

WASTE MANAGEMENT

&

3R (Reduce, Reuse, Recycle) POLICIES

JAPAN 2007

CLEAN JAPAN CENTER

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Contents

Chapter 1: Waste Management and 3R (Reduce, Reuse, Recycle) Policies in Japan	1
1. Changes in Waste Management and 3R Policies in Japan	1
2. Legislative System relating to Waste Management and 3R Policies	2
3. Fundamental Law for Establishing a Sound Material-Cycle Society	3
4. Waste Management Law	4
(1) Outline of the Law	
(2) Definitions of Waste	
(3) Intermediate Treatment and Final Disposal of Waste	
5. Law for Promotion of Effective Utilization of Resources	11
6. Containers and Packaging Recycling Law	13
(1) Outline of the Law	
(2) Current Status of Recycling in Accordance with the Containers and Packaging Recycling Law	
7. Home Appliance Recycling Law	15
(1) Outline of the Law	
(2) Current Status of Recycling of Home Appliances	
8. Food Recycling Law	17
(1) Outline of the Law	
(2) Current Status of Minimization, Reduction, and Recycling of Food Waste	
9. Construction Material Recycling Law	19
(1) Outline of the Law	
(2) Current Status of Generation and Recycling of Construction Waste	
10. End-of-life Vehicle Recycling Law	21
(1) Outline of the Law	
(2) Current Status of Vehicle Recycling	
11. Green Purchasing Law	23
Chapter 2: Overview of Generation, Recycling, and Final Disposal of Waste in Japan	25
1. Current Status of Industrial Waste	25
(1) Changes in the Amount of Generation, Recycling, Reduction, and Final Disposal	
(2) Generation Volume by Industry and Category	
(3) Processing flow	
(4) Rate of Recycling, Reduction, and Final Disposal of Industrial Waste by Category	
(5) Current Status of Intermediate Treatment Facilities and Final Disposal Sites for Industrial Waste	
2. Current Status of Municipal Solid Waste (MSW)	30
(1) Changes in the Total Amount of Refuse Generation	
(2) Refuse Disposal Flow	
(3) Remaining Capacity and Remaining Lifetime of MSW (Refuse) Final Disposal Sites.	

Chapter 1: Waste Management and 3R (Reduce, Reuse, Recycle) Policies in Japan

1. Changes in Waste Management and 3R Policies in Japan

● Enactment of the Waste Management Law

The Waste Management Law was enacted in 1970, when Japan was enjoying a period of rapid economic growth and was being driven by necessity to deal with problems of waste, which continued to increase as well as became diversified and difficult to dispose.

In addition to refuse and human waste, which had been defined as “filthy matters” in the conventional law, this law defined unnecessary matters in solid or liquid state, generated from human activities, including by-products and emission matters arising following business activities, as “waste”. It aimed to systemize the waste management for the first time by stipulating the responsibilities of concerned parties and disposal methods according to waste category in order to realize proper treatment and disposal of waste.



● Awareness of the importance of recycling

The 1973 oil crisis reminded us that Japan was poor in natural resources, and impressed us on the necessity of proper waste treatment and disposal as well as effective use of waste as resources and energy.



● Consolidation of the legislative system for the 3R promotion

In 1990s, people have come to realize the significance of recycling from the standpoint of the response to global environmental issues and sustainable development. In 1991, the Japan’s first law for the promotion of recycling, “Law for the Promotion of Utilization of Recycled Resources (present Law for Promotion of Effective Utilization of Resources)” was enacted, and the Waste Management Law was revised by adding the phrase the “generation reduction, sorting, and recycling of waste” to its purpose.

The role of waste-related measures has also been reviewed. The conventional waste-related measures had been focused on the reduction of generated waste in the process of the intermediate treatment, including recycling and incineration, etc. However, it came to be considered that it was not enough to mitigate the impact of huge quantities of waste and promote sustainable development by minimizing resource loading.

As a result, it was proposed that future measures against waste should be implemented to ensure appropriate disposal in order of priority of 3Rs as follows: ①Reduce generation of waste ②Reuse used products and parts ③Recycle waste as raw materials or energy sources.

In response, various laws were enacted to promote 3R measures according to the characteristics of each product and waste, including the Containers and Packaging Recycling Law, the Home Appliance Recycling Law, the Food Recycling Law, the Construction Waste Recycling Law, and the End-of-life Vehicle Recycling Law. Fundamental Law for Establishing a Sound Material-Cycle Society, which aimed to establish a basic orientation and framework for 3R measures in each law of the above, was put in force in 2000.

In addition, the Law for the Promotion of Utilization of Recycled Resources with stipulations on the responsibilities of businesses and other concerned parties for promotion of recycling was revised as the Law for Promotion of Effective Utilization of Resources with stipulations on their responsibilities for 3R promotion.

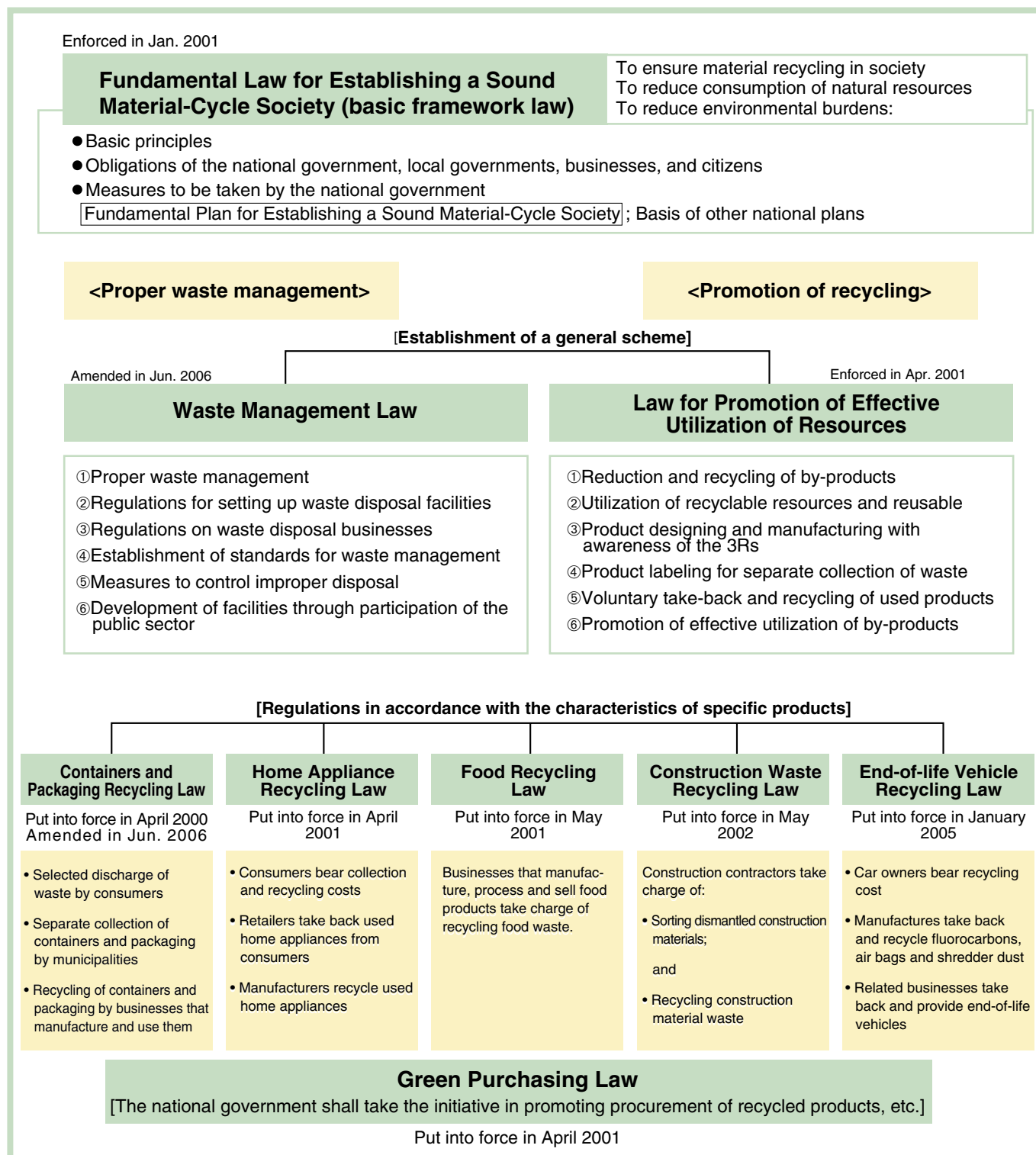
Table 1 Examples of concrete efforts for 3R promotion

Reduce	<ul style="list-style-type: none"> • Reduction of used products by promoting downsizing, weight saving, and improved endurance of products • Reduction of byproducts generated from used products
Reuse	<ul style="list-style-type: none"> • Development of reusable products • Establishment of a system to collect and reuse used products voluntarily • Promotion of utilization of returnable containers
Recycle	<ul style="list-style-type: none"> • Promotion of sorted collection • Development of recyclable products • Promotion of utilization of recycled raw materials • Promotion of effective utilization of byproducts

2. Legislative System for Waste Management and 3R Policies

As stated above, various laws are enacted for the purpose of promoting appropriate waste treatment and 3R measures in Japan. Figure 1 shows each law's role and relations between each law.

Figure 1 Legislative System for Promoting the Creation of a 3R-Oriented Society

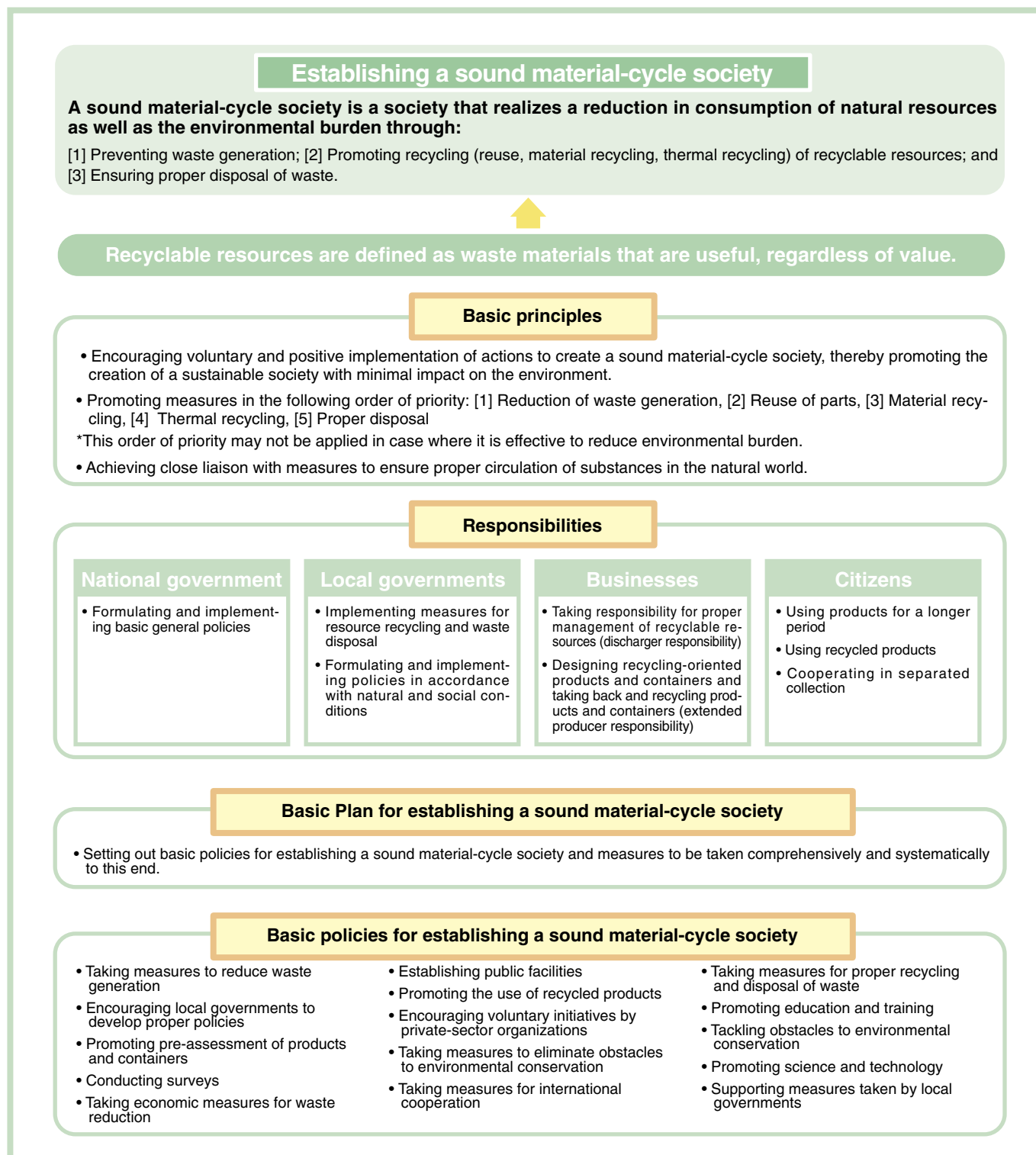


(Source: "Towards a 3R-Oriented, Sustainable Society: Legislation and Trends 2007" by the Ministry of Economy, Trade and Industry)

3. Fundamental Law for Establishing a Sound Material-Cycle Society

The law aims to establish a recycling-based society which realize a reduction in consumption of natural resources and environmental burden to a maximum extent by cyclical use of resources, and provides a basic framework to promote waste treatment and 3R policies comprehensively.

Figure 2 Framework of Fundamental Law for Establishing a Sound Material-Cycle Society



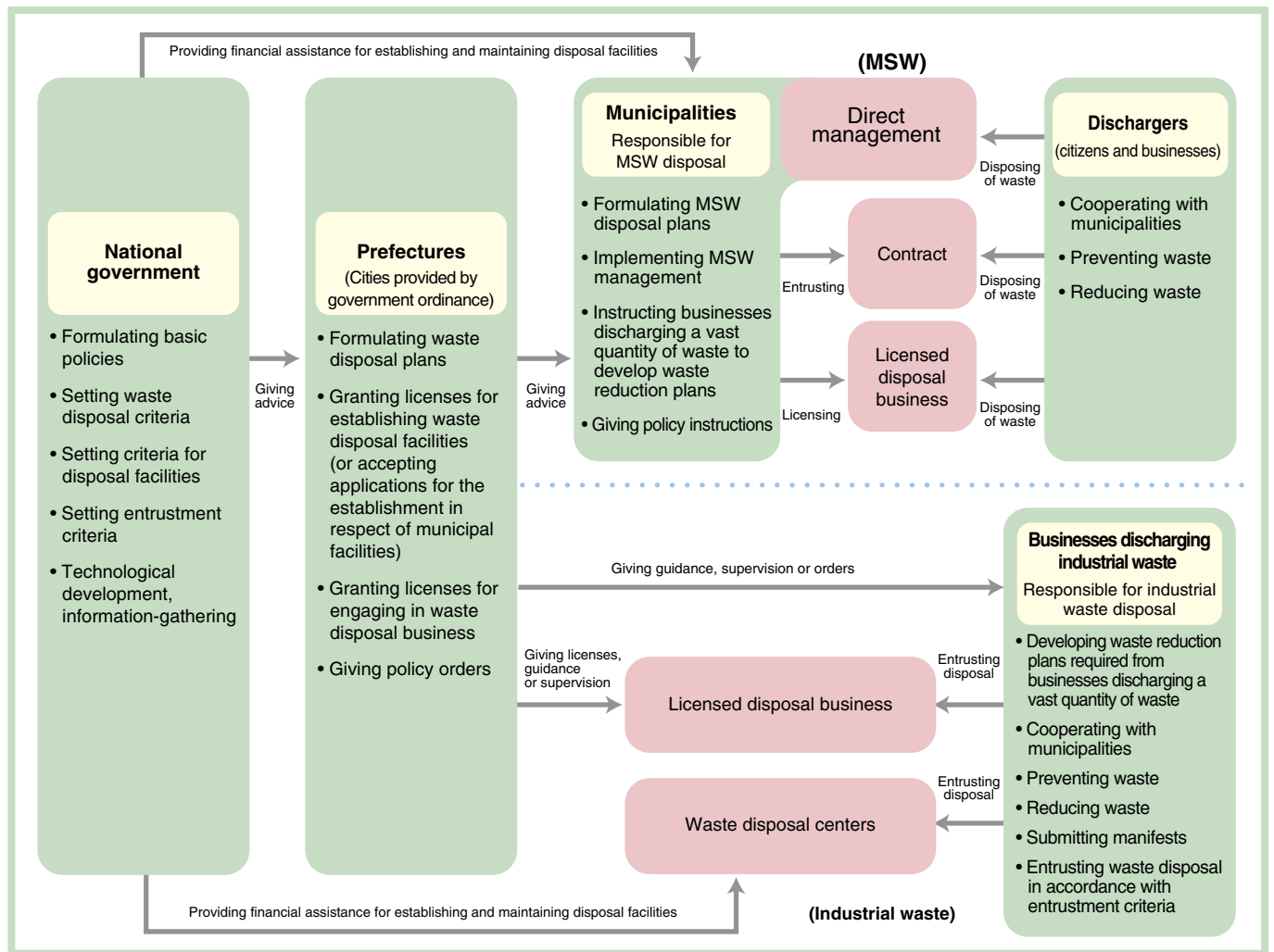
(Source: “Towards a 3R-Oriented, Sustainable Society: Legislation and Trends 2007” by the Ministry of Economy, Trade and Industry)

4. Waste Management Law

(1) Outline of the Law

The law aims to promote conservation of living environment and improvement in public health through waste minimization and proper disposal, and stipulates definitions of waste, disposal methods, and responsibilities of the national government, local governments and waste dischargers (citizens and businesses) (Figure 3).

Figure 3 Flow under the Waste Management Law



(Source: Ministry of Environment)

① Responsibilities of the national government

Formulation of basic policies for waste disposal, establishment of criteria for waste disposal, disposal facilities, and entrustment, technological development and gathering of information on waste, etc.

② Responsibilities of local governments

Prefectures and cities with public health centers: Formulation of waste disposal plans, permission of the establishment of waste disposal facilities, license of industrial-waste disposal business, and implementation of orders, etc.

Municipalities: Formulation of MSW disposal plans, disposal of MSW, license of MSW collection and transport business, instruction for waste reduction plans of high-volume waste dischargers, and implementation of orders, etc.

③ Responsibilities of citizens

Cooperation for reduction and proper disposal of waste with the national government and municipalities by promoting waste minimization and recycling

④ Responsibilities of businesses

Proper disposal of waste generated from business activities with self-responsibility (by conducting disposal in accordance with disposal criteria, disposal entrustment in accordance with entrustment criteria, and management based on the manifest, etc.), preparation of waste reduction plans for high-volume waste dischargers, and waste minimization, etc.

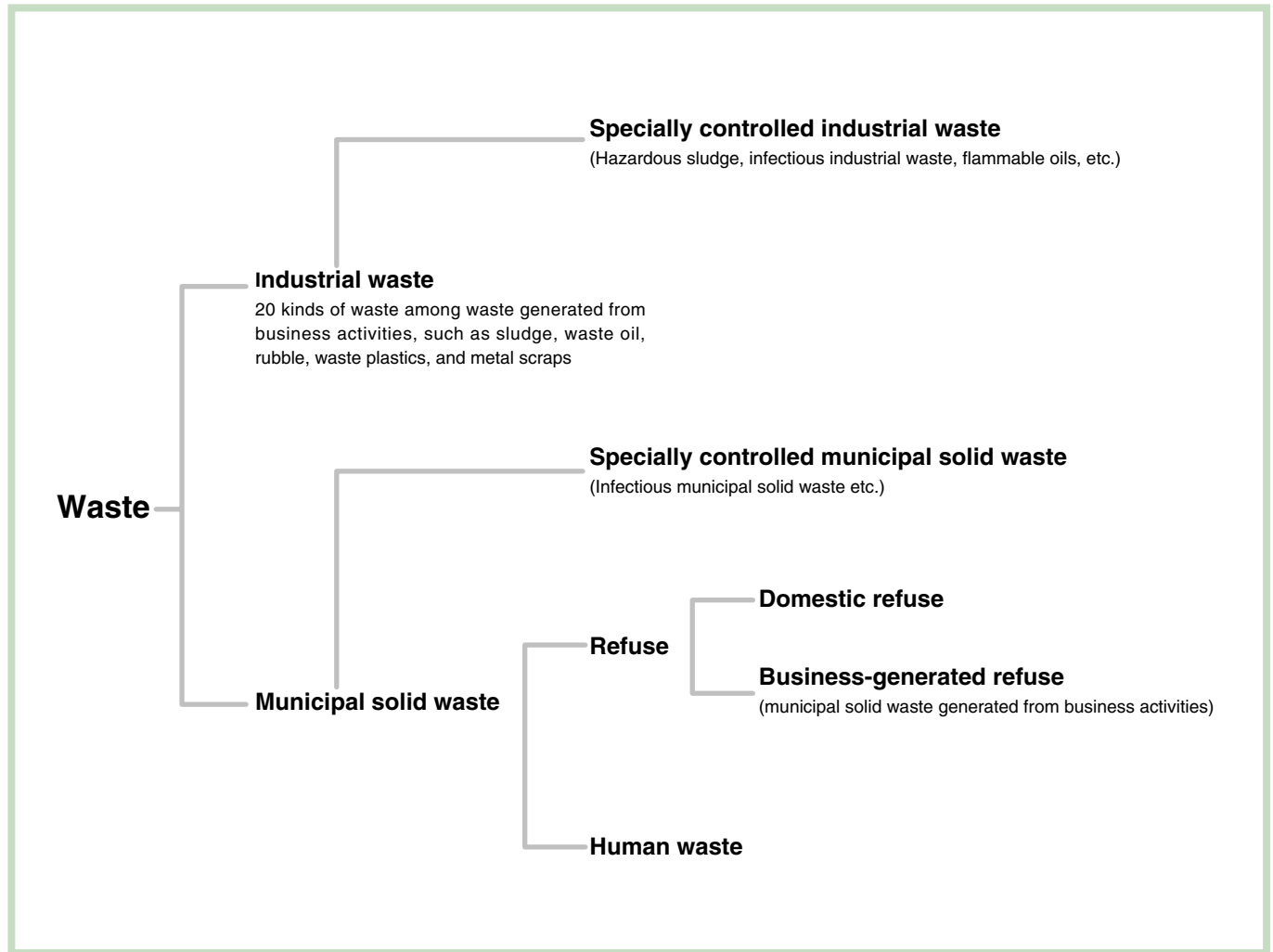
(2) Definitions of Waste

① What is waste?

In the Waste Management Law, waste is defined as things that become useless because they can no longer be used by their owners or sold to others for value, including refuse, bulky refuse, burnt residue, sludge, excreta, and other solid or liquid waste materials or unnecessary things. Radioactive waste and waste polluted by radioactivity, which are subject to the other law, are excluded.

Waste is divided broadly into two categories: industrial waste and municipal solid waste. “Specially controlled industrial waste” and “specially controlled municipal solid waste” refer to those which are explosive, toxic, infectious, or of a nature otherwise harmful to human health and the living environment. They should be strictly managed in all process from collection to disposal.

Figure 4 Classification of waste



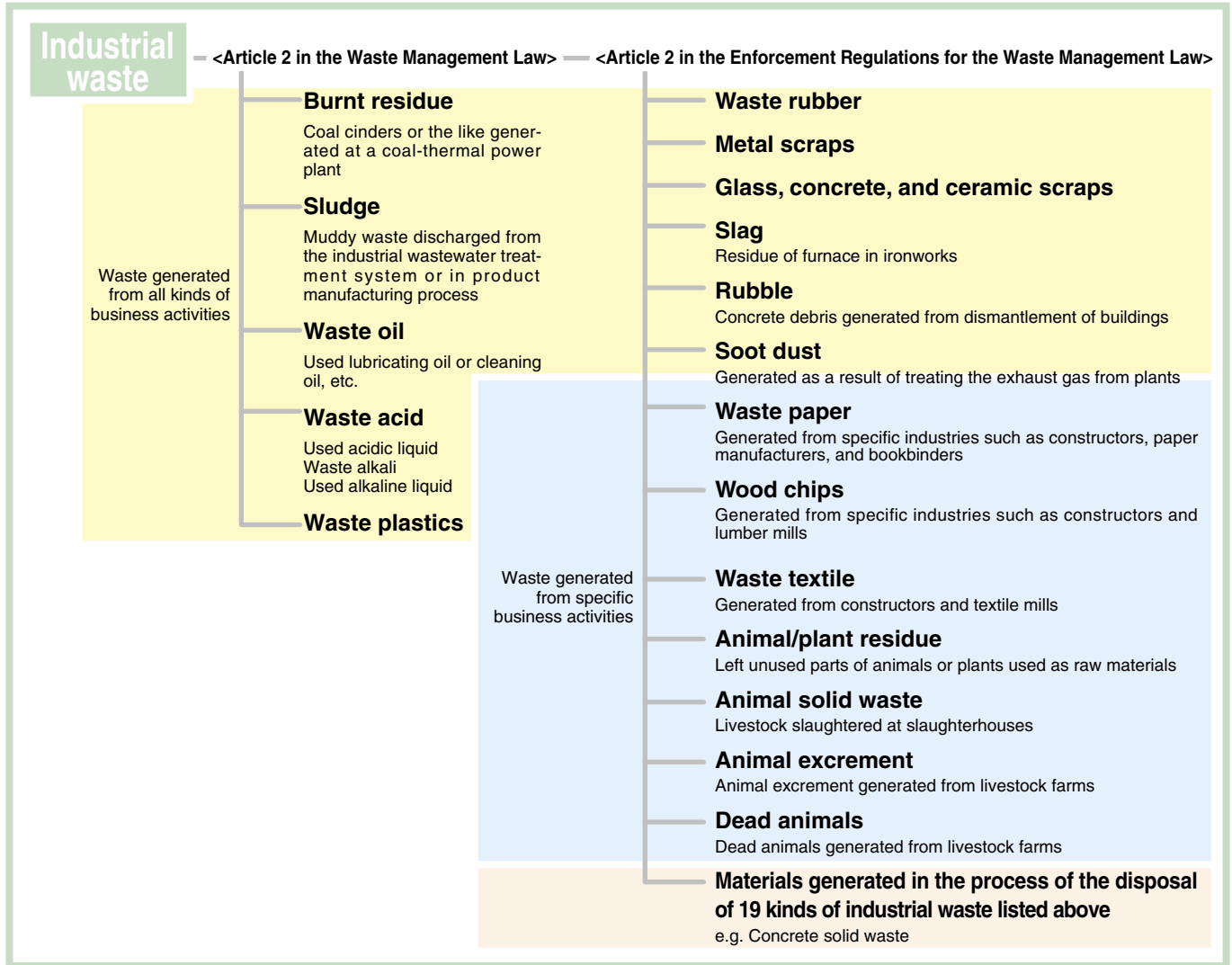
(Source: Website of the Department of Environment and Lifestyle, Yamaguchi Prefecture)

② Industrial waste

Industrial waste refers to 20 kinds of waste among waste generated from business activities, as shown in Figure 5. It should be properly disposed under waste dischargers' own responsibility.

If waste dischargers implement the disposal of industrial waste by their own, they are obliged to dispose in compliance with the disposal criteria stipulated in the Waste Management Law. If waste dischargers entrust the disposal of industrial waste, they are obliged to conclude an entrustment contract of collection, transport, intermediate treatment, and final disposal in compliance with entrustment criteria stipulated in the Waste Management Law.

Figure 5 Classification of industrial waste



③ Municipal solid waste

Municipal solid waste refers to waste other than industrial waste, and is classified into domestic refuse mainly generated from households, refuse through industrial activities generated from business offices and restaurants, and human waste. (Human waste is not mentioned in this book.)

The Waste Management Law stipulates the responsibilities of municipalities for the disposal of municipal solid waste.

Figure 6 Classification of municipal solid waste



(3) Intermediate Treatment and Final Disposal of Waste

① Intermediate treatment

Intermediate treatment is a process of reducing in size and weight, detoxifying, and stabilizing waste before recycling or final disposal. Table 2 shows examples of intermediate treatment and intermediate treatment facilities.

Table 2 Examples of intermediate treatment and intermediate treatment facilities

Reduction in size and weight Reduce waste in size and weight.	<ul style="list-style-type: none"> • Wood chips and rubble shredding facilities • Combustible waste incineration facilities • Sludge dehydration facilities
Detoxification Remove/decompose harmful substances, substances that have a considerable impact on environment, or pathogens contained in waste, or make waste environmentally friendly.	<ul style="list-style-type: none"> • Asbestos waste melt-solidification facilities • Infectious waste incineration facilities • PCB waste decomposition facilities
Stabilization Stabilize waste physically and chemically.	<ul style="list-style-type: none"> • Waste acid and alkali neutralization processing facilities • Fly ash and dust solidification processing facilities
Treatment for recycling Change waste into recyclable forms as raw materials and energy sources, or separate/extract useful substances from waste.	<ul style="list-style-type: none"> • Glass bottle color sorting facilities • Aluminum and steel can magnetic separation facilities • Food waste composting facilities

② Incineration disposal

In Japan, it is a characteristic that waste undergoing intermediate treatment is mostly disposed by incineration. In particular, 40.99 million tons, 81% of the total amount of municipal solid waste (refuse) is disposed by incineration.

As of the end of FY 2004, the number of refuse incineration facilities is 1,374, and the total disposal capacity is 195,952 tons per day. Table 3 shows the number of refuse incineration facilities by type and disposal capacity.

Table 3 Number of refuse incineration facilities by type and disposal capacity (as of the end of FY 2004)

Facility type	Incineration (except direct melting, gasification melting, and re- forming)	Direct melting	Gasification melting/ reforming	Total
Number of facilities	1,295 (1,329)	25 (21)	54 (46)	1,374 (1,396)
Disposal capacity (unit: t/day)	184,614 (184,195)	3,532 (3,102)	7,806 (6,559)	195,952 (193,856)

Value in parenthesis is based on data as of FY 2003.
(Surveyed by the Ministry of the Environment)

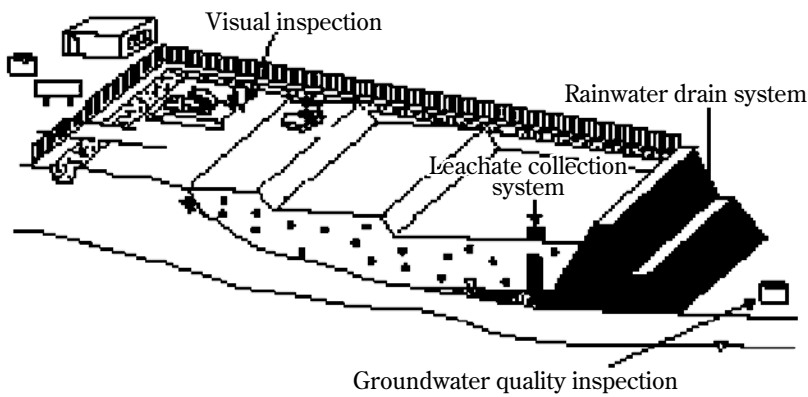
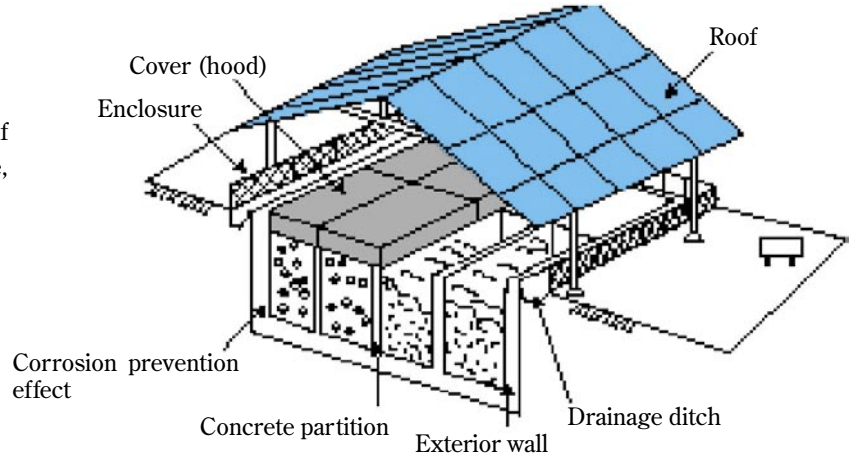
③ Final disposal

Final disposal refers to landfill disposal or sea dumping disposal of waste. In principle, waste should be landfilled in final disposal facilities which have technical guidelines and maintenance management criteria. There are three types of final disposal facilities according to the type of waste to be landfilled as follows:

Figure 7 Types of final disposal facilities and examples of facility structures

Strictly controlled landfill site:

Industrial waste containing excessive levels of hazardous substances, such as burnt residue, soot dust, sludge, and slag

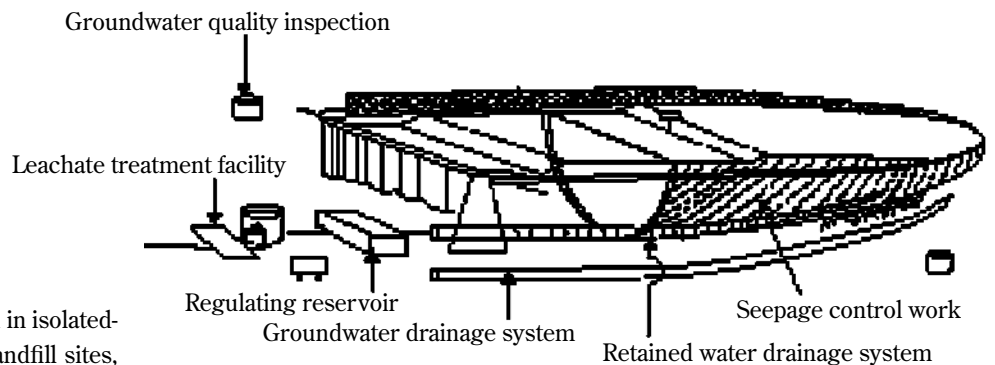


Inert waste landfill site:

Waste plastics, waste rubber, metal scraps, grass scraps, concrete scraps, and ceramic scraps

Controlled landfill site:

Industrial waste that is not disposed in isolated-type landfill sites and inert waste landfill sites, and municipal solid waste (A leachate treatment facility should be installed.)



④ Development of industrial waste disposal facilities through participation of the public sector

● Need for participation of the public sector

In principle, industrial waste disposal facilities should be established by waste-discharging businesses and waste disposers, however, some of them cannot independently develop proper disposal facilities. Consequently, the public sector has recently participated in developing disposal facilities in order to ensure safe and secure industrial waste disposal by utilizing creditworthiness of the public sectors as well as know-how and human resources of private sectors.

Table 4 shows the forms of participation of the public sector.

Table 4 Forms of the development of industrial waste disposal facilities through participation of the private sector

Form of participation of public sector		Examples
1. Management participation		Funding of business entities
2. Economic instruments (hardware support)	Support for procurement of sites	Free provision, lease, and sale of public use land
	Subsidies	Subsidies, low-interest loans, and debt guarantees for the development of facilities
3. Regulations, instruction, and guidance policy (software support)	Explanation to local communities	Explanatory meeting to obtain the understanding of local people over a site
	Application procedures etc.	Assessment support and service for application to the City Planning Council, etc.
	Others	Creation of an environment in which waste is gathered in safe and secure disposal facilities, support for distribution of recycled products, cooperation for ensuring residue disposal places, and provision of information, etc.

● Waste disposal center system

One of systems for the development of disposal facilities through participation of the private sector is the waste disposal center system, in which the national government designates a public interest corporation established for the purpose of disposing waste as a waste disposal center. Designated waste disposal centers can receive preferential treatment concerning finance and taxes. The system aims to promote proper waste treatment and ensure wide-area disposal.

Though the target organizations used to be limited to public interest corporations, they now include joint-stock corporations co-financed by the national government, a local government, or a private company, as well as PFI (private finance initiative) contractors under a revision of the Waste Management Law in 2000. The number of waste disposal centers had been limited to only one center in each prefecture, however, there is no longer restriction under the above revision. Table 5 is a list of corporations designated as waste disposal centers as of December 2006.

In Japan, there are few cases of industrial waste disposal participated by the private sector, and it is conducted mainly by private sectors.

Table 5 Corporations designated as waste disposal centers

Prefecture	Corporate name	Development status of the facility
Iwate	Clean Iwate Agency	A controlled landfill site, an incineration plant, and a shredding facility are in operation. (From September 1995)
Oita	Oita Prefecture Environmental Conservation Center	A construction and demolition debris processing facility and an asphalt recycling facility are in operation. (From November 1994)
Nagano	Nagano Prefecture Waste Processing Agency	A final disposal site is scheduled to be constructed.
Ehime	Ehime Prefecture Waste Disposal Center	An incineration plant is in operation. (From January 2000)
Kagawa	Kagawa Prefecture Environmental Conservation Public Corporation	A plan to construct a disposal facility etc. is under consideration.
Niigata	Niigata Prefectural Environmental Conservation Agency	An incineration plant and a final disposal site are in operation. (From April 1999)
Kochi	Eco-cycle Kochi	An incineration plant and a final disposal site are scheduled to be constructed.
Hyogo	Hyogo Prefectural Environmental Create Center	A final disposal site is in operation. (From October 2001)
Mie	Mie Prefectural Environmental Conservation Agency	An incineration plant is in operation. (From December 2002)
Kanagawa	Kanagawa Waste Processing Agency	An incineration plant is in operation. (From June 2001)
Miyazaki	Miyazaki Prefecture Environmental Conservation Public Corporation	A final disposal site and an incineration plant are in operation. (From November 2005)
Shimane	Shimane Prefectural Environmental Management Center	A final disposal site is in operation. (From April 2002)
Ibaraki	Ibaraki Prefectural Environmental Conservation Agency	A final disposal site and an incineration plant are in operation. (From August 2005)
Saga	Saga Prefecture Environment Clean Foundation	A final disposal site and an incineration plant, etc. are under construction. (From FY 2003)
Yamanashi	Yamanashi Prefecture Environmental Management Agency	A final disposal site is scheduled to be constructed.
Shiga	Shiga Prefecture Environmental Project Public Corporation	A final disposal site is under construction from FY 2005, and an incineration plant is scheduled to be constructed.
Wakayama	Kinan Environmental Public Service Corporation	A final disposal site is scheduled to be constructed.
Aichi	Aichi Coastal Environmental Management Center	A final disposal site is scheduled to be constructed.
Iwate	Iwate Kempoku Clean	An incineration plant is scheduled to be constructed.

⑤ Storage and treatment of PCB waste

In Japan, PCB waste is designated as a specially-controlled waste because it is identified as carcinogenic. Since 1975 when PCB's manufacturing, import, and use were prohibited, efforts for the establishment of a treatment system of PCB waste have been made. However, any treatment facility had not been constructed for thirty years, during which businesses have been keeping PCB waste. Because of concern about loss and leakage of PCB waste with the prolonged storage, the Law Concerning Special Measures against PCB Waste was enacted for the purpose of early realization of proper treatment in 2001. It stipulates the completion of disposal of PCB waste by July 2016. The outline of the law is as follows:

- Businesses that store PCB waste are obliged to dispose PCB waste within a fixed time limit and submit an annual report on storage state of PCB waste.
- The Japan Environmental Safety Corporation (JESCO) develops PCB waste treatment facilities and conducts PCB waste treatment programs.
- The PCB waste treatment fund is established in order to alleviate the burden of expenses for the treatment on small-and-medium-sized enterprises.

PCB treatment is fully in progress: JESCO treatment facilities, which were established in accordance with the Law Concerning Special Measures against PCB Waste, started operations at four sites, and electric power companies and other businesses started the processing of low-concentrated PCB contaminated substances.

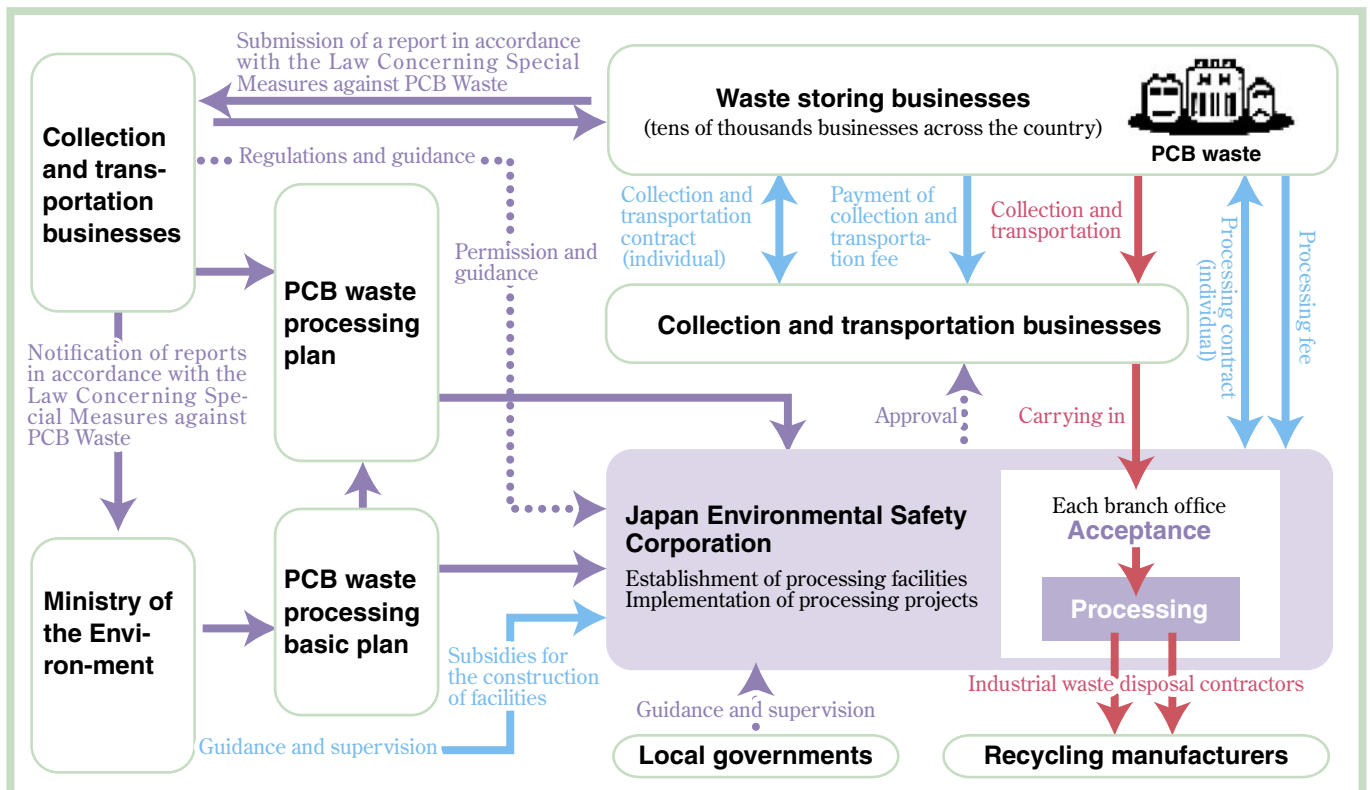
Table 6 State of stored PCB waste (as of March 31, 2004)

Type of waste	Number of waste storing businesses	Storage amount
High voltage transformer	2,688	18,687 units
High pressure condenser	45,533	250,739 units
Low voltage transformer	427	35,949 units
Low pressure condenser	3,520	1,836,705 units
Pole-mounted transformer	153	2,146,581 units
Stabilizer	12,358	5,551,983 pieces
PCB	206	53 tons
Oil containing PCB	1,060	176,489 tons
Pressure sensitive copying paper	416	668 tons
Waste cloth	886	225 tons
Sludge	179	15,411 tons
Other equipment	1,819	114,915 units

Note: With regard to waste that cannot be indicated in number or weight because they are collectively stored in containers, only the number of waste storing businesses is counted. The quantity of PCB, oil containing PCB, pressure sensitive copying paper, waste cloth, and sludge that are measured in volume is converted into weight at 1 liter to 1 kg.

(Source: Ministry of the Environment)

Figure 8 Flow of PCB waste processing in accordance with the Law Concerning Special Measures against PCB Waste



(Source: Website of the Japan Environmental Safety Corporation)

5. Law for Promotion of Effective Utilization of Resources

The law aims for comprehensive promotion of 3R policies. It provides government ordinances for designate industries and products that require 3R-related measures, and ministry ordinances for measures to be taken voluntarily by businesses.

It stipulates 3R measures against byproducts, 3R consideration in production designing and production stages, labeling for sorted collection, and development of a system for self-collection and recycling by manufacturers, with regard to the following industries and items shown in Table 7.

A system to disclose information on substances contained in products, such as television sets, air conditioners, refrigerators, washing machines, microwave ovens, clothes driers, and personal computers, was adopted in July 2006.*

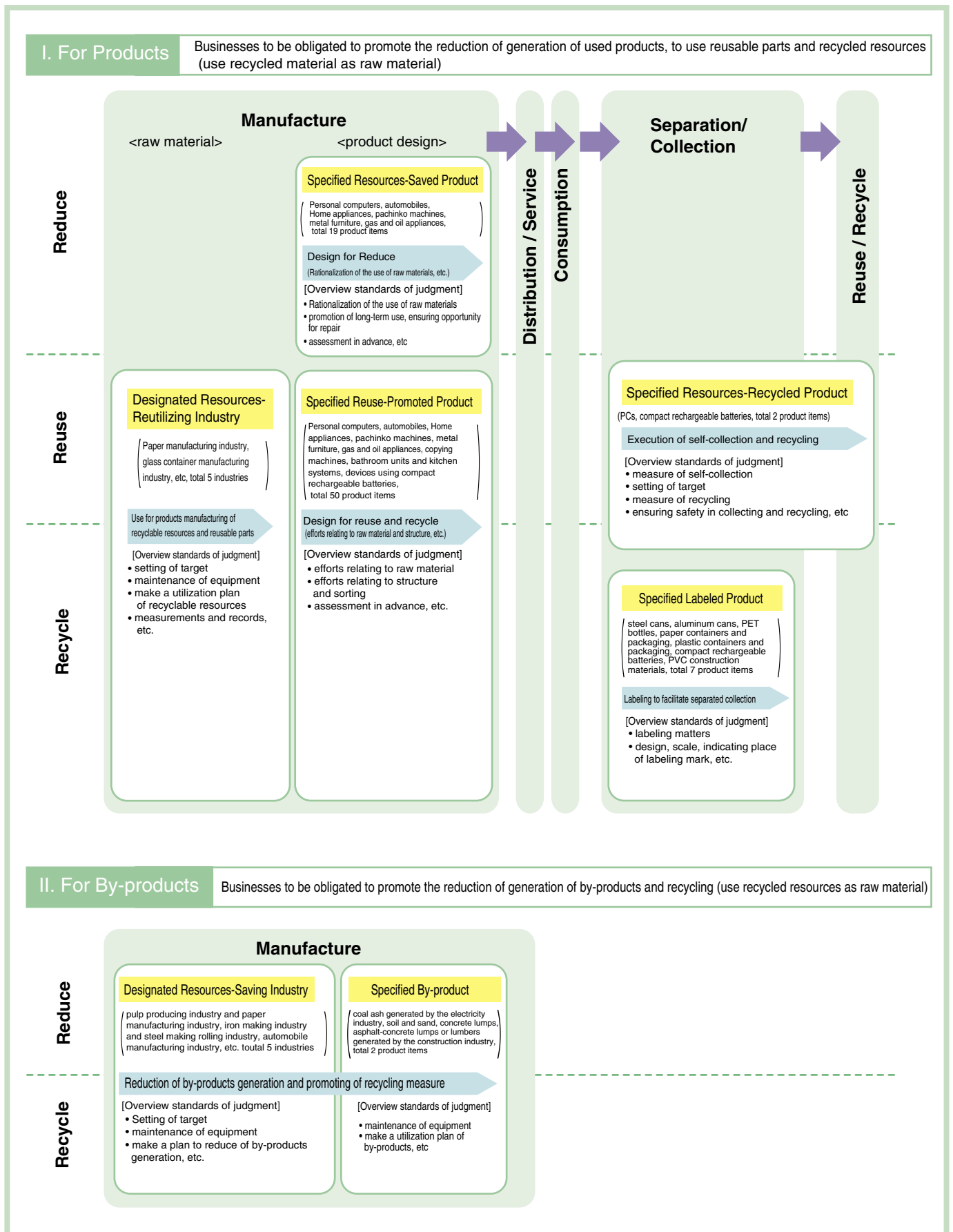
* In the event that any of the above products contains lead and its compound, mercury and its compound, hexavalent chromium, cadmium and its compound, polybromo biphenyl, or polybromo diphenyl ether, it should be added a mark (except when impossible to remove them technically).

Table 7 List of industries and products designated by the Law for Promotion of Effective Utilization of Resources

<p>Specified resource-saving industries Businesses in industries listed on the right column are required to reduce generation of by-products and promote use as recyclable resources.</p>	<ul style="list-style-type: none"> • Pulp and paper manufacturing • Inorganic chemical manufacturing (excluding salt manufacturing) and organic chemical manufacturing • Iron-making and steel-making/rolling • Primary copper smelting/refining • Automobile manufacturing (including motorized bicycle manufacturing)
<p>Specified resource-reusing industries Businesses in industries listed on the right column are required to use recyclable resources and parts</p>	<ul style="list-style-type: none"> • Paper manufacturing • Glass container manufacturing • Construction • Rigid PVC pipes and pipe fitting manufacturing • Copier manufacturing
<p>Designated resource-saved products Manufacturers of products (including repairers for automobiles) listed on the right column are required to ensure rational use of raw materials, prolong product life and reduce generation of used products.</p>	<ul style="list-style-type: none"> • Automobiles • Home appliances (television sets, air conditioners, refrigerators, washing machines, microwave ovens, clothes dryers) • Personal computers • Pachinko machines (including rotary type) • Metal furniture (metal cupboards, shelves, office desks and swivel chairs) • Gas and oil appliances (oil heaters, gas cookers with grills, switch-on gas water heaters, bath heaters with gas burners, oil-fired water heaters)
<p>Designated reuse-promoted products Manufacturers of products (including repairers for automobiles) listed on the right column are required to promote use of recyclable resources and parts (by designing and manufacturing products that can be easily reused or recycled).</p>	<ul style="list-style-type: none"> • Automobiles • Home appliances (television sets, air conditioners, refrigerators, washing machines, microwave ovens, clothes dryers) • Personal computers • Pachinko machines (including rotary type) • Copiers • Metal furniture (metal cupboards, shelves, office desks and swivel chairs) • Gas and oil appliances (oil heaters, gas cookers with grills, switch-on gas water heaters, bath heaters with gas burners, oil-fired water heaters) • Bathroom units, integrated kitchen systems • Devices using compact rechargeable batteries (28 items including electric power tools and cordless phones)
<p>Designated labeled products Manufacturers and importers of products listed on the right column are required to conduct labeling to facilitate sorted collection.</p>	<ul style="list-style-type: none"> • Steel cans, aluminum cans • PET bottles • Compact rechargeable batteries (sealed nickel-cadmium batteries, sealed nickel-metal-hydride batteries, lithium batteries, compact sealed lead batteries) • PCV construction materials (rigid PVC pipes, gutters and window frames, PVC flooring and wallpaper) • Paper containers and packaging, plastic containers and packaging
<p>Designated resource-recycled products Manufacturers and importers* of products listed on the right column are required to promote self-collection and recycling.</p>	<ul style="list-style-type: none"> • Personal computers (including CRTs and liquid crystal displays) • Compact rechargeable batteries (sealed nickel-cadmium batteries, sealed nickel-metal-hydride batteries, lithium batteries, compact sealed lead batteries) <p>* Including manufacturers and importers of products using a sealed battery as a component.</p>
<p>Designated byproducts Businesses in industries listed on the right column are required to promote use of the listed byproducts as recycled resources.</p>	<ul style="list-style-type: none"> • Coal ash generated by the electricity industry • Soil and sand, concrete and asphalt mass, and lumber generated by the construction industry

(Sorted out based on the website of the Ministry of Environment)

Figure 9 Scheme of the Law



6. Containers and Packaging Recycling Law

(1) Outline of the Law

The law aims to promote recycling of waste containers and packaging, which accounts for 60 % (volume ratio) of domestic waste.

① Containers and packaging subject to the law

Glass containers, paper containers, plastic containers, PET bottles, steel cans, aluminum cans, corrugated boards, and paper cartons, etc. which are discharged from households

② Responsibilities of the parties concerned

- Consumers

Consumers should sort and discharge waste containers and packaging in accordance with sorted collection standards stipulated by municipalities.

- Municipalities

Municipalities should carry out sorted collection of waste containers and packaging discharged from households.

- Specified businesses

Specified businesses (manufacturers of containers and distributors using containers/packaging when selling products etc.) should recycle according to the volume of produced, used, or imported containers/packaging. (recycled by themselves, or entrusted to the designated corporation)

* Specified businesses are currently exempt from obligations to recycle steel cans, aluminum cans, corrugated boards, and paper cartons.

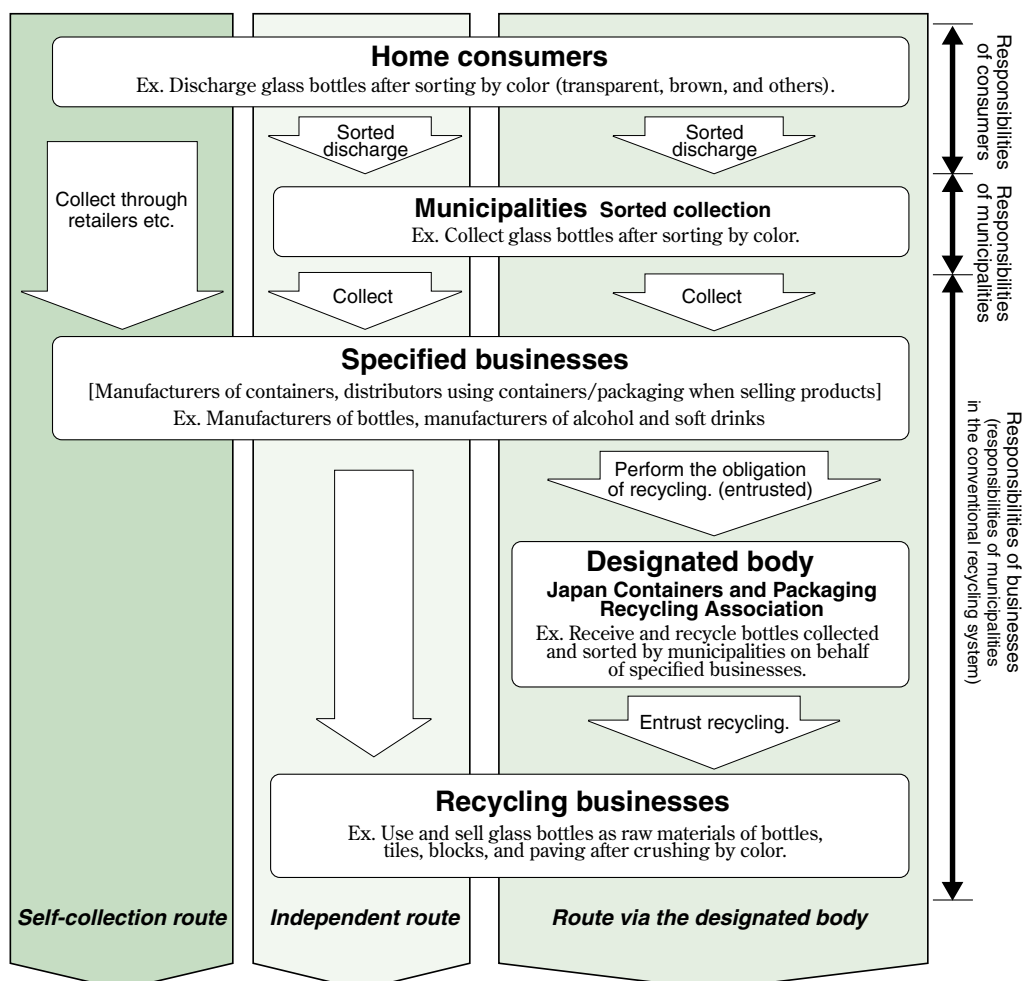
- Designated body (Japan Containers and Packaging Recycling Association)

The designated body should collect from municipalities upon request, and recycle waste containers/packaging under the entrustment of specified businesses on behalf of specified businesses.

- Recycling businesses

Recycling businesses should recycle containers/packaging under the entrustment of the designated body.

Figure 10 Framework of the Containers and Packaging Recycling Law

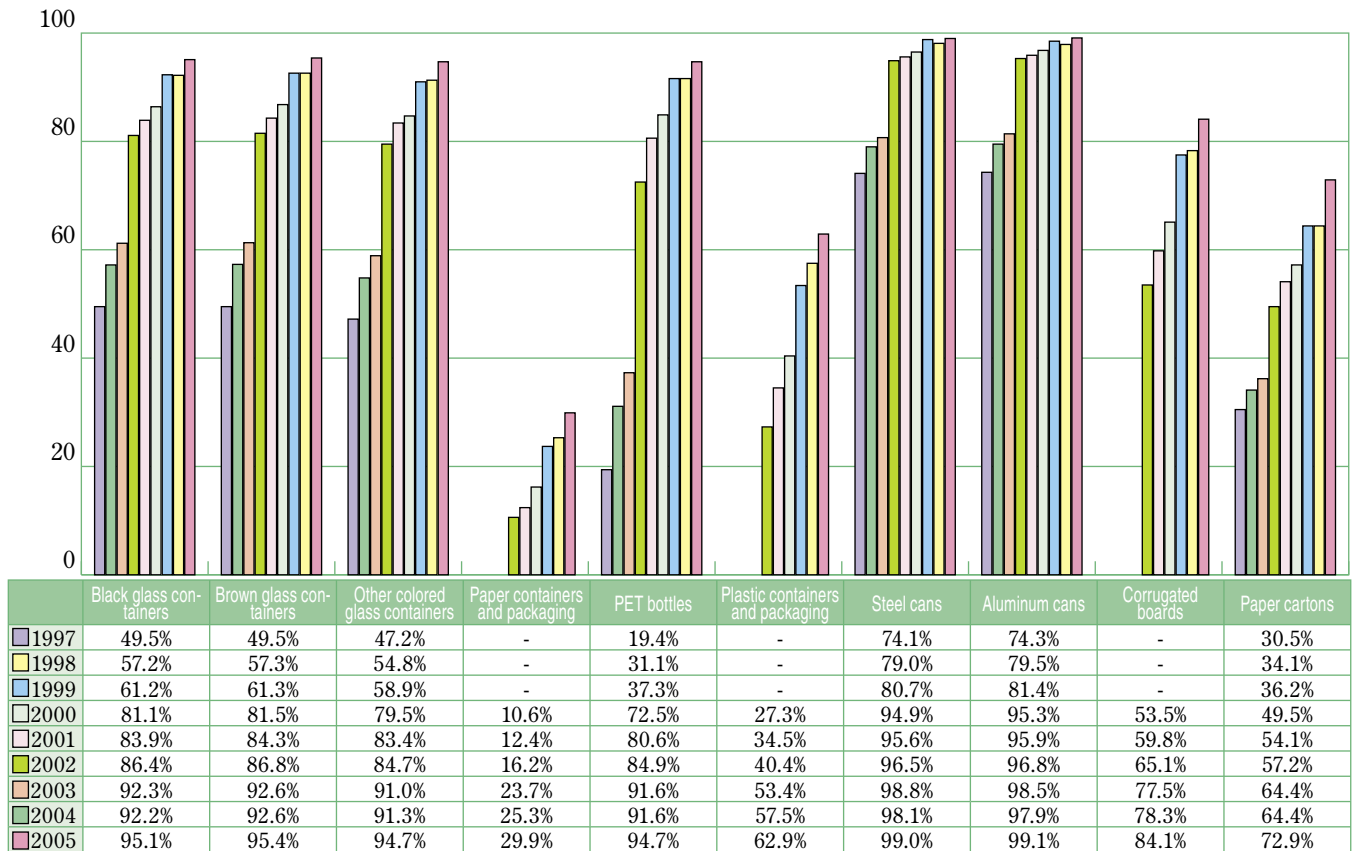


(Source: Website of the Ministry of Environment)

(2) Current Status of Recycling in Accordance with the Containers and Packaging Recycling Law in Municipalities

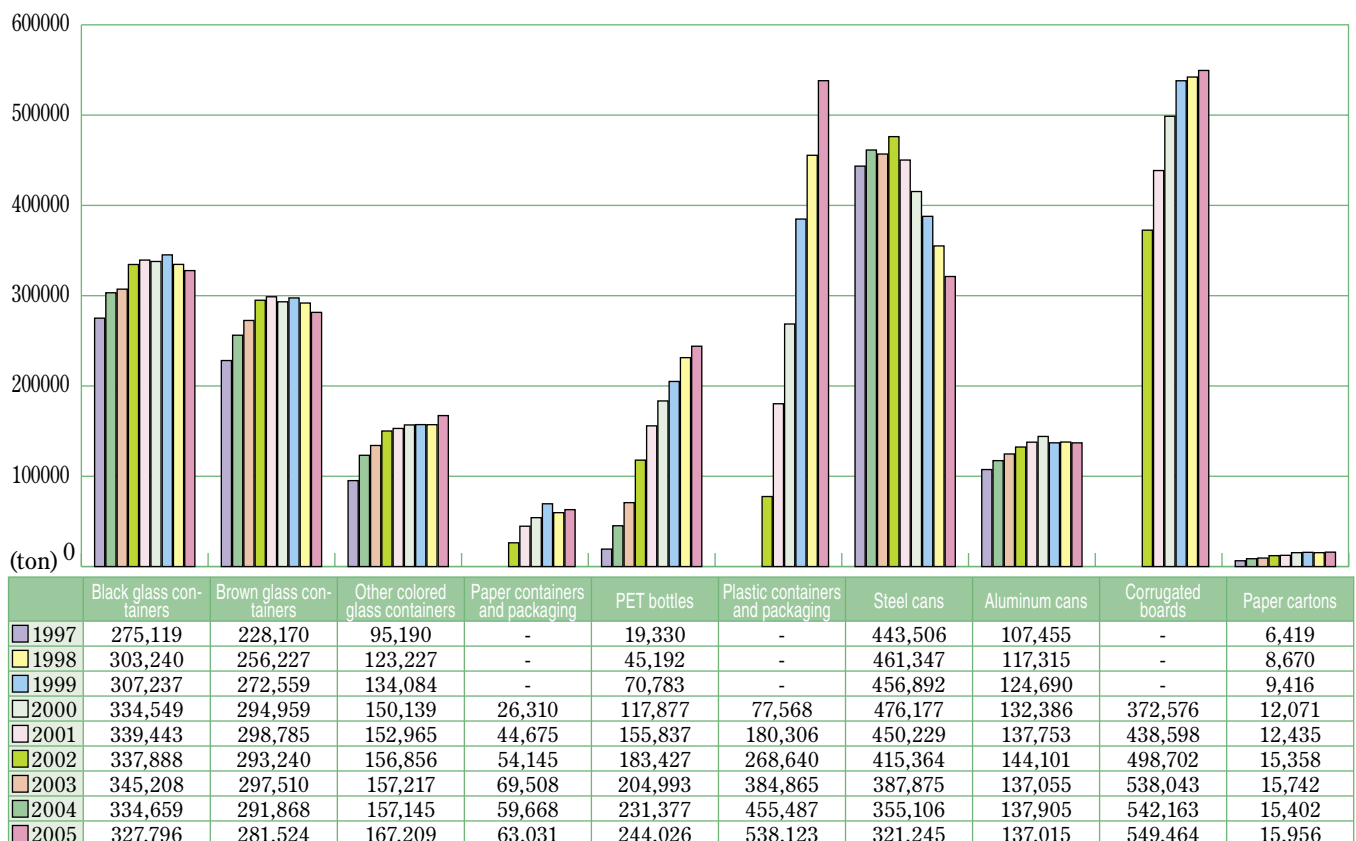
Figure 11 shows percentages of municipalities implementing sorted collection of waste containers and packaging in accordance with the Containers and Packaging Recycling Law. Figure 12 shows changes of the amount of recycled containers and packaging.

Figure 11 Percentage of municipalities implementing sorted collection



(Source: Ministry of Environment)

Figure 12 Amount of recycled containers and packaging (including the amount processed independently by municipalities)



(Source: Ministry of Environment)

7. Home Appliance Recycling Law

(1) Outline of the Law

The law aims to promote recycling of waste home appliances, and stipulates the responsibilities of consumers (dischargers), retailers, manufacturers, and importers, etc. as follows:

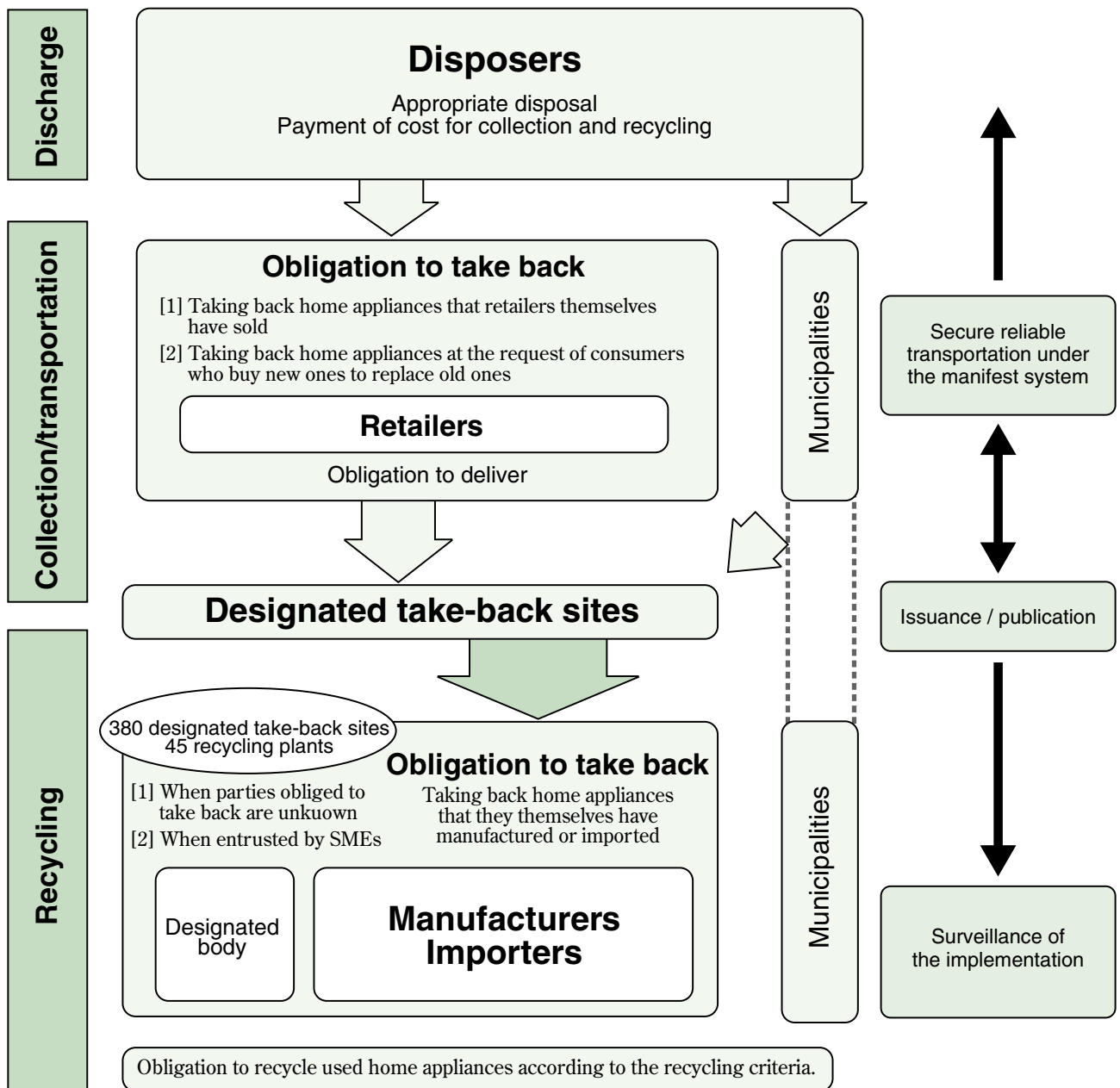
① Home appliances subject to the law

Air conditioners, television sets, refrigerators, and washing machines for domestic use

② Responsibilities of the parties concerned

- Consumers (dischargers)
Deliver to retailers etc. by paying costs for collection, transport, and recycling when discharging any of the above four items.
- Retailers
Collect home appliances, which they sold, or are requested to collect by consumers who buy new ones to replace old ones.
- Manufacturers and importers
Recycle home appliances, which they manufactured or imported.
- Designated body (Association for Electric Home Appliances)
Recycle home appliances, whose manufacturers or importers are unknown.

Figure 13 Flow of Recycling of Used Home Appliances

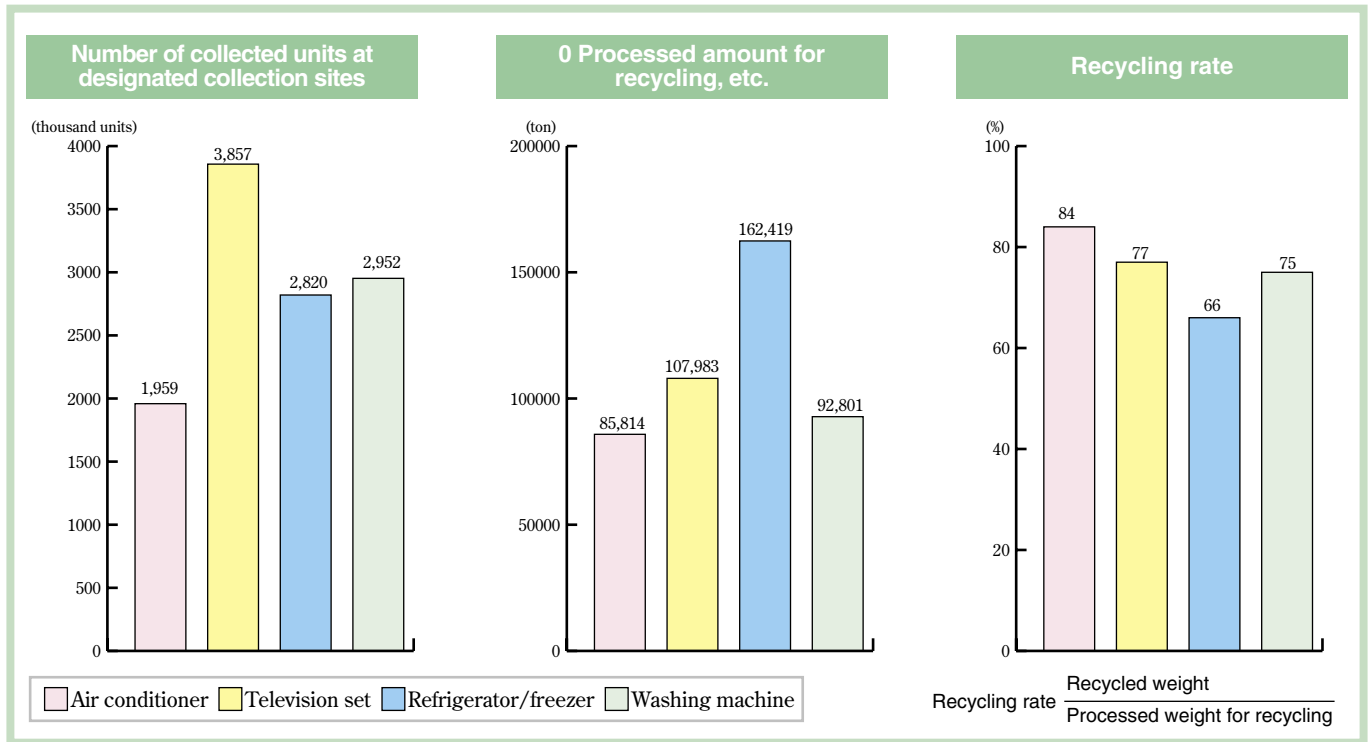


(Source: Website of the Ministry of Environment)

(2) Current Status of Recycling of Home Appliances

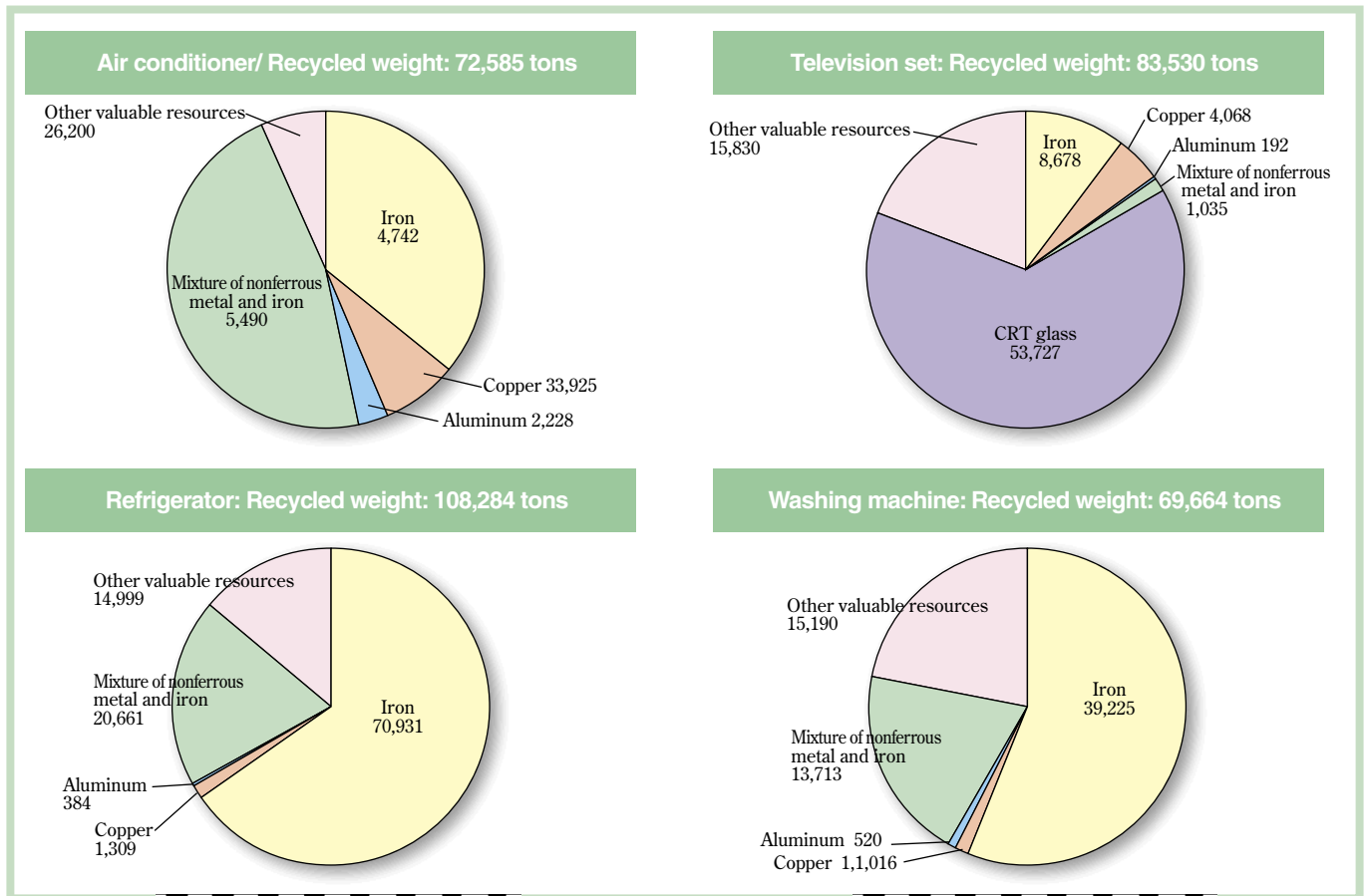
Figure 14 shows the current status of recycling of home appliances by manufacturers and the designated body. Figure 15 shows recycled weight by item.

Figure 14 Current status of implementation of recycling by manufacturers and the designated body (FY 2005)



(Source: Data from the Association for Electric Home Appliances)

Figure 15 Weight of appliances recycled by manufacturers and the designated body (unit: ton) (FY 2005)



* Recycled weight is the total weight of the relevant parts and materials in a state where they can be handed over for value or for free to those who will use them as parts or materials of products.
 * Other valuable resources include plastics.

(Source: Data from the Association for Electric Home Appliances)

8. Food Recycling Law

(1) Outline of the Law

The law aims to reduce and recycle food waste discharged from food-related businesses, and stipulates their responsibilities.

① Food waste subject to the law

Unsold or uneaten food products and residue generated in the process of manufacturing, processing, and cooking food products (excluding kitchen waste discharged from households)

② Businesses subject to the law

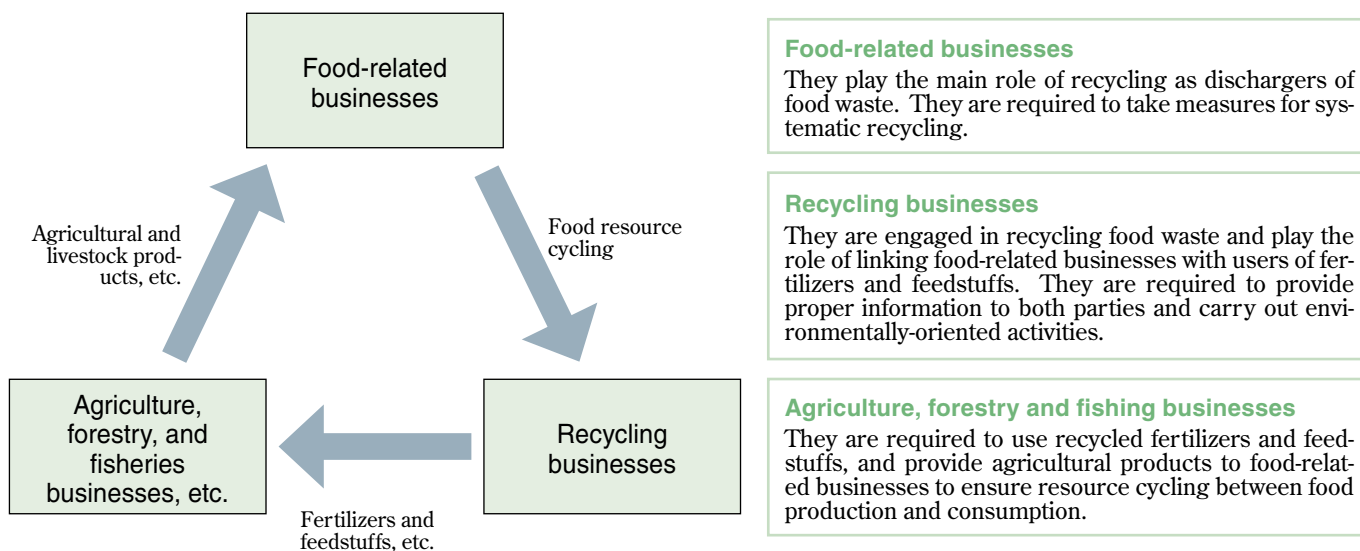
Manufacturers/processors and wholesalers/retailers of food products, and restaurants, etc.

③ Responsibilities of the parties concerned

- **Minimization:** Minimize food waste generation by improving production and distribution process and consumption system.
- **Reduction:** Reduce the amount of food waste by dehydration, drying, fermentation, and carbonization.
- **Recycling:** Use food waste as fertilizers, feedstuffs, oil, and raw materials for methane fermentation

The goal of the law is that all food-related businesses have increased the recycling rate to 20% or higher by minimizing generation, reducing weight, and recycling food waste by FY 2006.

Figure 16 Related businesses promoting food recycling and their responsibilities



(Source: "Towards a 3R-Oriented, Sustainable Society: Legislation and Trends 2006" by the Ministry of Economy, Trade and Industry)

(2) Current Status of Minimization, Reduction, and Recycling of Food Waste

Table 8 and 9 shows the current status of minimization, reduction, and recycling of food waste in industries of food manufacturing, wholesaling, retailing, and service.

Table 8 Generation minimization, weight reduction, and recycling of food waste (FY2004/2005)

Unit: Actual figure: thousand tons Proportion & Rate: %

Category of industry	Fiscal year	Annual amount of food waste generated		Annual amount of food waste generated		Reduced amount		Recycled amount		5) Recycled amount for the purpose stipulated under the Food Recycling Law	
		Actual figure	1) Generation rate	Actual figure	2) Minimization rate	Actual figure	3) Reduction rate	Actual figure	4) Recycling rate	Actual figure	Recycling rate
Total of food industries	2005	11,362	100	510	4	366	3	6,664	59	5,300	47
	2004	11,358	100	515	4	330	3	5,793	51	4,444	39
Food manufacturing	2005	4,946	44	241	5	176	4	4,221	85	3,762	76
	2004	4,980	43	235	5	234	5	3,803	78	3,206	65
Food wholesaling	2005	744	7	31	4	8	1	505	68	432	58
	2004	751	7	48	6	12	2	398	53	266	35
Food retailing	2005	2,629	23	122	4	44	2	1,028	39	685	26
	2004	2,604	23	121	4	37	1	821	32	595	23
Food service	2005	3,043	27	116	4	138	5	910	30	421	14
	2004	3,104	27	110	3	47	2	770	25	377	12

Note: 1) It is the generation rate by industry and indicates a structural percentage to the total annual generation amount of food industries.

2) It is the percentage of the effect of minimization in the annual food waste generation.

3), 4) It is the percentage to the annual food waste generation.

5) The purpose stipulated under the Food Recycling Law is to recycle as fertilizers, feedstuffs, oil and oil products, and raw materials for methane.

(Source: "Actual Condition Survey on Utilization of Recyclable Food Resources FY 2006" by the Ministry of Agriculture, Forestry and Fisheries)

Table 9 Rate of businesses taking measures for minimization, reduction, and recycling of food waste (FY 2005)

Category of industries	Rate of businesses taking measures for waste minimization	Rate of businesses taking measures for weight reduction	Rate of businesses taking measures for recycling
Total of food industries	41%	7%	28%
Food manufacturing	35%	10%	48%
Food wholesaling	30%	8%	22%
Food retailing	45%	4%	24%
Food service	40%	10%	30%

Note: They are percentages to the total number of businesses

(Source: "Actual Condition Survey on Utilization of Recyclable Food Resources FY 2006" by the Ministry of Agriculture, Forestry and Fisheries)

9. Construction Material Recycling Law

(1) Outline of the Law

The law aims to promote sorting and recycling of construction waste, such as concrete, wood, and asphalt concrete generated in the process of construction work, and stipulates the responsibilities of construction clients and contractors, etc.

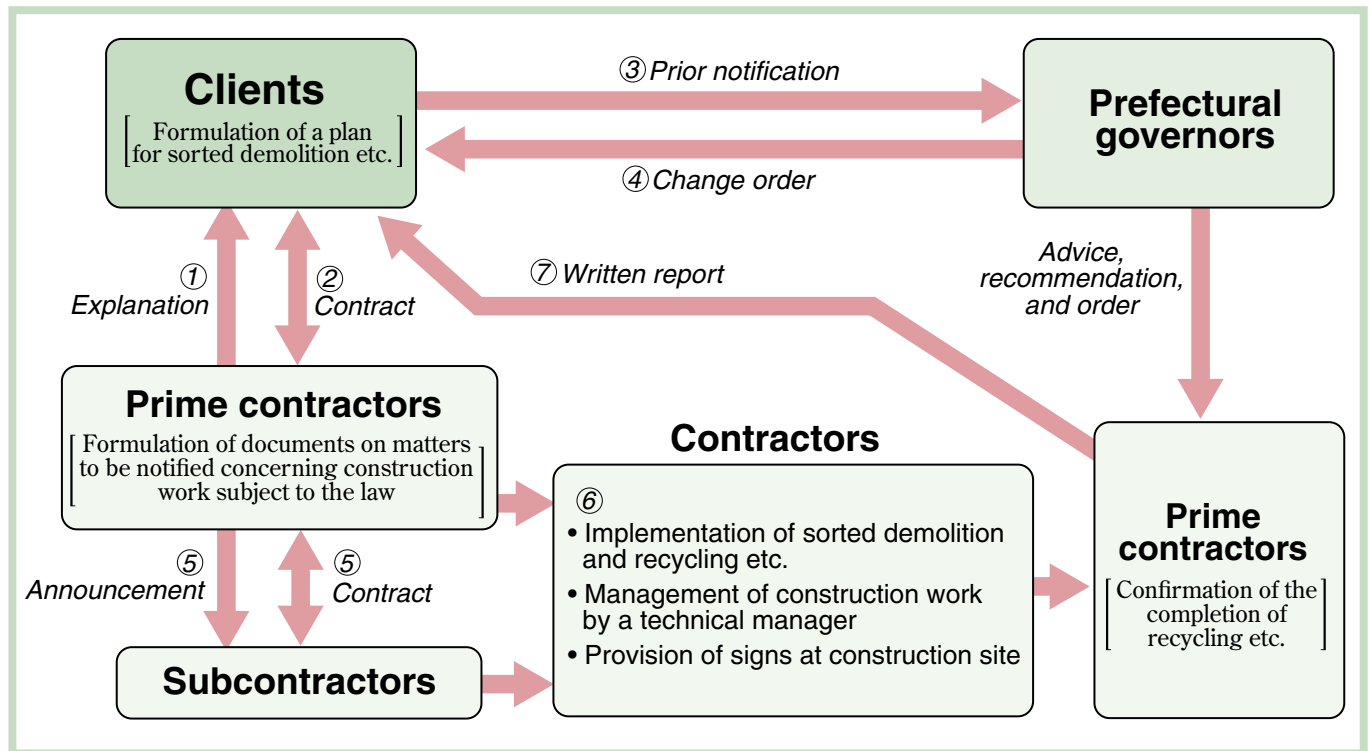
① Construction waste subject to the law

- Concrete mass (including secondary products such as precast slabs)
- Wood generated in construction
- Asphalt concrete mass

② Responsibilities of the parties concerned

- Clients or self-builders of construction work subject to the law
Prepare a plan for sorted demolition and submit a prior notification to a prefectural governor.
- Contractors of construction works subject to the law
Implement sorting and recycling at construction sites.

Figure 17 Framework of the Construction Material Recycling Law

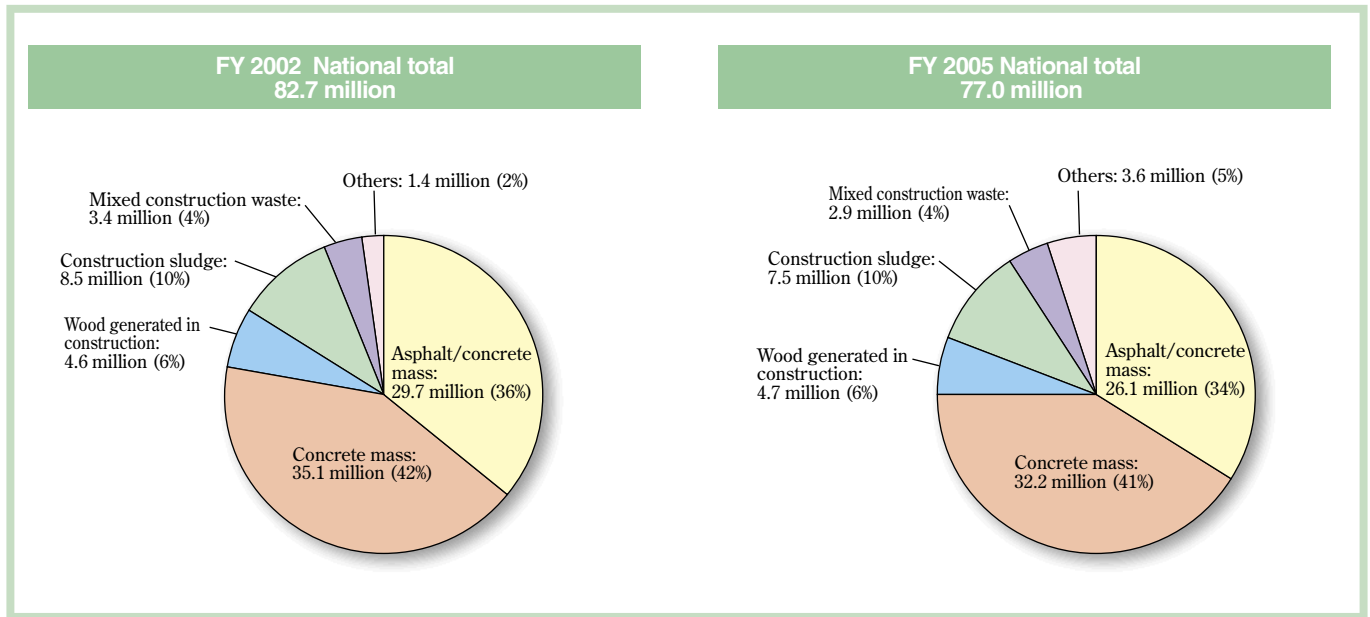


(Source: "Future Trend of Construction Material Recycling" by the Policy Bureau of the Ministry of Land, Infrastructure and Transport)

(2) Current Status of Generation and Recycling of Construction Waste

Figure 18 shows the amount of generated construction waste by item. Table 10 shows the state of recycling of construction waste, reusing construction waste at other sites, and recycling of sediment.

Figure 18 Changes in the amount of generated construction waste by item (FY2002/2005)



(Source: “2005 Survey on the State of Construction Byproducts” by the Ministry of Land, Infrastructure and Transport)

Table 10 State of recycling etc. of construction waste and reusing of sediment (FY2002/2005)

	2002	2005	Increase/decrease
Recycling rate ¹⁾ of asphalt/concrete mass	98.7%	98.6%	0.1 point decrease
Recycling rate of concrete mass	97.5%	98.1%	0.6 point increase
Recycling rate of wood generated in construction ²⁾	61.1%	68.2%	7.1 point increase
Rate of recycling etc. ³⁾ of wood generated in construction	89.3%	90.7%	1.3 point increase
1.3 point increase Rate of recycling etc. of construction sludge	68.6%	74.5%	5.9 point increase
Generated amount of mixed construction waste	3,375 thousand tons	2,928 thousand tons	447 thousand tons decrease
Rate of recycling etc. of construction waste	91.6%	92.2%	0.6 point increase
Utilization rate of sediment generated in construction ⁴⁾	65.1%	62.9%	2.2 point decrease

Note 1) Recycling rate is a percentage of the amount of construction waste recycled and reused at other construction sites to the total amount of construction waste.

Note 2) Wood generated in construction includes thinned wood and grubbed-out trees.

Note 3) Rate of recycling etc. is a percentage of construction waste recycled, reduced, and reused at other construction sites to the total amount of construction waste. Recycling etc. means recycling and reducing.

Note 4) Utilization rate of sediment generated in construction is a percentage of the used amount of sediment generated in construction including soil improvement to the total used amount of sediment (receiving sediment and on-site sediment).

(Source: “2005 Survey on the State of Construction Byproducts” by the Ministry of Land, Infrastructure and Transport)

10. End-of-life Vehicle Recycling Law

(1) Outline of the Law

The law aims to promote recycling and proper disposal of end-of-life vehicles (ELVs), and stipulates the responsibilities of car owners, car manufacturers, and auto dismantling businesses, as well as payment burden of recycling costs.

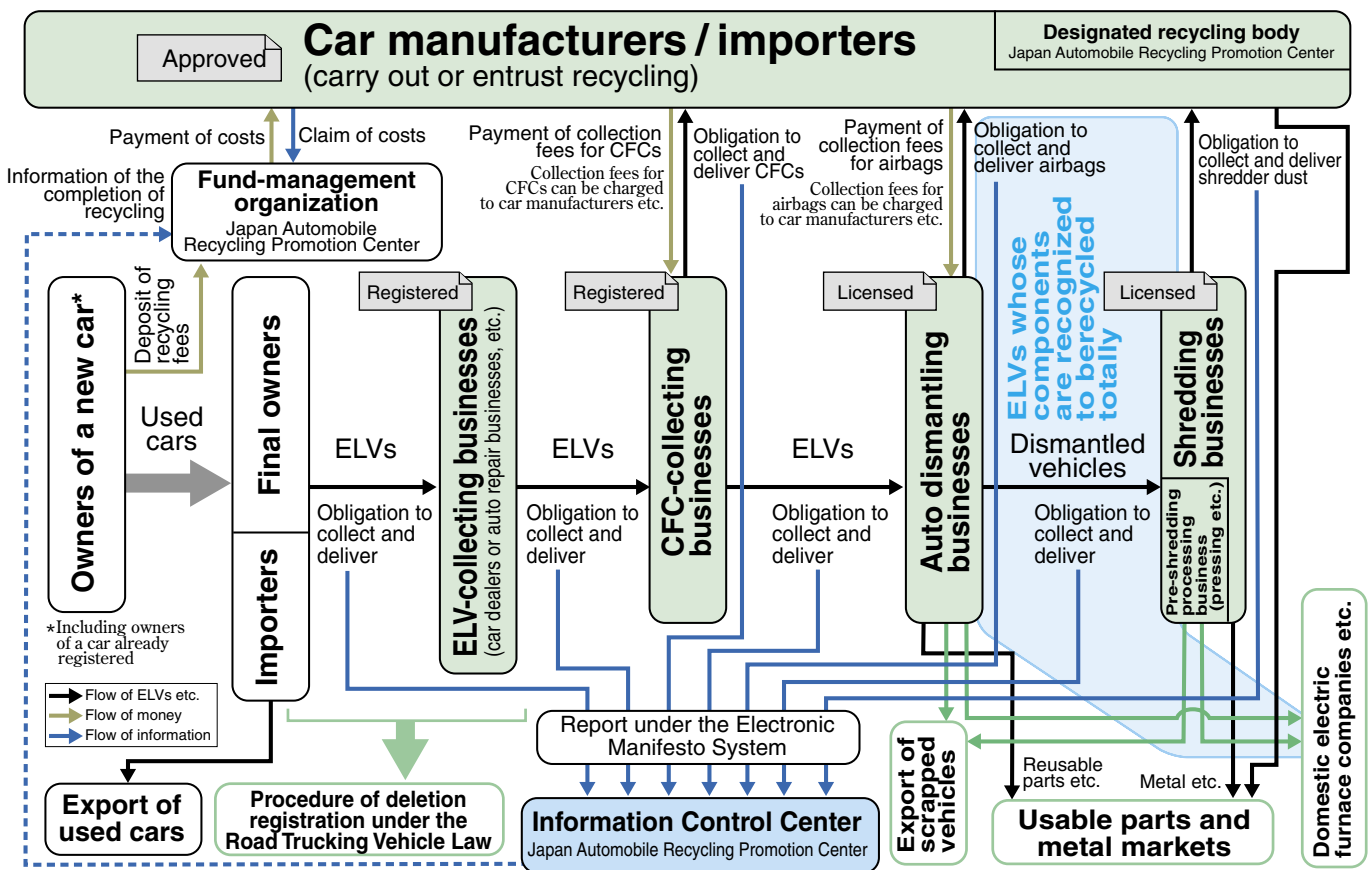
① Vehicles subject to the law

Vehicles (excluding towed vehicles, two-wheelers, agricultural and forestry machines, snowmobiles, and armored vehicles)

② Responsibilities of the parties concerned

- Car manufacturers and importers
Collect and recycle airbags and shredder dust from ELVs that they have manufactured or imported, and destroy CFCs.
- ELV-collecting businesses (businesses registered to prefectural governors etc., such as car dealers and auto repair businesses)
Collect ELVs from car owners, and deliver them to CFC-collecting businesses or auto dismantlers.
- CFC-collecting businesses (registered to prefectural governors etc.)
Collect CFCs from ELVs properly, and deliver the ELVs to car manufacturers etc. (Collection fees for CFCs can be charged to car manufacturers etc.)
- Auto dismantling and shredding businesses (licensed by prefectural governors etc.)
Recycle ELVs properly, and deliver airbags and shredder dust to car manufacturers. (Collection fees for airbags can be charged to car manufacturers etc.)
- Car owners
Deliver ELVs to ELV-collecting businesses, and pay for recycling fees.

Figure 19 Framework of the End-of-life Vehicle Recycling Law

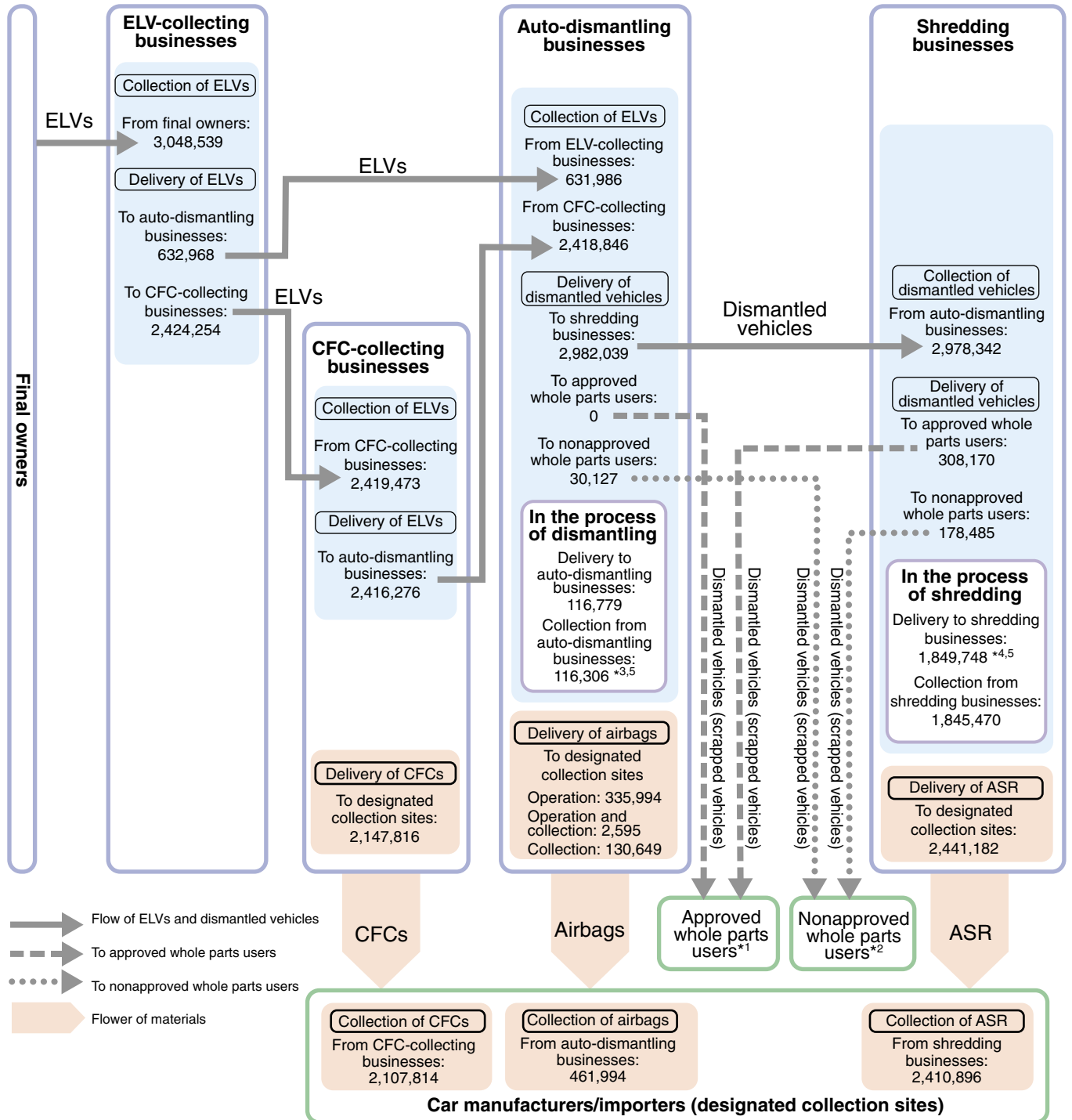


(Source: Website of the Organization for Small & Medium Enterprises and Regional Innovation, Japan)

(2) Current Status of Vehicle Recycling

Figure 20 shows the current status of collection and delivery of ELVs, dismantled vehicles, CFCs, airbags, and shredder dust (ASR) in accordance with the End-of-life Vehicle Recycling Law.

Figure 20 Current status of collection and delivery of ELVs, dismantled vehicles, CFCs, airbags, and ASR (FY 2005)



*1 Approved whole parts users: Businesses that are approved to recycle whole parts by the competent ministry (in accordance with Article 31 of the law) and put dismantled vehicles (scrapped vehicles) into electric furnace/converter to recycle as raw materials of iron and steel
 *2 Nonapproved whole parts users: Businesses that put dismantled vehicles (scrapped vehicles) into electric furnace/converter or export them
 *3 Collection in the process of dismantling: A report of transfer to another dismantling business may be given by a dismantling business in order to promote recycling usable parts and materials.
 *4 Collection in the process of shredding: Shredding businesses (press and shear processing businesses) engaged only in the pre-shredding process should deliver dismantled vehicles to other shredding businesses (shredders) in principle.
 *5 Reason for the discrepancies of figures between delivery in the process and collection: A certain period after giving a report of delivery is admitted until giving a report of collection delay as a period required for collection and transportation of dismantled vehicles. As a result, a report of collection may remain not given though a report of delivery has been given.

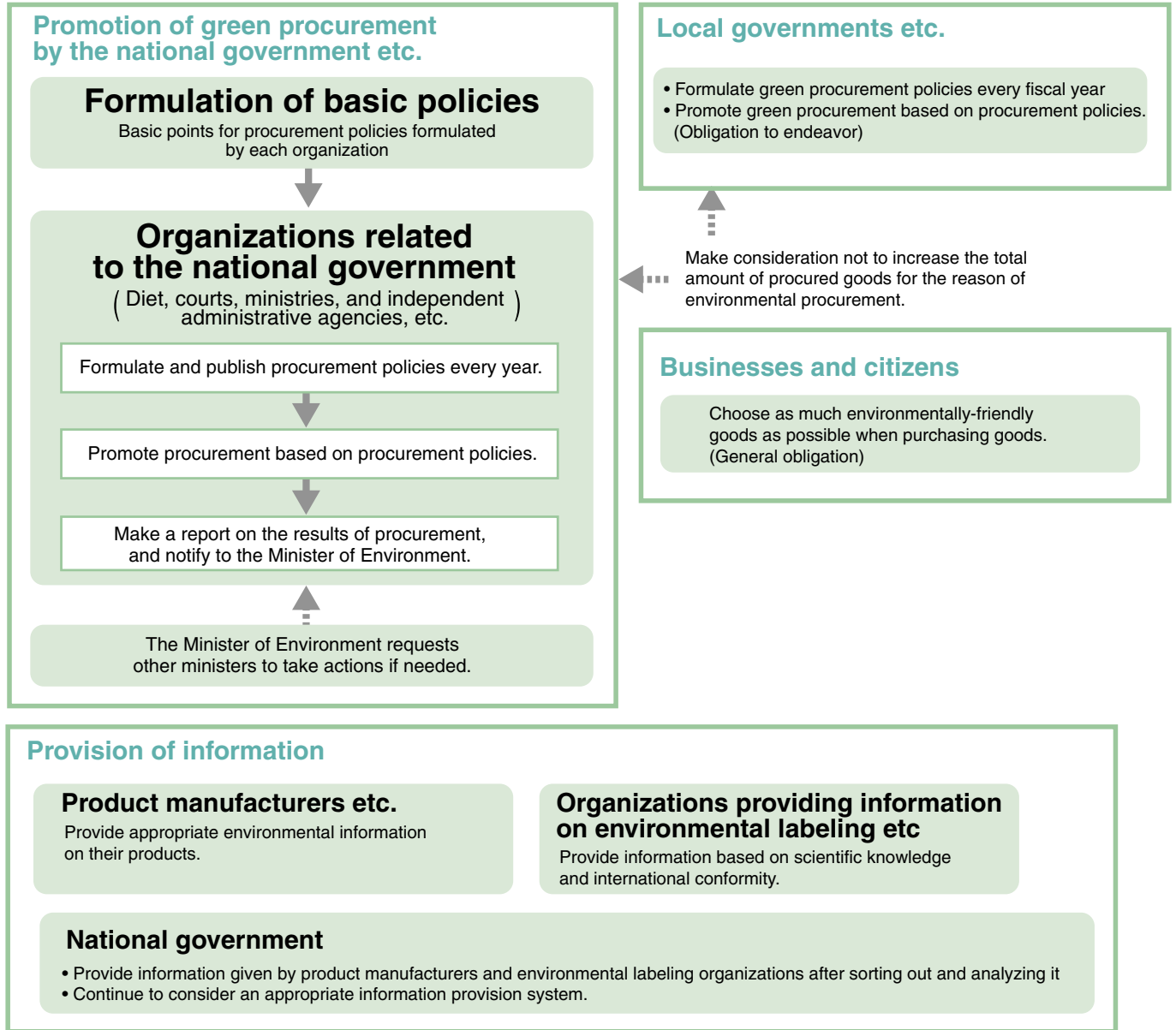
(Source: Data from the Vehicle Division of the Ministry of Economy, Trade and Industry, and the Recycling Promotion Office of the Policy Planning Division of the Ministry of the Environment)

11. Green Purchasing Law

The law aims to ensure that the national government and local governments take the initiative in procuring products and services that contribute to reduced environmental impact. It also aims to encourage businesses and citizens to choose environmentally-friendly products when purchasing goods.

It stipulates environmentally-friendly products and services to which priority should be given (specific procurement items) and criteria to evaluate the level of environmental friendliness (Table 11).

Figure 21 Framework of the Green Purchasing Law



(Source: Website of the Ministry of Environment)

Table 11 Specific procurement items under the Green Purchasing Law (214 items in total)

Category	Specific procurement items (approved by the Cabinet in February 28, 2006)	Evaluation criteria
Paper	8 items including information paper (copier paper, diazotized photo-sensitive paper, etc.), printing paper, and sanitary paper (toilet paper, facial tissues)	Recycled pulp compounding ratio, whiteness degree, etc.
Stationery	79 items including mechanical pencils, ball point pens, scissors, dust blowers, glue, files, binders, desk mats, envelopes with windows, blackboard dusters, can/bottle crushing machines	Use of recycled materials, such as recycled plastics, thinned wood, and plant-derived plastics, and global warming potential, etc.
Equipment	10 items including chairs, desks, shelves, coat hooks, umbrella stands, and blackboards	
OA equipment	13 items including copiers, printers, facsimile machines, monitors, and digital duplicators	Energy efficiency etc.
Home appliances	Electric refrigerators, electric freezers, electric freezer-refrigerators, electric toilet seats	
Air conditioners etc.	Air conditioners, gas-heat pump system, and heaters	
Water heaters etc.	Electric hot water heaters, gas-water heaters, oil water heaters, gas cooking appliances	
Lighting	Fluorescent lighting equipment, fluorescent lamps, light bulb-shaped lamps	
Vehicles etc.	Automobiles, ETC adaptable car accessories, car navigation systems, tires for common official cars, 2 cycle engine oil	Gas emission, fuel consumption, etc.
Fire extinguishers	Fire extinguishers	Use of recycled fire-extinguishing agent
Uniforms and working wear	Uniforms, working wear	Use of resin recycled from PET bottles etc.
Interior fixtures and bedding	Carpets, curtains, blankets, comforters, bed frames, mattresses, etc.	
Work gloves	Work gloves	
Other fiber products	Meeting tents, tarpaulins, safety nets	
Facilities	Solar power generation systems, fuel cells, solar heating systems, garbage disposers	Use of solar energy, and reduction of kitchen waste, etc.
Public works	Public works: 1) Construction materials (47 items including particleboards, porcelain tiles, blast furnace cement, permeable concrete, heat-insulating sashes/doors, automatic flushing system, light control system, and sewage sludge fertilizers) 2) Construction machines (low-emission type and low-noise type) 3) Construction methods (6 items including concrete mass recycling treatment method and road surface recycling method) 4) Special-purpose items (drainage paving, permeable paving, and rooftop greening)	Recycled material utilization ratio, gas emission, and noise, etc.
Services	Energy conservation diagnosis, cafeterias, printing, recapped automobile tires, automobile repair, management of government office buildings, and cleaning	Contents of technical qualification/diagnosis, kitchen waste disposal, recycled paper compounding ratio, tire repair, and use of recycled car parts, etc.

Note: For green purchasing, environmental labels such as Eco-Mark (certified by the Japan Environment Association) and Eco-Leaf (used by the Japan Environmental Management Association for Industry) are important information sources to distinguish environmentally-friendly products.

(Source: "Guidebook for Recycling-Oriented Society 2007" by the Ministry of Economy, Trade and Industry)

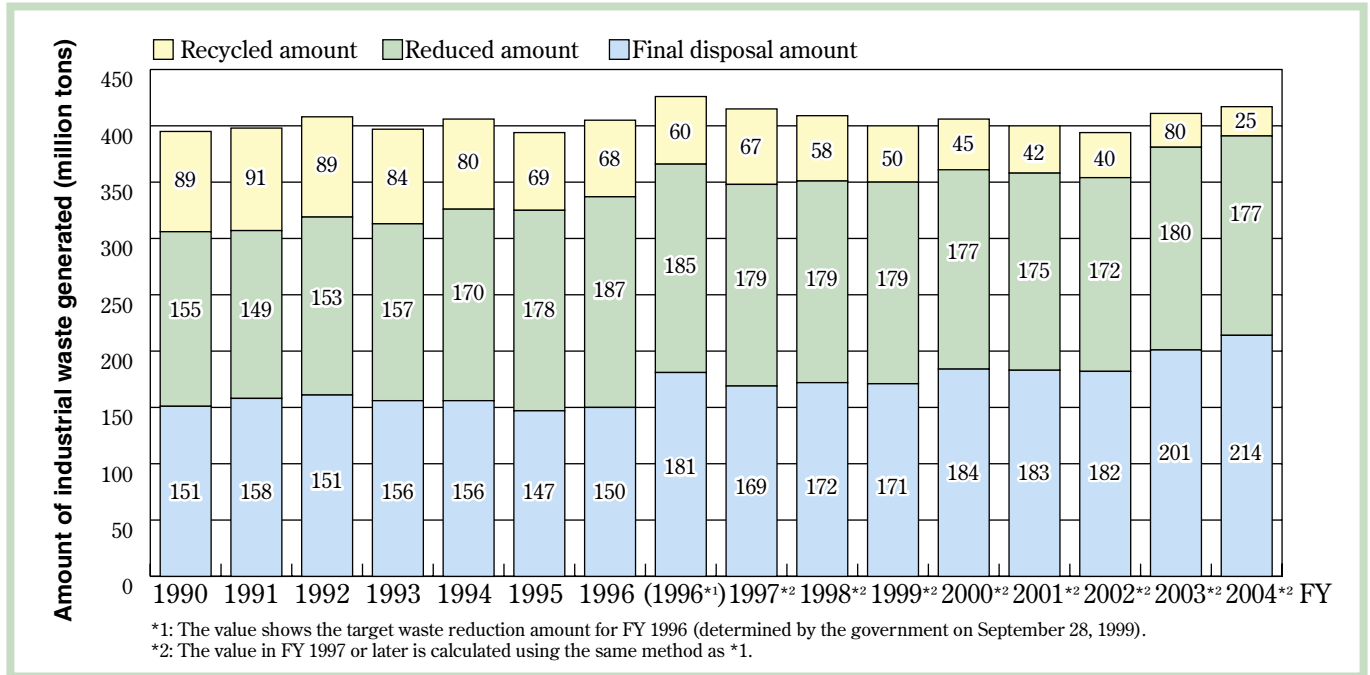
Chapter 2: Overview of Waste Generation, Recycling, and Final Disposal, etc. in Japan

1. Current Status of Industrial Waste

(1) Changes in the Amount of Generation, Recycling, Reduction, and Final Disposal

Figure 22 shows changes in the amount of generated industrial waste etc. in Japan. Though the amount of industrial waste generated in FY 2004 was approximately 417 million tons, an increase of approximately 6 million tons from the previous fiscal year, the final disposal rate reduced to 26% due to the significant increase of the recycled amount.

Figure 22 Changes in the amount of generation, recycling, reduction, and final disposal of industrial waste



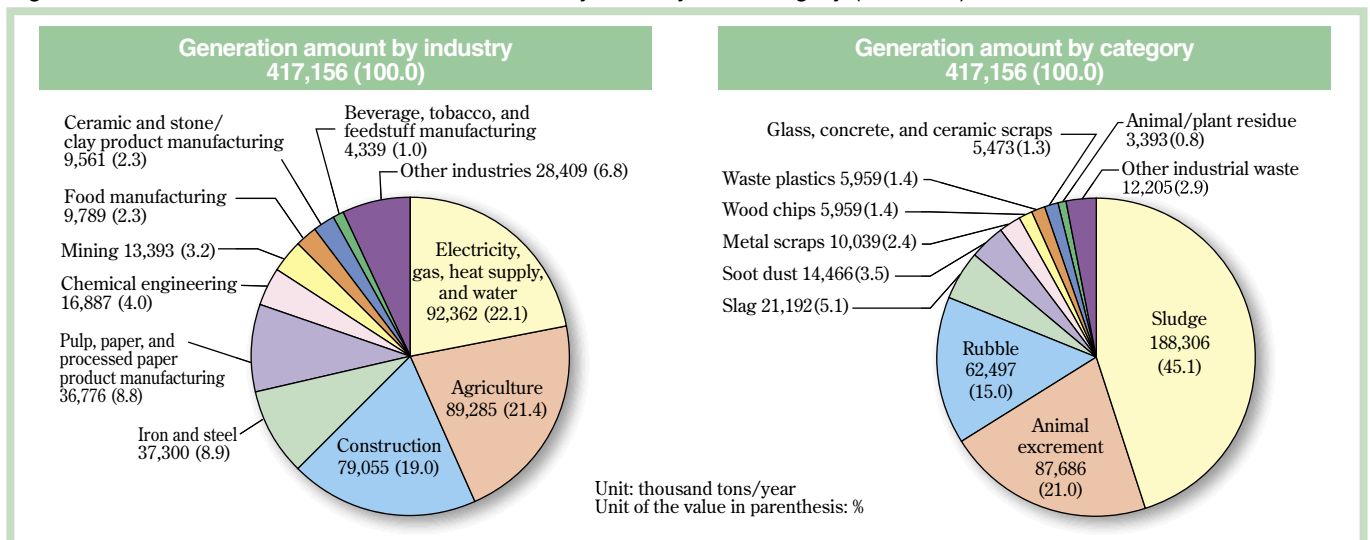
(Source: Ministry of Environment)

(2) Generation Volume by Industry and Category

Figure 23 shows the generation amount of industrial waste by industry and category.

The industry which generates most is the electricity, gas, heat supply, and water (including sewage) industry (92.36 million tons), followed by agriculture (89.29 million tons), construction (79.06 million tons), iron and steel (37.3 million tons), pulp, paper, and processed paper product manufacturing (36.78 million tons), and chemical engineering (16.89 million tons). The category which is generated most is sludge (188.31 million tons), followed by animal excrement (87.69 million tons) and rubble (62.5 million tons).

Figure 23 Generation amount of industrial waste by industry and category (FY 2004)



(Source: Ministry of Environment)

(3) Processing Flow

Figure 24 shows the processing flow of industrial waste. Of the total amount of industrial waste of 417 million tons, the intermediate treatment amount is 314 million tons (75%), the directly recycled amount is 91 million tons (22%), and the direct final disposal amount is 13 million tons (3%).

Of the amount of industrial waste gone through intermediate treatment, the reduced amount is 177 million tons, the recycled amount is 123 million tons, and the final disposal amount is 13 million tons.

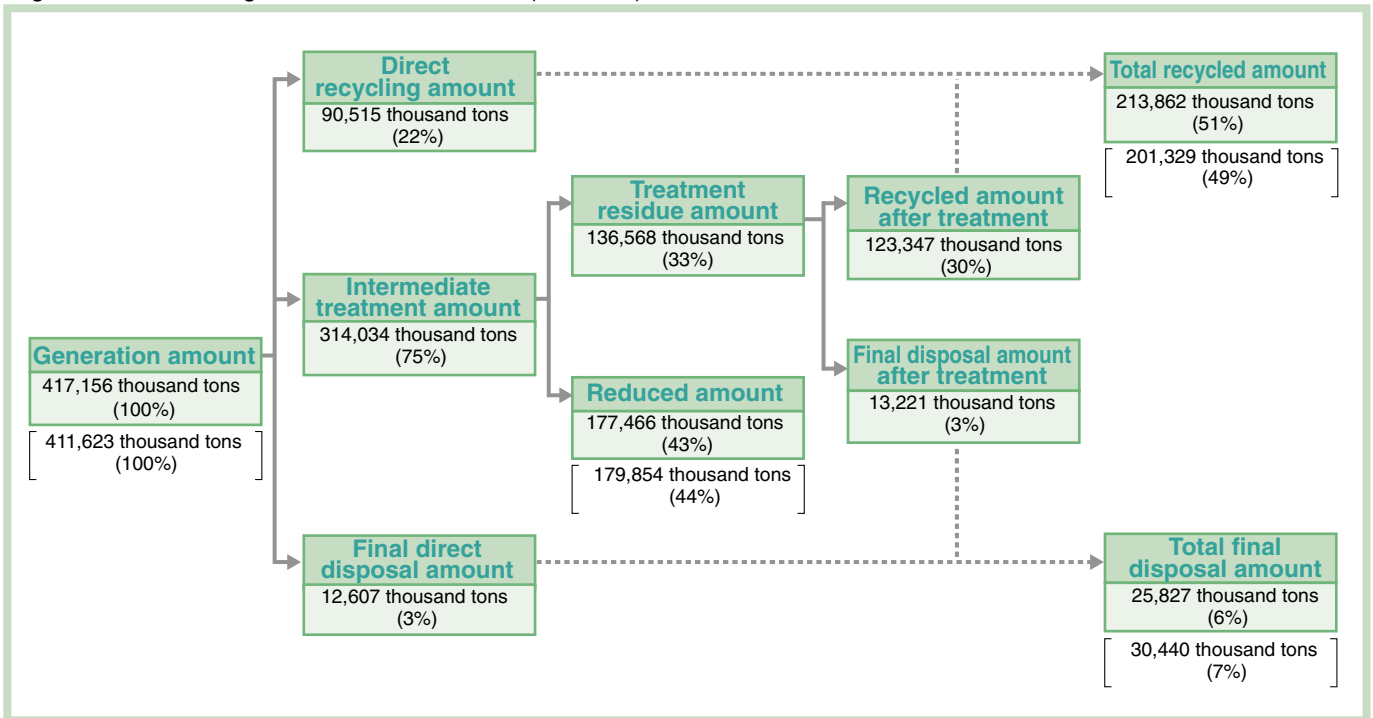
As a whole, the recycled amount is 214 million tons, accounting for 51% of the total amount of industrial waste, and the final disposal amount is 26 million tons, accounting for 6%.

Industrial waste in this statistics includes waste subject to the Construction Material Recycling Law, and animal/plant residue generated from the food manufacturing industry, which are subject to the Food Recycling Law*.

Though end-of-life vehicles generated from business activities fall under industrial waste, they are not included in this statistics. However, residue generated from auto-dismantling and shredding businesses are included.

* Cooking waste and food residue generated from the food service industry do not fall under industrial waste.

Figure 24 Processing flow of industrial waste (FY 2004)



(Source: Ministry of Environment)

(4) Rate of Recycling, Reduction, and Final Disposal of Industrial Waste by Category

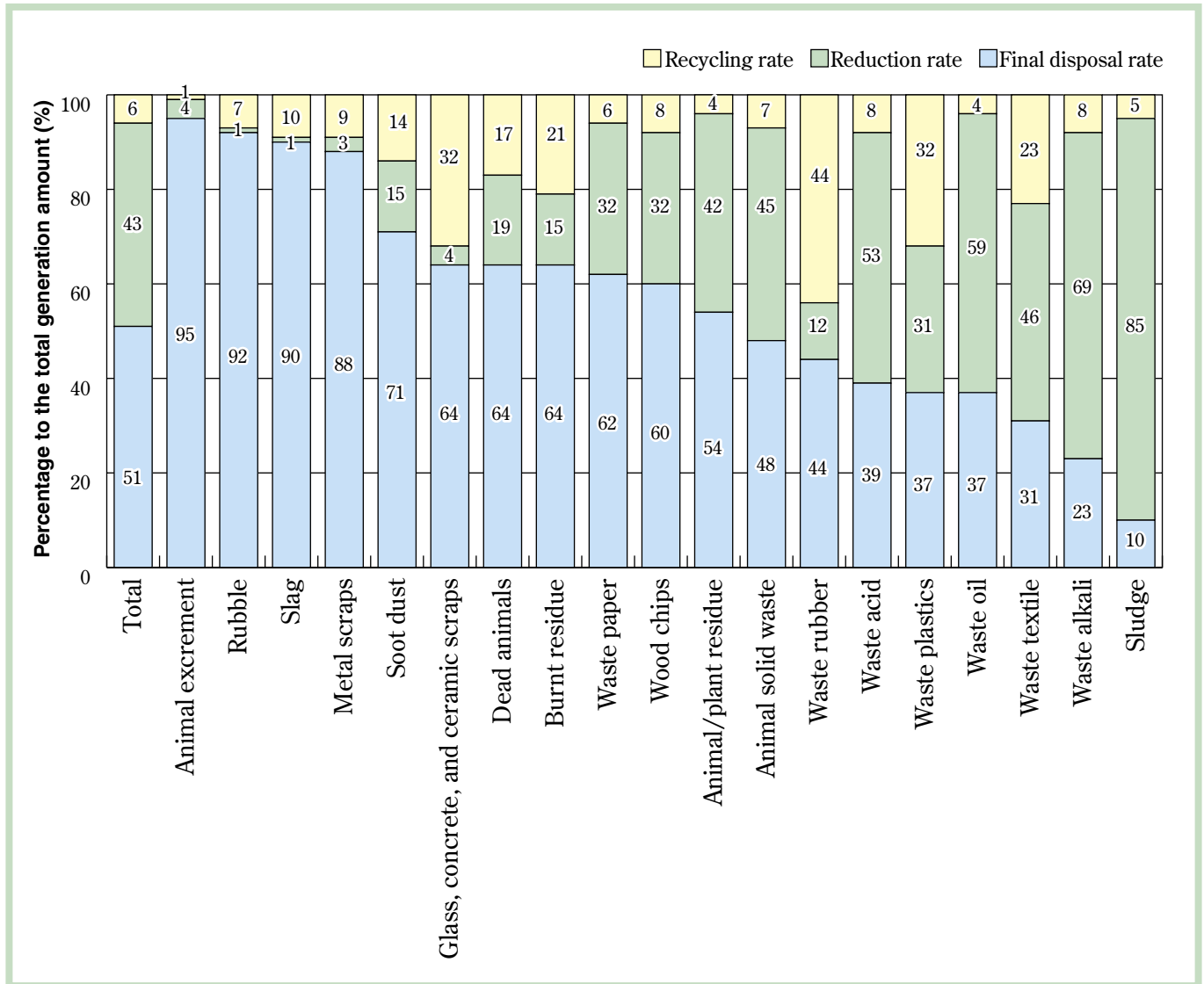
Figure 25 shows the rate of recycling, reduction, and final disposal of industrial waste by category.

Industrial waste categories whose recycling rate is high are animal excrement (95%), rubble (92%), slag (90%), and metal scraps (88%), and those whose recycling rate is low are sludge (10%), waste alkali (23%), and waste textile (31%).

Industrial waste categories whose reduction rate is high are sludge (85%), waste alkali (69%), waste oil (59%), and waste acid (53%), and those whose reduction rate is low are slag and rubble (1%, respectively), metal scraps (3%), glass/concrete/ceramic scraps and animal excrement (4%, respectively).

Industrial waste categories whose final disposal rate is low are animal excrement (1%), animal/plant residue and waste oil (4%, respectively), and sludge (5%), and those whose final disposal rate is high are waste rubber (44%), glass/concrete/ceramic scraps and waste plastics (32%, respectively).

Figure 25 Rate of recycling, reduction by intermediate treatment, and final disposal of industrial waste by category (FY 2004)



(Source: Ministry of Environment)

(5) Current Status of Intermediate Treatment Facilities and Final Disposal Sites for Industrial Waste

Table 12 shows the number of intermediate treatment facilities and final disposal sites of industrial waste in Japan. The number of intermediate treatment facilities is 19,916, an increase of 632 from the previous year. The number of final disposal sites is 2,547, a decrease of 94 from the previous year. Figure 26 shows the changes in the number of newly licensed final disposal sites.

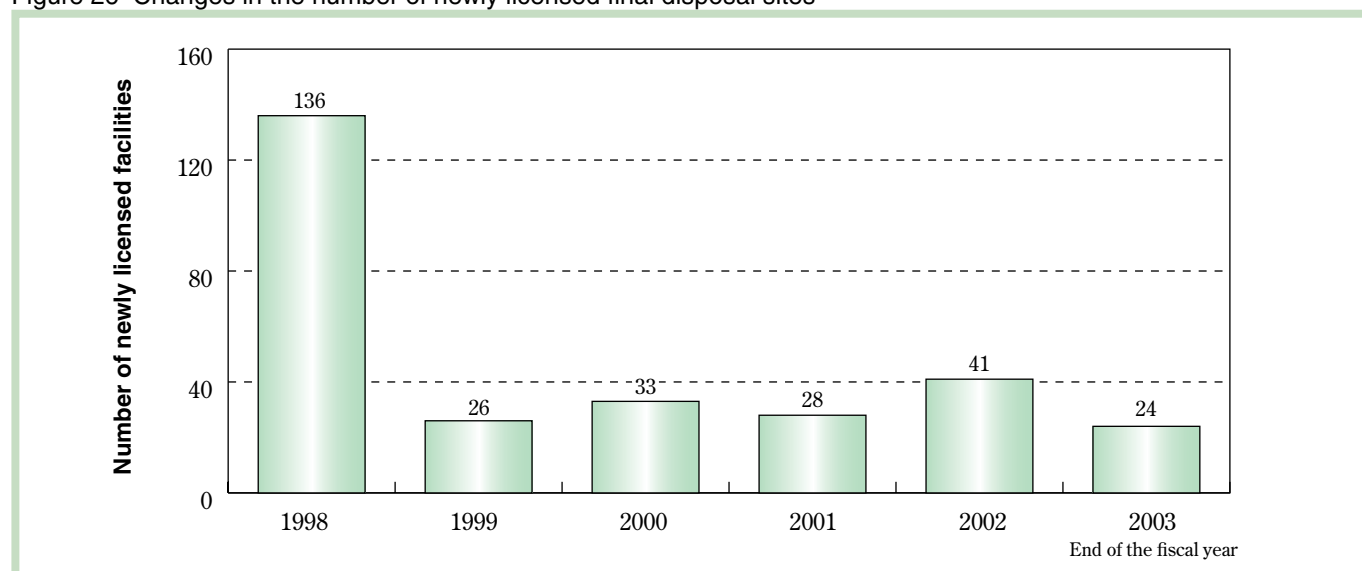
Table 12 Number of intermediate treatment facilities and final disposal sites of industrial waste

Category	Number of facilities (as of April 1, 2004)	
Intermediate treatment facility	19,916	(19,284)
Sludge dehydration facility	6,682	(6,646)
Sludge drying facility (machinery)	235	(242)
Sludge drying facility (sunlight)	83	(84)
Sludge incineration facility	650	(644)
Oil-water separation facility for waste oil	266	(261)
Waste oil incineration facility	637	(629)
Neutralization facility for waste acid and alkali	202	(196)
Waste plastics shredding facility	951	(832)
Waste plastics incineration facility	1,066	(1,125)
Shredding facility for wood chips and rubble	7,248	(6,684)
Concrete solidifying facility	44	(44)
Mercury-contaminated sludge roasting facility	7	(6)
Cyanogen compound decomposition facility	277	(230)
Waste PCB incineration facility	0	(0)
Waste PCB decomposition facility	17	(13)
Waste PCB cleaning facility	6	(5)
Other incineration facility	15,95	(1,643)
Final disposal site	2,547	(2,641)
Isolated-type landfill site	35	(39)
Inert waste landfill site	1,554	(1,632)
Controlled landfill site	958	(970)
Total	22,463	(21,925)

Note: 1. Shredding facilities for wood chips and rubble were added to facilities to be licensed in February, 2001.
2. Value in parenthesis is the results of the survey in the previous year.

(Source: Ministry of Environment)

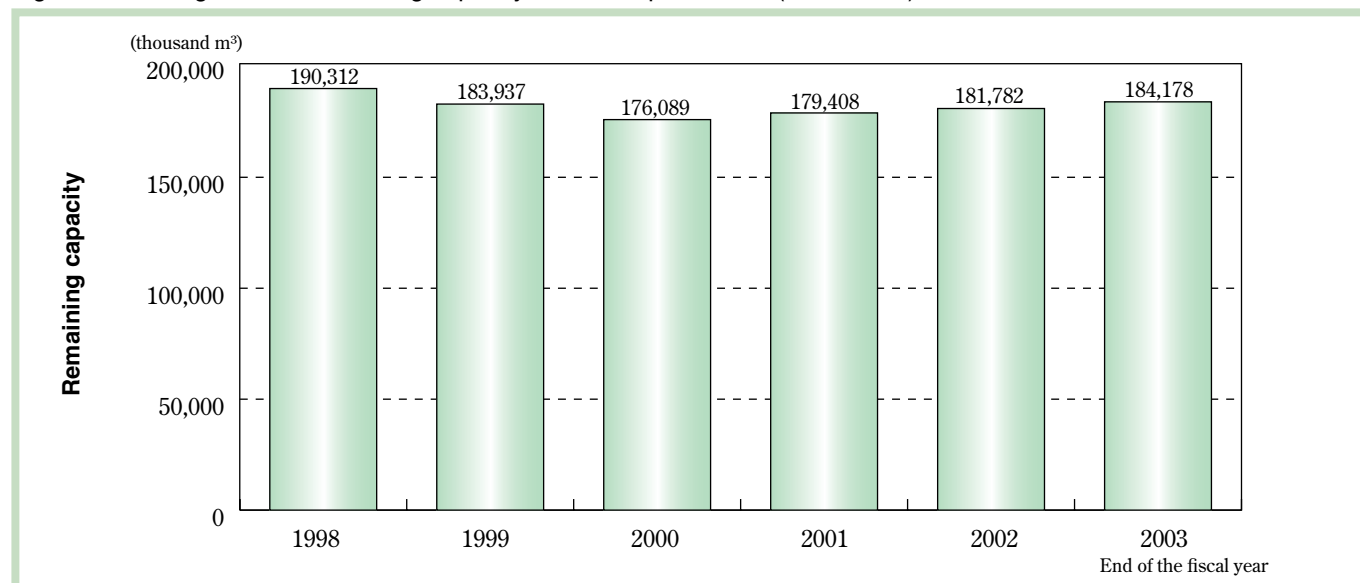
Figure 26 Changes in the number of newly licensed final disposal sites



(Source: Ministry of Environment)

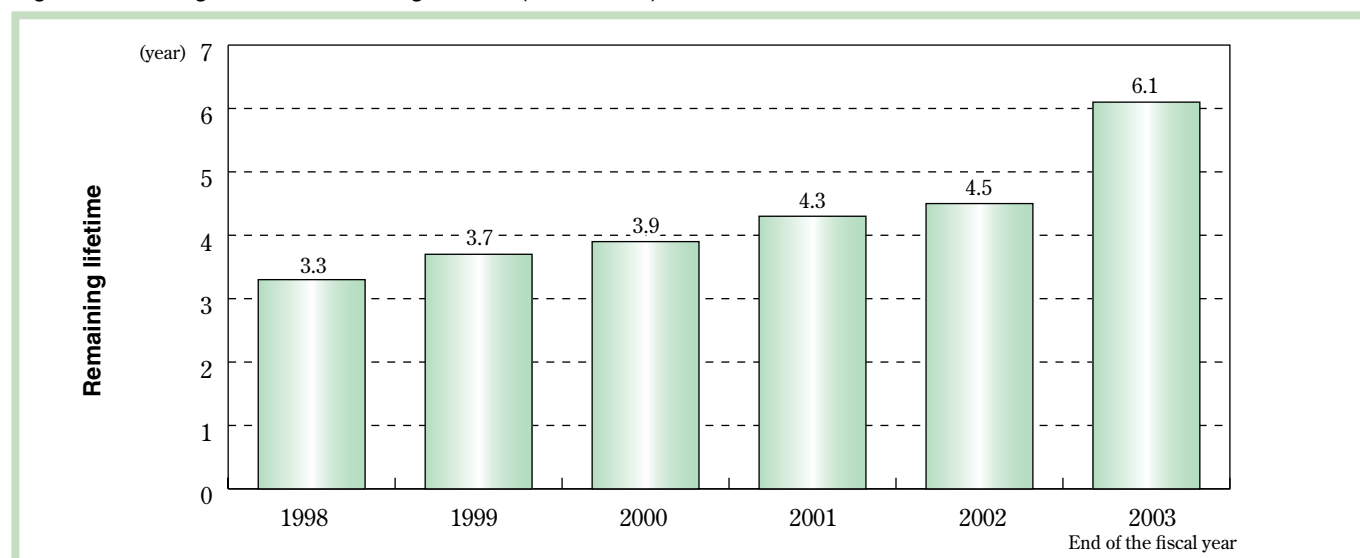
Figure 27 shows the changes in remaining capacity of final disposal sites. Figure 28 shows the changes in remaining lifetime. Though the national average remaining lifetime estimated from the final disposal amount in FY 2003 and remaining capacity as of April, 2004 is 6.1 years, the remaining lifetime in the capital region is 2.3 years, which indicates its severe conditions (Table 13). Table 13. Changes in the remaining capacity and remaining lifetime of final disposal sites of industrial waste (as of April 1, 2004)

Figure 27 Changes in the remaining capacity of final disposal sites (nationwide)



(Source: Ministry of Environment)

Figure 28 Changes in the remaining lifetime (nationwide)



(Source: Ministry of Environment)

Table 13 Changes in the remaining capacity and remaining lifetime of final disposal sites of industrial waste (as of April 1, 2004)

	Final disposal amount (ten thousand tons)	Remaining capacity (ten thousand m ³)	Remaining lifetime (year)
Nationwide	3,000	18,418	6.1
Capital region	807	1,878	2.3
Kinki region	432	1,839	4.3

*1: The capital region consists of Ibaraki Prefecture, Tochigi Prefecture, Gunma Prefecture, Saitama Prefecture, Chiba Prefecture, Tokyo Prefecture, Kanagawa Prefecture, and Yamanashi Prefecture. The Kinki Region consists of Mie Prefecture, Shiga Prefecture, Kyoto Prefecture, Osaka Prefecture, Hyogo Prefecture, Nara Prefecture, and Wakayama Prefecture.

2: Each final disposal amount of industrial waste in the capital region and Kinki region is calculated using the formula "30 million tons×26.9%(capital region)" and "30 million tons×14.4% (Kinki region)" (based on the ratio of the generation amount in FY 2003).

3: Remaining lifetime = remaining capacity/final disposal amount (scaling ratio: 1 ton = 1 m³)

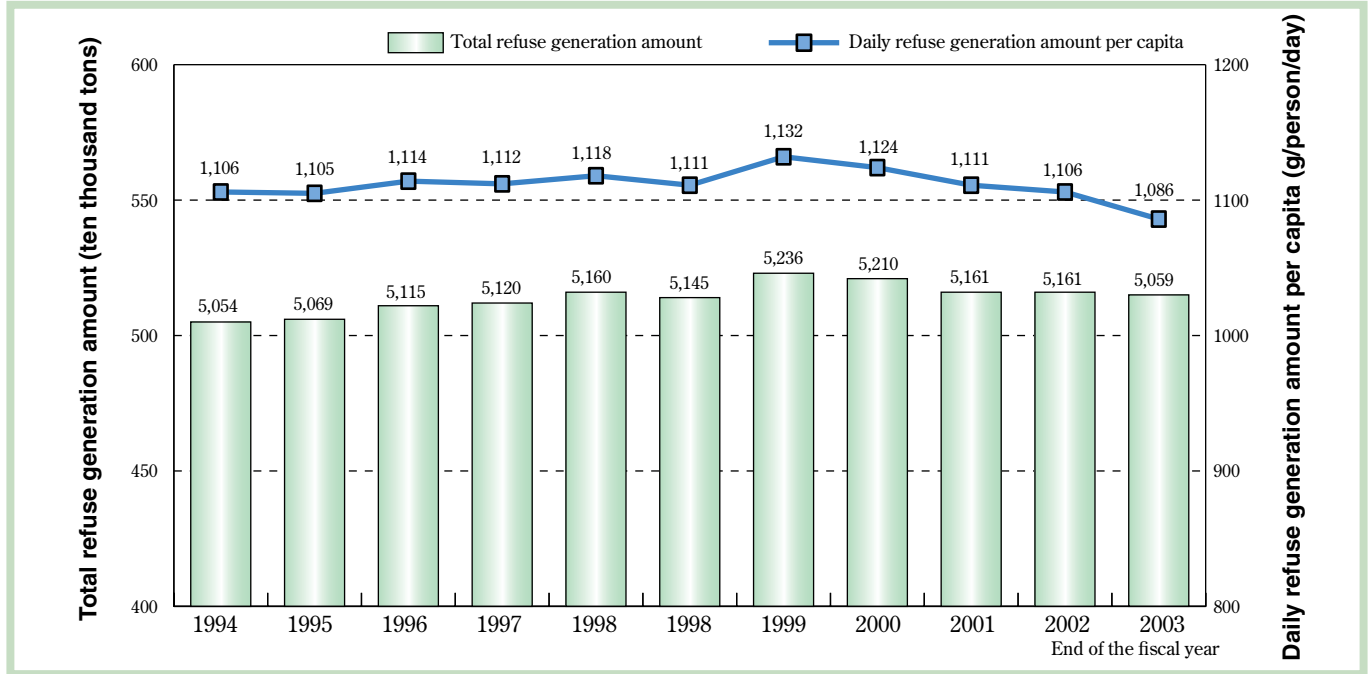
(Source: Ministry of Environment)

2. Current Status of Municipal Solid Waste (MSW)

(1) Changes in the Total Amount of Refuse Generation

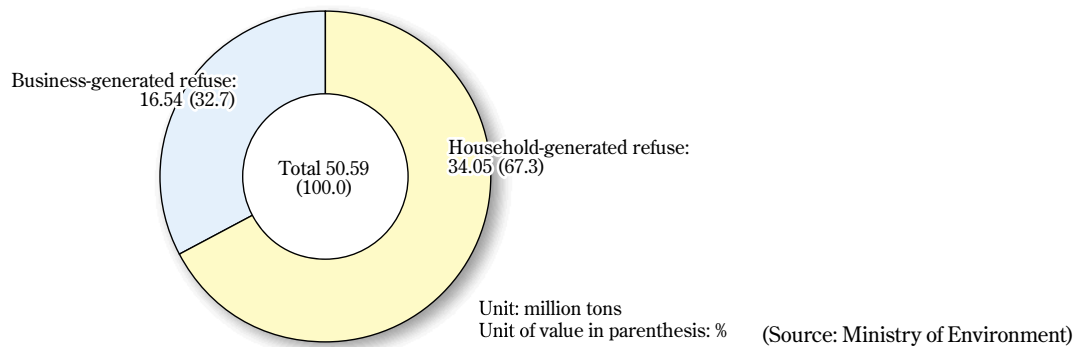
The total refuse generation amount in FY 2004 (note) is 50.59 million tons, and the daily refuse generation amount per capita is 1,086 grams. The refuse generation amount has been decreasing since FY 2000 (Figure 29). Breakdown of discharge forms shows that business-generated refuse is 16.54 million tons, and household-generated refuse is 34.05 million tons, which accounts for 67% of the total (Figure 30).

Figure 29 Changes in the total amount of refuse generation



Note: Total refuse generation amount = collected refuse amount + directly carry-in refuse amount + self-disposal amount
(Source: Ministry of Environment)

Figure 30 Generation ratio of household-generated refuse and business-generated refuse



(2) Refuse Disposal Flow

Figure 31 shows the flow of refuse disposal in FY 2004. Of the total refuse generation amount of 50.59 million tons, 50.46 million tons are the sum of refuse collected by municipalities and refuse directly carried in municipal facilities.

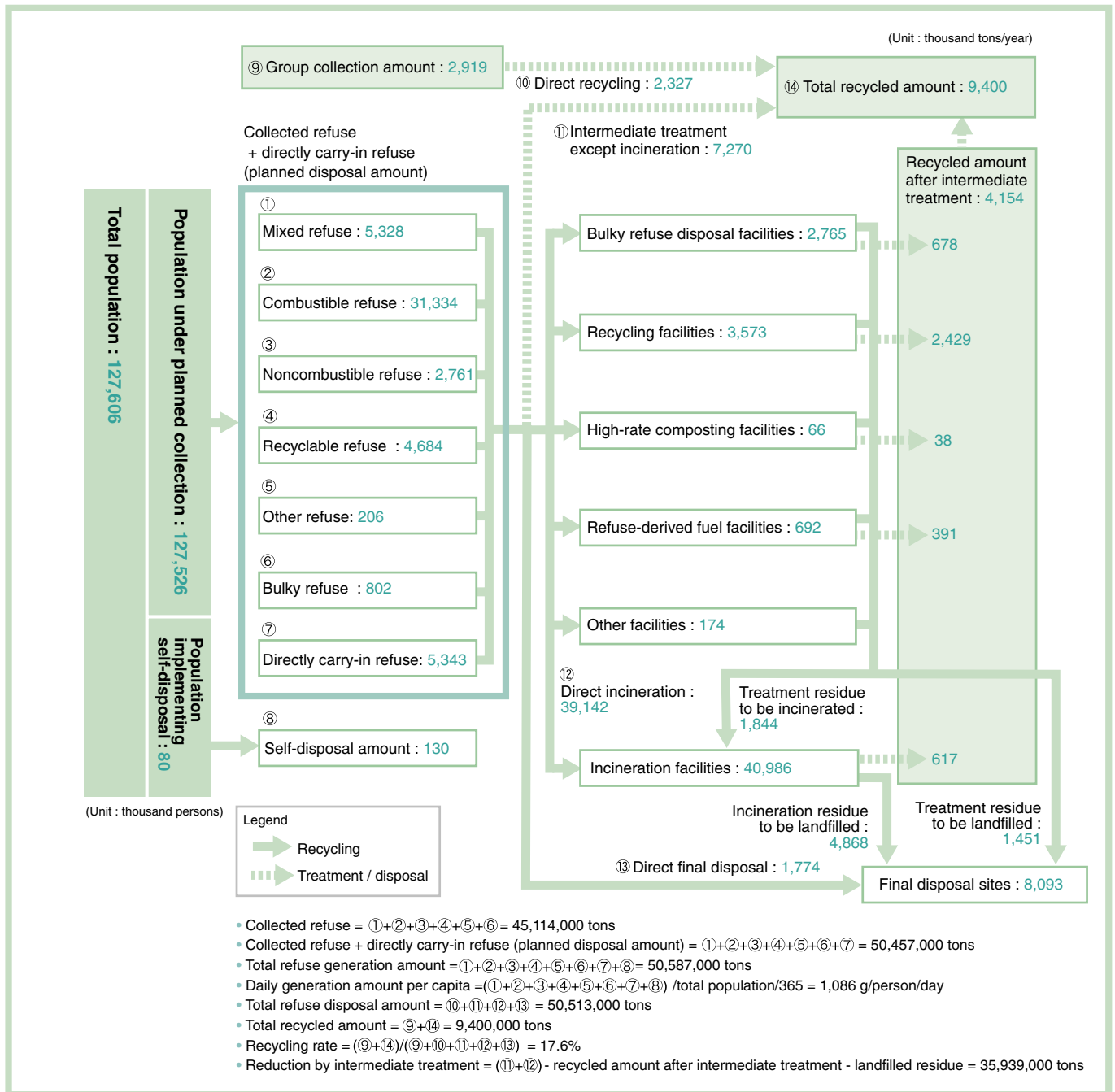
Breakdown of disposal processes shows that refuse directly delivered to recyclers is 2.33 million tons; refuse undergoing intermediate treatment except incineration (shredding, sorting, composting, and fuel recycling of bulky refuse) is 7.27 million tons; refuse directly incinerated is 39.14 million tons (77% of the total generation amount); and refuse directly delivered to final disposal sites is 1.77 million tons.

In terms of recycling, the total recycled amount is 9.4 million tons, which is the sum of the above directly-recycled amount of 2.33 million tons and the recycled amount after intermediate treatment of 4.15 million tons, plus the group collection amount of 2.91 million tons. The recycling rate is 17.6%.

The total final disposal amount is 8.09 million tons, which is the sum of the above direct final disposal of 1.77 million tons and land-filled residue after intermediate treatment of 1.45 million tons, plus landfilled incineration residue of 4.87 million tons.

The refuse amount in this statistics includes waste subject to the Containers and Packaging Recycling Law, as well as cooking waste and food residue generated from the food service industry, which are subject to the Food Recycling Law. Though end-of-life vehicles generated from households fall under municipal solid waste, they are not included in this statistics. Four items of home appliances subject to the Home Appliance Recycling Law, which have been collected as bulky refuse by municipalities before the enforcement of the law, are included in this statistics, though the amount after the enforcement of the law are excluded.

Figure 31 Refuse disposal flow in Japan

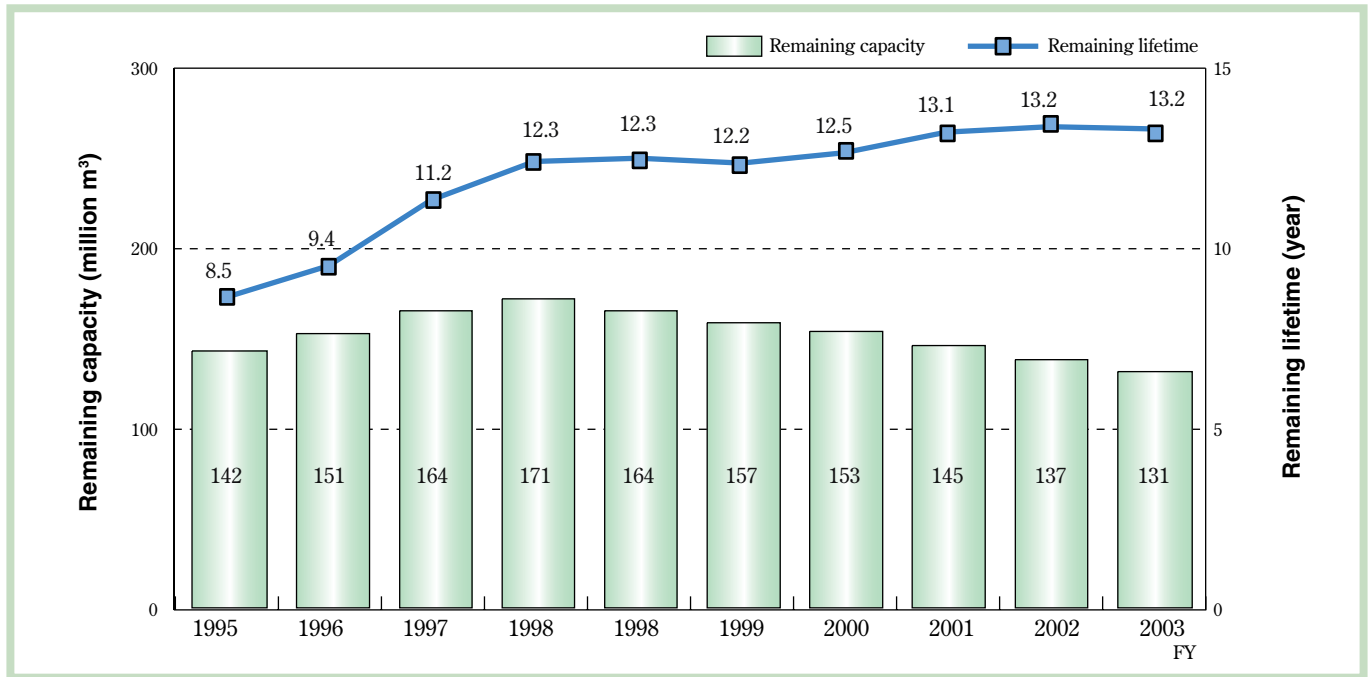


(Source: Ministry of Environment)

(3) Remaining Capacity and Remaining Lifetime of MSW (Refuse) Final Disposal Sites

Figure 32 shows the changes in the remaining capacity and remaining lifetime of refuse final disposal sites.

Figure 32 Changes in the remaining capacity and remaining lifetime of refuse final disposal sites



Note: Remaining lifetime means years during which refuse can be landfilled in the event that any other final disposal site is not newly established and the amount of landfill keeps at the same level of the relevant fiscal year.

$$(\text{Remaining lifetime}) = (\text{remaining capacity at the end of the fiscal year}) \div ((\text{final disposal amount for the relevant fiscal year}) \div (\text{specific gravity of landfilled refuse}))$$

(specific gravity of landfilled refuse = 0.8163)

(Source: Ministry of Environment)

WASTE MANAGEMENT and 3R (Reduce, Reuse, Recycle)
POLICIES JAPAN 2007

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Clean Japan Center

Clean Japan Center, established in 1975, is a public interest corporation supported jointly by governments and private sectors, including the Ministry of Economy, Trade and Industry, the Japan Chamber of Commerce and Industry, and the Japan Business Federation in order to promote recycling.

Clean Japan Center aims to promote the establishment of a sustainable resource-saving society through 3R (Reduce, Reuse, and Recycle) policies, and is working on initiative projects, including research study, gathering/provision of information, and awareness raising/promotion.

