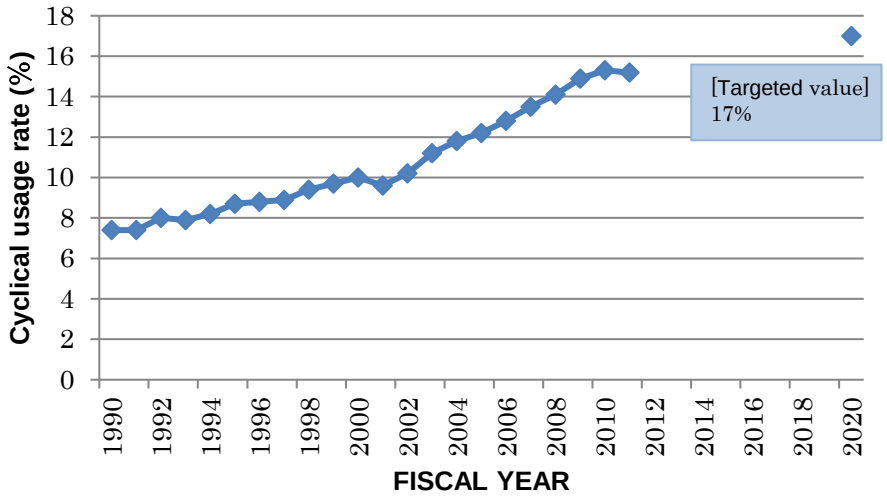


Source: Translated from Annual Report on the Environment in Japan 2015

Figure C-10 Trends in resource productivity

2. Cyclical use rate (= amount of cyclical use / (amount of cyclical use + natural resources input))

The target for cyclical use rate in FY2020 is set at 17% (approximately 70% percent improvement over about 10% in FY2000). Furthermore, the rate was approximately 15% in FY2012 and it increases 5.3% compared with FY2000, but it remains at the same level in and after FY2010 (Figure C-11).

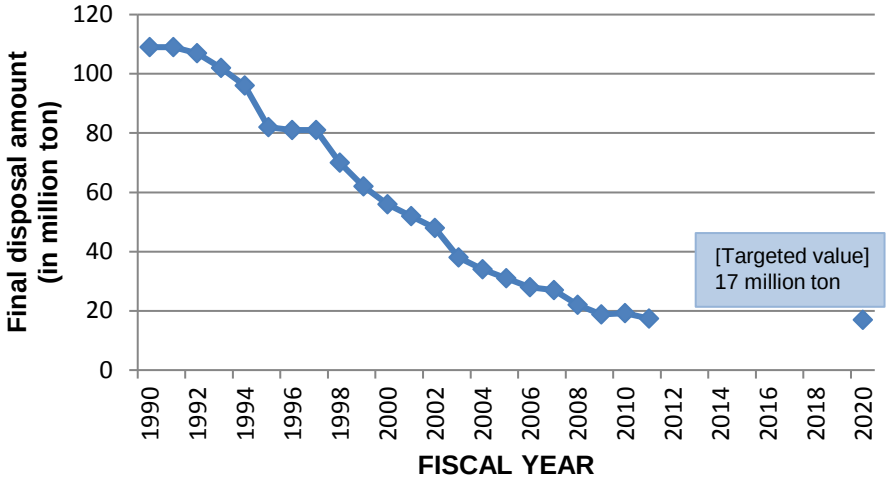


Source: Translated from Annual Report on the Environment in Japan 2015

Figure C-11 Changes in cyclical usage rate

3. Final disposal amount (= amount of landfill waste)

The target for final disposal amount is set at 17 million tons in FY2020 (approximately 70% decrease about 56 million tons in FY2000). The final disposal quantity for the year 2012 (FY2012) is approx. 17.9 million tons which is approximately 68% lesser than that for the year 2000. However, it has increased compared to 2011 Figure C-12.



Source: Translated from Annual Report on the Environment in Japan 2015

Figure C-12 Trends in final disposal amount

V. Amount of Agricultural Biomass Used

In December 2010, the “Basic Plan for Promotion of Utilization of Biomass” was determined by the Cabinet, based on the “Basic Law for Promotion of Utilization of Biomass”.

For the purpose of comprehensive and planned utilization of biomass. This basic plan determined, the basic policy regarding the measures to promote the use of biomass, the target to be achieved by the country and the matters related to research and development of technology. (Table C-8)

Goals set to be achieved by 2020 include formulating a biomass utilization promotion plan for 600 municipalities, creating new industries of JPY500 billion which will use biomass and aiming to use 26 million tons of biomass yearly via carbon conversion.

In this basic plan, the goal for the utilization of each type of biomass has been set for the expansion of the use of biomass. Further the biomass which has been targeted in this basic plan is not limited to the agriculture and livestock industry. It includes any "Resource that is organic substance derived from plants and animals (excluding fossil resources)".

Further, in Table C-8, the amount generated in the current year is mentioned and the current utilization rate is a numerical value from 2009. The amount of generation, and changes in the utilization rate are given in Table C-9.

Table C-8 The Amount of Generation, Utilization Rate and Goal of Each Type of Biomass

Type of biomass	Amount generated in current year	Current utilization rate	Goal of FY 2020
Domestic animal wastes	Approximately 88 million tons	Approximately 90%	Approximately 90%
Sewage sludge	Approximately 78 million tons	Approximately 77%	Approximately 85%
Black liquor (*1)	Approximately 14 million tons (*2)	Approximately 100%	Approximately 100%
Paper	Approximately 27 million tons	Approximately 80%	Approximately 85%
Food waste	Approximately 19 million tons	Approximately 27%	Approximately 40%
Remainder material of saw mill etc.	Approximately 3.4 million tons (*2)	Approximately 95%	Approximately 95%
Construction generated wood	Approximately 4.1 million ton	Approximately 90%	Approximately 95%
Non-food part of agricultural crops	Approximately 14 million ton	Approximately 30% (Except plowing)	Approximately 45%
		Approximately 85% (Including plowing)	Approximately 90%
Remainder material of forest	Approximately 8 million tons (*2)	Almost unused	Approximately above 30%

*1: Black liquor is a resin in liquid form which comes out when extracting fiber from wood chip in the manufacturing process of wood pulp and is considered as a main ingredient.

*2: Dry weight for black liquor and sawmill open forest remainder. Other biomasses indicate wet weight.

Source: Basic Plan for Promotion of Utilization of Biomass

Table C-9 Changes in the Utilization Rate of Each Type of Biomass *(Unit: 10,000 tons)*

Biomass type	2007			2008			2009			2010			2011			(Reference) Target of year 2020
	Generation quantity	Utilization rate	Utilization quantity	Generation quantity	Utilization rate	Utilization quantity	Generation quantity	Utilization rate	Utilization quantity	Generation quantity	Utilization rate	Utilization quantity	Generation quantity	Utilization rate	Utilization quantity	Utilization rate
Domestic animal waste	–	–	–	Approx. 8,800	Approx. 90% (※)		Approx. 8,700			Approx. 8,500			Approx. 8,400			Approx. 90%
Sewage sludge	Approx. 7,800	Approx. 77%	Approx. 6,000	Approx. 7,700	Approx. 78%		Approx. 7,600	Approx. 77%	Approx. 5,900	Approx. 7,400	Approx. 78%	Approx. 5,800				Approx. 85%
Black liquor				Approx. 1,400	Approx. 100%		Approx. 1,400	Approx. 100%	Approx. 1,400	Approx. 1,400	Approx. 100%	Approx. 1,400	Approx. 1,300	Approx. 100%	Approx. 1,300	Approx. 100%
Paper							Approx. 2,700	Approx. 80%	Approx. 2,200	Approx. 2,800	Approx. 79%	Approx. 2,200	Approx. 2,800	Approx. 79%	Approx. 2,200	Approx. 85%
Food waste	Approx. 1,900	Approx. 27%	Approx. 510	Approx. 1,900	Approx. 25%	Approx. 460	Approx. 1,800	Approx. 21%	Approx. 380							Approx. 40%
Remainder material of saw mill							Approx. 340	Approx. 95%	Approx. 320	Approx. 360	Approx. 94%	Approx. 340	Approx. 370	Approx. 95%	Approx. 350	Approx. 95%
Construction generated wood				Approx. 410	Approx. 90%	Approx. 370										Approx. 95%
Non-food part of agricultural crops (except plow)	Approx. 1,400	Approx. 30%	Approx. 420							Approx. 1,200	Approx. 33%	Approx. 410				Approx. 45%
Remainder material of forest	Approx. 1,400	Approx. 1%	Approx. 8	Approx. 800	Approx. 1%	Approx. 8	Approx. 800	Approx. 1%	Approx. 9	Approx. 800	Approx. 1%	Approx. 11	Approx. 800	Approx. 1%	Approx. 12	Approximately above 30%

Note 1: Dried weight in case of black liquor, remainder material of saw mill, remainder material of forest. Besides this, wet weight in case of biomass.

Note 2: Annual value for domestic animal waste, sewage sludge, food waste, construction generated wood. Value of calendar year has been mentioned for other biomass.

Note 3: For the current utilization rate in Basic Plan for Promotion of Utilization of Biomass, values for sewage sludge, food waste, non-food part of agricultural crops, remainder material of forest are from 2007, values for domestic animal waste, black liquor and construction generated wood are from 2008 and values for paper, remainder material of saw mill are from 2009.

Note 4: A blank cell indicates that the number is not determined.

Source:Ministry of Agriculture, Forestry, and Fisheries of Japan

If the generation amount, or the used amount mentioned in the Basic Plan for Promotion of Utilization of Biomass in Table C-8 is converted into carbon, its result is shown in Table C-10. When the used amount is converted into carbon, it comes to approximately 23 million carbon tons (approximately 88%) as against its target which was 26 million carbon tons. One effect of the Great East Japan Earthquake is that the decrease in the utilization of sewage sludge is on track to recover.

Table C-10 Carbon Converted Value of Utilized Quantity of Each Type of Biomass

	While planning			Actual values of FY2014			Targeted value
	Utilization quantity		Utilization rate	Utilization quantity		Utilization rate	Utilization quantity
	Weight (t)	Amount of carbon converted value (Carbon t)	%	Weight (t)	Amount of carbon converted value (Carbon t)	%	Amount of carbon converted value (Carbon t)
Domestic animal wastes	76 million	4.55 million	13	70 million	4.2 million	13	
Sewage sludge	60 million	0.69 million	77	44 million	0.51 million	58	
Black liquor	14 million	4.62 million	100	12 million	3.93 million	100	
Waste paper	22 million	8.24 million	80	22 million	8.31 million	80	
Food waste	5.2 million	0.21 million	27	4.2 million	0.17 million	25	
Remainder material of Saw mill	3.2 million	1.6 million	94	3.8 million	1.9 million	95	
Construction generated wood	3.7 million	1.63 million	90	4.7 million	2.07 million	94	
Non-food part of agricultural crops	4.1 million	1.46 million	32	4 million	1.42 million	33	
Remainder material of forest	0.13 million	0.07 million	2	0.5 million	0.24 million	6	
Total		23 million			23 million		26 million

Source: Compiled from material from the 7th conference for the promotion of utilization of biomass

VI. Marine & Coastal Plastic Waste Quantity

In July 2009, the "Law concerning the Promotion of Handling of Coastal Drift, etc. related to the Maintenance of Good Landscape and Environment in the Coastal Areas to Preserve the Rich and Beautiful Nature" came into effect. Based on the provisions of this Act, a Coastal Drift Handling Measures Promotional Council has been set up for the respective administrative agencies to coordinate and carry out a comprehensive, effective and efficient promotion of coastal drift handling measures.

Recovery is carried out by clean-up activities according to the study carried out by the Ministry of the Environment, the Secretariat at the Promotional Council.

The quantity of coastal flotsam (quantity at the beginning of the year) in Japan is estimated by calculating the consumption rate based on the recovery performance by clean-up activities according to the study carried out by the Ministry of the Environment, the Secretariat at the Promotional Council (C-11).

Table C-11 Estimated result of coastal flotsam quantity

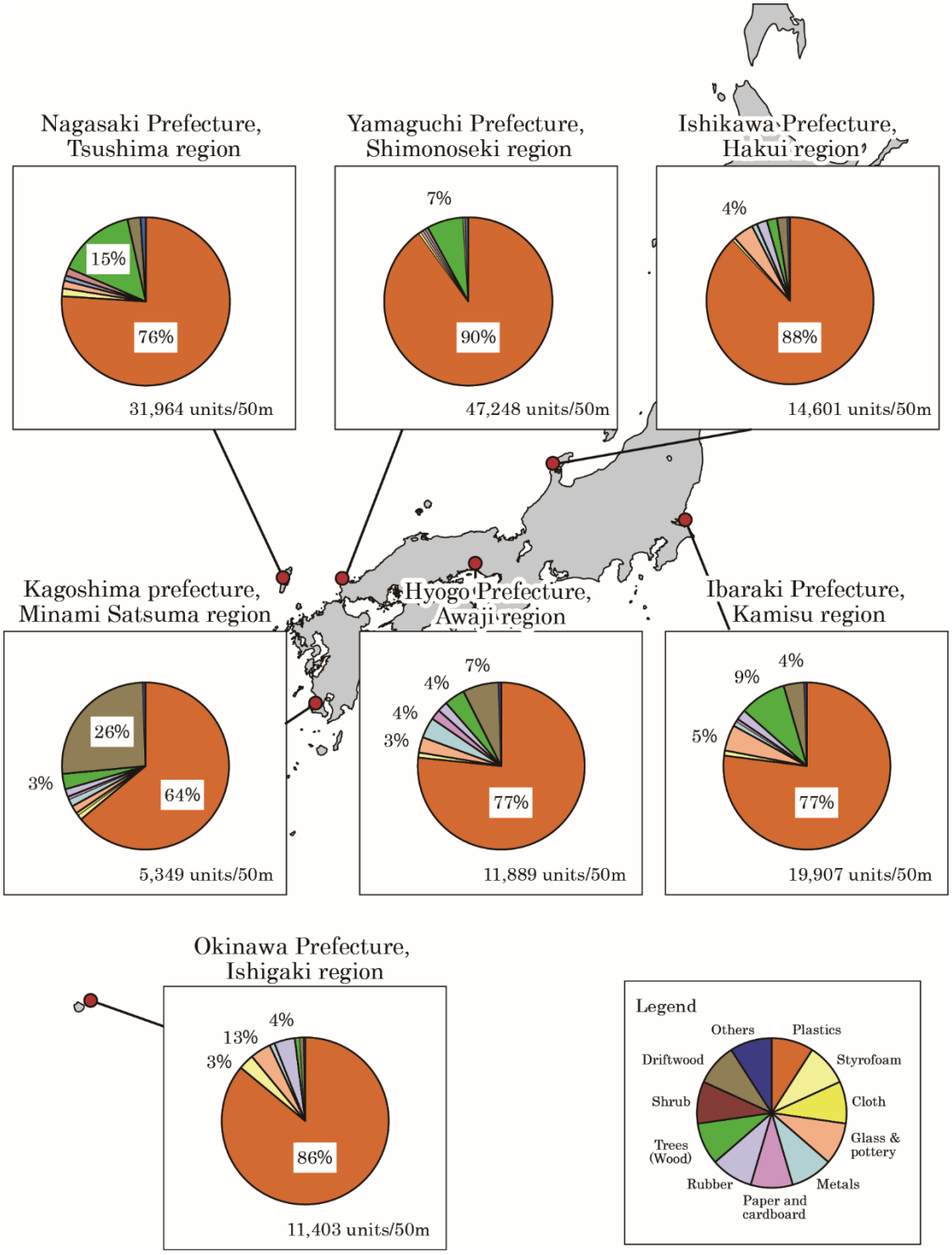
	Amount of marine litter
FY 2009 *	230,000 to 460,000 tons
FY 2010	290,000 to 590,000 tons
FY 2011	300,000 to 570,000 tons
FY 2012*	280,000 to 580,000 tons
FY 2013	310,000 to 580,000 tons

*The estimates for the FY2009 and 2012 are reference values since the actual data is small.

Source: "FY2014 Advanced marine debris research study service Report" by Ministry of the Environment contractors FY 2014 Japan NUS Co. Ltd.

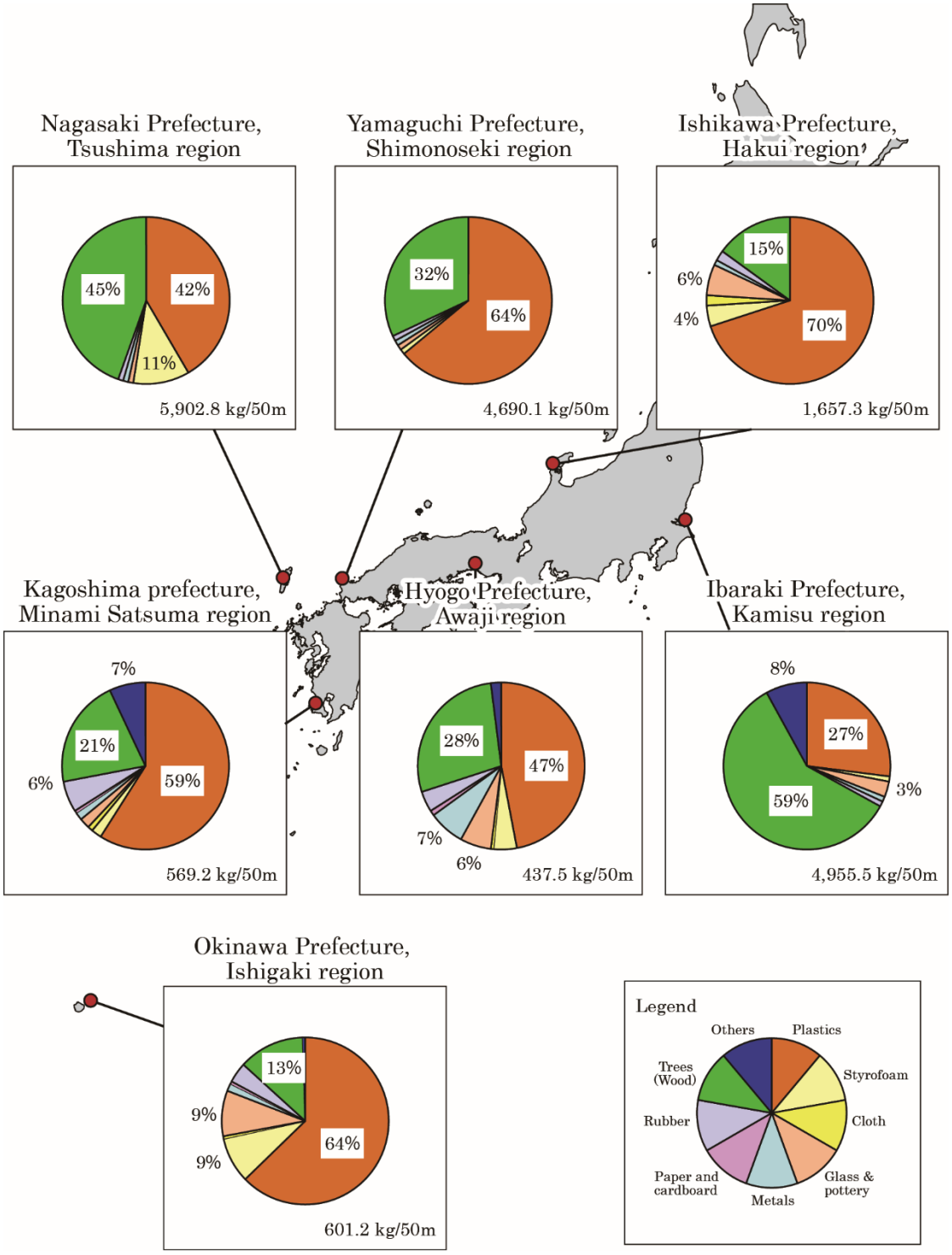
Moreover, according to the study, recovery in FY2013 was 45000 tons.

In addition, the Ministry of Environment conducted a survey on marine litter in seven power plants across the country in the five-year period between FY2010 and FY2014. Looking at the five-year totals, considering individually, there was more plastics (Source: Material from the 6th Coastal Drift Handling Measures Promotional Council
Figure C-8), wood, etc. accounted by weight in two sites, and plastics in other survey sites. On analyzing the bottles (Figure C-14) according to their country of manufacture, many of them originated in Japan on the Pacific side, with bottles originating from China and South Korea in the East China Sea and Sea of Japan (Figure C-15).



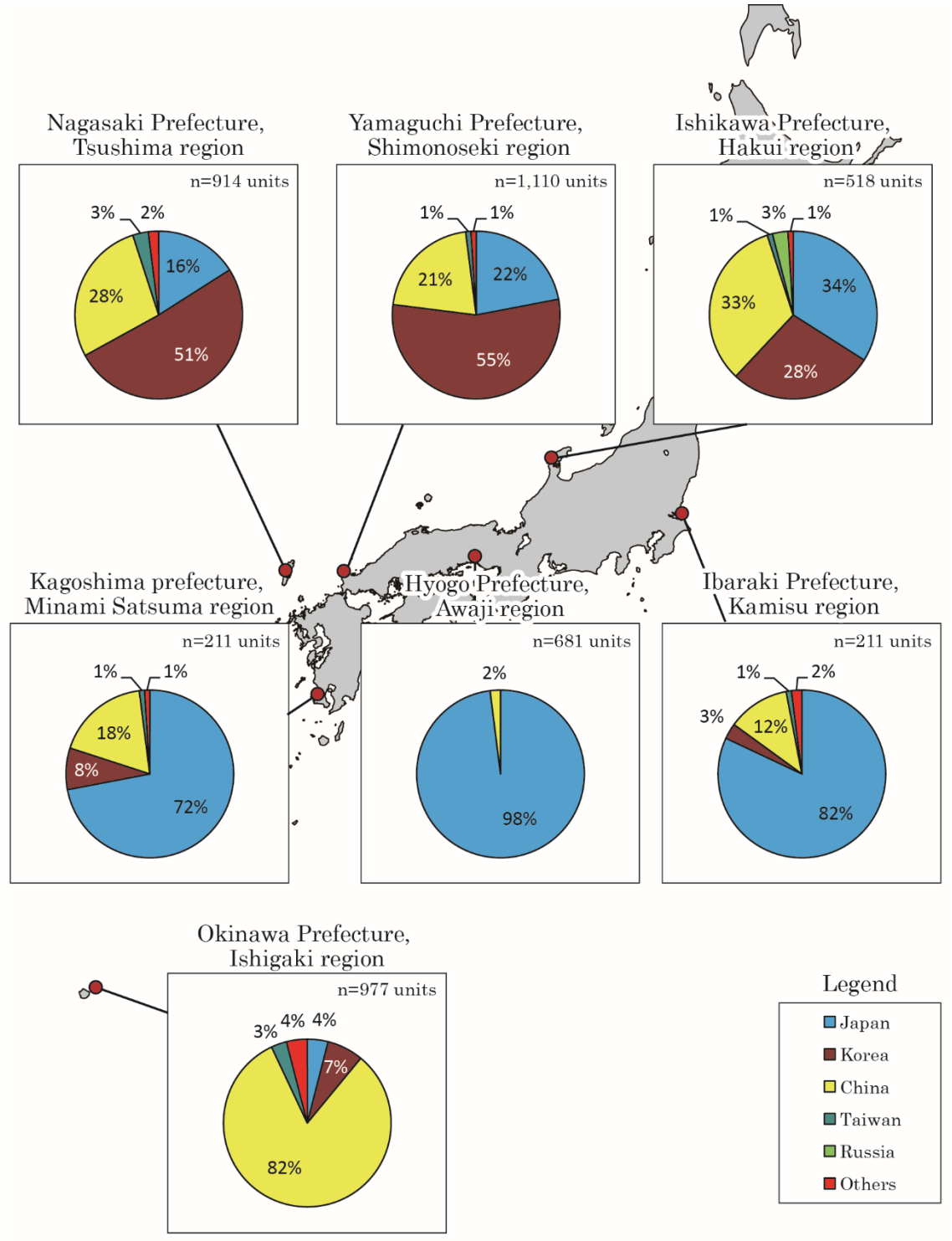
Source: Material from the 6th Coastal Drift Handling Measures Promotional Council

Figure C-13 Marine litter (number of items + natural objects) individual number (five-year total: excluding shrubs)



Source: Material from the 6th Coastal Drift Handling Measures Promotional Council

Figure C-14 Marine litter (number of items) weight (five-year total)



Source: Material from the 6th Coastal Drift Handling Measures Promotional Council

Figure C-15 National Aggregate of bottles (five-year total)

Moreover, the Ministry of the Environment conducted a survey in FY2014 on the buoyant density by visual inspection of the drifting garbage and compared this to the average values in each ocean for the total density of plastic films, polystyrene foam and other petrochemical products (Table C-12, Figure C-16). In addition, microplastics were collected with a plankton net and those of sizes 1~5mm were compared with the buoyant density for each ocean. (Table C-13, Figure C-17)

Table C-12 Visual survey of drifting garbage (total of plastic film, Styrofoam, other petrochemical products) comparison of buoyant density (Minimum value, middle value, maximum value, average value)

Unit : Item/m^3

Survey name	Ocean segment	Minimum value	Middle value	Maximum value	Average value	Number of survey locations
Offshore survey	East China Sea	0.0	39.4	148.2	39.1	n=66
	Sea of Japan, West	1.1	22.0	110.9	26.7	n=58
	Sea of Japan, North	3.2	20.9	79.4	28.8	n=29
	Pacific Ocean, North	0.4	13.0	45.4	17.8	n=35
	Mid-Pacific Ocean	3.9	15.7	28.2	14.8	n=6
	Pacific Ocean, South	0.5	12.2	30.5	20.8	n=12
	Seto Inland Sea	0.2	8.0	54.1	14.1	n=10
Coastal Survey	Seto Inland Sea	0.6	22.0	32.0	18.7	n=7

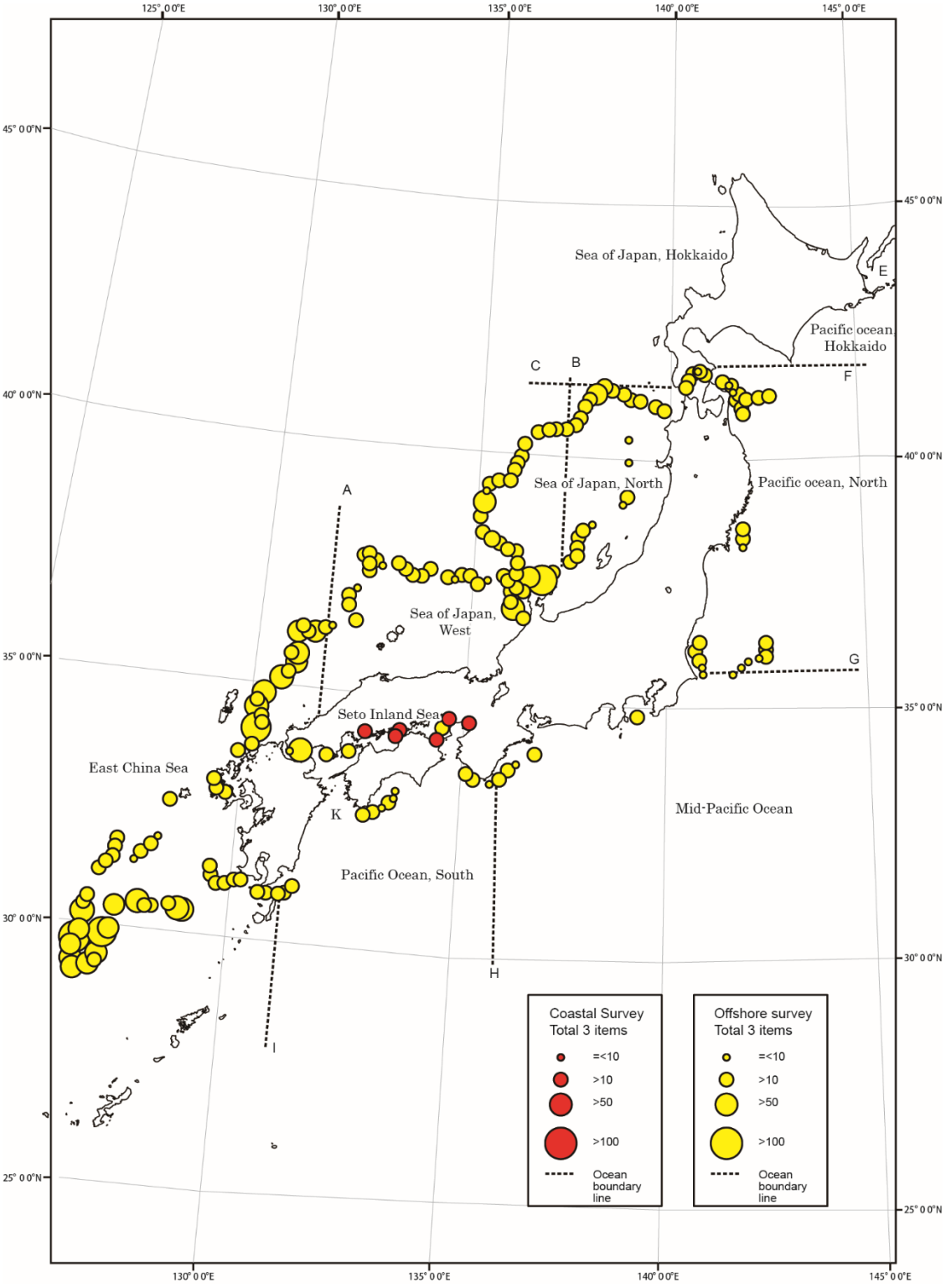
Source: Material from the 6th Coastal Drift Handling Measures Promotional Council

Table C-13 Comparison of microplastic buoyant density (mean value, drift difference)

Unit: Item/m^3

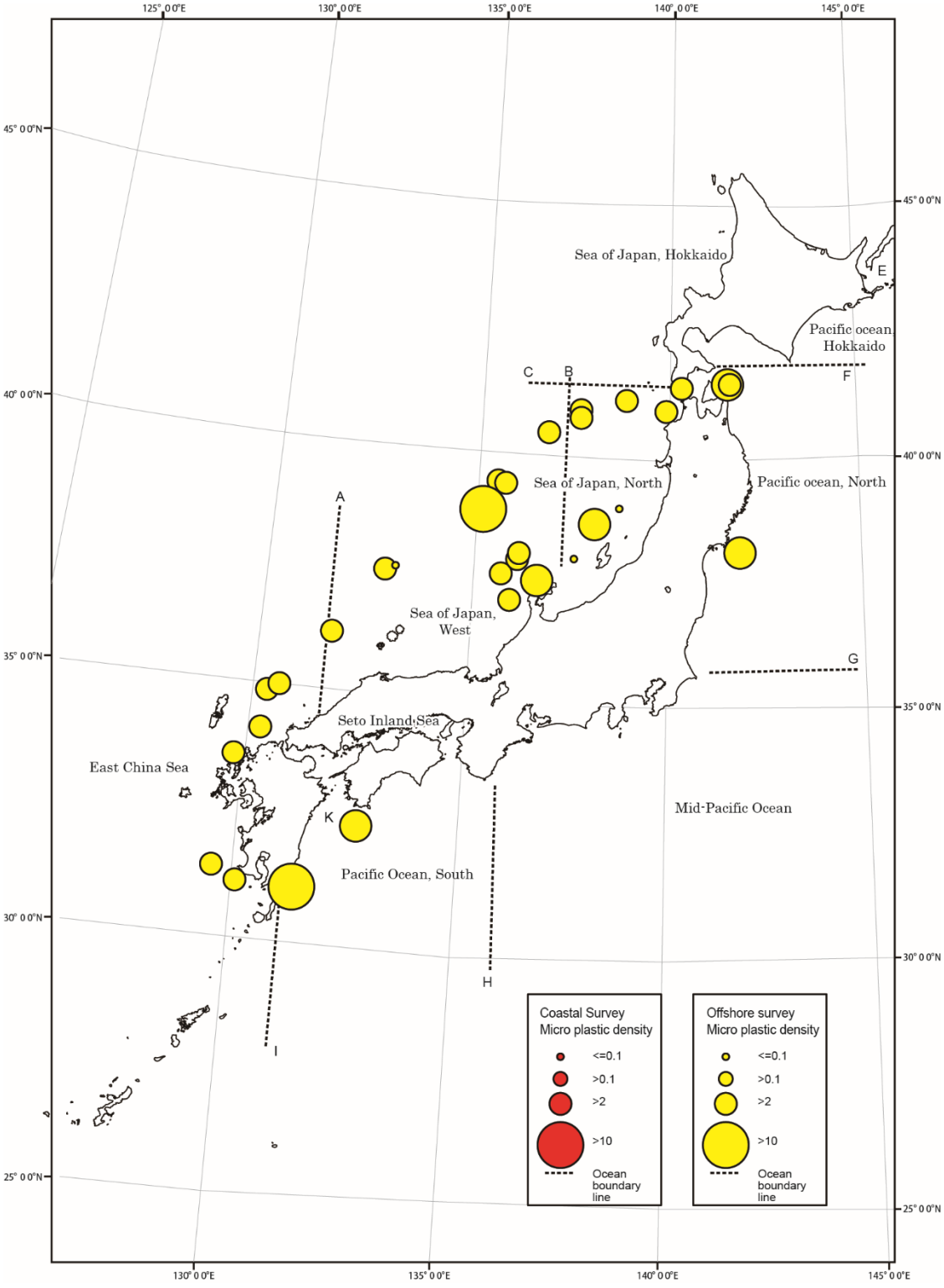
Survey name	Ocean segment	Average value	Standard deviation	Number of survey locations
Offshore survey	East China Sea	0.594	0.541	n=7
	Sea of Japan, West	1.232	2.847	n=17
	Sea of Japan, North	0.727	1.115	n=8
	Pacific Ocean, North	1.222	2.697	n=9
	Mid-Pacific Ocean	0.000	-	n=1
	Pacific Ocean, South	15.751	22.098	n=3
Coastal Survey	Seto Inland Sea	0.037	0.031	n=7

Source: Material from the 6th Coastal Drift Handling Measures Promotional Council



Source: Material from the 6th Coastal Drift Handling Measures Promotional Council

Figure C-16 Visual survey of drifting garbage (total of plastic film, Styrofoam, other petrochemical products) Distribution of buoyant density



Source: Material from the 6th Coastal Drift Handling Measures Promotional Council

Figure C-17 Distribution of microplastic buoyant density

VII. Amount of E-Waste Generation, Disposal and Recycling. Existence of Policies and Guidelines for E-waste Management

1. Home Electronics Appliances

There is a particularly high need for recycling in the case of 4 categories, namely home air-conditioners, televisions, refrigerators & freezers, and finally, washing machines & cloth dryers. Hence, these have been stipulated as special household e-waste based on the Home Appliances Recycling Law and it has been made mandatory for the manufacturer to carry out recycling above a specific standard.

Concretely, recycling of the four types of e-waste household appliances has been made mandatory for manufacturers and the recycling ratio (not including thermal recovery) is stipulated and recycling is promoted. The four types of e-waste household appliances at nationwide specified locations are shown in Table C-14.

Table C-14 Number of exchanged units at nationwide specified locations

	Air-conditioner	Television		Electric refrigerator Electric freezer	Electric washing machine Clothes dryer	Total
		Braun tube	LCD and plasma			
FY2002	164	352	－	257	243	1,016
FY2003	158	355	－	266	266	1,046
FY2004	181	378	－	280	281	1,121
FY2005	199	386	－	282	295	1,162
FY2006	183	413	－	272	294	1,161
FY2007	189	461	－	273	288	1,211
FY2008	197	537	－	275	282	1,290
FY2009	215	1,032	22	301	309	1,879
FY2010	314	1,737	65	340	314	2,770
FY2011	234	787	60	284	315	1,680
FY2012	236	228	49	292	315	1,120
FY2013	296	204	70	343	360	1,273
FY2014	223	187	85	278	314	1,086

* No. of exchanged units of electric refrigerators and electric freezers up to 2003 is the value of only electric refrigerators.
* No. of exchanged units of electric washing machines and clothes dryers up to 2008 is the value of only electric washing machines.
* Both can be corrected with provisional summary value in the future.
* The total value may be different due to rounding off.

Source: Ministry of the Environment

Changes in recycling rate of manufacturers and legal standards are shown in Table C-15. All are above the legal standards. Legal standards were raised in April 2015.

Table C-15 Recycling state

	FY2012	FY2013	FY2014	Legal standards	
				～FY2014	FY2015～
Air-conditioners	91%	91%	92%	70%	80%
Braun tube televisions	82%	79%	75%	55%	55%
LCD and plasma TVs	87%	89%	89%	50%	74%
Electric refrigerators and electric freezers	80%	80%	80%	60%	70%
Electric washing machines and clothes dryers	86%	88%	88%	65%	82%

Source: Created based on the data of Ministry of the Environment

2. Personal computers and related items

According to the Law for Promotion of Effective Utilization of Resources, recycling of industrial computers has been mandatory since April 2001 and recycling of home computers has been mandatory since October 2003 for manufacturers, with a stipulated recycling ratio of 50% or higher for desktop computers (main unit), 20% or higher for laptop computers, 55% or higher for cathode ray tube display devices and 55% or higher for liquid crystal display devices.

The results of a voluntary recall in 2012 is shown in Table C-16. The recycling ratio of manufacturers is shown in Table C-17 and all were above the legal standards.
In addition, computers and related items are included as target articles in the Small Home Appliances Recycling Law which came into force in April 2013.

Table C-16 Voluntary recall results of personal computers (FY2013)

Product classification	Recovery weight (t)	Recovered items (Units)
Desktop computers	2,126 (2,066)	196,610 (193,836)
Notebook computers	753 (646)	238,382 (199,186)
Braun tube display devices	737 (887)	43,750 (53,859)
LCD type display devices	1,722 (1,535)	190,498 (175,528)
Total	5,338 (5,135)	669,240 (622,409)

* In the table, results for FY2013 are shown in upper part and results for FY2014 are shown in lower part. Announced actual results of each operator (only operators having obligations of the voluntary recall and recycling) are summarized.
* Recall results for product reuse are included in voluntary recall results of FY2012 and FY2013 of this year's total.

Source: Ministry of the Environment

Table C-17 Results of recycling of personal computers (FY2013)

Product classification	Processing amount (t)	Processing items (units)	Recycling amount (t)	Recycling rate (%)	Legal targets (%)
Desktop computers	1,983 (1,875)	180,680 (174,889)	1,555 (1,459)	78.4 (77.8)	50
Notebook computers	704 (580)	222,725 (181,854)	417 (344)	59.3 (59.4)	20
Braun tube display devices	736 (887)	43,734 (53,859)	522 (635)	70.9 (71.6)	55
LCD type display devices	1,527 (1,348)	173,956 (157,459)	1,134 (979)	74.3 (72.6)	55
Total	4,950 (4,690)	621,095 (568,061)	3,628 (3,417)		

* In the table, results for FY2013 are shown in upper part and results of FY2014 are shown at lower part. Announced actual results of each operator (only operators having obligations of the voluntary recall and recycling) are summarized.
* Recall results for product reuse are included in voluntary recall results for FY2012 and FY2012 of this year's total.
* Recycling means using reproduction components and recyclable resources.

Source: Ministry of the Environment

3. Compact rechargeable batteries (nickel - cadmium rechargeable battery, nickel hydrogen rechargeable battery, lithium rechargeable battery, valve-regulated lead acid battery)

Rare resources such as nickel, cadmium, cobalt, lead etc. are used as the main materials in compact rechargeable batteries and hence, recycling of compact rechargeable batteries plays an important role.

According to the Law for Promotion of Effective Utilization of Resources, manufacturers have been requested to recycle compact rechargeable batteries from April 2001, with a recycling ratio stipulated at 60% or higher for nickel cadmium rechargeable batteries, 55% or higher for nickel hydrogen rechargeable batteries, 30% or higher for lithium rechargeable batteries and 50% or higher for valve-regulated lead acid batteries. Further promotion of recycling is planned.

The actual results of the voluntary recall of compact rechargeable batteries (including those in mobile phones etc.) in FY2012 are shown in Table C-18 and actual results of recycling rate in FY2012 are shown in Table C-19. Both have achieved the target as per act.

Table C-18 Voluntary recall results of compact rechargeable battery (FY 2013)

Product classification	Weight (t)
Nickel - cadmium battery	792 (849)
Nickel-hydrogen battery	183 (220)
Lithium secondary battery	393 (336)
Small control valve type lead-acid battery	1,229 (1,504)
Total	2,597 (2,908)

* In the table, the first value shows the actual results in FY2013 and the second value in the parenthesis shows the actual results in FY2012. The actual announced results of JBRC, the Battery Association of Japan and Telecommunications Carriers Associations and Communications and Information Network Association of Japan (Mobile recycling network) are added.

Source: Ministry of the Environment

Table C-19 Achievement of recycling of compact rechargeable battery (FY2013)

Product classification	Processing amount (t)	Recycling amount (t)	Recycling rate (%)	Legal targets (%)
Nickel - cadmium battery	713 (764)	515 (555)	72.2 (72.6)	60
Nickel-hydrogen battery	164 (198)	126 (121)	76.6 (76.6)	55
Lithium secondary battery	365 (312)	221 (191)	60.5 (61.1)	30
Small control valve type lead-acid battery	1,229 (1,504)	615 (752)	50.0 (50.0)	50
Total	2,472 (2,777)	1,477 (1,649)		

* In the table, the first value shows the actual results in FY2013 and the second value in the parenthesis shows the actual results in FY2012. The actual announced results of JBRC, Battery Association of Japan and Telecommunications Carriers Associations and Communications and Information Network Association of Japan (Mobile recycling network) are added.

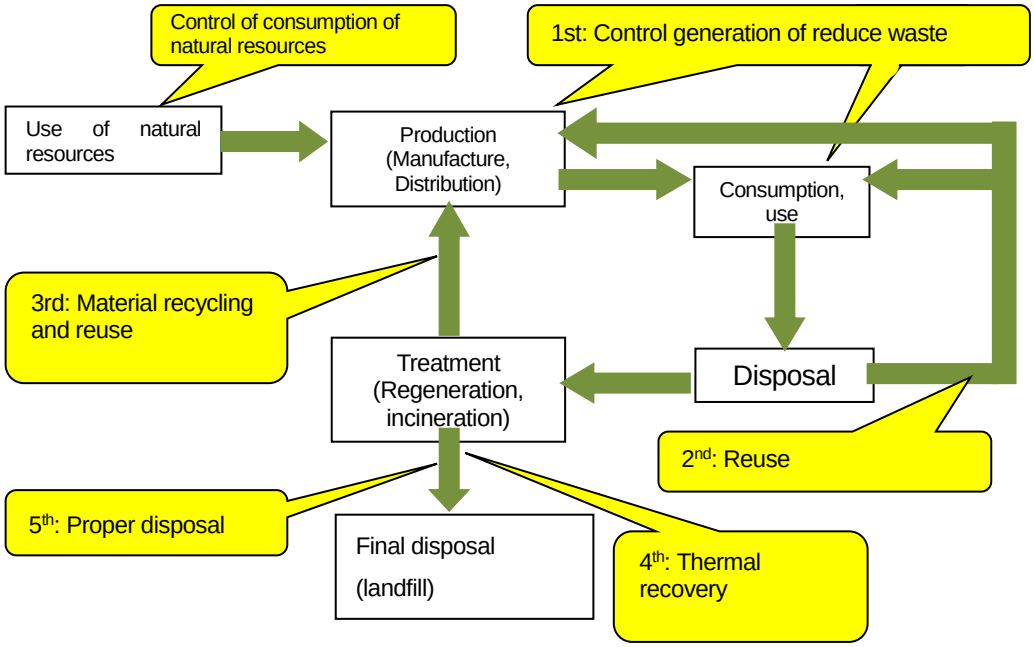
Source: Ministry of the Environment

4. Small electronic devices

The Law for Promotion of Recycling of Small Waste Electrical and Electronic Equipment (Small Home Appliances Recycling Law) was enforced on April 2013. This law has been designed to ensure proper treatment of waste and efficient use of resources based on the situation wherein used small electronic devices are disposed of without recovering the majority of metals used in them and taking measures for promoting recycling of the used small electronic devices. In the basic policy of this act, the targeted amount of recovered recycling was 140,000 tons up to FY2015 and when converted, this denotes 1kg per person per year.

VIII. Existence of Policies, Guidelines, and Regulations Based on the Principle of Extended Producer Responsibility (EPR)

The Basic Law for Establishing a Sound Material-Cycle Society was brought into effect in January 2001. However, in this law, the target articles are taken comprehensively as “waste” regardless of whether they are priced or free of cost, and there are stipulations on achieving control over the products from becoming waste, redefining the generated waste as “recycled resource” by focusing on its usefulness, achieving its proper recyclable use (reuse, recycling, thermal recovery) and on proper disposal of waste that cannot be recycled and reused, thereby realizing “recycling-oriented society” which is “a society that controls consumption of natural resources so as to reduce the burden on the environment to the extent possible” (Figure C-18). While making the “priority” of the process statutory by law, it is also inevitable that the efforts towards actions such as the regulation of the thorough implementation of “disposer’s responsibility” and steps based on the “Extended Producer Responsibility” (implementation of cyclical use, pre-evaluation of products, etc.) should be taken as national measures towards the formation of a recycling-oriented society.



Source: Ministry of the Environment

Figure C-18 Image of Sound Material-Cycle Society

The following rules and regulations shall be included as in the law incorporating Extended Producer Responsibility (Table C-20)

Table C-20 Law Incorporating Extended Producer Responsibility

Name of the Law	Subject Items	Year of Enforcement
Law for Promotion of Effective Utilization of Resources (division pertaining to voluntary recovery and recycling)	Personal computers, compact rechargeable batteries	2001 (2003 for Home PC)
Law for the Promotion of Sorted Collection and Recycling of Containers and Packaging (Containers and Packaging Recycling Law)	Glass bottles, metal cans, paper containers and packages, plastic containers and packages	1997 (glass bottles, metal cans, plastic bottles, paper cups for beverages, cardboards) 2000 (paper cups for beverages, paper containers and packages excluding cardboards, plastic containers and packages excluding pet bottles)
Home Appliance Recycling Law	Air conditioners, TVs, refrigerators, freezers, washing machines, clothes dryers	2001 (2004 for freezers, 2009 for LCD and Plasma TVs, clothes dryers)
End-of Life Vehicles Recycling Law	Used cars	2005
Law for Promotion of Recycling of Small Waste Electrical and Electronic Equipment (Small Home Appliance Recycling Law)	Personal computers, small electronic appliances such as mobile phones	2013

Source: Ministry of the Environment

1. Law for Promotion of Effective Utilization of Resources

The Law for Promotion of Effective Utilization of Resources has been established based on manufacturers' decisions about the obligations and initiatives for reduce, reuse, recycle at each stage from the design and manufacturing stages of the product to recovering and recycling.

The manufacturers and importers of personal computers and compact rechargeable batteries are required to address voluntary recovering and recycling.

2. Law for Promotion of Sorted Collection and Recycling of Containers and Packaging (Container and Packaging Recycling Law)

The Container and Packaging Recycling Law was enacted in June 1995 and has been fully enforced from April 2000 for promoting the effective utilization of resources as well as planning for the reduction of waste concerning 20~30% of the weight of the general waste disposed from homes, and containers and packaging waste which account for about 60% by volume.

As for general wastes, along with the conventional thinking that the municipality is responsible for processing general wastes as the standard, consumers as disposers should also separate their waste, municipalities should carry out a separate collection and operators should conduct recycling.

3. Home Appliances Recycling Law

The Home Appliance Recycling Law was fully enforced in April 2001. The law stipulates that retailers collect and transport specific household appliances, such as air conditioners, TVs (Cathode Ray Tube (CRT), Liquid Crystal Display (LCD), and Plasma display), refrigerators, freezers, washing machines, and clothes dryers. The law enhaces that manufacturers recover the useful parts and materials. The laws requests recycling should be done in the event of the rate (recycling rate) exceeding the standards as stated in the law. The standards for the recycling rate as stated in the law from April 2015 has been increased to 80% for air conditioners, 55% for CRT TV, 74% for LCD and Plasma TVs, 70% for refrigerators and freezers, 82% for washing machines and clothes dryers.

4. End-of Life Vehicles Recycling Law

The End-of Life Vehicles Recycling Law came into effect in January 2005. It stipulated measures to be taken for vehicle manufacturers and concerned operators on custody of ELVs and carrying out proper and smooth recycling. Based on the law, the standard values pertaining to the amount necessary for carrying out recycling (target values) has been set at 50% from FY2010~2014 for Automobile Shredder Residue (shredder dust), 70% every subsequent year from FY2015, 85% for air bag varieties.

With a recycling rate for Automobile Shredder Residue (shredded dust) for FY2013 at 96~97.7%, and a recycling rate for air bags at 94~95%, the target of this law has been achieved.

5. Law for Promotion of Recycling of Small Waste Electrical and Electronic Equipment (Small Home Appliance Recycling Law)

By taking measures to facilitate the recycling of used small electronic devices, etc., the Small Home Appliance Recycling Law helps to achieve the proper processing of waste and effective utilization of resources. To do this, those persons attempting to recycle such used small electronic devices can create a re-commercialization business plan and receive approval from the cabinet minister in-charge, without the need to gain permission from the waste processing industry. This is intended to promote the recycling of items such as used small electronics.

The Basic Policy of Small Home Appliance Recycling Law aims at a recovery recycling implementation amount of 140,000 tons per year by 2015, amounting to 1 kg per person per year.

IX. GHG Emission from Waste Sector

Japan's greenhouse gas inventory has been created at the National Institute for Environmental Studies. According to its database, greenhouse gas emissions derived by Japan's waste sector are as per Table C-21. These emissions are from incineration of waste used as energy and waste associated with energy recovery, which are reported as emissions from the energy field.

Table C-21 Emissions of Greenhouse Gases from the Waste Sector *(Unit: 1000 t-CO2)*

Fiscal year	CO2	CH4	N2O	Total
1990	22,442	12,349	3,154	37,946
1995	27,440	11,515	3,715	42,670
2000	31,061	9,951	3,982	44,994
2005	30,064	8,146	3,807	42,017
2006	28,282	7,800	3,700	39,782
2007	28,839	7,441	3,505	39,785
2008	30,178	7,126	3,470	40,775
2009	26,395	6,764	3,365	36,524
2010	26,957	6,375	3,261	36,592
2011	26,749	6,130	3,276	36,156
2012	28,608	5,887	3,292	37,787
2013	28,264	5,669	3,293	37,225
2014	28,540	5,548	3,293	37,381

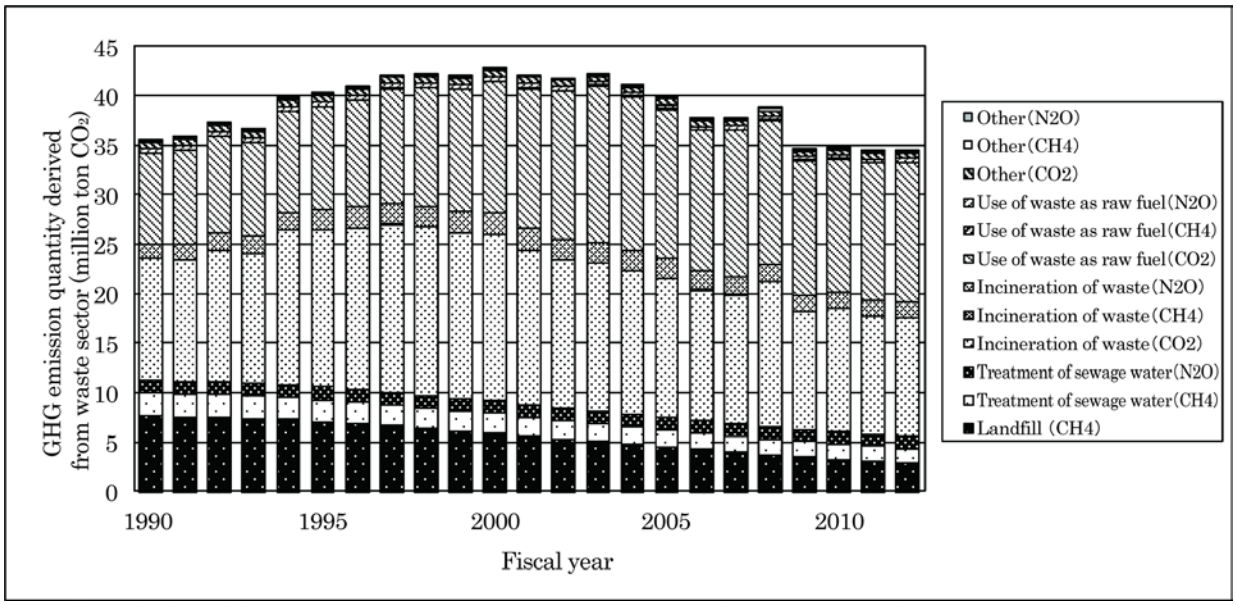
Source: Created based on data of National Institute for Environmental Studies

On the other hand, according to data from the Central Environment Council, greenhouse gases emissions derived from waste came to about 34.5 million tons of CO2 in 2012 (about 42.8 million tons of CO2 in 2000), which is a reduction of about 19 % as compared to that of 2000 (Figure C-19).

Moreover, in 2012, there was a reduction of about 19.7 million tons of greenhouse gas emissions in sectors other than waste. This reduction was achieved by recycling the greenhouse gases emitted as waste into raw fuel or by utilizing it in power generation from waste. This was an estimated increase of about 2.3 times as compared to the year 2000 (Figure C-20).

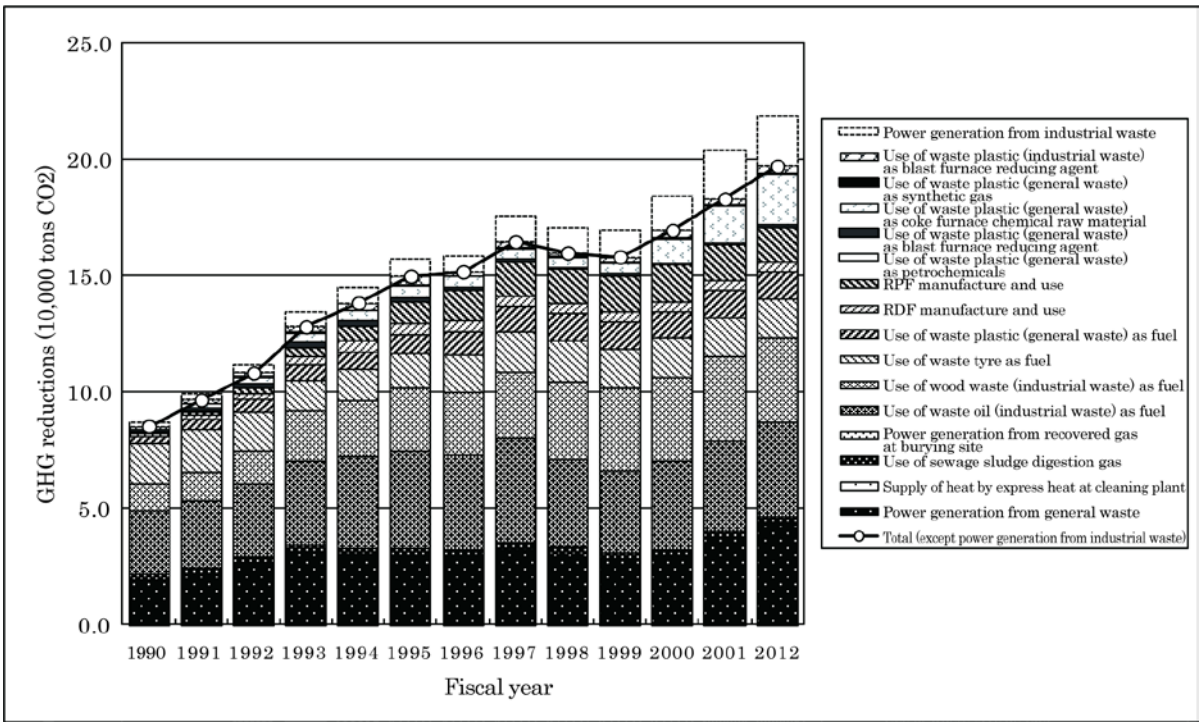
For reducing greenhouse effect gas associated with wastes incineration or land reclamation, the countermeasures below have been taken

- Waste incineration or direct landfill is controlled by promoting generation control, reuse and recycling of waste.
- To control the amount of fossil fuels used, waste power generation and heat utilization or utilization of biomass energy is promoted.
- In principle, direct landfill of organic waste such as wood waste is not carried out on final disposal site, and proper recycling is done.



Source: Central Environment Council

Figure C-19 Transition in Quantity of Emissions of Greenhouse Gases Derived from Waste Sector



Source: Central Environment Council

Figure C-20 Reduction in Greenhouse Gases in other Sectors due to Recycling the Greenhouse Gases Emitted as Waste into Raw fuel or by Utilizing it in Power Generation from Waste

(Note) Power generation from industrial waste duplicates with use of different types of industrial heat and it is difficult to remove this duplicated part. Hence, quantity of reduction due to generation of power from industrial waste is handled as a reference value and it is not included in the total value of reduction in greenhouse gases.

D: EXPERT'S ASSESSMENT ON 3R POLICY IMPLEMENTATION

As described in "C: 3R INDICATORS, IV. Indicator Based on Macro-level Material Flows", targets have been set for three indicators namely "Resource productivity", "Cyclical usage rate" and "Final disposal amount" so that a recycling society can be achieved in Japan.

As long-term indicators, following the enforcement of the Basic Law for establishing a Sound Material-Cycle Society in 2000, steady efforts towards realization of sound material-cycle society have been taken such as a drastic reduction in the amounts for final disposal.

First, the situation regarding the amounts for final disposal amount, one of the three indicators mentioned above, is as follows: 3R policy in Japan is progressing in a parallel manner considering the difficulty in assuring final disposal site as a direct opportunity. Construction of final disposal sites affect the environment irreversibly, and so it is vital to minimize the amount for final disposal in addition to disposing of waste such as hazardous waste in an eco-friendly manner. This amount for final disposal has decreased compared to the past. However, it has remained unchanged during recent years and final disposal quantity must be reduced based on thorough efforts being taken for 3R in the future.

Resource productivity, another indicator mentioned above, is an important one from the viewpoint of effective utilization of resources. However, there has been a trend of increasing resource productivity up to now. A reduction in domestic input quantity of non-metal mineral natural resources based on a reduction in large-scale public utilities or changes in industry structure can be given as examples. This resource productivity has also remained unchanged in recent years and what would be desirable in the future is an improvement in resource productivity by promoting more effective utilization of resources.

As for the other indicator, the cyclical usage rate has also been increasing for a long period against a background of reduction in input quantity of natural resources. However, it has remained unchanged recently. The proportion of recycling of generated waste showed an increase for a long period with a value of approximately 44% in 2012, but this has remained unchanged during recent years. There has been an increase in the utilization rate based on TMR (Total Material Requirement) (quantity including earth, sand and ore generated when collecting resources) resource utilization ratio of metal sources considering the hidden flow that focuses on "quality" and active recycling of big metals in the hidden flow is desired in future.

Besides this, it is also important to control the generation of waste which is a target in the Basic Policy based on the Waste Management Law. Efforts to reduce and reuse are slow as compared to efforts put in for recycling among 3R, but these efforts must be strengthened.

In addition to this, one of the pillars of the policy is to make efforts increase awareness on safety and recovery for citizens following the Great East Japan Earthquake and accident of Tokyo Electric Power's Fukushima I Nuclear Power Plant in Japan and to promote international cooperation for 3R.

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