

Towards a 3R-Oriented, Sustainable Society: Legislation and Trends 2010

Ministry of Economy, Trade and Industry

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In the course of economic activities based on mass-production/consumption/disposal, Japan has been producing an enormous amount of waste, and is currently facing various problems, such as a shortage of final disposal sites and adverse environmental effects of inappropriate waste disposal. There are concerns over the depletion of resources and energy for the future due to changes in the global economic status, thus resulting in a price surge for resources such as oil and iron.

In order to overcome problems with the environment as well as with resources, it is essential to establish a sustainable society by promoting what is called the “3Rs”: reduce waste generation, reuse parts, and recycle used products as raw materials.

The Japanese government currently strives to actively confront environmental and resource constraints by establishing and revising appropriate laws and guidelines. They include the Containers and Packaging Recycling Law, Home Appliance Recycling Law, Construction Materials Recycling Law, Food Recycling Law, End-of-Life Vehicles Recycling Law, Green Purchasing Law, Promotion of Utilization of Recycled Resources and Waste Disposal Law. Most importantly, however, the government should seek to establish a society in which environmentally concerned economic activities are highly appreciated through implementation of the 3Rs of every citizen, using it to penetrate into a range of economic activities and social engagements.

In accordance with the proposal presented in the report “Vision for an Economy of Recycling” prepared at the Industrial Structure Council, the Ministry of Economy, Trade and Industry has been promoting the “3R” policy in order to shift the society of mass-production/consumption/disposal to a sustainable economic system. This handbook features an outline of the legislation concerning the creation of a sustainable society and the trends of the 3Rs in individual fields. We hope that it will be helpful to those who are engaged in 3R-related activities.

1 The Need for Creating a Sustainable Society

In the course of economic activities based on mass-production/consumption/disposal, Japan is facing problems such as a shortage of final disposal sites and the adverse environmental effects of hazardous substances, as well as concern over the depletion of mineral resources in the future. These environmental and resource constraints are at the level in which a restriction of economic activities or reduction of the size of the economy would result.

(1) Environmental problems

In Japan, as many as 470 million tons of waste are generated every year, and the number of remaining sustainable years of final disposal sites is rapidly dwindling: 15.6 years for general waste and 7.7 years for industrial waste. Under these circumstances, it is necessary to promote measures concerning waste disposal and the 3Rs (reduce, reuse and recycling).

Furthermore, environmental problems have recently expanded, due to industrial pollution on a global level, including the long-term environmental effects of hazardous substances such as dioxin, PCB, and endocrine-disrupting chemicals, as well as global warming.

(2) Resource constraints

In the 20th century, human beings mined and consumed limited mineral resources such as oil and metal at a rapid pace. As a result, the supply of rare metals, indispensable for manufacturing high-tech products such as automobiles and electrical and electronic equipment, is increasingly at risk, along with general metal resources, which would obviously be restricted in 2050, according to an academic study.

According to the overview of Japan's material flow, Japan utilized about 1.82 billion tons of resources in total, consuming 490 million tons of energy and discharging 580

Fig. I-1a Environmental Problems

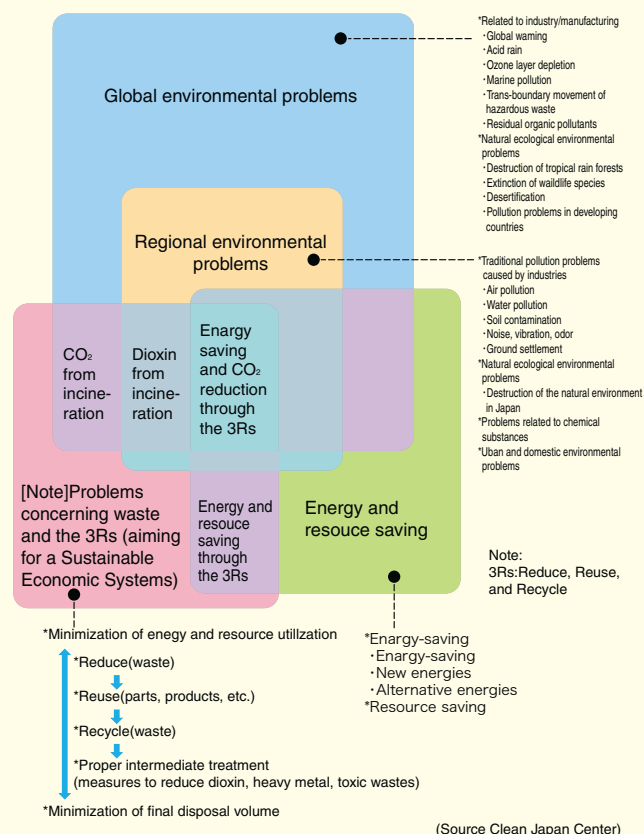


Fig. I-1b Cumulative Demand against Current Reserves by 2050

In the year 2050, more than several times more metallic resources will be required than the current reserves

The metals almost exhausted by 2050:

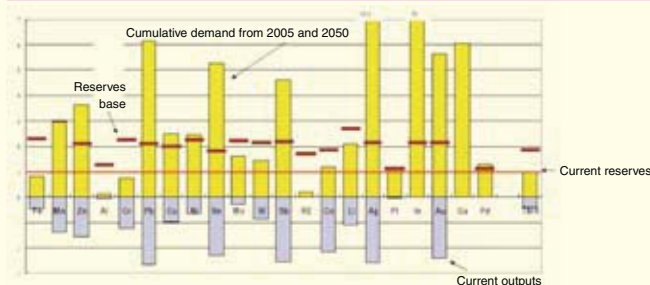
Fe, Mo, W, Co, Pt, Pd

The metals used twice as much as the current reserves by 2050:

Mi, Mn, Li, In, Ga

The metals exceeding the reserves by 2050:

Cu, Pb, Zn, Au, Ag, Sn



* Reserves base: Amount of resources including those that are economically difficult to mine at present and subeconomic resources.

Source: National Institute for Materials Science

million tons of waste.

Most of the 750 million tons of resources accumulated in Japan, which are utilized for roads, bridges, and buildings, will become industrial waste in due course. Meanwhile, the amount of resources that were recycled and reused was about 230 million tons and subsequently remained at a low level, accounting for about 12.5% of the total amount of resources utilized.

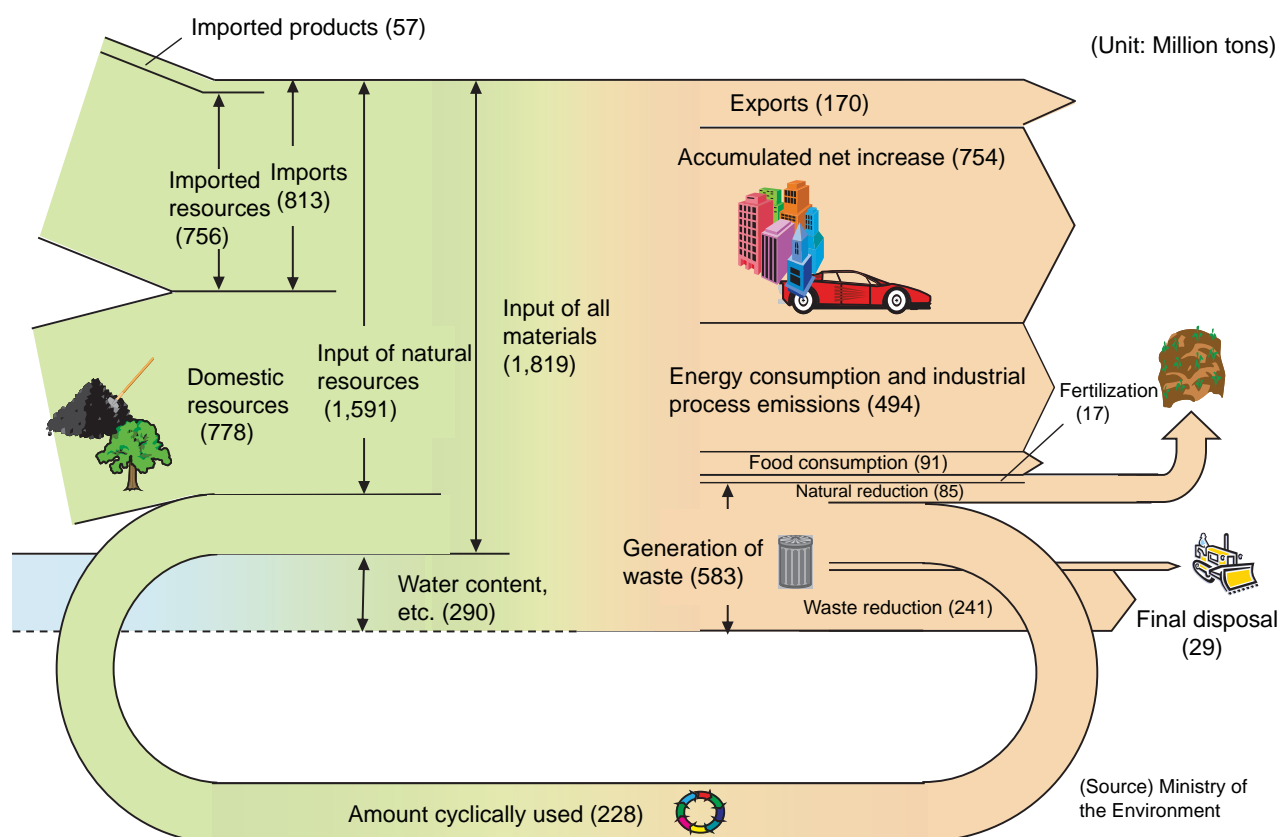
As outlined above, in order to achieve sustainable development in the 21st century, Japan should take measures in relation to problems concerning waste and enforce the 3Rs as its top priority. There is an urgent need to establish a new economic system that is favorable for both the environment and the economy.

More specifically, for the sustainable development of Japan, it is essential to move from the conventional economic system

that is based on mass-production/consumption/disposal and create a sustainable economic system and society, while promoting “the environmentalization of industry” (incorporating measures for environmental and resource constraints into business activities) and “industrialization of the environment” (generating market value through measures for environmental and resource constraints) through effective use of the power of the private sector.

*Source: White Paper on Environment/Sustainable Society (FY2008), Ministry of the Environment

Fig. I-2 Japan's Material Flow (FY2006)



(Note) Water content, etc.: Water content in waste (sludge, animal manure, excrement, waste acid, and waste alkali) and input of earth and sand accompanying economic activities (sludge from the mining industry, construction industry, and water supply business, and slag from the mining industry)

2 Current Situation for Waste in Japan

(1) Municipal Solid Waste (MSW)

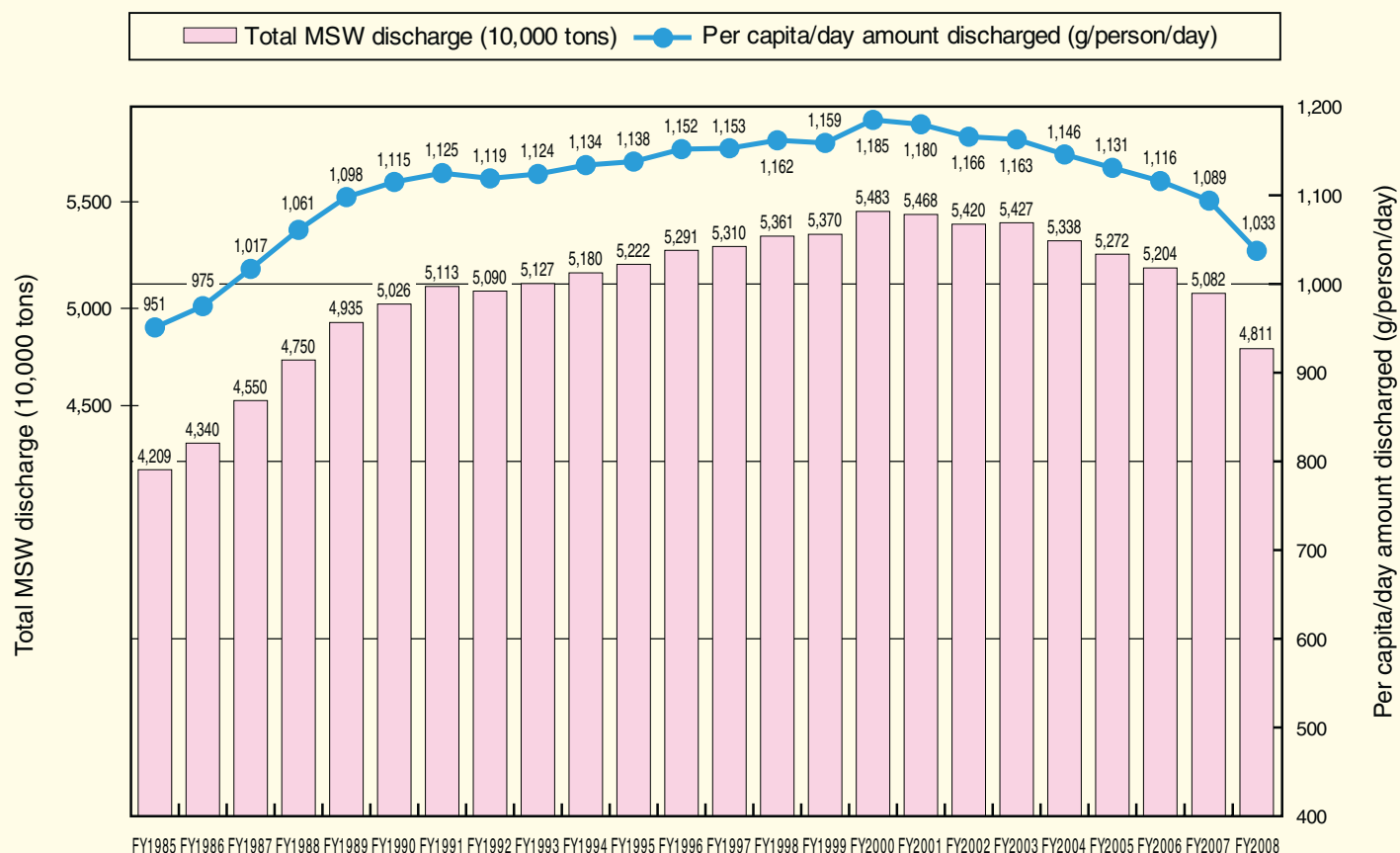
[1] Total amount of municipal solid waste discharged

The total amount of municipal solid waste discharged (MSW: waste discharged from households) in FY2008 was 48.11 million tons—enough to fill the Tokyo Dome 130 times (0.3 tons per m³)—with the per capita/day amount at 1,033g (see Fig. I-3).

The total amount of MSW discharged and the per capita/day amount discharged started to increase rapidly around FY1985. However, it has remained almost flat since FY1989,

and successively decreased from FY2000. The amount of disposal per person/day has decreased by about 13% from the peak year, FY2000.

Fig. I-3 MSW Discharge



Note: Total MSW discharge = MSW collected + MSW directly delivered + MSW treated in-house.

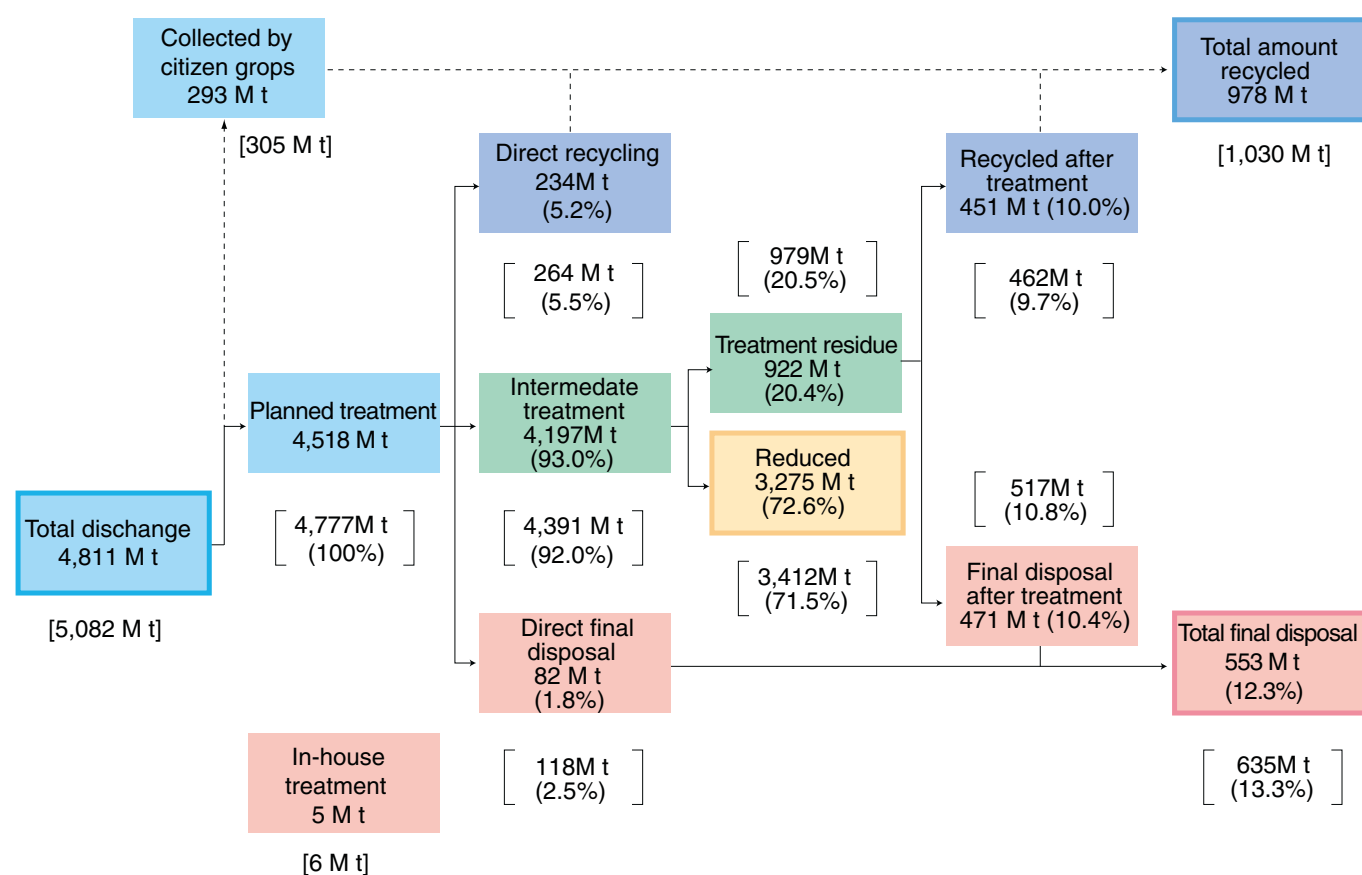
Source: Ministry of the Environment, Discharge and Treatment of MSW (FY2008) (April 16, 2010) (revised)

[2] Waste treatment

In the total amount of MSW treated in FY2008, 41.97 million tons underwent intermediate treatment by municipalities, such as incineration, comminution and selection, while 2.34 million tons were directly delivered to recycling industries, collectively accounting for 98.2% of the total amount of MSW treated. Out of the 41.97 million tons of MSW delivered to intermediate treatment facilities, 4.51 million tons were reused after treatment. The total amount

of MSW recycled, the sum of the amount of MSW recycled through intermediate treatment, the amount of MSW directly recycled, and the amount of recyclable resources recovered by citizen groups, was 19.78 million tons. Some 0.82 million tons of MSW were delivered to direct final disposal without going through intermediate treatment (direct landfill) and 32.75 million tons were reduced through intermediate treatment (see Fig. I-4).

Fig. I-4 Flow of MSW Treatment in Japan (FY2008)



Notes: 1. The total amount of MSW treated does not correspond to the “amount of scheduled treatment” due to errors in measurement.

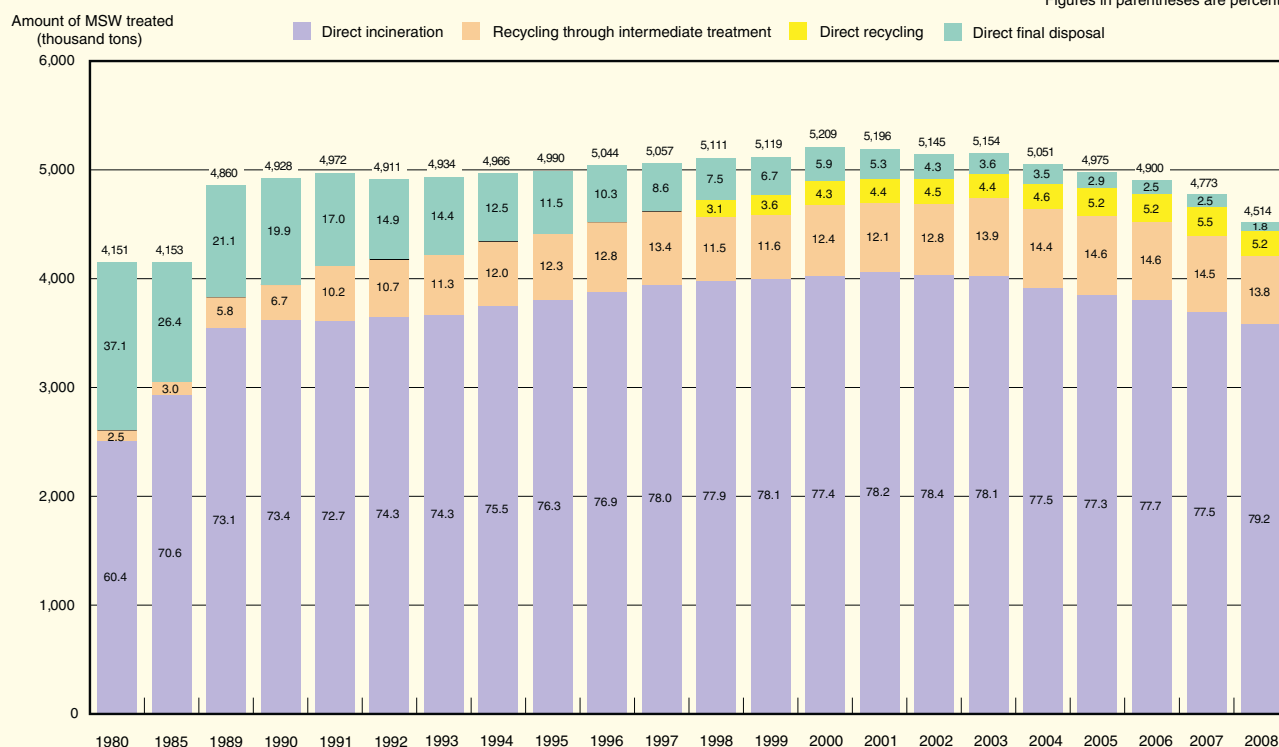
[]: the amount of FY2005

2. Rate of waste reduced in treatment (%) = [(intermediate treatment) + (directly recycling)] / (total MSW treated) x 100

Source: Ministry of the Environment, Discharge and Treatment of MSW (FY2008) (April 16, 2010)

Fig. I-5 Waste Treatment Methods

Figures in parentheses are percentages



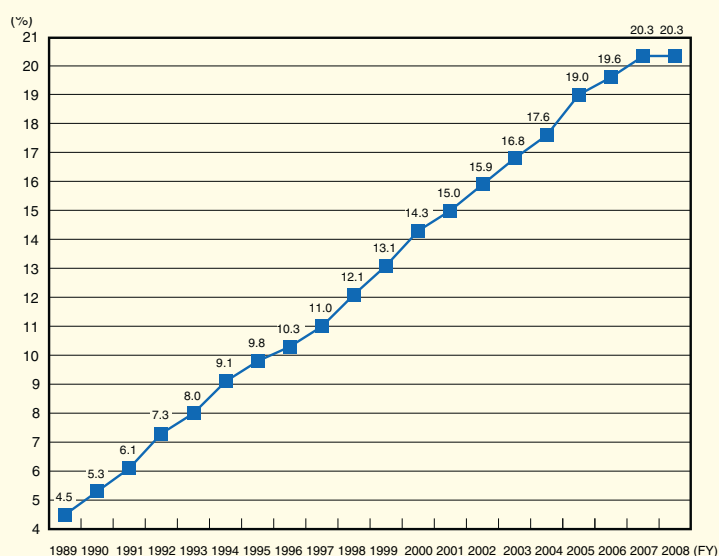
Notes: 1. Direct recycling is a category introduced in 1998, and refers to the amount of MSW that is directly delivered to recycling industries without going through recycling facilities.
2. Until FY1997, the amount of "direct recycling" was included in the amount of "recycling through intermediate treatment."

Source: Ministry of the Environment, Discharge and Treatment of MSW (FY2008) (April 16, 2010) (revised)

[3] Recycling

In FY2008, 2.34 million tons of MSW were separately collected and directly recycled by municipalities, 4.51 million tons were recycled through intermediate treatment, and 2.93 million tons were collected by citizen groups for recycling. The total amount of MSW recycled, aggregating all of the above, was 9.78 million tons (see Fig. I-4). The recycling rate increased yearly to 20.3%, about four times higher than in FY1989 (4.5%) (see Fig. I-6). However, recycling has yet to be promoted sufficiently for some kinds of MSW, such as kitchen garbage.

Fig. I-6 Recycling Rate



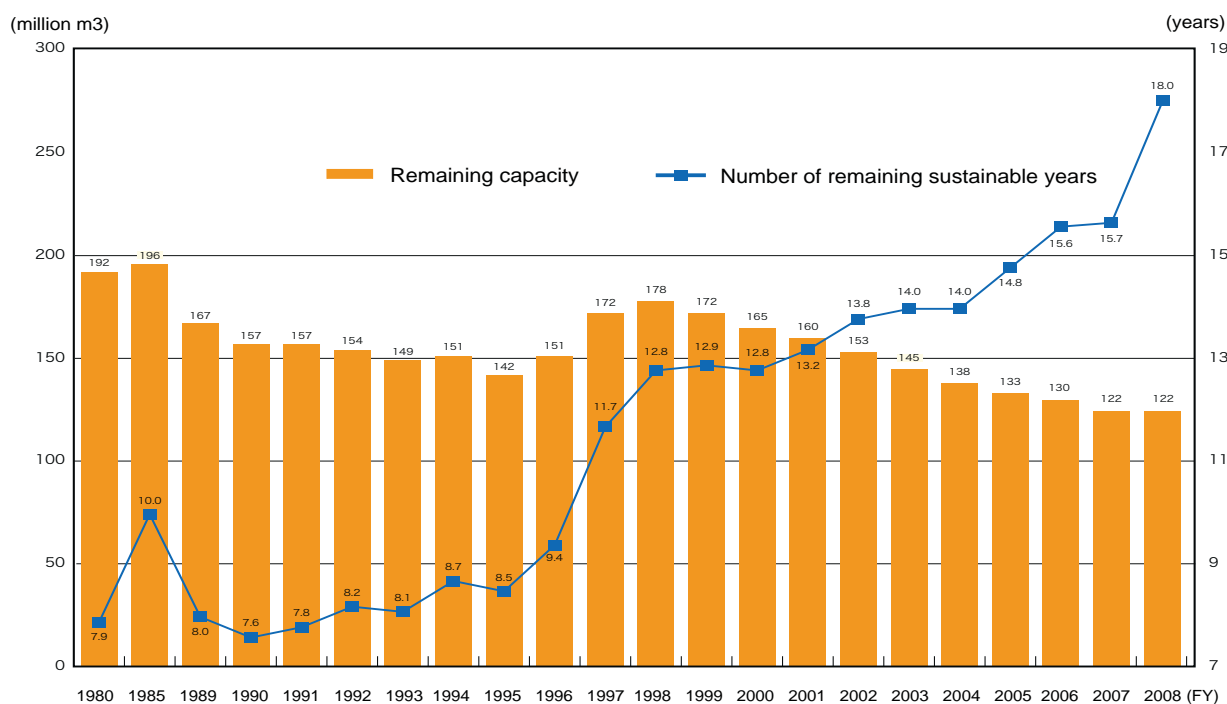
Source: Ministry of the Environment, Discharge and Treatment of MSW (FY2008) (April 16, 2010) (revised)

[4] Final disposal sites

As of the end of FY2008, there were 1,823 final disposal sites for MSW. The remaining capacity was 121.84 million m³ and the national estimated number of remaining

sustainable years was 18.0 years (see Fig. I-7). As the distribution of final disposal sites is regionally uneven, the number of remaining sustainable years may differ among regions.

Fig. I-7 Remaining Capacity and Number of Remaining Sustainable Years of Final Disposal Sites for MSW



$$\text{Number of remaining sustainable years} = \frac{\text{Remaining capacity at the end of the fiscal year}}{(\text{Total final disposal in the fiscal year} / \text{Weight of landfill waste})}$$

Note) Of the remaining capacity corrected in accordance with an air survey, etc. in FY2005, the increment amount (7,737m³) was added to the data for the fiscal years before 2004 to compute the remaining capacity and the number of remaining sustainable years for each fiscal year.

Source: Ministry of the Environment, Discharge and Treatment of MSW (FY2008) (April 16, 2010) (revised)

Final landfill/Facility for exudated water treatment



(2) Industrial Waste

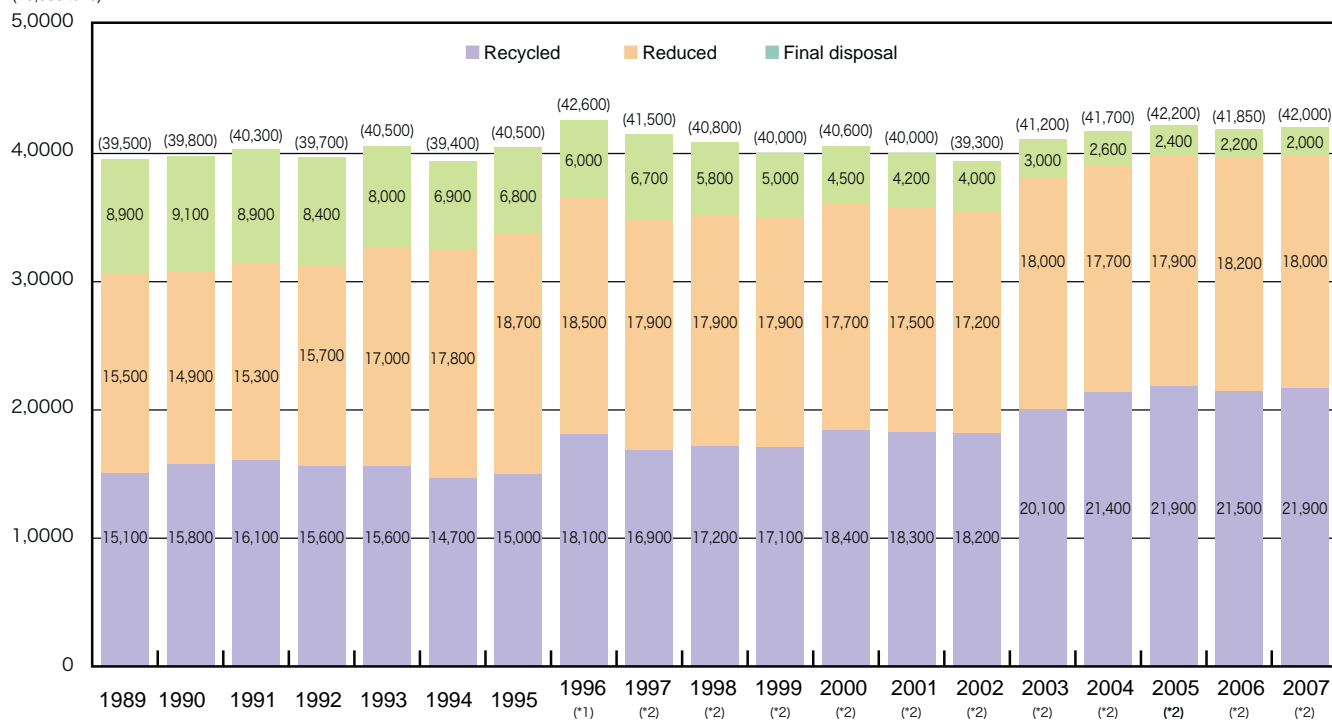
[1] Total amount of industrial waste discharged

The total amount of industrial waste discharged in Japan in FY2007 was about 419 million tons, remaining almost flat since FY1990. The amount of industrial waste recycled and the amount of industrial waste reduced through intermediate treatment has been increasing gradually. Therefore, the

amount of final disposal has been decreasing and stood at 20 million tons in FY2007 (see Fig. I-8).

Fig. I-8 Industrial Waste Discharge

Amount of discharge
(10,000 tons)



- Notes: 1. The amount of discharge(*1) shown above is the amount in FY 1996 according to the “target amount of waste reduction” set by the government to be achieved by FY 2010(decided by the government on September 28, 1999) under the Basic Policy for Measures against Dioxin (decided by the Ministerial Meeting on Measures Against Dioxin).
2. The amount of discharge(*2) for FY 1997 and after is calculated under the same conditions as 1 above.

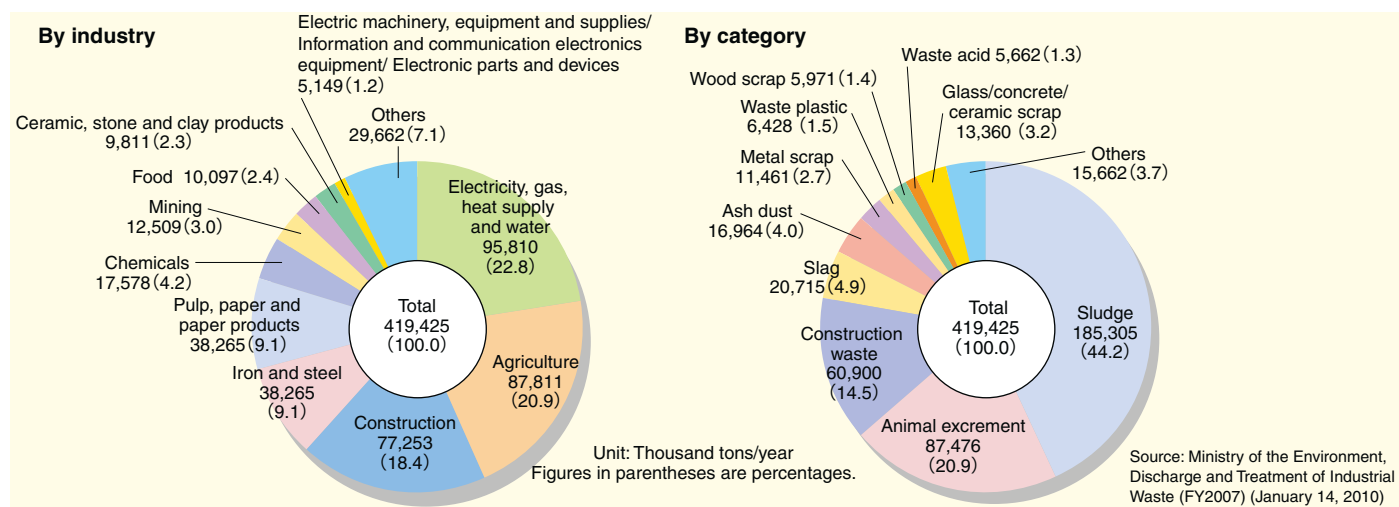
*The aggregate total may not correspond to the total amount because figures for individual amounts are rounded off.

[2] Amount of discharge by industry and category

The amount of discharge by six industries — electricity/gas/heat/water and sewage, agriculture, construction, iron and steel, pulp/paper and paper products, and chemicals — accounted for about 80% of the total amount of industrial waste discharged. In terms of category, sludge, animal

excrement and construction waste accounted for about 80% of the total amount of industrial waste discharged (see Fig. I-9).

Fig. I-9 Amount of Industrial Waste Discharged by Industry and Category (FY2007)

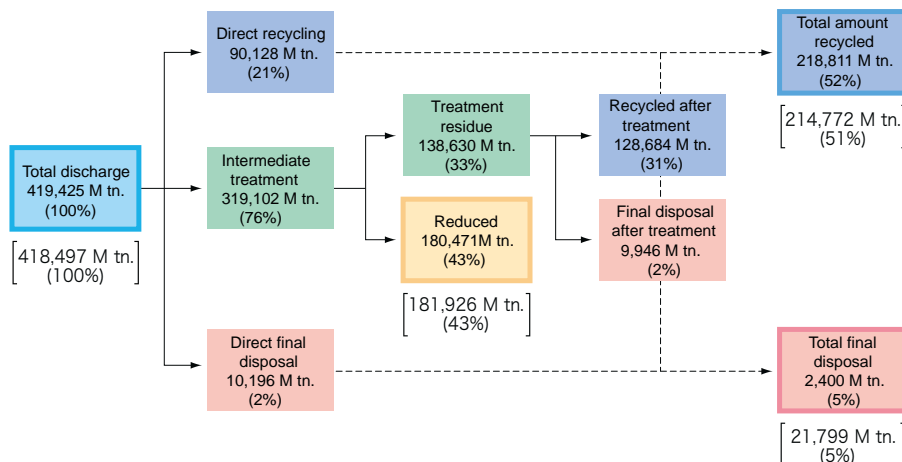


[3] Flow of industrial waste treatment

Of the total amount of industrial waste discharged (about 419.4 million tons), about 90.1 million tons were directly recycled, and about 319.1 million tons were delivered to intermediate treatment, which were further reduced to about 138.6 million tons and then recycled or finally disposed

of. Finally, 52% of the total amount of industrial waste discharged was recycled and 5% was finally disposed of (see Fig. I-10).

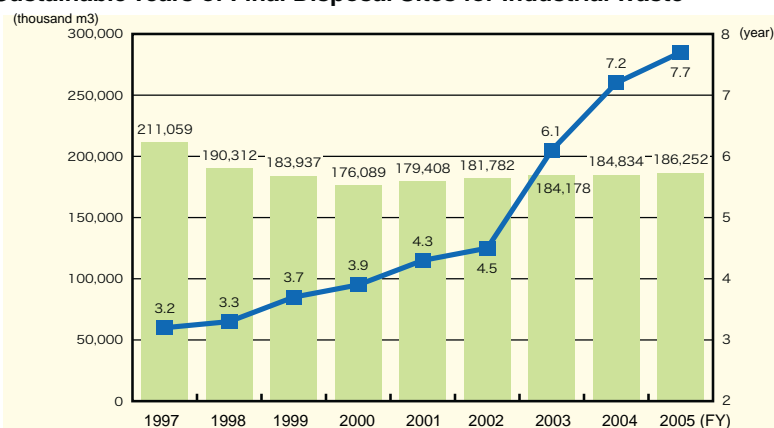
Fig. I-10 Flow of Industrial Waste Treatment in Japan (FY2006)



[4] Final disposal sites

As of April 1, 2005, the remaining capacity of final disposal sites for industrial waste was about 186.25 million m³, an increase of about 1.42 million m³ (0.8%) over the previous year. The national average number of remaining sustainable years of final disposal sites was 7.7 years (see Fig. I-11).

Fig. I-11 Remaining Capacity and Number of Remaining Sustainable Years of Final Disposal Sites for Industrial Waste



1 Legislative System

In the more than ten years since the “Law for Promotion of Utilization of Recycled Resources (amended to the Law for Promotion of Effective Utilization of Resources)” came into force in 1991, related laws have systematically been provided

based on experience and measures of promoting the reduction, reuse and recycling of waste. The “Containers and Packaging Recycling Law” and the “Food Recycling Law” were amended in June 2006 and June 2007 respectively (see Fig. II-1).

Fig. II-1 Legislative System for Promoting the Creation of a 3R-Oriented Society

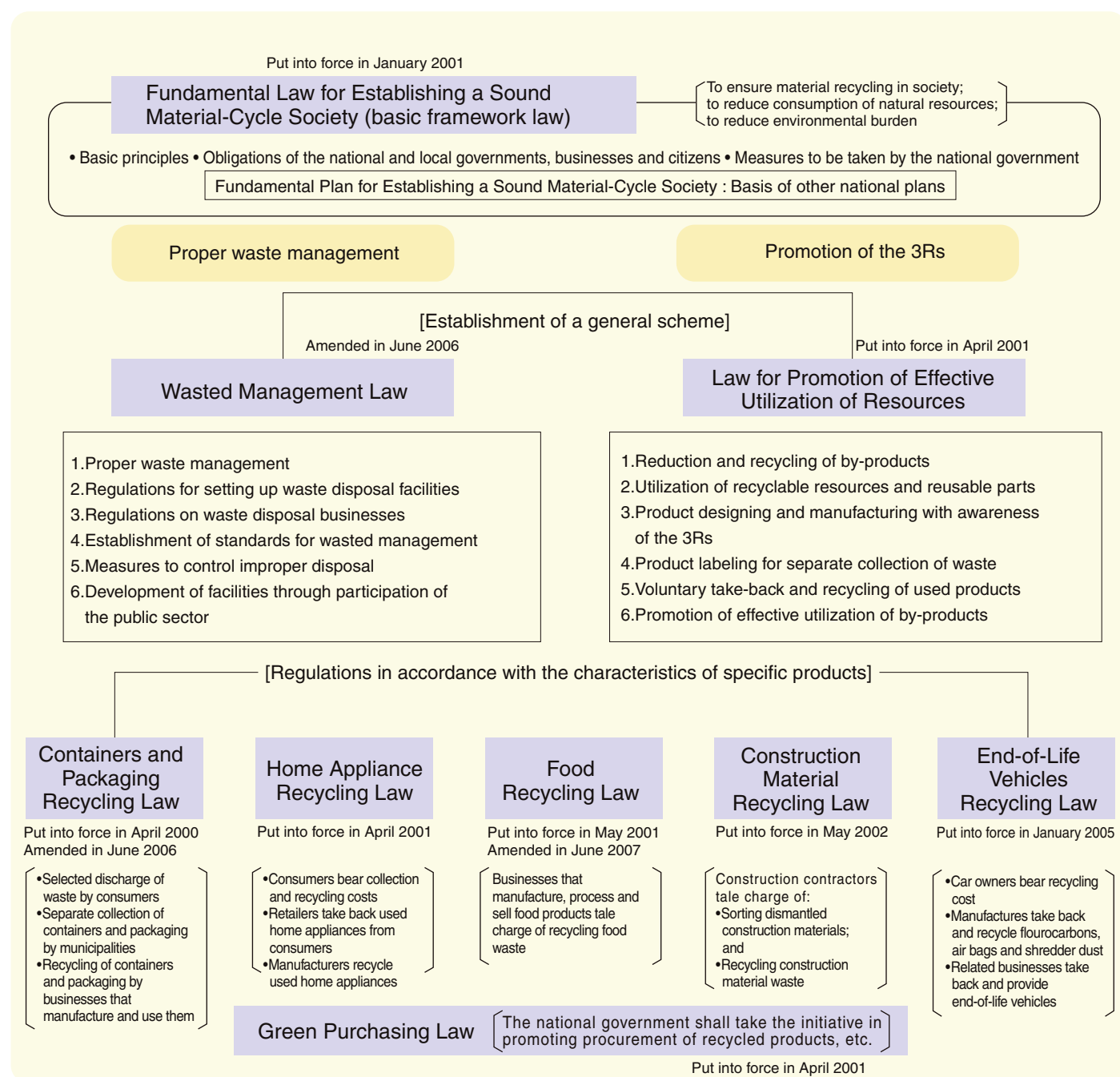


Fig. II-2a Laws in Product Lifecycle

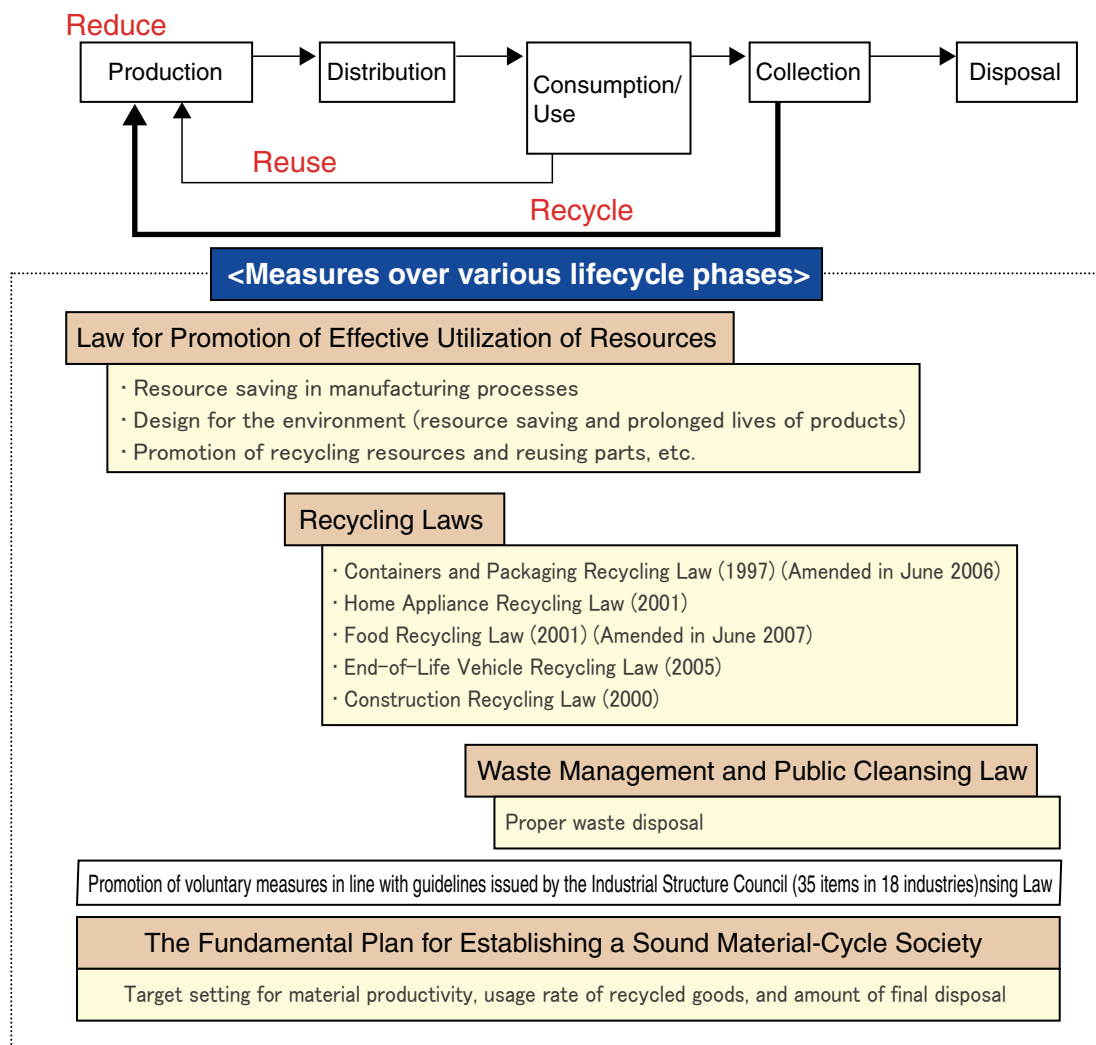
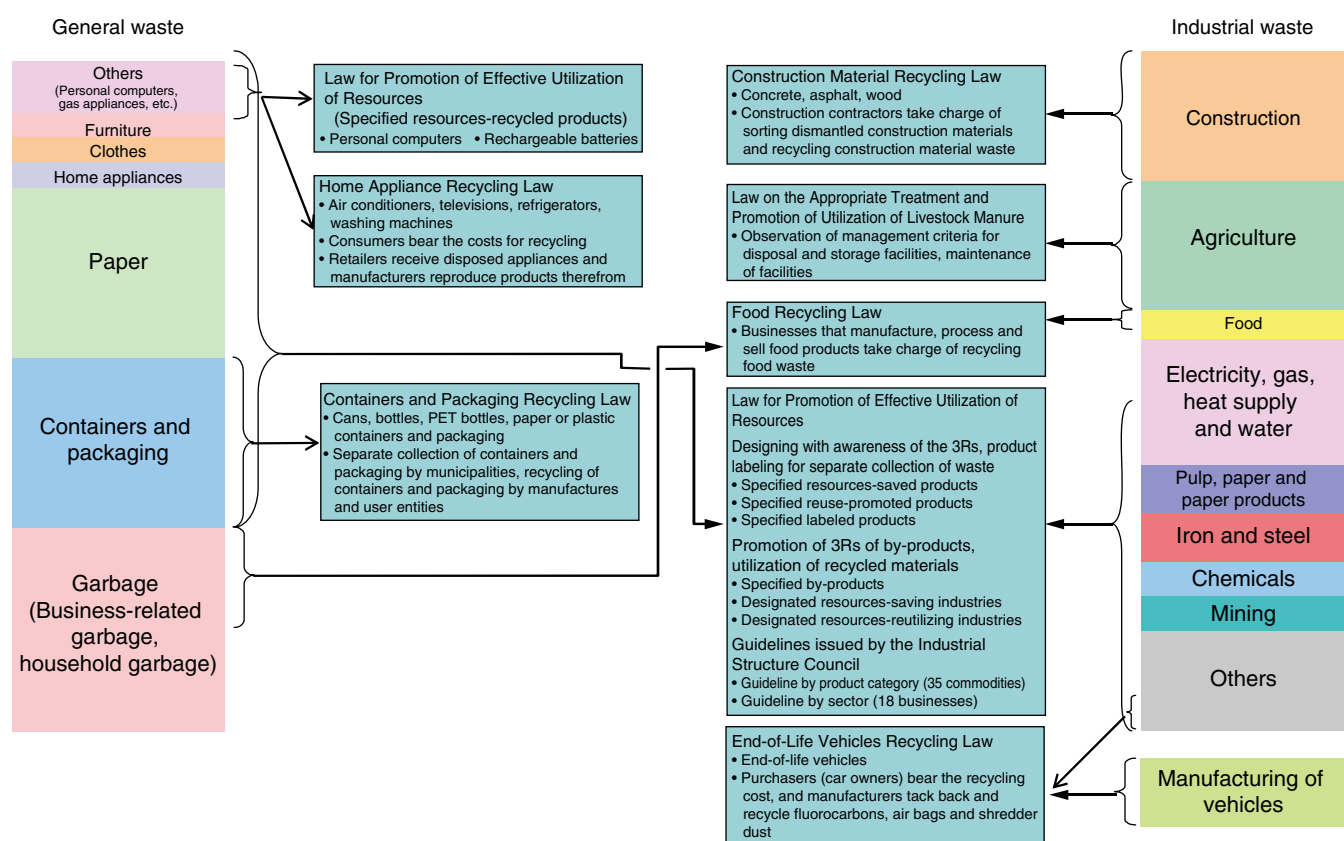


Fig. II-2b Shift to a Sustainable Society

	Year	Law (enforcement)	Social situation, etc.
End of WWII	1945		Waste was a “public sanitation problem” arising from garbage that must be solved in the public health service.
	1960		Worsened environmental contamination was caused by illegal waste handling as a result of a massive generation of waste.
High economic growth period	1971	Waste Management and Public Cleansing Law	...Clarification of waste disposal responsibility and disposal standard, including industrial waste.
	1991	Law for the Promotion of Utilization of Recycled Resources	...The start of promoting recycling measures based on the recycling laws.
The 1st year of an era of sustainable society	2000	Containers and Packaging Recycling Law	
	2001	The Fundamental Law for Establishing a Sound Material-Cycle Society	Building a sustainable society in which consumption of natural resources, thereby the environmental load, is reduced.
		Law for Promotion of Effective Utilization of Resources	The 3R concept that gives priority to reducing and reusing over recycling.
		Home Appliance Recycling Law	Overall amendment of the Law for the Promotion of Utilization of Recycled Resources for comprehensive promotion of 3R efforts.
		Food Recycling Law	
		Green Purchasing Law	
	2002	Construction Waste Recycling Law	
	2005	End-of-Life Vehicle Recycling Law	

In addition to these laws, 3R for a diverse range of wastes, by-products, and used products has been promoted by implementing necessary measures according to the guidelines (see p.46) provided by the Industrial Structure Council for relevant commodities and businesses.

Fig. II-3 Laws and Guidelines to Control Waste



2 Fundamental Law for Establishing a Sound Material-Cycle Society

- [1] Title of the law: Fundamental Law for Establishing a Sound Material-Cycle Society
- [2] Date put into force: January 2001 (promulgated in June 2000)
- [3] Purpose: Providing a basic framework and clarifying the process for establishing a sound material-cycle society

Outline of the Law

The law defines individual roles to be played by citizens, businesses, municipalities and the national government in establishing a sound material-cycle society, and provides basic principles for promoting necessary measures (see Fig. II-4).

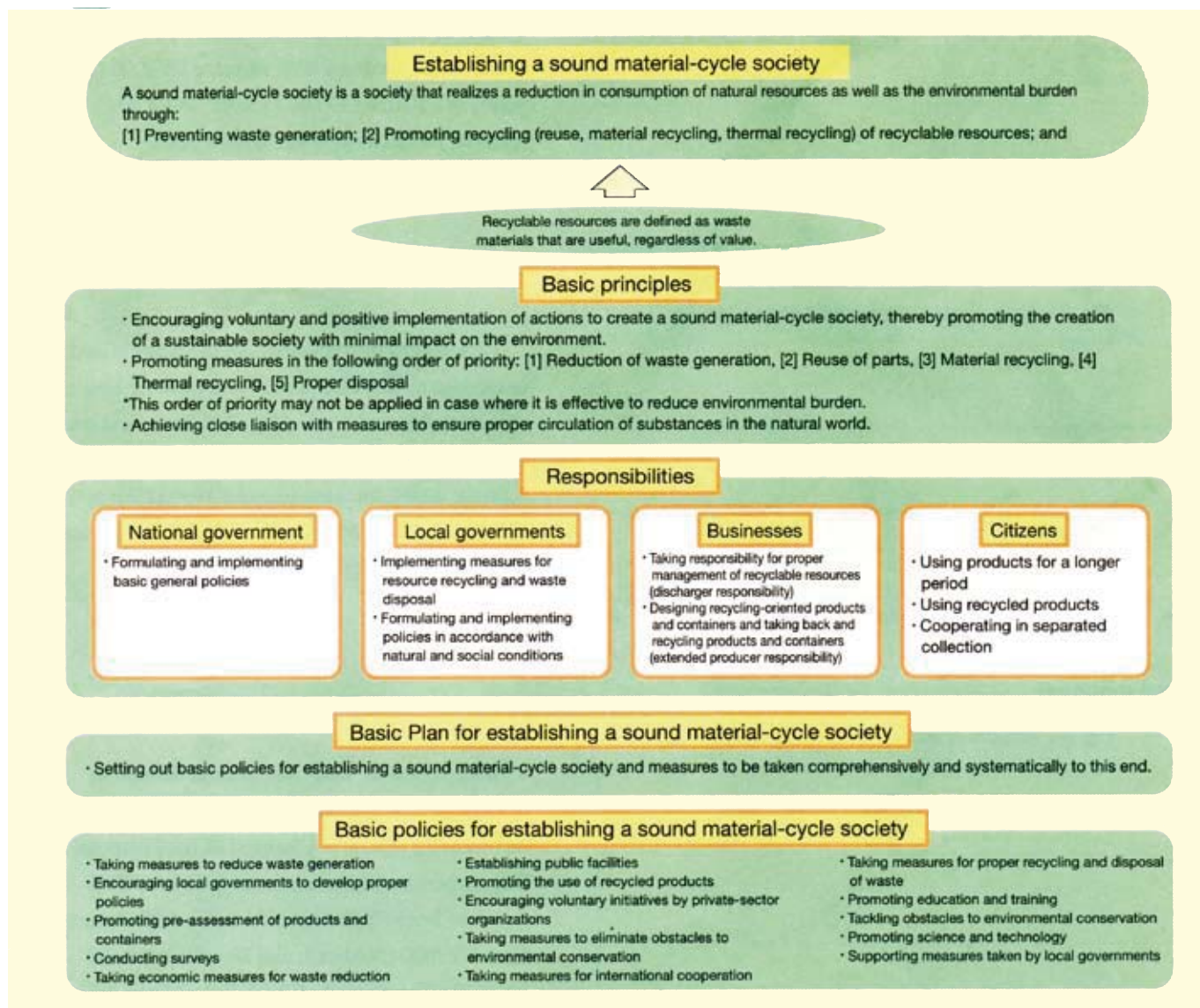
(1) Subjects to be regulated

The law states that it shall be applicable to “waste” in general, valuable or valueless, and that efforts should be made to prevent products from generating waste materials and to promote recycling of such waste materials generated by focusing on their utility as “recyclable resources.”

(2) Parties to be regulated

The law attributes responsibility to the national and local governments, businesses and citizens. The two distinctive features of the law are that it clarifies the discharger responsibility of businesses and citizens, while defining the extended producer responsibility.

Fig. II-4 Framework of Fundamental Law for Establishing a Sound Material-Cycle Society



(3) Basic Plan for Establishing a Sound Material-Cycle Society

The Basic Plan for Establishing a Sound Material-Cycle Society was developed in March 2003 during efforts to comprehensively promote the policies related to Establishing a Sound Material-Cycle Society, as planned.

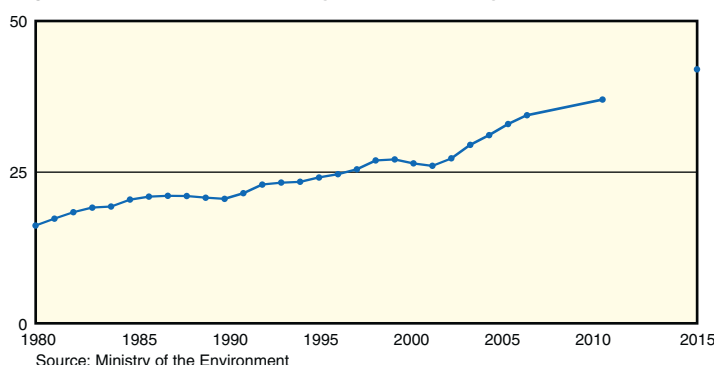
This Basic Plan is to be reviewed roughly every five years, and in March 2008, the plan was revised into the Second Basic Plan for Establishing a Sound Material-Cycle Society

In the Second Basic Plan, numerical targets for FY2015

are provided for three indices of different phases of the material flow: “entry,” “recycled” and “exit” so as to ascertain how much resources are taken, consumed and disposed. Meanwhile, account was taken of past trends in technological innovation and changes in the demand structure of goods and services toward realization of a Sound Material-Cycle Society, where measures for waste generation restraints, reuse, reuse after treatment, disposal and so forth are well balanced.

[1] Material productivity (=GDP/Amount of natural resources)

Fig. II-5 Material Productivity (Unit: 10,000 yen/t)

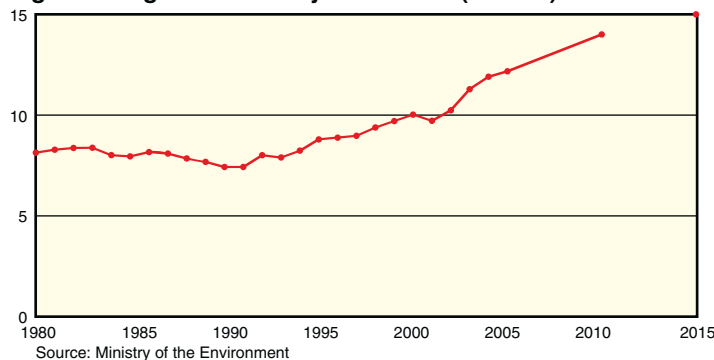


Note) Material productivity in FY2007 was 361,000 yen/t, up by 37% from FY2000 (264,000 yen/t).

With regard to “entry,” an index is defined as “material productivity” representing how effectively material is used (how much affluence is produced with less resource) by industries and people’s lives. The numerical target was doubled from FY1990 [210,000 yen/t], and aimed at a 60% increase of the FY2000 rate [260,000 yen/t] in FY2015 [420,000 yen/t]. In FY2007, the material productivity was 361,000 yen/t.

[2] Usage rate of Recycled Goods (=Usage rate of recycled goods / (Usage rate of recycled goods + amount of natural resources used))

Fig. II-6 Usage Rate of Recycled Goods (Unit: %)

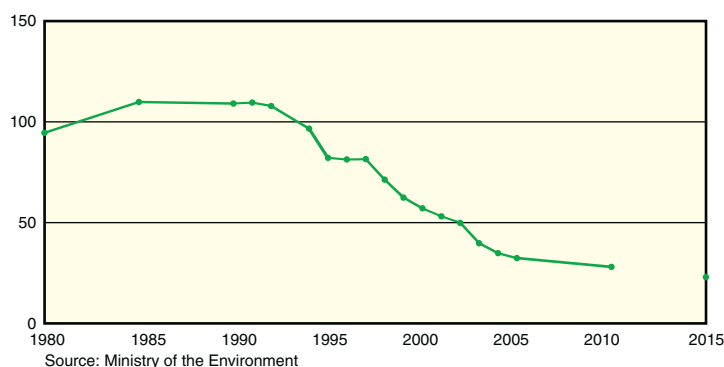


Note) Usage rate of recycled goods in FY2007 was 13.5%, up by 3.5 points from FY2000 (10.0%).

With regard to “recycled,” an index is defined as “usage rate of recycled goods” representing how much resource input is cyclically used (reuse and reuse after treatment). The numerical targets are set as follows: an 80% increase from FY1990 [8%] and a 40 to 50% increase from FY2000 [10%] to reach 14 to 15% in FY2015. It was 13.5% in FY2007.

[3] Final disposal

Fig. II-7 Amount of Final Disposal (Unit: Million tons)



Note) The amount of final disposal in FY2007 was 27 million tons, down by 53% from FY2000 (56 million tons).

With regard to “exit,” an index is defined as “amount of final disposal” (landfill waste) representing an urgent need for final disposal sites. The numerical targets are set as follows: an 80% decrease from FY1990 [110M tn.] and a 60% decrease from FY2000 [56M tn.] to reach 23 million tons in FY2015. The amount of final disposal was 27 million tons in FY2007.

(4) Extended producer responsibility

In discussions on 3R-related policies and systems, “Extended Producer Responsibility (EPR)” is often used.

Extended producer responsibility means that producers bear a certain degree of responsibility for proper recycling and management of the products that they produced even after the products are used and disposed of.

More specifically, in order to contribute to prevention of waste generation as well as recycling and proper disposal of recyclable resources, producers are required to [1] design recycling-oriented products, [2] indicate the materials or ingredients of products, and [3] take back and recycle designated products after they are disposed of.

Having studied extended producer responsibility as an

environmental policy approach since 1994, the OECD developed and published a guidance manual for OECD members in 2001.

Table II-1 Extended Producer Responsibility under the OECD “Extended Producer Responsibility: Guidance Manual for Governments”

[1] Definition	<p>“An environmental policy approach in which a producer's responsibility, physical and/or financial, for a product is extended to the post-consumer stage of a product's life cycle”. This approach has the following features:</p> <p>(a) The responsibility is transferred from local governments to the producer.</p> <p>(b) Producers consider the environmental impact when designing their products.</p>
[2] Primary effect	<p>Transfer the financial and/or physical responsibility of waste management from local governments and the general taxpayer to the producer, encourage positive changes in material selection and in the design aspects of a product. Appropriate signals can be sent to the producer to internalize a substantial portion of the external environmental cost of the product.</p>
[3] Major objective	<p>(a) Source reduction (natural resource conservation/material conservation)</p> <p>(b) Waste prevention</p> <p>(c) Design of more environmentally compatible products</p> <p>(d) Closure of material-use loops to promote sustainable development</p>
[4] Sharing responsibility	<p>Sharing responsibility among parties concerned in the product chain from production to disposal is an inherent key of EPR.</p>
[5] Specific policy instruments and measures	<p>(a) Take-back and recycling of products</p> <p>(b) Deposit/refund scheme</p> <p>(c) Material taxes as earmarked taxes</p> <p>(d) Advance disposal fee</p> <p>(e) Criteria for users of recycled products</p> <p>(f) Leasing</p>
[6] EPR and PPP	<p>The Polluter Pays Principle (PPP) states that the polluter should bear the expenses of preventing and controlling pollution to ensure that the environment is in an acceptable state.</p> <p>In contrast, EPR seeks to solve problems by holding producers responsible for the entire life cycle of a product.</p> <p>Inconsistency between EPR and PPP can be completely prevented by clearly defining their roles.</p>

Source: OECD, Extended Producer Responsibility: Guidance Manual for Governments (2001) (compiled by the Clean Japan Center)

3 Law for Promotion of Effective Utilization of Resources

- [1] Title of the law: Law for Promotion of Effective Utilization of Resources
- [2] Date put into force: April 2001 (promulgated in June 2000)
- [3] Purpose: Comprehensively promoting reduction of waste, reuse of parts, and recycling of used products as raw materials
- [4] Outline of the law: The law provides for measures to be taken by businesses, such as 3R-related measures in the production stage, 3R consideration in the product designing stage, labeling for separated collection, and development of a system for self-collection and recycling by manufacturers.

(1) Responsibilities of parties concerned

[1] Businesses

- Rationalize use of raw materials with the aim of reducing used products and by-products
- Using recyclable resources and reusable parts
- Promoting the use of used products and by-products as recyclable resources and reusable parts

“Recyclable resources”: Used products or by-products (waste) generated in plants that can be used as raw materials

“Reusable parts”: Used goods that can be used as parts of the products

[2] Consumers

- Using products as long as possible
- Using products containing recyclable resources
- Cooperating for separated collection
- Cooperating with measures taken by the national and local governments as well as by businesses

[3] National and local governments

- Taking financial measures
- Promoting the use of recyclable resources in procurement
- Promoting science and technology development
- Endeavoring to gain the understanding of the public

(3) Provision of product information

In order to integrate DfE into the economic system and benefit the entire company, it is vital to achieve clear standardization in labeling and assessment indices for DfE to facilitate each entity involved in the product life cycle.

Law for Promotion of Effective Utilization of Resources therefore designates product items in which the 3Rs are considered. Items include automobiles, home electric appliances (television sets, refrigerators, washing machines, microwave ovens, clothes dryers), PCs, copiers, metal furniture, gas/oil equipment, bathroom units and pachinko machines. Items the require labeling for separate collection include PET bottles, steel cans, aluminum cans, plastic tray packaging, paper container packaging and compact secondary batteries. Moreover, a new information disclosure system with information on materials contained in the product (home electric appliances and PCs) was planned to be introduced in July 2006.

(2) Industries and products to be regulated

The law provides the standards of judgment (ministerial ordinances) for the 3Rs (reduction, reuse and recycling), and requires that businesses comply with the standards with respect to 10 designated industries and 69 product items (covering about 50% of municipal and industrial waste).

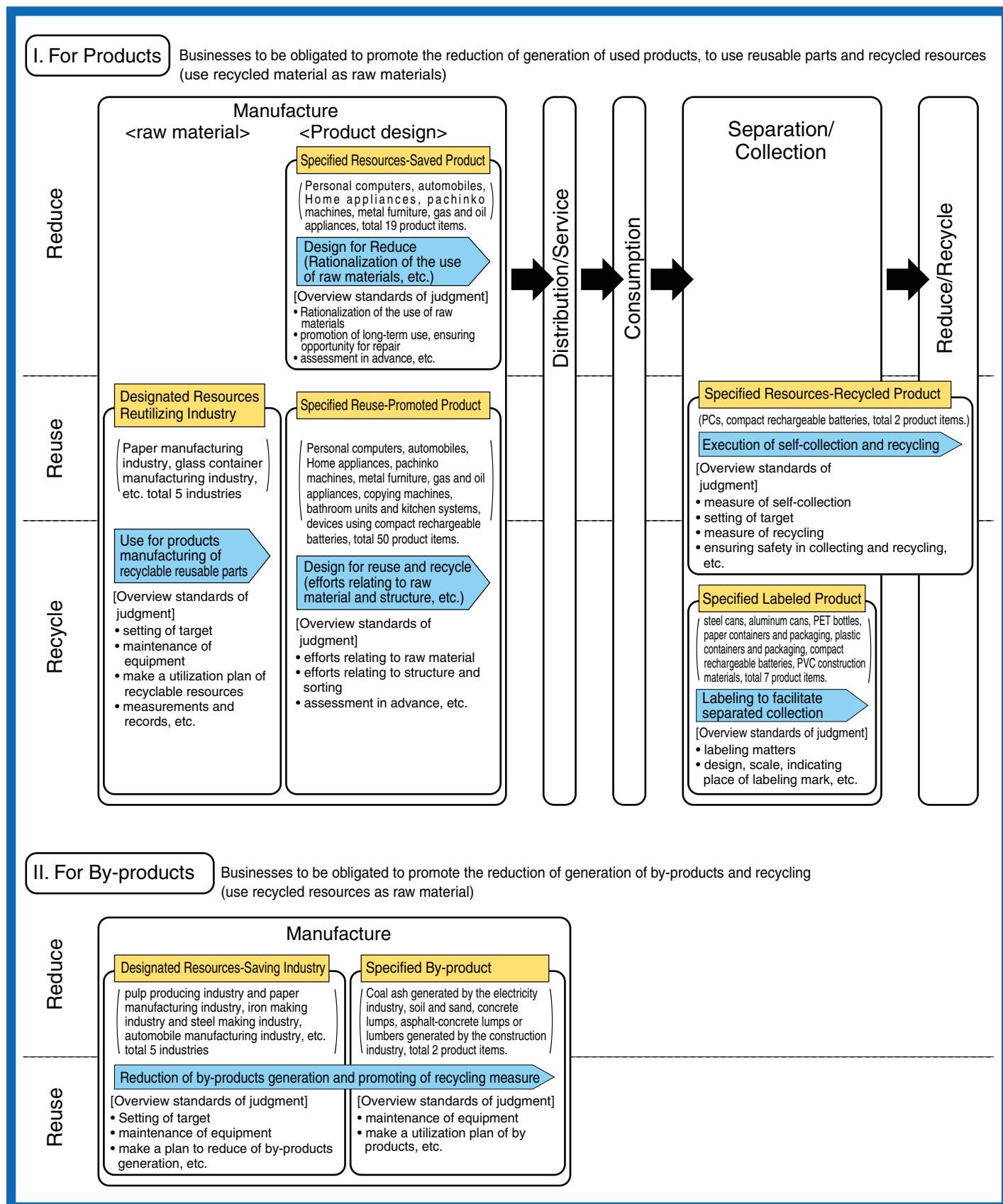
Fig. II-8 Identification of Materials Contained



Subject materials contained (labeling is obligatory)

*Notes: The symbol presented in left side shall be attached to the body and packaging of the subject product items (PCs, air conditioners, television sets, refrigerators, washing machines, microwave ovens, clothes driers) containing subject materials (lead and lead compounds, mercury and mercury compounds, hexavalent chromium compounds, cadmium and cadmium compounds, polybromo-biphenyls, polybromo-diphenyl ether). Information such as the location and amount of materials contained shall be indicated in manuals and websites.

Fig. II-9 Scheme of the Law



1 Designated resources-saving industries

Required to reduce generation of by-products (by ensuring rational use of raw materials and promoting use of by-products as recyclable resources)

- Pulp and paper
- Inorganic chemical manufacturing (excluding salt manufacturing) and organic chemical manufacturing
- Iron-making and steel-making/rolling
- Primary copper smelting and refining
- Automobile manufacturing (including motorized bicycle manufacturing)



2 Designated resources-reutilizing industries

Required to use recyclable resources and reusable parts

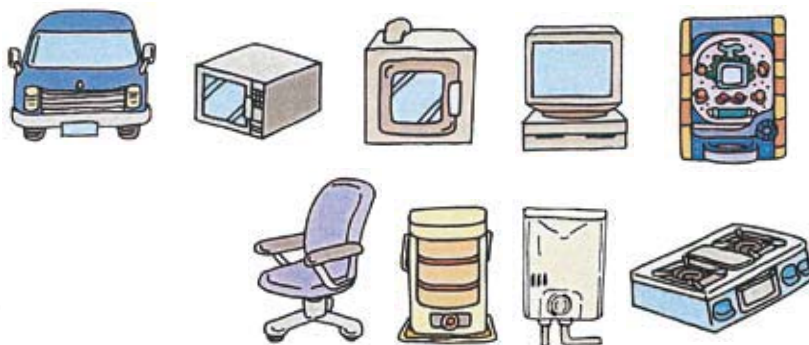
- Paper manufacturing
- Glass container manufacturing
- Construction
- Rigid PVC pipes and pipe fitting manufacturing
- Copier manufacturing



3 Specified resources-saved products

Required to ensure rational use of raw materials, prolong product life and reduce generation of used products

- Automobiles
- Home appliances (television sets, air conditioners, refrigerators, washing machines, microwave ovens, clothes dryers)
- Personal computers (including CRTs and liquid crystal displays)
- Pachinko machines (including rotary types)
- Metal furniture (metal storage furniture, 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)



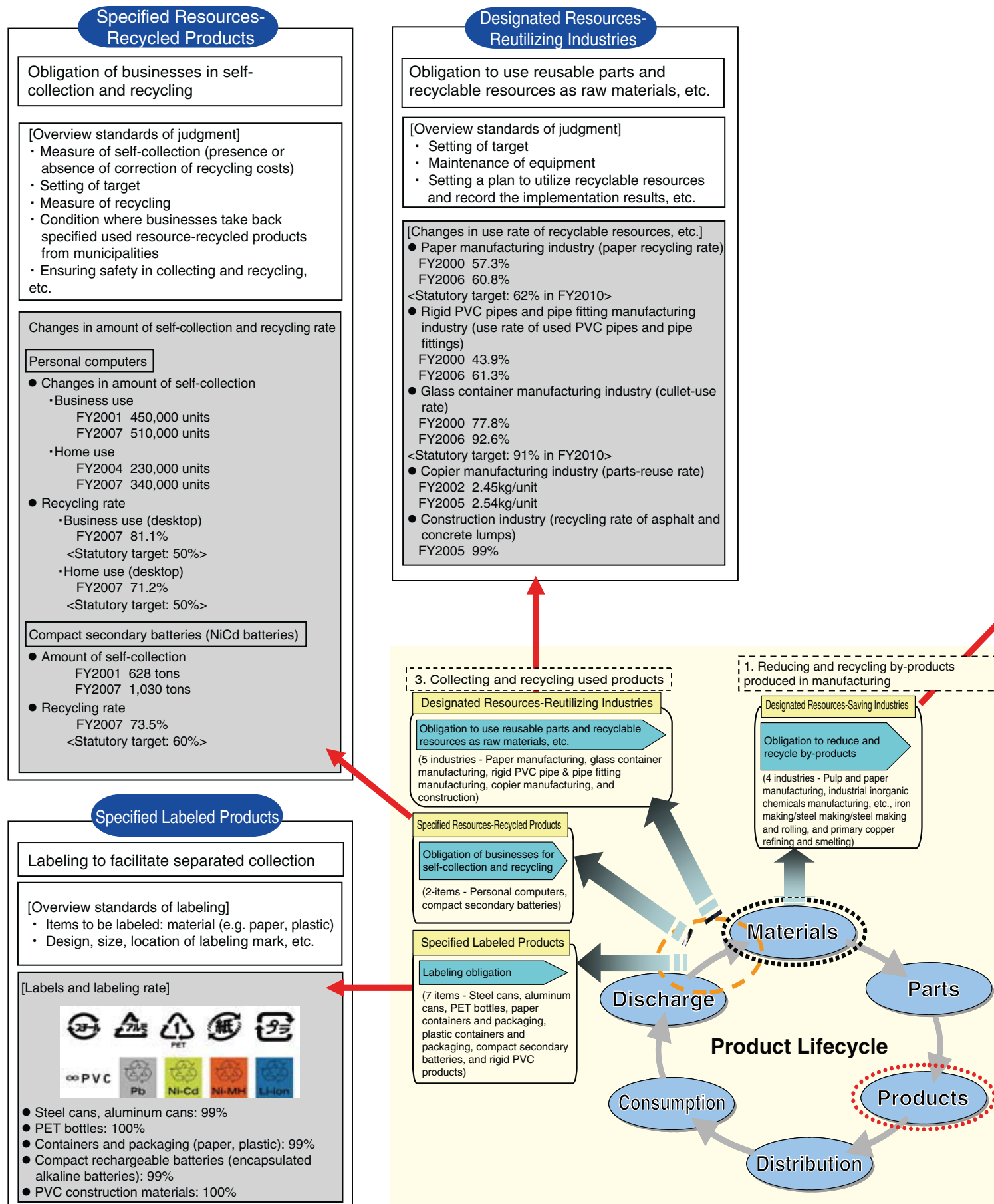
4 Specified reuse-promoted products

Required to promote the use of recyclable resources or reusable parts (designing and manufacturing products that can be easily reused or recycled)

- Automobiles
- Home appliances (television sets, air conditioners, refrigerators, washing machines, microwave ovens, clothes dryers)
- Personal computers (including CRTs and liquid crystal displays)
- Pachinko machines (including rotary types)
- Copying machines
- Metal furniture (metal storage furniture, 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 and kitchen systems
- Devices using compact rechargeable batteries (electric power-supply devices, power tools, guide lights, fire alarm systems, security alarm devices, electric assisted bicycles, electric powered wheelchairs, printers, portable data collecting devices, cordless phones, facsimile devices, telephone switchboards, communication devices for mobile phones, communication devices for MCA systems, communication devices for simplicity radio transmission, radio sets for amateurs, video cameras, headphone stereos, electric vacuum cleaners, electric shavers, electric therapeutic apparatuses, electric bubble generators, electric toys)



Fig. II-10 Implementation of the Law for Promotion of Effective Utilization of Resources



Designated Resources-Saving Industries

Obligation to reduce and recycle by-products

[Overview standards of judgment]

- Setting of target
- Maintenance of equipment
- Setting a plan to reduce generation of by-products, and submission of the plan to the relevant minister, etc.

[Changes in the amount of final disposal of by-products]

- Pulp and paper manufacturing industry
FY2000 612,000 tons
FY2005 424,000 tons
- Industrial inorganic chemicals manufacturing industry
FY2000 1 million tons
FY2005 690,000 tons
- Iron-making, steel-making, and steel-making and rolling industry
FY2000 810,000 tons
FY2005 690,000 tons
- Primary copper refining and smelting industry
FY2000 660,000 tons
FY2005 520,000 tons
- Automobile manufacturing industry
FY2000 51,000 tons
FY2005 10,000 tons

Specified By-products

Obligation to recycle by-products

[Overview standards of judgment]

- Maintenance of equipment
- Setting a plan to use by-products, etc.

[Changes in by-product use rate]

- Coal ash in the electricity industry
FY2000 82%
FY2006 97%
- Asphalt and concrete lumps recycling rate in the construction industry
FY2005 99%

Specified Resources-Saved Products

Obligation to reduce weight and size, and prolong life by means of reduction-oriented design

[Overview standards of judgment]

- Weight saving and downsizing (rational use of raw materials)
- Ensuring a longer service life and opportunity for repairs
- Preliminary assessment, etc.

[Examples of reduction-oriented design]

- Lighter and more compact
 - Automobiles - Lighter bonnet 22kg -> 8kg
 - Personal computers - Weight saving 1,650g -> 1,199g
 - Pachinko machines - The steel plunger base was replaced with an aluminum die cast alloy (reduction of approx. 160g).
 - Metal furniture - Reduced-mass structure by using joints as legs (13% reduction)
- Long service life
 - Automobiles - Extension of specified replacement period
CVT oil: 40,000km to 80,000km
Oil filter: 20,000km to 30,000km
 - Personal computers - Long-life hard disks 1.5 times longer than conventional 2.5-inch models.

processes (zero-emission measures in production sites)

Specified by-products

Obligation to recycle by-products

(2 items - Coal ash in the electricity industry, and soil, sand and wood in the construction industry)
* Only by-products resulting from energy supply and construction are included.

2. Environmentally conscious product design
(Design focusing on reducing weight and facilitating the collection of recyclable materials, etc.)

Specified Resources-saved Products

Obligation to reduce weight and size, and prolong life by means of reduction-oriented design

(19 items - Personal computers, automobiles, pachinko machines, pinball machines, metal furniture)

Specified Reuse-promoted Products

Obligation to facilitate the collection of recycled materials by means of reuse- and recycling-oriented design

(50 items - Personal computers, automobiles, home electric appliances, pachinko machines, pinball machines, metal furniture, gas and oil appliances, copiers, prefabricated bath units, custom kitchens, compact secondary battery driven equipment)

Designated Resources-saving Industries

Obligation to reduce and recycle by-products

(1 industry - Automobile manufacturing)

Specified Reuse-Promoted Products

Obligation to facilitate the collection of recycled materials by means of reuse- and recycling-oriented design

[Overview standards of judgment]

- Considerations on raw materials, etc.
- Improved disassembly efficiency (structural and sorting considerations)
- Preliminary assessment, etc.

[Examples of reuse- and recycling-oriented design]

- Considerations of raw materials, etc.
 - Automobiles - Reduced variety of materials
The types of polypropylene are reduced from 30 to six.
 - Prefabricated bath unit - Materials available for use as recyclable resources were increased to 13.2% of the total weight.
- Improved disassembly efficiency
 - TV - The parts were reduced to half the number in conventional models.
46% reduction of screws (from 231 to 125)
 - Personal computers - Reduction of screws by an average of 25% improved the efficiency of disassembly.
 - Gas and oil appliances - Quick connection reduced the number of screws (from five to none).
- Labeling
 - Air-conditioners - Labeling of plastic parts weighing more than 5g

4 Waste Management Law

- [1] Title of the law: Waste Management and Public Cleaning Law (Waste Management Law)
- [2] Date put into force: Date designated by Cabinet Order within one year after the date of promulgation (promulgated in May 2010)
- [3] Purpose: To preserve the living environment and improve public health by preventing waste generation, promoting proper waste management (transportation, disposal, recycling, etc.) and maintaining a clean living environment.
- [4] Outline of the law: The law provides for the definition of waste, permission for engaging in the waste disposal business, permission for establishing waste disposal facilities, and setting of the waste disposal criteria (see Fig. II-11).

(1) Definition of waste

The law defines “waste” as “refuse, bulky refuse, ashes, sludge, excreta, waste oil, waste acid, waste alkali, carcasses and other filthy and unnecessary matter, which are in solid or liquid state.” In other words, “waste” means things that become useless because they can no longer be used by their owners or be sold to others for value.

Whether a thing falls under the definition of waste is comprehensively judged in light of its nature, the condition of its discharge, the ordinary way to handle it, whether it has any commercial value, and its owner’s intention. For example, if used tires are piled up in an open field and left untouched for as long as about 180 days, they are regarded as waste.

Among waste materials discharged in business activities, 20 kinds of waste materials, such as ashes, sludge, animal excrement discharged in the livestock industry, waste oil, waste acid, waste alkali, and animal bodies discharged in the livestock industry, are defined as industrial waste, and other kinds of waste materials are defined as municipal solid waste.

(2) Responsibilities of businesses

[1] Businesses shall bear the responsibility of properly managing waste materials generated in their activities or entrust such management in writing to licensed waste disposal businesses.

[2] Businesses are also required to follow the flow of waste materials that they discharge until their final disposal in

accordance with the “Manifest” (waste management sheet).

[3] Businesses discharging a vast quantity of waste (businesses that have discharged 1,000 tons or more of industrial waste or 50 tons or more of specially controlled industrial waste in the previous year) need to develop a waste disposal plan.

[4] Except for incineration under the waste disposal standards, (incineration under) other laws or ordinances, or incineration inevitable for public interests or social custom, businesses shall be prohibited from incinerating waste and shall be punished for violating this prohibition.

(3) Permission of disposal facilities

Businesses shall obtain permission to establish a waste disposal facility under this law even in the case of engaging in recycling provided under the Home Appliance Recycling Law or the Containers and Packaging Recycling Law.

(4) Special schemes

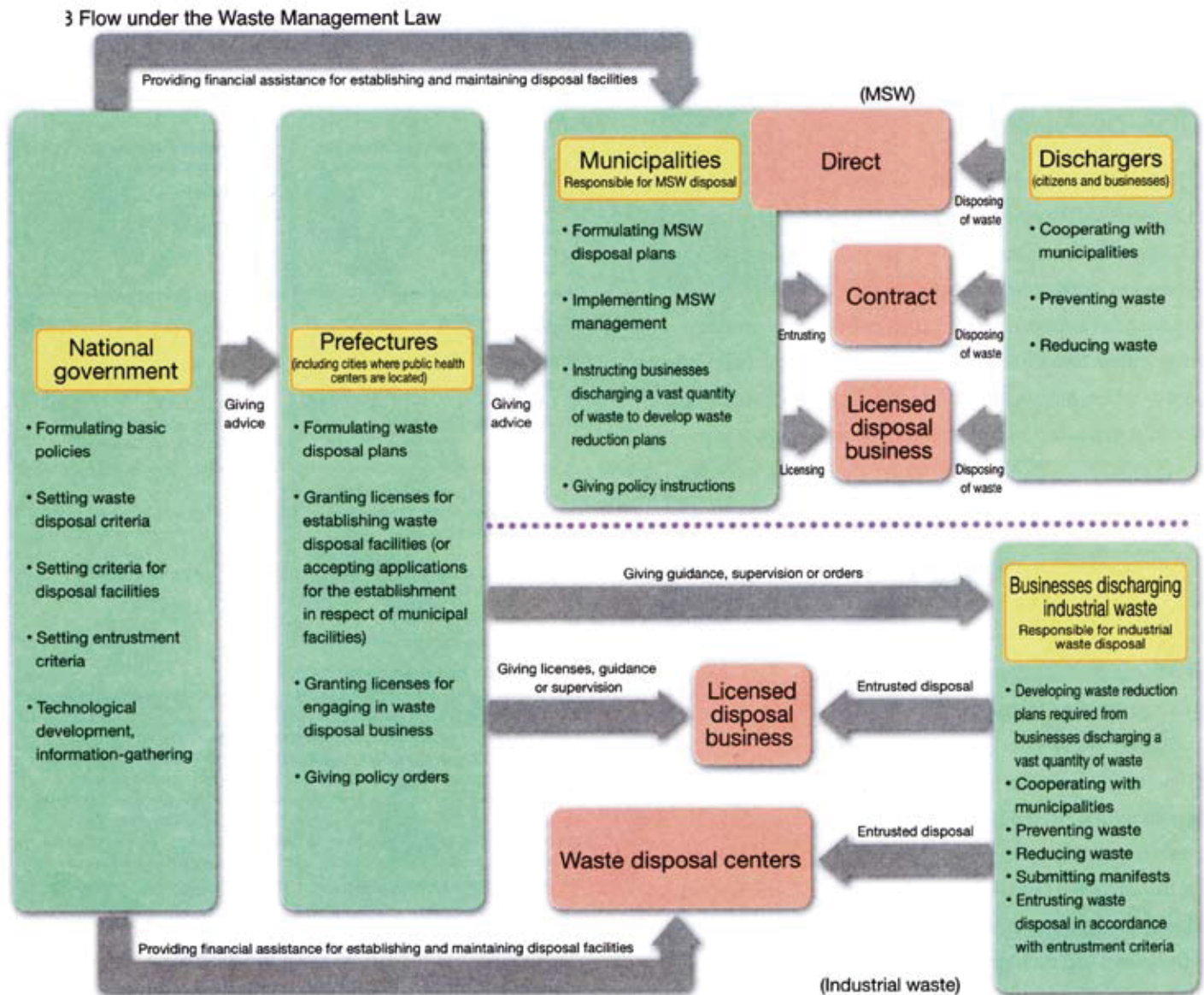
Licenses for engaging in a waste disposal business or establishing waste disposal facilities shall not be required under two special schemes: the National Permit System and the Disposal and Recycling Approval Scheme.

The National Permit System was created as an enhanced version of the original Wide-Area Disposal and Recycling Designation Scheme, with the aim of promoting better waste management (based on the amended law, which entered into effect on December 1, 2003) (see Table II-2).

Table II-2 Outline of the Special Schemes for Waste Disposal Businesses and Facilities

	National Permit System	Disposal and Recycling Approval Scheme
Details of the scheme	<ul style="list-style-type: none"> Under this system, local waste management permits are not necessary for entities that have received authorization from the Minister of the Environment as businesses that conduct waste management over a wide area. 	<ul style="list-style-type: none"> Businesses approved by the Minister of Environment as carrying out disposal and recycling of designated waste materials in accordance with the criteria shall not be required to obtain a license for engaging in a waste disposal business or for establishing waste disposal facilities.
Waste materials subject to the scheme	<p>Waste that falls under either of the following categories:</p> <ol style="list-style-type: none"> Items those are not likely to have a harmful impact on the human living environment as a result of their decomposing easily under normal transport conditions, evaporating, or otherwise undergoing changes in their physical properties. For products that have become waste, if entities that conduct manufacturing, processing or sales operations of the said products also conduct treatment of said waste items, a reduction in the volume of said waste, and other proper management can be ensured. <p><MSW></p> <ul style="list-style-type: none"> Waste spring mattresses Waste personal computers Waste rechargeable batteries Waste motorcycles Waste printers Waste open-type lead-acid batteries Waste FRP ships Waste digestive organs Waste gunpowder Waste mobile phone equipment 	<p><MSW></p> <ul style="list-style-type: none"> Used rubber tires (recycled as raw materials for cement) Plastic waste (recycled as iron-making reducer) Meat and bone waste (recycled as raw materials for cement) Waste containing metal (the metal is recycled as raw material) <p><Industrial waste></p> <ul style="list-style-type: none"> Used rubber tires (recycled as raw materials for cement) Plastic waste (recycled as iron-making reducer) Construction inorganic sludge (recycled as materials for building super (high-standard) levees) Sludge containing silicon (recycled deoxidizer for fused steel) Waste meat and bone meal (recycled as raw materials for cement) Waste containing metal (the metal is recycled as raw material)

Fig. II-11 Flow under the Waste Management Law



Source: Ministry of Environment, White Paper on Recycling-Oriented Society (2003)

5 Containers and Packaging Recycling Law

- [1] Title of the law: Law for Promotion of Sorted Collection and Recycling of Containers and Packaging (Containers and Packaging Recycling Law)
- [2] Date put into force: April 2000 (promulgated in June 1995) December 2006 (amended in June 2006) Reduction of Discharge, etc. is enforced in April 2007 Payment of Money to the Municipal Government is enforced in April 2008
- [3] Purpose: Reducing containers and packaging that are discharged as MSW from households, clarifying the role-sharing in managing these waste, i.e., consumers sorting waste materials when discarding them, municipalities carrying out collection of sorted waste, and businesses recycling the collected waste, with the aim of ensuring proper management of waste and effective use of resources through reduction of MSW and adequate use of recyclable resources.
- [4] Outline of the law: The law provides for a collection and recycling system in which municipalities take charge of collecting sorted containers and packaging (sorted and discarded by consumers) and businesses take charge of recycling such collected containers and packaging (see Figs. II-11 and II-12).

(1) Containers and packaging

“Containers” refers to things in which products are contained (including bags), and “packaging” means things used to wrap products.

The term “containers and packaging” as used in this law shall mean containers and packaging of goods (including cases where containers and packaging of goods are paid for) which become unnecessary when the said goods have been consumed or when the said containers and packaging have been removed from the goods.

(2) Containers and packaging subject to recycling

“Containers” subject to the law include glass containers, PET bottles, paper containers, plastic containers (including styrene foam trays and plastic bags), and “packaging” subject to the law includes packaging and wrapping materials, all of which are discharged from households, under the following conditions.

[1] Are they containers/packaging?

Examples: Caps of PET bottles, covers of pudding cups, plastic films, etc. of the transparency used for the box lunch sold in convenience stores, etc. are containers/packaging.

[2] Are they containers/packaging of goods?

Examples: Containers or packaging on which a premium or prize is placed, bags for cleaning and containers or packaging of courier service are not.

[3] Do the containers/packaging become unnecessary if the goods were consumed or if the containers/packaging are detached from the goods?

Examples: Dirty bags where desiccant was directly placed, CD cases and camera cases are not.

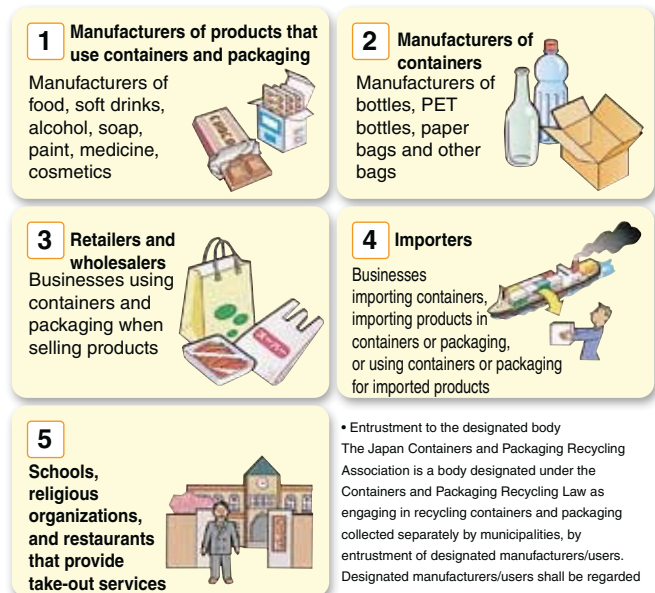
(3) Businesses to be obligated to recycle

The law specifies that businesses (manufacturers/users) that are to be regulated are obliged to recycle containers and packaging.

(4) Businesses shall endeavor to reduce

“Specified container users” who manage any of the following retail trades shall endeavor to reduce waste containers and packaging discharged by reducing the excess use of containers and packaging.

- Retail Trade, General Merchandise
- Retail Trade (dry goods, apparel and apparel accessories)
- Retail Trade (food and beverage)
- Motor Vehicle Parts and Accessories Stores
- Retail Trade (furniture, household utensil and household appliance)
- Drug and Toiletry Store
- Book and Stationery Stores
- Sporting Goods, Toy, Amusement Goods and Musical Instrument Stores
- Tobacco and Smoking Article Specialty Stores



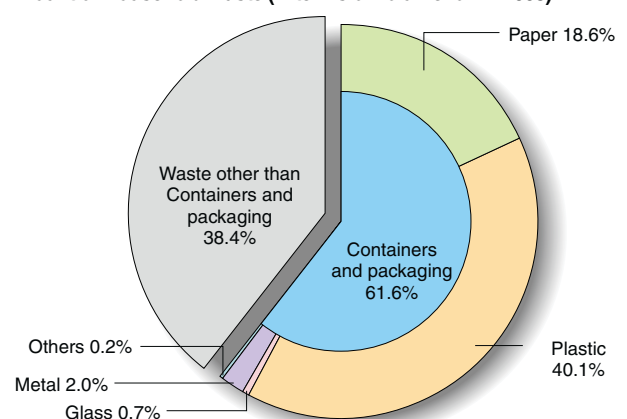
• Entrustment to the designated body
The Japan Containers and Packaging Recycling Association is a body designated under the Containers and Packaging Recycling Law as engaging in recycling containers and packaging collected separately by municipalities, by entrustment of designated manufacturers/users. Designated manufacturers/users shall be regarded as recycling containers and packaging when they conclude a recycling contract with the designated

body to perform their obligation under the contract. The designated body shall also be entrusted by municipalities to recycle containers and packaging on behalf of the municipalities (recycling these to be recycled by businesses that are excluded from the application of the law).

• 60% of domestic waste is from containers and packaging

In Japan, the amount of waste per annum is 48.11 million tons (in FY2008), of which waste discharged from households is 34.10 million tons, accounting for 70.9%. Containers and packaging discharged from households account for about 62% of domestic waste in terms of volume.

Fig. II-12 Share of Waste from Containers and Packaging in the Total Amount of Household Waste (in terms of volume for FY2008)



Source: Ministry of Environment, Actual condition survey of utilizing waste from containers and packaging and its disposal and business report about effect verification(2003)

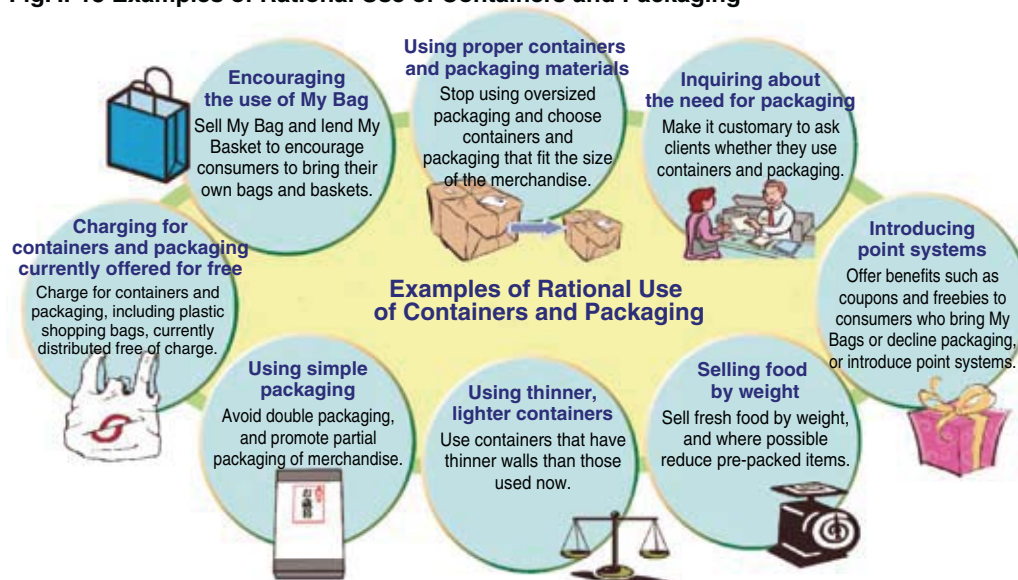
(5) Obligation of specified container users

[1] Measures for target setting and rational use of containers and packaging

Specified container users are obligated to set a target for reducing the basic unit (*) of containers and packaging (i.e., target setting), and systematically take the necessary measures to achieve the target (i.e., rational use of containers and packaging).

(*) A value given by dividing the quantity of used containers and packaging by a value having a close relation with the quantity of used containers and packaging, such as the amount of sales or selling floor area.

Fig. II-13 Examples of Rational Use of Containers and Packaging



[2] Other obligation

Providing information

Business owners need to provide consumers at shops information that will help to reduce waste containers and packaging, distribute brochures explaining the measures taken by business owners, and indicate the importance of reducing waste containers and packaging.

Establishing an organized system, etc.

It is necessary to assign responsible persons and educate employees.

Considerations on safety, etc.

Considerations on the safety and functionality of containers and packaging materials are required.

Rational use of containers and packaging, and effect verification

The amount of used containers and packaging, the measures that were taken, and the effects of these measures need to be verified.

Coordination with concerned parties

In order to effectively take the necessary measures, one must take into consideration coordination with the government, relevant local public bodies, consumers, related organizations and collaborating businesses.

(6) Obligation of copious container users

Of the specified container users, those who used more than 50 tons of containers and packaging materials (the sum of paper, cardboard, plastic and other types of containers and packaging materials) in the previous fiscal year (copious container users) are obligated to compute the quantity of the containers and packaging used in that year and the basic unit, etc., enter the result in the annual report and submit the report by the end of June of the current fiscal year.

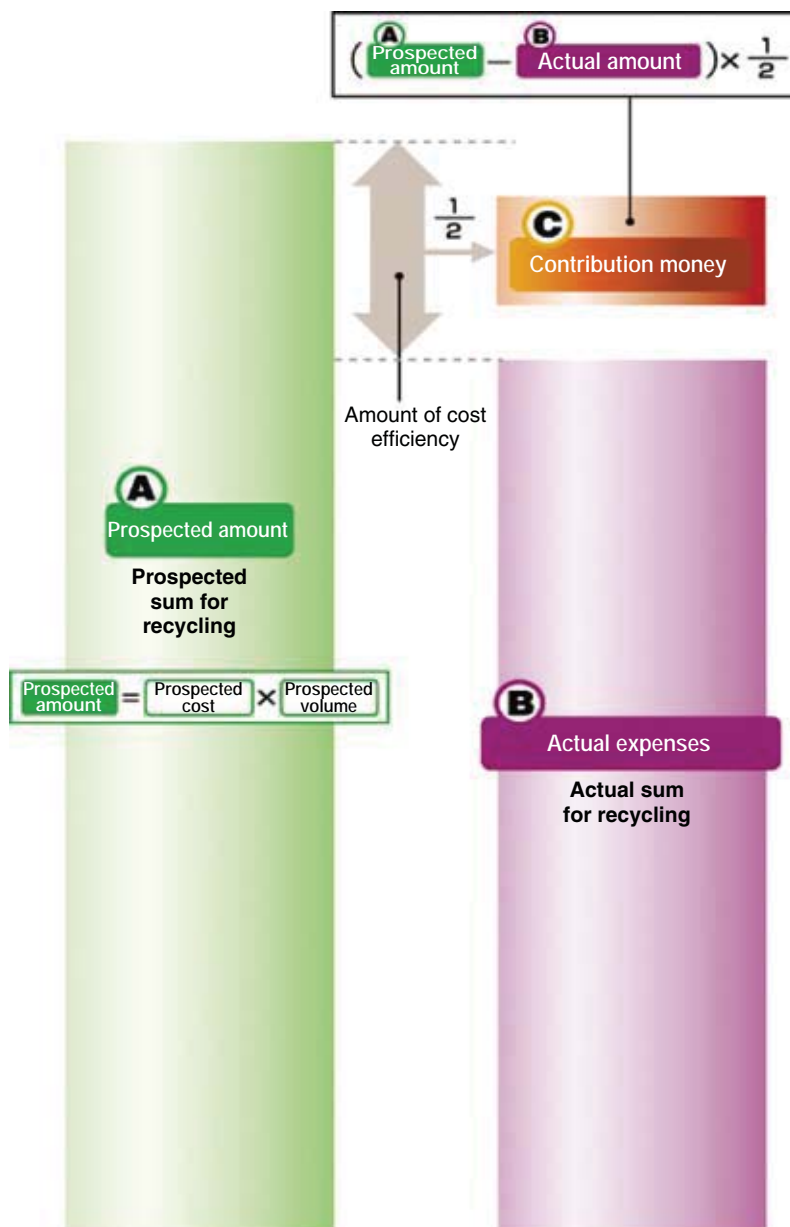
(7) Funding for municipalities

“Payment of Money to the Municipal Government” is a new system that takes effect in FY2008.

The system is based on the provision set forth in Article 10 (2) of the Containers and Packaging Recycling Law, for the purpose of improving the recycling efficiency and reducing social costs through the collaboration of citizens and municipalities with specific businesses.

When the total amount of expenses actually required for recycling falls below the total amount of expenses prospected to be required for recycling (amount of cost efficiency), one half of the amount corresponding to difference in expenses is paid to the municipal government as a contribution toward transitioning toward recycling.

Fig. II-14



Source: “Payment of Money to the Municipal Government” The Japan Containers and Packaging Recycling Association

Fig. II-15 Three Recycling Routes

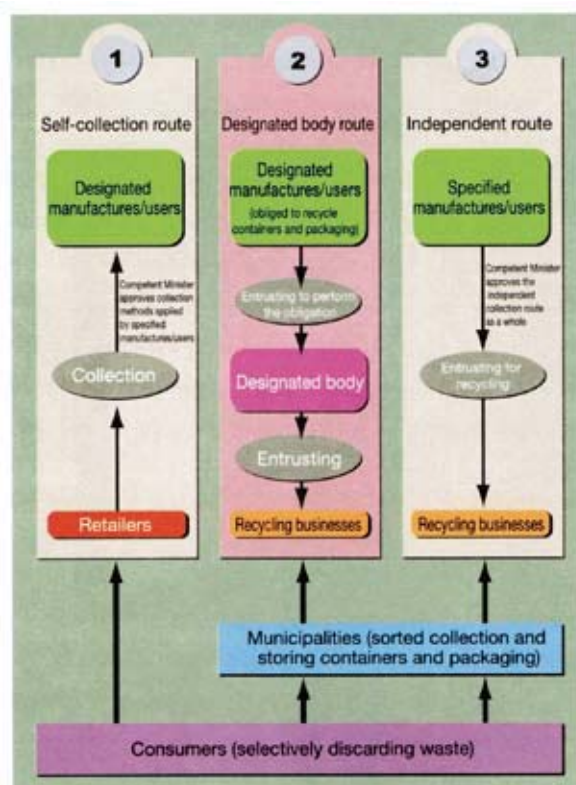


Fig. II-16 Scheme under the Containers and Packaging Recycling Law (Designated body route; PET bottles)

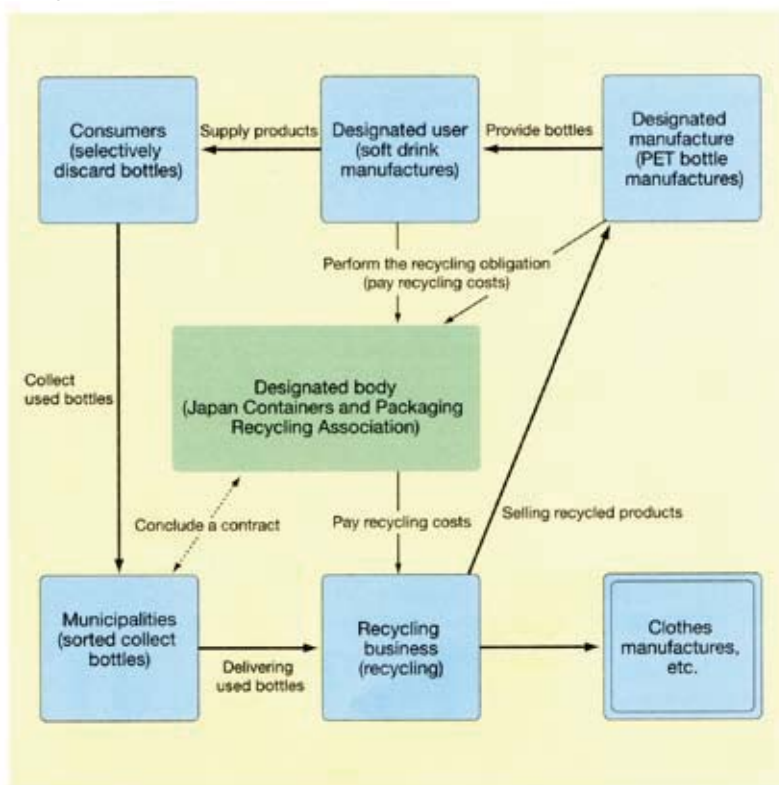






Fig. II-17 Methods for Recycling Waste from Containers and Packaging under the Recycling Obligation

Category	Recycling method		Examples of Recycled products
Glass bottles	▶	Crushed into cullets	<ul style="list-style-type: none"> • Glass containers • Construction and civil engineering materials 
PET bottles	▶	Palletized, etc. Polyester raw materials	<ul style="list-style-type: none"> • Fibers • Plastic sheets • PET bottles 
Paper containers and packaging	▶	Sorted by paper-making material + RDF Used for manufacturing construction boards of material woven from crushed recycled paper + RDF	<ul style="list-style-type: none"> • Paperboards • Construction materials • Refuse-derived fuel 
Plastic containers and packaging Polystyrene foam trays	▶	Raw materials for plastic products Liquefaction Blast furnace reducing agent Gasification Coal materials substitute for the coke oven Conversion into solid fuel, etc. (Note)	<ul style="list-style-type: none"> • Plastic products including imitation wood and palettes • Industrial raw materials • Solid fuel, etc. 

(Note) A contingent or complementary way used when smooth recycling in any other way is difficult

* Steel cans, aluminum cans, paper cartons, and corrugated cardboard are subject to the Containers and Packaging Recycling Law, but they have yet to be subject to the recycling obligation.

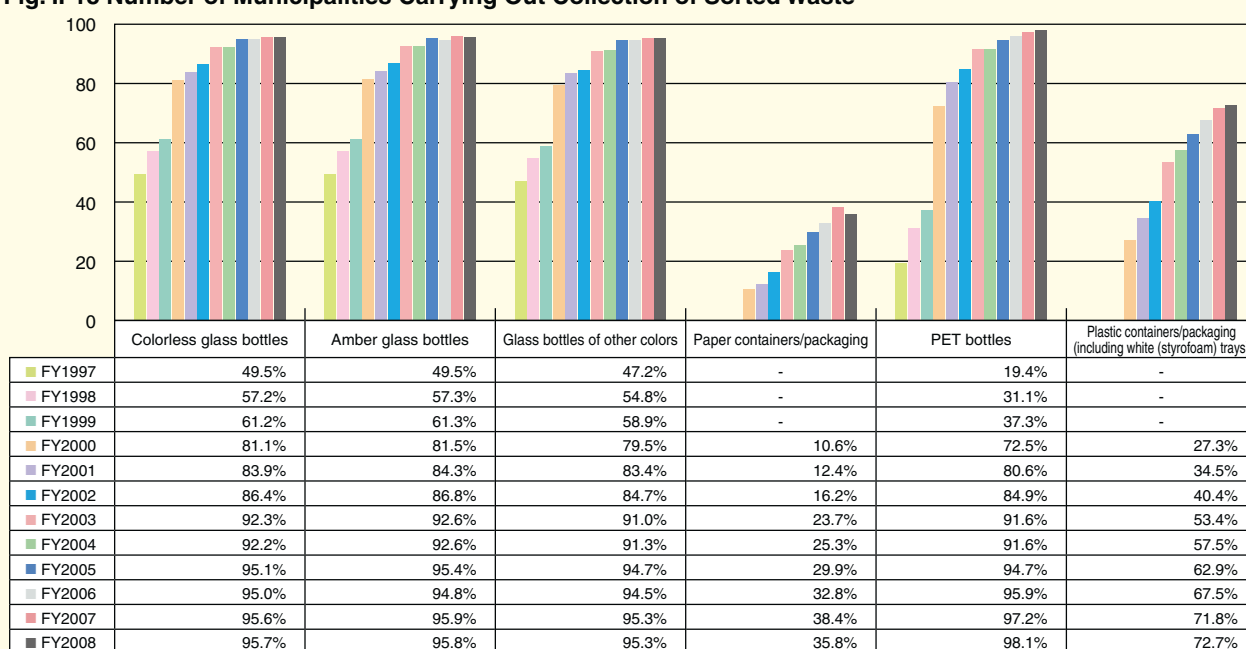
Present Situation of Recycling

The number of those carrying out collection of sorted waste and recycling under the Containers and Packaging Recycling Law has been increasing steadily (see Fig. II-18).

The volume of PET bottles collected separately in FY2008 was 284,000 tons (see Fig. II-19), which is a small increase compared to FY2007. The volume of PET bottles collected and then recycled by municipalities was 277,000 tons (see Fig. II-20), out of which 154,000 tons were recycled and 122,000 tons were recycled and sold via the designated body (see Fig. II-21(d)).

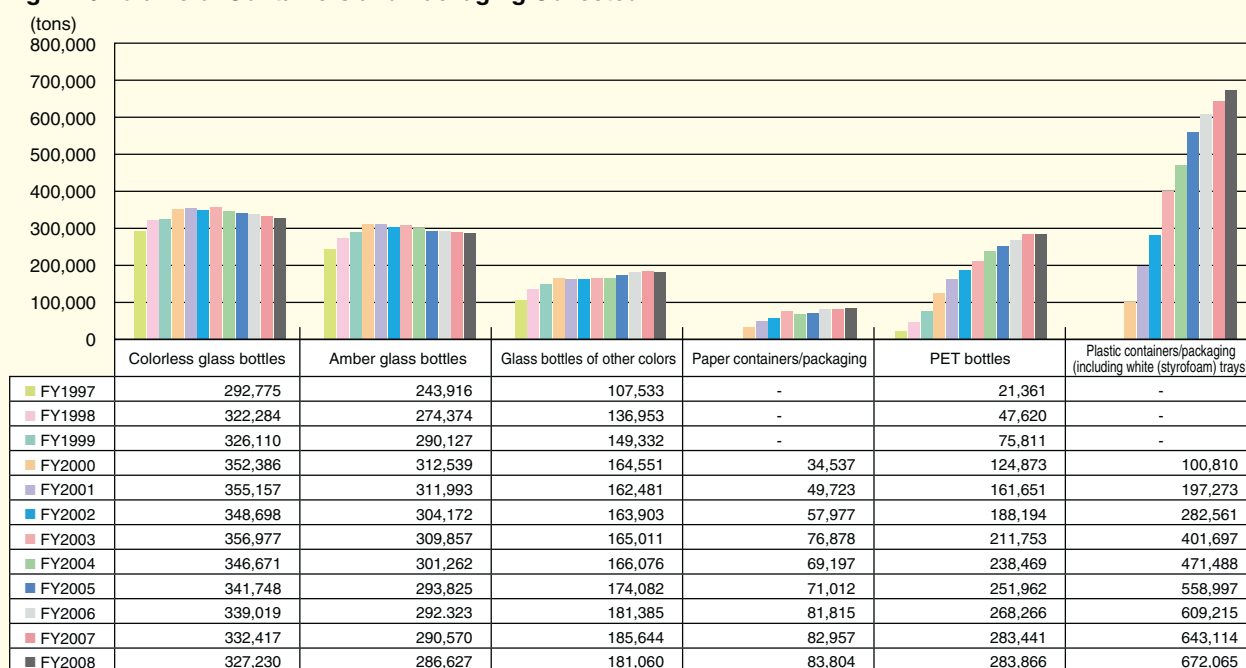
With respect to paper containers/packaging and plastic containers/packaging, which were included in the scope of regulation in 2000, the volume of those separately collected in FY2007 was 84,000 tons and 672,000 tons (see Fig. II-19). Meanwhile, the volume of those recycled was 80,000 tons and 640,000 tons (see Fig. II-20), out of which 27,000 tons and 375,000 tons were recycled and sold via the designated body (see Fig. II-21(e)(f)), respectively.

Fig. II-18 Number of Municipalities Carrying Out Collection of Sorted Waste



(Source: Ministry of the Environment)

Fig. II-19 Volume of Containers and Packaging Collected



(Source: Ministry of the Environment)

Fig. II-20 Volume of Containers and Packaging Recycled (Volume of Those Delivered to Recycling Businesses)

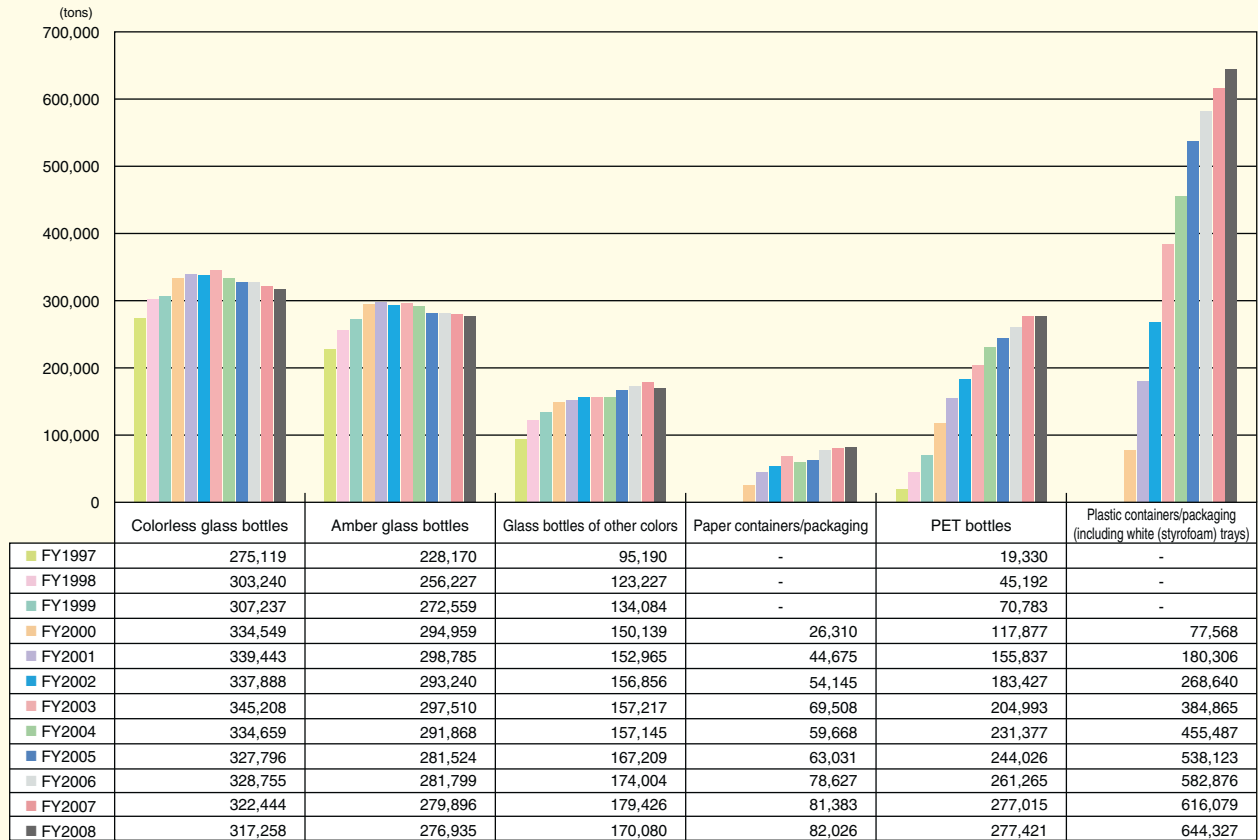
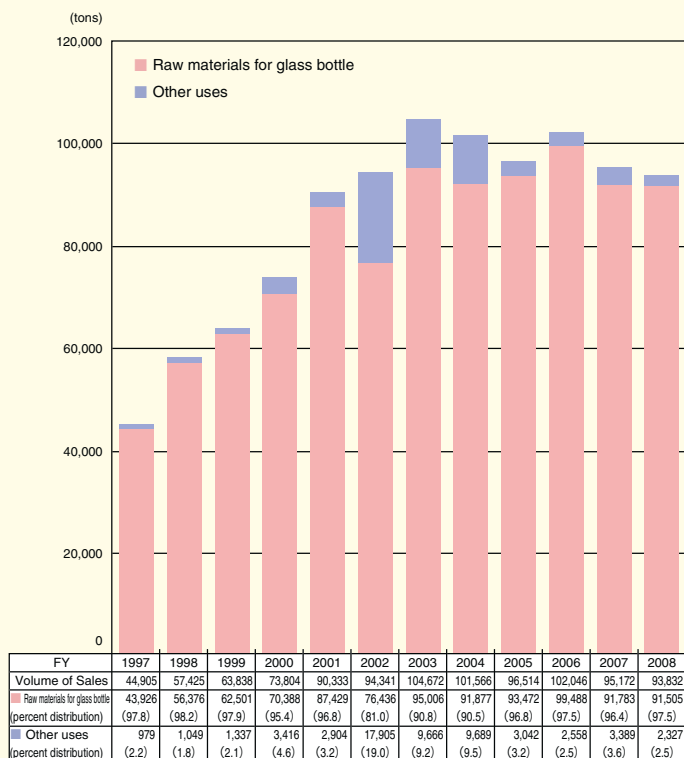
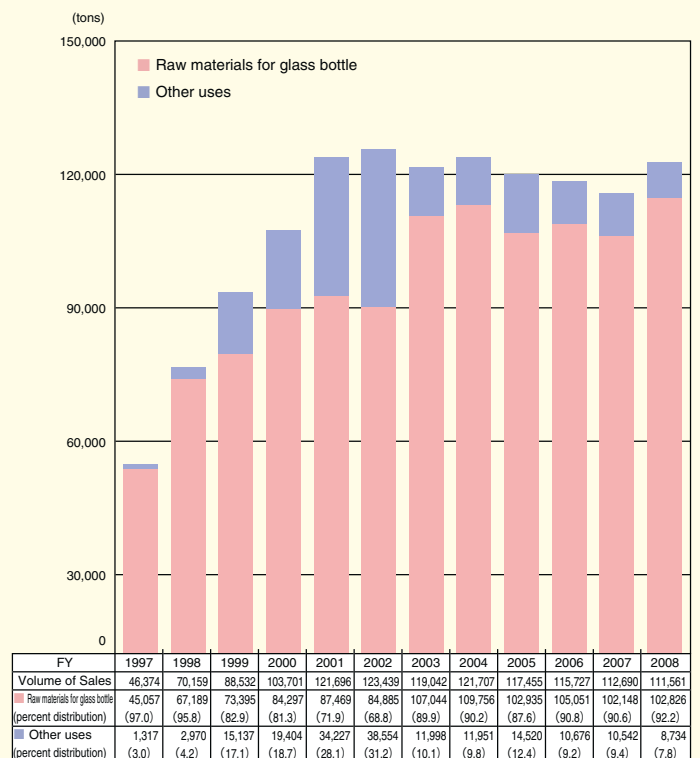


Fig. II-21 Trends in the Volume of Sales of Containers and Packaging Recycled via the Designated Body and the Use of Recycled Products

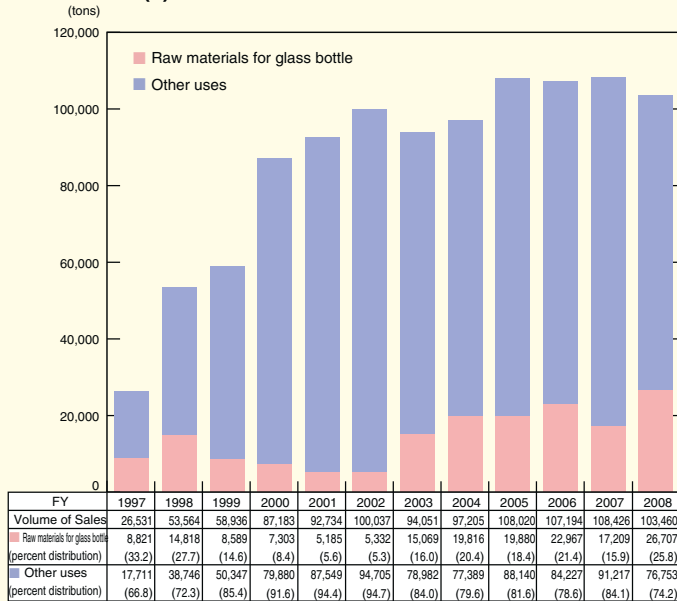
(a) Colorless glass bottles



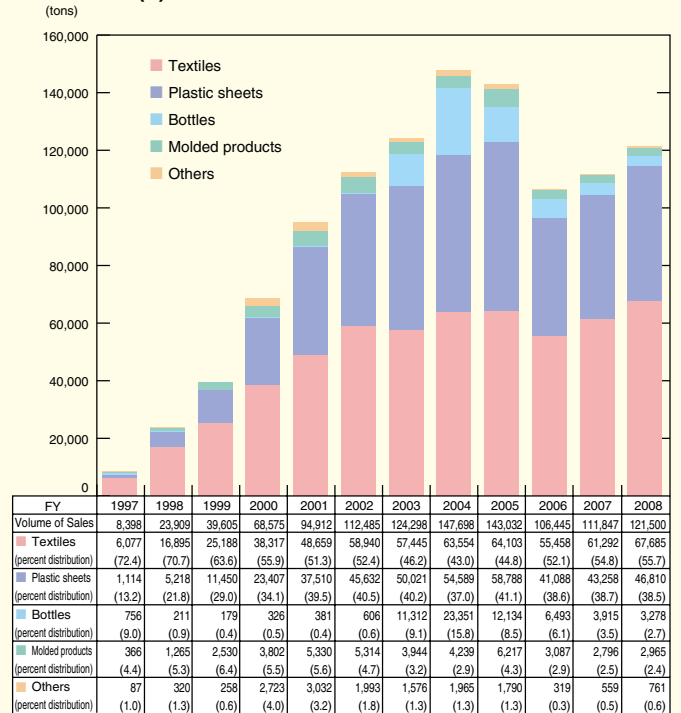
(b) Amber glass bottles



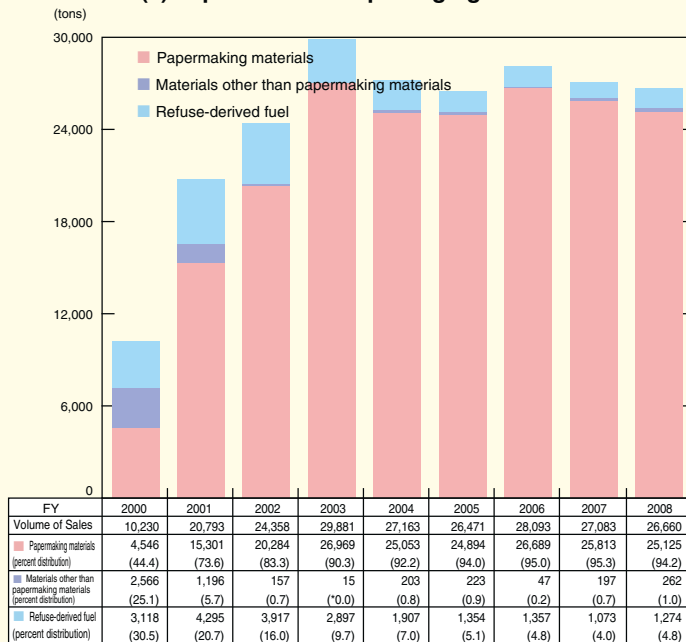
(c) Glass bottles of other colors



(d) PET bottles



(e) Paper containers/packaging



(f) Plastic containers/packaging

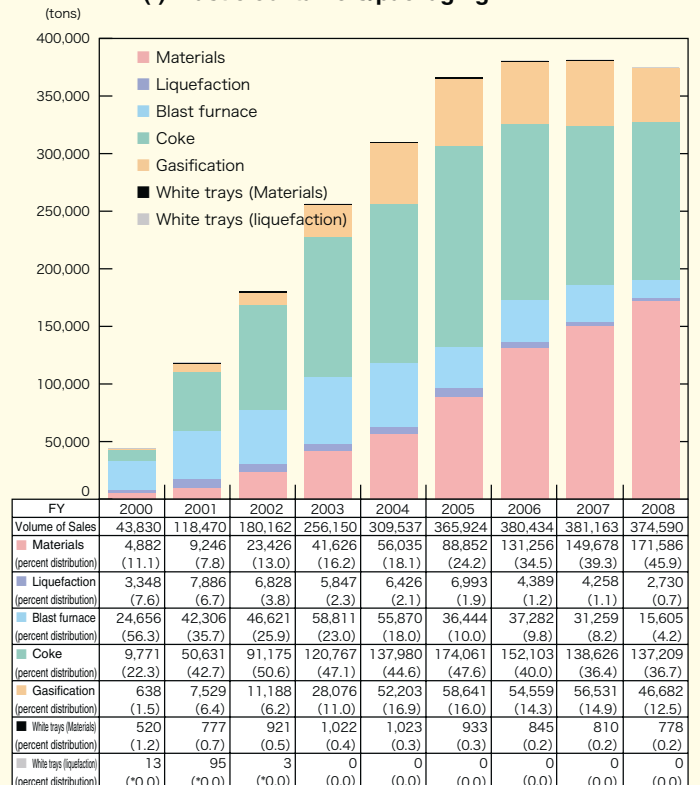
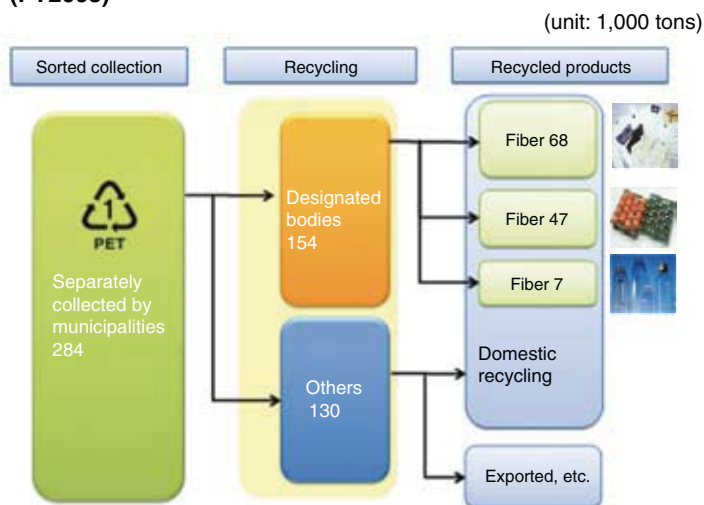
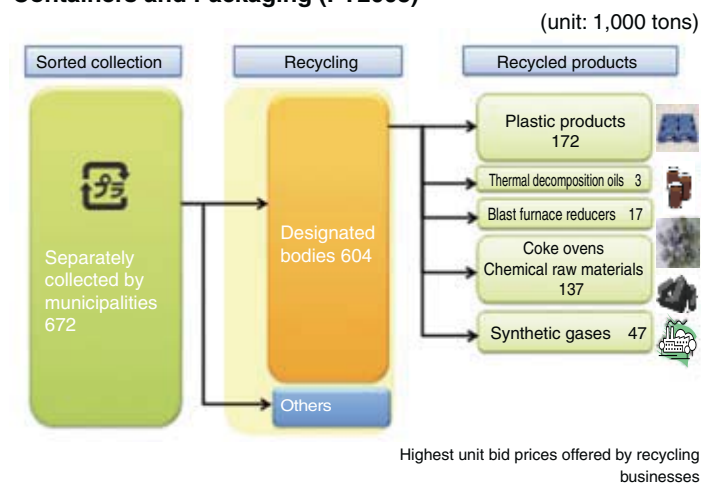


Fig. II-22 Flow of Collection and Recycling of PET Bottles (FY2008)



Figures in parentheses indicate the amount of handling by product.

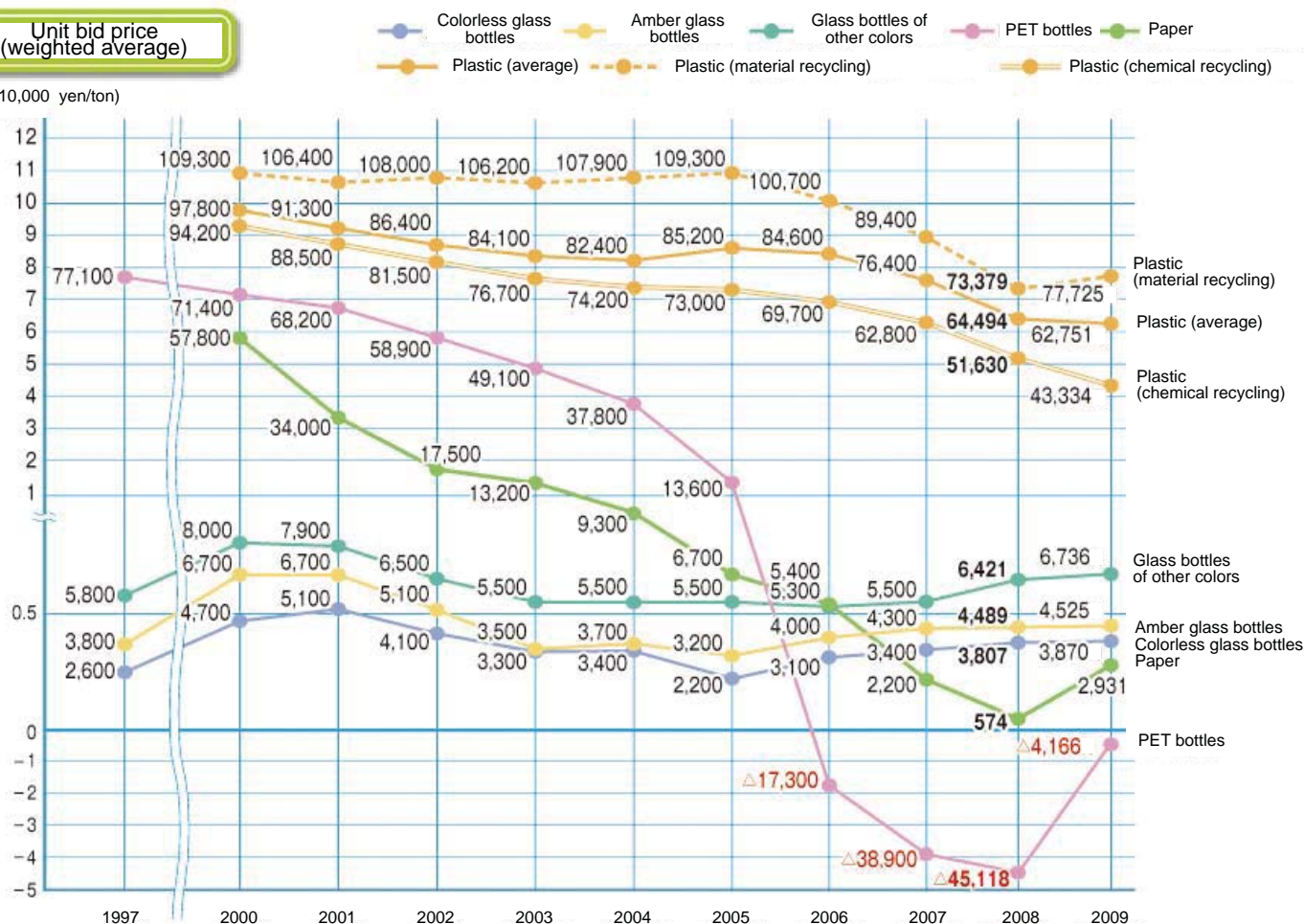
Fig. II-23 Flow of Collection and Recycling of Plastic Containers and Packaging (FY2008)



Highest unit bid prices offered by recycling businesses

Unit bid price
(weighted average)

(unit: 10,000 yen/ton)



Source: Newsletter No. 46, The Japan Containers and Packaging Recycling Association

6 Home Appliance Recycling Law

- [1] Title of the law: Law for Recycling of Specified Kinds of Home Appliances (Home Appliance Recycling Law)
 [2] Date put into force: April 2001 (promulgated in June 1998)
 [3] Purpose: Clarifying the role-sharing between consumers, retailers and home appliance manufacturers in managing used home appliances disposed of by households, with the aim of promoting waste reduction and recycling.
 [4] Outline of the law: The law provides for a collection and recycling system in which home appliance retailers take charge of collecting used home appliances and home appliance manufacturers take charge of recycling collected appliances (see Fig. II-26).

(1) Home appliances to be regulated

- [1] Air conditioners
 [2] CRT-type televisions, liquid crystal televisions, plasma televisions*1
 [3] Refrigerators, freezers
 [4] Washing machines, clothes driers*1

(2) Recycling

“Recycling” means removing parts and materials from used home appliances and reusing them as parts or raw materials for new products, or assigning them, with or without charge, to those who will reuse them. “Recycling” includes thermal recycling or using waste as fuel. However, it is currently required to satisfy a certain recycling level*2 only in terms of recycling waste as parts or raw materials of new products.

Recycling level required under the law

(3) Responsibilities of parties concerned

[1] Consumers (Those who use home appliances shall pay for recycling costs.)

- Appropriate disposal
- Payment of costs for collection and recycling

[2] Home appliance retailers (Those who sell home appliances shall collect and transport them.)

- Taking back home appliances, which they have sold, from businesses that dispose of them
- Taking back home appliances at the request of consumers who buy new ones to replace old ones and proper delivery of collected home appliances to the manufacturers, etc.
- Issuing home appliance recycling coupons*3 to manufacturers and the designated body and sending copies to dischargers
- Displaying the costs of collecting and transporting in shop windows

[3] Home appliance manufacturers and importers (Those who manufacture home appliances shall recycle them.)

- Taking back home appliances, which they have manufactured or imported, from retailers
- Recycling these home appliances
- Publishing the costs for recycling these home appliances (recycling fees)

[4] Designated body (Association for Electric Home Appliances)

- Recycling home appliances whose manufacturers are unknown or those entrusted by specific manufacturers (manufacturers whose production volume is less than 900,000 units for air conditioners, 900,000 units for televisions, 450,000 units for refrigerators, and 450,000 units for washing machines)

[5] Municipalities

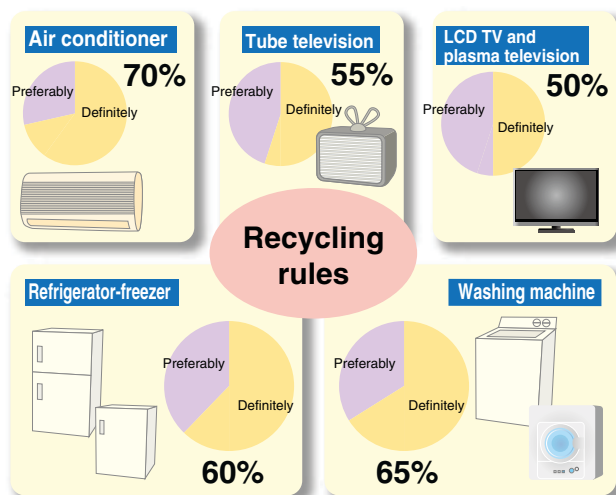
- Measures to promote collecting, transporting and recycling

*1 Liquid crystal televisions, plasma televisions, and clothes driers became subject to the regulation as of April 2009.

*2 Recycling rate = $\frac{\text{Weight of materials recycled}}{\text{Weight of units treated for recycling}}$

*3 The Association for Electric Home Appliances operates the home appliance recycling coupon system, which is convenient for paying and collecting recycling fees. Recycling fees may be paid and collected via retailers or by

Fig. II-25 Recycling Level Required under the Law



Present Situation of Recycling

The four items have been taken back by retailers or municipalities, and then recycled by manufacturers/importers or the designated body (Association for Electric Home Appliances) at 49 recycling plants for home appliances (as of February 2010).

In FY2008, manufacturers/importers or the designated body took back a total of about 12.73 million units (up by 5.9% compared to the previous year) of the four items at take-back sites, and the recycling rates for the four items were 74% to 89% (see Fig. II-27). All these recycling rates exceeded the target levels under the Home Appliance Recycling Law.

With regard to the composition of the weight of materials recycled, iron, copper, aluminum and glass account for the majority of the total, depending on products (see Figs. II-28 and II-29).

CFCs used as refrigerants for air conditioners, refrigerators/freezers, and clothes driers, and CFCs in the heat insulator of refrigerators/freezers are also collected and decomposed.

The ratio of home appliances illegally discarded to the number of units taken back has varied between 1% and 2% during the last few years (see Fig. II-30). The total number of the four items illegally discarded in FY2008 was 113,496 (1,465 municipalities, 121.56 million people: 95.2% of total population). This was a decrease of 2,319 units (2%) compared to the same term of the previous year. Continued investigation of the actual situation is needed.

Fig. II-26 Flow of Recycling of Used Home Appliances

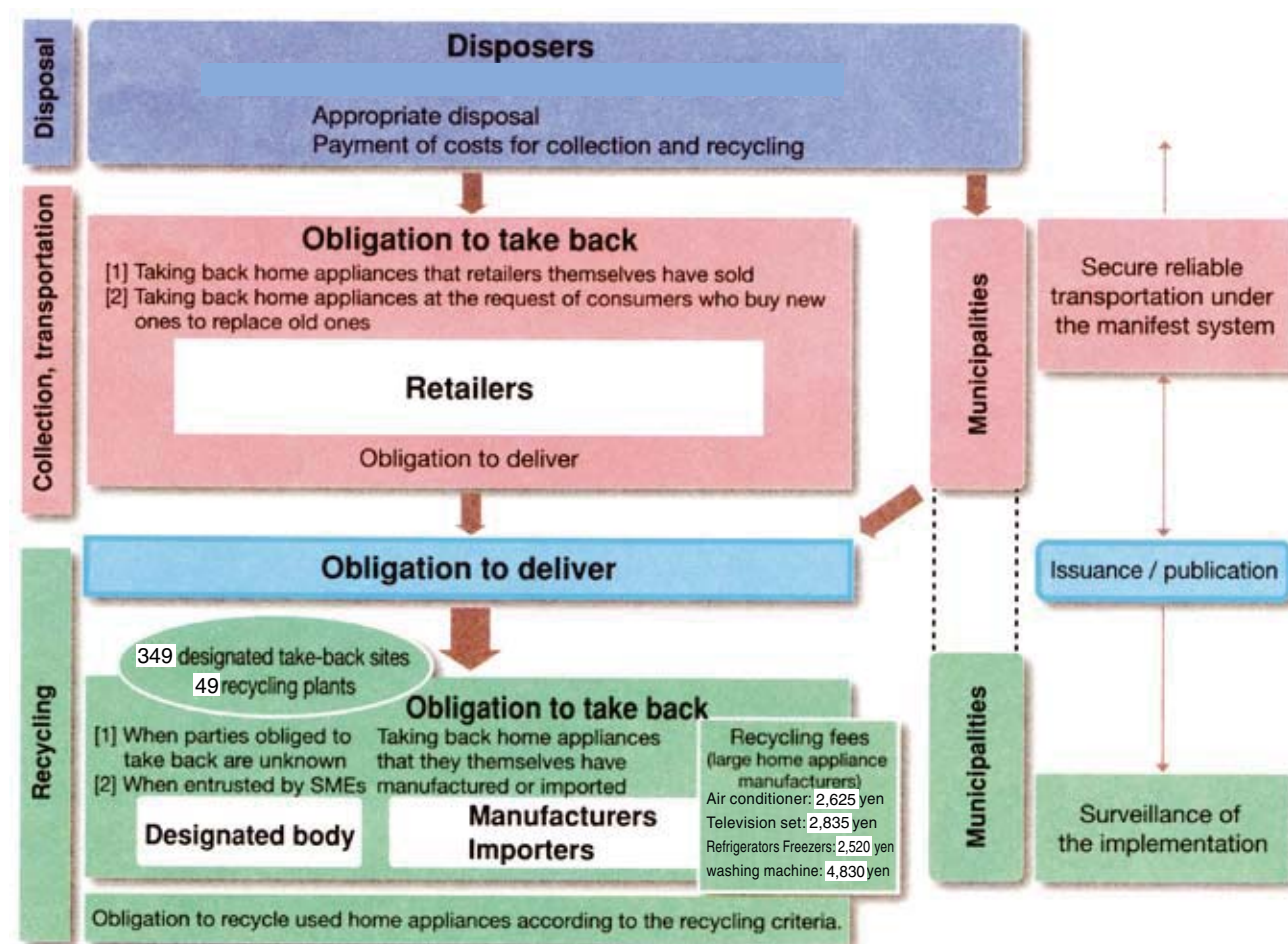


Fig. II-27 Recycling by Manufacturers/Importers and the Designated Body (FY2008)

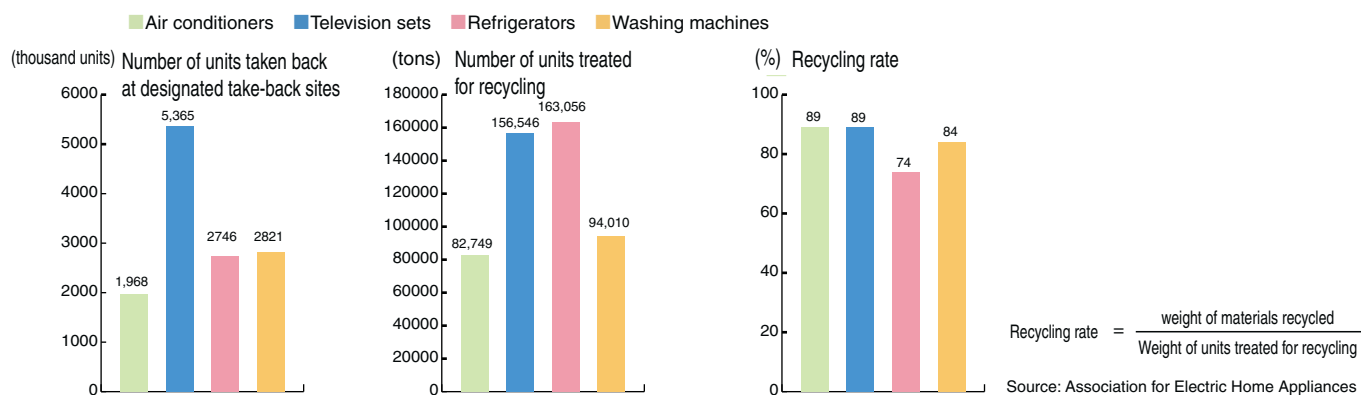


Fig. II-28 Weight of Materials Recycled by Manufacturers/Importers and the Designated Body (FY2008)

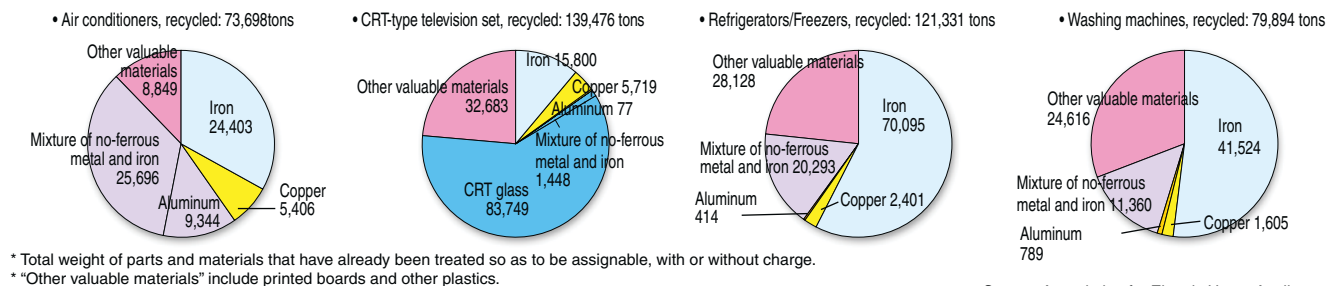


Fig. II-29 Composition of Home Appliances

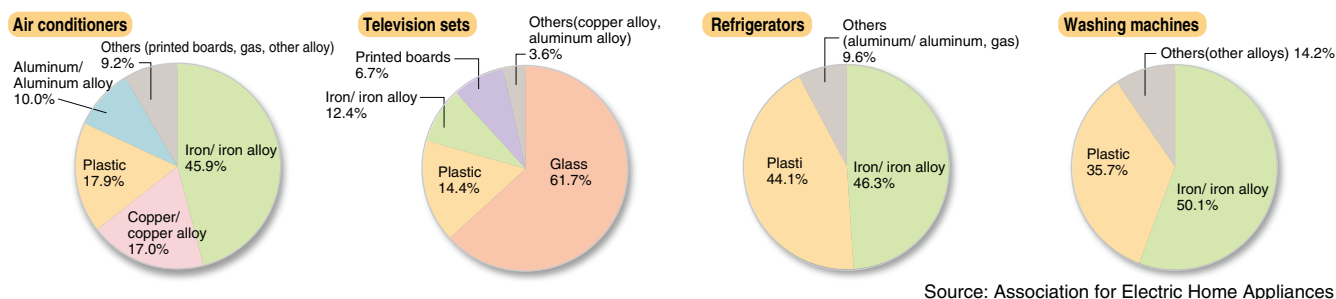
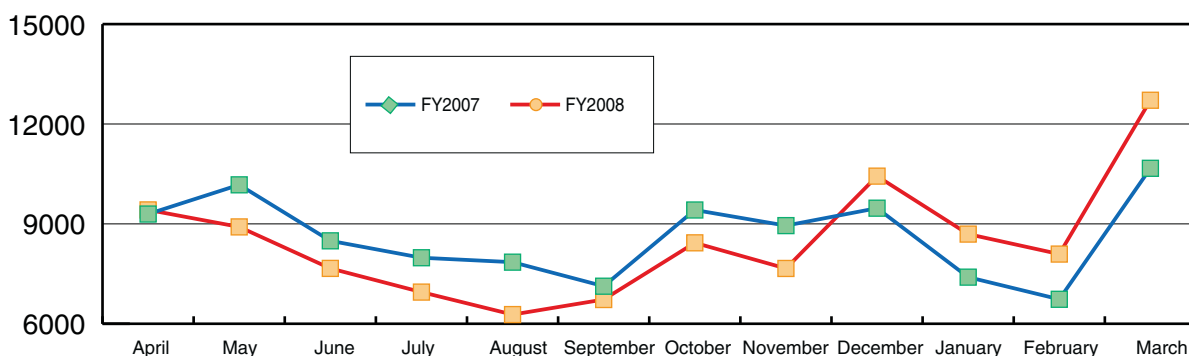
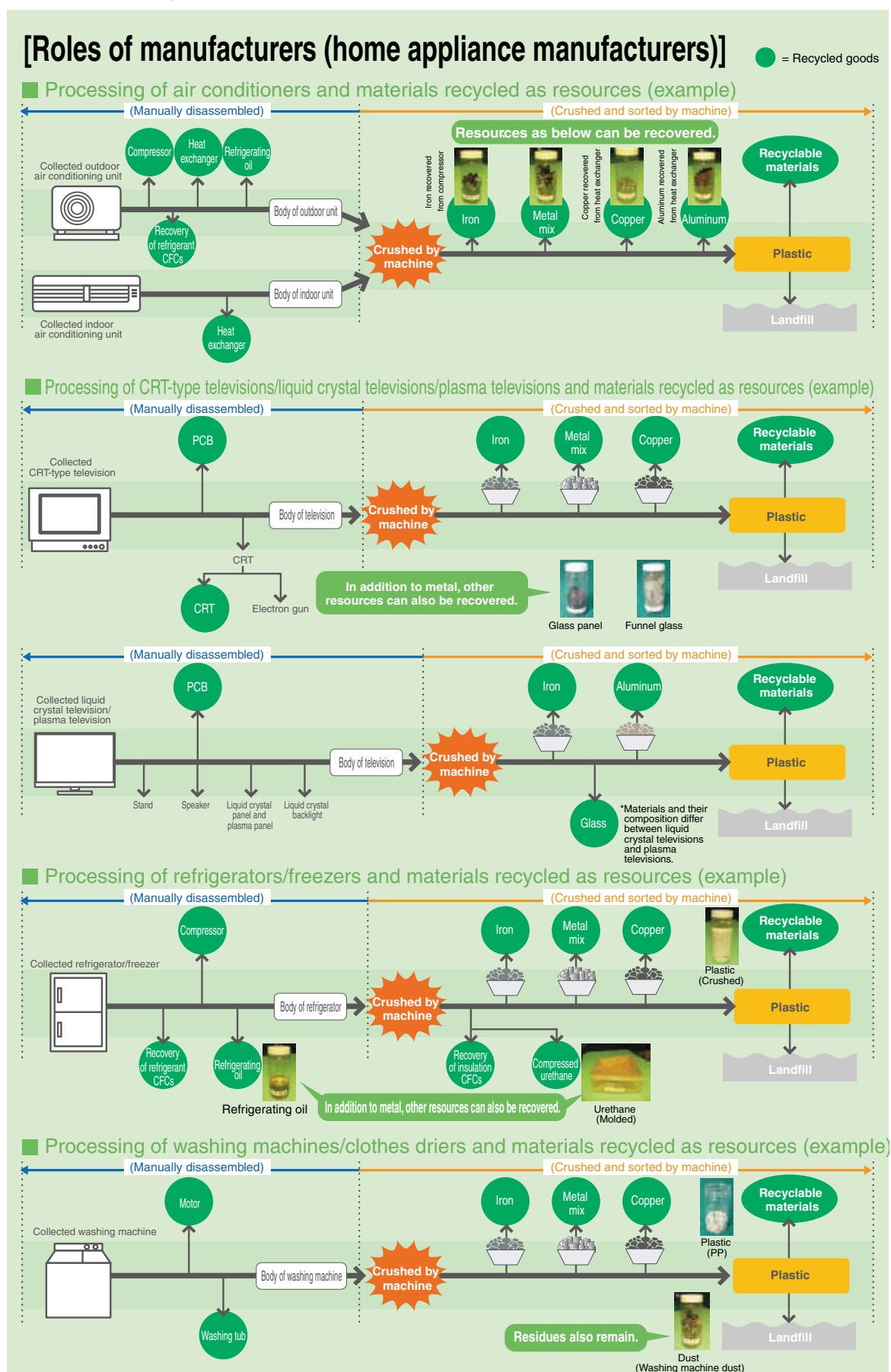


Fig. II-30 Ratio of Number of the Four Items Illegally Discarded to the Number of Units Taken Back



* The number of units illegally discarded across the country was estimated based on findings from 1,762 municipalities from FY2005 to FY2006.
 Source: Ministry of Environment, "Status of illegally discarded home appliances (February 22, 2010)"

Fig. II-31 Standard Processing of Four Items



7 End-of-Life Vehicle Recycling Law

[1] Title of the law: Law on Recycling of End-of-Life Vehicles (ELV Recycling Law)

[2] Date put into force: January 1, 2005 (promulgated in July 2002)

[3] Purpose: Construct a recycling system to ensure recycling and proper disposal of ELVs role-sharing of businesses, beginning with car manufacturers.

[4] Outline of the law: The law provides role-sharing between car owners, ELV-collecting businesses, car manufacturers, and car importers to build a recycling-oriented society in which waste is reduced and resources are used with care.

(1) Vehicles to be regulated

Nearly all four-wheel vehicles (including large vehicles and commercial vehicles, such as trucks and buses)

(2) Responsibilities of the parties concerned

[1] Car owners (end users)

Payment of recycling fee, delivering end-of-life vehicles to ELV-collecting businesses that are registered with local authorities

[2] ELV-collecting businesses

Taking back ELVs from end users and then delivering them to CFC-collecting businesses and auto-dismantling businesses

[3] CFC-collecting businesses

Collecting fluorocarbons properly from ELVs in accordance with the recycling standards and handing over ELVs to car manufacturers/importers

[4] Auto dismantling businesses

Dismantling ELVs properly in accordance with the recycling standards, collecting airbags and handing over ELVs to car manufacturers/importers

[5] Shredding businesses

Shredding dismantled ELVs (press, cutting and shredding) in accordance with the recycling standards, handing over shredder dust (waste remaining after shredding dismantled ELVs) to car manufacturers/importers

[6] Car manufacturers/importers

Collecting and recycling CFCs, airbags and shredder dust from ELVs that are manufactured and imported by themselves

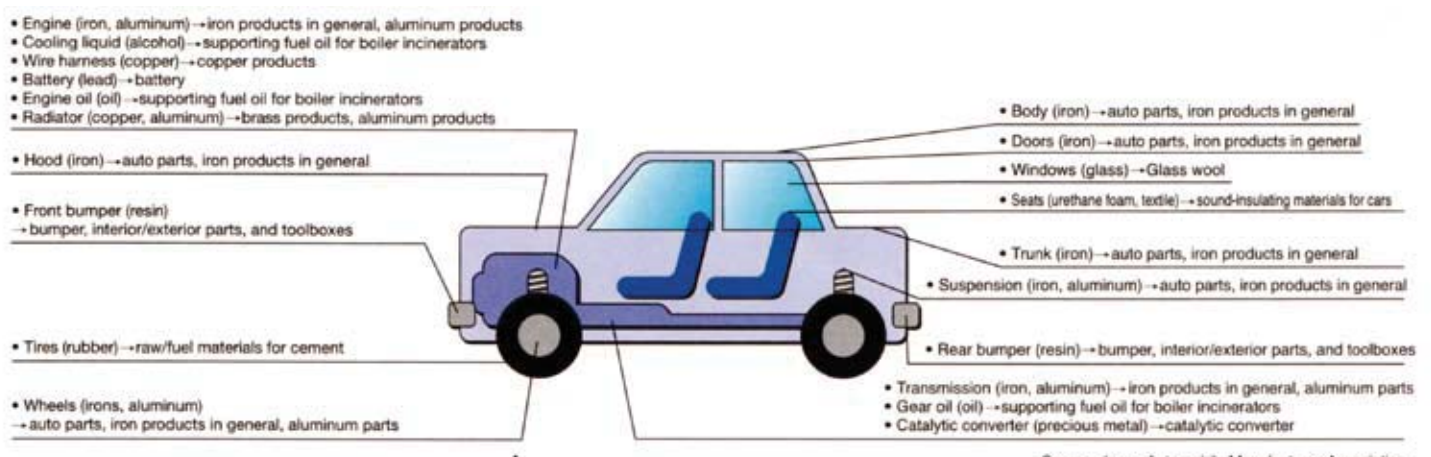
(3) Payment of recycling fee

[1] People who purchase new cars shall pay recycling fees upon purchase. People who own any cars for which they have not paid recycling fees shall pay the fees by the time they dispose of such cars.

[2] Recycling fees are determined on every car by individual car manufacturers/importers, depending on the possible quantity of shredder dust and CFCs, number of airbags and simplicity of taking off airbags.

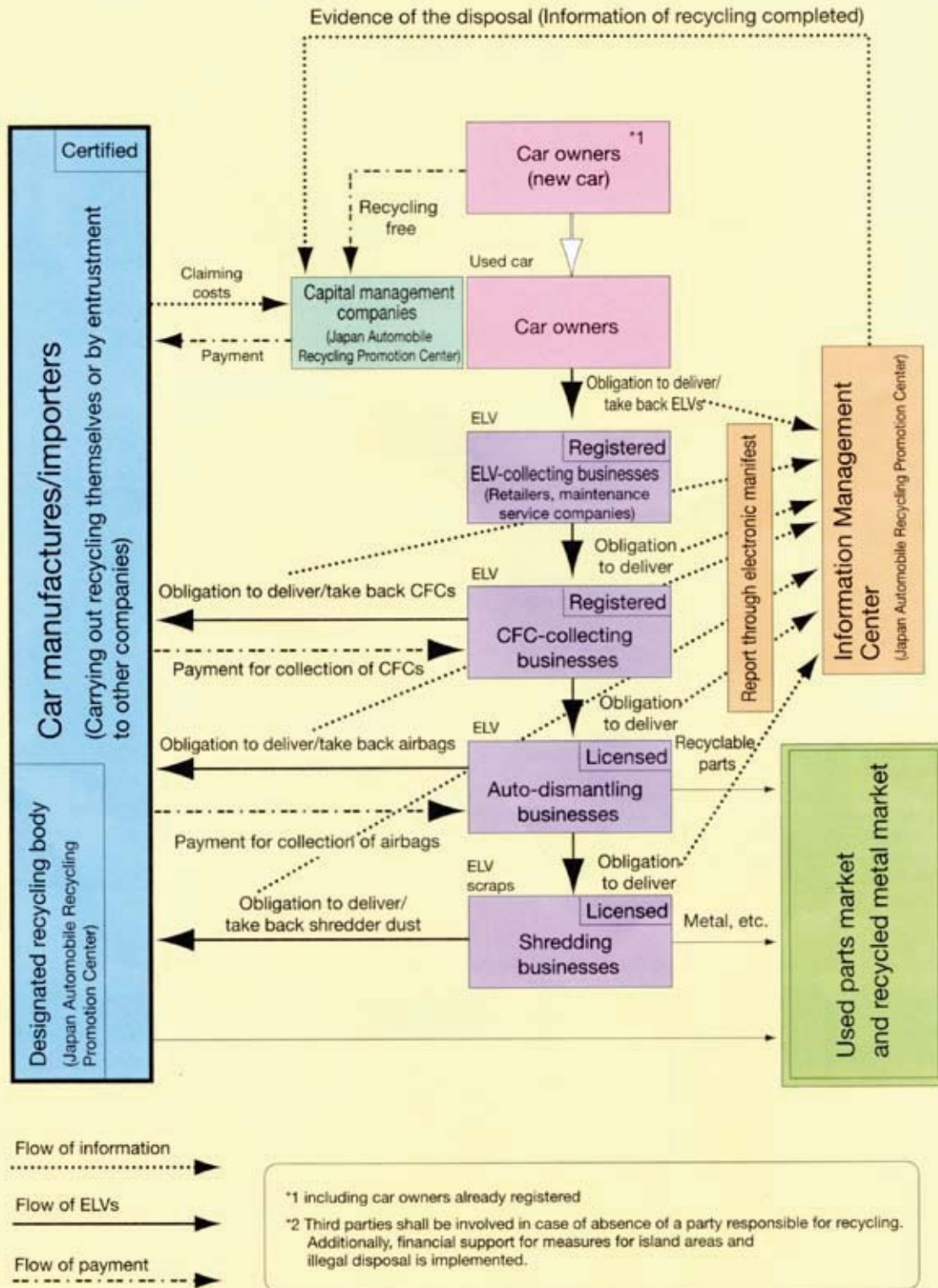
[3] The average fee for recycling shall be disclosed by car manufacturers/importers. Visit the websites provided by car manufacturers/importers, or the website for the automobile recycling system (<http://www.jars.gr.jp>).

Fig. II-32 Recycling Uses of ELVs



Source: Japan Automobile Manufacturers Association

Fig. II-33 Concept of the ELV Recycling Law



(Source: Data by Automobile Recycling WG, Waste Prevention and Recycling Subcommittee, Environment Committee, Industrial Structure Council)

(4) State of compliance with the End-of-Life Vehicle Recycling Law

Around 100,000 automobile-related business operators, including dealers and shredders, are obliged to report the collection and transportation of ELVs to the ELV Recycling System on the Internet (transfer report). Collection of approximately 3,580,000 ELVs was reported in FY2008.

Table II-3 Results of Electronic Manifest by Process

Process	No. of reports		No. of reports	
	FY2008	FY2007	FY2008	FY2007
Process	3,580,882	3,708,996	3,585,291	3,717,347
Recovery of CFCs	2,798,418	2,792,803	2,794,004	2,792,951
Disassembly *1)	3,716,791 (137,361)	3,867,341 (149,065)	3,713,619 (138,003)	3,875,309 (149,445)
Shredding *1)	6,129,797 (2,610,501)	6,294,740 (2,623,147)	6,185,373 (2,611,053)	6,341,740 (2,627,370)

*1 Figures in parentheses indicate the number of transfer reports in the same process.

Table II-4 Collection of Three Items by Carmakers]

Item	No. of reports	
	FY2008	FY2007
CFCs	2,717,277	2,662,431
Airbags	1,306,233	1,002,406
ASR	3,229,027	3,289,507

(5) Recycling fee deposits

Table II-5 Result in FY2007 by Time of Deposit

Time of deposit	No. of vehicles		Deposit (unit: \1,000)	
	FY2008	Cumulative total after law enforcement	FY2008	Cumulative total after law enforcement
New vehicle registration	4,710,448	23,218,225	52,574,067	257,394,656
Regular inspection	—	63,044,979	—	—
Collection	512,910	6,448,169	2,734,219	46,571,107
Total	5,223,358	92,771,371	55,308,286	912,075,297

(Note 1) Cumulative total after law enforcement: The cumulative total between January 2005 and March 2006. The same applies to the rest of this document.

(Note 2) The number of ELVs does not exactly coincide with the number of vehicles sold due to the presence of ELVs excluded from the ELV law and the time lag in paying deposits.

(Note 3) The deposit system at the time of periodic inspection was terminated at the end of February 2008.

Table II-6 Number of Vehicles on Deposit, and Outstanding Amount of Deposits as of the End of FY2007

The number of vehicles and the balance of the recycling fee deposit given by subtracting the money paid to relevant business operators, reimbursement for used cars exported overseas, and specified recycling deposit, etc. from the cumulative total of the recycling fees after law enforcement.

No. of vehicles *1)	Amount of deposit (unit:\1,000)
74,767,000	770,655,774

*1) Equipment fitted later is not included.

(Source: Data by Automobile Recycling WG, Waste Prevention and Recycling Subcommittee, Environment Committee, Industrial Structure Council)

8 Construction Material Recycling Law

- [1] Title of the law: Law on Recycling Construction-Related Materials (Construction Material Recycling Law)
- [2] Date put into force: May 2002 (promulgated in May 2000)
- [3] Purpose: To promote sorting and recycling of designated construction materials that are discharged in the process of demolishing buildings
- [4] Outline of the law: The law provides for the process of sorted demolition and recycling carried out by contractors and the contractual procedures to be followed by the client and the prime contractor for construction works (see Fig. II-37).

(1) Construction works to be regulated

Type of construction	Standard size
Demolition of a building	80m ² or more (total floor space)
Construction of a new building or extension	500m ² or more (total floor space)
Repairing or remodeling (renovating) of a building	100 million yen or more (contracting fee)
Other construction work (civil engineering work)	5 million yen or more (contracting fee)

Notes:

- Demolition work means demolishing parts of a building, such as the foundation, foundation piles, walls, posts, roof trusses, bases, diagonal framing, floor covers, roof plates or horizontal framing, which support the weight of the building or its live load, snow, wind pressure, earth pressure or hydraulic pressure, or earthquake or other vibration or impact.
- Work for demolishing part of a building or constructing part of a new building or extension shall be subject to the regulation if the total floor area of the part concerned falls under the standard size. Reconstruction work shall be regarded as a combination of demolition and construction of a new building (or extension).

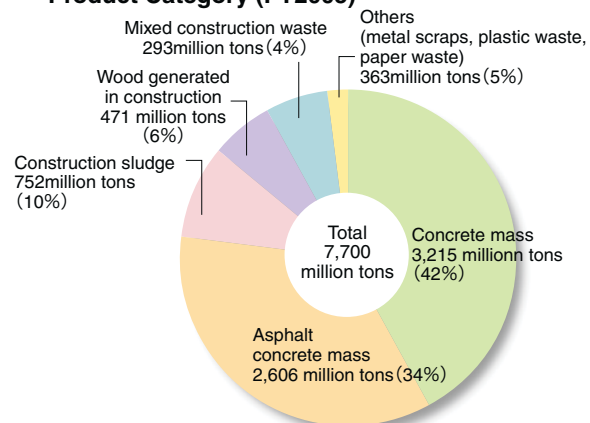
(2) Construction materials to be regulated

- Concrete
- Construction materials consisting of concrete and iron
- Wood*
- Asphalt concrete

* It is allowable to reduce (incinerate) wood if the construction site is more than 50 km away from the nearest recycling facility.

- These materials account for about 80% of the total amount of construction waste (see Fig. II-34).

Fig. II-34 Amount of Construction Waste Discharged, by Product Category (FY2005)

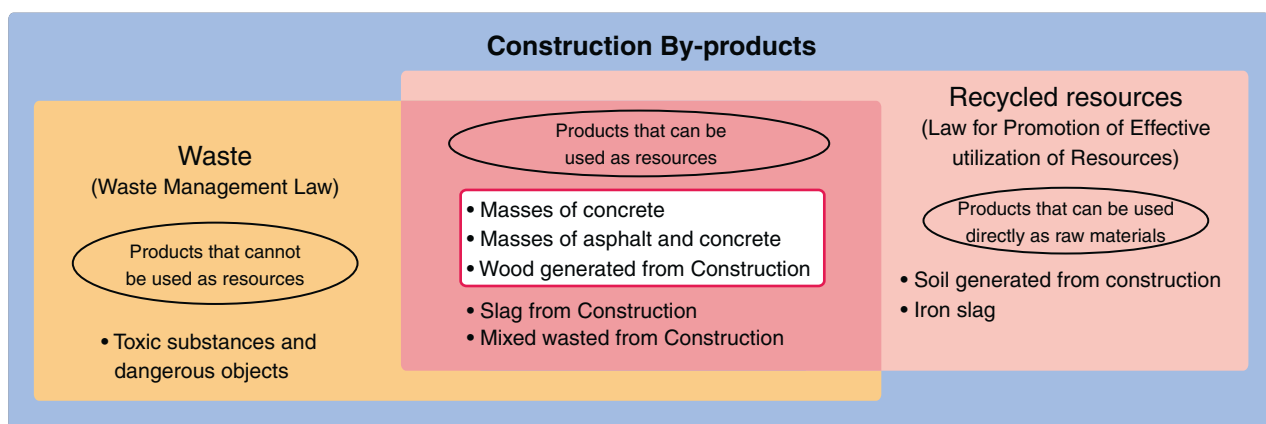


Note 1: The aggregate total may not correspond to the total amount because figures for individual amounts are rounded off.

Note 2: The survey is carried out every five years.

Source: Ministry of land, Infrastructure, Transport and Tourism

Fig. II-35 Relationship between Construction By-products, Recycled Resources and Waste



Construction by-products are products generated as byproducts from construction; they include recycled resources and waste.

Source: Committee for the Promotion of Recycling of Construction By-product,(2004)

 = Recycling of these items is mandatory under the Construction Material Recycling Law

The diagram illustrates the evolution of waste management practices. It starts with 'Formerly ... Mincing demolition' (yellow oval), which leads to 'Mixed waste' (orange starburst). From 'Mixed waste', the path splits: one leads to 'Final disposal' (yellow oval) and the other to 'Illegal dumping' (orange starburst). Below 'Formerly ... Mincing demolition', a downward arrow points to a blue box containing 'Sorted demolition and so on'. This box lists 'Concrete masses', 'Asphalt masses', and 'Wood generated from construction'. An arrow from this box points to 'Recycling', which lists 'Recycled aggregate', 'Recycled asphalt mix beams', and 'Wooden tips'. A central text block between the top and bottom paths lists '• Obligatory' and '• Sorted Demolition and recycling'.

```
graph LR; A([Formerly ... Mincing demolition]) --> B((Mixed waste)); B --> C([Final disposal]); B --> D((Illegal dumping)); A --> E[Sorted demolition and so on]; E --> F[Recycling];
```

• Obligatory
• Sorted Demolition and recycling

Sorted demolition and so on

- Concrete masses
- Asphalt masses
- Wood generated from construction

Recycling

- Recycled aggregate
- Recycled asphalt mix beams
- Wooden tips

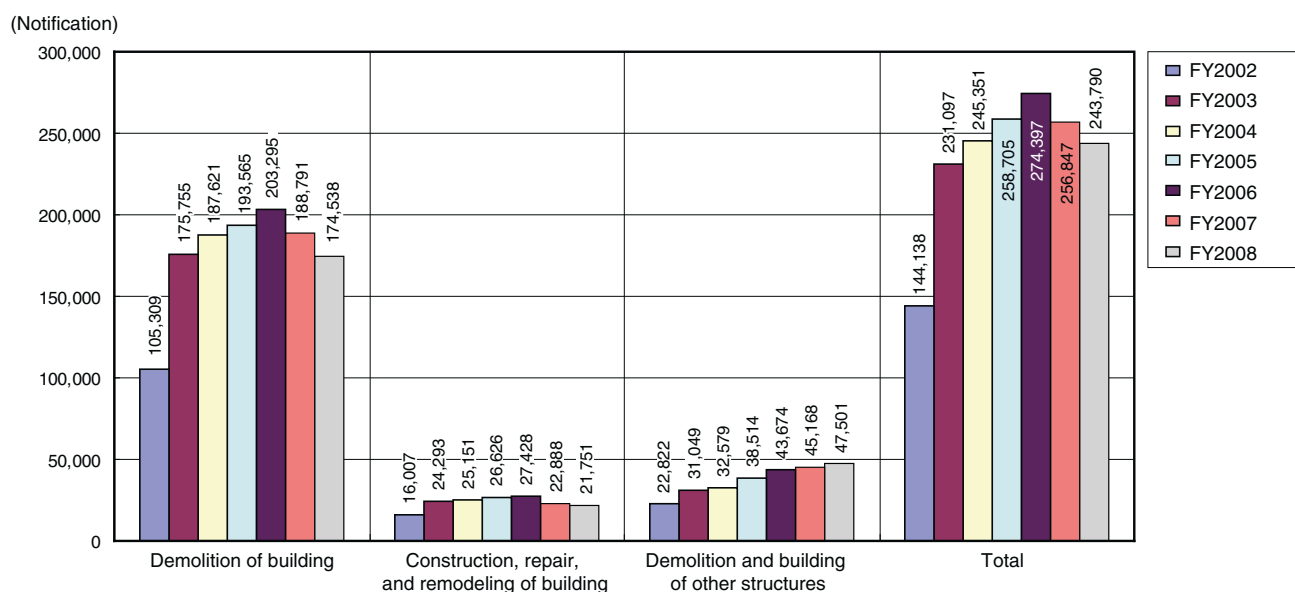
Fig. II-37 Flow of Sorted Demolition and Recycling: from placement of order to implementation



The diagram illustrates a closed-loop aggregate recycling process. It begins with 'Natural aggregate' from a 'Stone pit' (Feature 1: Restrains destruction of nature caused by mining of natural aggregate resources). This aggregate is used in a 'Ready-mixed concrete plant' to create 'Concrete building'. The 'Concrete building' is then demolished at a 'Demolition site' (Feature 2: Revives good aggregate contained in concrete waste from demolition). The demolition site feeds into a 'High-quality aggregate collecting plant', which produces 'Coarse/fine aggregate'. This aggregate is then processed through 'Crushing' and sent to a 'Cement plant'. The 'Cement plant' also receives input from the 'High-quality aggregate collecting plant'. The 'Cement plant' produces 'Ready-mixed concrete plant' material, which is then used in the 'Ready-mixed concrete plant' to create 'Concrete building'. The 'High-quality aggregate collecting plant' also produces 'Road-bed materials' (Feature 3: Reduces environmental burden caused by final disposal). The 'Road-bed materials' are then sent to a 'Final disposal site'.

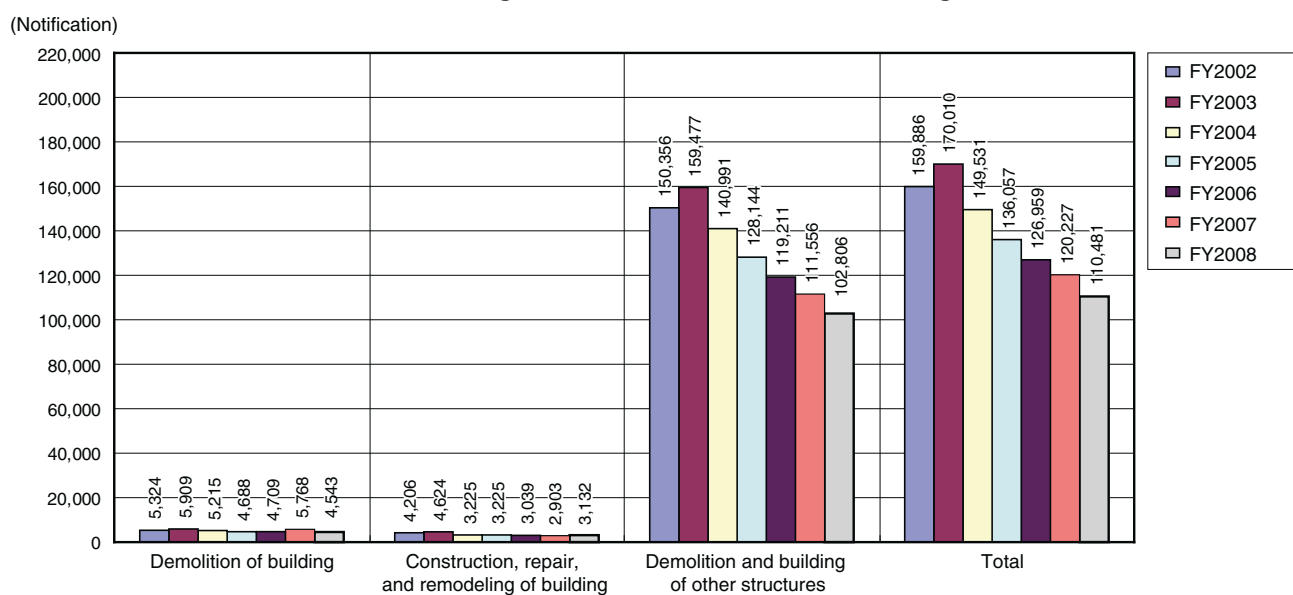
(3) State of compliance with the Construction Material Recycling Law

Fig. II-39 Number of Notifications concerning Relevant Constructions according to Article 10 of the Law



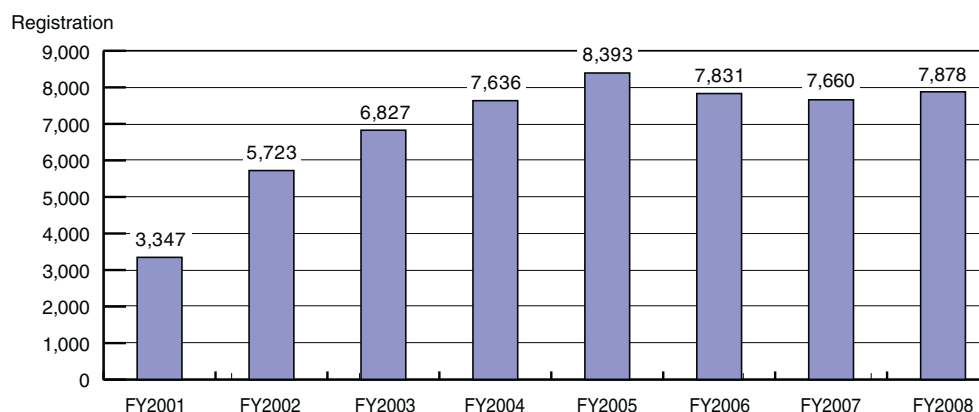
* Data for FY2002 is before the enforcement of the Construction Material Recycling Law (June 2002–March 2003).

Fig. II-40 Number of Notifications concerning Relevant Constructions according to Article 11 of the Law



* Data for FY2002 is before the enforcement of the Construction Material Recycling Law (June 2002–March 2003).

Fig. II-41 Number of Registered Demolishing and Construction Business Operators according to Article 21 of the Law



* The data is the number of registrations at the end of each fiscal year (source: Ministry of Land, Infrastructure, Transport and Tourism).

9 Food Recycling Law

- [1] Title of the law: Law Concerning Promotion to Recover and Utilize Recyclable Food Resources (Food Recycling Law)
- [2] Date put into force: May 2001 (promulgated in June 2000)
Amended in December 2007 (promulgated in June 2007)
- [3] Purpose: To prevent and reduce food waste discharged from food-related businesses, thereby decreasing the amount for final disposal, as well as to promote recycling of such waste as fertilizers and animal feeds.
- [4] Outline of the law: The law provides for measures to be taken by food-related businesses.

(1) Food waste to be regulated

- [1] Unsold or uneaten food waste generated in the process of distribution and consumption
- [2] Leftover plant and animal food generated in the process of manufacturing, processing and cooking food products (excluding kitchen waste discharged from households)

(2) Food-related businesses to be regulated

- [1] Businesses engaged in manufacturing/processing food products for wholesale or retail sales
* e. g., food manufacturers, green grocers, department stores, supermarkets
- [2] Restaurants and other food-service businesses
* e. g., cafeterias, restaurants, hotels, Japanese-style hotels, wedding centers, floating restaurants

(3) Role of parties concerned

- [1] Food-related businesses

All food-related businesses engaged in manufacturing and distributing food products or providing catering and restaurant services shall achieve the target specified for individual sectors of the food industry for handling of food waste, etc. (prevention of waste generation, recycling, reduction of final disposal, and heat recovery).

◇ Obligation to submit a regular report

Food-related business operators who produce more than the specified quantity (100 tons/year) of food waste, etc. (copious generator) are required to submit a regular annual report to the competent minister.

For franchise chain businesses, whether a franchise business is a copious generator or not is determined by the amount of food waste generated by the franchisees.

- [2] Consumers

Consumers shall prevent generation of food waste by improving their methods of buying and cooking food and by using recycled products.

(5) Exceptions in the Food Recycling Law

It is necessary to execute widespread recycling to execute the recycling smoothly.

Therefore, the Food Recycling Law provides exceptions that negate the need for obtaining the following permissions usually required for the collection and transportation of municipal solid waste (MSW):

- (1) Permission for unloading is not needed if food waste is carried in the site of a recycling business operator registered by the competent minister.
- (2) Permission for the collection and transportation of food waste is not needed as long as the range of a recycling business plan approved by the competent minister is not exceeded. (If food waste is subject to the Waste Management Law, the recycling business operator is required to follow procedures stipulated in the said law, such as obtaining permission to conduct disposal business or establish waste disposal facilities. (If food waste is applicable to waste of Waste Management Law, it is necessary to follow procedures concerned with permission of waste disposal businesses and permission to establish a waste disposal facility.)

From the viewpoint that attempts the simplification of procedures, the notification of manufacturing and sales is assumed to be unnecessary for registration recycling businesses, as also stated in the Law Concerning Safety Assurance and Quality Improvement of Feeds, and Manure Managing Law.

- [3] The national and local governments

The national and local governments shall implement measures to promote recycling of recyclable food resources.

(4) Target of recycling and priority of measures

Aim: Achieve the recycling target specified for each sector of food industry by FY2012.

- Food manufacturer 85% (81%) • Food retailer 45% (31%)
- Food wholesaler 70% (61%) • Catering service/restaurant 40% (21%)
- * Figures in parentheses indicate results from FY2005.

- [1] Prevention: Preventing generation of food waste

- [2] Recycling: Recycling of food waste as raw materials for producing fertilizer, feedstuff, fat and oil products, methane, ethanol, or fuels and reducers manufactured through carbonization processes.

- Fertilizers: compost made by aerobic fermentation, organic fertilizer made by drying
- Animal feeds: feed for livestock or aquarium fish made by pressure steaming, aerobic fermentation or dehydration through frying
- Oil and fat products: cooking oil, soap
- Methane: biogas made by anaerobic fermentation of kitchen waste (composed of methane gas (about 60%) and carbon dioxide gas (about 40%)), used as fuel
- Ethanol: Used as an alternative of oil
- Fuels and reducers manufactured through carbonization processes: Used as alternatives for charcoal.

- [3] Reduction: reducing the amount of food waste by dehydration, drying, fermentation or carbonization (roasting)

- [4] Heat Recovery: Heat is recovered or transferred from food waste.

Fig. II-42 Exceptions concerning Permission for MSW Collecting and Transporting Business

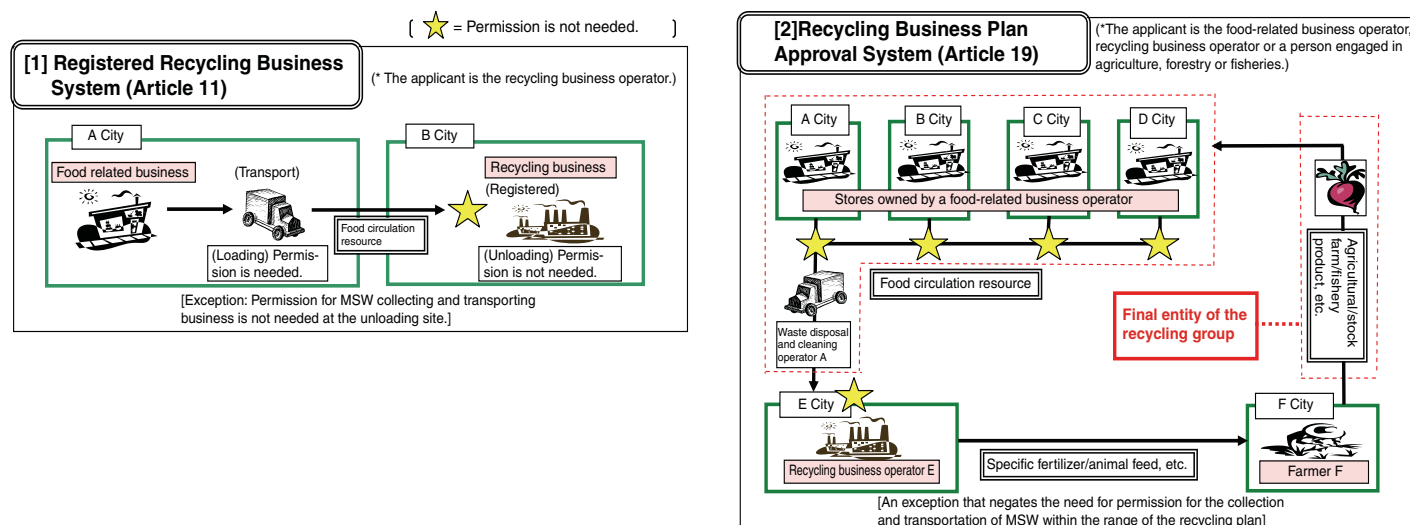


Fig. II-43 Food Waste and Recyclable Food Resources

Food waste includes leftover plant and animal food generated in the process of manufacturing and cooking food products and unsold or uneaten food waste generated in the process of distribution and consumption.

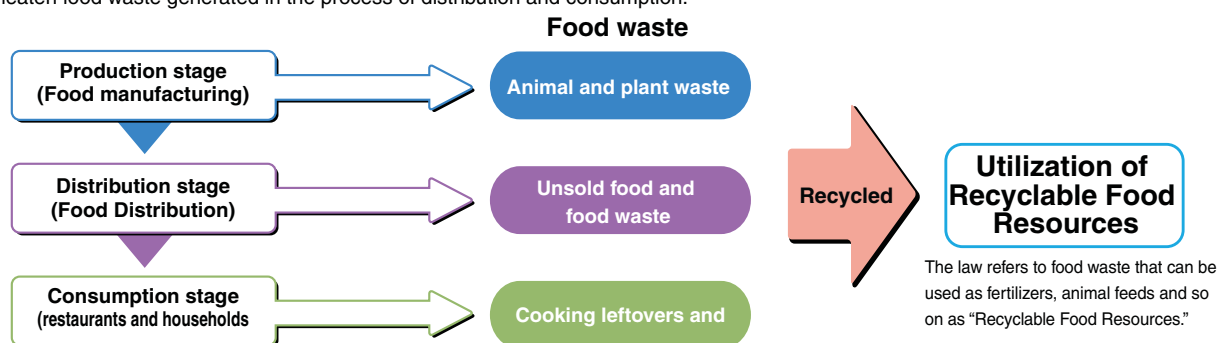


Table II-7 Amount of Food Waste Generated and Recycled (FY2007)

(Unit: %)

	Waste generated a year (10,000 tons)	Recycling rate (%)	Reduction of generation (%)	Reduction in quantities (%)	Recycled (%)	Allocation of recycled waste by usage (%)			
						Fertilizer	Animal feeds	Methane	Oil and fat products
Food manufactures	493	81	5	3	73	41	50	6	3
Food wholesalers	74	62	4	1	56	69	23	—	7
Food retailers	263	35	4	2	30	67	26	—	7
Food-service businesses	305	22	3	2	15	28	31	—	40
Total	1,134	54	4	3	47	46	43	4	7

(Source: Department of Statistics, Ministry of Agriculture, forestry and Fisheries, "Actual condition survey on utilization of recyclable food resources (2007)")

Note: The grand total may not match the sum of subtotals because figures are rounded off.

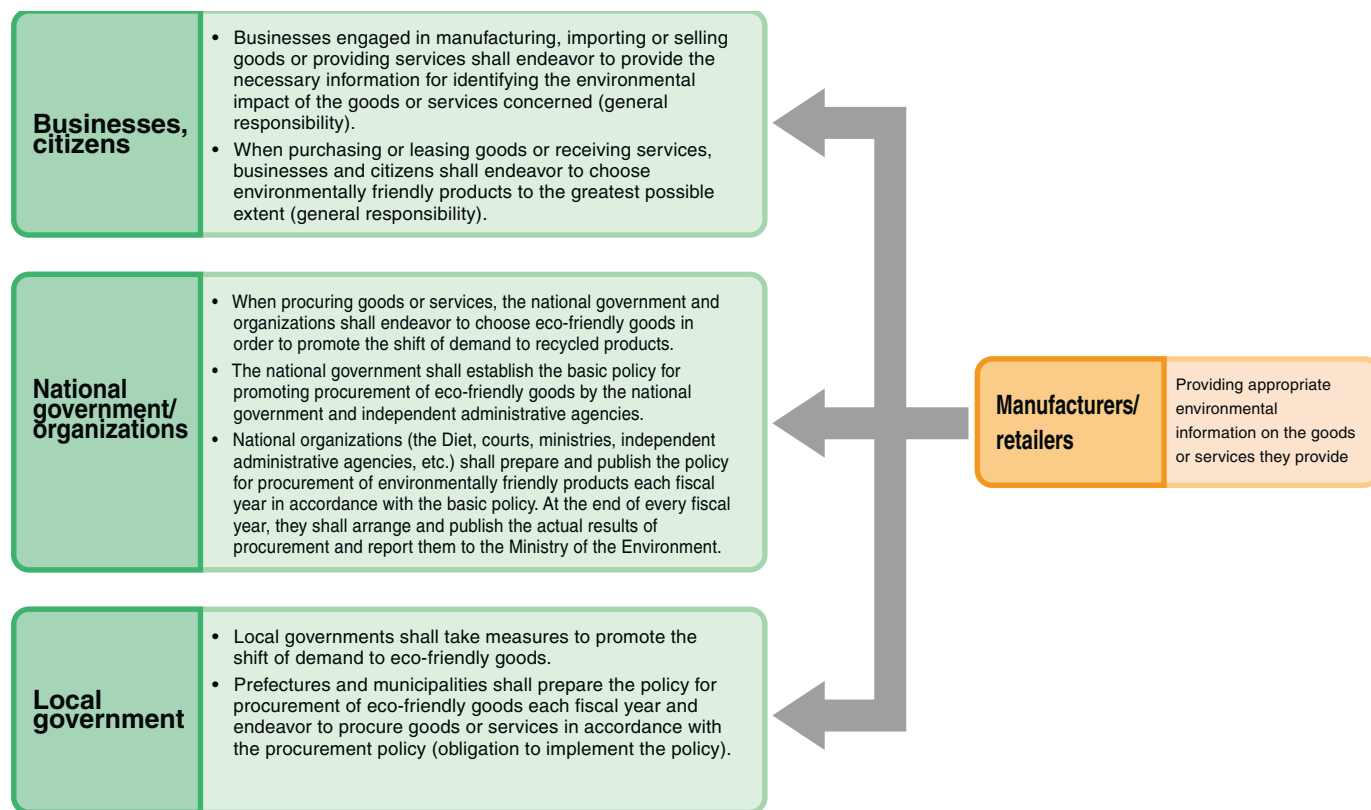
10 Green Purchasing Law

- [1] Title of the law: Law Concerning the Promotion of Eco-friendly Goods and Services by the State and Other Entities Authorities (Green Purchasing Law)
- [2] Date put into force: April 2001 (promulgated in May 2000)
- [3] Purpose: To create and develop markets for recycled products and other products that contribute to the reduction of environmental impact.
- [4] Outline of the law

The law provides for the purchase of eco-friendly goods by the national government and national organizations (and provides for local authorities' obligation to make efforts), while requiring businesses and citizens to choose eco-friendly goods, to the greatest possible extent (see Fig. II-44).

The law designates the types of eco-friendly goods on which priority should be placed in procurement and judgment criteria with respect to 256 items (see Table II-8).

Fig. II-44 Green Purchasing Law



• Green procurement

Green procurement generally means that, when purchasing raw materials, manufacturers choose eco-friendly goods or procure products from manufacturers that implement environmental considerations. In other words, it means procuring materials and parts from manufacturers that have established systems for environmental management and prohibited substance management.

Large manufacturers have developed their own “green procurement criteria” and started taking measures accordingly. For example, 18 large information/communication device manufacturers unified their green procurement criteria in 2002 and included heavy metals and halogen compounds such as

cadmium (Cd), lead (Pb), mercury (Hg) and hexavalent chromium (Cr6+), which are contained in materials and parts, as common items to be disclosed.

In July 2006, an information disclosure system with information on materials (Pb, Hg, Cd, and Cr6+ as well as two kinds of Br (bromine)-based flame retardants) contained in the product (home electric appliances and PCs) was introduced. Furthermore, the EU enforced the RoHS Directive, which prohibited home electric appliances and communication devices from containing the above six materials. Manufacturers have already started to take these measures.

Table II-8 Designated Procurement Items and Criteria (256 in total)

Category	Designated procurement item (Cabinet Decision on February 5, 2010)	Criteria
Paper	8 items including information paper (copy paper, business forms, coated inkjet paper), printing paper (coated or uncoated printing paper), hygienic paper (toilet paper, facial tissue)	Composition of recycled pulp, Use of Forest Certification products and thinned wood, Degree of whiteness, etc.
Stationery	81 items including mechanical pencil, ball point pens, scissors, dust blowers, glue, files, binders, desk mats, windowed envelopes, blackboard dusters, can/bottle crushing machines	Use of recycled plastic, thinned wood, plant-origin plastic, Global warming potential
Office Furniture	10 items including chairs, desks, shelves, coat hooks, umbrella stands, blackboards	
OA Machines	17 items including copiers, printers, facsimile machines, display devices, digital printers	Energy efficiency
Home appliances	Refrigerators, freezers, refrigerators with freezer, electrically heated toilet seat, television	
Air conditioners	Air conditioners, gas-heat pump systems, heaters	
Water heaters	Electric hot water heaters, gas-water heaters, oil-fired water heaters, gas cookers	
Lighting	Fluorescent lighting apparatuses, fluorescent lamps, electric-lamp bulbs, LED lighting equipment, internal lighting type LED indicator lights	
Vehicles	5 items including automobiles (Natural gas driven vehicles), ETC devices, etc.	Gas emissions, fuel consumption
Fire extinguisher	Fire extinguishers	Use of recycled extinguishing agent
Uniforms and Work clothes	Uniforms, work clothes	Use of resin recycled from PET bottles
Interior fixtures and bedding	10 items including carpets, curtains, blankets, futons, bed frames, etc.	
Work gloves	Work gloves	
Other five goods	Tents, tarpaulins, protective netting	
Facilities	Photovoltaic generation systems, solar thermal systems, kitchen waste disposers, Water-saving apparatuses	Use of solar energy, Reduction of kitchen waste
Emergency supplies	6 items including PET bottle water, pouch-packed food, emergency canned fuel, blanket, etc.	Use-by date, Use of resin recycled from PET bottles
Public works projects	Public works [1] Recycled materials (48 items including particle boards, ceramic-quality tiles, blast furnace cement, permeable concrete, heat-insulating window sashes/doors, automatic water taps, light control systems, and sewage sludge fertilizer) [2] Construction machinery (low-emission type, low-noise type) [3] Method of construction (5 items including recycling of construction sludge s and road surface layer) [4] Special-purpose items (drainage paving, transparent paving and tree planting on the roof)	Usage degree of recycled materials, emitted gas and noise
Services	Energy-saving diagnoses, cafeterias, printing, tire retread, car repair, government office building management, plants management, cleaning, insect pest control, transportation and delivery, passenger transport, lighting facility supply, retailers in government office buildings, etc.	Contents of technical qualifications and diagnoses, kitchen waste disposal, composition of recycled paper, tire retread, use of recycled car parts

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 eco-friendly goods.

11 METI Industrial Structure Council: Guidelines for Waste Treatment and Recycling

In the Guidelines for Waste Treatment and Recycling (by Product Category/Sector), the Industrial Structure Council indicates measures to be taken by businesses for waste treatment and recycling, with the aim of promoting voluntary actions.

The Guidelines were first developed in 1990 with respect to 14 product categories and 10 sectors. After repeated revisions for improvement and enhancement of the contents, they were revised in October 2005 for the seventh time, regulating 35 product categories and 18 sectors in

total, and were reviewed in October 2006.

The Guidelines play two roles: [1] a collection of voluntary measures to be undertaken with respect to product categories and sectors that are not regulated under recycling-related laws, and [2] implementation guidelines with respect to product categories and sectors that are regulated under recycling-related laws. Industries aim at achieving the numerical targets for recycling set in the guidelines as quickly as possible.

(1) Guidelines by product category (35 commodities)

Paper	Glass bottles	Steel cans	Aluminum cans
Plastics	Automobiles	Motorbikes	Tires
Bicycles	Home electrical appliances	Spring mattresses	Office furniture
Carpets	Futons	Dry cell batteries, button batteries	Small secondary batteries, etc.
Lead batteries for automobiles and two-wheel vehicles	Cassette gas cylinders	Aerosol cans	Small gas cylinders
Fire extinguishers	Pachinko game machines, etc.	Personal computers and peripheral devices	Copying machines
Gas and kerosene equipment	Textile products	Lubrication oil	Electric wires
Construction materials	Bath tubs and bathroom units	Kitchen components	Cellular phones and PHS
Fluorescent tubes	Vending machines	Single-use cameras	

(2) Guidelines by sector (18 businesses)

Iron and steel	Paper/pulp manufacturing	Chemicals	Glass sheet manufacturing
Textiles	Nonferrous metal manufacturing	Electricity	Automobile manufacturing
Car part manufacturing	Electronic/ electric device manufacturing	Oil refineries	Distribution
Leasing	Cement manufacturing	Rubber product manufacturing	Coal mining
Gas	Factory-produced housing manufacturing		

(For more details, see "Guidelines for Waste Treatment and Recycling (By Industry Sector)," METI)

(3) Guidelines by product category (target and future approach)

1. Paper	Paper recycling rate 62% [FY2010]	18. Gas canisters	Measures against residual
2. Glass bottles	Cullet-use rate 91% [FY2010]	19. Aerosol cans	Measures against residual
3. Steel cans	Maintenance of recycling rate over 85%	20. Portable gas cylinders	PR for proper handling
4. Aluminum cans	Maintenance of collection and recycling rate over 85%	21. Fire extinguishers	Collection rate 60% [FY2005]
5. Plastics	PET bottle collection rate over 80% [FY2014]	22. Pachinko machines	Material recycling target rate 55% [FY2005] (Pachinko machines and pinball slot machines)
6. Automobiles	Recycling rate of 85% [FY2002 - FY2014]	23. Personal computers and peripheral devices	Recycling rate [FY2003] Desktop PC 50%, Laptop 20%, CRT display 55%, LCD display 55%
7. Motorbikes	Recycling rate of 85% [FY2002 - FY2014]	24. Copiers	Expansion of general collection system is under review.
8. Tires	Recycling rate of over 90% [FY2005]	25. Gas and kerosene equipment	Review of assessment guidelines
9. Bicycles	Feasible recycling rate of 67%	26. Textile products	Building of a recycling system is under review.
10. Home electric appliances	Recycling rate: Air-conditioner 60%, TV 55%, refrigerator 50%, washing machine 50%	27. Lubrication oil	Review of sorting methods for more efficient recycling
11. Spring mattresses	Building of a recycling system is under review.	28. Electric wires	Measures for recycling electric wires
12. Office furniture	Measures for promoting 3R are under review.	29. Construction materials	Expansion of PVC pipe fitting recovery bases
13. Carpets	Reduction of lint within processes to 20% of FY2001 [FY2006]	30. Bath tubs and bathroom units	Supply of materials information is under review.
14. Futons	Reduction of cotton waste within processes to less than 4.5% - 4%	31. Kitchen components	Material indication methods, etc. are under review.
15. Dry cell batteries/ button batteries	Production and delivery of 6,000 collection boxes	32. Cellular phones and PHS	Setting of collection and recycling targets is under review.
16. Compact secondary batteries	Recycling rate: Compact sealed lead storage battery 50%, NiCd battery 60%, nickel-hydrogen battery 55%, lithium secondary battery 30%	33. Fluorescent tubes, etc.	Development focusing on downsizing, improved efficiency and longer life
17. Batteries	Review for restructuring a recycling system	34. Vending machines	Determination of substances to be controlled and understanding of use state
		35. Single-use cameras	Measures for promoting collection

* Colored portion of the items is covered by the Law for Promotion of Effective Utilization of Resources.

(4) Guidelines by sector (target and future approach)

1. Iron and steel	Reduction of final waste disposal amount to 50% of FY1998 in FY2010
2. Paper/pulp manufacturing	Reduction of final waste disposal amount to 57% of FY1998 in FY2010
3. Chemicals	Reduction of final waste disposal amount to 75% of FY1998 in FY2010
4. Glass sheet manufacturing	Reduction of final waste disposal amount to 42% of FY1998 in FY2010
5. Textiles	Improvement of intermediate treatment and expansion of recycling efforts for reducing sludge
6. Nonferrous metal manufacturing	Target of reduction of final waste disposal amount in FY2010 (to the FY1998 level): Japan Mining Industry Association: 37%; Japan Brass Makers Association: 76%; Japan Aluminum Association: 14%; Japan Aluminum Refiners' Association: 10%; Japanese Electric Wire and Cable Maker's Association: 50%
7. Electricity	Maintenance of a final waste disposal rate in FY2010 similar to the level of FY2006 (approx. 8% in FY2004)
8. Automobile manufacturing	Reduction of final waste disposal amount to 87% of FY1998 in FY2010
9. Car part manufacturing	Reduction of final disposal amount of waste produced in production processes to 96% of FY1990 by FY2010
10. Electronic/ electric device manufacturing	Reduction of final waste disposal amount to 5% of FY2003 in FY2010
11. Oil refineries	Reduction of final waste disposal amount to 67% of FY1990 in FY2010
12. Distribution	Reduction of packaging materials to 25% of FY2000 and shopping bags to 35% of FY2000 in FY2010
13. Leasing	A solution for a problem area is under review for understanding actual treatment of products and promoting efficient recycling.
14. Cement manufacturing	Target amount of waste and by-products produced per ton of cement in FY2010 is set to 400kg.
15. Rubber product manufacturing	Reduction of final waste disposal amount to more than 45% of FY2001 in FY2010
16. Coal mining	Reduction of final waste disposal amount to more than 80% of FY1998
17. Gas	Reduction of final waste disposal amount to 25% of FY1998 in FY2010
18. Factory-produced housing manufacturing	Reduction of waste produced in production phase to more than 80% of FY2001 in FY2010

* Colored portion of the items is covered by the Law for Promotion of Effective Utilization of Resources.

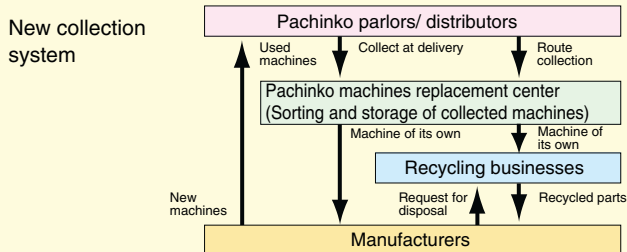
Example of a guideline for waste treatment and recycling (Reviewed in October 2006)

<By product category>

Pachinko machines, etc.

• Overview of the guideline

1. Considerations to be taken into designing and manufacturing toward 3R
 - [1] Implementation of the product assessment
 - [2] Disclosure of the conditions and effects due to the measures carried out
 - [3] Commonization and standardization to prolong the life of products eligible for repairing
 - [4] Reduce varieties of materials and amount of lead
 - [5] Standardized labeling of materials
2. Goals of material recycling
FY2001: 35%, FY2005: 55%, FY2007: 75%
3. Measures for distribution and disposals
Adopt a nationwide system of collection and recycling, and maintain and expand collection sites
4. Promotion of R&D
R&D for reusing parts based on the concept of easy disposal, reduction of shredder dust and the law to prevent irregularity
5. PR activity
Instruct and enlighten on the appropriate disposal methods and publicize recycling status implemented by the businesses



• Progress of measures implemented (overview)

1. Considerations to be taken into designing and manufacturing toward 3R
 - Reduction in usage of ABS resin and plywood and the number of parts for frames
 - Implementation of research on types of resin and amount of environmental burden (e.g., lead) used
 - Material labeling for resin parts that weigh 100g or more. Parts lighter than 100g are labeled to the maximum extent.
2. Material recycling

Pachinko machines	Slot machines
FY2001 (actual): 41.4%	-
FY2002 (actual): 51.9%	62.8%
FY2003 (actual): 63.6%	64.7%
FY2004 (actual): 74.4%	69.1%
FY2005 (actual): 82.3%	87.3%
3. Measures for distribution and disposals
In the Tokyo Metropolis, a new collection system in which the machines are delivered to manufacturers at collection sites by area blocks was launched in October 2003 and its area expanded to be nationwide.
4. Promotion of R&D
The system for facilitating reusable parts is strengthened.
5. PR activity
Publicizing measures taken for recycling through industry newsletters and exhibitions

• Measures to take after this (overview)

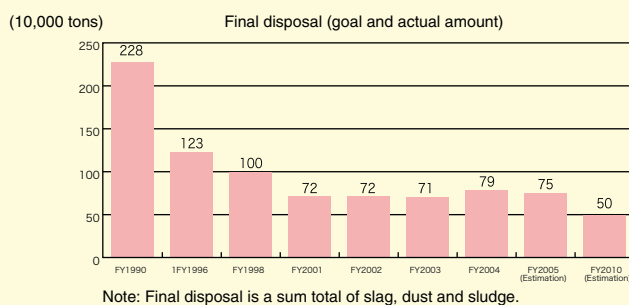
- start collection of new type of slot machines used for pachinko ball
- measure to collect from solitary islands
- maintain and expand collection sites
- promotion of R&D for parts reuse based on the concept of easy disposal, reduction of shredder dust

<By sector>

Iron ore industry

• Overview of the guideline

1. Goal to reduce final disposal
Meet a goal of a 50% decrease in final disposal in FY2010 in comparison with FY1998
2. Recycling of iron and steel slag
 - [1] Promotion of research/study to further increase utilization of iron steel slag
 - [2] PR activities to encourage utilization
3. Acceptance of materials from other industries
With regard to waste plastic (including waste plastic, waste tires, ASR, etc.), an acceptance system is developed aiming at accepting one million tons in 2010, given that conditions including a system of goods collection are met.



• Progress of measures implemented (overview)

- (Development of recycling iron and steel slag)
Amount of iron and steel slag generated: 38.14 million tons in FY2006 (37.48 million tons in FY2005)
Final disposal of iron and steel slag: 340,000 tons in FY2006 (320,000 tons in FY2005)
Effective use of iron and steel slag: 99.1% in FY2006 (99.2% in FY2005)
- [1] Measures for increased use of recycled waste and improved reliability
- Have continued preliminary working for revision of “JIS A 5015 (iron and steel slag for road construction)”
 - Uploaded the full text of the revised Guidelines on Control of Iron and Steel Slag Product and a list showing the progress of related companies for corporate manual production to our website in an effort to improve reliability, and at the same time, published slag newsletters and distributed the pamphlets and brochures explaining the products subject to the Green Purchasing Law to government and municipal offices for PR.
- (Progress of waste plastic acceptance)
FY2006: 370 thousand tons (FY2005: 440 thousand tons)

• Future measures (overview)

- (Measures to further increase utilization)
- Promotion of R&D to apply iron and steel slag to harbor and ocean fields
 - Revision of JIS for iron and steel slag aggregate for concrete or iron and steel slag for road construction
 - Setup of a group standard on iron and steel slag for civil engineering
- (Enlightenment)
- Promotion of enlightenment for various slag products
 - Support to acquire JIS (Electric arc furnace oxidizing slag aggregate for concrete) acknowledgment factory
- (Others)
With regard to waste plastic, an acceptance system is being developed aiming at accepting one million tons in 2010, given that conditions including a system of goods collection are met.

12 Governance of Waste and Recycling

“Guideline for governance of waste and recycling for dischargers” was developed by the Waste Prevention and Recycling Subcommittee, Environment Committee, Industrial Structure Council in September 2004 in order to properly instruct dischargers to promote appropriate disposal and recycling of waste.

1. Background of development of Guideline for governance of waste and recycling

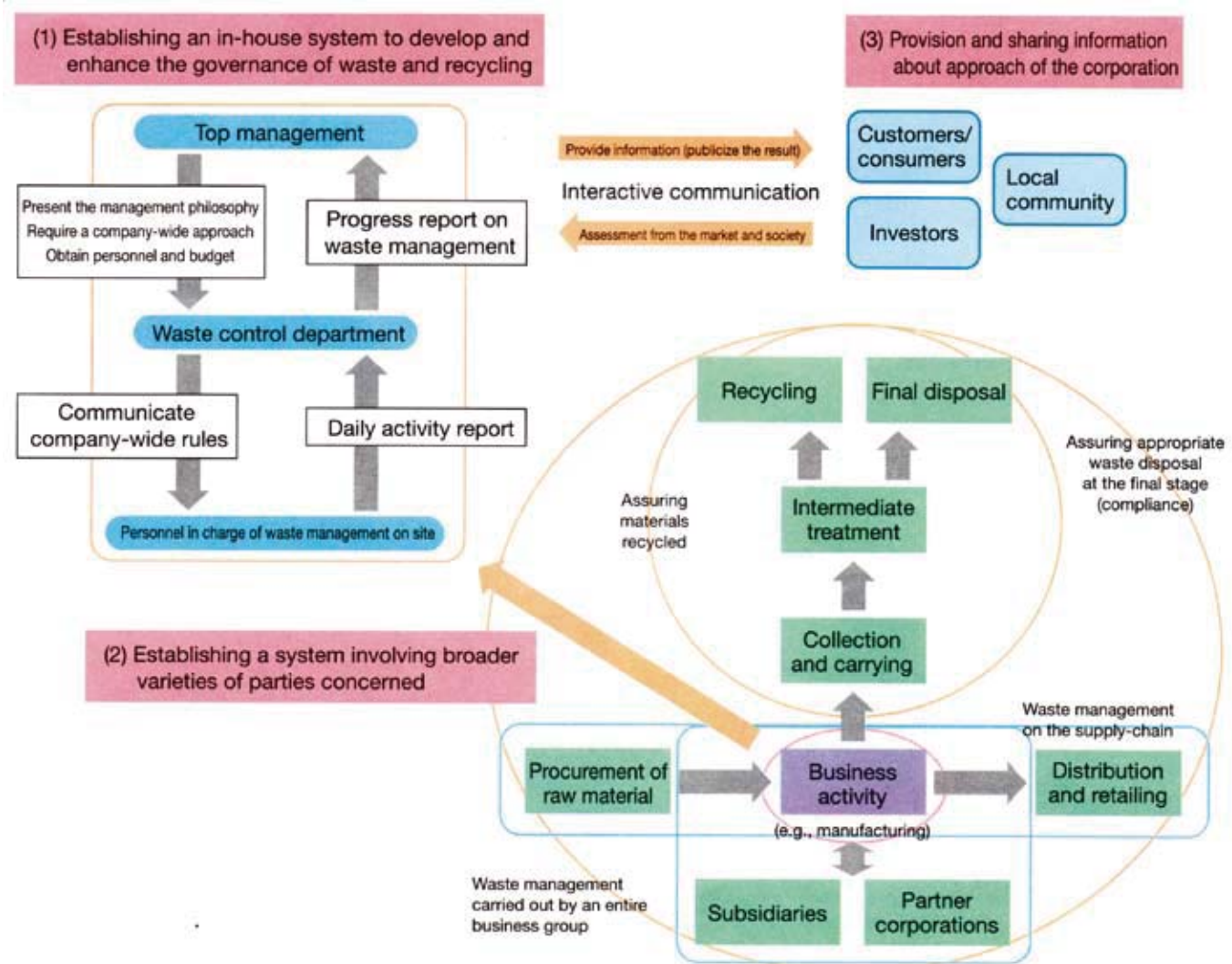
In recent years, some major cases of illegal dumping including Teshima, Kagawa Pref. (1990), the prefectural boundary between Aomori and Iwate (2002), and Yokkaichi city, Mie Pref. (2005) have been revealed, and they have caused serious social problems.

Subsequently, the Waste Disposal Law was revised to ask dischargers to accept heavier responsibilities. In the case of the prefectural boundary between Aomori and Iwate, both

prefectural governments took the following steps: reported and levied fees on dischargers; disclosed the name of the company that is confirmed to have perpetrated illegal disposal; and ordered the said company to remove the waste from the site. Violation of laws such as by illegal dumping may cause risk to a company’s management due to its degraded image of the corporate brand.

Upon these facts the “Guideline for governance of waste and recycling” is assembled with concepts that include the importance of compliance, views of social responsibility of a corporation and necessity to address the issue with a standpoint of corporate management.

Fig. II-45 Outline of Governance of Waste and Recycling



2. Points to be considered in governance of waste and recycling

Governance of waste and recycling is a concept of an ideal approach for a corporation (discharger) to increase the corporate value through improvement of the corporate brand image and reduced management risk by preventing an inappropriate discharge of waste by the corporation. The guideline has three specific points to consider.

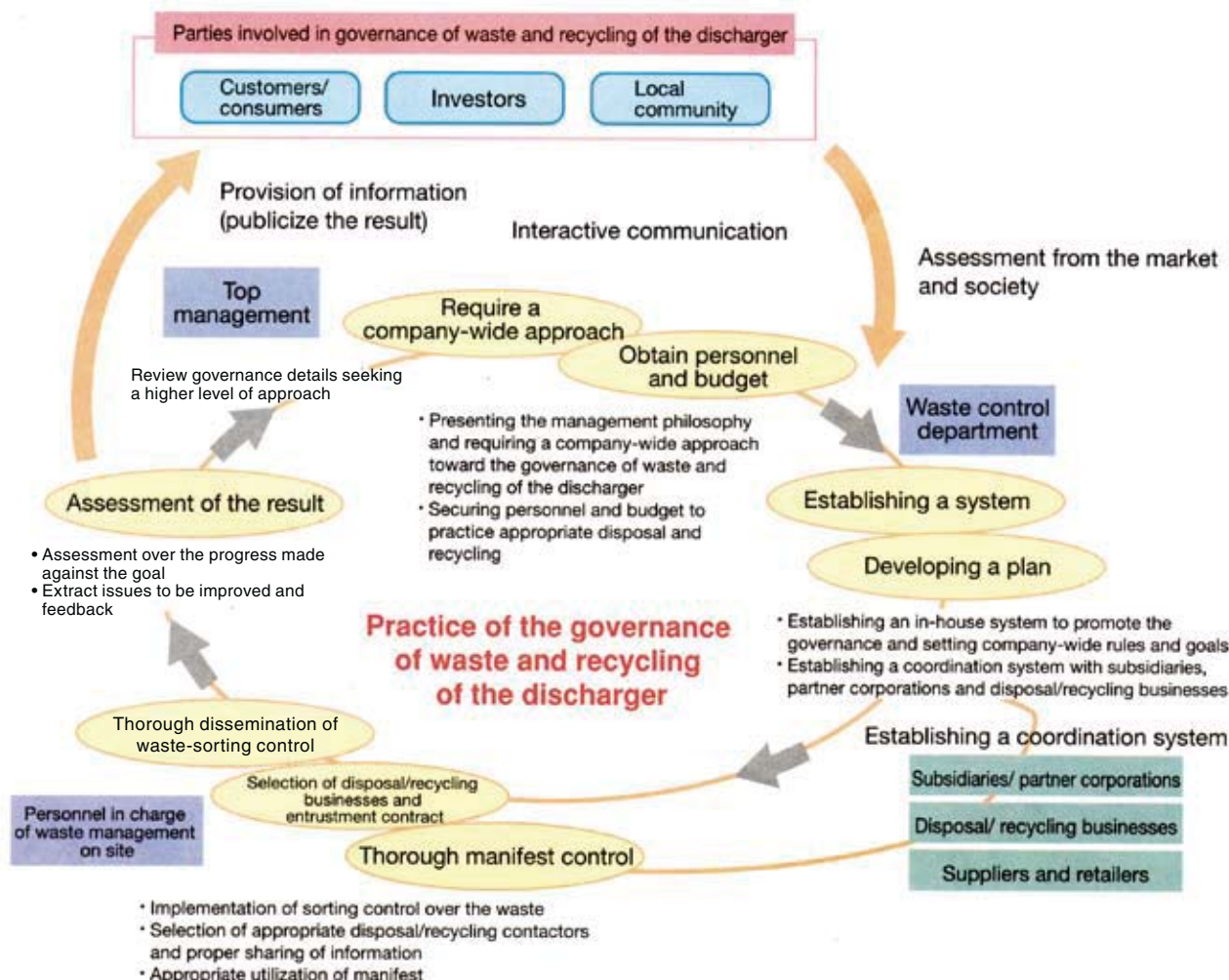
The necessity of a company-wide approach, where not only the personnel in charge of waste management on site but also the entire organization from the top management to employees are involved in disposal and recycling of waste, is presented as a primary point. The importance to promote appropriate disposal, among others, through active involvement of top management by securing personnel and budget for the waste control department and requiring a company-wide approach, is emphasized.

Second, in order to mitigate the risk of inappropriate discharge of the waste by the corporation, the significance of establishing a cooperative relationship with broader

varieties of parties concerned, including subsidiaries, partner corporations, retailers, disposal and recycling businesses, to pursue appropriate treatment of the waste is highlighted. Coordination with disposal and recycling businesses has greater significance because it will enable the discharger to properly carry out disposal and recycling through opinion exchanges about better methods of sorting, treatment and recycling of waste.

The third point to consider is the idea of provision and sharing information with a variety of third parties, such as customers, consumers, investors including stockholders of the corporation, the local community including local, about approaches made by the corporation. This effort allows the corporation to receive reasonable assessment over their approach, which helps them further improve governance of waste and recycling.

Fig. II-46 Flow Followed by a Discharger to Practice the Governance of Waste and Recycling



13 Environmental Labels and Identification Marks

“Environmental Labels and Declarations” is a claim representing the environmental aspects of the product and service, of which general principles are provided by ISO14020 “Environmental labels and declarations - General principles,” a standard issued by International Organization for Standardization (and JIS (Japan Industrial Standard) Q 14020) as a stimulator to promote the supply and demand of eco-friendly products and services and the possibility of continuous market-oriented improvement of the environment. It can be presented in the form of statements, symbols or graphics made on product or packaging labels, product literature, technical bulletins, advertising, publicity or similar applications. JIS categorizes the environmental labels into three types based on the ISO standard.

(1) Type I: Environmental labels

The type I Environmental label is a label granted by third-party bodies and operated in accordance with ISO 14024 (Environmental labels and declarations—Type I environmental labeling—Principles and procedures) issued in 1999 and JIS Q 14024 established in 2000. In this system, third-party accreditation bodies establish criteria among the environmental friendliness of products in comparison with other similar products in light of the entire life cycle for specific kinds of commodities, and certify some products as environmentally friendly in accordance with the criteria. Predetermined marks can be attached to certified products.

“Eco-Mark” in Japan, “Blue Angel” in Germany and “Nordic Swan” in North European countries are included in Type I labels.

“Eco-Mark” service is provided by the Japan Environment Association (<http://www.jears.or.jp>), which started its service in 1989 with seven product categories of “spray products in which the designated CFC is not used.” They cover 43 product categories and 4,690 brands as of the end of September 2010 as a result of annual extension of subject product categories and certified products.

Fig. II-47 Eco-Mark



(2) Type II environmental labels

The type II Environmental labels is a type in which self-declaration is made by businesses in accordance with ISO 14021 (Environmental labels and declarations—Self-declared environmental claims—Type II environmental labeling) issued in 1999 and JIS Q 14021 established in 2000. Since it is essential to assure reliability in self-declared environmental claims and since vague or unclear environmental claims could mislead consumers, definitions are provided for the following twelve terms.

Compostable
Degradable
Designed for disassembly
Extended life product
Recovered energy
Recycled content
[Preconsumer materials, postconsumer materials, recycled material, collected (recycled) materials]
Reduced energy consumption
Reduced resource use
Reduced water consumption
Reusable and refillable
Waste reduction

The type II label is based on self-declarations by businesses of their environmental consideration, indicating how environmentally friendly their products are, in the form of statements, symbols or graphics. Additionally, the “Mobius Loop” is a symbol claiming “Recyclable” or “Recycled Content.” Industrial associations and companies also use their own original identification marks to indicate recycled products and materials to be selectively collected.

Fig. II-36 Identification Marks



Fig. II-49 Identification Marks

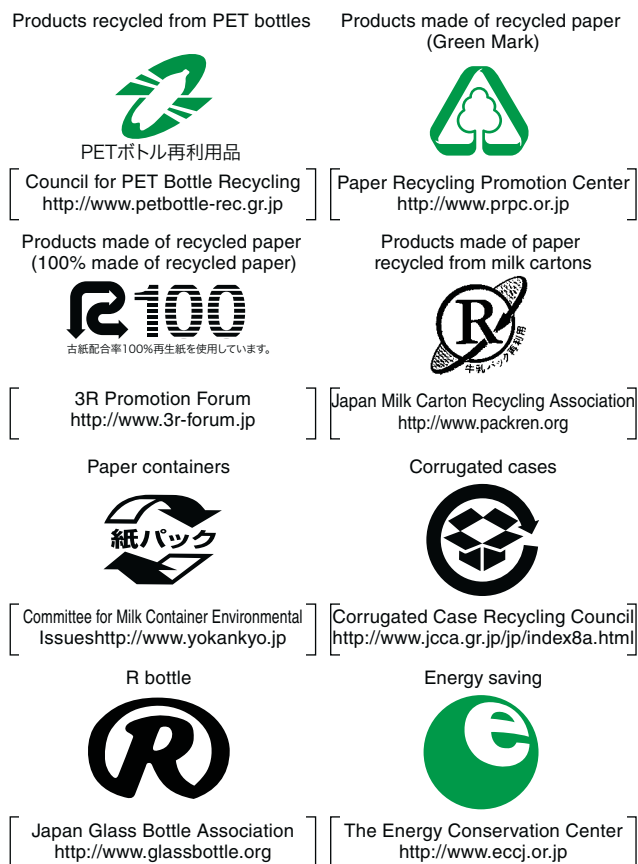


Fig. II-50 Eco-Leaf Environmental Label



No.XX-04-001



Product registration number
Representing a product with an environmental label granted
and indicating a data registration number

Composition of Eco-Leaf

The environmental label of "Eco-Leaf" is publicized according to the following three models: 1) PEAD (Product Environmental Aspects Declaration), 2) PEIDS (Product Environmental Information Data Sheet) and 3) PDS (Product Data Sheet).



① PEAD : Product Environmental Aspects Declaration
It provides information about environmental burden including the following categories in an easy-to-understand manner based on the primary information of the product as well as the data.

- (1) Burden of global warming (CO₂ converted)
- (2) Burden of acidification
- (3) Energy consumption (MJ)

② PEIDS : Product Environmental Information Data Sheet
It provides a list of inventory analysis/impact assessment results according to each life cycle stage.



③ PDS : Product Data Sheet
It provides product information and mass of energy and material input/emitted per product according to each life cycle stage. (LCA data)



(3) Type III environmental labels

The type III environmental label indicates qualitative data on the environmental impact of products through the entire life cycle, from gathering of resources to manufacturing, use, and disposal/recycling, calculated by the life cycle assessment (LCA) method and using predetermined environmental indicators in accordance with ISO 14025 (Environmental labels and declarations—Type III environmental declarations—Principles and procedures) issued in June 30, 2006. However, only a few countries have adopted the type III environmental labels.

As an example, Eco-Leaf is an environmental label that has been used in the "Eco-Leaf Type III Environmental Labeling Program" since June 2002 by the Japan Environmental Management Association for Industry (<http://www.jemai.or.jp>). Sixty-two cineraria by product category were laid down and 496 product items (sum total 930 items) were registered and publicized in the program as of the end of February 2010.

Assessment of overall recycling process



(Source: Japan Environmental Management Association for Industry)

14 Design for Environment (DfE)

(1) Toward realization of green product chain

In reducing environmental burden and minimizing material consumption and the amount of waste generated through the entire life cycle of the product (from material acquisition and utilization to recycling and disposal of end-of-life products), it is essential to take the concept of the 3Rs into the designing and manufacturing, design for environment (DfE).

Although the idea of energy saving in light of global warming should be incorporated into DfE in addition to the design and manufacturing requiring efficient material consumption, controlling waste amount, detoxification and an easy disassembly, bear in mind that the nature of those design aspects may conflict with each other.

By adopting DfE, a positive effect leading a variety of industries to promote development of eco-friendly products seems to be spreading. Effective material usage through cyclical use by utilizing recycled material made from used products in the same product category increases at some manufacturers.

Accelerating to expand a sound material-cycle society demands materialization of a “green product chain” in which environmental considerations are incorporated through “green manufacturing” by manufacturers, and it will be assessed by green consumers and green markets.

Use of a range of information about environmental considerations taken into the product is essential to realize this. For efficient use of such information by each party concerned, visualization and communication at each stage of the product life cycle (i.e., material procurement, production, distribution/retailing, consumption/purchase, discharge/taking back and reusing/recycling) is needed. Such information in addition to the traditional information about functions and price will become new evaluation criteria at the market, resulting in bearing vital power to further stimulate the businesses that are properly evaluated and enabling them to produce more innovation.

Considering the current development of the global trend of the accelerated division of labor and market globalization, satisfying DfE based on the global point of view is critical.

ISO as international standards, therefore, provide Guide 64 (Guide for the inclusion of environmental aspects in product standards) and TR14062 (Environmental management - Integrating environmental aspects into product). IEC, the International Electrotechnical Commission, issued a common guidance standard for DfE at the WG2 of a new technical committee (TC111), which was established for the purpose of reviewing cross-cutting environmental standards.

(2) Product assessment guidelines applied by industrial associations

In 1994, the Industrial Structure Council established the “Guidelines for Preparing Pre-Evaluation Manuals in Product Designing to Contribute to the Promotion of the Use of Recycled Resources” as a reference for manufacturers to achieve DfE.

Industrial associations developed “product assessment guidelines” applicable to their products in accordance with the Council Guidelines. They implement DfE by conducting pre-evaluation under their own guidelines.

Product assessment (pre-evaluation) means that manufacturers, prior to production, investigate, estimate and evaluate the safety and resource/environmental impact of their products at the stages of production, distribution, use, discharge, and recycling/disposal, and amend their product designs and production methods as necessary, thereby reducing the resource/environmental impact.

**Table II-9 Establishment/Revision of Product Assessment Guidelines of Industrial Associations
(As of the end of April, 2010)**

Name of association	Condition of product assessment guidelines	Name of association	Condition of product assessment guidelines
Japan Automobile Manufacturers Association (http://www.jama.or.jp)	Jul. 1994 Guidelines for Pre-Evaluation in the Product Designing Stage for Promotion of Recycling established	Japan Industrial Association of Gas and Kerosene Appliances (http://www.jgka.or.jp)	Jul. 2006 3R Designing Guidelines for Preparing Product Assessment Manual (copiers, etc.) established
	Dec. 2001 Judgment Criteria Guidelines on Prevention of Generation of Used Products/Use of Recycled Resources or Parts established	Japan Gas Association (http://www.gas.or.jp/default.html)	Apr. 1993 Assessment Guideline for Gas Appliances established
Japan Bicycle Promotion Institute (http://www.jbpi.or.jp)	June 1997 Product Assessment Manual Guidelines on Bicycles established (final revision in Mar. 2006)		Oct. 1993 Assessment Guideline for Kerosene Appliances established
			Sept. 2009 Assessment Guidelines for Gas/ Kerosene Appliances revised (to include 3R programs)
Association for Electric Home Appliances (http://www.aeha.or.jp)	Oct. 1991 Product assessment Manual: Electric Home Appliances established (4th edition on May 2006)	Japan Association of Kitchen & Bath (http://www.kitchen-bath.jp)	Jun. 2001 Product Assessment Manual: Bath Units established (final revision in Dec. 2005)
Japan Office Institutional Furniture Association (http://www.joifa.or.jp)	Apr. 1996 Guidelines on Environmental Measures for Office Furniture established (final revision in Sept. 2008)	Japan Reinforced Plastics Society, (Bath Tub Division) (http://www.jrps.or.jp)	
	Apr. 2001 Product Assessment Manual: Metal Furniture established (final revision in Sept. 2008)	Japan Bath Unit Association	
	Apr. 1998 JOIFA Environmental Self-Action Plan established (final revision on Dec. 2007)	Japan Association of Kitchen & Bath (http://www.kitchen-bath.jp)	Apr. 2001 Product Assessment Manual: Kitchen Components established (final revision in Dec. 2007)
Japan Luminaires Association (http://www.jlassn.or.jp)	Mar. 1992 Product Assessment Manual: Luminaires established (final revision in Sept. 2001)	Japan Electric Lamp Manufacturers Association (http://www.jelma.or.jp)	Jul. 1992 Product Assessment Manual: Lamps and Stabilizers established (final revision in Apr. 2008)
Japan Game Machine Association, Japan Electric Game Machine Association	Jan. 1998 Product Assessment Manual established	Japan Vending Machine Manufacturers Association (http://www.jvma.or.jp)	Aug. 1997 Product Assessment Manual: Vending Machines established (final revision in Feb. 2007); Title changed to Product Assessment Guideline: Vending Machines
Japan Electric Game Machine Association (http://www.nichidenkyo.or.jp)	Jul. 2001 Product Assessment Manual revised	Communication and Information Network Association of Japan (http://www.ciaj.or.jp)	Mar. 2001 Product Environmental Assessment Guidelines for Cellular Phones/PHS established (final revision in Feb. 2004)
Japan Electronics and Information Technology Industries Association (http://www.jeita.or.jp)	Aug. 2001 Product Assessment Manual revised	Aerosol Industry Association of Japan (http://www.aiaj.or.jp)	Aug. 2002 Design Guidelines for Easily Recyclable Aerosol Containers established
Japan Business Machine and Information System Industries Association (http://www.jbmia.or.jp)	Jul. 1995 Environmental Designing Assessment Guidelines for Information Processing Devices established (final revision in Sept. 2000)		
	Jan. Environmental Designing Assessment Guidelines for Personal Computers established		

Note: Based on interviews with the industrial associations concerned

(Source: Industrial Structure Council, October 17, 2006 (revised))

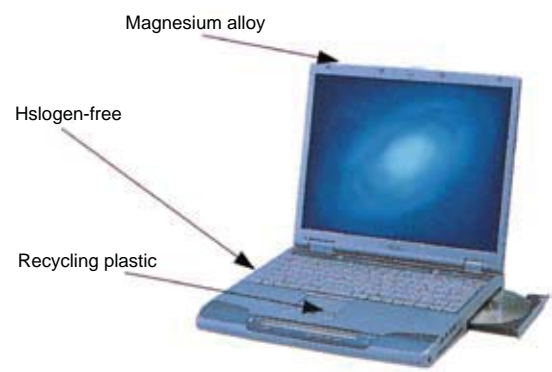
(3) Examples of DfE

[1] Materials

In order to promote recycling of resin materials used for auto parts, Company A unifies part materials while encouraging more frequent use of easily recyclable thermoplastic resin, including polypropylene resin.

Company B uses easily recyclable materials for personal computers, such as magnesium-alloy cases and halogen-free plastics.

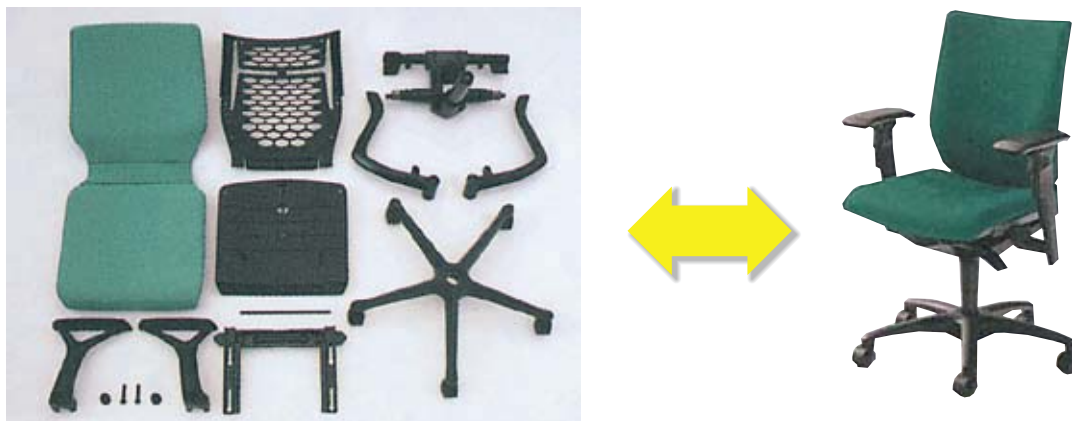
Fig. II-51 Use of Recycling-Oriented Materials



[2] Recycling-oriented designs and material indication

Company C designs office chairs that can easily be dismantled by using single materials and indicates as many materials as possible, thereby promoting the recycling of materials.

Fig. II-52 Recycling-Oriented Chair



[3] Examples of advanced recycling schemes - Home electric appliances -

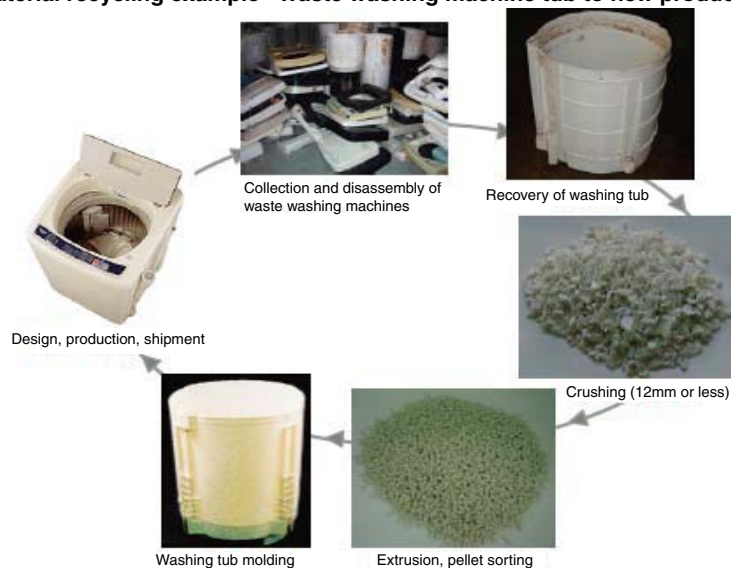
In the field of home electric appliances, recycling efforts by manufacturers and the Design for the Environment (DfE) technology make it possible to reuse recycled plastics recovered from used products. This contributes to promoting highly efficient recycling for reducing the use of new resources. The use of recycled materials will be beneficial in terms of strengthening competitiveness as the resource price is rapidly increasing as well as suppressing CO2 emissions.

Example 1

Waste plastics recovered from used home electric appliances are reused as parts and materials for producing home electric appliances. This is called “self-circulation material recycling.”

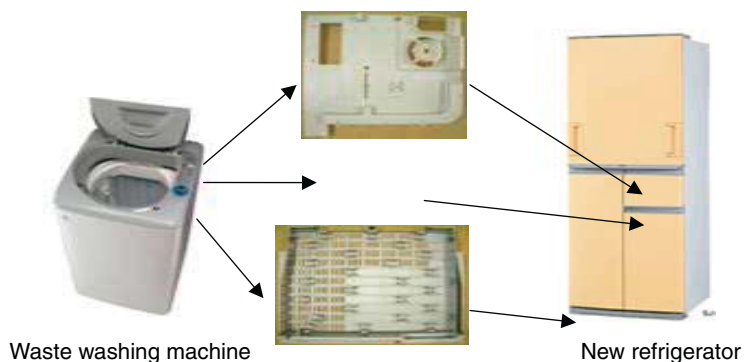
Used products are manually disassembled to subtilize and recover waste plastics by manufacturers in collaboration with recycling operators. Technology to adjust the physical properties and serviceable life of plastics to the characteristics required for reused materials was developed.

[Material recycling example - Waste washing machine tub to new product]



Example 2

Plastics collected from the waste washing machine parts are reworked for use as materials for refrigerators.



Example 3

Glass-reinforced AS resin (ASG), used for the cross-flow fan of the indoor unit of air-conditioners, is recycled as materials for producing new cross-flow fans for air-conditioners.



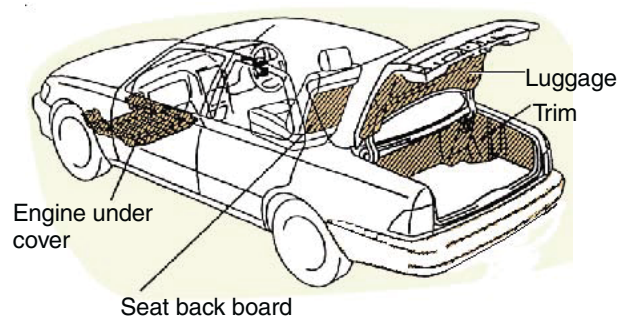
(Source: Report from the Basic Policy WG, Waste Prevention and Recycling Subcommittee, Environment Committee, Industrial Structure Council)

[4] Examples of advanced recycling schemes - Automobiles -

In the automobile industry, efforts are also made to reuse the materials, such as the recyclable plastics recovered from used parts, for manufacturing the same parts through the development and design of products, keeping in mind the effective use of recyclable resources collected from car parts, combined with recycling technologies.

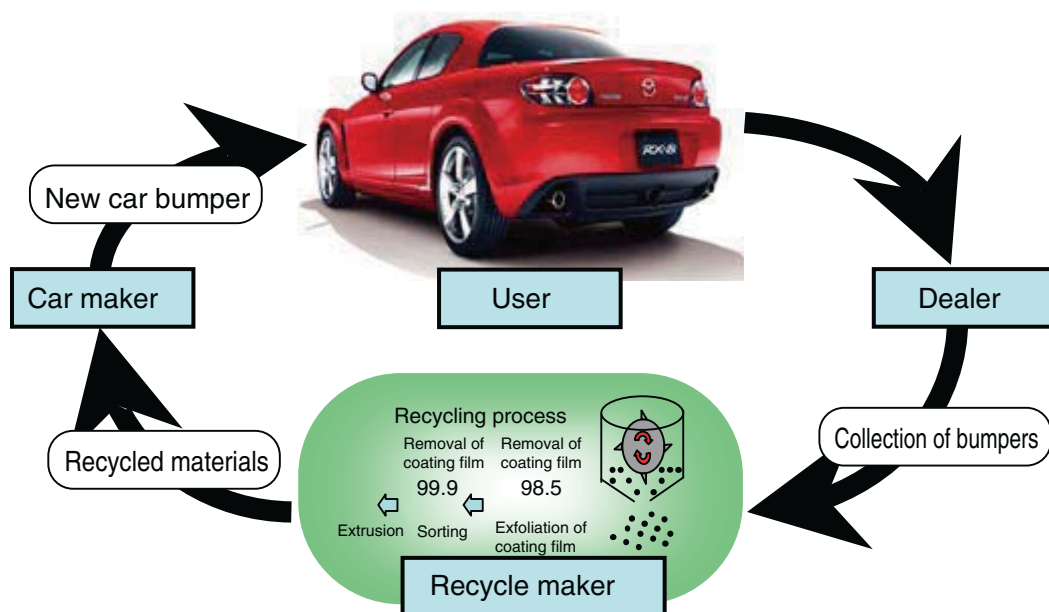
Example 1

Recyclable plastics collected from bumpers are reused as raw materials for producing car parts.



Example 2

Recyclable plastics collected from bumpers are reused as raw materials for manufacturing bumpers.



(Source: Data by the Basic Policy WG, Waste Prevention and Recycling Subcommittee, Environment Committee, Industrial Structure Council)

(4) Establishing standards for promoting advanced recycling schemes

In the electric and electronic industry, Japan Industrial Standards (JIS), which standardizes the definition and indication of the use rate of recycled resources, such as recyclable plastics, have been established for promoting self-circulation recycling schemes. In order to closely coordinate the design and the recycling phases in the self-circulation recycling scheme, the JIS for integrating the indications, such as the material indication for recyclable plastics, location of screws, and disassembly positions, has also been established.

Efforts for strengthening coordination between the product design and recycling phases for achieving effective and efficient recycling are important.

◆Calculation and display methods of recycled and reused indicator of electric and electronic equipment (JIS C 9911)

Aiming at promoting the reuse of resources, indicators for displaying the recycled resources and their percentage in electric and electronic equipment are standardized to allow consumers to easily understand the content for increasing the popularity of eco-products in the market.

◆The marking for identification of plastic parts for electric and electronic equipment (JIS C 99112)

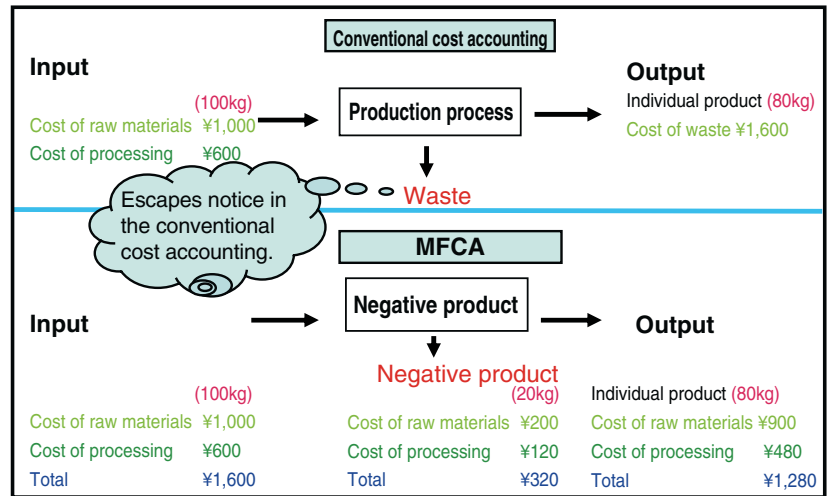
Clear indication of the history and characteristics of plastic parts with a new marking on the parts will facilitate and improve efficiency of the sorting of plastic parts in recycling plants.

Indication	Mark
Fire-retarding materials are not contained.	FR0
Use of recycled plastic materials and percentage (Example) Material: Polypropylene, Content: 50%	>PP < R50

15 Material Flow Cost Accounting (MFCA)

(1) Overview of MFCA

The MFCA is an essential tool for environmental management accounting (specially used for the assessment of corporate environmental expenditure), which visualizes waste by measuring the flows and stocks of materials of negative products in a production process in both physical and monetary units. The use of MFCA will bring about an improvement in production processes by reducing waste and boosting yield, and at the same time will reduce costs and environmental impact through productivity enhancement.



(2) Differences between conventional cost accounting and MFCA

P/L in conventional method (unit: ¥1,000)		MFCA based P/L (unit: ¥1,000)	
Sales	2,500	2,500	Sales
Cost of positive product	1,600	1,600	Total cost of product
	(Not known)	1,280	Cost of positive product
	(Not known)	320	Cost of negative product (loss)
Sales profit	900	900	Sales profit
Sales administrative expense	400	400	Sales administrative expense
Operating profit	500	500	Operating profit

(3) Examples of MFCA

Lens machining process in company A

(Problem) 2/3 of material loss occurred in the rough lens grinding process.

(Countermeasure and result) Near shape (thin lens) was employed in cooperation with the raw material supplier, resulting in an 80% reduction in the amount of grinding.

Adhesive tape production process in company B

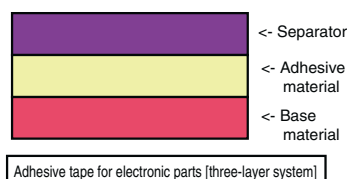
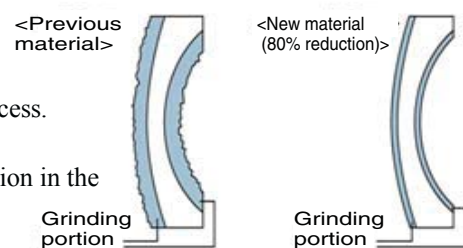
(Problem) Loss reached around 2/3 of sales profit in company B.

(Countermeasure and result) Negative product was reduced by 10% in 2004 after installing new production equipment, etc.

Precision part material machining process in company C

(Problem) Costs for thermal disposal of waste liquid solvent were too large (accounting for 80% of the total disposal cost).

(Countermeasure and result) The disposal method was changed from thermal disposal to microbial activated sludge treatment. The energy-saving effect was 33 million yen/year (2,328t/year, in CO2 equivalent). Capital investment (66 million yen/year) could be recouped mostly in a year.



Result of improvement and target (Adhesive tape for electronic parts)			
	2001	2004	2009 (target)
Positive product	68%	78%	90%
Negative product	32%	22%	10%
Total	100%	100%	100%

16 3R Technology Development Program

Technological developments required for promoting 3R, including basic research and practical product development, have been conducted systematically, aiming at growing out of the conventional mass-production, mass-consumption and mass waste-producing economy, and establishing a 3R-oriented, sustainable society.

So far, the focus has been put into downstream measures — the development of recycling technology for used products with the aim of reducing the amount of final disposal. However, the scope of the R&D should further be expanded to upstream measures — the development of manufacturing technology with due consideration to 3R from the stages of designing and manufacturing, thereby continuing to promote effective development of 3R technology that will realize a more efficient use of resources.

Major Efforts

[Recovery of rare metals from lithium-ion batteries]

Develop technology to recover lithium and other rare metals from waste positive materials generated from lithium-ion batteries of used vehicles and recycle them back to lithium-ion batteries

[High-accuracy separation of plastic by material]

Develop innovative technology to separate mixed waste plastic accurately by material to promote advanced material recycling (plastic to plastic)

[Development of materials substituting rare metals]

Utilize cutting-edge technology, such as nano-technology, to develop substitute materials and reduce consumption of rare metals, which are indispensable for producing high-tech products but whose supply is expected to become tighter.

Fig. II-53 History of R&D Projects

Priority issues		Major theme	-2006	2007	2008	2009	2010	2015	2020	2025	2030
Roadmap for priority issues	Reduction of total final disposal	①②	To achieve goals by 2015			Exploration of ways to utilize large amounts of waste			Advanced technology for generation control and conversion		
			Technology to reduce total final disposal in the short term, mainly for			Technology to recycle waste for new uses or as new material			Reduction of total final disposal through thorough implementation of 3Rs		
									Recycling also at final disposal sites (Recovery of useful materials)		
									Recycling technology at final disposal sites including that for recovery of useful materials		
	Construction stock (Construction waste)	①②	Expansion of recycling use of demolition			Measures for waste from existing buildings (reduction of final disposal)			Reduction of input of construction materials (reduction of resource)		
									Maintenance technology for improving service life		
									Technology to design and construct long life buildings		
									⇒ Creation of stock-oriented society		
	Metal resources 3Rs	②	Thorough recycling			Technology for separation and recovery			Establishment of technology for cyclic use		
									Technology to improve efficiency and prevent		
									Development of substitute materials		
									Shift of materials to use		
	3Rs Eco design/ Technology for recycling production	①②③	Development of component technology for each of the 3Rs			Technology to design components common for			Focus on reduction and reuse		
									Production and management technology for		
									Optimization design for overall life cycle		
									Technology to design life cycle		

Note) Major themes are as follows:

(i) Effective especially for the reduction of total final disposal

(ii) Effective especially for effective use of resources (countermeasures against depletion of resources)

17 International Promotion of the 3Rs

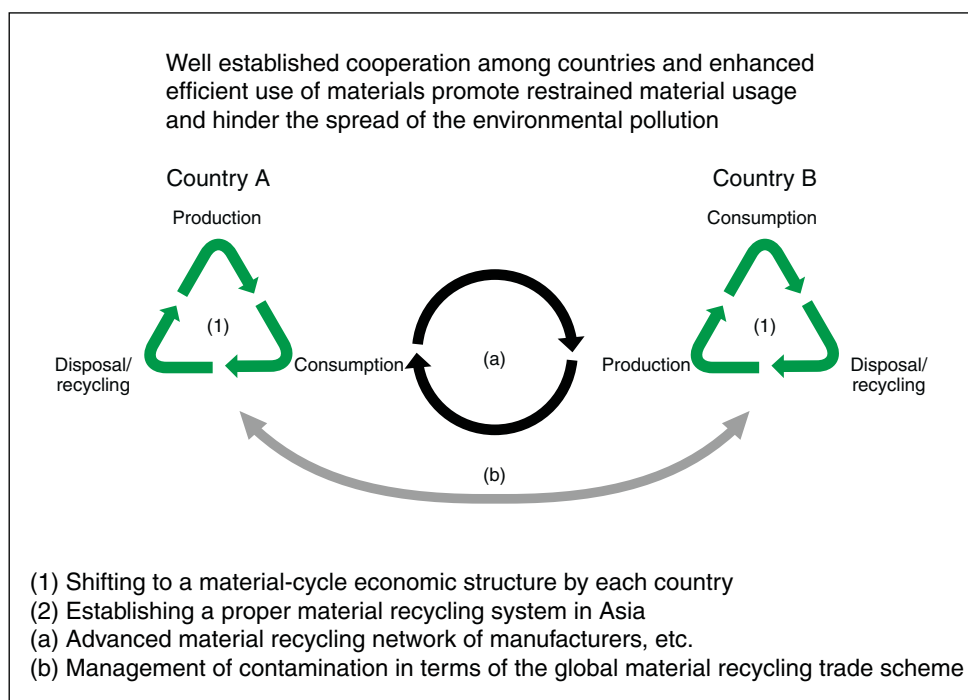
Recently, with the economic growth of Asian countries and the globalization of economy, the international trade amount of recyclable resources, such as scrap metal and used plastic, has been increasing in the Asian region. Now, recyclable resources that were recycled only in Japan are becoming utilized globally. (For example, the CRT glass cullet of televisions collected according to the rules of the Home Appliance Recycling Law of Japan is exported as raw materials for CRT production in Asia.)

In addition, Japanese companies operating abroad are facing the problems of recycling and disposing wastes that is

caused by their operation in Asian countries.

However, in many Asian countries, the legal systems and industrial infrastructure on recycling of resources have not yet been built. Smooth international trade of recyclable resources will be interrupted if an improper process of recycling causes environmental pollution in these countries.

Fig. II-54 Sustainable Material-Cycle Economic Society in Asia



Under this situation, The Working Group on Enhancing International Recycling, Waste Prevention and Recycling Subcommittee, Environment Committee, Industrial Structure Council/METI, recommended a sound method for the international recyclable resources circulation system within the Asian region in October, 2004.

In this report, it was said that each Asian countries must make further efforts to realize a “Sustainable Asia based on the 3Rs” (Fig. II-54). To realize the goal, each country first makes a considerable effort in constructing a sound domestic recycling system for recyclable resources. In addition, recyclable resources that cannot be recycled in each country should be utilized efficiently between Asian countries to reduce consumption of natural resources while preventing the

expansion of environmental pollution.

In order to solve this problem, the Ministry of Economy, Trade and Industry is attempting to share information concerning the trend of waste disposal and 3R-related regulations and policies as well as the development of related industries through political dialogs with other nations, while carrying out technological cooperation and human resources development to support the establishment of systems and infrastructures in various countries.

For example, we take the following actions in China and Southeast Asian nations:

[1] China

- Political dialogues

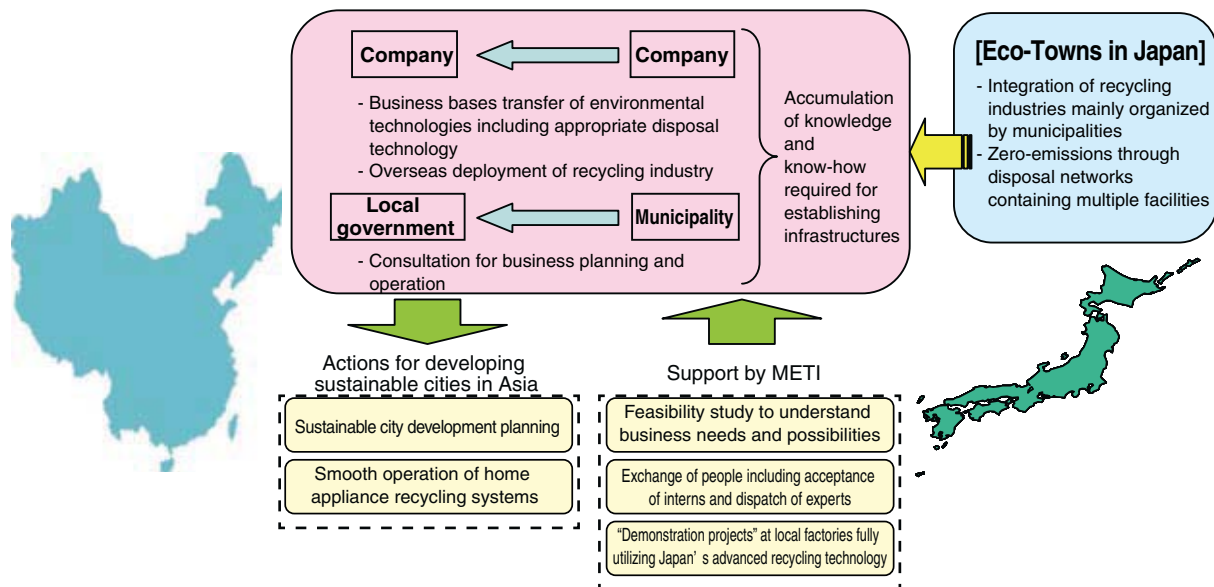
Started in 2004 with the National Development and Reform Commission of R.P.China, aiming at exchanging opinions on 3R policy in Japan and China. The second conference and the third conference were held in Beijing in June 2007 and in June 2009.

- Cooperation for sustainable city development

Agreed between the ministries of both nations in December 2006. Know-how for implementing recycling facilities that maximize the effective use of resources, accumulated by municipalities through the development of eco-towns, will be given through interchanges with local governments in China.

- Cooperation for recycling technology

In order to resolve waste and recycling problems faced by local communities in China, demonstration projects have been carried out by fully utilizing Japan's advanced recycling technology and systems.



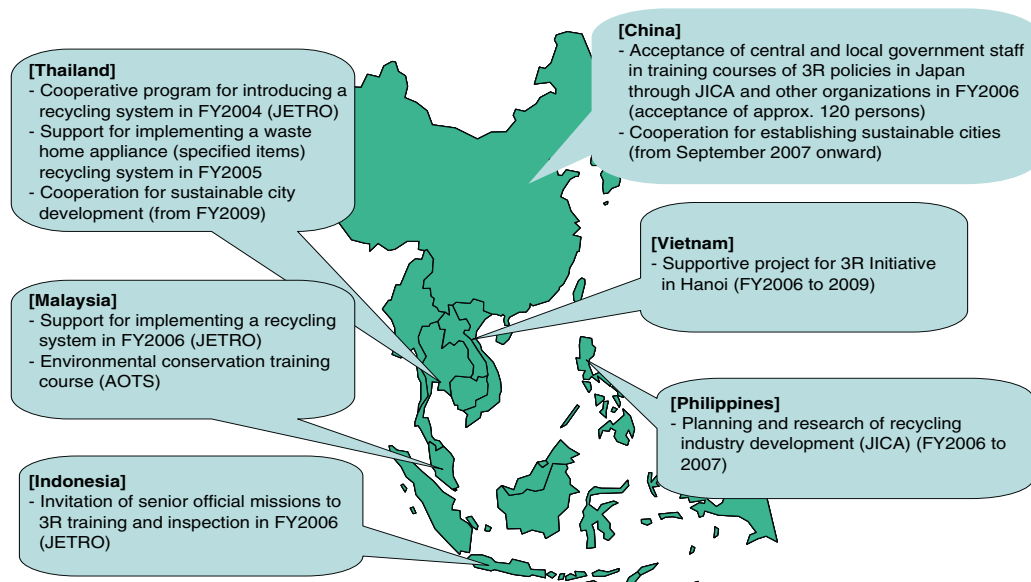
[2] Southeast Asian nations (Thailand, Indonesia, the Philippines, Malaysia, Indonesia)

- Political dialogues

Carried out to foster a common view in order to conduct cooperation according to the Green Aid Plan (GAP), which is a program that supports the efforts of developing nations to save energy and cope with environmental problems. An exchange of opinions for waste disposal and 3R-related cooperative actions are also carried out.

- Examples

The cooperation for sustainable city development as mentioned above has also been offered in other Asian countries, including Thailand, since FY2009.



1 Containers and Packaging

(1) Reducing the weight and thickness of containers

Reduction is one of the priorities in the Fundamental Law for Establishing a Sound Material-Cycle Society in perspective of decreasing the consumption of natural resources and generation of waste. In the production phase of cans, bottles, PET bottles and other containers and packaging, efforts toward cutting back on weight and thickness have been promoted.

Eight recycling organizations for containers and packaging (Note) made individual self-action plans to promote 3R activities by business operators, in which the targets and measures for promoting 3R were determined by material, and a 3R promotion liaison conference was formed to follow the state of annual achievement. Efforts toward reduction have steadily been made to achieve the targets by FY2010.

(Note) Eight recycling organizations for containers and packaging:

Glass Bottle Recycling Promoter Association, Council for PET Bottle Recycling, Paper Containers and Packaging Recycling Promotion Council, Plastic Containers and Packaging Promotion Council, Steel Can Recycling Council, Aluminum Can Recycling Association, Beverage Paper Container Recycling Association, and Cardboard Recycling Promotion Council.

Table III-1 Reduction in FY2008 (in comparison with FY2004)

Material	Target achieved by FY2010 (in comparison with FY2004)	Results in FY2008
Glass bottles	Reduce weight per bottle by 1.5%.	Average weight reduction per bottle: 1.4% (Reference: Weight reduction: 1,527 tons; 26 items of 7 categories)
PET bottles	Reduce weight per bottle by 3% for each of the major sizes and usages of containers.	Of 15 major sizes and usages, 13 attained weight reduction of 0.1 to 11.0%.
Trays	Reduce the total weight by 2%.	Weight reduction: 1.3%
Plastic containers and packaging	Reduce 3% to the result of FY2004.	(1) Confirmed reduction: 1,375 tons (2) Conversion of effects of improvement in cost unit: 12,856 tons (see p27 for details)
Steel cans	Reduce 2%.	Weight reduction/can: 2.0%
Aluminum cans	Reduce weight by 1% per can on an average.	Average weight reduction/can: 0.8%
Beverage packs	Reduce weight by 1%.	No change in the total weight.
Cardboard	Reduce weight by 1% per m2.	Weight reduction/m2: 0.9%

Source: Follow-up report in 2008 for the Self-Action Plan for Promoting 3R of Containers and Packaging, December 2009 (3R Promotion Liaison Conference)

• Glass bottles

Lightweight bottles have been increasingly used year by year, drastically changing the image of bottles as being heavy. Returnable bottles that are lighter than conventional bottles by as much as 45% are used for the milk bottles dedicated to home delivery. Large beer bottles that are about 20% lighter than conventional bottles have been on the scene. Bottles are now much easier to take hold of and carry.

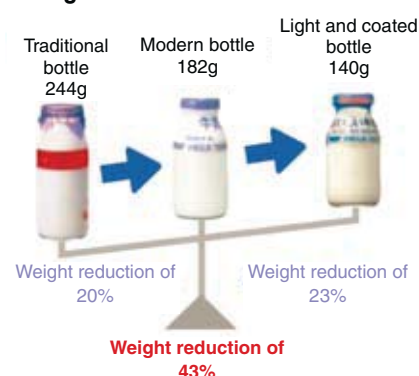
Some estimate that returnable milk bottles have saved as much as 30,000 tons in resources annually, upon shipments, between 2003 and 2009.

Table III-2 Effects of Reduction: Resources Saved by Reducing Bottle Weight (2003 -> 2009)

The following are major types of glass bottles (by category and capacity) whose weight reduction between 2003 and 2009 saved resources significantly.

Category	Average reduction per bottle		Production ('09)		Saved resource
Small bottle for beverage	[114g (2003) - 108g (2009)]	×	1.4848 billion bottles	=	9,400 tons
720ml Distilled spirit bottle	[501g (2003) - 474g(2009)]	×	85.7 million bottles	=	2,300 tons
720ml wine bottle	[385g (2003) - 355g (2009)]	×	58.9 million bottles	=	1,800 tons
360ml noodle sauce bottle	[198g (2003) - 171g (2009)]	×	47.8 million bottles	=	1,300 tons
700ml whiskey bottle	[531g (2003) - 500g (2009)]	×	39.2 million bottles	=	1,200 tons
Total					16,000 tons

• Weight reduction of 200-ml milk bottles

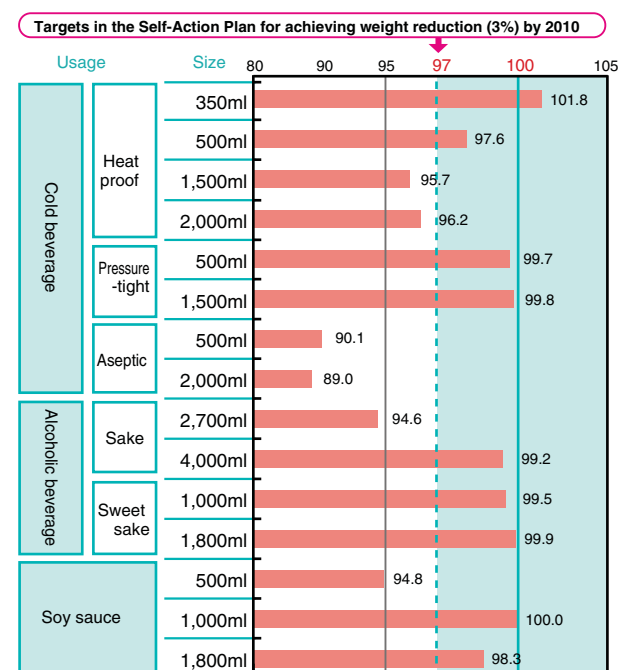


• PET bottles

As the production of PET bottles has been increasing every year, thinner and lighter bottles have been developed to reduce the use of PET resin and promote the effective use of limited resources. The weight of 2- and 1.5-liter heatproof bottles was reduced by 26% and 35% respectively in the past 20 years.

The recent weight reduction of 520-ml bottles from 30g to 12g (reduction of 40%), and 2-liter bottles from 63g to 42g (reduction of 33.3%) are good example of drastic weight reduction. Of the 15 items subject to weight reduction, the weight of 13 containers was successfully reduced in FY2008, showing the progress for achieving the targets in the self-action plan (3% reduction by 2010 in comparison with the result in FY2004).

Weight Reduction of PET Bottles by Size and Usage (2008)



*Reduction rate based on the unit bottle weight (100) in FY2004
(Source) Data from the Council for PET Bottle Recycling

Table III-3 Weight Reduction of PET Bottles

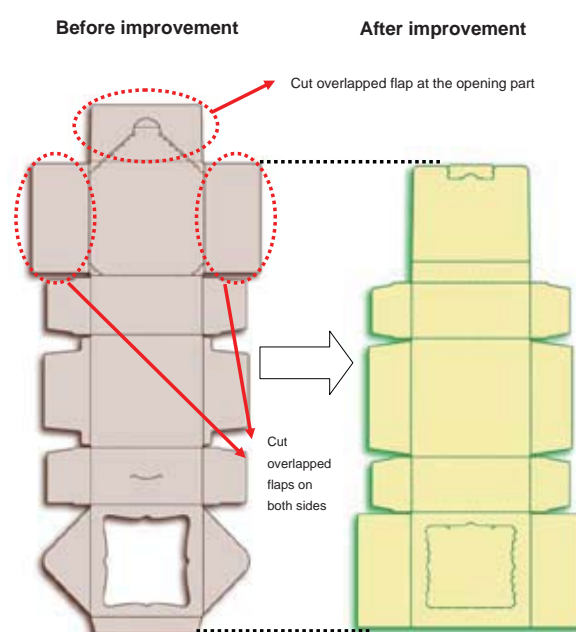
Manufacturer	Bottle type	Reduction	Percentage
Asahi Soft Drinks	2000-ml bottle for Juroku-cha	57g -> 43g	24.6%
Suntory	2000-ml bottle for mineral water (Okudaisen)	47g -> 40g	14.9%
Otsuka Pharmaceutical	500-ml bottle for POCARI SWEAT	27g -> 18g	33.3%

(Source) 2009 Annual Report on PET Bottle Recycling (Website of the Council for PET Bottle Recycling)

• Paper containers and packaging, paper containers for beverage

There have been various efforts to reduce the weight and volume of paper containers and packaging. For example, improvements in tissue paper are achieved through simple changes, such as reducing the height of the tissue box by reducing the volume of tissue paper, or reducing the use of paper for producing tissue boxes by eliminating the overlapped portion of cover to reduce the area of the carton expansion plan.

In 2008, the weight of paper containers for beverages had been reduced by 1.3% from the level in FY2004. Manufacturers are continuing efforts with related businesses for even further reduction.



(Source: Cases of 3R Improvements in Paper Containers and Packaging)
December 2009 (Paper Containers and Packaging Promotion Council)

• Plastic containers and packaging

One-third of plastics produced are used for containers and packaging film sheets familiar with us. There have been various efforts including weight reduction, development of repacking containers, proper packaging, and reduction in labeled items.

Examples of effects of reduction

(i) Confirmed reduction = 1,375 tons

- 1,375 tons by reviewing film composition, reducing the thickness of wrapping materials, and reducing the size (food related business)

(ii) Conversion of effects of improvement in cost unit = 12,856 tons

- 5,230 tons in total by Japan Soap and Detergent Association, Japan Frozen Food Association, and Japan Oilseeds Processors Association

- 7,626 tons in total by Japan Polyethylene Products Industrial Federation and Japan Plastic Food Containers Industry Association

*: Difference between the presumed quantity in FY2006, given by the cost unit in FY2004 multiplied by the amount of product shipment in FY2008, and the actual quantity of consumption in FY2008.

(Source: Follow-up report in 2009 for the Self-Action Plan for Plastic Containers and Packaging)

Cans (steel and aluminum)

Efforts to produce thinner and lighter cans have been promoted. Weight reduction of steel cans in previous years include a reduction of 63% for 350g cans, and a reduction of 20% for 190g cans. In FY2008, the average weight reduction of steel cans for beverages was 2.01% (0.72g/can).

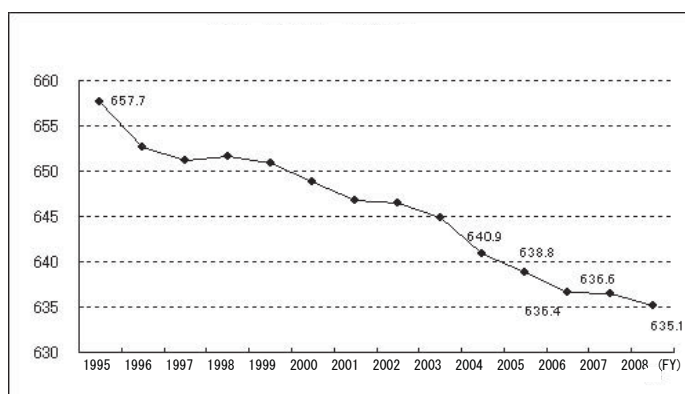
A reduction of 16.5% in the weight of aluminum cans had been achieved in the period of 1985 to 1994, and subsequent reduction of 1.2% by the year of 2004. The weight reduction of aluminum cans in FY2008 was 0.8% on average, compared with that in FY2004.



• Cardboard

Cardboard is used for packing products, and designed according to the conditions of product distribution (e.g., strength of products and methods of transportation). Efforts for reducing the thickness of cardboard materials resulted in saving the weight per 1 m² by 3.5% from 1990 to 2007.

Weight reduction of cardboard (g/m²)



(Source: Follow-up report in 2007 for the Self-Action Plan for Cardboard)

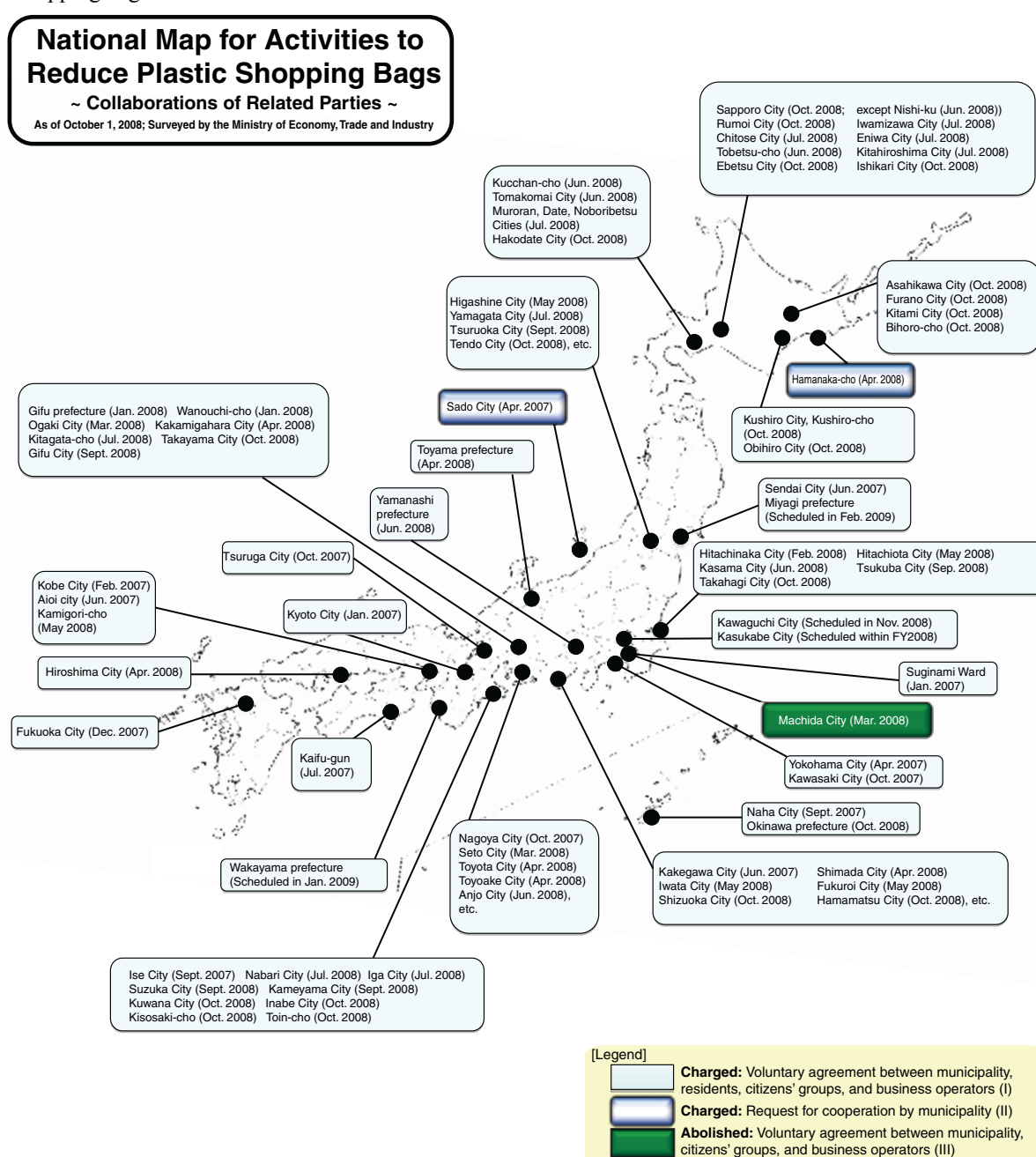
(2) Reduction of plastic shopping bags

Reducing the use of plastic shopping bags has become a social concern, and various activities have been taken across the country since the new system was introduced according to the amendments of the Containers and Packaging Recycling Law (April 2007).

The activities are roughly classified into the following: (1) plastic shopping bag charging scheme based on voluntary agreements between local administrations, residents and businesses, (2) discount service for those who decline shopping bags, and (3) distribution of My Bag. Some municipalities are considering taking specific measures toward reducing the use of plastic shopping bags.

Charging for shopping bags based on voluntary agreements is referred to as the “Kyoto Method” since Kyoto was the first city to charge for shopping bags, in January 2007. The cities, including Sendai, Nagoya and various other cities across the nation, have followed the practice since then.

Machida City, a municipality in Tokyo, launched the first municipality-level effort in Japan to ban the use of plastic bags in collaboration with administrations, residents and businesses.



Activities to Reduce Plastic Shopping Bags ~ Collaborations among Related Parties ~

Examples of charging for plastic shopping bags

[Kyoto City]

• **Agreement on promoting the use of own bags and reducing plastic shopping bags:** On January 10, 2007, business operators, citizens' groups, Kyoto City Committee on Promotion of the Charging of Plastic Shopping Bags, and Kyoto City concluded an agreement so as to restrict careless delivery and use of plastic shopping bags and encourage consumers to bring their own shopping bags. This "Kyoto-style" agreement was the first one concluded among citizens' groups, companies, and the local government in Japan. Later, on April 17 and October 20, 2007 and on June 27, 2008, they had the second, third, and fourth meetings to conclude the agreement with additional parties. At present, the agreement is concluded with 13 business operators (67 stores, two shopping malls) and 13 citizens' groups. The total number of bags used at 10 stores that started to charge for plastic shopping bags was reduced from the prior level (39.20 million annually) to 6.5 million.

[Sendai City]

• **Agreement on activities to reduce plastic shopping bags:** On May 14, 2007, business operators, citizens' groups, and Sendai City concluded an agreement for reducing plastic shopping bags. Under this agreement, business operators are making efforts to start charging for shopping bags. The charging started at four stores of four business operators on June 1, 2007, and spread to 28 stores of seven business operators as of July 1, 2008. The number of shopping bags used from June 2007 up to the end of May 2008 was reduced by 12.1 million from the previous fiscal year.

[Kakegawa City]

• **Agreement on activities to reduce plastic shopping bags:** Kakegawa Supermarket Association, Kakegawa City Consumer Association, and Kakegawa City concluded an agreement for reducing plastic shopping bags. Under this agreement, the charging started at nine stores on June 1, 2007, and spread to 18 stores of 15 business operators as of March 24, 2008. Kakegawa City launched a "My Bag 80" campaign and could raise the rate of the use of own bags to 80% by the end of December 2008 (from 38% in January 2007). The number of shopping bags used was reduced by 11.6 million during the period between June and September 2008, compared with the same months of the previous year.

[Ise City]

• **Agreement on activities to promote the use of own bags and charging for plastic shopping bags for the purpose of significantly reducing plastic shopping bags in Ise City:** On September 11, 2007, seven supermarkets in Ise City, citizens' groups, and Ise City concluded an agreement so as to reduce plastic shopping bags. The charging started at 21 stores in the city on September 21, 2007, and spread to 31 stores of 10 business operators as of September 21, 2008. The rate of the use of own bags was 91.3% in September 2008.

[Toyama prefecture]

• **Concerted introduction of charging for plastic shopping bags at supermarkets:** In November 2007, 12 supermarket operators in the prefecture, consumers' groups, and the prefectural Plastic Shopping Bag Reduction Promotion Council announced that charging for shopping bags would begin in April 2008. On March 5, 2008, the administrative authority, citizens' groups, and business operators concluded an agreement on promoting the reduction of shopping bags and the charging started at 208 stores of major supermarket operators (including 88 stores of one laundry operator) in the prefecture on April 1, 2008. As of November 3, 2008, 400 stores of 44 business operators (including 148 stores of six laundry operators) charged for shopping bags. In the three months of April, May and June 2008, 29.293 million shopping bags were saved.

[Hamanaka-cho in Hokkaido]

• **Declaration to reduce plastic shopping bags;** Request all stores to cooperate: In April 2008 in Hamanaka-cho in Hokkaido (a town next to Nemuro City with a population of 7,000; it flourished through dairy farming to produce raw milk for Häagen-Dazs ice cream and other products and through the fishing industry, and is the hometown of the animation "Lupin the 3rd"), the mayor, the president of the Chamber of Commerce, the president of autonomous associations, and the chairman of the Plastic Shopping Bag Reduction Promotion Committee signed the "Hamanaka-cho Declaration of Plastic Shopping Bag Reduction" and charging for shopping bags started. At 60 stores in the town, consumers who receive a plastic shopping bag at a store are supposed to put the charge (1 yen) in a box installed at each store (at three convenience stores and one home center, shopping bags are basically free but consumers are to put some money in a box of the same type on a voluntary basis). In October 2008, common shopping bags for town people designed by said committee won the "My Unique Bag Prize (Presidential Award from the Hokkaido Association of Department Stores)" at the "My Bag Contest in Hokkaido," which was held by the Hokkaido Bureau of Economy, Trade and Industry and five distributor organizations. The idea to prepare the bags at member stores and lend them to consumers who forget their own bags was highly appreciated.

Examples of abolishing plastic shopping bags

[Machida City]

• **Conclusion of an agreement on abolishing plastic shopping bags at model stores:** On March 4, 2008, Machida City, citizens' groups, and a business operator (one supermarket in the city) concluded an agreement on carrying out a test for abolishing plastic shopping bags, with the aim of realizing a "society without plastic shopping bags." The test was initially scheduled to last only for six months from March 14, 2008, but it is still underway. The business operator is in charge of carrying out the test and verifying its effects, while citizens' groups and the administrative authority fully support this activity. After this test, they are going to work on collaborating with other business operators in the city and are discussing means to expand the abolishment of plastic shopping bags throughout the city.

Examples of establishing original municipal ordinances

[Suginami Ward]

• Suginami Ward Ordinance on Promotion of Charging for Plastic Shopping Bags:

On October 16, 2006, Summit Inc., Suginami Ward Plastic Shopping Bag Reduction Promotion Council, and Suginami Ward concluded the "Agreement on Activities to Promote the Reduction of Plastic Shopping Bags" and carried out a demonstration experiment from January 15, 2007 to March 31, 2007.

In May 2007, the "Conference to Discuss Suginami Ward Ordinance on Promotion of the Charging of Plastic Shopping Bags (provisional)" was established and discussions started. In September, the discussion results were compiled and were disclosed for Public Comment from October 11 to November 10, 2007. The Suginami Ward Ordinance on Promotion of the Charging of Plastic Shopping Bags was adopted in March 2008 and was enforced on April 1, 2008 (the ordinance is applicable to supermarkets and other stores that use over 0.2 million shopping bags annually and such stores are obliged to submit a plan, by the end of June 2008, to raise the percentage of their customers' use of their own bags to 60% or more in two years). As of April 1, one business operator (Peacock Store) submitted a plan for reducing plastic shopping bags to Suginami Ward and started charging at three stores in the ward (one of them had started charging for shopping bags prior to the enforcement of the ordinance).

[Sado City]

• Sado City Ordinance on Promotion of the Charging of Plastic Shopping Bags:

Sado City in Niigata started a "Campaign for Abolishing Plastic Shopping Bags" in April 2007. As of November 1, 2008, cooperative stores in the city increased to 195. According to the questionnaire survey for 22 large-scale stores, the percentage of customers bringing their own bags was 78.3%. The number of shopping bags used at 15 major stores out of those cooperative stores decreased from 4.73 million in FY2007 to 0.58 million in FY2008 (down by 88%).

Public Comments were invited from August 15 to September 16, 2008, on a draft ordinance to require supermarkets and other stores that use over 0.1 million shopping bags annually to submit a plan to raise the percentage of their customers' use of their own bags to 60% or more. The ordinance is scheduled to be enforced in April 2009.

Examples of business operators' voluntary efforts

• **Plan to abolish free delivery of plastic shopping bags at 1000 stores nationwide by FY2012:** AEON established the "Global Warming Prevention Manifesto" on March 14, 2008, and is planning to abolish the free delivery of plastic shopping bags at 1000 stores nationwide by FY2012 so as to raise the average percentage of customers who do not accept shopping bags to 80%. The company is going to donate 50% of the proceeds from the abolition of free delivery to local activities for environmental conservation and to use the remaining 50% to purchase CO2 emission rights and donate them to the national government. The free delivery of shopping bags was first abolished in January 2007, and expanded to 387 stores (including those scheduled) of the company's consolidated companies by the end of 2008.

• **Discount service for customers who do not accept plastic shopping bags:** SEIYU set a goal to raise the percentage of customers who do not accept shopping bags to 50% by 2010 and started a service to discount 2 yen each for such customers at all its stores on June 14, 2007. The company also introduced a system to sell a shopping bag for 20 yen and exchange a no longer usable bag for a new one. As of the end of December 2007, the percentage reached 31.6% (23.7% at the beginning), exceeding 30%, the initial target for 2007. The monthly percentage for October 2008 was 47.5%.

• **Delivery of "my bags":** LAWSON developed a "Convenience Store Eco Bag" which is of a size and shape, with pockets at both sides, just suitable for a boxed lunch and PET bottle drinks, which sell well at convenience stores. The company delivered the eco bags free of charge from March 28, 2007 through a "Campaign for Bringing an Eco Bag." The company gradually expanded areas to deliver the bags and delivered a total of 1.682 million eco bags at its stores as of the end of February 2008.

• Campaign to reduce plastic shopping bags at convenience stores: POP Display Stands

In order to help shop clerks ask customers whether they need shopping bags, 12 convenience store chains that are members of the Japan Franchise Association, put POP Display Stands around cash registers for four months from July to the end of October 2008. The campaign was carried out at all stores of these 12 convenience store chains (42,000 stores).

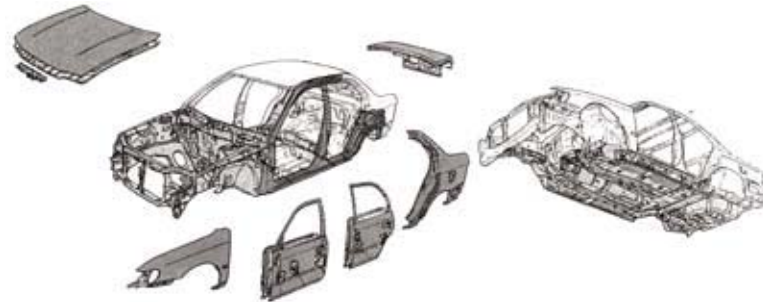


2 Automobiles

In the automobile industry, efforts toward reduction include prolonged life in vehicles and liquids, lighter body on vehicles, and a reduced amount of refrigerant used for car air-conditioners.

[1] Examples of prolonged life

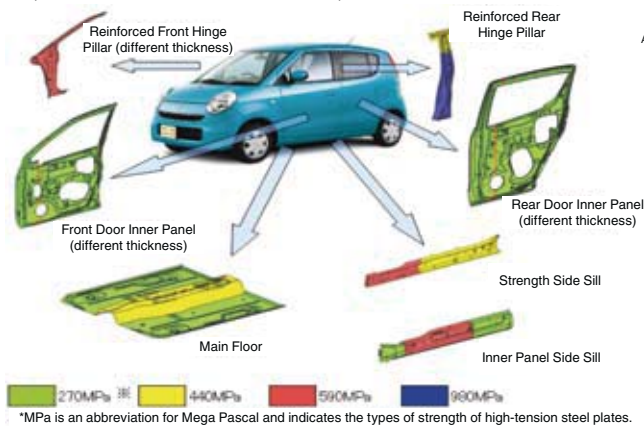
- Prolonged life in vehicles: Rustproof alloys are used for the body and underbody parts.
- Longer lasting liquids for reducing the frequency of replacement



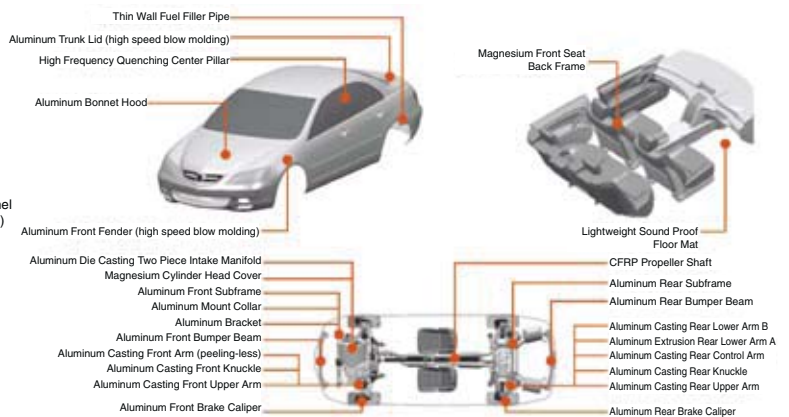
Liquid	Specified replacement intervals
Engine oil	10,000kw=>15,000kw
Engine coolant liquid	3 years=>11 years
Oil filter	20,000kw=>30,000kw
CVT oil	40,000kw=>80,000kw

[2] Examples of weight reduction

- Weight reduction by using high-tension steel plates (rational use of raw materials)



- Weight reduction by 151kg through heavy use of light metals



[3] Examples of reducing refrigerant for air-conditioners in cars (HFC134a)

- Development and installation of refrigerant saving air conditioners have been promoted for reducing the cost unit of the use of refrigerant by 20% in 2010 in comparison with 1995.

	95	99	00	01	02	03	04	05	06	07	08
Quantity per car (g) (% of 95)	700 (100)	650 (93)	615 (88)	603 (86)	588 (84)	582 (83)	553 (79)	548 (78)	536 (77)	521 (74)	520 (74)

* Quantity per car = Total amount of HFC134a in production / Number of cars produced

Maximum reductions between 1995 and 2006

Passenger cars	810g	→ 400g -51%
Light cars	500g	→ 290g -42%
Buses	6,800g	→ 4,000g -41%

Major refrigerant-saving technologies

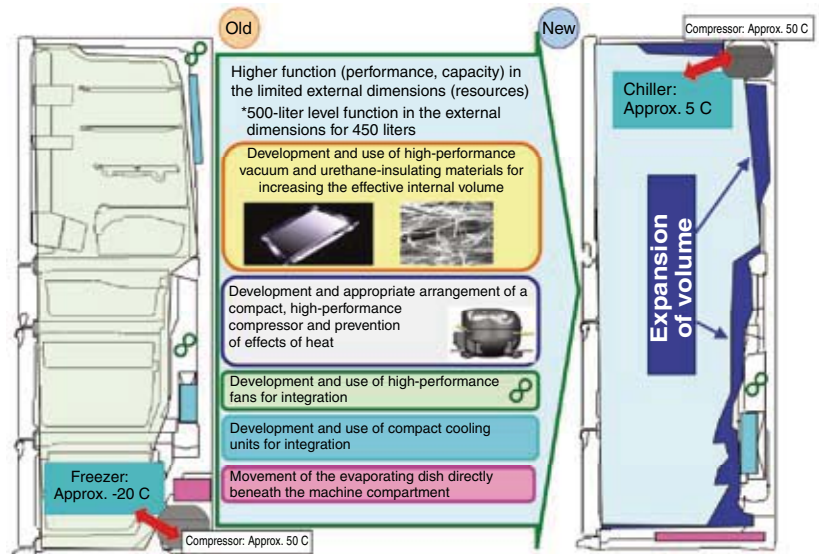
- Integration of components
- Compact and high-performance heat exchangers
- Sealed shaft at connections of piping
- Use of low-leak hoses
- Comprehensive control of assembling process

(Source: Material from the Global Warming Prevention Subcommittee, Biotechnology Taskforce, Industrial Structure Council)

3 Home Electric Appliances

[1] Expansion of available volume in the same dimensions

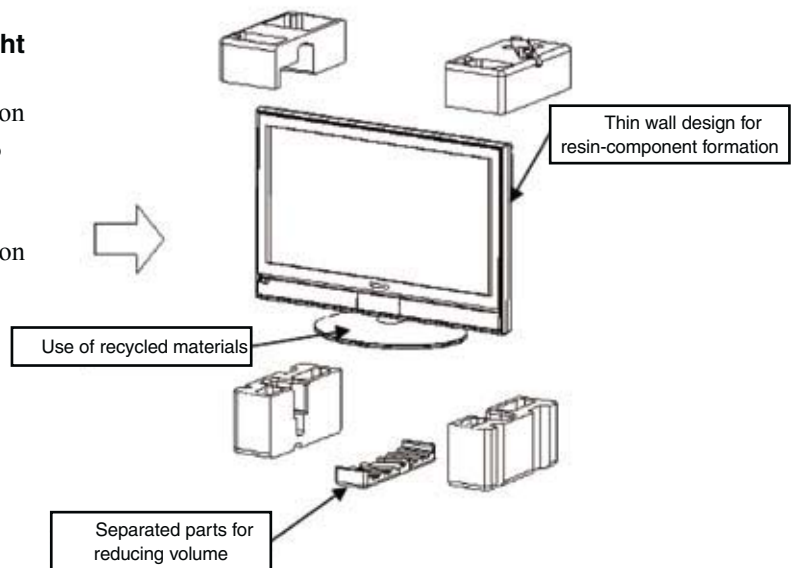
- Expansion of available volume from 450 to 500 liters in the same dimensions by increasing the effective volume through the development of new materials for parts with thinner walls, and review of parts arrangement.



(Source: Material from Basic Policy WG, Waste Prevention and Recycling Subcommittee, Environment Taskforce, Industrial Structure Council)

[2] Examples of reducing the amount and weight of raw materials

- Thin wall design for large components and gas formation contributed to reducing the amount of resin used by 17% (7,510g -> 6,240g).
- Product weight was reduced by 21% to facilitate collection and transportation (26.6kg -> 21.0kg).

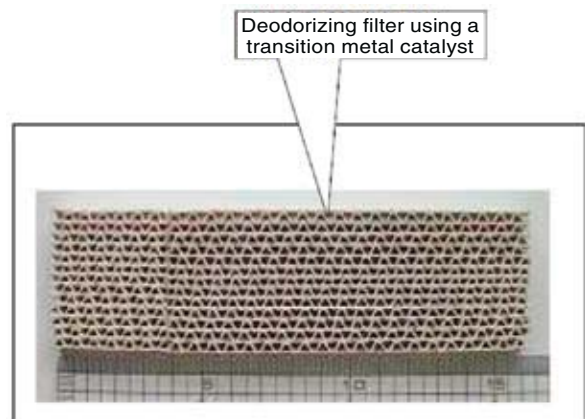


(Source: Product Assessment Example Management System, Association for Electric Home Appliances)

<http://www.aeha.or.jp/assessment/example.html>

[3] Examples of prolonged life

- The number of parts for replacement was reduced by installing a deodorizing filter using a transition metal catalyst for which neither maintenance nor replacement is needed for ten years.



(Source: Product Assessment Example Management System, Association for Electric Home Appliances)

<http://www.aeha.or.jp/assessment/example.html>

1 Glass Bottles

(1) Reuse of glass bottles (returnable bottles)

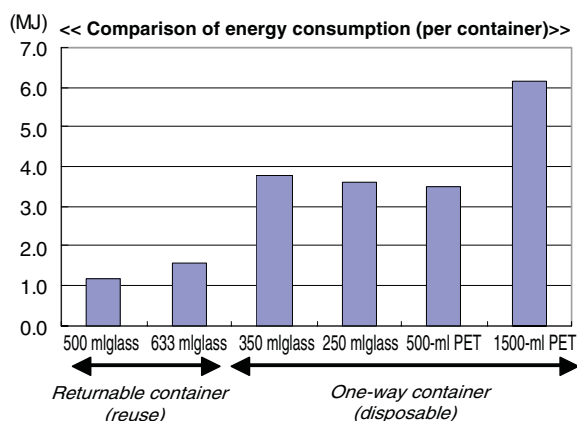
Returnable bottles, traditionally used for large Sake bottles, beer bottles and milk bottles, are cleaned each time they are returned for reuse; and because of their availability for repeated use, they have a much lower environmental impact than disposable containers, and are particularly effective both for curbing global warming and promoting 3R measures.

The effect of energy saving is high in returnable bottles -- their energy consumption is several times smaller than disposable bottles throughout the lifecycle from production to collection and disposal. In addition, approximately 100g of CO₂ emissions can be reduced by buying goods in returnable bottles, instead of those in disposable bottles.

Yet, the recent use rate of returnable bottles has been declining year by year because of changes in consumer preference, and various efforts have to be made to promote the use of returnable bottles.

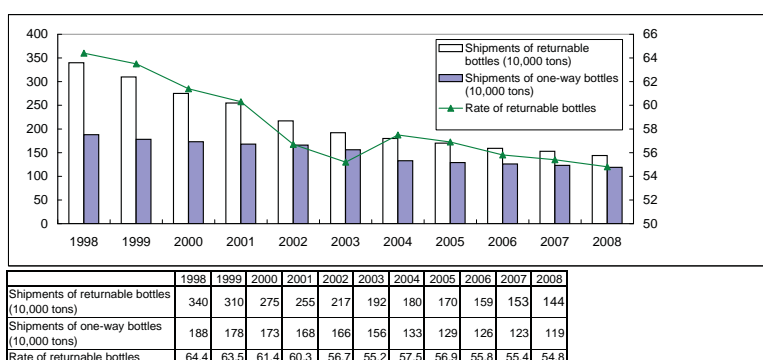
When the use of returnable bottles, which has continuously been in decline, can be maintained or even recovered through these efforts, energy saving and reduction in CO₂ emissions will be significant. (For example, if the level of 2005 is ensured in 2010, the energy saving equivalent to approximately 200,000 kilo liters of oil (i.e., biomass fuel introduction target of 210,000 kilo liters) will be achieved).

In addition to large Sake bottles, beer bottles and milk bottles, returnable bottles are used for 720-ml and 300-ml Sake, 900-ml distilled spirit, 200-ml juice, and seasonings such as vinegar and soy sauce. A marusho ("regular" in Chinese character enclosed by a circle) or R mark is engraved on these returnable bottles for ensuring they are returnable.



(Source: Institute for Policy Sciences (report of survey concerning Containers and Packaging Lifecycle Assessment in FY2004))

Changes in use rate of returnable bottles



(Source: Glass Bottle Recycling Promoter Association)

Major returnable bottles



(2) Recycling of glass bottles

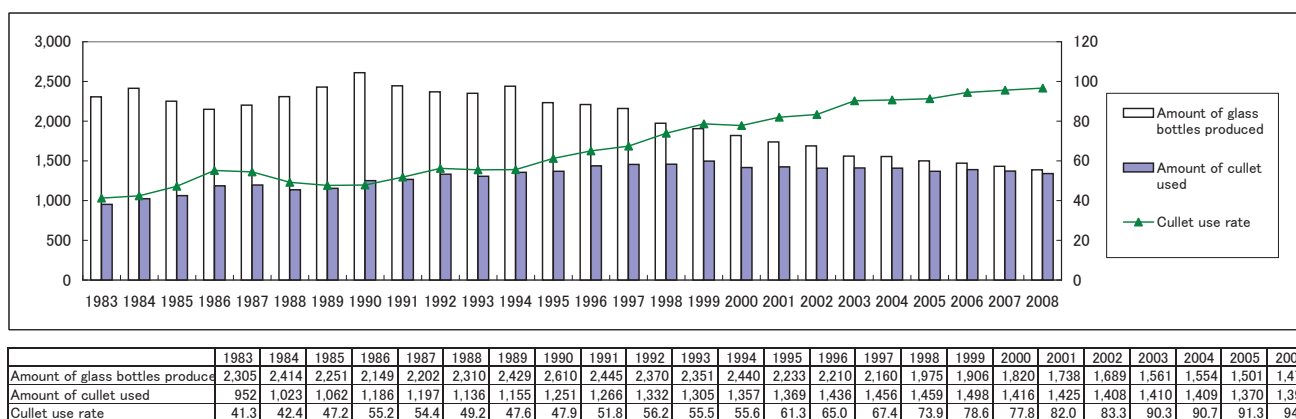
Glass bottles are classified into returnable bottles used repeatedly (e.g., beer bottles, large Sake bottles and milk bottles) and one-way bottles containing food, seasonings, beverages, medicine, juice, refined sake, and distilled spirit (in the order of the largest volume of use), which are collected and reused as raw glass materials (cullet).

The cullet use rate has been increasing every year since FY1989 and had already reached 96.7% by FY2008, exceeding the 91%-level that was expected to be achieved by FY2010 under the Law for Promotion of Effective Utilization of Resources (see Fig. IV-1). While almost all colorless and brown glass containers are recycled as raw glass materials,

60% of glass containers in other colors is recycled for other uses.

Eco-bottles, which contain cullet by more than 90%, have been increasingly used year by year, reaching 105 million in 2008 (see Fig. IV-2).

Fig. IV-1 Amount of Glass Bottles Produced, Amount of Cullet Used and Cullet Use Rate



Unit: 1000 tons, %

Sources: Amount of glass bottles produced: "Miscellaneous Goods Statistics" and from 2002 "Ceramics and Construction Materials Statistics" by the Ministry of Economy, Trade and Industry

Amount of cullet used: Materials by the Japan Glass Bottle Association (organized by six major bottle makers) and materials by the Glass Bottle Forum Japan (organized by 11 bottle makers)

Cullet use rate: Amount of cullet used / Amount of glass bottles produced

Fig. IV-2 Shipments of Eco-bottles

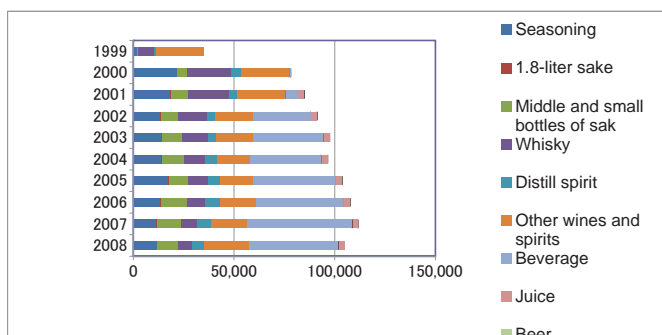
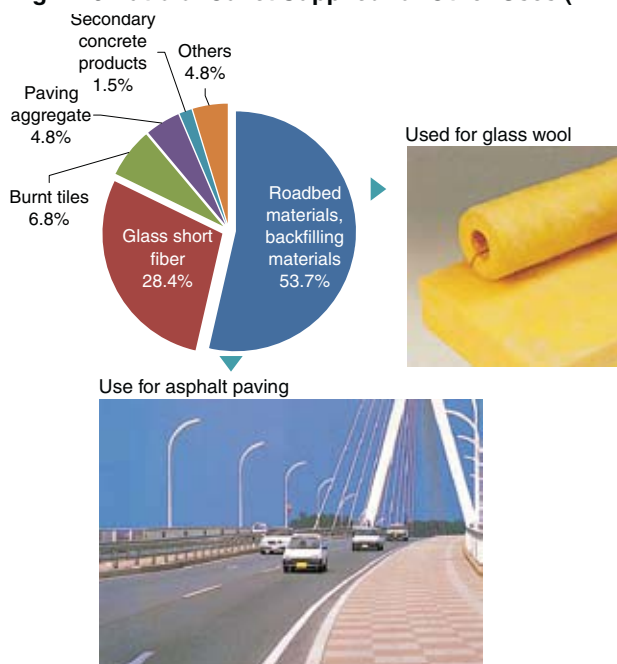


Fig. IV-3 Ratio of Cullet Supplied for Other Uses (FY2007)



Source: Japan Glass Bottle Association

How to identify returnable bottles Flow of Recycling of Glass Bottles (FY2007)

Marusho mark

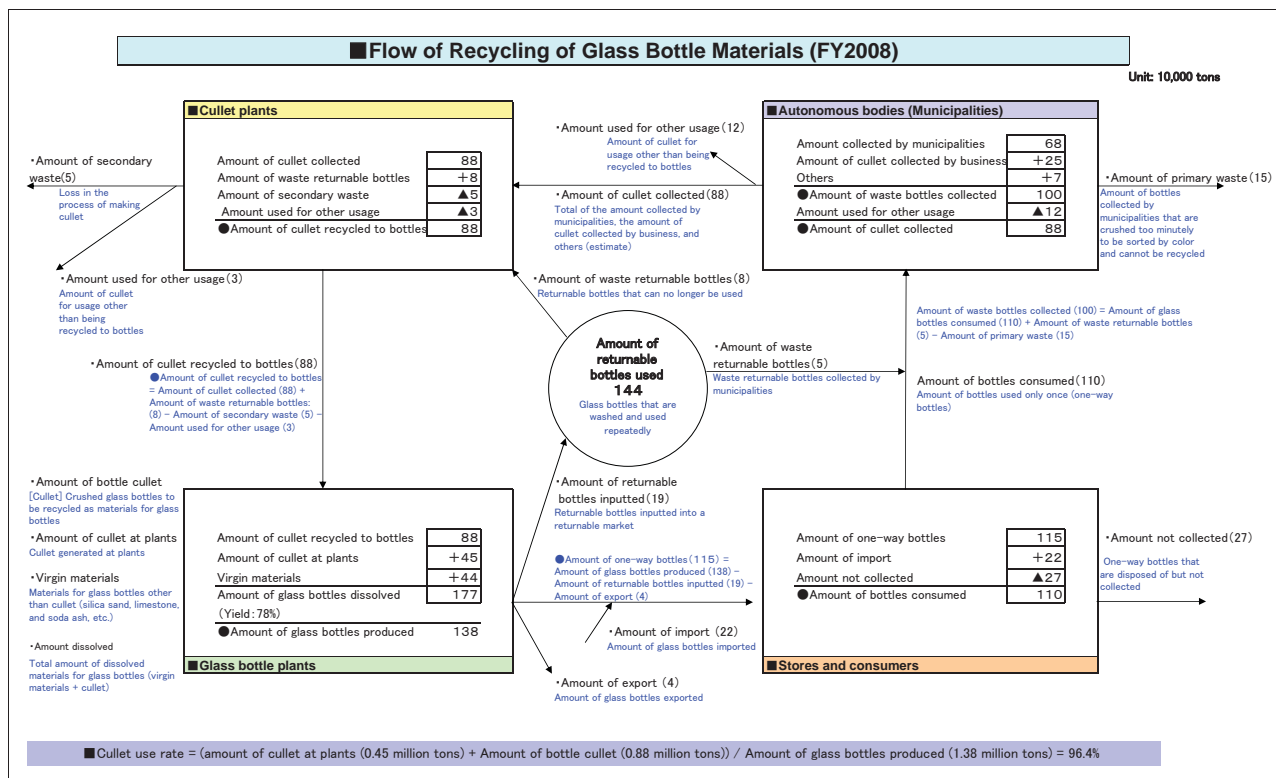


A mark specified in the Measurement Law. It indicates the containers manufactured in such a way as to ensure a specified quantity of liquid when the containers are filled with a liquid product to a certain height. Bottles with this mark have been used as returnable bottles since the early times.

R mark



A mark attached to standardized returnable bottles approved by the Japan Glass Bottle Association.



METI Reuse Model Projects

● FY2008

- ◆ Demonstration project to sell goods in returnable bottles and collect used bottles at drugstore chains
- ◆ Model project for a recycling system for R300 bottles and R900 bottles in Kyoto
- ◆ Demonstration project to introduce reuse cups at smaller scale athletic events
- ◆ Creation of a portal site for returnable bottles

2 Steel Cans

The weight of steel cans recycled in 2008 was about 680,000 tons and the recycling rate was 88.5%, exceeding the 85% level targeted in the Guidelines for Waste Treatment and Recycling by Product Category (see Fig. IV-4). Thus, recycling of steel cans is going smoothly, for the following reasons.

- [1] Separate collection systems have been disseminated nationwide.
- [2] People become more aware of separate collection.
- [3] Steel makers provided effective acceptance systems for recycling scrapped cans (82 locations across the nation).

[4] Resource recycling markets are established throughout the steel industry.

Used steel cans are pressed into scraps or shredded and used as materials in iron-making plants. They are also recycled into various iron products, such as construction materials, materials for automobiles, and materials for refrigerators, washing machines, and other home appliances and new steel cans (see Fig. IV-5).

Fig. IV-4 Weight of Steels Cans Consumed, Weight of Cans Recycled and Recycling Rate

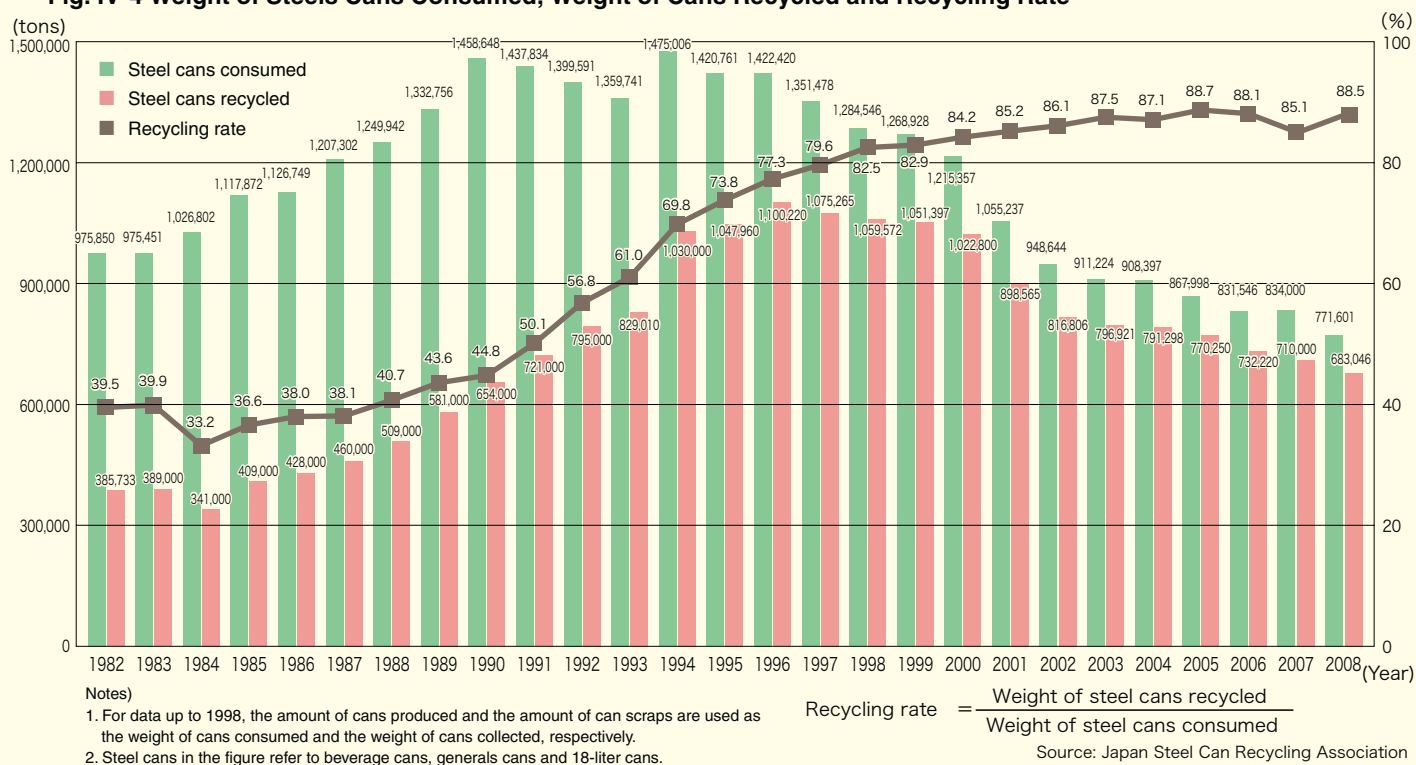
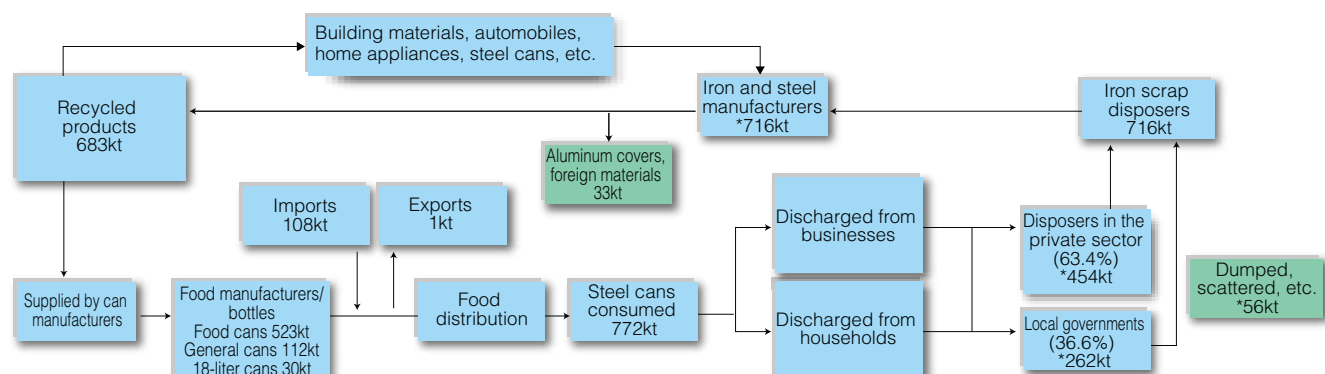


Fig. IV-5 Flow of Recycling of Steel Cans (FY2006)



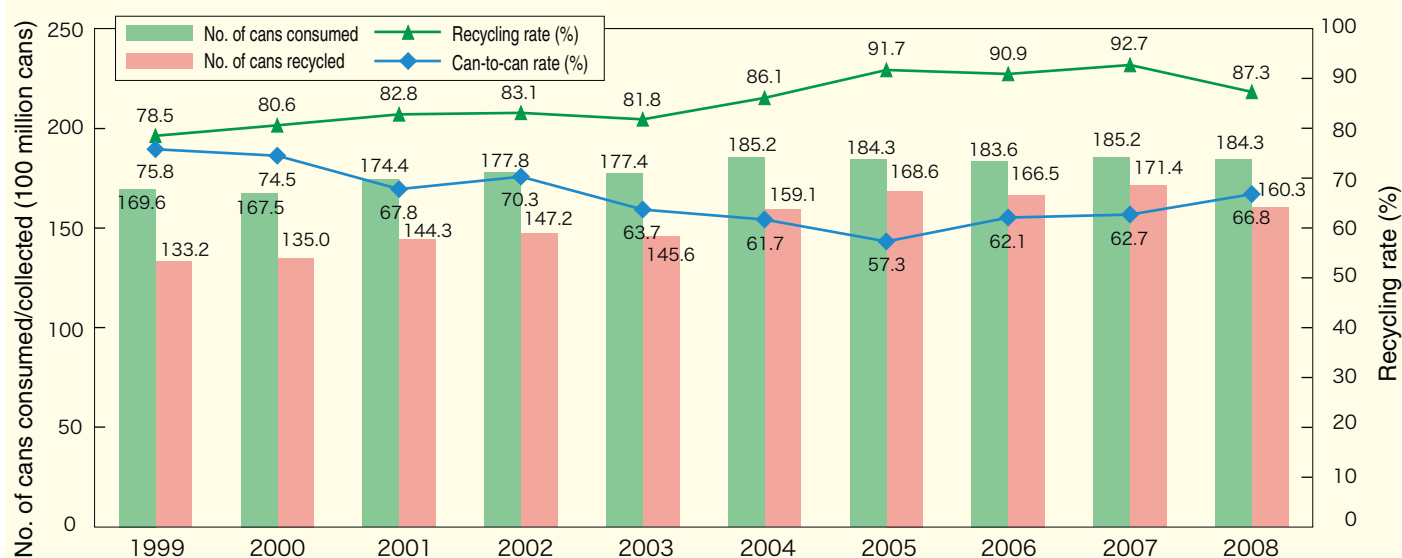
3 Aluminum Cans

The weight of aluminum cans consumed, the weight of cans recycled and the recycling rate have been increasing year by year (see Fig. IV-6) as the rate of canned beer and the rate of aluminum cans for drinks other than beer have been increasing. The recycling rate of aluminum cans has been improving due to the following:

- [1] the spread of collecting sorted waste;
- [2] the large number of users of recycled cans; and
- [3] the ease of recycling aluminum cans.

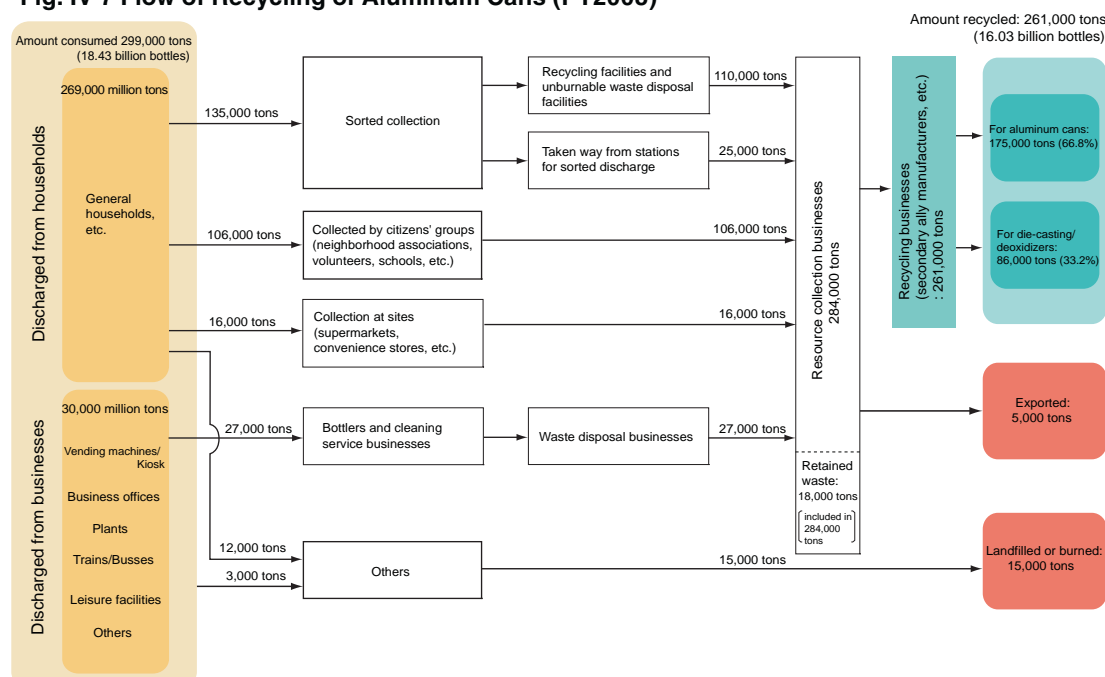
In FY2008, the amount of aluminum cans recycled was 261,000 tons and the recycling rate was 87.3%, with businesses being asked for their continuous cooperation and to contribute to educational activities in order to achieve the 90%. The weight of aluminum cans reused as materials was 175,000 tons in FY2008 and the can-to-can rate was 66.8%. Aluminum cans are also reused for automobile parts, deoxidizers for iron-making (see Fig. IV-6 and IV-7).

Fig. IV-6 Changes in the aluminum can recycling rate (last decade)



Notes) 1. The recycling rate is the proportion between the weight of recycled cans and that of consumed cans.
2. The can-to-can rate is the percentage of aluminum cans recycled into aluminum cans again.

Fig. IV-7 Flow of Recycling of Aluminum Cans (FY2008)



Notes:

1. The total amount of aluminum cans recycled is calculated by the Japan Aluminum Can Recycling Association based on the survey results reported by recycling business operators.
2. The total amount of aluminum cans consumed is calculated by the Association based on the data provided by METI and other surveys.
3. The total amount of aluminum cans recycled according to routes is estimated by the Japan Aluminum Can Recycling Association.

Source: Japan Aluminum Can Recycling Association

4 PET Bottles

PET bottles used for soft drinks, specified seasoning, and alcohol are to be labeled under the Law for Promotion of Effective Utilization of Resources. Due to the revision of PET bottle categories, the category of “soy sauce” was expanded and reorganized as “specified seasoning” in April 2008. The collection by both municipalities and businesses of PET bottles, one of the specified labeled products, has increased rapidly since around the time of the enforcement of the Containers and Packaging Recycling Law in 1997, in line with the increase in PET bottles for beverage use (see Fig. IV-8).

In FY2008, the sales of specified labeled PET bottles were 571,000 tons, while the amount collected by municipalities was 284,000 tons and the amount collected by businesses as confirmed by the Council for PET Bottle Recycling was 162,000 tons. The collection rate was 77.9%

The amount of resin recycled in Japan as confirmed by the Council for PET Bottle Recycling was 192,000 tons, which was reused for fiber products (46%), sheet products (50%), bottles (2%), and molded items and others (2%) (see Fig. IV-9).

Fig. IV-8 Changes in Production, Sales and Collection of Specified Labeled PET Bottles and Collection Rates

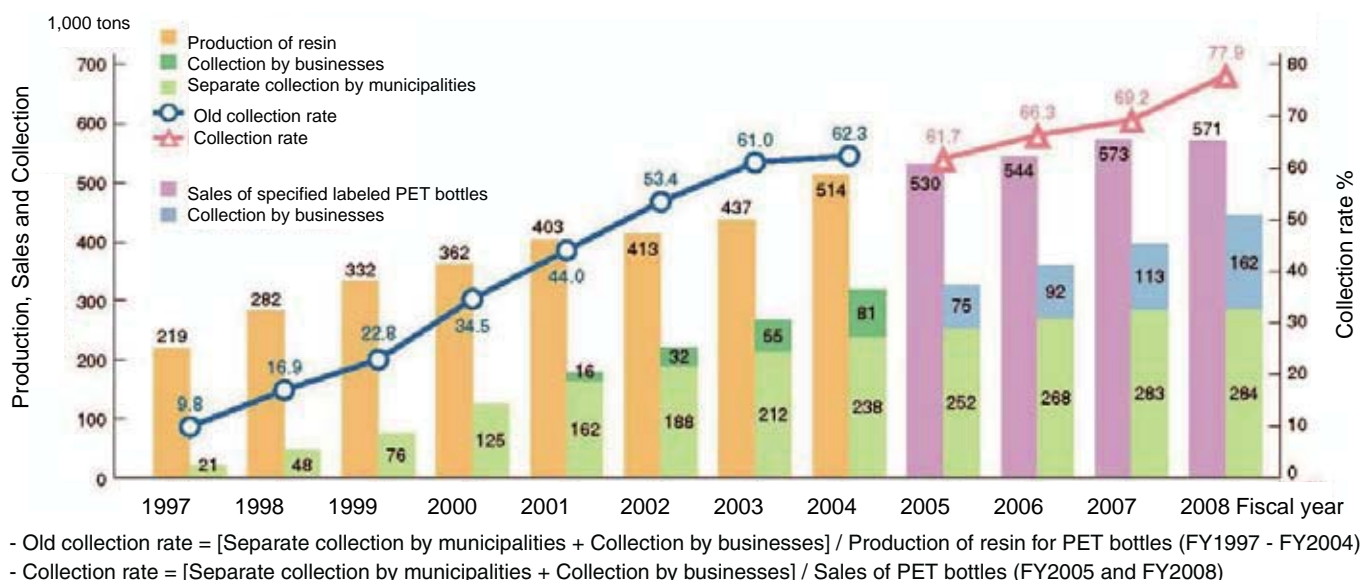
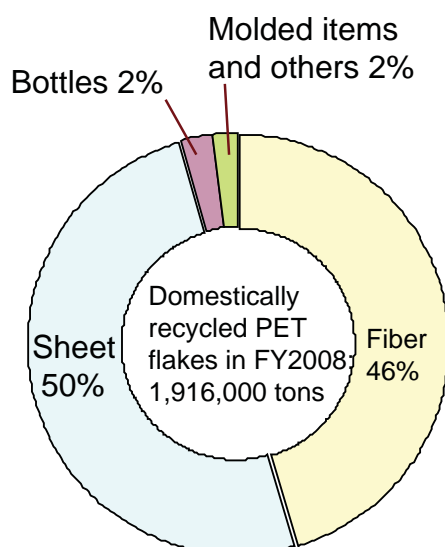


Fig. IV-9 Volume and Use of Domestically Recycled PET Bottles in FY2008



5 Plastics

- The effective utilization rate of plastic waste increased by 3% to 76%, while the recycling rate of general waste materials remained the same as the previous year. The amount of plastic waste generated was 9,980,000 tons (up by 40,000 tons from the previous year). The amount of MSW was at the same level as the previous year, at 5,020,000 tons, and that of industrial waste increased slightly by 40,000 tons to 4,960,000 tons.
- Out of the 5,020,000 tons of MSW, the amount of containers and packaging was the largest at 3,540,000 tons (percent distribution: 71%), followed by domestic articles (970,000 tons, 19%), electric/machinery (260,000 tons, 5%), and others (250,000 tons, 5%). These ratios were almost the same as in the previous year. The amount of industrial waste (4,960,000 tons) is broken down as follows: electric/machinery – 1,220,000 tons (percent distribution: 25%); containers and packaging – 1,150,000 tons (23%); construction materials – 720,000 tons (15%); transportation – 440,000 tons (9%); agriculture, forestry and fisheries – 180,000 tons (4%); domestic articles – 130,000 tons (3%); and others – 250,000 tons (5%). There were 10,000-ton decreases from the previous year both in agriculture, forestry and fisheries, and domestic articles. Processing and production waste also declined from 890,000 tons in the previous year to 860,000 tons (17%).
- The amount of plastic waste used effectively increased by 360,000 tons to 7,580,000 tons (76% of the total amount discharged). The amount used as raw materials (material recycling) was almost the same as in the previous year, at 2,140,000 tons (up only 10,000 tons). Regarding the amount used for thermal recycling, the amount used as “solid fuel”

decreased by 190,000 tons to 410,000 tons, and the amount “incinerated for heat application” decreased by 80,000 tons to 1,240,000 tons, while that “incinerated for power generation from waste” increased by 640,000 tons to 3,530,000 tons. As a result, the percent distribution of thermal recycling (energy recovery) expanded from 48% to 51%. Meanwhile, the amount used for liquefaction, gasification or blast furnacing (chemical recycling) decreased by 40,000 tons to 250,000 tons.

- The amount burned decreased by 290,000 tons to 1,180,000 tons and the amount landfilled decreased by 20,000 tons to 1,220,000 tons, while the total declined by 310,000 tons to 2,400,000 tons.
- The amount of plastic waste has generally changed within a small margin compared with the previous year.

Fig. IV-10 Amount of Plastics Produced and Discharged

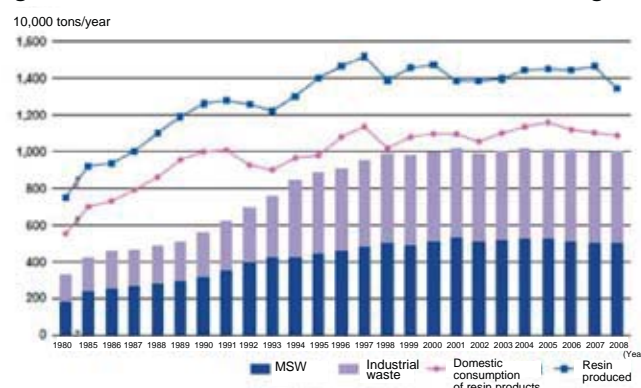
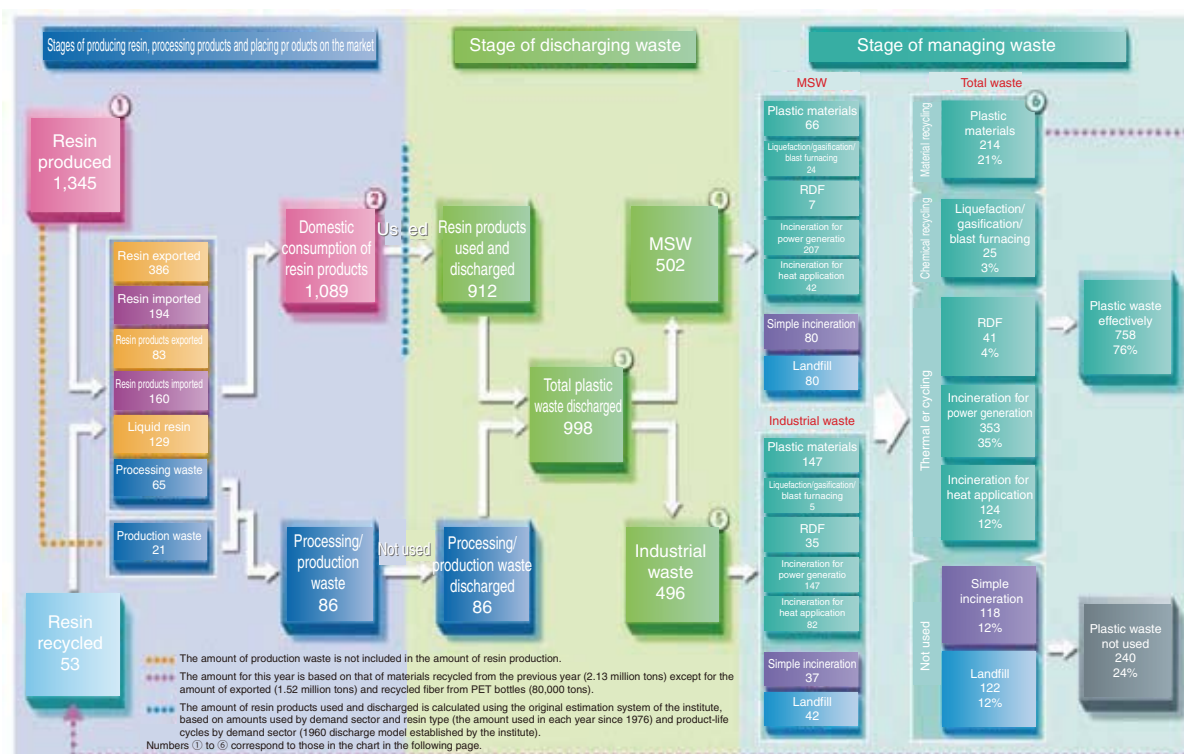


Fig. IV-11 Flow of Recycling of Plastic Products and Waste (2006) (Unit: 10,000 tons)



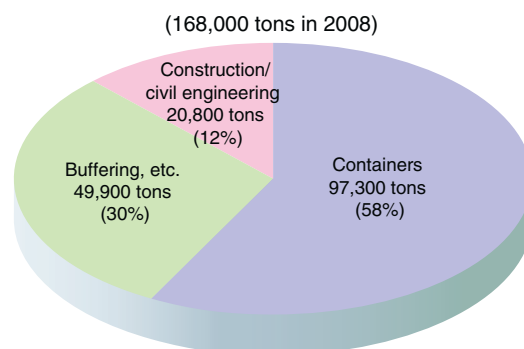
6 Styrofoam

Styrofoam in a broad sense is divided into three types, according to the manufacturing method: expanded polystyrene (EPS) or styrofoam in a narrow sense; polystyrene paper (PSP); and extruded polystyrene (XPS). These three types of styrofoam are used and treated in final disposal differently.

(1)EPS: It is used for containers for agricultural or fishery products or buffer packaging for home appliances and OA equipment, and generally discharged from businesses. The amount of EPS supply decreased slightly from about 240,000 tons in 1991 to about 200,000 tons. The amount of domestic distribution has been about 170,000 to 180,000 tons (see Fig. IV -13), of which 56% is used for containers for fresh fish or vegetables/fruit, 30% for buffering, and the rest for construction/civil engineering (see Fig. IV-12).

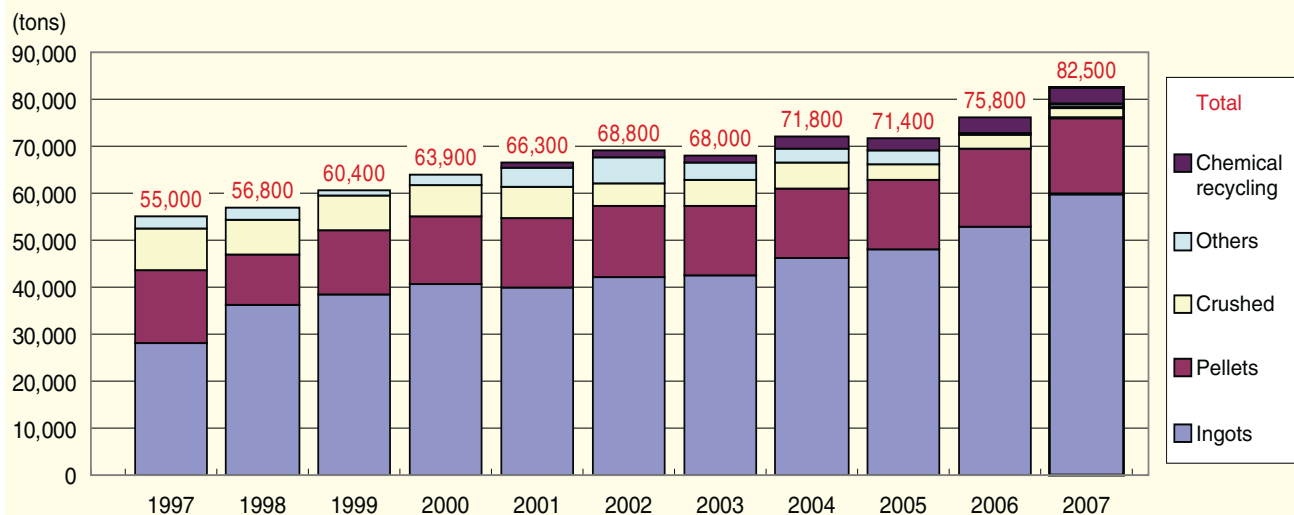
EPS waste is collected through wholesale markets, and large home appliance stores and supermarkets or by businesses engaging in intermediary treatment of industrial waste. The amount of EPS collected and recycled has been increasing year by year, reaching 82,200 tons (material recycling) with the material recycling rate at 53% in 2008. Collected EPS waste is recycled as ingots (about 80% is finally exported), reused as packaging, videocassettes or synthetic wood after being palletized, or used as mortar additives after crushing. Thermal recycling such as incineration for power generation was carried out for 30.5% of domestic distribution (2008); and the material recycling and energy recovery rate was 83.5%. Chemical recycling, such as reduction in blast furnacing, liquefaction or gasification, also started in 2001 (see Fig. IV-13).

Fig. IV-12 Amount of EPS Supplied, by Use (thousand tons/year)



Source: Japan Expanded Polystyrene Recycling Association

Fig. IV-13 Actual Data of Material Recycling



(2)PSP: It is used for many kinds of food containers such as trays, noodle cups, natto containers, and packed-meal cases. PSP is a resource-saving material made more than 90% from air and less than 10% from polystyrene resin. Type III Eco-Leaf is issued as the environmental label for this material.

The annual shipment of PSP is about 130,000 tons, and the ratio of PSP in 900,000 tons of food containers made of oil in Japan is 13%. The estimated ratio of the food containers containing other materials in the approximately 14 million tons (Note 1) of domestically consumed volumes of plastics is about 6%.

The amount of oil used for producing PSP is equivalent to 0.1% of the total volume of oil consumed in Japan (roughly 0.22 billion kilo liters).

Note 1) Present Situation of Petrochemical Industry 2007, p4, p13 (Japan Petrochemical Industry Association)

The majority of PSP food containers are disposed as domestic garbage. This is equivalent to 0.3% of all domestic garbage, but in fact, all of these are subject to the Container

and Packaging Recycling Law. White trays are separately collected by municipalities, while the voluntary collection system is also available for PSP trays (white, colored, and patterned). In this system, consumers clean and dry these trays and bring them to stores. Consumers and container manufacturers are the main players, and distributors, supermarkets and other mass retailers cooperate in promoting collection. The amount of collection in the voluntary collection system reaches around 12,000 tons annually.

Adding the amount of collected and recycled PSP after being cleaned and dried by consumers according to the Containers and Packaging Recycling Law, the entire recycling rate is roughly 30% of the amount of PSP and trays produced.

(Reference: Japan Polystyrene Foamed Sheet Industry Association <http://www.jasfa.jp>, Japan Polystyrene Paper Fabrication Industry Association <http://www.japfca.jp/>)

(3)XSP: It is used as heat-insulating construction materials and discharged by construction operations

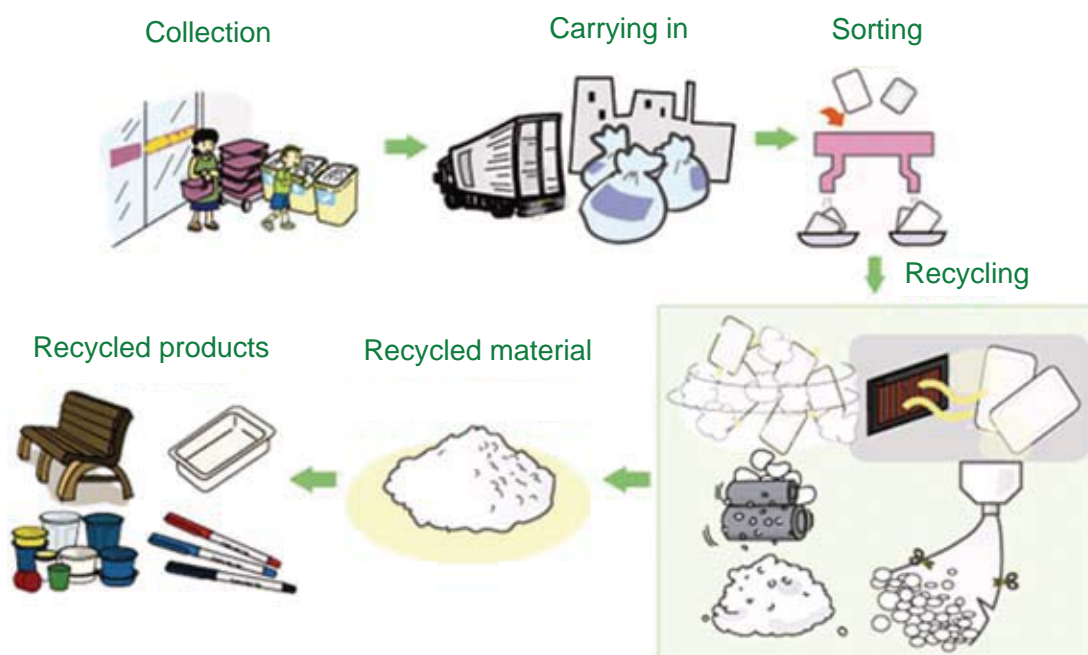
Table IV-1 Amount of Collected and Recycled PSP Trays

unit: 1,000 tons

PSP tray production	2000	2001	2002	2003	2004	2005	2006
Estimated separate collection (3rd Separate Collection Plan)	8.30	11.9	14.9	10.2	12.6	14.4	9.50
Result of separate collection	3.04	3.40	3.55	4.22	3.93	4.58	4.33
Accepted by the Container and Packaging Recycling Association: Inner number of results	0.66	0.99	1.05	1.16	1.13	0.97	0.90
Voluntary collection and recycling (including colored and patterned)	13.8	14.1	12.8	12.4	11.9	11.6	11.7

(Source: Japan Polystyrene Foamed Sheet Industry Association)

Schematic illustration of voluntary collection



7 Paper

In 2008, the production of paper/paperboard reached 28.85 million tons, the majority of which is consumed domestically (see Fig. IV-14).

Used paper discharged from households is collected by local communities or municipalities. Used paper discharged from industries is collected by collecting traders, and used paper discharged voluminously from industries (e.g., printing and bookbinding plants) is collected by tsuboage businesses specialized in collecting mainly industrial waste.

In 2008, 22.21 million tons of used paper was collected and about 19.13 million tons of recycled paper were consumed (see Fig. IV-15). Both the paper collection rate and the paper recycling rate (rate of used paper to the total paper-making raw materials) have been increasing year by year, reaching 76.7% and 62.4% in 2008 respectively (see Fig. IV-16).

The target of the paper-recycling rate is 62%, and it is expected to be achieved by FY2010 under the Law for Promotion of Effective Utilization of Resources.

In order to achieve this target and to advance the used paper recycling further, it is important to advance the used paper in the paper field where the paper recycling rate is low compared with the hardboard field. To achieve this, paper manufacturers are expected to improve used paper recycling technology, and consumers are expected to proactively use used paper products while increasing their awareness of such products and thoroughly separate used paper from other garbage.

Under the Containers and Packaging Recycling Law, 83,804 tons of used paper containers were separately collected by municipalities and 82,026 tons were recycled in

FY2008. About 80% of the total amount of recycled paper is used for corrugated cases, newspapers, and magazines. In recent years, the export of used paper has expanded rapidly, and 3.87 million tons were exported in 2008.

Slightly more than 1% of total recycled paper is also used as cushioning, such as pulp mold, heat insulators for building, and solid fuel.

Fig. IV-15 Generation and Distribution of Recycled Paper (2008: thousand tons/%)

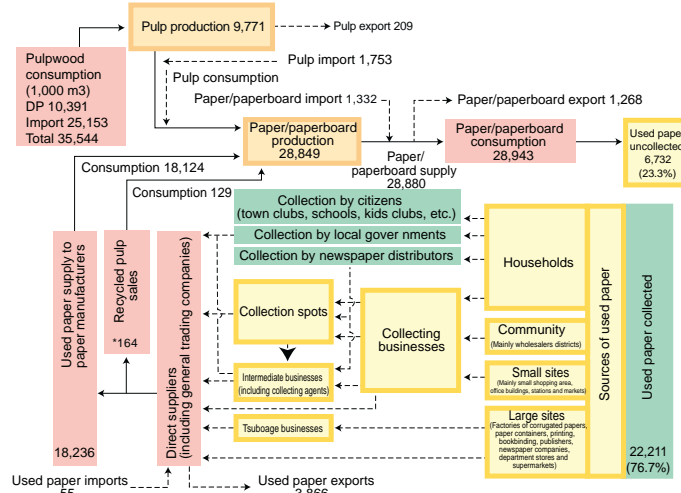


Fig. IV-14 Paper Production by Type of Paper (2007)

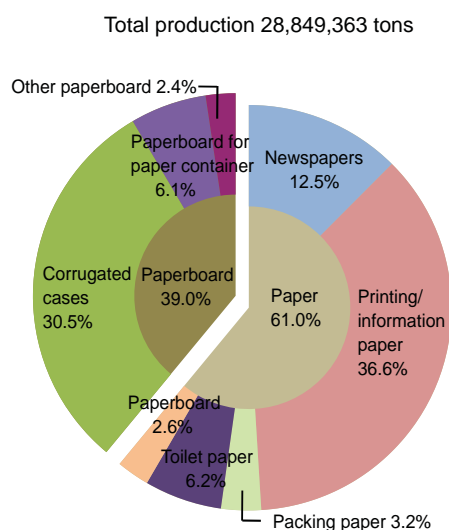
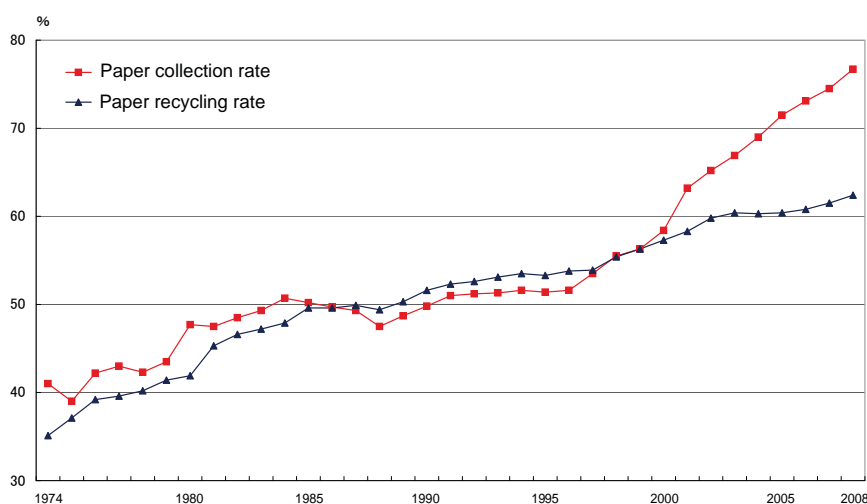


Fig. IV-16 Paper Collection Rate and Paper Recycling Rate



8 Automobiles and Motorcycles

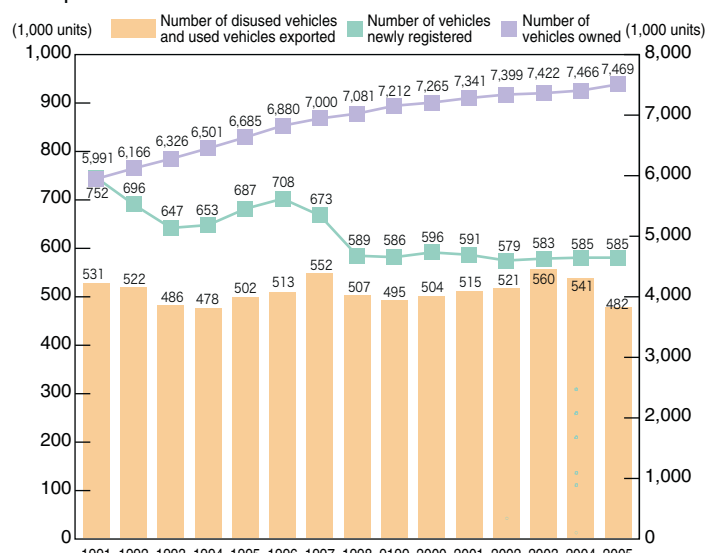
In 2005, the number of vehicles owned was 74.69 million while the number of disused vehicles has remained almost unchanged in the past decade at around 4 million a year (see Fig. IV-17). The recycling system for end-of-life vehicles has already been established in the form of infrastructure for collecting iron scraps. In this system, the collection rate is nearly 100% and the recycling rate has reached 90% (see Fig. IV-18). In May 1997, the Ministry of International Trade and Industry (the current Ministry of Economy, Trade and Industry) published the End-of-Life Vehicle Recycling Initiative, which set specific numerical targets such as improving the recycling rate for end-of-life vehicles to 95% or more by 2025 and reducing the amount of end-of-life vehicles dumped into landfill to 1/5 of the amount in 1996.

Shredder dust generated from end-of-life vehicles (waste remaining after shredding dismantled ELVs) was mainly used as landfill. But the shortage of final waste disposal facilities means we need to decrease the quantity of shredder dust used as landfill. Furthermore, fees are needed when car owners dispose of cars because of the rising landfill fee and changes in the fee for iron scraps. Under these circumstances, the recycling system of ELVs was in disarray at one time, and there was concern about illegal disposal.

It contributes to global warming when car air conditioners and CFCs are not treated properly. Airbags are obstacles in car dismantling and require professional treatment. In view of these circumstances, the End-of-life Vehicle Recycling Law was enacted in January 2005. By the end of March 2008, recycling fees had been deposited for about 74.17 million

vehicles (770.9 billion yen). As the Law for Promotion of Effective Utilization of Resources includes automobiles in the specified resource-saving products and the specified reuse-promoting products, the automobile industry works on the recycling of resin parts, development of recycling technology in consideration of the discarding stage, development of new materials and car structures that will contribute to recycling, and implementation of material marking.

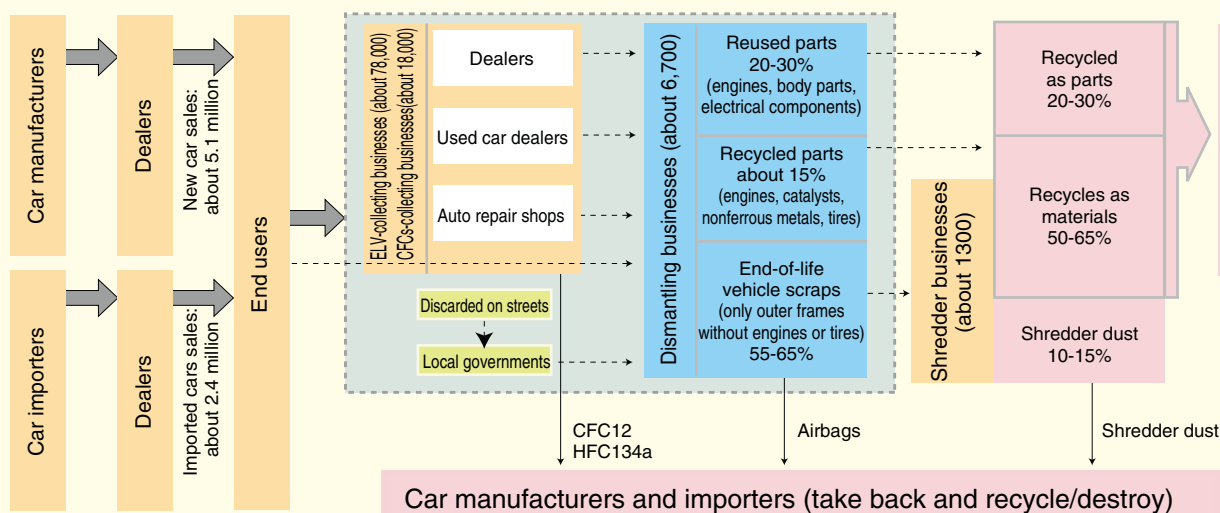
Fig. IV-17 Number of Disused Vehicles and Used Vehicles Exported



Notes: 1. Number of disused vehicles and used vehicles exported = number of vehicles owned in the previous year + number of vehicles newly registered in the present year – number of vehicles owned in the present year
2. Breakdown of the number of disused vehicles and used vehicles exported is unknown due to lack of eligible statistics.

Source: Japan Automobile Manufacturers Association

Fig. IV-18 Flow of Recycling of End-of-Life Vehicles and the Current Recycling Rate (as of the end of March 2008)



Note: The same businesses may operate as dealers, used car dealers, or auto repair shops.

End-of-life vehicle recycling rate = $\frac{\text{Weight of vehicles supplied for recycling}}{\text{Weight of vehicles collected}}$

Source: Ministry of Economy, Trade and Industry

Motorcycle manufacturers that are members of the Japan Automobile Manufacturers Association and participating motorcycle importers started operating a voluntary motorcycle recycling system in October 2004.

System of motorcycle recycling

There are 190 (designated) collecting sites for disused motorcycles in Japan. Businesses dealing with the disused motorcycles recycling system (15,000 shops) are clearly identified with a sticker so that users can readily recognize them.

For disposal/recycling of disused motorcycles, 14 facilities have been properly established nationwide. Proper treatment is provided for the motorcycles in consistency with the instruction manual developed by participating manufacturers and importers.

Since a recycling fee is paid at the time of purchase when buying a new motorcycle bearing a recycling label, motorcycle shops take the motorcycle without charging the user a fee when it is disused. For motorcycles without a recycling label, users pay the fee for recycling.

An electronic information system is introduced by the designated body to collect the motorcycle, disposal/recycling facilities and management company for more efficient management of recycling fees, information and distribution of motorcycles. A traditional manifest is replaced by the control voucher (recycling fee receipt integrated) to manage the distribution until it is taken for recycling.

Recycling data

Recycling labels are affixed to all motorcycles produced or shipped for domestic sale by the 16 member manufacturers on or after October 1, 2005 (a total of 453 models).

The number of disused motorcycles taken back by the designated bodies was 2,898 and the recycling rate on a weight basis was 86.2% in FY2008. The recycling rate of scooters was 85.9%, whereas the rate of motorcycles was 86.9%.

Fig. IV-19 Motorcycle Recycling System

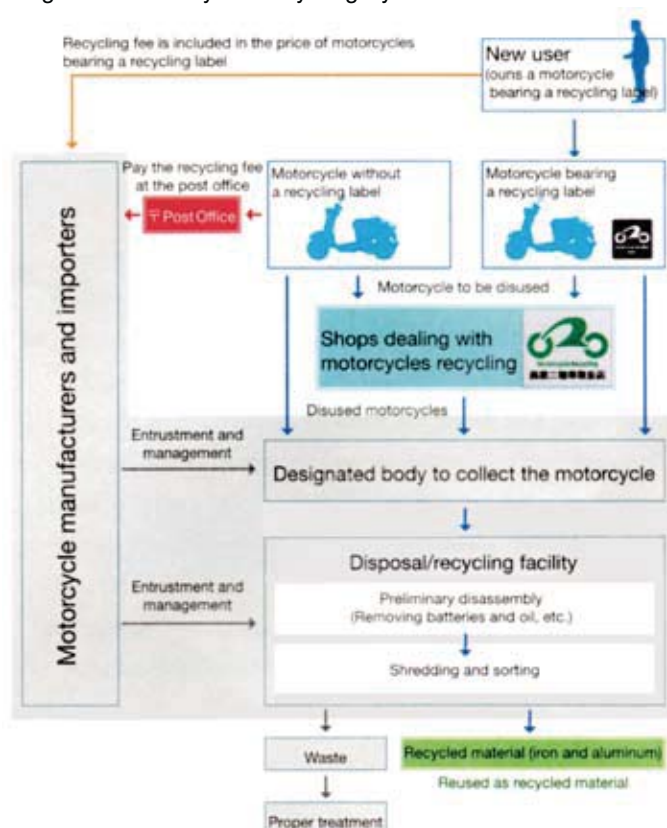
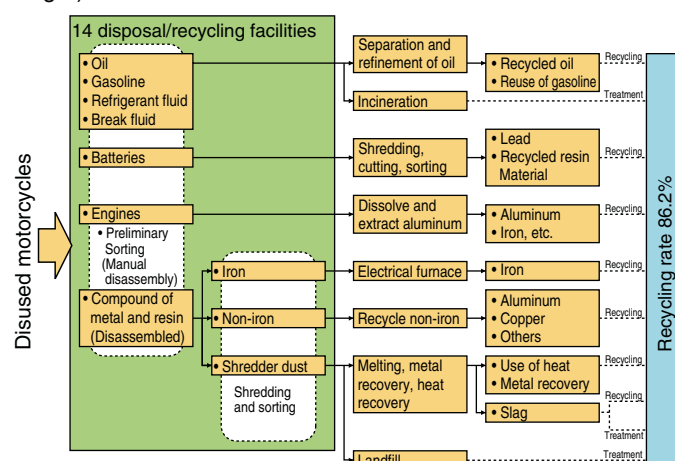


Fig. IV-20 Flow of Disposal/Recycling of Disused Motorcycles (by weight)

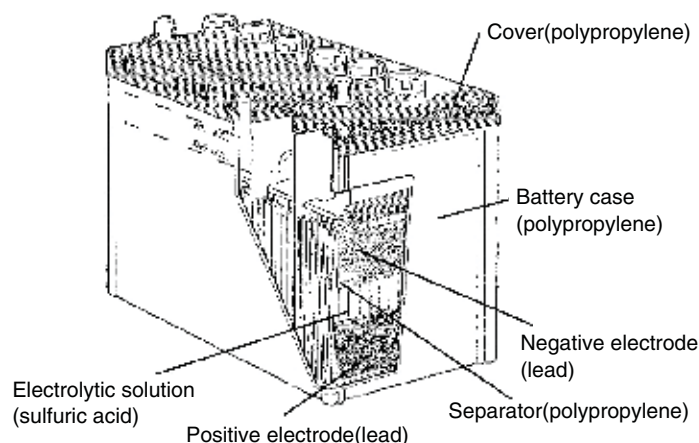


9 Lead Batteries Used for Starting Engines of Automobiles (Lead Batteries for Automobiles)

Twenty-seven million vehicle batteries for new vehicles or maintenance are brought into the Japanese market annually. The lifespan of vehicle batteries is roughly three to five years depending on usage.

Due to the nature of vehicle batteries, they contain plastics such as polypropylene and large amounts of lead and sulfuric acid, making proper disposal vital.

Fig. IV-21 Structure of Vehicle Batteries



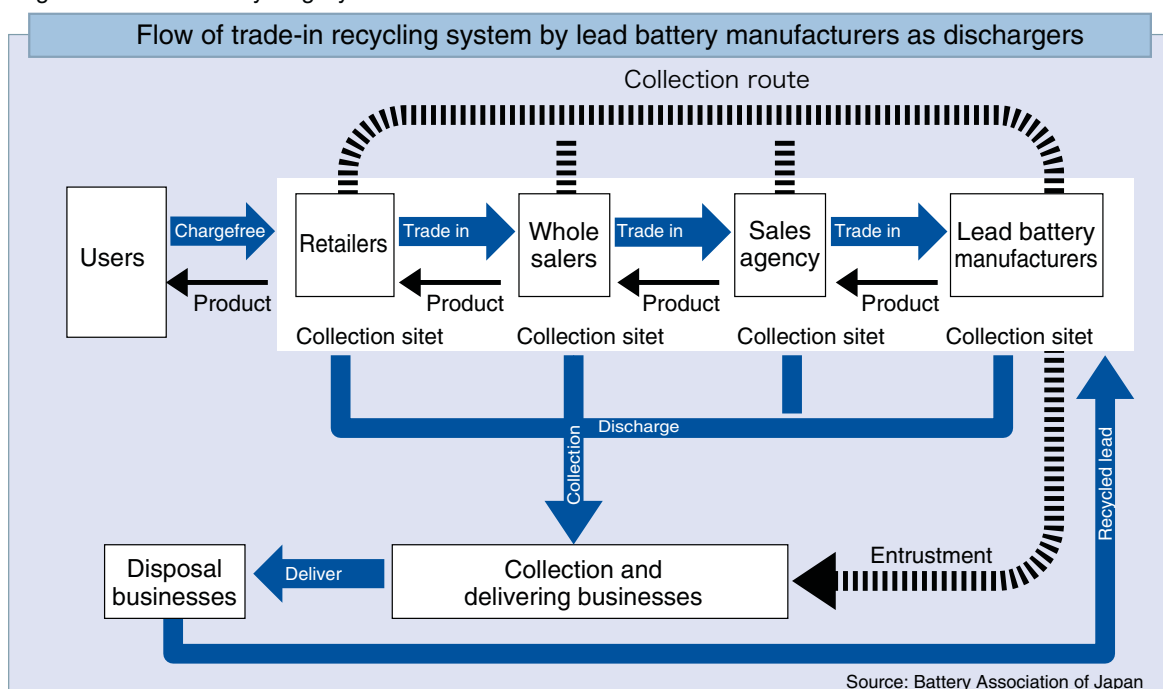
The current recycling system of vehicle batteries is established. The members of the Battery Association of Japan that are battery manufacturers voluntarily purchase recycled lead batteries, taking them back and recycling them, and 20 million lead batteries are expected to be taken back annually.

Although this system has exerted some effectiveness and functionality, there were concerns that the collection of batteries became stagnant due to an increased amount of imported vehicle batteries of which recycling requirements were not necessarily met and the possibility that disused batteries would become chargeable if the market price of lead had significantly dropped. In view of these circumstances,

the reports are collected and sorted at the joint meeting of the Central Environment Council in order to assure the effectiveness of the collection and recycling of imported batteries and to establish a continuous and stable system that is less susceptible to the trend of the lead market.

Recent soaring copper price accelerates the export of used copper, causing a decrease in the smelted copper for recycling in Japan.

Fig IV-22 Present Recycling System of Vehicle Batteries



10 Compact Secondary Batteries (Rechargeable Batteries)

There are many types of batteries/cells, as shown in Fig. IV-23.

Fig. IV-23 Types of Batteries/Cells

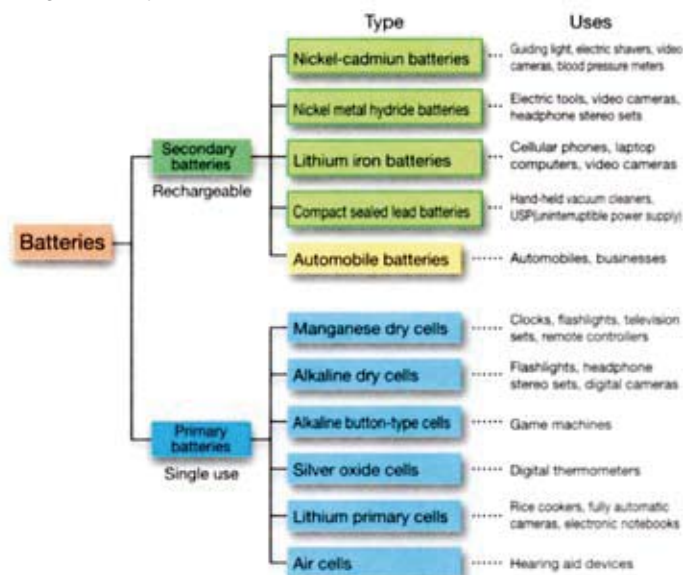


Fig. IV-24 Collection Box of Compact Rechargeable Batteries (JBRC)

Please put used compact rechargeable batteries (domestic use only) into the recycling boxes located at shops that are members of the Rechargeable Battery Recycling Club. You can search for these collection spots on the JBRC Website (<http://www.jbrc.com>).



Source: Japan Portable Rechargeable Battery Recycling Center

Table IV-2 Amount of Compact Secondary Batteries (Rechargeable Batteries) Collected

	Voluntary collection(t)	Disposed (t)	Recycled (t)	Recycling rate(%)	Statutory target(%)
Nickel-cadmium batteries	984 (1,030)	886 (927)	649 (681)	73.3 (73.5)	60
Nickel metal hydride batteries	224 (185)	202 (166)	154 (127)	76.6 (76.6)	55
Lithium iron batteries	320 (302)	297 (278)	188 (178)	63.3 (64.1)	30
Compact sealed lead batteries	1,729 (2,224)	1,729 (2,223)	865 (1,112)	50.0 (50.0)	50
Total	3,258 (3,741)	3,114 (3,595)	1,857 (2,099)		

Notes: The upper figures are actual data from FY2008, while figures in parenthesis indicate a sum of FY2007 based on the data publicized by the JBRC, Battery Association of Japan, Telecommunications Carriers Association and Communications and Information Network Association of Japan (Mobile Recycling Network)

11 Cellular Phones and Personal Handy Systems (Cell Phones)

The number of cell-phone subscribers in Japan exceeded 100 million as of the end of March 2007, resulting in a 90% dissemination rate against population, and many cell phones are disposed of.

Cell phones use rare metals such as gold, silver and palladium as well as general metals (copper, aluminum or iron). In addition, some parts contain toxic material, e.g., GaAs, which requires extra-careful treatment since it will be environmental burden if disposed as non-burnable waste. The Law for Promotion of Effective Utilization of Resources obliges collection and recycling of batteries (compact secondary batteries).

The Mobile Recycling Network, which consists of cell-phone manufacturers and telecommunication carriers, promotes cell-phone recycling. The bodies of cell phones,

rechargers and batteries are voluntarily collected by distributors at no cost and they are recycled for metal materials. The “Environmental Impact Assessment for cellular phones and PHS” was established as a guideline for the manufacturers, and assessments were implemented.

The amount of collection in FY2008 was 6,170,000 units, but many users do not dispose of the old model after changing to a new one due to poor awareness about recycling cellular phones as well as high added values and the sophisticated design of the machine. For these reasons, the amount of collection tends to decrease.

Fig IV-25 Cell Phone Collection Shop



Fig. IV-26 Flow of Recycling of Cell Phones

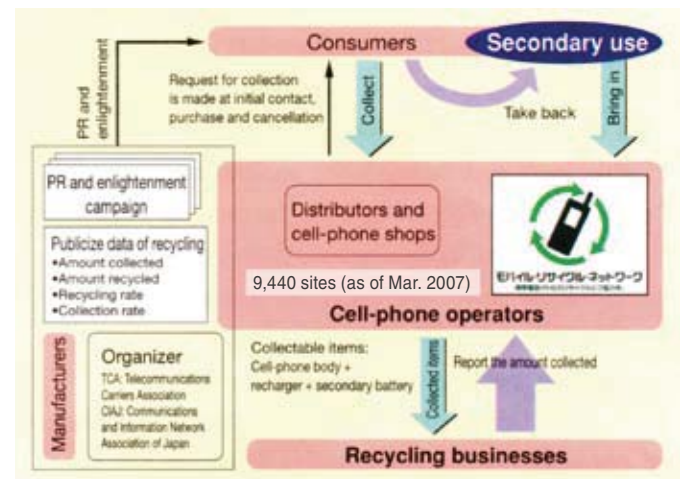


Table IV-3 Factual Data of Recycling of Cell Phones

		Before launch of Mobile Recycling Network	After launch of Mobile Recycling Network							
		FY2000	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008
Cell-phone body	Amount collected (thousand units)	13,615	13,107	11,369	11,717	8,528	7,444	6,622	6,443	6,174
	Weight collected (t)	819	799	746	821	677	622	558	544	533
Battery	Amount collected (thousand units)	11,847	11,788	9,727	10,247	7,312	6,575	6,133	7,198	8,388
	Weight collected (t)	304	264	193	187	159	132	125	145	167
Recharger	Amount collected (thousand units)	3,128	4,231	3,355	4,387	3,181	3,587	3,475	3,706	4,776
	Weight collected (t)	328	361	251	319	288	259	234	250	355

Notes: Collection rate is calculated at the time of new purchase and cancellation of the contract using the following formula.

Amount recycled is calculated by the following formula.

Amount recycled = recycling rate × weight collected

Recycling rate = Rate of metal content of the cell phone

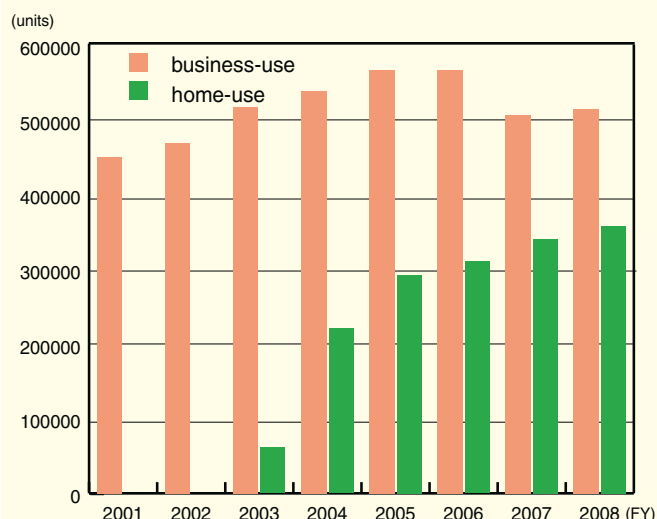
12 Personal Computers

In accordance with the Law for Promotion of Effective Utilization of Resources enacted in April 2001, computer manufacturers have been required to design products that consider the 3Rs (reduce, reuse, and recycle), and are also obliged to collect and recycle disused computers for business use. Manufacturers have also been required to collect and recycle computers discharged from households. Accordingly, computers sold on or after October 1, 2003, and discharged from households are, in principle, to be collected at designated collection spots, free of charge, and recycled. Computers subject to collection are desktop PCs including body, CRT displays and LCD, and laptop PCs. Standard peripheral devices such as keyboards and mouse are collected if they are discharged with PCs.

Unlike large home electric appliances, disused PCs for home-use do not necessarily leave the end-user when a new PC is bought due to its distribution system feature, since it is common for purchasers to take the product home and transfer data from the old PC. A different system from large-sized home electric appliances is established for PCs.

At present, a collection system is established by cooperation between the Japan Portable Rechargeable Battery Recycling Center (JBRC) and Japan Post Holdings designating post offices as collection spots for disused PCs from households so that the PCs are collected through “Eco Yu Pack,” a parcel service for disused PC collection. The number of computers collected from households reached a total of 35,584 in FY2008.

Fig. IV-27 Number of Unused Computers Collected



For collecting and recycling personal computers for business use, business operators need to directly contact the manufacturers and request that the used personal computers in their offices be collected. The collection and recycling fee are paid by the business operators who dispose of the personal computers. The personal computers disposed of by businesses reached roughly 514,000 in FY2008.

Fig. IV-28 Flow of Collection and Recycling of Unused Home-use Computers

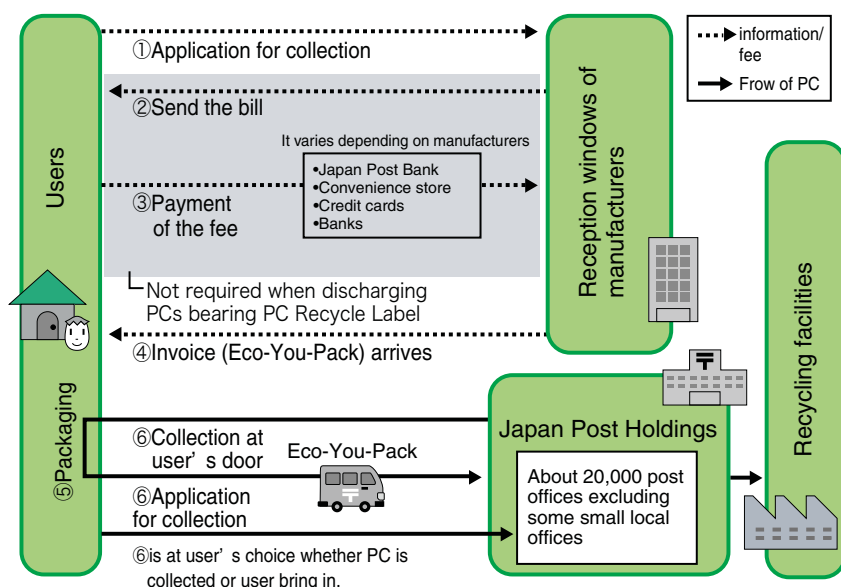
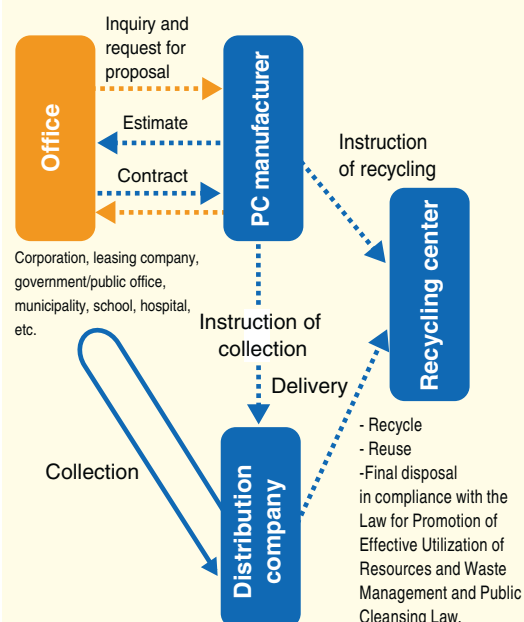


Fig IV-29 Example of recycling business PC





October is a month for promoting 3Rs

“The month for promoting 3Rs” was originally “the month for promoting recycling” in the light 1R in the Law for the Promotion of Utilization of Recycled Resources enacted in October 1991. Subsequently, a more comprehensive approach is demanded through 3Rs (reduction of wastes, reuse and recycling), not only 1R, in order to overcome the constraint on the environment and materials and to maintain sustainable development. The basic ideas of 3Rs is defined by the Basic Law for Establishing the Recycling-based Society, and specific approaches to 3R are provided in the Law for Promotion of Effective Utilization of Resources, successor of the Law for the Promotion of Utilization of Recycled Resources; extensive efforts have been made to disseminate 3Rs since 2004, when the month is renamed to “The month for promoting 3Rs.”

•The 3R Logo

This is the logo created in 2003 by the Reduce, Reuse, Recycle Promotion Association to encourage active participation and cooperation in 3R activities.

<Design Concept>

The Rs represent “reduce,” “reuse” and “recycle.”

The three figures are taking a step forward, evoking a sense of progress.

Orange represents people, green earth, and blue the sky.



About the Reduce, Reuse, Recycle Promotion Association

Recycling Promotion Association, the predecessor of the Reduce, Reuse, Recycle Promotion Association, was established in September 1991, aiming at developing a sound material-cycle society and carrying out extensive national recycling activities through close cooperation among governments, consumers and industries.

The organization changed its name to the Reduce, Reuse, Recycle Promotion Association in June 2002 and carries out extensive national activities especially in October, the month for promoting 3Rs.

Major activities

- (1) Implement the month for promoting 3Rs in October
- (2) Recognition of distinguished people in promoting 3Rs

Headquarters

Clean Japan Center

6th floor, No. 16 Kowa Building, 1-9-20 Akasaka, Minatoku, Tokyo 107-0052 Tel: 03 (6229) 1031

<http://www.cjc.or.jp>

Japan Environment Association

2nd floor, Prime Kanda Building, 1-11-9 Azabudai, Minatoku, Tokyo 106-0041 Tel: 03 (5114) 1251

<http://www.jeas.or.jp>

3R Awards Programs

* Awards for Resource-Recycling Technologies and Systems

The Awards for Resource-Recycling Technologies and Systems are granted to businesses and other entities. Its aims are to promote and expand excellent initiatives and create new businesses that suppress the generation of waste, reuse used products, and contribute to recycling resources. Candidates for the awards must, in principle, have a track record of at least three years in such projects and initiatives. This awards program started in 1975 as the Awards for Corporate Contributions to Resource Recycling, and has the longest history in Japan among awards programs associated with recycling.

Overview of FY2009

Date and time of award ceremony: October 2, 2009, Fri., 13:15

Location: Science Hall of Science and Technology Museum (Kitanomaru Park, Chiyoda Ward, Tokyo)

Overview of the awards: Clean Japan Center (<http://www.cjc.or.jp>)

Name of awards and number of recipients

METI Minister Awards	1 recipient in 1 company
METI Industrial Technology Environmental Agency Director General's Awards	4 recipients in 4 companies
Clean Japan Center Chairman's Awards	11 recipients in 14 companies
Best Practice Awards	3 recipients in 4 companies

* Awards for Distinguished Contributors in Promotion of Reduce, Reuse and Recycle

The Awards for Distinguished Contributors in Promotion of Reduce, Reuse and Recycle (Awards for Distinguished Contributors in 3R Promotion) are granted to individuals, groups, businesses, and other entities who have made efforts toward promoting 3Rs and achieved excellent results through continuous activities. Its aims are to promote and raise awareness about 3Rs for establishing a sustainable society. The awarding ceremony is held in every October, which is the month for promoting 3Rs, by the Reduce, Reuse and Recycle Promotion Association (3R Promotion Association).

The awards were previously presented as the Awards for Distinguished Contributors in Promotion of Recycling from the time it was created in FY1992 until FY2001.

Overview of FY2009

Date and time of award ceremony: October 23, 2009, Fri., 14:00

Location: Alumni House of Tokai University (Kasumigaseki Bldg., Kasumigaseki, Chiyoda Ward, Tokyo)

Overview of the awards: 3R Promotion Association (<http://www.cjc.or.jp/3r-communication/>)

Name of awards and number of recipients

Prime Minister Awards	1	Minister Awards of Ministry of Agriculture, Forestry and Fisheries	2
Finance Minister Awards	1	METI Minister Awards	1
Awards of Minister of State for Special Missions in Cabinet Office	None	Minister Awards of Ministry of Land, Infrastructure, Transport and Tourism	6
Minister Awards of Ministry of Education, Culture, Sports, Science and Technology	4	Environmental Minister Awards	1
Minister Awards of Ministry of Health, Labour and Welfare	1	3R Promotion Association Chairman's Awards	75

Support system

1 Subsidy system

(1) Industrial Technology Research Grant Program (Grant for Young Researchers)

From the viewpoint of enhancing industrial technology, subsidies are granted for research and development activities for industrial applications conducted by young researchers (individuals or teams) working at universities or research institutes. The program aims to explore and foster seeds of new industrial technology that meet the needs of the industrial sector and society, and to develop human resources specialized in research on industrial technology. Research terms are either four years or two years, and the upper limit of direct costs covered is 50 million yen for 4-year research and 30 million yen for 2-year research.

(2) Interest Subsidies for Fund for Promoting Effective Use of Resources

Necessary funds are provided for private financial institutions so as to help business operators pay interests on the cost of establishing or renovating recycling facilities.

2 Financing system

Loans offered by the Japan Finance Corporation for Small Business and National Life Finance Corporation

Loans with low interest are available at the introduction of new equipment for the benefit of 3Rs if such an activity satisfies a certain degree of requirements.

3 Tax break system

Taxes including special initial depreciation of equipment, property tax and business office tax are diminished upon the introduction of new equipment for the benefit of 3Rs if such an activity satisfies a certain degree of requirements.

4 Eco-town Project

Overview of the project:

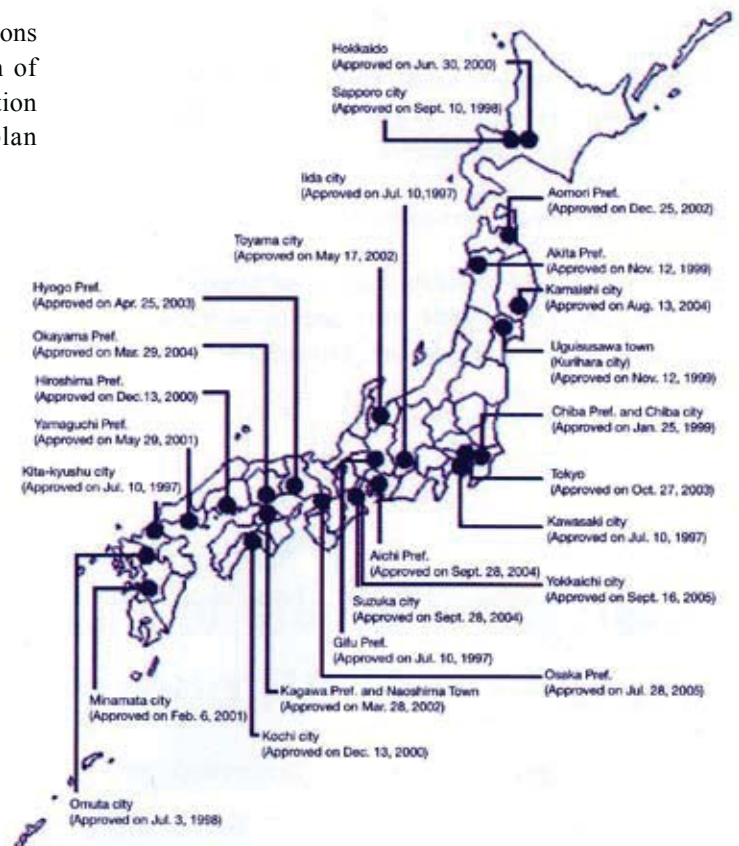
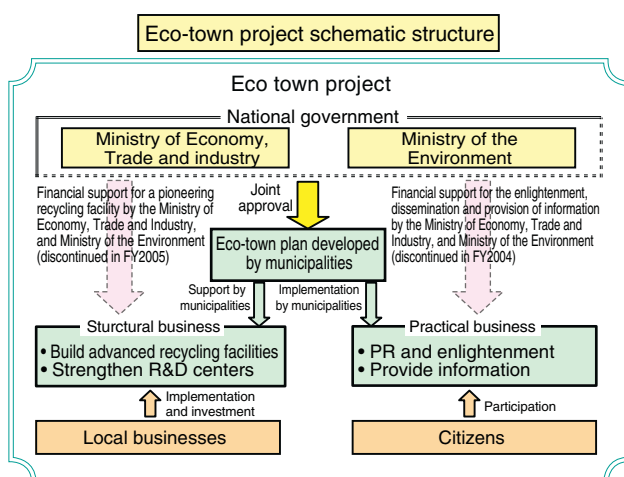
Objective:

- [1] Regional development through activation of environmental industries making up most of the regional industrial experiences
- [2] Establishing a sound material-cycle society through control of waste amount and promotion of recycling considering regional uniqueness

Procedure:

- [1] Municipalities develop their own "Eco-town plan-city plan harmonized with the environment" with their unique features integrated.
- [2] METI and the Ministry of Environment jointly approved a plan that can serve as a model for other municipalities.
- [3] Financial support is provided for local public organizations and private businesses with regard to the construction of a recycling facility beneficial for pioneering the formation of a sustainable society according to the approved plan (discontinued in FY2005).

Areas approved for Eco-town project
(As of January 2008: 26 regions)



More details with regard to 1 (1) and (2), contact engineering department of the local bureau of economy and industry

More details with regard to 2 and 3, call 03 (3501) 1511 (Recycling Promotion Dept. Industrial Science and Technology Policy and Environment Bureau, METI)

More details with regard to 4 and 5, call 03 (3501) 1511 (Harmonized Industry Promotion Dept. Industrial Science and Technology Policy and Environment Bureau, METI)

Brochures

The brochures listed below are published by the Recycling Promotion Department of the Ministry of Economy, Trade and Industry. Write to the following e-mail address to request these brochures : 3r-info@meti.go.jp
(Please note that your request for a brochure may not be fulfilled due to a lack of inventory.)



“Tips for Environmentally Friendly Containers and Packaging”

Published in April 2007

This contains various examples of efforts for rational use of containers and packaging. It also introduces lighter and thinner containers and packaging, and tips for environmentally friendly ways of wrapping.

297mm H x 210mm W, A4, 20 pages



“Benefits of Awareness and Knowledge of 3Rs”

Published in March, 2007

This book is written mainly for elementary and junior high school students, and familiar topics relating to 3Rs are explained in an easy-to-understand manner using illustrations and tables. It aims to encourage readers to be concerned and think about 3Rs, and to deepen understanding about 3Rs.

297mm H x 210mm W, A4, 68 pages



“Measures for Promoting Emissions Suppression, Containers and Packaging Recycling Law- For Retailers”

Published in March 2007

The Measures for Promoting Emissions Suppression, enforced on April 1, 2007, is explained in detail including an overview of the system, obligations of businesses, methods of entering the regular report, and mandatory bookwork.

297mm H x 210mm W, A4, 15 pages



“Container and Packaging Recycling Law”

Published in December 2006

The outline of the Containers and Packaging Recycling Law, and obligations of specified businesses are explained in detail with charts, tables and statistic data.

297mm H x 210mm W, A4, 24 pages



“Waste and Recycling Governance for Waste-Generating Businesses: Proper Waste Treatment and Promotion of Recycling”

Published in March 2005

“Guidelines to Waste-Generating Businesses for Waste and Recycling Governance” was provided in September 2004 to support the waste-generating businesses to perform proper waste treatment. These businesses are expected to implement and practice waste and recycling governance.

297mm H x 210mm W, A4, 6 pages



“Points of Implementing and Practicing Waste and Recycling Governance for Waste Generators”

Published in March 2005

This explains in plain words the “Guidelines to Waste-Generating Businesses for Waste and Recycling Governance” provided in September 2004 to support the waste-generating businesses to carry out proper waste treatment.

297mm H x 210mm W, A4, 60 pages

Ministry of Economy, Trade and Industry

METI Hokkaido Natural Resources, Energy and Environment Department

Environmental Protection Administration Division

2-1-1 Kitahachijo Nishi Kitaku, Sapporo City 060-0808
Tel: 011-709-1754 (direct)
<http://www.hkd.meti.go.jp/information/recycle/index.htm>

METI Tohoku Natural Resources, Energy and Environment Department

Recycling Industry Promotion Division

3-3-1 Honcho Aobaku, Sendai City 980-8403
Tel: 022-263-1206 (direct)
http://www.tohoku.meti.go.jp/s_kan_ri/index_kanri.html

METI Kanto Natural Resources, Energy and Environment Department

Environmental Protection and Recycling Division

1-1 Shintoshin Chuoku, Saitama City 330-9715
Tel: 048-600-0292 (direct)
<http://www.kanto.meti.go.jp/seisaku/kankyo/recycle/index.html>

METI Chubu Natural Resources, Energy and Environment Department

Environmental Protection and Recycling Division

2-5-2 Sannomaru Nakaku, Nagoya City 460-8510
Tel: 052-951-2768 (direct)
<http://www.chubu.meti.go.jp/kankyo/index.htm>

METI Kinki Natural Resources, Energy and Environment Department

Environmental Protection and Recycling Division

1-5-44 Otemae Chuoku, Osaka City 540-8535
Tel: 06-6966-6018 (direct)
<http://www.kansai.meti.go.jp/kankyo.html>

METI Chugoku Natural Resources, Energy and Environment Department

Environmental Protection and Recycling Division

6-30 Hacchobori Nakaku, Hiroshima City 730-8531
Tel: 082-224-5676 (direct)
<http://www.chugoku.meti.go.jp/policy/energy.html>

METI Shikoku Natural Resources, Energy and Environment Department

Environmental Protection and Recycling Division

3-33 Sun-port, Takamatsu City 760-8512
Tel: 087-834-3954 (direct)
http://www.shikoku.meti.go.jp/1_sesaku/index.html#kankyo

METI Kyushu Natural Resources, Energy and Environment Department

Environmental Protection and Recycling Division

2-11-1 Hakataeki higashi Hakataku, Fukuoka City 812-8546
Tel: 092-482-5471 (direct)
<http://www.kyushu.meti.go.jp/seisaku/recycle/frame.htm>

Okinawa General Bureau Department of Economy, Trade and Industry

Environmental Protection and Natural Resources Division

2-21-7 Maeshima, Naha City 900-8530
Tel: 098-864-2065 (direct)
<http://www.ogb.go.jp/move/pickup/kankyo/01.htm>

Ministry of Economy, Trade and Industry Industrial Science and Technology Policy and Environment Bureau Recycling Promotion Division

1-3-1 Kasumigaseki Chiyodaku, Tokyo 100-8901
Tel: 03-3501-4978 (direct)
<http://www.meti.go.jp/policy/recycle/>

Visit the website to learn more about the “3R policy.”

Updates on activities, legal information, and statistical information are available.

<http://www.meti.go.jp/policy/recycle/>



Towards a 3R-Oriented, Sustainable Society: Legislation and Trends 2010



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