2010

Establishing a sound material-cycle society

Milestone toward a sound material-cycle society through changes in business and life styles

Ministry of the Environment
Government of Japan

2010

Establishing a sound material-cycle society

Milestone toward a sound material-cycle society through changes in business and life styles

CONTENTS

Establishing a sound material-cycle society

Milestone toward a sound material-cycle society through changes in business and life styles

Establishing a Sound Material-Cycle Society

—Milestone toward a Sound Material-Cycle Society through changes in business and life styles—

Section 1. Outlook of society marking its 10th anniversary since the "First Year of Sound Material-cycle Society"

1 10th Milestone Anniversary

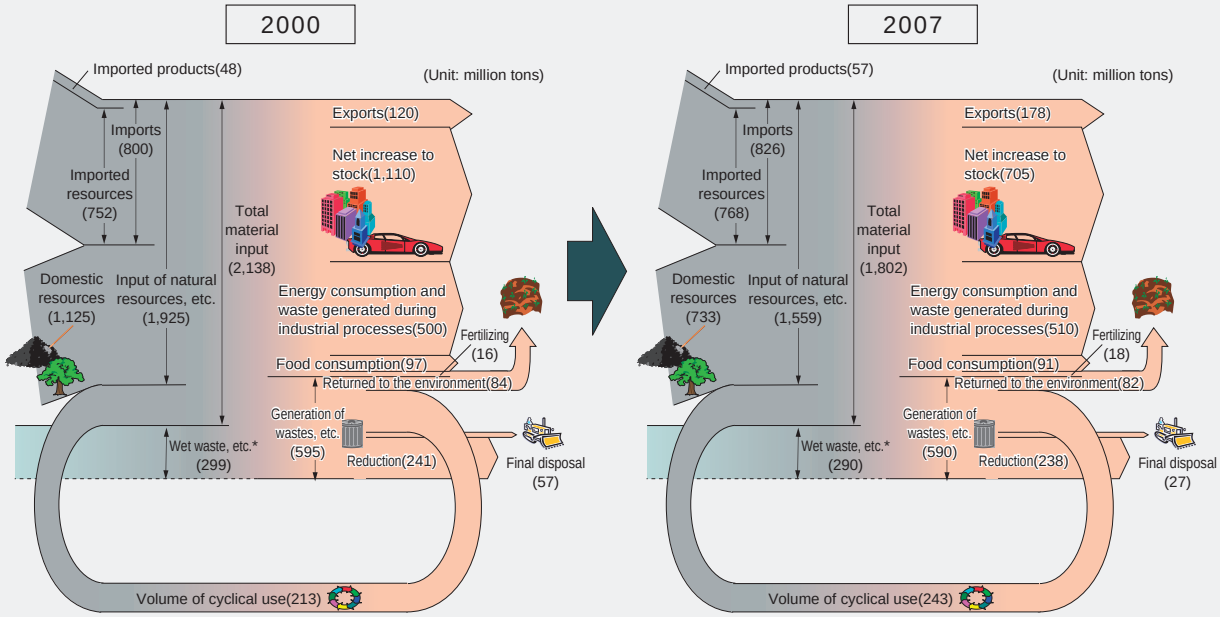
This year marks the 10th anniversary since year 2000 which is called “First Year of Sound Material-Cycle Society” and the Fundamental Law for Establishing a Sound Material-Cycle Society (Law No. 110/2000, hereinafter referred to as “the Fundamental Law for a Sound Material-Cycle Society”) was enacted in that year. How have Japan’s efforts toward a Sound Material-Cycle Society changed during this decade?

Regarding the Fundamental Plan for Establishing a Sound Material-Cycle Society to comprehensively and systematically promote measures on the establishment of a Sound Material-Cycle Society (hereinafter referred to as “the Fundamental Plan for Establishing a Sound Material-Cycle Society”) set forth in Article 15 of the Fundamental Law for a Sound Material-Cycle Society, the First and Second Fundamental Plans for Establishing a Sound Material-Cycle Society were decided by the Cabinet in March 2003 and March 2008 respectively and the efforts have been put forth based on such fundamental plans.

In order to establish a Sound Material-Cycle Society, it is extremely important to know where, what and how much waste is generated as premises for confirmation of the cause of waste generation, promotion of the efficient use of materials input into society, etc. Consequently, the Fundamental Plan for Establishing a Sound Material-Cycle Society covers Japan’s material flow from the phase of extracting natural resources in which materials are moved from nature to the human world to the phase of final disposal of wastes from the human world to nature. Figure 1-1 compares the latest statistics of material flow in fiscal 2007 with that in fiscal 2000 showing that the material input amount decreases and the material amount for cyclical use increases.

The resource productivity, an index which comprehensively indicates that how much industries and people’s lives effectively use materials, was 361,000 yen/ton in fiscal year 2007, i.e., increased by 37% from fiscal 2000. The

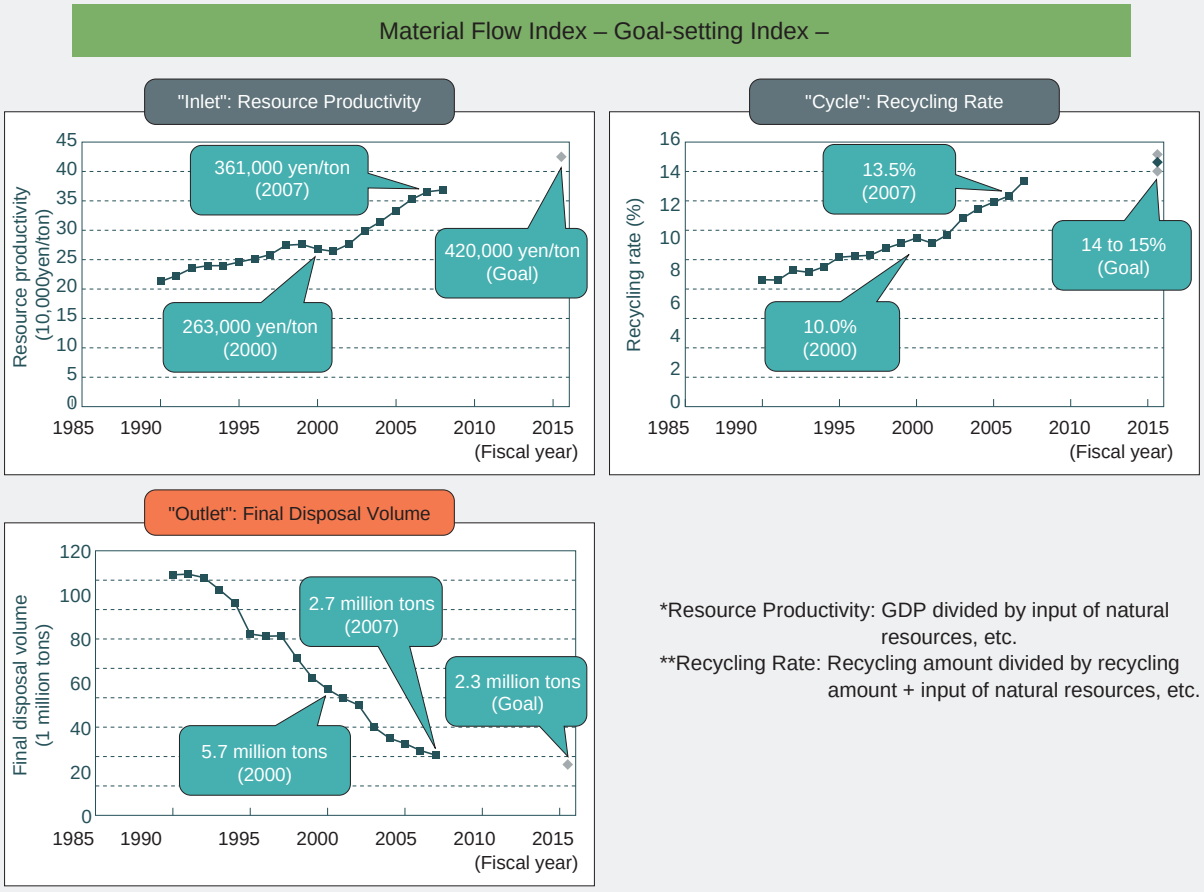
Figure 1-1 The Material Flow of Our Country



*Note: Wet wastes, etc.: Water taken in socioeconomic activities and water content included in wastes (e.g. sludge, animal wastes, raw sewage, waste acid, or waste alkali); and input of earth and sand as a result of economic activities (e.g., sludge generated by the mining, construction and waterworks industries and slag from the mining industry)

Source: Ministry of the Environment

Figure 1-2 Changes in Resource Productivity, Recycling Rate and Final Disposal Volume



*Resource Productivity: GDP divided by input of natural resources, etc.
**Recycling Rate: Recycling amount divided by recycling amount + input of natural resources, etc.

Source: Ministry of the Environment

recycling rate (an indicator for the proportion of recycled and reused amount to total amount input to the economic society) was 13.5% in fiscal 2007, increased by 3.5% from fiscal 2000. The final disposal volume of wastes was 2.7 million tons in fiscal 2007, increased by 53% from fiscal 2000 (Figure 1-2).

Daily per capita garbage was 1,089 grams in fiscal 2007, decreased by 8.1% from fiscal 2000. Daily per capita household garbage was 586 grams in fiscal 2007, decreased by 10.4% from fiscal 2000. Wastes from business activities were 15.09 million tons in fiscal 2007, decreased by 16.1% from fiscal 2000. The final disposal volume of industrial wastes was 20.57 million tons in fiscal 2007, decreased by 77% from fiscal 2000 (Figure 1-3).

Concerning legal infrastructures, the Waste Management and Public Cleansing Law was amended as well as enacting the Fundamental Law for a Sound Material-Cycle Society, and the Law for the Promotion of Effective Utilization of Resources, the Construction Materials Recycling Act, the Law for the Promotion of the Utilization of Recyclable Food Resources and the Law concerning the Promotion of Procurement of Eco-Friendly Goods and Services by the State and Other Entities (hereinafter referred to as “Green Purchasing Law”) were enacted. The legal infrastructures promoting efforts for establishing a Sound Material-Cycle Society have been improved (Table 1-1).

Internationally, efforts on promotion of 3Rs (Reduction, Reuse and Recycling) and waste disposal have been advanced for establishing a Sound Material-Cycle Society. After proposing 3R Initiative in 2004, Japan has played a leading role in promoting international 3Rs: “Kobe 3R Action Plan” proposed by Japan was adopted by the Environment Ministers Meeting held in Kobe in 2008 and was supported by the G8 Hokkaido Toyako Summit in 2008.

3Rs promotion and proper waste disposal are urgent issues for Asian countries where waste generation is increasing accompanied with economic growth and population growth. As a platform of 3Rs promotion in Asia, a meeting for the establishment of “Regional 3R Forum in Asia” was hosted by Japan and UN Centre for Regional Development (UNCRD) in November 2009 and “Tokyo 3R Statement Regarding Establishment the 3R Forum in Asia” was adopted in that forum. The Regional 3R Forum in Asia will be continuously held in Asia to promote 3Rs and establish a Sound Material-Cycle Society in Asia.

Figure 1-3 Changes in General Wastes Reduction

Source: Ministry of the Environment

Table 1-1 Overview of Legal Infrastructures since Fiscal 2000 (Chronological Table)

Year	Month	Item
2000	May	Construction Materials Recycling Act was promulgated. Law concerning the Promotion of Procurement of Eco-Friendly Goods and Services by the State and Other Entities (Green Purchasing Law) was promulgated.
	June	Fundamental Law for Establishing a Sound Material-Cycle Society was promulgated. Law for the Promotion of Utilization of Recyclable Resources was amended ("Law for the Promotion of Effective Utilization of Resources" was renamed). Waste Management and Public Cleansing Law was amended. Law for the Promotion of the Utilization of Recyclable Food Resources was promulgated.
2001	June	Law concerning Special Measures for Promotion of Proper Treatment of PCB Waste was promulgated. Japan Environment Corporation Law was amended. Johkasoh Law was amended.
2002	January	Order for Enforcement of Waste Management and Public Cleansing Law was amended (ban on sea dumping disposal of night soil, etc.)
	July	Law for the Recycling of End-of-Life Vehicles was promulgated.
	December	Biomass Japan Comprehensive Strategy was decided by the Cabinet.
2003	March	Fundamental Plan for Establishing a Sound Material-Cycle Society was decided by the Cabinet.
	April	Basic Plan for PCB Waste Treatment was formulated.
	May	Environmental Restoration and Conservation Agency of Japan Act was promulgated. Japan Environmental Safety Corporation Act was promulgated and went into effect.
	June	Waste Management and Public Cleansing Law was amended. Law on Special Measures concerning Removal of Environmental Problems Caused by Specified Industrial Wastes was promulgated and went into effect.
	October	The Basic Directions for Systematically and Steadily Promoting Removal of Environmental Problems Caused by Specified Industrial Wastes By Fiscal 2012 were formulated. Wastes Disposal Facility Development Plan was decided by the Cabinet.
2004	April	Waste Management and Public Cleansing Law was amended (measures at the time of accident, strengthened penalties, etc.).
	May	Marine Pollution and Disaster Prevention Law was amended (establishment of permit system for sea dumping disposal from vessels, ban on burning wastes in the sea, etc.)
	June	Action Plan for Elimination of Illegal Dumping was announced.
2005	April	3R Initiative Action Plan
	May	Law on Special Measures concerning Removal of Environmental Problems Caused by Specified Industrial Wastes was amended.
2006	March	Biomass Japan Comprehensive Strategy was reviewed and decided by the Cabinet.
	June	Act on the Partial Revision of the Law for the Promotion of Sorted Collection and Recycling of Containers and Packaging was promulgated. Law to Promote the Development of Specified Facilities for the Disposal of Industrial Waste was amended.
2007	June	Act on the Partial Revision of Law for the Promotion of the Utilization of Recyclable Food Resources was promulgated.
	October	Law for Ensuring the Implementation of Recovery and Destruction of Fluorocarbons concerning Specified Products was amended.
2008	March	The Second Fundamental Plan for Establishing a Sound Material-Cycle Society was decided by the Cabinet. Wastes Disposal Facility Development Plan was decided by the Cabinet. Asia 3R Conference
	April	Plan 2008 for Promoting the Construction Waste Recycling was formulated.
2009	July	Act for the Promotion of Driftage Disposal for Good Coastal Landscape and Environmental Conservation to Protect Rich and Beautiful Nature
	November	Regional 3R Forum in Asia was established.

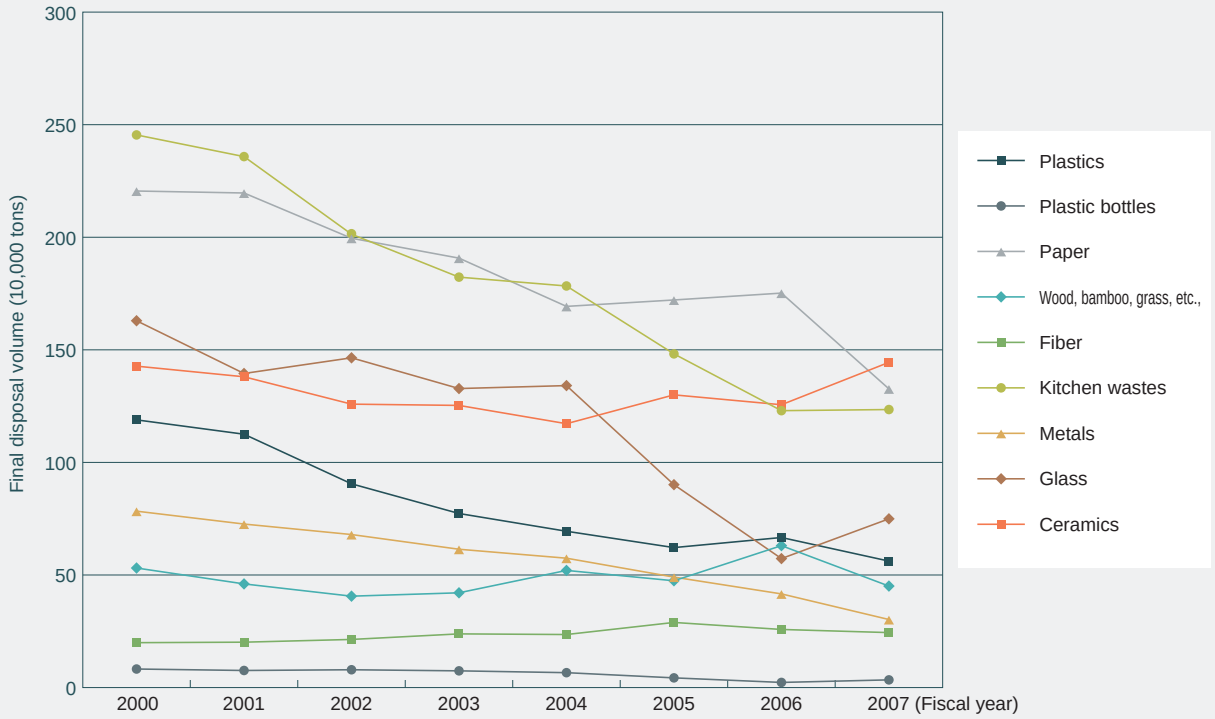
Source: Ministry of the Environment

2 Need to Cope with Recent Changes

In this way, efforts toward a Sound Material-Cycle Society have been advanced in a decade. On the other hand, a Sound Material-Cycle Society will not necessarily be established by continuing efforts as same as the past decade considering changes in recyclable resource demand. In addition to the past efforts, qualitative changes are required.

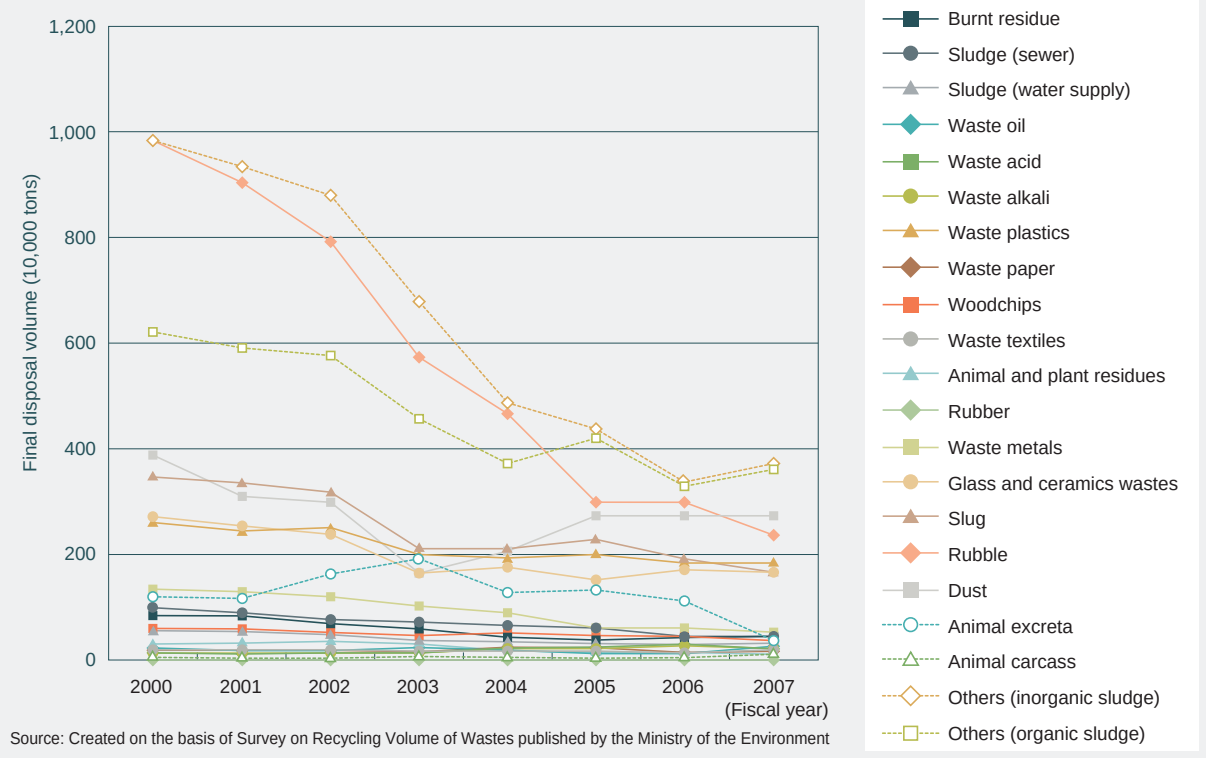
For instance, although Japan's domestic final disposal

Figure 1-4 Changes in Final Disposal Volume of General Waste (according to waste item)



Source: Created on the basis of Survey on Recycling Volume of Wastes published by the Ministry of the Environment

Figure 1-5 Changes in Final Disposal Volume of Industrial Wastes (according to waste item)



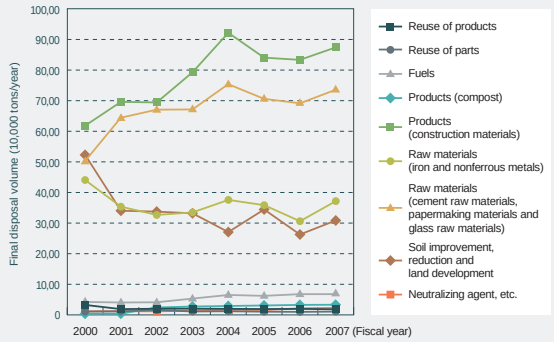
Source: Created on the basis of Survey on Recycling Volume of Wastes published by the Ministry of the Environment

volume has been reduced, the breakdown shows that the wastes are separated into two: one has drastically decreased the final disposal volume since fiscal 2000 (e.g., kitchen wastes, paper, etc. in general wastes and rubble, sludge, etc. in industrial wastes) but another one has shown little changes in the final disposal volume since fiscal 2000 (Figure 1-4 and 1-5).

Regarding items in which the final disposal volume decreases, the recycling has advanced overall while the reduction rate of the final disposal volume has slowed down recently. As above, it is desirable that the recycling of wastes has advanced, and we need continued recycling. Meanwhile, many of wastes have been recycled to construction materials (aggregate and paving) and raw materials (cement raw material, etc.). Since it is possible that demand for products using recyclable resources is greatly affected by economic fluctuation, etc., too much recycling to specific materials may stop recycling resources in Japan accompanied with reduced demand caused by changes in economic and social trends. It is necessary to diversify the utilization of recyclable resources (Figure 1-6 and 1-7).

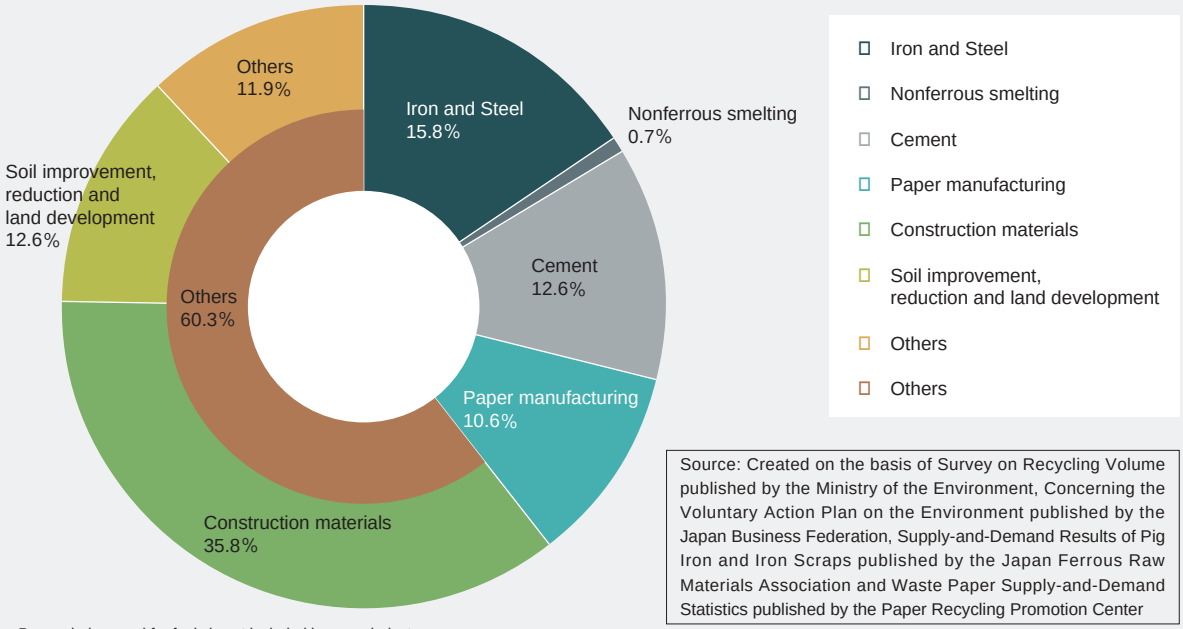
Obviously, it is necessary to further advance recycling of the wastes in which the final disposal volume shows little change.

Figure 1-6 Breakdown of Recycling According to Waste



Source: Created on the basis of Survey on Recycling Volume of Wastes published by the Ministry of the Environment

Figure 1-7 Percentage of Accepting Wastes to Be Recycled to Iron and Steel, Nonferrous Metals, Cement and Paper Manufacturing



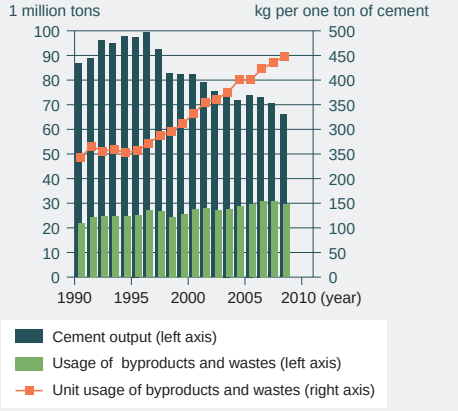
Source: Created on the basis of Survey on Recycling Volume published by the Ministry of the Environment, Concerning the Voluntary Action Plan on the Environment published by the Japan Business Federation, Supply-and-Demand Results of Pig Iron and Iron Scraps published by the Japan Ferrous Raw Materials Association and Waste Paper Supply-and-Demand Statistics published by the Paper Recycling Promotion Center

Note: Paper sludge used for fuels is not included in paper industry.
1)Data for iron and steel (waste plastics), nonferrous smelting, wastes and byproducts of cement are from pages 20, 23 and 45 of Results of the Follow-up Survey Fiscal 2008 (Individual industry version), Concerning the Voluntary Action Plan on the Environment [Building a recycling society series] published by the Japan Business Federation.
2)Data for wastes and byproducts of iron and steel (metals) are from Supply-and-Demand Results of Pig Iron and Iron Scraps published by the Japan Ferrous Raw Materials Association (domestic supply of iron scraps).
3)Data for wastes and byproducts of iron-making (waste paper) are from Table 3 Changes in Waste Paper Recovery Rate of 2008 of Waste Paper Supply-and-Demand Statistics published by the Paper Recycling Promotion Center (waste paper recovery volume).
4)Data for wastes and byproducts of paper manufacturing are from page 74 of Results of the Follow-up Survey Fiscal 2008 (Results in Fiscal 2007) (Individual industry version), Concerning the Voluntary Action Plan on the Environment [Global warming countermeasure series] published by the Japan Business Federation.

Column Future possibilities of using byproducts and wastes from cement industry

National Institute for Environmental Studies and Nagoya University estimated demand for cement based on a scenario on new demand for buildings and civil structures and a scenario on introduction of measures to decrease usage of unrenewable resources in the near future (by around year 2030) and conducted fundamental examinations on future possibilities of using byproducts and wastes from cement industry. As a result, if domestic demand for cement drastically decreases, the cement output may decrease by two thirds of the current output (70 million tons). Then, if the current unit usage of byproducts and wastes (448 kg per one ton of cement in 2008) does not increase, total usage of byproducts and wastes also decreases by two thirds of the current usage (30 million tons). Under this circumstance, kinds of recycled byproducts and wastes may greatly change. In order to maintain the current total usage of byproducts and wastes, it is necessary to increase the unit usage of byproducts and wastes per one ton of cement by 600 kg.

Figure 1-8 Changes in Cement Production and Use of Byproducts and Wastes in Cement Industry



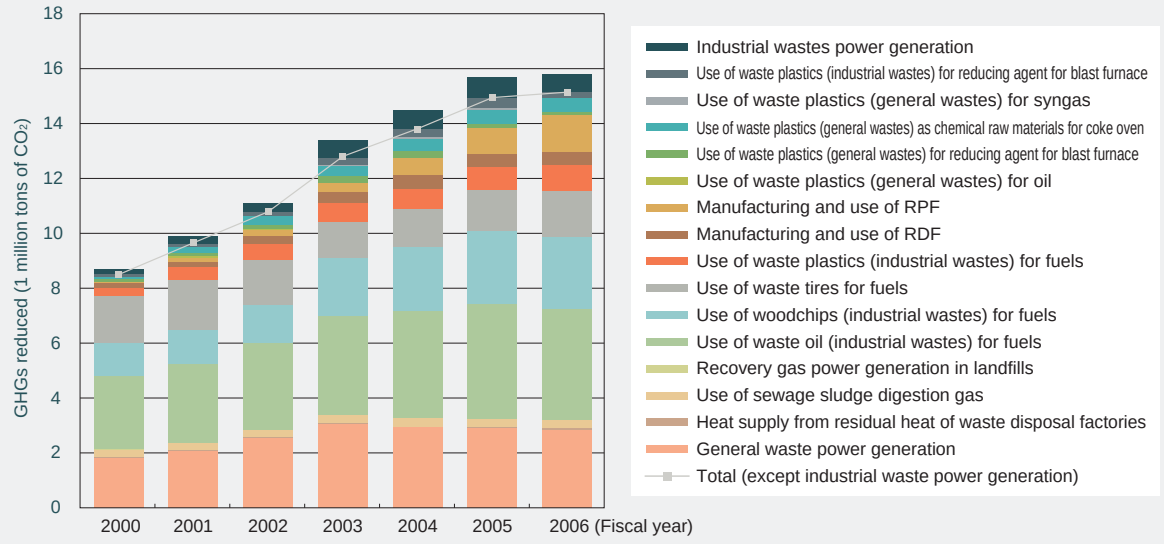
Source: Created by the Ministry of the Environment based on Cement Handbook published by the Japan Cement Association

On the other hand, it is also required to simultaneously achieve a Sound Material-Cycle Society and a low-carbon society toward the achievement of the goal that greenhouse gas emissions are reduced by 25% from 1990 levels by the year 2020. Given that carbon is also one of resources/materials, it is further required to create a society using resources and materials efficiently with economy. Such efforts can be an engine for new growth.

Column Greenhouse gas emissions (GHGs) reduced in sectors other than the waste sector by utilizing generated wastes for raw fuels and waste power generation

According to an estimate by the Ministry of Environment, greenhouse gas emissions (GHGs) reduced in sectors other than the waste sector by utilizing generated wastes for raw fuels and waste power generation was estimated 1.5 million tons of CO2 in fiscal 2006.

Figure 1-9 GHGs reduction effect by the efforts toward a sound material-cycle society



Note: Although industrial waste power generation is overlapped with use of industrial waste heat, since it is difficult to eliminate the overlapped part, the amount reduced by industrial waste power generation is treated as a reference and is not included in total GHGs reduced.

Source: Ministry of the Environment - Results of the Second Progress of the Second Fundamental Plan for Establishing a Sound Material-Cycle Society

3 New Efforts

In order to respond to the recent changes, it is necessary to advance technology development continuously. It is also important that stakeholders control waste generation by 3Rs, especially reduction and reuse, and establish a recycling circle by increasing demand for products using recyclable resources, i.e., increasing in purchasing and using products utilizing recyclable resources, in cooperation with each other; not just waiting for the advancement of technology.

Efforts toward establishing a Sound Material-Cycle Society have been advanced on the basis of a new concept which is a pioneer of such movement.

(1) Disposal-aware design, construction, manufacturing and operation efforts

○ Joint Challenge to Lifecycle Zero Emission by the client, architect and builder (Figure 1-10)

In constructing a new factory of Automobile Manufacturer H, efforts toward environmental considerations, i.e., zero emission, on the whole lifecycle of the factory were undertaken from the perspectives of the client (Company H), the architect (Company N) and the builder (Company K). The client aimed for an environmentally responsible green factory, e.g., reduction of production-related energy consumption installation of solar panels and natural-circulation rooftop gardening utilizing rainwater. The architect designed the building in consideration of recycling efficiency when demolishing the factory 50 or 100 years later (e.g., improvement of segregation and recycling efficiency when demolishing by adopting system toilets, steel partitions and recyclable fireproof panels: demolition-conscious building design). The builder improved the recycling efficiency when demolishing by adopting recyclable construction materials and methods at the stage of construction as well as making efforts toward zero emission of construction byproducts which are generated during the construction such as thorough segregation and reduction of wastes by using leased goods. As a result, the environmental impact was reduced at the stages of design, construction, operation and demolition of the factory, and the wastes in demolishing which have the greatest impact were drastically reduced and the recycling efficiency was substantially improved (90% or more of used construction materials (by weight) are recyclable).

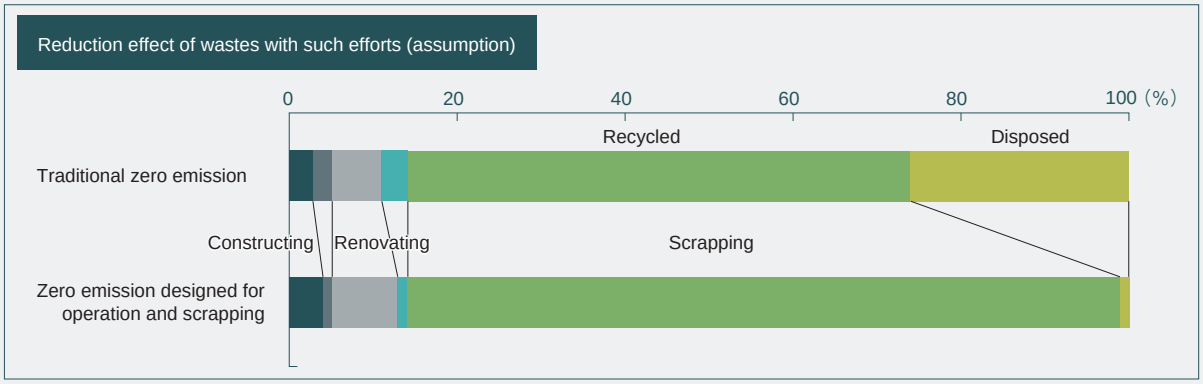
(2) Efforts to encourage concerned parties to voluntarily deal with 3Rs utilizing the market mechanism

○ Utilization of 3Rs eco-points (Figure 1-11)

Efforts for 3Rs promotion using points have been advanced nationwide. For instance, Gifu Eco-life Promotion Project provides points to people who cooperate in the effort such as reduction of plastic grocery bags, bringing of own chopsticks, promotion of simple packaging, sale by measure and bringing own packages coupled with two cities and nine towns in Seino region and five cities and three towns in Gifu region. People can exchange certain points to eco-goods, etc. More than 800 shops have cooperated in this effort. There is not only an effect of inducing citizens' 3Rs activities but also a possibility to boost demand for shops handling environment-friendly goods or for environment-friendly products.

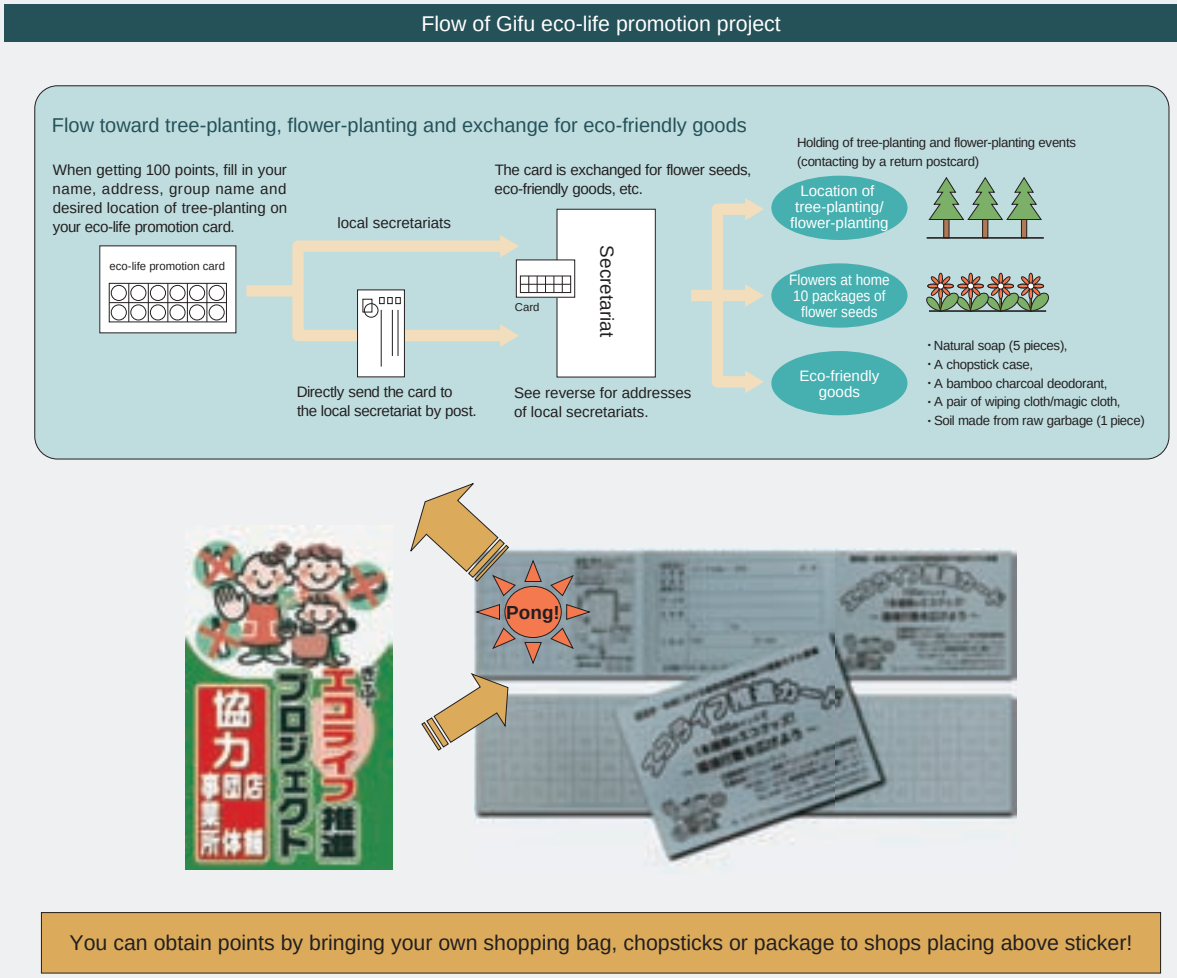
Figure 1-10 Disposal-aware design, construction, manufacturing and operation efforts

Adoption of a toilet unit (left-hand picture) and steel partitions (right-hand picture) made of materials and structures designed for segregation when scrapping and recycling efficiency



Source: Ogawa Plant, Saitama Factory, Honda Motor Co., Ltd.

Figure 1-11 Gifu eco-life promotion project



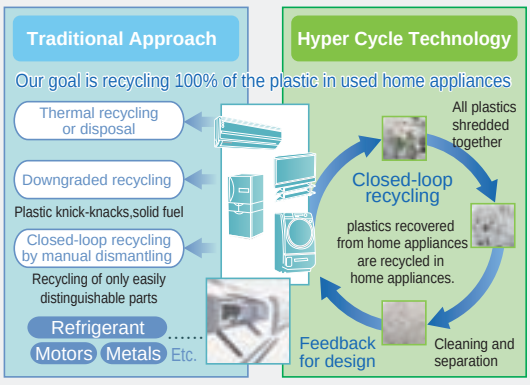
Source: Seino Environment NPO Network Gifu Eco-life Promotion Project Executive Committee

(3) Efforts to encourage waste generators to control waste generation by themselves and become demanders for recycled products

○ Efforts toward closed-loop-recycling with 100% recycled materials (Figure 1-12)

In order to manufacture new home appliances, Home Appliance Manufacturer M has promoted “closed-loop-recycling” using plastic materials which are precious “resources (materials)” collected from products for their products again, not “consuming” limited resources one after another. Aimed at using 100% recycled materials, not new materials, it has dealt with study and development of recycling technologies producing high-quality recycled plastics and advanced the effort to automatically separate and collect recyclable materials from “shredded mixed plastic” which were hard to be recycled and use for products. This company estimates that with this effort, newly about 6,400 tons of plastic materials can be closed-loop-recycled a year.

Figure 1-12 Closed-loop-recycling efforts aimed at 100% recycling rate

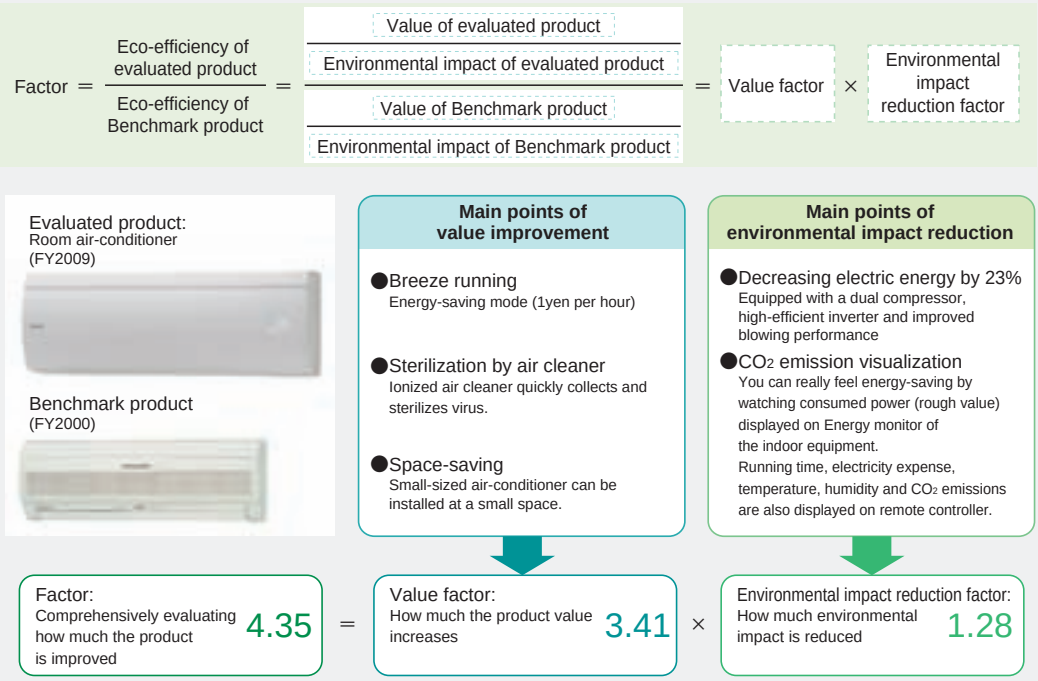


Source: Mitsubishi Electric Corporation

Column Improved eco-efficiency of products by introducing a concept of eco-efficiency indicator to product design

There are some businesses which set up indicators or standards to judge environmental performances such as resource saving and recycled item use rate to make use of product design and manufacturing. At present, many of businesses set up in-house indicators since the calculation method for environmental efficiency is different depending on each business. It is hoped the calculation method will be standardized and the indicators will be used as a guide for consumers' selection/purchasing of products, e.g., comparison of products.

Figure 1-13 Eco-efficiency improvement of products introducing a concept of eco-efficiency indicator to product design



Source: TOSHIBA CORPORATION

(4) Construction of a system incorporating users of products utilizing recyclable resources from the planning stage

○ Tanseikan (Tahara City) (Figure 1-14)

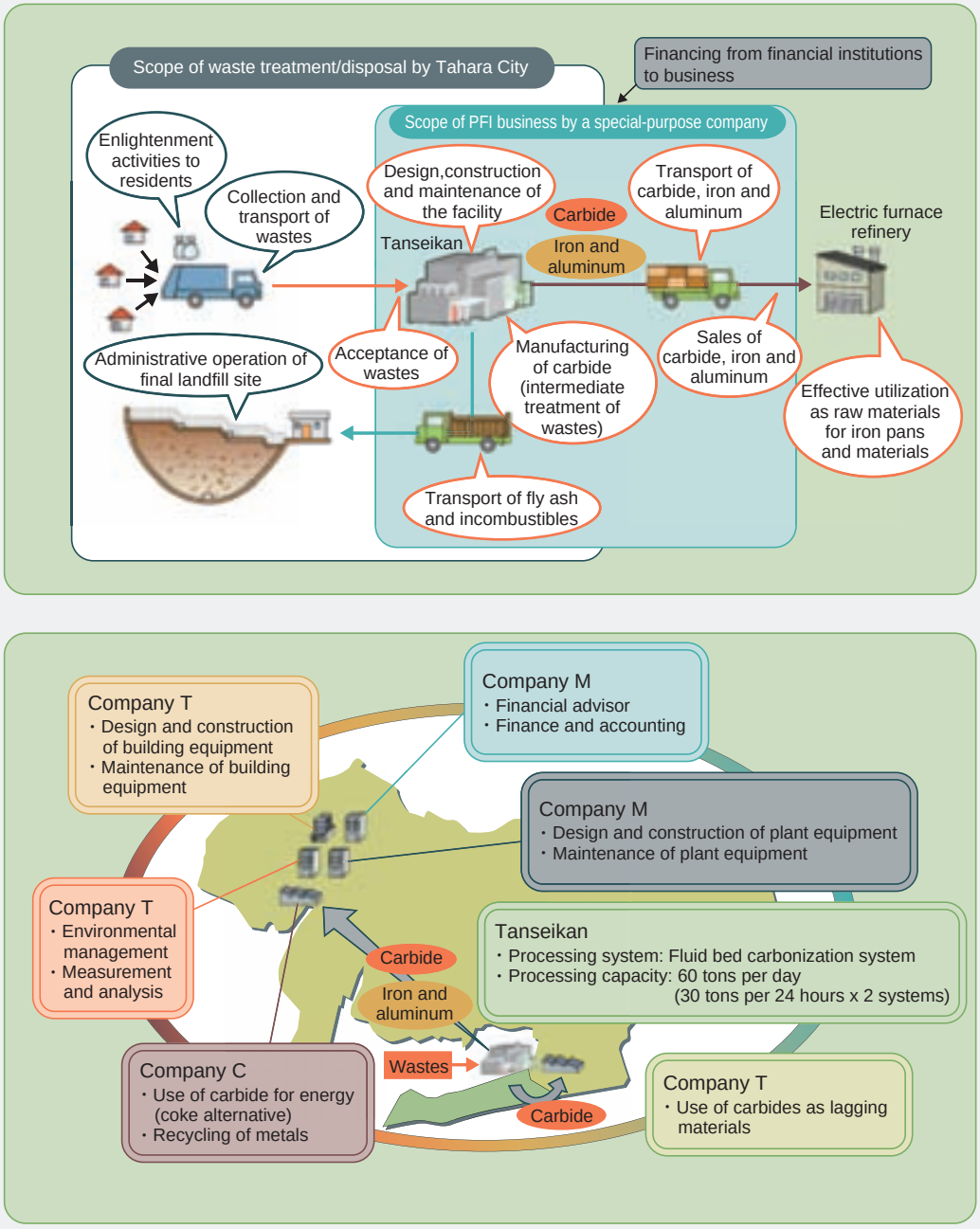
In Tahara City, a special-purpose company was established by five enterprises in different categories located in Aichi Prefecture (Plant Company M, Construction Company T, Leasing Company M, Environment Management Company T and Electric Furnace Steel-making Company C) to conduct intermediate treatment processes of combustible wastes and combustible bulky wastes as a part of waste treatment/disposal business of Tahara City. Working together with the electric furnace steelmaking plant which is a demander for carbide and valuable metals manufactured from wastes, a system making effective use of products utilizing recyclable resources is established from the planning stage. In addition, each investing company is mainly in charge of its specialized field, i.e., design and construction of Tanseikan, environment management and use of carbide to smoothly operate the business.

(5) Japan's efforts to complement recycling in developing countries

○ Promotion of importing difficult items to dispose of properly (Table 1-2)

As a result of improved treatment technologies of Japan, internationally expanding Japanese enterprises and increased corporate social responsibility, efforts to accept and properly treat wastes which are difficult to be treated properly in developing countries but are able to be done in Japan within the realm of handling capacity have been advanced. Such activities should be actively promoted since they reduce the environment load of import trading partners. Meanwhile, the "Bill for a Partial Amendment to the Waste Management and Public Cleansing Law" including addition of persons as waste importers who commission the disposal of foreign wastes having a probable cause to be treated in Japan to industrial waste disposal contractors was submitted to the 174th Diet in March 2010.

Figure 1-14 Tanseikan



Source: Tahara City

Table 1-2 Imported wastes

Imported wastes in fiscal 2008 (the figure in parenthesis indicates the result of previous year)		
Permitted number of imports	9（6）	4,450（3,461）tons
Reported import volumes	1,843（282）tons	
Imported from	Thailand, Philippines, Republic of Korea, Taiwan and Hong Kong	
Commodities	Waste dry-cells, waste fluorescent tubes, used photoreceptor drums, used cartridges, etc.	

Source: Ministry of the Environment

(6) Efforts to recycle high value-added goods

○ Efforts to collect rare metals

In Japan, rare metals are collected by nonferrous smelters or manufacturers who produce interim products or products made of rare metals, and also collected from secondary raw materials (nonferrous scraps, metalized wastes, etc.). At nonferrous smelters, primary raw materials (ores) and secondary raw materials containing traces of rare metals such as platinum and indium are purified at the production process of main products, copper, lead and zinc, and such rare metals are removed as impurities and collected as by-products. In many cases, gold and silver contained in raw materials are also collected at the same time.

In addition, a model project of collecting end-of-life compact appliances was carried out at seven regions in Japan in fiscal 2009. In this project, various collection methods have been adopted at each model region in order to examine effective and efficient collection methods for end-of-life compact appliances. For example, collection boxes for compact appliances are installed at rail stations in Koto Ward and Hachioji City in Tokyo. In Minamata City, there

is a new segregation classification, “compact appliance” on collection boxes at stations. Proper collection methods based on regional characteristics such as size of population are sought by collecting compact appliances with various collection methods in each region.

(7) Efforts coupled to local revitalization and improved local finances

○ Trying to reduce combustible wastes by one-third (Chiba City) (Figure 1-15)

Chiba City tries to reduce combustible wastes by one-third (100,000 tons) by advancing efforts for 3Rs and aims to reduce the number of waste disposal factories from 3 to 2 by closing down one aging disposal factory. With the achievement of this goal, Chiba City says that 1) cost of constructing a new waste disposal factory (about 18.2 billion yen) and its maintenance cost (about 640 million yen a year) can be saved, 2) greenhouse gas emissions generated by waste incineration can be controlled and 3) lifetime of the final disposal site can be extended. To that end, waste segregation classes have been launched in all municipal elementary schools aimed at promotion of separating waste paper, etc. and efforts for a model project of sorted collection and biogassification of raw garbage have been advanced.

○ Yokohama G30 (Yokohama City)

Yokohama City has dealt with mainly segregation and recycling of wastes to achieve the goal of “Yokohama G30 Plan” which reduces waste generation* in the city in fiscal 2010 by 30% (upwardly revised to 35% in fiscal 2006) compared to that in fiscal 2001. As a result, the waste generation* in fiscal 2009 was reduced by about 42% compared to that in fiscal 2001, and two out of seven waste disposal factories were closed and one was made as a backup. As well as these efforts, Yokohama City will change residents ′lifestyle to “no waste, no carried-in waste” and deal with waste generation control in the future.

Waste generation:Volume of wastes except recyclable ones

Figure 1-15 Trying to reduce combustible wastes by one-third (Chiba City)

Source: Chiba City

4 Accessible circulation activities

Although there are excellent efforts described above, it is also true that there are issues on costs, infrastructures, etc. to improve the quality of efforts for a sound material-cycle society.

In order to settle efforts toward establishing a sound material-cycle society including new efforts launched in various regions, it is required that each and every individual understands, participates and acts in each position. However, according to a public opinion poll conducted by the Cabinet Office in June 2009, 92.4% of respondents are interested in waste problems but they are not so interested in concrete practices (Figure 1-16 and 1-17).

Here, examples of accessible activities toward establishing a sound material-cycle society in daily life and the possibility of the effect are verified. Individual simple action has a significant meaning for the establishment of a sound material-cycle society.

(1) Waste generation reduction effect by providing information to consumers, etc.

The Ministry of the Environment carried out experiments on what effect is given to consumers' 3Rs activities by providing information on waste generation situation, etc. with help from enterprises, etc.

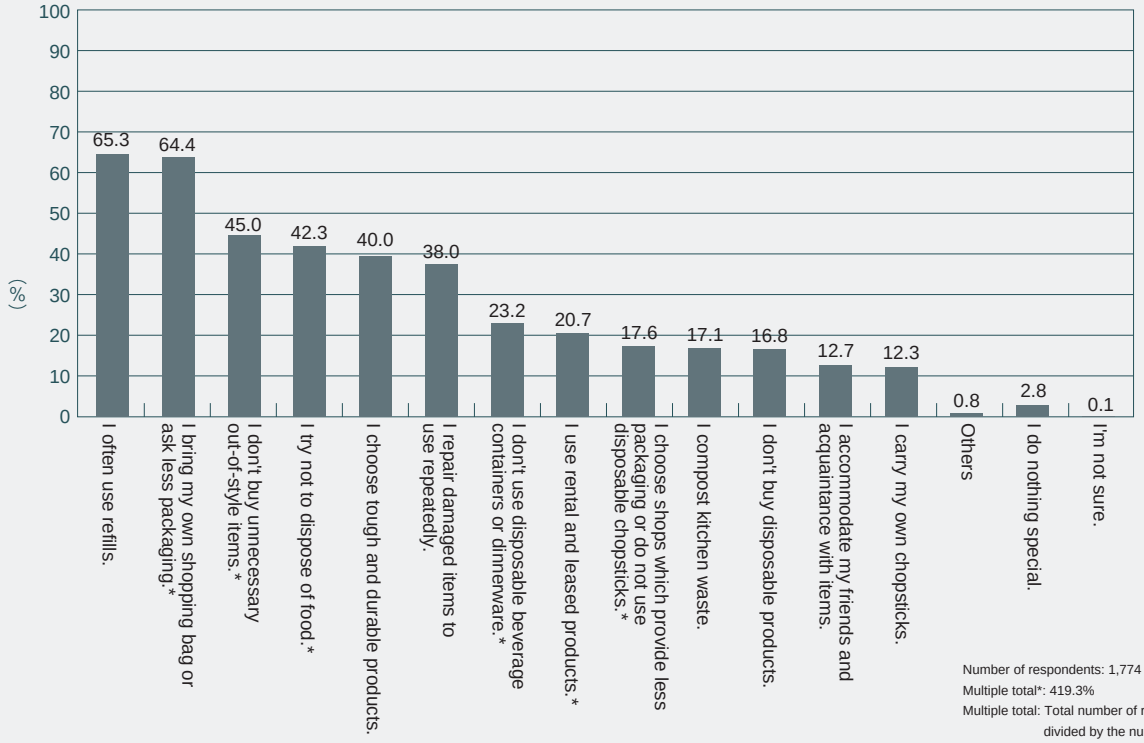
In a case that information on reduced waste paper generation and segregation method for miscellaneous paper as well as facts, e.g., the situations of waste paper generation and mixed miscellaneous paper, was provided to employees for the purpose of reducing waste paper generation and promoting the segregation of miscellaneous paper in the workplace, the waste paper generation decreased by half and the volume of segregated miscellaneous paper doubled compared to that before providing information. According to follow-up questionnaire targeting the employees, they were aware that it was a relatively major factor in the increase in the volume of segregated miscellaneous paper to know the fact that miscellaneous paper is mixed in combustible wastes. Therefore, it would appear that it was effective in promoting the segregation of miscellaneous paper to provide information on facts (Figure 1-18).

In another case that a poster showing how to dispose of plastic bottles properly was displayed and information on the current disposal situation of plastic bottles was provided to the employees everyday (visualization) aimed at the promotion of properly disposing of plastic bottles in the workplace (removal of caps and labels, rinse of the inside and crush are proper disposal at the tested region), the proper disposal increased by about 62% after displaying the poster and increased by about 76% after providing information (visualization) (Figure 1-19).

(2) Container/Package weight reduction effect by purchasing refills

The weight of containers/packages can be drastically reduced by using refills compared to bottles, etc. Therefore, the more the sales rate of refills increases, the less the materials are used for containers. Figure 1-20 (1) and (2) show the study results, i.e., the sales rate of shampoo/rinse refills

Figure 1-16 Efforts for reducing wastes
(Breakdown of answers from respondents who said they are interested in waste problem (multiple answers allowed))

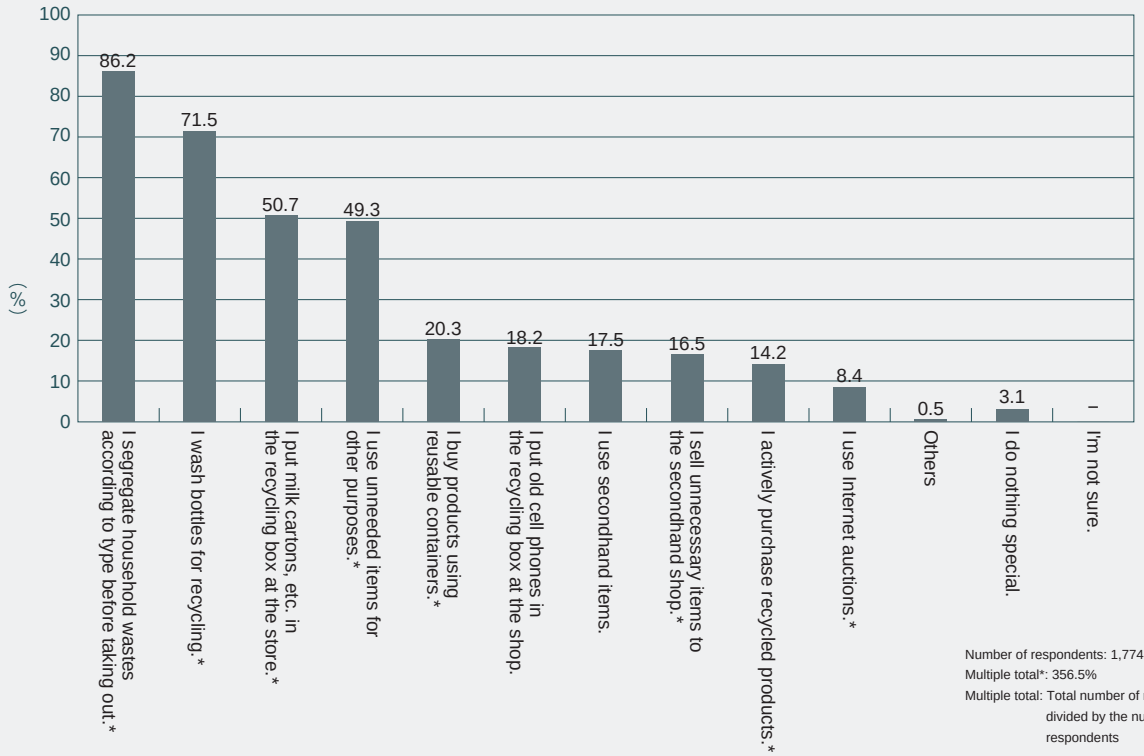


Number of respondents: 1,774
Multiple total*: 419.3%
Multiple total: Total number of responses divided by the number of respondents

Source: Created by the Ministry of the Environment based on Opinion Polls on Environmental Problems in FY2009 published by the Cabinet Office

* The sentence was partially abbreviated since it is too long.

Figure 1-17 Efforts for reusing and recycling wastes
(Breakdown of answers from respondents who said they are interested in waste problem (multiple answers allowed))

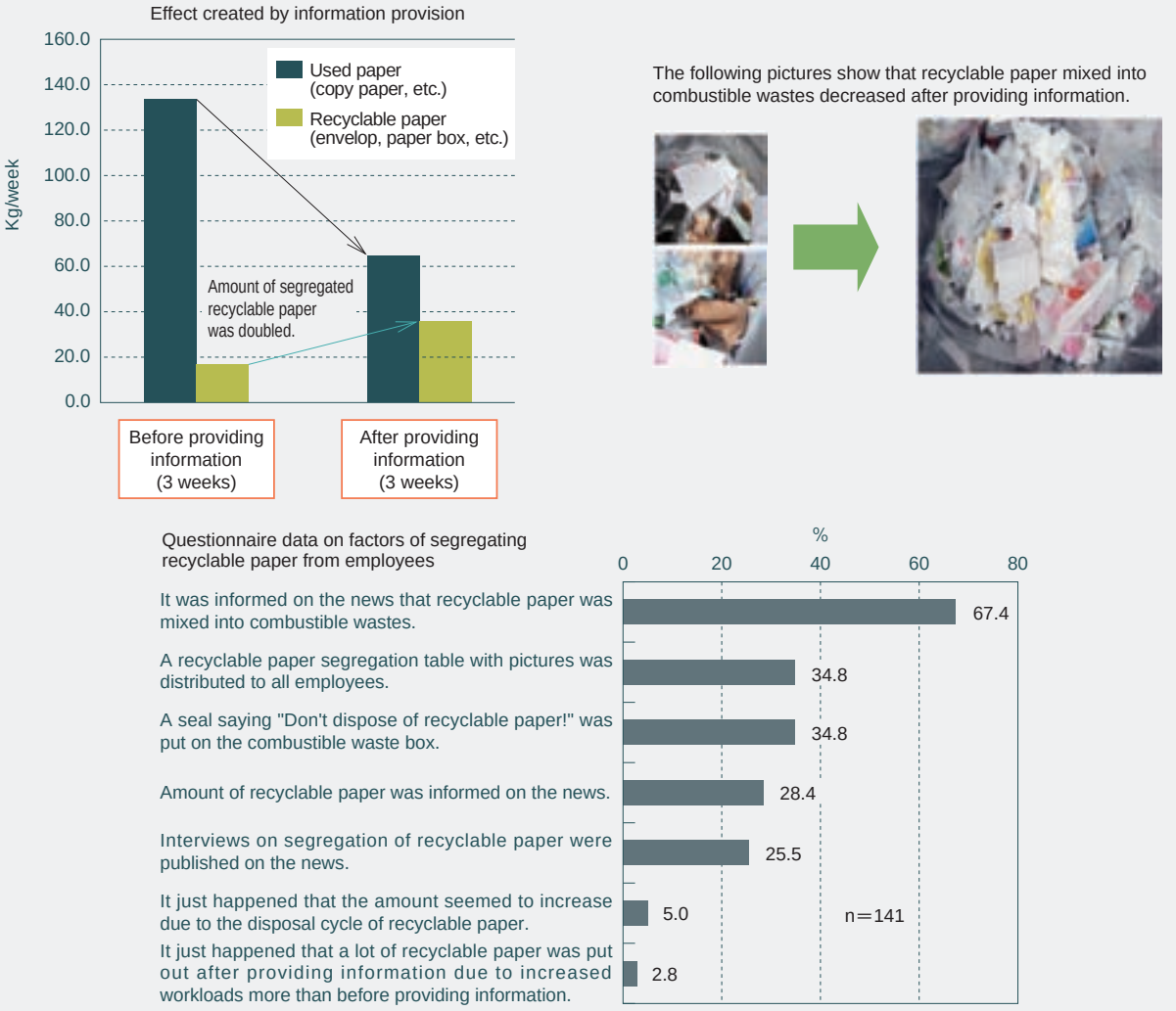


Number of respondents: 1,774
Multiple total*: 356.5%
Multiple total: Total number of responses divided by the number of respondents

Source: Created by the Ministry of the Environment based on Opinion Polls on Environmental Problems in FY2009 published by the Cabinet Office

*The sentence was partially abbreviated since it is too long.

Figure 1-18 Waste reduction effect created by information provision to consumers, etc.



Source: Ministry of the Environment

was calculated using POS data mainly from supermarkets and the reduced amount was estimated using the weight of each container. These data show that the reduction effect increases over time.

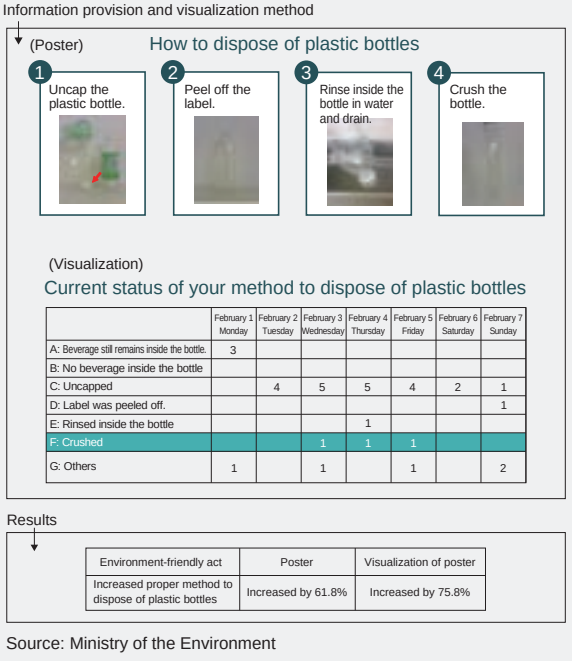
(3) Effect of introducing reusable cups in offices

Company N has removed disposable paper cups which were consumed at a rate of 4,000pcs a day and introduced reusable cups since September 2009. Materials and stacking efficiency are considered for the shape of the reusable cup and colorful cups are adopted so that employees can select in an enjoyable format. A collection box is placed next to the beverage server and collected reusable cups are washed all together. According to this company, with this effort, waste paper cups which used to be heavily generated everyday disappear and about 480kg of waste is reduced per month (Figure 1-21).

We need to fulfill our responsibility properly toward the establishment of a sound material-cycle society. This responsibility and division of roles are not limited to one generation but are taken by future generations.

As mentioned above, the efforts toward the establishment

Figure 1-19 Waste reduction effect created by information provision to consumers, etc. (plastic bottles)

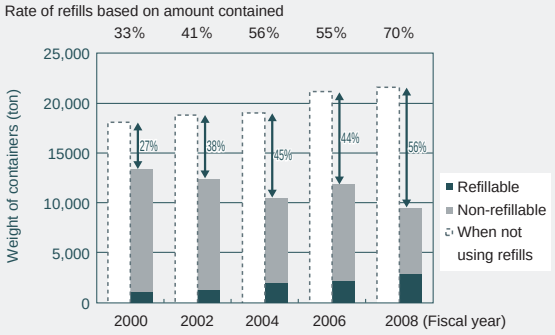


	February 1 Monday	February 2 Tuesday	February 3 Wednesday	February 4 Thursday	February 5 Friday	February 6 Saturday	February 7 Sunday
A: Beverage still remains inside the bottle.	3						
B: No beverage inside the bottle							
C: Uncapped		4	5	5	4	2	1
D: Label was peeled off.							1
E: Rinsed inside the bottle				1			
F: Crushed			1	1	1		
G: Others	1		1		1		2

Source: Ministry of the Environment

Figure 1-20 (1) Generation control effect created by the spread of refillable shampoo (including set)

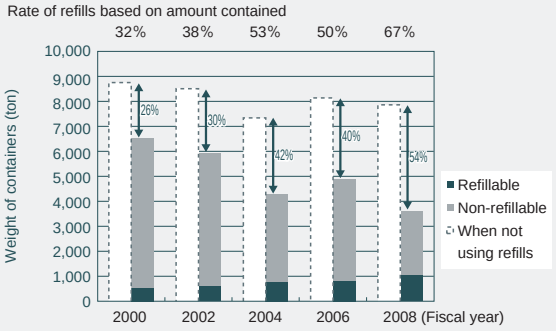
Extended estimate by using chemical industry statistics data multiplied by sales rate of POS data



Source: Analysis on Reduction and Reuse of Wastes: Systematization of Evaluation Methods and Application Study, 2009 Grant-in-Aid for Scientific Research on the Establishment of a Sound Material-Cycle Society

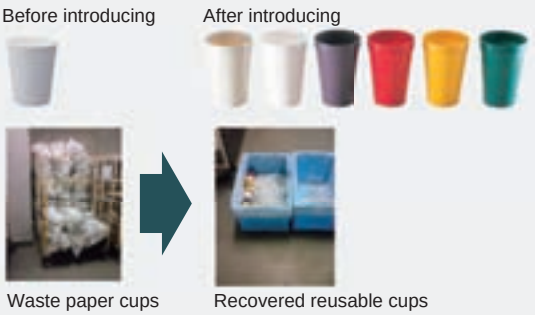
Figure 1-20 (2) Generation control effect created by the spread of refillable rinse (including set)

Extended estimate by using chemical industry statistics data multiplied by sales rate of POS data



Source: Analysis on Reduction and Reuse of Wastes: Systematization of Evaluation Methods and Application Study, 2009 Grant-in-Aid for Scientific Research on the Establishment of a Sound Material-Cycle Society

Figure 1-21 Effect of introducing reusable cups in offices



Source: Oracle Corporation Japan

of a sound material-cycle society have been advanced. However, in order to realize a sound material-cycle society, it is necessary to clearly understand effects of 3Rs and qualitatively improve the activities like 3Rs which lead to a sound material-cycle society. It is also necessary to propose a new image of sound material-cycle society and let all levels of people deal with cyclical activities with an easy mind based on the current socioeconomic circumstances. Furthermore, the sound material-cycle society business must take in each and every individual cyclical activity and lead to local revitalization or job security.

Willingly or not, our activities have a great impact on all options of future generations. We need to accelerate efforts toward a sound material-cycle society by crystallization of the wisdom and collaboration and cooperation based on mutual trust so that the next generation does not suffer social unrest caused by limited resources or waste problems. Let us start from the closest thing step by step (Table 1-3).

Table 1-3 Efforts toward establishing a sound material-cycle society in our daily lives

Clothes	Wearing kimonos passed down for generations
	Distribution of secondhand clothing by utilizing flea markets, etc.
	Making over old clothing
Food	Consumption of food with producer's name
	Purchasing and consumption of food in the order of expiration date
	Use of menu-driven cooking for wedding ceremonies, etc.
	Consumption of seasonal local productions
	Purchasing and use of chopsticks made of wood thinned from forests
Residence	Design of quality houses for long-term use
	Installation of photovoltaic facilities, installation of solar water heaters and use of high-performance insulation materials
	Utilization of chick blinds and water sprinkling
	Reform of buildings
How to spend leisure time	Ecotourism
	Use of reusable cups in the stadium
	Utilization of raw garbage generated from hotels and restaurants
Things	Long-term use of furniture and tools
	Purchasing of long-life products
	Utilization of leased and rental products
	Spread of repair and maintenance
	Active use of servicizing
	Bringing own shopping bags or wrapping cloths
	Do not receive unnecessary containers or packaging.
	Purchasing of environment-friendly products, e.g., recycled products and refills, and services (green products and services)

Source: Created on the basis of the Second Fundamental Plan for Establishing a Sound Material-Cycle Society published by the Ministry of the Environment

Column

Approaches of citizens and civilian organizations for establishment of a sound material-cycle society

There are now already several advanced approaches, and we now introduce some leading-edge cases of private organizations which were awarded the following prizes in fiscal 2009: 1) “Citizen-made Environment-Friendly Town Genki Grand Prix” sponsored by the Specified Nonprofit Activities Corporation, known as the Genki Net for Creating a Sustainable Society, 2) “Commendation for Contributors to Promote the Establishment of a Sound Material-Cycle Society by the Minister of the Environment” sponsored by the Ministry of the Environment and 3Rs Promotion Forum*1, 3) “Prize of the Minister of the Environment for 3Rs Promotion for Waste Containers and Packages” and 4) “Prize of the Minister of the Environment for Food Recycling Promotion” sponsored by the Ministry of Environment, 5) “Prize of the Prime Minister for Contributors to Promote Reduction, Reuse and Recycling” sponsored by the Reduction, Reuse and Recycling Promotion Council*2 and 6) “Prize of the Minister of Economy, Trade and Industry for Resource Recycling Technologies and System” sponsored by the Clean Japan Center.

*1 3Rs Promotion Forum

”3Rs Promotion Forum” established in January 2006 consists of members of local municipalities and private organizations, advances further social efforts on 3Rs with advanced technologies and promotes further 3Rs activities being vividly aware of change to a sound material-cycle society. In fiscal 2009, it jointly held “The 4th National 3Rs Promotion Convention” with the Ministry of the Environment and Chiba City and spread and enlightened 3Rs measures though events such as the exhibition. The 3Rs Promotion Poster Contest in which the Prize of the Minister of the Environment was given in the ceremony of the convention received about 10,000 posters created by elementary and junior high school students from all over Japan. That is, it also contributes to the promotion of environment education activities. During the 3Rs promotion month in October, the Ministry of the Environment and the Ministry of Economy, Trade and Industry jointly conducted “Environment-Friendly Shopping Campaign” to call for implementation of 3Rs activities such as purchasing of environment-friendly products and bringing of own shopping bags with the help of 47 prefectures, distributors and retailers. In addition, excellent efforts promoting the establishment of a sound material-cycle society and food recycling have been nominated for the commendation by the Minister of the Environment, survey researches on changes in Japan’s 3Rs system, technologies and experiences have been conducted and information on 3Rs has been provided nationwide through the Web site, mailing news, etc.

*2 The Reduction, Reuse and Recycling Promotion Council

Aimed at the promotion of recycling in cooperation between the administration, consumers and industries, “Recycling Promotion Council” was established in September 1991. Based on the fact that in order to deal with resource and waste problems in the future, it is necessary to establish a sound material-cycle society through 3Rs (Reduction, Reuse and Recycling), not only recycling, the name was changed to “Reduction, Reuse and Recycling Promotion Council” in June 2002 and it has enlightened and spread 3Rs movement.

1. The “Citizen-made Environment-Friendly Town Genki Grand Prix”

The Specified Nonprofit Activities Corporation, known as the Genki Net for Creating a Sustainable Society founded a “Citizen-made Environment-Friendly Town Genki Grand Prix” in fiscal 2001 and began to give the award to those entities promoting leading-edge activities.

(1) Grand Prix of fiscal 2009

Subject name: “A Project Creating New Values on Secondhand Clothes to Establish a Sound Material-cycle Society”

Group name: A nonprofit organization called WE 21 Japan (Kanagawa Prefecture)

Aimed at making independence support grant for women mainly in Asia, WE 21 Japan has operated “WE shop” for 10 years to sell clothes and miscellaneous goods contributed from all over the country utilizing local resources (people, things, money and knowledge). The number of shops in the prefecture has expanded to 53. About more than 500 tons of clothes are contributed annually. In order to spread “mottainai” concept and establish an intra-regional sound material-cycle society, its activities have developed into the creation of new values by remaking products or in collaboration with young artists.

2. The Commendation for Contributors to Promote the Establishment of a Sound Material-Cycle Society by the Minister of the Environment

The Commendation for Contributors to Promote the Establishment of a Sound Material-Cycle Society has been given to individuals, enterprises and organizations who have contributed remarkable achievements to the proper promotion of Reduction, Reuse and Recycling of waste generation since fiscal 2006 in order to contribute to the promotion of establishing a sound material-cycle society.

In fiscal 2009, five individuals, 12 organizations and 21 enterprises were given the commendation, and the commendation ceremony was conducted in the "4th National Convention for 3Rs Promotion" held in Chiba City in October 2009. Several efforts awarded are as follows:

(1) Promoter to establish a sound material-cycle society/Promoter of 3Rs Activities in fiscal 2009 (Organization)

Shimokawa Town Forest Cooperative (Shimokawa Town, Kamikawa County, Hokkaido)

The Shimokawa Town Forest Cooperative has promoted efforts to thoroughly use wooden biomass, e.g., a soil improvement agent made of carbonized wood offcuts generated from wood processing facilities and carbonized forest thinnings generated in the forestry, production of snow melting agent, development of aromatherapy products using remained fir offcuts and use of steam from wood offcuts generated by a laminated wood factory for heating of the factory.

(2) Promoter to establish a sound material-cycle society/Good-standing enterprise concerning 3Rs Activities in fiscal 2009 (Enterprise)

Tosu Kankyo Kaihatsu Ltd. (Tosu City, Saga Prefecture)

Tosu Kankyo Kaihatsu Ltd. has carried out multiple and chained utilization of resources such as methane fermentation power generation and composting of food resources generated from school lunch centers and offices in the city and drying of sludge in household wastewater treatment facilities.

3. The Prize of the Minister of the Environment for 3Rs Promotion for Waste Containers and Packages

The Prize of the Minister of the Environment for 3Rs Promotion for Waste Containers and Packages was established in fiscal 2006 to encourage and spread activities for 3Rs promotion for waste containers and packages, and exceptional efforts and products contributing to 3Rs promotion for waste containers and packages have been awarded every year in the following three categories: "regional collaboration and cooperation," "retail shop" and "products." In fiscal 2009, there were one winner of the highest award, one winner of outstanding award and two winners of incentive award in the "regional collaboration and cooperation", two winners of incentive award in the "retail shop" and one winner of the highest award and two winners of incentive award in the "products."

(1) Winner of the highest award in the "regional collaboration and cooperation"

Subject name: Establishment of a Collection System for R300ml Bottles (Miyagi System)
Group name: Miyagi Brewers Association (Sendai City, Miyagi Prefecture)

In order to reuse returnable bottles, dedicated collection boxes are required, but there were problems regarding inventory control and cost of the boxes. In this Miyagi System, such problems are all solved by making "R 300ml bottle-dedicated collection boxes" which are used only in the venous logistic area (flow from consumers to manufacturers) in the prefecture, and a system to promote the reuse of low-capacity bottles within the region has been established. In the first year (fiscal 2008), 220,000 R300ml bottles were collected and reused.

(2) Winner of the highest award in the "products"

Product name: "I LOHAS" (natural water) 520ml, the nation's lightest plastic bottle (12g)
Company name: Coca-Cola Japan Co., Ltd. (Minato Ward, Tokyo)

The company has succeeded in drastically lightening a plastic bottle by 40% compared to the conventional in-house product and developed the nation's lightest one (12g) by devising the bottle shape. The company has also succeeded in lightening a cap and label and achieved a substantial reduction of used amount of raw materials as a whole product. Since it is possible to reduce the volume substantially by squeezing and crushing the bottle after drinking, this can also contribute to the improved transport efficiency of collected resources.

4. The Prize of the Minister of the Environment for Food Recycling Promotion

By commending and introducing outstanding efforts made by food-related businesses, etc. concerning reuse and heat recovery of food resources and control of and reduction of food wastes to the whole country, the Ministry of the Environment has promoted, spread and enlightened further efforts to establish a sound material-

cycle society.
The highest award of the Prize of the Minister of the Environment for Food Recycling Promotion of fiscal 2009
Organization name: Aleph Inc. (Sapporo City, Hokkaido)

The company has established a recycling network in which raw garbage generated from “Bikkuri Donkey” which has about 130 hamburger restaurants throughout the country is fermented and dried by garbage disposers installed at each restaurant, composted at the partner farms and used for cultivating vegetables. It has also made draff generated from in-house beer factories into methane gas for power generation and made waste edible oil into biodiesel. These efforts are utilizing food wastes multilaterally, and a comprehensive well-balanced recycling system involving consumers has been established.

5. The Commendation for Contributors to Promote Reduction, Reuse and Recycling

The Reduction, Reuse and Recycling Promotion Council commends people who have taken the initiative in 3Rs (Reduction, Reuse and Recycling) and achieved significant performance, provides the Commendation for Contributors to Promote Reduction, Reuse and Recycling and gives eight related ministers’ prizes including prime minister’s one every year for the purpose of encouraging these activities.
The Prize of the Prime Minister of fiscal 2009
Winner: Sekisui House, Ltd. (Osaka City, Osaka)
Title: Continued Zero Emission Activities in Industrialized Housing – The Industry’s First Achievement of Zero Emission in Four Sectors –

The winner has achieved zero emission (100% recycling rate) in four sectors; production of housing materials, construction of new building, follow-through maintenance and housing improvement. Moreover, the company has a leading role in 3Rs promotion in the housing industry, e.g., it extends the life of housing and recycles housing with a new business which renovates and sells company-owned used houses introducing the latest specifications.

6. The Commendation for Resource Recycling Technologies and System

The Clean Japan Center publicly seeks, discovers and commends projects and efforts which contribute to the control of waste generation and reuse and recycling of wastes in order to encourage and spread those projects and efforts.
The Prize of the Minister of Economy, Trade and Industry of fiscal 2009
Winner: Kanuma Office, Sony Chemical & Information Device Corporation (Tochigi Prefecture)
Title: Ban on the Use of Organic Solvents in the Industrial Adhesive Tape Manufacturing Process with the Method of Ultraviolet Photopolymerization

The winner has improved the traditional adhesive tape manufacturing method and advanced the development of adhesive tape without organic solvents and succeeded in the mass production. As a result, not only organic solvents for solution polymerization or viscosity control but also heat quantity for drying became unnecessary, the tape can be manufactured with only electrical energy needed for ultraviolet irradiation and the energy for the manufacturing process has drastically reduced.

Column

Industry Efforts toward the establishment of a sound material-cycle society

1) Environmental Voluntary Action Plan

The Japan Business Federation has formulated “Environmental Voluntary Action Plan” on measures for wastes and advanced industry efforts by conducting follow-up survey every year.

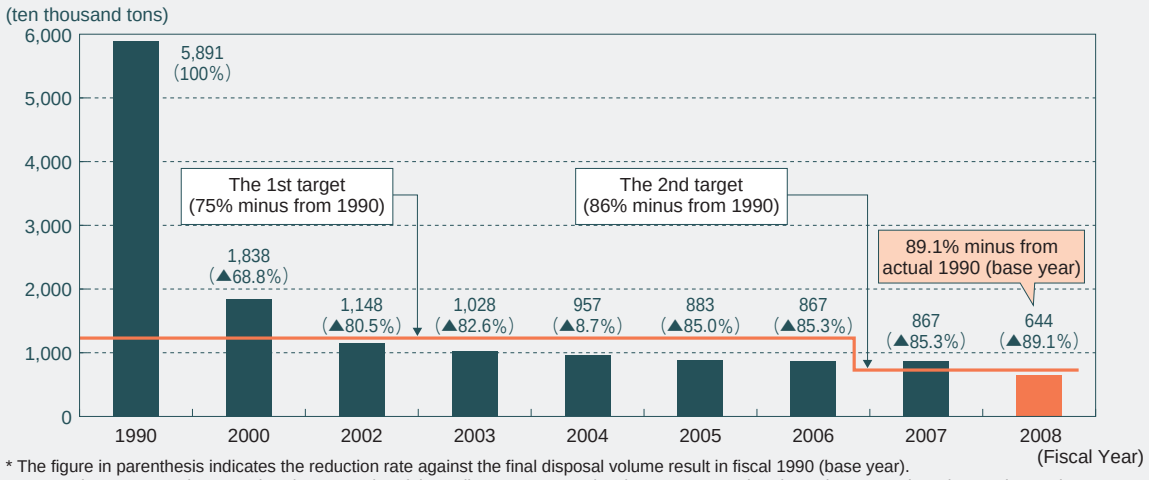
Since the recent industry efforts toward the establishment of a sound material-cycle society are not only measures for wastes but also various things such as 3Rs (Reduction, Reuse and Recycling), the Japan Business Federation expanded the Environmental Voluntary Action Plan in March 2007, i.e., the plan was reformed from “Measures for Wastes” to “Establishing a Sound Material-Cycle Society.”

At the same time, based on the fact that the conventional industry goal (final disposal volume of industrial wastes in fiscal 2010 decreases by 75% compared to that in fiscal 1990) had been achieved a year ahead of schedule for four straight years since fiscal 2002, the goal was revised that final disposal volume of industrial wastes in fiscal 2010 decreases by 86% compared to that in fiscal 1990 (the second target).

2) Follow-up survey in fiscal 2009

The Japan Business Federation conducts follow-up survey on the situation of efforts in each industry every year in order to promote voluntary industry efforts and increase transparency of the efforts. According to the result of follow-up survey in fiscal 2009, the final disposal volume of industrial wastes in fiscal 2008 was about 6.44 million tons, greatly decreased compared to

The final disposal volume of industrial wastes of all 31 industries



* The figure in parenthesis indicates the reduction rate against the final disposal volume result in fiscal 1990 (base year).
Source: The Japan Business Federation - Results of the Follow-up Survey Fiscal 2009, Concerning the Voluntary Action Plan on the Environment [Building a recycling society series]

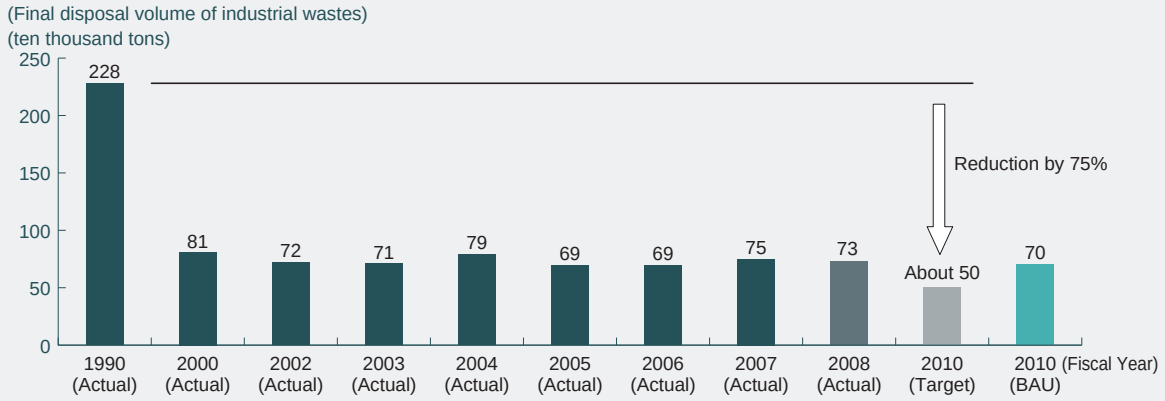
the previous fiscal year (about -2.23 million tons). This is equivalent to the level of decrease by about 89.1% compared to that in fiscal 1990 (about 58.91 million tons). That is, the industry goal (the second target) on the reduction of final disposal volume of industrial wastes was achieved two years ahead of schedule.

(1) Iron and steel industry

In the iron and steel industry, about 99% of the by-products involved in the production of steel are recycled, for use as construction materials, cement raw materials, etc. Regarding products, the recycling rate of steel cans is 85%, the top-ranking in the world, and iron scraps have been reused as raw materials by using converter furnaces and electric furnaces.

The final disposal volume in the iron and steel industry in fiscal 2008 declined to 730 thousand tons, with a decrease of about 20 thousand tons compared to the preceding year. In the iron and steel industry, iron and steel slag which is the greater part of the by-products has been certified as products, e.g., the standardization is promoted by using JIS, iron and steel slag is designated as a procurement item under the Law on Promoting Green Purchasing, etc. In addition, new demands such as utilization for ocean have been created. The industry has also promoted efforts toward the establishment of a sound material-cycle society as well as preventing global warming by trying to recycle dust and sludge generated during the iron and steel production within steel factories and making effective use of waste plastics generated from other industries or societies as raw materials of iron and steel.

Iron and Steel Industry

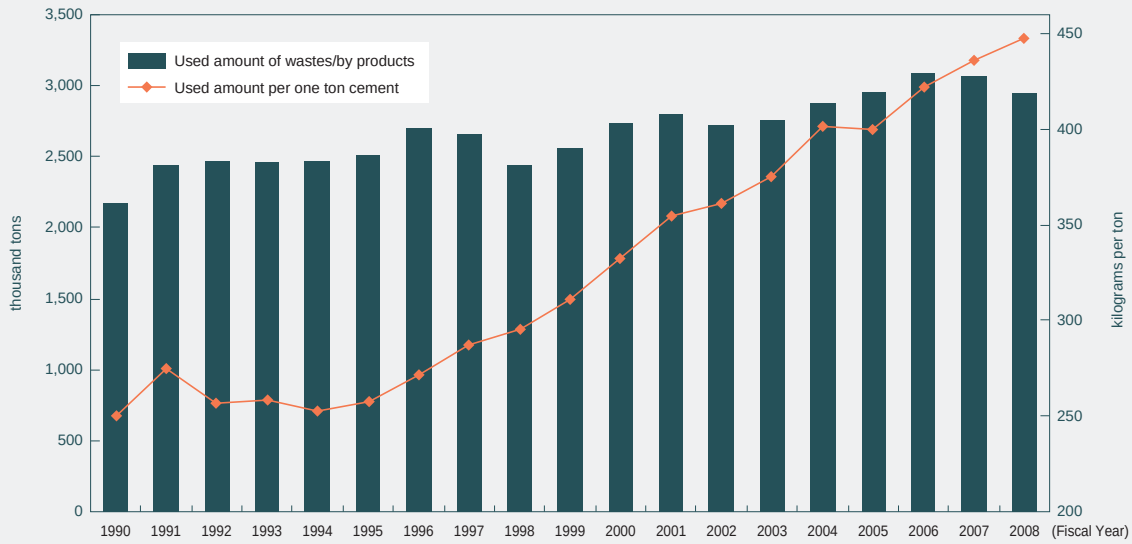


Source: The Japan Iron and Steel Federation

(2) Cement manufacturing industry

The cement industry, by making the most use of cement manufacturing processes, has accepted various wastes and by-products from other businesses such as the iron and steel industry (various types of slag), the electric utility industry (desulfurization plaster), the tire industry (scrap tires), the metal casting industry (casting sand)and local municipalities (sewage sludge and incineration ash). In fiscal 2008, about 294.67 million tons of wastes and by-products were accepted. The industry contributes to the saving of natural resources as well as prolonging the life of final disposal sites. In addition, not only industrial wastes but also municipal solid waste incineration ash has been accepted. Furthermore, municipal solid wastes have also been accepted since fiscal 2002, i.e., the industry also contributes to the life prolongation of final disposal sites for municipal solid wastes.

Cement Manufacturing Industry



Source: Japan Cement Association

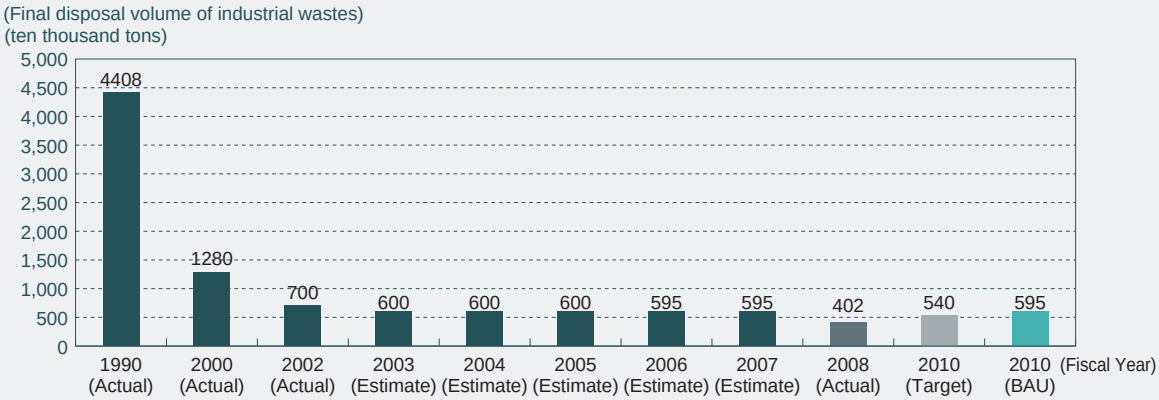
(3) Construction industry

In the construction industry, industry approaches and systems have been promoted in a positive manner due to the high proportion of construction wastes accounting for the generation and the final disposal volume of industrial wastes.

Construction wastes have different characteristics from general wastes since construction work takes place in a temporary construction site and the type generated and the waste generation differs at each site. Therefore, the Construction Eight Groups By-Products Countermeasures Conference has uniquely prepared and used common agreements and manifests which are suitable for the characteristics of the construction industry.

Moreover, the recycling of asphalt/concrete mass has been considerably advanced for making effective use of resources toward the establishment of a sound material-cycle society, and the industry will further promote efforts on construction sludge, construction materials, mixed construction wastes, etc. in the future.

Construction Industry



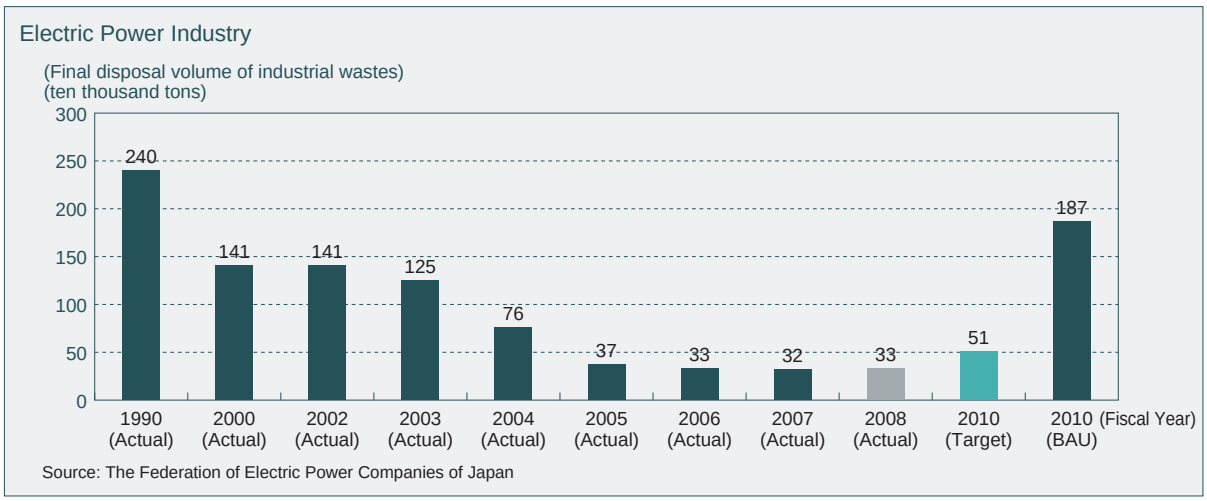
Source: Japan Federation of Construction Contractors, Japan Civil Engineering Contractors Association, Inc. and Building Contractors Society

(4) Electric power industry

The electric power industry has promoted voluntary and active efforts for environment-related issues placing those efforts as the top priority, e.g., “Environmental Action Plan in the Electric Power Industry” was announced in November 1996.

The volume of waste generation of the electric power industry in fiscal 2008 was 10.71 million tons, an increase on the previous year. On the other hand, the volume of recycled wastes in the same year was 10.37 million tons. As a result, the recycling ratio was 97%, i.e., the high target ratio of 97% was achieved continuing from the previous year.

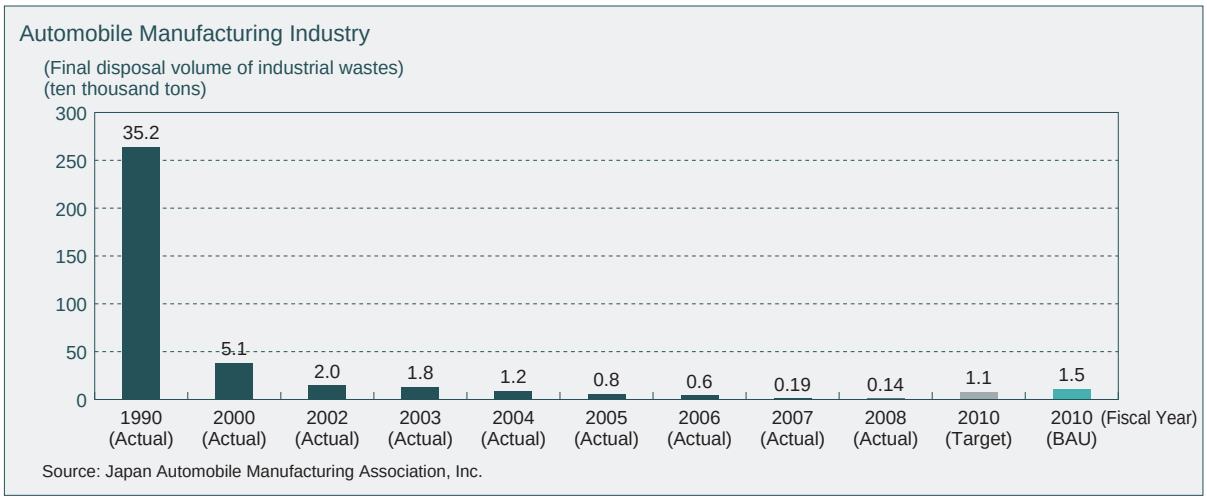
Toward the realization of a sound material-cycle society, the industry has made efforts for the achievement of the goal, “Trying to achieve a recycling ratio of more than 95% in fiscal 2010,” besides decreasing the final disposal volume of industrial wastes.



(5) Automobile manufacturing industry

In the automotive manufacture industry, the volume of waste generation in fiscal 2008 was about 2.079 million tons, with a decrease of 580 thousand tons compared to the previous year. On the other hand, the volume of recycled wastes was about 2.077 million tons, resulting in a 99.9% recycling ratio of wastes, i.e., wastes have been effectively used as resources.

As an effort toward the reduction in the final disposal volume, the industry has mainly promoted the generation control and recycling of waste plastics. The industry has also promoted 1) the reduction in wastes generated from the manufacturing process or when scrapping the car, 2) the increase in the adoption of recyclable materials, 3) the indication of parts' materials and 4) the consideration in the ease of disassembly from the planning stage.

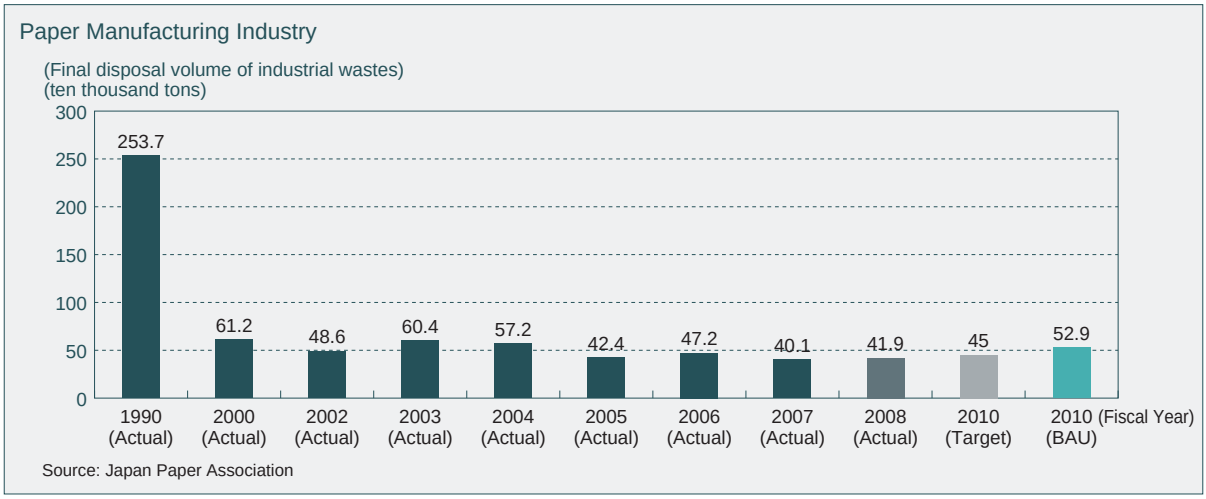


(6) Paper manufacturing industry

In the paper manufacturing industry, the waste generation in fiscal 2008 has decreased to 6.102 million tons, 730 thousand tons less than the previous year, due to the reduction in paper sludge, etc. associated with production dropping caused by stoppage and disposal of paper machines after Lehman's fall. On the other hand, the final disposal volume was 2.363 million tons, reduced by 453 thousand tons from the previous year.

Since organic sludge is incinerated as a fuel and the collected thermal energy is reused in the factory, the industry has set its own target, the proportion of effective heat use volume to generated heat (recycled heat volume + used heat volume) since fiscal 2007 and actively promoted the efforts toward the establishment of a sound material-cycle society (the effective heat use ratio in fiscal 2008 was 93.1%).

The industry has also contributed to the reduction in landfill volume of wastes by recycling used materials generated from other industries such as the construction industry and using waste materials and RPF (solid fuel) as fuels.



Section 2. Current Situation of the generation, circulative use and disposal of wastes

With a central focus on those waste and recycling activities that are working for the establishment of a Sound Material-Cycle Society, here is a detailed description of the situation of the generation, circulative use and disposal of wastes, national countermeasures and individual activities, as well as international measures for the establishment of a Sound Material-Cycle Society.

1. The material flow of our country

(1) The material flow of our country

As a first step to the establishment of a Sound Material-Cycle Society, it is essential to know the amount of resources we are collecting, consuming and dumping.

Moreover, in order that a Sound Material-Cycle Society can be established, the Second "Fundamental Plan for Establishing a Sound Material-Cycle Society (a Cabinet decision in March 2008, hereafter called the "Fundamental Plan for a Sound Material-Cycle Society") has set new goals for the indexes concerning the "Inlet", "Outlet" and "Cycle" of materials (Table 2-1). This refers to the three different sections of the material flow (meaning the flow of materials and goods), where appropriate and balanced measures for reduction, reuse, recycling and disposal of resources should be developed.

It has also set goals for effort indexes to measure the progress of efforts toward the establishment of a Sound Material-Cycle Society (Table 2-2).

In the following, based on the Material Flow Accounts (MFA) used for the understanding of the entire flow of materials in the economy of our country, we are going to give an overview of the total flow of materials, the problems highlighted in our analysis and the present situation of the goals of the material flow set-up in the Fundamental Plan for a Sound Material-Cycle Society.

A. A general view of the material flow of our country

When we examine the material flow of our country in Fiscal 2007, there were 1.8 billion tons of total material input, and 710 million, about a half, were used in the construction of buildings and infrastructures. Moreover, 180 million tons were exported as products, 510 million tons were used in the energy consumption and manufacturing process and 590 million tons of wastes were generated. Out of these items, 240 million tons were subjected to cyclical use, equivalent to 13.5 % of the total material input amount (Figure 2-1).

Details of the material flow of our country are as follows.

(a) Considering the "Total Material Input Amount"

The total material input amount for fiscal 2007 was 1.8 billion tons, which was 84% of the 2.14 billion tons for fiscal 2000.

Table 2-1 Numerical targets of the Second Fundamental Plan for Establishing a Sound Material-Cycle Society in 2015 (material flow indexes)

Index	Target
Resource productivity*1	420,000 yen/ton
Recycling rate*2	14 to 15%
Final disposal volume	23 million tons
Resource productivity except input of soil and stone resources	770,000 yen/ton
GHG emissions derived from waste sector (collaboration with efforts toward low-carbon society)	Decrease in CO_2 emissions: 7.8 million tons*3

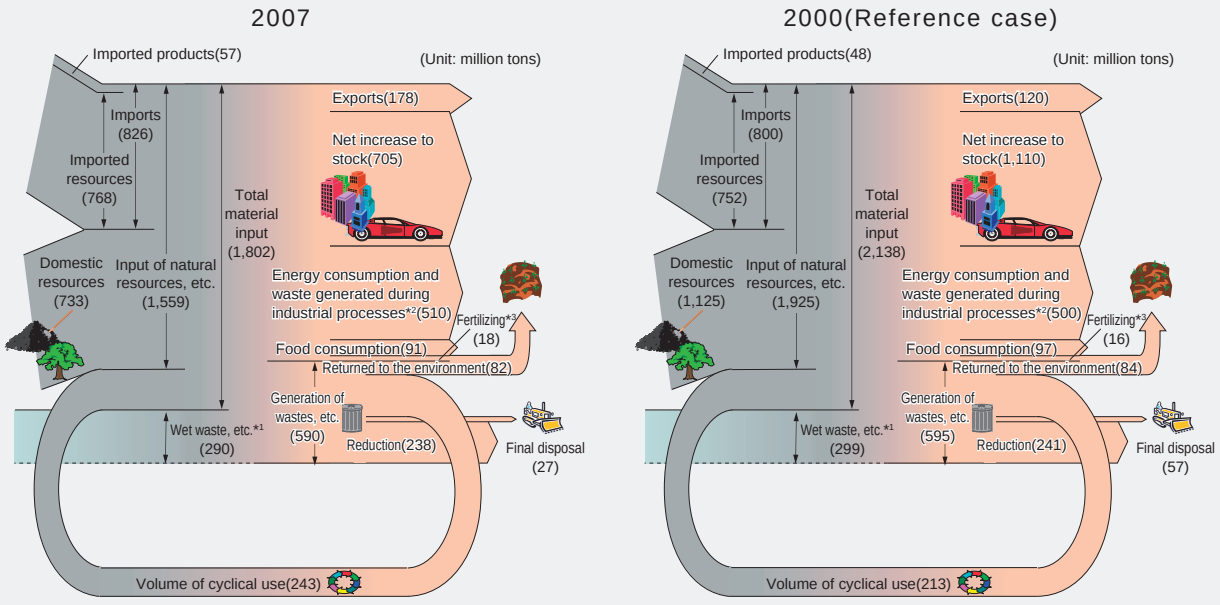
*1: Resource productivity = GDP / Input of natural resources, etc.
*2: Recycling rate = Recycling volume / (Recycling volume + Input of natural resources, etc.)
*3: Target year is 2010.
Source: Ministry of the Environment

Table 2-2 Numerical targets in the 2nd Fundamental Plan for Establishing a Sound Material-Cycle Society In 2015 (effort indices)

Classification	Indicators	Targets
(1) Reducing wastes, etc.		
a. Reducing municipal waste	(a) Daily waste generation per person*1	Approx. 10% reduction from the FY 2000 level
	(b) Daily domestic waste generation per person	Approx. 20% reduction from the FY 2000 level
	(c) Total volume of business waste	Approx. 20% reduction from the FY 2000 level
b. Reducing industrial waste	Final disposal volume of industrial waste	Approx. 60% reduction from the FY 2000 level (Approx. 80% reduction from the FY 1990 level)
(2) Changes in awareness of and attitude toward a sound material-cycle society		
a. Have an awareness of waste reduction, cyclical use, and green purchasing		Approx. 90% (as the target result of questionnaire survey)
b. Take specific action for waste reduction, cyclical use, and green purchasing		Approx. 50% (as the target result of questionnaire survey)
(3) Promoting sound material-cycle society business		
a. Promoting green purchasing	Implementing organizational green purchasing	All local governments Listed companies*2: Approx. 50% Unlisted companies*3: Approx. 30%
b. Promoting environmental business management	Number of acquisitions of Eco Action 21 Certificates	6,000
c. Expanding sound material-cycle society business market	Market scale	Approx. twice the level of FY 2000

*1: Daily waste generation per person was calculated using the volume of municipal waste as the sum of wastes collected through scheduled collection and group collection, and wastes carried in.
*2: Companies listed in the First and Second Sections of the Tokyo Stock Exchange, Osaka Securities Exchange and Nagoya Stock Exchange
*3: Unlisted companies with 500 or more employees, and business establishments
Source: Ministry of the Environment

Figure 2-1 The Material Flow of Our Country



Note 1: Wet waste, etc.: Water taken in socioeconomic activities and water content included in waste (e.g. sludge, animal waste, raw sewage, waste acid, or waste alkali); and input of earth and sand as a result of economic activities (e.g. sludge generated by the mining, construction and waterworks industries and slag from the mining industry)
Note 2: Energy consumption and waste generated during industrial processes: An estimation of water, etc., included in raw materials and released during the manufacturing processes of industrial products
Note 3: Fertilizing: Sprayed fertilizer is not actually accumulated and will be decomposed in the soil; therefore, particularly it has been taken out from the net increase to stock.
Source: Ministry of Environment

(b) "Natural Resources Input Amount"

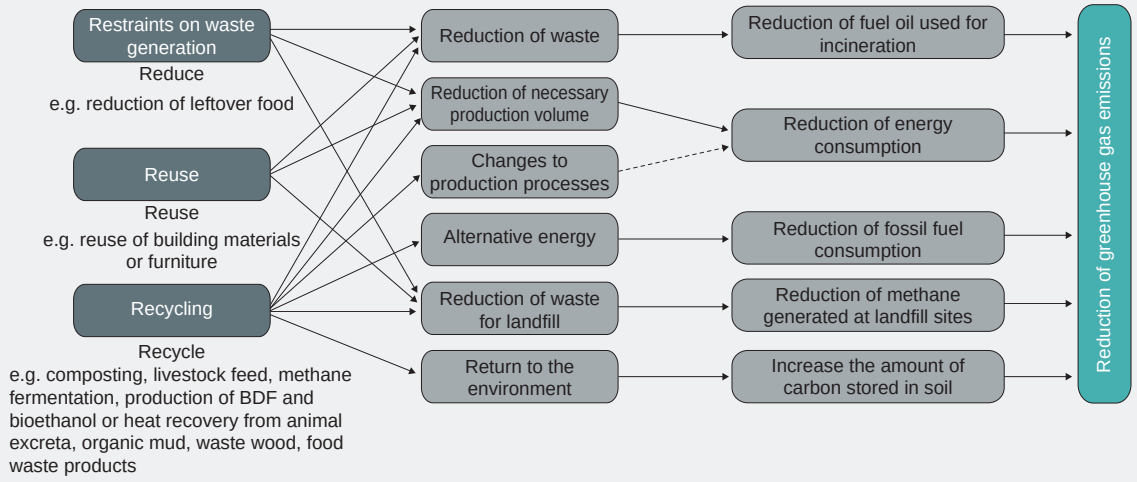
The natural resources input amount means the total amount of natural resources derived from domestic production or imports plus the amount of imported products; they are also known as the Direct Material Input (DMI).

The natural resources input amount estimated for fiscal 2007 was 1.56 billion tons as a total of domestic production and import (730 million tons domestic production + 830 million tons imports). This is about 81% of the 1.93 billion tons for fiscal 2000 (1.13 billion domestic production + 800 million tons imports).

The factor of reducing the natural resources input amount is mainly the decrease in soil and stone resources input amount and would mainly reflect the change in major government contracts. Since it is also possible that this is associated with the long-term change in Japan's industrial structure, the further analysis is needed.

Moreover, the natural resources input amount does not include the hidden flow, or the amount of material other than the targeted material collected/excavated or generated

Figure 2-2 The Relation of Reduction of the Amount of Waste Disposal with the Amount of Greenhouse Gas Emission



Source: Ministry of the Environment

as wastes in the process of collection of the resource. It is thought it will be necessary to improve Resource Productivity, considering the TMR that includes the hidden flow and the energy resources used at each stage of resource collection, and to further lower the collection level of resources from the present rate. As TMR data relies mostly on estimates, we are going to accumulate know-how through international opinion exchanges.

(c) Amounts of inlet flow and outflow of the resources and products

The amount of materials in the form of products and goods exiting our country is about one fifth, compared with the amount of resources and products entering. The burden of nitrogen-compounds released into our public water areas and underground water, for example, is much more than other countries are experiencing and so huge because enormous amounts of nitrogen have been imported in the form of food and feeding stuff; the situation is such that the natural nitrogen circulation in those areas might have been destroyed. From the international viewpoint, this can be called a state where proper material circulation has not been secured.

(d) "Cyclical use amount"

The amount of cyclical use is 240 million tons, while the Total Material Input Amount is 1.8 billion tons. The amount of cyclical use is presently measured by weight, however, it is also necessary to understand the recycling situation by adding the qualitative point of view, including investigations on the impact of the environmental burden from the point of life-cycle and recycling with higher value-added (or, closed recycle).

(e) Amount of waste generation

The amount of waste generation still remains at a high level. It is important in terms of ensuring proper material circulation to hold down the generation of waste and eventually the discharge into the environment.

(f) Amount of energy consumption

Global warming derived chiefly from the carbon dioxide emissions of fossil fuel resources is a critical problem which may have a serious effect on the living habitat of human beings. As the amount of energy consumption of our country is as high as 510 million tons or so, further promotion of energy consumption streamlining is inevitable.

(g) The reduction of Greenhouse Gas from waste sector

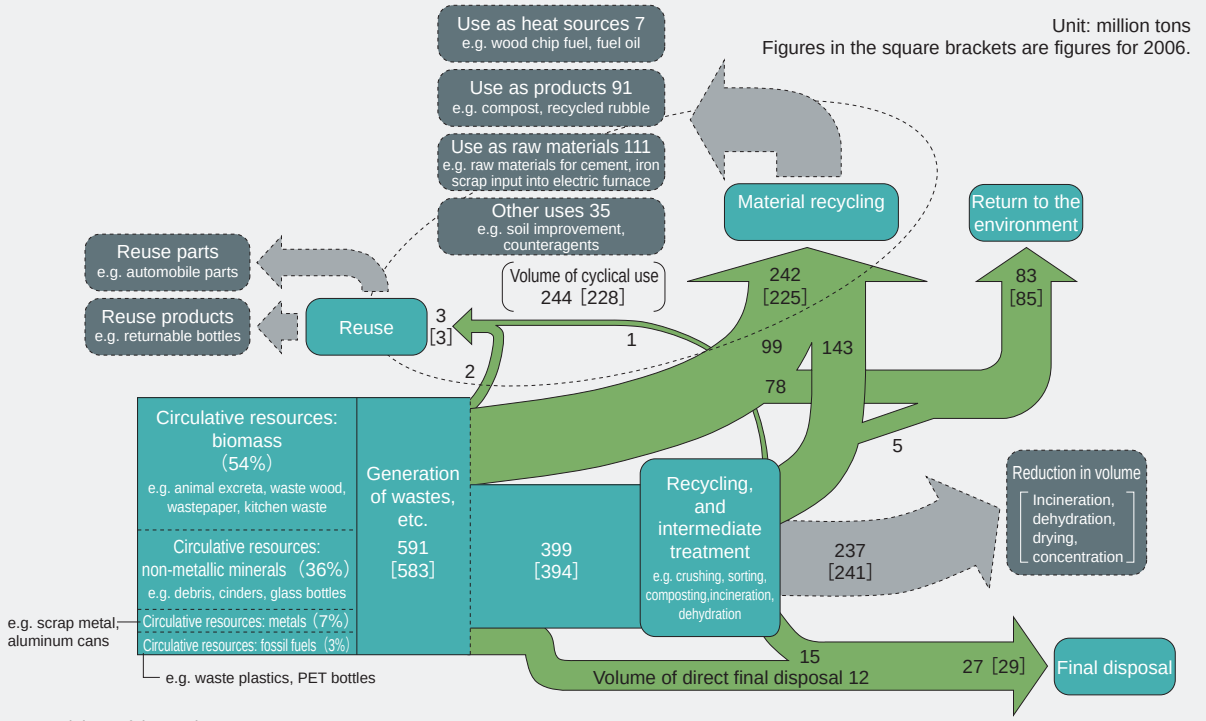
The "Kyoto Protocol Target Achievement Plan" has set objectives concerning waste-related measures to reduce the emissions of Greenhouse Gas, and it aims to reduce about 7.8 million tons (carbon dioxide equivalent) in Year 2010. The Greenhouse Gas emission derived from wastes mounted to 40.83 million tons (carbon dioxide equivalent) in Year 2007, which is about 3% of the total amount of Greenhouse Gas emissions (1.374 billion tons carbon dioxide equivalent) of Japan.

The reduction amount of Greenhouse Gas emission by recycling of waste to reused fuel and by electric power generation using waste was about 15 million tons (carbon dioxide equivalent) in Year 2006, therefore it is reasonable to assume that the amount of emissions derived from wastes is starting to decrease when those Greenhouse Gas emissions mentioned above are deducted (Figure 2-2).

The waste reduction has a large effect on the reduction of the amount of Greenhouse Gas emission. The reduction of waste generation contributes to the decrease of Greenhouse Gas generation accompanied by incineration and land fill. It is important to reuse and recycle until nothing is left of any wastes, and to make the most efficient use of the energy contained in flammable waste that must be either incinerated or land filled.

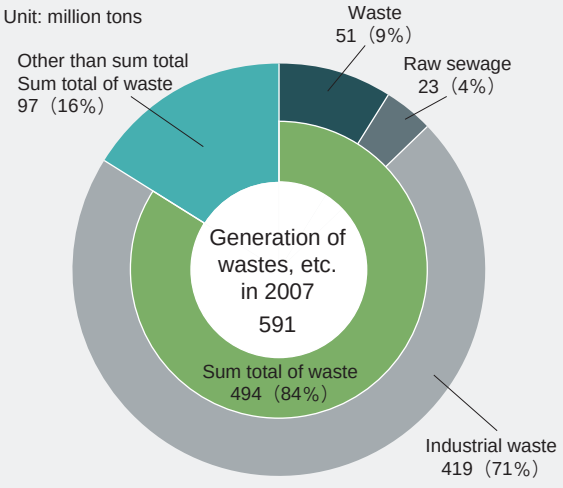
Concerning the power generation facilities/heat utilizing facilities of private businesses, monetary support has been given for the improvement of higher efficient energy utilization which will contribute as a counter-measure to global warming. Having also executed demonstration experiments for the suspension of white smoke prevention equipment, we have made the results well known, because improvements to the operation/maintenance methods in waste dis-

Figure 2-3 The Flow of the Circulative Resources of Our Country in 2007



Source: Ministry of the Environment

Figure 2-4 The Amount of Generation of Wastes, etc. in 2007



Source: Ministry of the Environment

posal facilities can contribute to counter global warming. We also chose and publicized an activity in a model area engaged in the utilization of Biomass derived from wastes, giving high marks for the value of the whole system.

Moreover, in the industrial waste disposal business segment, in November 2007, the National Federation of Industrial Waste Management Association drew up environmental voluntary action plans to reduce the Greenhouse Gas emitted along with the processing of industrial waste; the plans also gave the target to be attained and the measures for achievement of the target (revised in March 2008).

It is important to continue making advances both for the establishment of a Sound Material-Cycle Society and for a low carbon society.

B. General view of circulative use in our country

Next, the current state of the circulative use of our country in fiscal 2007 is shown in the Figure 2-3. It shows that 590 million tons of waste are generated annually, 240 million tons are put to circulative use by reuse or recycling, 240 million tons are reduced by incineration or dehydration; this leaves only 30 million tons for final disposal.

Details are shown in the following.

(a) Flow of the circulative resources of our country in fiscal 2007

a. Generation stage

In fiscal 2007, the amount generated as waste was 590 million tons. Among these, municipal wastes accounted for 70 million tons (50 million tons of garbage and 20 million tons of night soil), industrial wastes were 420 million tons and other by-products, and other wastes were 100 million tons (Figure 2-4).

When examined according to characteristics, biomass chiefly consisting of organic sludge and human waste, livestock excrement, and animal or plant residue is by far the largest with 320 million tons, non-metal mineral type materials (soil and stone) consisting of nonorganic polluted sludge and slag accounts for 210 million tons, metal consisting of iron and non-ferrous metal is 40 million tons, and fossil type materials consisting of plastics and paraffin liquid is 20 million tons.

b. Natural reduction stage

The amount of wastes was 80 million tons, which were exhausted as by-products deriving from cattle production and agriculture, such as livestock excrement, rice straw, wheat straw and rice husk, and later returned to farmland as fertilizer.

c. Recycling/reusing stage

The amount of circulative resources reused in fiscal 2007 was 3 million tons; this does not include resources sold as used commodities.

The reused articles referred to are made up of reused tires and returnable bottles such as beer bottles and milk bottles.

d. Circulation and recycling stage

The total of circulative resources reused directly and resources reused after intermediate processing or recycling processing were carried out, amount to 240 million tons circulative resources being recycled. This means 41% of generated wastes were recycled: this figure includes waste oil and waste wood reused as fuel.

The most typical items are 60 million tons of debris that are reused as alternative material of nonmetal mineral resources (reclaimed broken stone or reclaimed asphalt mixture) and 50 million tons of slag that are similarly reused as alternative materials of nonmetal mineral resources (raw materials and fuels of cement and road bed materials).

e. Heat recovery (energy recovery)

When considering the amount of wastes subject to heat recovery during incineration disposal, the major part of municipal waste is used for heat recovery in the form of electric power, steam or heated water, and the electric power generated by the recovered heat in the incineration facilities amounted to 6.9 billion kWh. (Refer to Section 2, 4(2))

(b) Characteristics of utilization of each circulative resource

It is important also to check the breakdown of circulative resources, for example, the increase or decrease of nonmetal mineral type resources such as soil and rocks may have a large impact on the total amount of natural resources input in the material flow, because such resources represent the major part, also the increase of biomass type resources is desirable when they are collected with careful consideration to the environment so that sustainable use is possible. The breakdown of the total amount of natural resources input by characteristic and by nation are shown in the Figure 2-5 and Figure 2-6.

In addition, the characteristics of how the circulative resources generated in our country are cyclically used are shown as follows in four classifications (Figure 2-7).

a. Biomass type circulative resources

The biomass type circulative resources account for 54% of the entire amount of waste generation. Their contents are livestock excrement, organic sludge derived from water processing in the sewage works or manufacturing, wood wastes derived from construction sites and the manufacturing process of wood products, and household kitchen waste (garbage).

Because biomass type circulative resources contain a high proportion of water and organic substances, it is characteristic that the rate of reduction volume during incineration and dehydration is high, with the natural reduction rate to generation being 26%, the cyclical use rate 17%, the volume reduction rate 55% and a final disposal rate of 3%. The major usage of cyclical use is for compost and feed in agriculture. Besides this, polluted mud is used for brick, and wood waste for reproduction wood board. The input amount of biomass type resources in our country is 190 million tons; the amount of cyclical use is 80 million tons, therefore, the proportion of the cyclical use in the total material input of biomass type resources is 22%.

When looking to increase the cyclical use of biomass type circulative resources and decrease the amount of final disposal, it is useful to consider the following factors, the expansion of acceptance of fertilizer and feed in the agriculture area, the transformation to energy in methane fermentation facilities, and the promotion of the reduction of residual substances by incineration.

b. Nonmetal mineral type circulative resources

Nonmetal mineral (soil and rocks) type circulative resources account for 36% of the entire amount of generation of wastes. Their contents are, debris from construction sites, slag from the iron and steel manufacturing/non-ferrous metal/cast metal industries, non-organic sludge from construction sites and water purification plants, and glass bottles from households and restaurants.

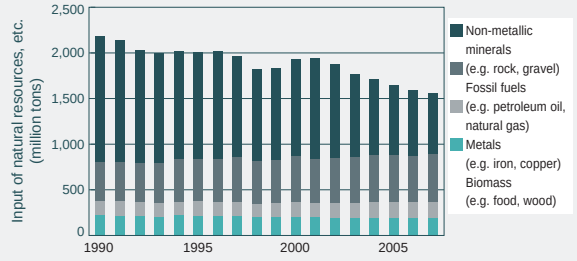
As nonmetal mineral type circulative resources are inorganic material with a stable nature, about 70% are recycled; the cyclical use rate compared to generation is 67%, the reduction rate is 26% and the final disposal rate is 7%, but on the contrary, however, the final disposal rate is rather high. The major cyclical use is in civil engineering and construction such as materials for road base and cement. The input amount of nonmetal mineral type resources in our country is 670 million tons, the amount of cyclical use is 140 million tons, therefore, the proportion of cyclical use against the total material input of nonmetal mineral type resources is 18%.

When looking to increase the amount of nonmetal mineral type circulative resources and decrease the amount of final disposal, factors to consider are expanding the acceptance of such materials in civil engineering and construction e.g. road base material and cement material as fertilizer. However, demand for civil engineering and construction is and will be on a declining trend in the future, it will be necessary to examine the expansion of cyclical use in other areas and to contemplate the examination of reduction strategies for final disposal.

c. Metal type circulative resources

Metal type circulative resources account for 7% of the entire amount of generation of wastes. Their contents are, scrap material from construction sites, scrap metal from iron and steel manufacturing/non-ferrous metal industries, metal processing scrap from machinery and appliances manufacturing industries, and such used household products as metal cans and home electric appliances.

Figure 2-5 The Breakdown of Natural Resources, etc.



Source: Ministry of the Environment

Figure 2-6 Natural Resources: Breakdowns of Domestic Extraction and Imports

Source: Ministry of the Environment

As metal type circulative resources are stable in nature and contain almost no water and collection/recycling systems have been established for many years; a characteristic point is the rate of cyclical use is relatively high, with a cyclical use rate compared to generation of 98%, and the final disposal rate is 2%. Typical usages are electrical furnace iron manufacturing, and metal resources input for non-ferrous metal refining. The input amount of metal type resources in our country is 180 million tons; the amount of cyclical use is 40 million tons, therefore, the proportion of cyclical use against the total material input of metal type resources is 19%.

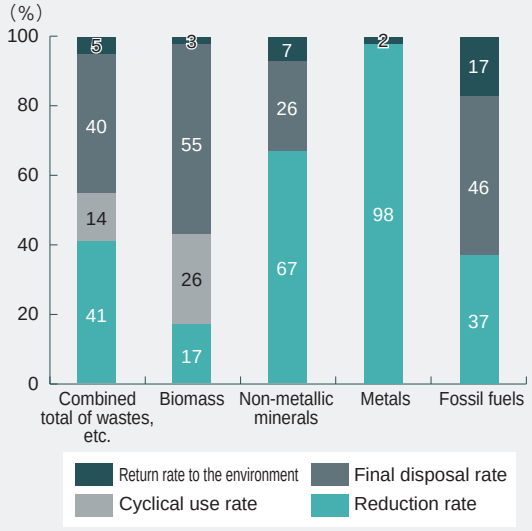
When looking to increase the amount of metal type circulative resources and decrease the amount of final disposal, factors to consider are the promotion of the collection and recycling of those metals in products which have not been used for cyclical use.

d. Fossil type circulative resources

Fossil type circulative resources account for 3% of the entire amount of generation of wastes. They consist of waste oil from various manufacturing industries, plastics processing waste from plastic article manufacturing industries and machinery and appliance manufacturing industries, and used plastic articles from households and various industries.

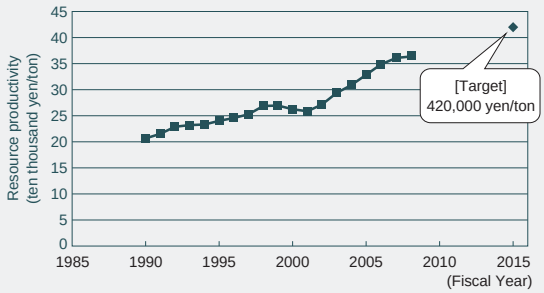
As the characteristic point of fossil type circulative resources is a relatively high reduction rate in the incineration process, the cyclical use rate compared with generation is 37%, the reduction rate is 46% and the final disposal rate is 17%. Typical use of these circulative resources is as build-

Figure 2-7 Cyclical Use and Disposal Status of Wastes, etc. (fiscal year 2007)



Source: Ministry of the Environment

Figure 2-8 Changes to Resource Productivity



Source: Ministry of the Environment

ing materials for construction and as a reducing agent of iron ore and an alternative to coke in the shaft furnaces of the iron and steel industry. Occasionally they are recycled as plastics material, however, as presently different grade resins and additives are contained in cyclical used waste plastics, they are mostly used by cascading (downsize recycling). The input amount of fossil type resources in our country is 520 million tons; the amount of cyclical use is 10 million tons, therefore, the proportion of cyclical use against the total material input of fossil type resources is 1%.

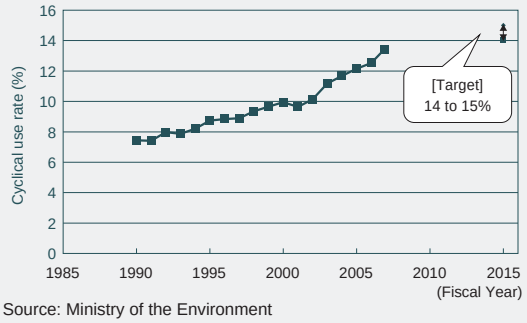
When looking to increase the amount of fossil type circulative resources and decrease the amount of final disposal, factors to consider are to expand the collection of used products and to develop engineering to enable recycling, through the drafting of legislation, such as the “Law for the Promotion of Sorted Collection and Recycling of Containers and Packaging”(abbreviated to: Containers and Packaging Recycling Law) and the “Law for the Recycling of Specified Kinds of Home Appliances”(abbreviated to : Home Appliances Recycling Law).

C. Target setting for the material flow index of our country

The Second Fundamental Plan for Establishing a Sound Material-Cycle Society has set new targets for the three indices concerning the “Inlet”, “Outlet” and “Cycle” of the material flow.

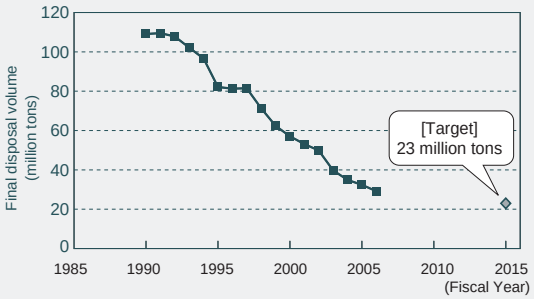
The target year of each index is assumed to be fiscal 2015.

Figure 2-9 Changes to the Cyclical Use Rate



Source: Ministry of the Environment

Figure 2-10 Changes to the Final Disposal Volume



Source: Ministry of the Environment

The latest achievements for each index are as follows.

1) Resource productivity (equals to GDP divided by the input of natural resources and others)

The target for resource productivity in the Year 2015 has been set as 420 thousand yen per ton. (Double the index of Year 1990; 210 thousand yen per ton; a 60% improvement on Year 2000; 260 thousand yen per ton.) In Year 2007 it was about 361 thousand yen per ton (Figure 2-8).

2) Cyclical use rate (equals the amount of recycling utilization divided by the amount of circulative utilization + input amount of natural resources and others)

The target of the recycling utilization rate in the Year 2015 has been set as about 14 to 15 %. (An 80% percent improvement from the index for Year 1990; about 8% for that year; a 40 to 50% improvement on Year 2000; about 10 % for that year.) Year 2007 was about 13.5% (Figure 2-9).

3) The amount of final disposal (equals the amount of land filling of waste)

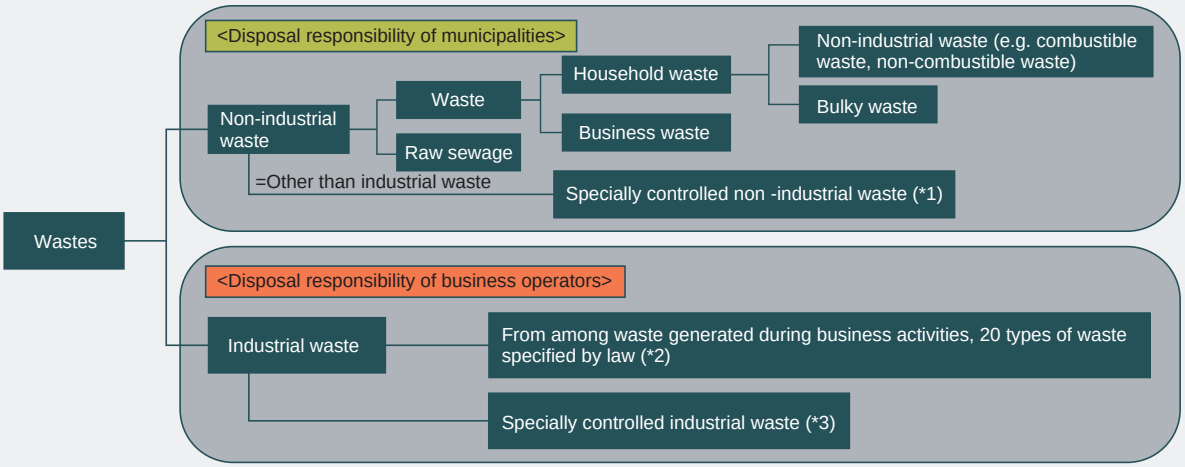
The target for final disposal in the Year 2015 has been set at around 23 million tons. (An 80% decrease on Year 1990; about 110 million tons for that year; a 60% decrease from Year 2000; about 56 million tons for that year.) Year 2007 was about 27 million tons. (Figure 2-10)

(2) Amount of waste generated

A. Classification of wastes

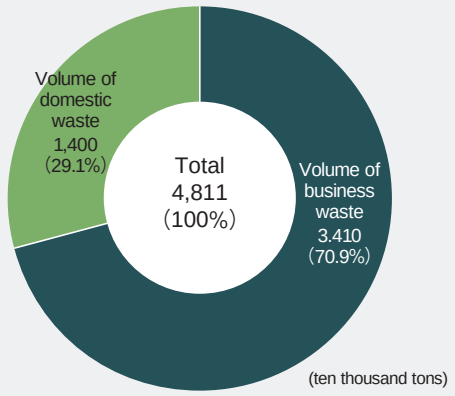
The “Waste Management and Public Cleaning Law” defines “wastes” as: unwanted materials or items which are no longer used personally or which are not delivered for value, and such materials or items can be described as, for example, garbage, bulky waste, burnt residue, polluted mud, feculence such as night soil and waste, either in solid or liquid form. Radioactive material and radioactive pollut-

Figure 2-11 Segregation of Wastes



Note 1: Waste that may be harmful to human health and the living environment or is explosive, toxic, or infectious
Note 2: Cinders, sludge, waste oil, waste alkali, waste plastics, waste paper, waste wood, waste fiber, animal offal and plant waste, solid animal waste, waste rubber, scrap metal, waste glass, waste concrete and ceramic, slag, debris, animal excreta, carcasses, soot and dust, any other items that are processed to dispose of the above 19 types of industrial waste, and imported waste
Note 3: Waste that may be harmful to human health and the living environment or is explosive, toxic, or infectious
Source: Ministry of the Environment

Figure 2-12 Proportion of Wastes Generated by Daily Life-related Wastes and Business-related Wastes (fiscal year 2008)



Note: Volume of group collection was classified into domestic waste.
Source: Ministry of the Environment

ants are not covered by the law, and are exempted from the terms of the law.

Wastes are divided into two broad classification; municipal wastes and industrial wastes. Industrial wastes refer to the twenty legally specified types of wastes derived from business activities and wastes imported from abroad.

Municipal wastes refers to wastes other than industrial wastes and consist mainly of night soil and domestic refuse or garbage, including business type wastes generated from offices and restaurants. (Figure 2-11).

B. Status of municipal wastes (garbage)

The amount of total emission of wastes*1 in fiscal 2008 was 48.11 million tons (decreased by 5.3% compared to the previous fiscal year), or 1,033 grams daily per person (decreased by 5.1% compared to the previous fiscal year).

*1 “Amount of total emission of wastes” =“Amount of collected wastes + amount of carried in wastes + amount of collected wastes by groups”

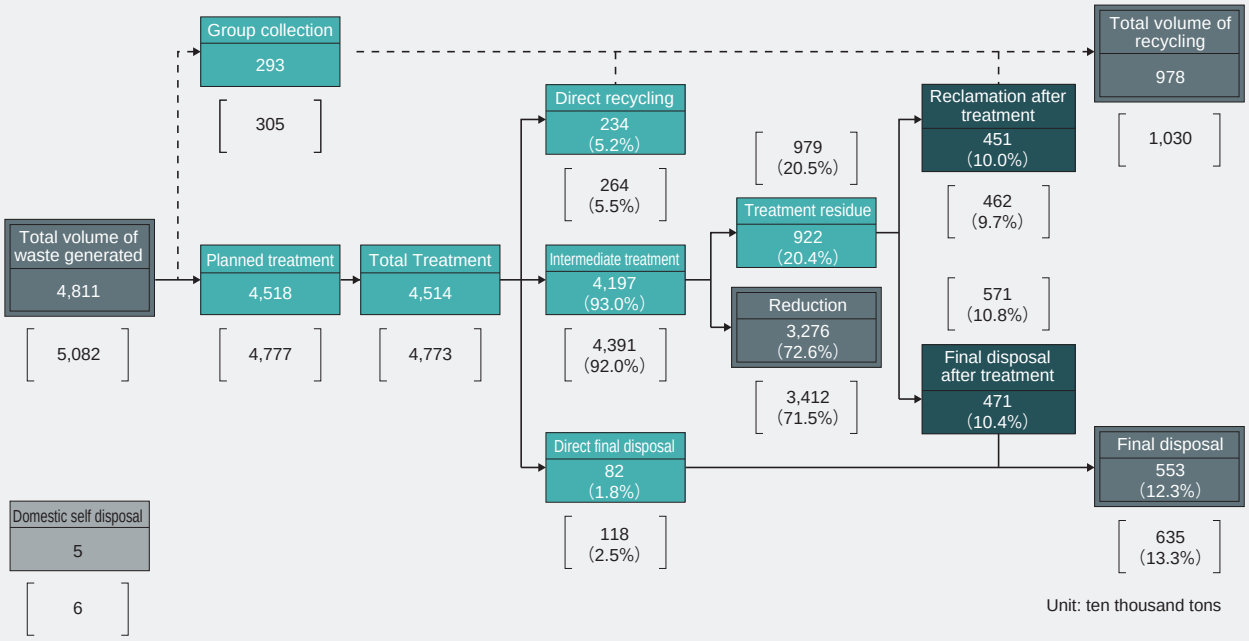
When considering the proportion of wastes generated by daily life-related wastes and business-related wastes, the former accounts for 34.10 million tons (about 70%) and the latter for 14 million tons (about 30%) (Figure 2-12).

Wastes can also be divided into three broad categories; wastes recycled to resources directly or by intermediate processing, wastes whose volumes are reduced by incineration or other methods, and wastes directly landfilled with no processing (Figure 2-13).

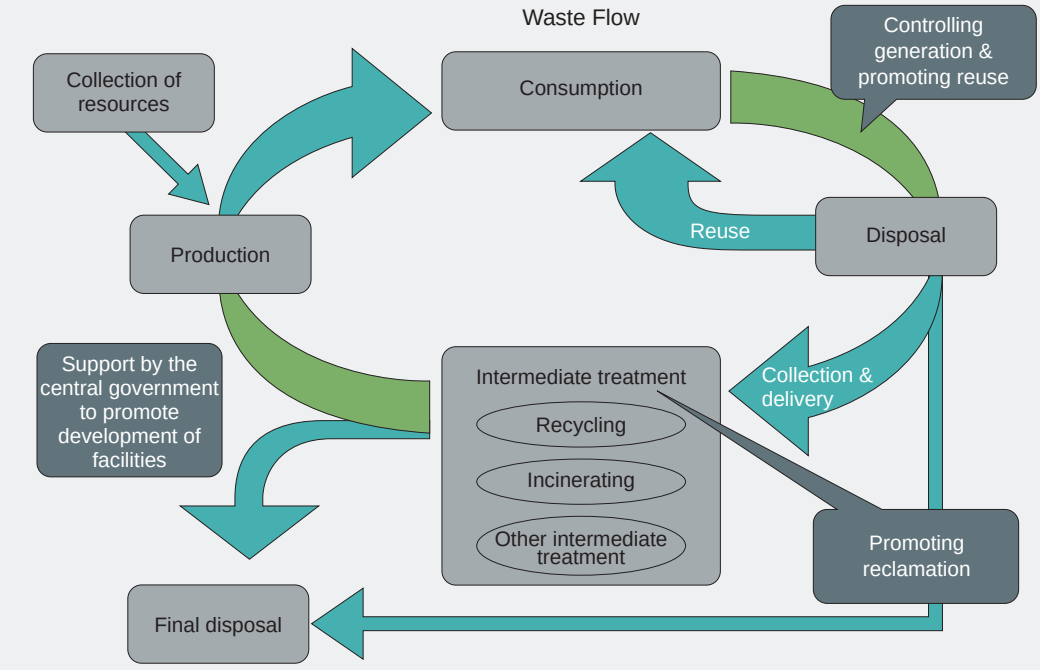
Wastes subject to any intermediate processing account for 41.97 million tons, about 87% of the total amount of disposed wastes. Intermediate processing facilities include, incineration facilities, recycling facilities, high-speed composting facilities, animal feed manufacturing facilities and methane recovery facilities. Out of the wastes brought into intermediate processing facilities, 4.51 million tons of wastes are reclaimed after processing, and when added to wastes directly recycled and collected by groups, the total amount of recycled wastes accounts for 9.78 million tons. The recycling ratio compared to the total of processed wastes increased from 5.3% in fiscal 1990 to 20.3% in fiscal 2008. With regard to the amount of intermediate processing, wastes directly incinerated account for 35.74 million tons (a direct incineration ratio of 79.2% of the whole of processing), and the reduced amount of wastes in intermediate processing, mainly by incineration, accounts for 32.76 million tons (equivalent to 75.6% of all processing). Recently incineration facilities have added electric power generators and heat supply facilities and the efficient use of heat is increasing in many places.

Meanwhile, the total amount of the wastes directly disposed of, incineration waste (such as soot and incinerated ash) and disposal waste from intermediate processing facilities equals the amount sent for landfill in final disposal sites. The amount of the wastes directly disposed of is almost 0.82 million tons, which equals 1.7% of the amount of total emissions. When the incineration and disposal waste are included, the total amount of final disposal is 5.53 million tons, and the amount of all categories is decreasing year on year.

Figure 2-13 Waste treatment flow in Japan (fiscal year 2008)



Note 1: Due to an error in planning or other factors, the volume of planned treatment does not equal the total volume of waste treated (= volume of intermediate treatment + volume of direct final disposal + volume of direct recycling).
Note 2: Figures in each item are rounded off; therefore, the total may not equal the breakdowns.
Note 3: Figures in the square brackets are figures for fiscal year 2007.
Note 4: "Direct recycling" refers to waste that is received directly by reclaiming operators and not through facilities for recycling; this item was newly established in the fiscal year 1998 survey, and until fiscal year 1997 it would seem to have been recorded in the "intermediate treatment, e.g. recycling" category.



Source: Ministry of the Environment

C. Status of municipal wastes disposal - night soil

The population using flush toilets in fiscal 2008 was 115.71 million, with 86.03 million connected to the public sewage systems, and 29.68 million using Johkasou (indibidual waste water treatment facilities) (14.27 million Johkasou users had a “Gappei-shori Johkasou” which treat domestic waste water such as kitchen and toilet wastewater). 11.82 million non-flush toilets of whom 11.3 million made use of planned collection systems and 520,000 used private processing.

The amount of night soil and individual wastewater treatment facility sludge (the planned collection system) generated by about 30 percent of the total population (the total of using non-flush toilets and Johkasou systems) accounts for 24.44 million kiloliters, and is decreasing yearly. The major content is water; however, the value is huge when simply compared to the amount of regular wastes. By counting one kiloliter as one ton 22.96 million kiloliters of night soil and individual wastewater treatment facility sludge are being processed at human-waste treatment plants, 40,000 kiloliters in composting facilities and methane recovery facilities, 1.35 million kiloliters by discharge into sewage systems, 40,000 kiloliters used on farmland and 50,000 kiloliters in other ways.

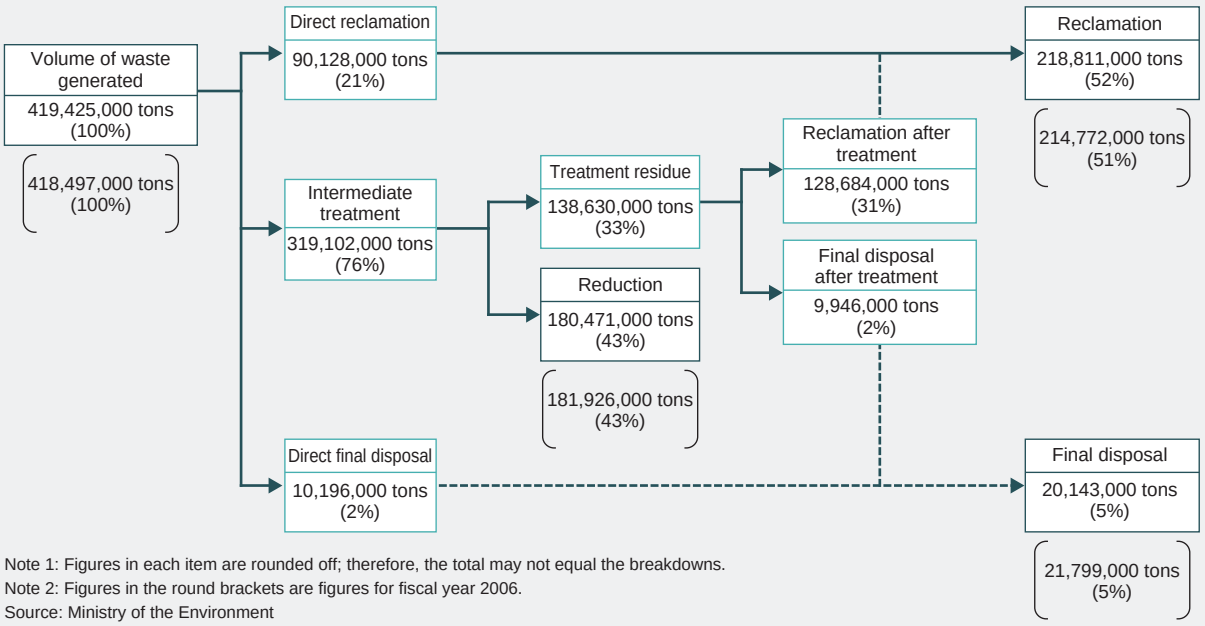
Please note, sewage sludge, generated by sewage treatment plants in the process of sewage disposal are counted as an industrial waste.

D. Status of industrial wastes disposal

The amount of total emission of industrial wastes across-the-country in fiscal 2007 was 419.43 million tons.

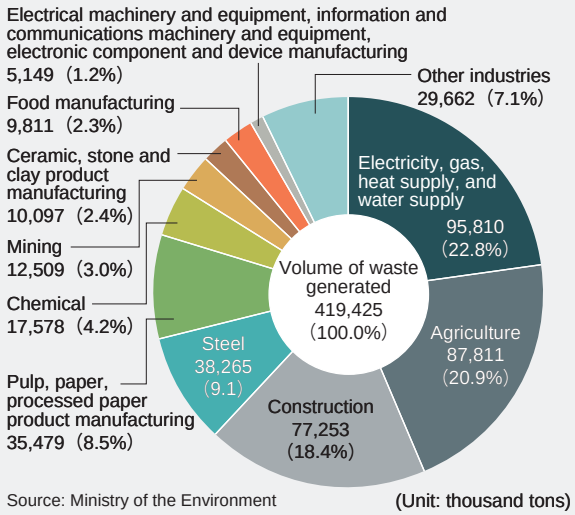
About 218.81 million tons (52% of the total amount) were reclaimed, about 180.47 million tons (43% of the total amount) were reduced by intermediate processing, and 20.14 million tons (5% of the total amount) were subject to final disposal. The amount of reclaiming refers to the total

Figure 2-14 Industrial waste treatment flow (fiscal year 2007)



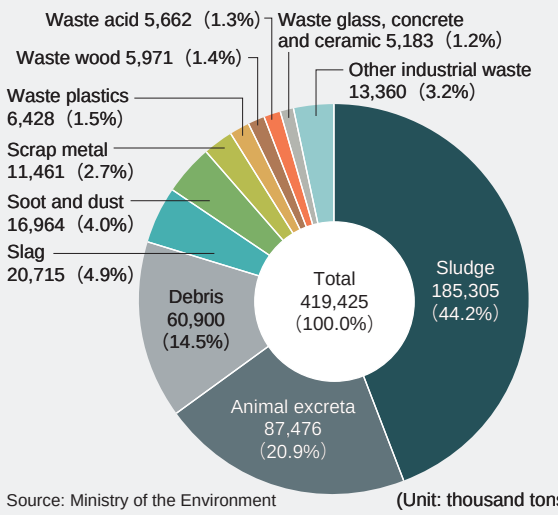
Note 1: Figures in each item are rounded off; therefore, the total may not equal the breakdowns.
Note 2: Figures in the round brackets are figures for fiscal year 2006.
Source: Ministry of the Environment

Figure 2-15 Industrial waste generation by industry (fiscal year 2007)



Source: Ministry of the Environment (Unit: thousand tons)

Figure 2-16 Industrial waste generation by type (fiscal year 2007)



Source: Ministry of the Environment (Unit: thousand tons)

amount of directly reclaimed wastes plus recycled wastes generated from processed wastes produced by intermediate processing. The amount of final disposal refers to the total amount of wastes directly sent for final disposal plus wastes sent to final disposal after intermediate processing (Figure 2-14).

When examining generated amounts of industrial wastes by business type, the major categories are in descending order, electric power generation, gas supply, heat supply, water supply, agriculture, and construction business. The top three businesses account for about 60% of the total generated amount (Figure 2-15).

When examining the generated amounts of industrial wastes by waste type, the largest category is polluted sludge with 40% of the total, followed by livestock excrement and debris; together they account for about 80% of the total generated amount. (Figure 2-16)

(3) Status of circulative use of wastes

A. Container and packaging (glass bottles, PET bottles, plastics containers and packaging, paper containers and packaging)

The results of the sorted collection of wastes and material recycling into saleable products, based on the Containers and Packaging Recycling Law are shown in the Figure 2-17. When examining the state of implementation in fiscal 2008, concerning the wastes targeted by the law, more than 90% percent of the municipalities are carrying out sorted collection, except for paper and plastics. The number of municipalities that have started the sorted collection of plastic containers and packaging, paper containers and packaging, and cardboard boxes added in the Law in fiscal 2000, is increasing steadily.

(a) Glass bottles

The amount of glass bottle production in fiscal 2008 was 1.387 million tons; generally there is a decreasing manufacturing trend. It is reasonable to assume consumer preference shifted from glass bottles which are mostly heavy and breakable, to other containers such as PET bottles which come in a wide variety of shapes and designs, and are light and easy to carry.

Please note, a target has been set to increase the utilization ratio of cullet in the manufacturing of glass containers to 91% before fiscal 2010, based on the “Law on Promotion of the Effective Utilization of Resources” (abbreviated: The Resources Effective Utilization Promotion Law.)

Glass bottles are categorized as one-way bottles for single use, and returnable bottles for repeated use after cleaning. The wasted one-way bottles are crushed to make cullet, which is recycled and used as materials for new bottles. Cullet is fragmented glass and the utilization ratio of cullet indicates the ratio of the amount of cullet compared with the amount of new materials in the manufacture of glass (Figure 2-18).

In terms of the environment, returnable bottles are worthy of a mention, as when the entire life-cycle from manufacturing to collection and disposal is considered, and with the possibility of repeated use, they demonstrate a definite energy-saving effect, and are containers effectively contributing to measures to counter global warming.

(b) PET bottles

The growth rate of PET bottle sales was increasing until fiscal 2007, but took a downward turn in fiscal 2008.

The practice of recycling of PET bottles started with the beginning of sorted collection by municipalities in accord with the Containers and Packaging Recycling Law enforced in April 1997, and the collection ratio (the amount of the sorted collection compared with the amount of manufacturing of plastics used for PET bottles) in fiscal 1997 was only 9.8%; it had risen to 49.6 %, in fiscal 2008. When the amount of PET bottles collected chiefly by business units other than the municipal entities are included, the collection ratio accounts for 77.9%, according to the research conducted by the PET Bottles Recycling Promotion Association, a group of manufacturers of soft drink and PET bottles.

The number of municipalities that have adopted sorted collection systems increased from 631 in fiscal 1997 to 1,765 in fiscal 2008, about 98.1% of the total of municipalities.

Moreover, the recycling of bottles used for food (chiefly for beverages) which are then used again as a bottle containing food is commonly called “bottle to bottle,” and this technology (chemical recycling) was put to practical use in fiscal 2003. (Figure 2-19 and 2-20)

(c) Plastic containers and packaging

Plastic containers and packaging were newly targeted by the Containers and Packaging Recycling Law in fiscal 2000, and the beginning of segregated collection by the municipalities.

Sorted collection in fiscal 2008 was 672,000 tons, and it is expected this figure will increase as recycling systems become more common. The number of municipalities making the sorted collections in fiscal 2008 was 1,308, about 72.7% of the total of municipalities.

(d) Paper containers and packaging

Paper containers and packaging were newly targeted by the Containers and Packaging Recycling Law in fiscal 2000, along with plastic containers and packaging, and sorted collection by the municipalities began.

Sorted collection in fiscal 2008 was 84,000 tons, and the number of municipalities carrying out sorted collection is limited to only 644. The reason is this figure contains those municipalities that handle independent sorted collection of paper containers and packaging. This number does not include the collection of paper containers and packaging, even if sorted collection is actually taking place by making use of the collection routes of newspaper and magazines of the municipalities, which had already been implemented prior to the enforcement of the law.

(e) Steel cans

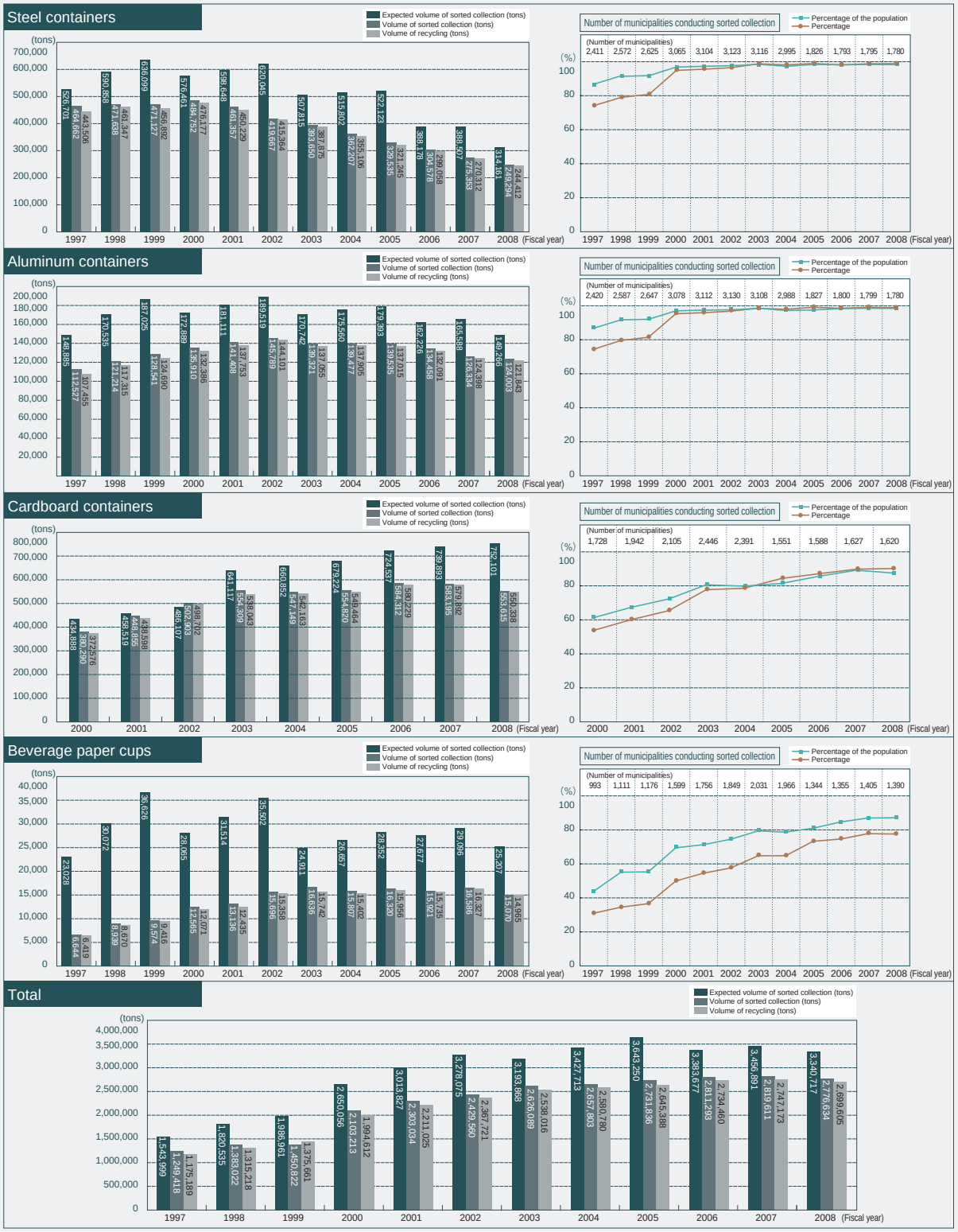
In recent years, the consumption weight of steel cans has dropped; 772,000 tons in fiscal 2008. The recycling rate (ratio of the amount of recycling, the amount collected and recycled as iron scrap, to the consumption weight) is 88.5% in fiscal 2008, according to the Steel Can Recycling Society (Figure 2-21).

The background to this high figure is possibly the acceptance framework of steel cans has been firmly established.

(f) Aluminum cans

The consumption weight of aluminum cans has remained stable in recent years; 299,000 tons in fiscal 2008. The recycling rate (ratio of the weight of reclamation to the con-

Figure 2-17 Results of sorted collection and recycling based on the Law for the Promotion of Sorted Collection and Recycling of Containers and Packaging



*Totals may not agree due to rounding.
*Plastic containers and packaging mean entire plastic containers and packaging including white trays.
*The number of municipalities conducting sorted collection for white tray indicates the number of those conducting sorted collection for white tray only.
*Japan's population as of the end of March 2009 was 127.86 million people.
*The number of municipalities as of the end of March 2009 was 1,800 including Tokyo's 23 wards.
*"Expected annual volume of sorted collection by fiscal year", "Annual volume of sorted collection by fiscal year" and "Annual volume of recycling by fiscal year" include the volume disposed of by municipalities.
Source: Ministry of the Environment

sumption weight) is 87.3% in fiscal 2008, according to the Aluminum Can Recycling Society. (Figure 2-22). In the same year, the recycling rate of collected aluminum cans to manufacture new cans (commonly known as “can to can”) was 66.8 %.

The background to this high figure is possibly the acceptance framework of aluminum cans has been firmly established, in the same way as steel cans.

(g) Paper cartons

Paper cartons (except for cartons containing aluminum) are used as containers for milk, soft drinks, and alcoholic beverages. The practical amount of sorted collection of paper cartons in fiscal 2008 was 15,000 tons, with 1,390 municipalities carrying out sorted collection for the year.

The amount of paper carton shipments for beverage in fiscal 2008 was 211,000 tons, with 189,000 tons used in domestic households, 10,000 tons in vending machines and restaurants, and 12,000 tons in school lunches.

The total amount of collections by municipalities, at counter shop and group collections were 57,000 tons; the recycling usages are for the manufacture of toilet paper, tissue paper and pressboard.

(h) Cardboard

Cardboard was newly targeted by the Containers and Packaging Recycling Law in fiscal 2000 and sorted collection by the municipalities began. The actual result of sorted collection in fiscal 2008 was 554,000 tons.

The number of municipalities carrying out sorted collection accounted for 1,620, which is substantially more than in the case of plastic containers and packaging and paper containers and packaging, which were made targets of the Containers and Packaging Recycling Law at the same time. The background to this high figure is possibly the acceptance framework of cardboard has been firmly established.

According to the Cardboard Recycling Association, used cardboard can be recycled into new cardboard about seven times.

The consumption weight of cardboard was 8.612 million tons in fiscal 2008 and collected waste cardboard rose to 8.527 million tons, the recycling rate (ratio of the weight of collected waste-paper to the consumption weight by manufacturers) was 117.2%. However, it is presumed there was an excessive import of recycled waste cardboard for about 1.25 million tons in fiscal 2008, the final recycling rate when considering this factor reduces to 95.6%.

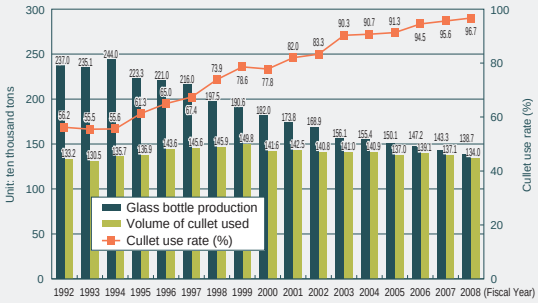
B. Paper

The recycling rate and reuse rate of paper in fiscal 2008 were 76.7% and 62.4%, respectively (Figure 2-23).

Although it is evident that there is a limit to the increase of the recycling rate, because some paper such as toilet paper is impossible to collect and some paper such as for books will be kept for a long time, it is still necessary to continue the promotion of sorted collection and the use of recycled paper so that the recycling rate and reuse rate are improved.

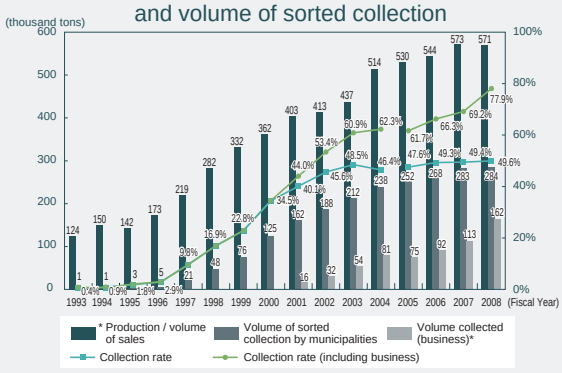
A target has been set to raise the recycling rate of paper manufactured in our country to at least 62% by fiscal 2010, in accordance with the Law for Promotion of Effective Utilization of Resources.

Figure 2-18 Glass bottle production and volume of cullet used



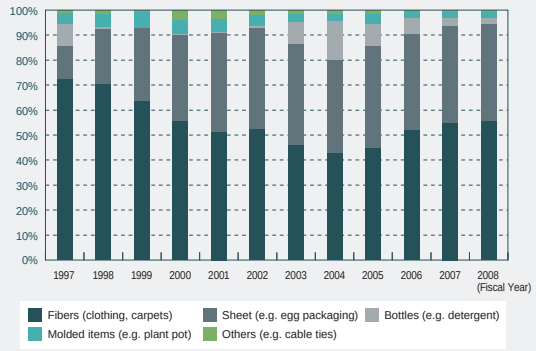
Source: Glass Bottle Recycling Promoter Association

Figure 2-19 Changes to PET bottle production and volume of sorted collection



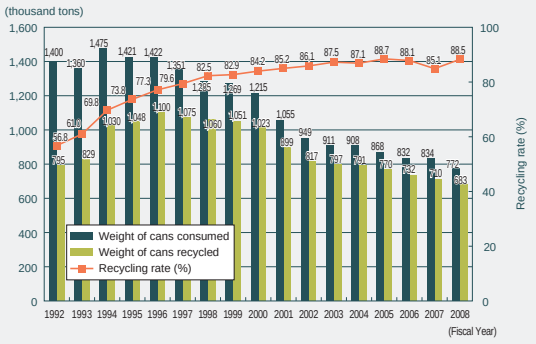
Source: Created by the Ministry of the Environment, based on materials published by the Council for PET Bottle Recycling
* Figures show production volume until fiscal year 2004, and the volume of sales for fiscal year 2005 and after.

Figure 2-20 Changes to recycled PET resin use by type



Source: Created by the Ministry of the Environment, based on materials published by the Japan Containers And Packaging Recycling Association

Figure 2-21 Steel cans: consumption weight, recycled weight and recycling rate



Note: Steel can recycling rate (%) = Weight of steel cans recycled (t) / Weight of steel cans consumed (t)
Source: Japan Steel Can Recycling Association

C. Plastics

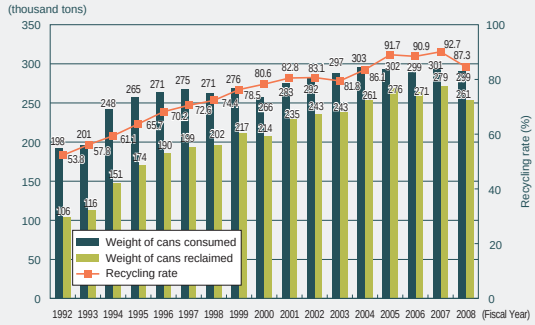
Plastics, because they are easy to process and have a wide range of applications are used for many products.

According to the Plastics Processing Promotion Conference, the amount of plastics production was presumed to be 13.45 million tons in fiscal 2008, with an increase of domestic consumption and the amount of emissions compared to the previous year. Also the amount of disposal by recycling methods specified in the Containers and Packaging Recycling Law is increasing; the amount of effective utilization, along with the reclamation amount of industrial waste and the heat recovery amount are also increasing. The effective utilization rate, which is the ratio of amount of effective utilization compared with the amount of emission, has steadily improved to 76% (Figure 2-24). In addition, it is presumed that the direct incineration rate is 12% and disposal by landfill rate is 12%.

D. Home electric appliances

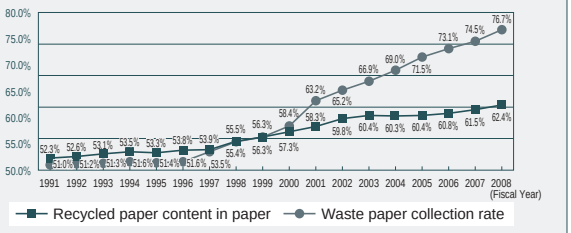
In general, disposed household electric appliances had been collected and processed by municipalities, but even though the necessity of recycling was especially high for the following four appliances, household air-conditioners, CRT-based televisions, refrigerators/freezers, and clothes washing machines, it was not easy for the municipalities to recycle these items. In consequence, such articles have been defined as specific household appliance wastes by the Home Appliance Recycling Law, which was enforced in

Figure 2-22 Aluminum cans: consumption weight, recycled weight and recycling rate



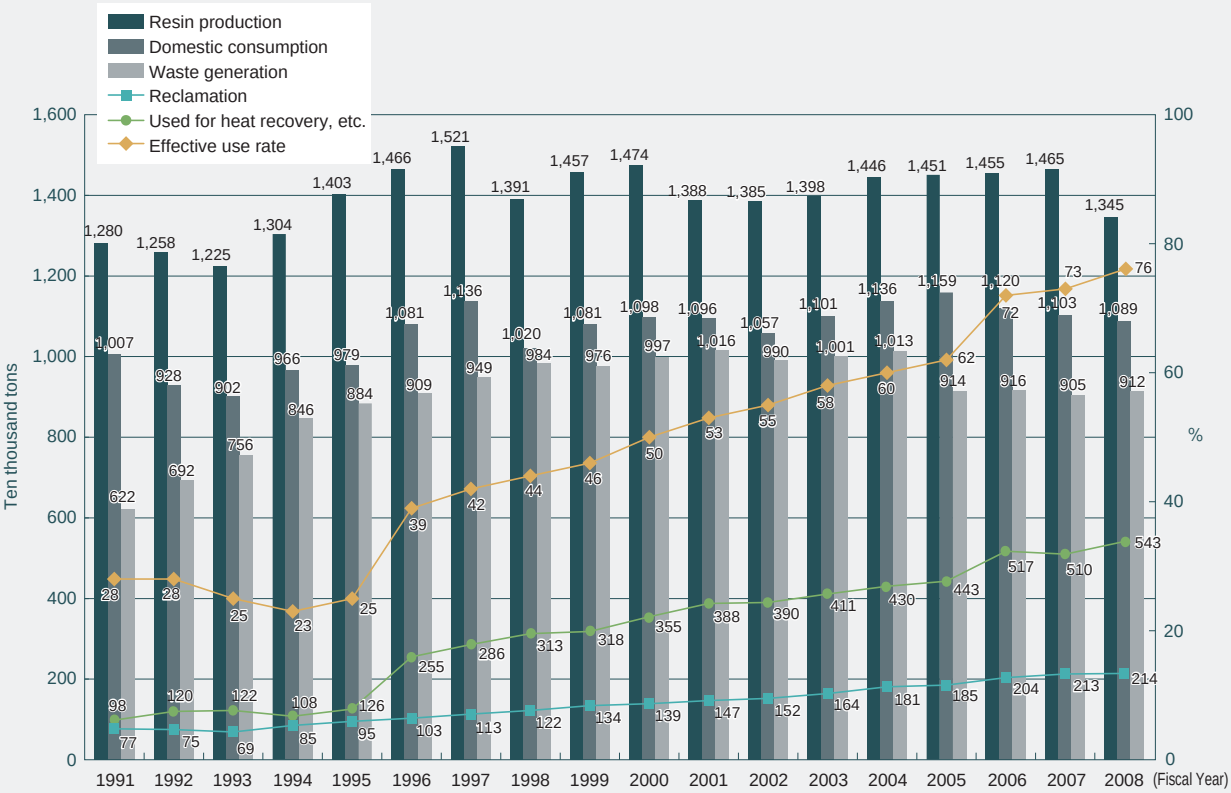
Note: Aluminum can recycling rate (%) = Weight of aluminum cans reclaimed (t) / Weight of aluminum cans consumed (t)
Source: Created by the Ministry of the Environment, based on materials published by the Japan Aluminum Can Recycling Association

Figure 2-23 Collection Rate and Reuse Rate of Paper



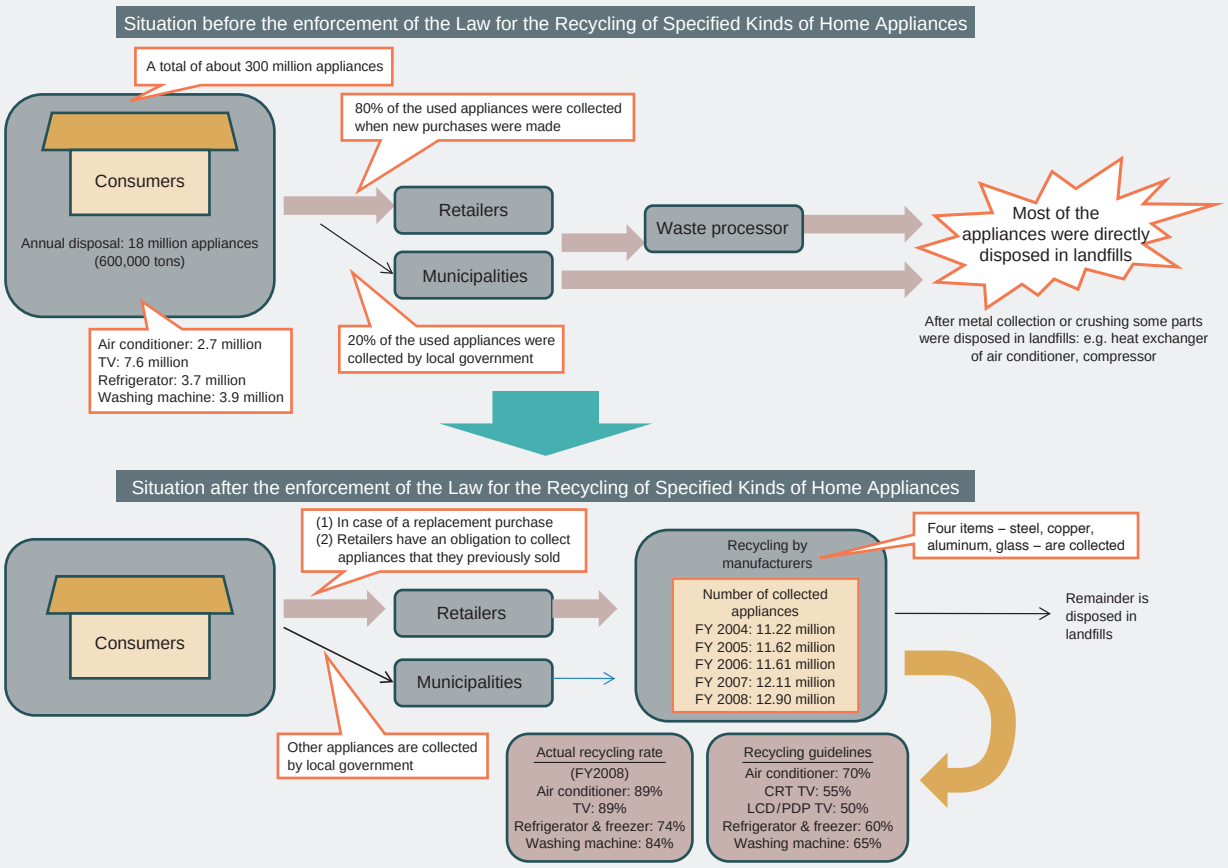
Note: Due to a change in classification types, the calculation method of waste paper collection rate was changed in fiscal year 2000; concerning the export and import of paper and cardboard, some types that had been formerly classified as paper secondary products were reclassified as printing paper in the paper category.
Source: Paper Recycling Promotion Center

Figure 2-24 Changes to plastic production, consumption, waste generation and reclamation



Note 1: Effective use rate = Volume of effective use / Volume of waste generation (Volume of effective use is a figure calculated by adding the volume of reclamation and the volume used for heat recovery, etc.)
Note 2: In fiscal year 1995, the calculation method was changed; unused resin, production loss, and processing loss were newly included in industrial waste.
Source: Created by the Ministry of the Environment, based on materials published by the Plastic Waste Management Institute

Figure 2-25 Status of waste home appliance treatment



Source: Ministry of the Environment, Ministry of Economy, Trade and Industry

April 2001 and manufacturing industries are now obliged to recycle such wastes into saleable products.

With the enforcement of the Home Appliance Recycling Law, manufacturing industries are now obliged to recycle the wastes from these four appliances into saleable products, and have promoted recycling. The recycling to salable products rate (except for the thermal recycling) is as follows: 60% or more for household air-conditioners, 55% or more for CRT-based televisions, 50% or more for refrigerators/freezers (freezers being added in April 2004) and 50% or more for clothes washing machines. The total number of these four appliances accepted at the specified collection sites was 12.90 million appliances in fiscal 2008, about a 6.5% increase on the previous year.

The recycling to salable products rates achieved by the manufacturing industries in fiscal 2008 were 89% for household air-conditioners, 89% for CRT-based televisions, 74% for refrigerators/freezers and 84% for clothes washing machines, all items exceeded the regulatory standards (Figure 2-25), (Figure 2-26).

Starting from April 1, 2009, liquid crystal/plasma-panel televisions and clothes driers were added as subject appliances and middle-to-high quality plastics were added to the calculation criteria for the calculation of those recycling to salable products manufacturing industries are obliged to process; consequently, recycling to salable products rates were revised to 70% or more for household air-conditioners, 55% or more for CRT-based televisions, 50% or more for liquid crystal/plasma-panel televisions, 60% or more for refrigerators/freezers and 65% or more for clothes washing machines/clothes driers.

E. Construction waste

Construction waste accounts for about 20 percent of the industrial waste generated and for about 80 percent of illegal dumping. In the future, especially wastes from building debris are expected to increase, as the buildings built in the boom after 1965 face refurbishment.

The amount generated, consists of concrete lumps, asphalt concrete lumps and construction site wood, and accounts for about 90% of construction wastes, such generated materials must be recycled if the construction project exceeds a specified scale as stipulated in the “Law Concerning Recycling of Materials for Construction Works” (Law No. 104, Year 2000) (Abbreviated: “Construction Materials Recycling Act”). It is inevitable that these three items will be recycled first (Figure 2-27).

The recycling rate of concrete mass and asphalt concrete mass is greatly improved following the “Rules on the Present Operations Concerning the Use of Recycling Resources Involved in Public Works” prepared in March 1991 (which was revised to as the “Rules on the Obligation of Recycling” in June 2006) and measures taken by each Regional Development Bureau. The actual recycling rate of these articles in fiscal 2008 has already achieved the target of 95%, which was regulated for fiscal 2010 by the Construction Material Recycling Act.

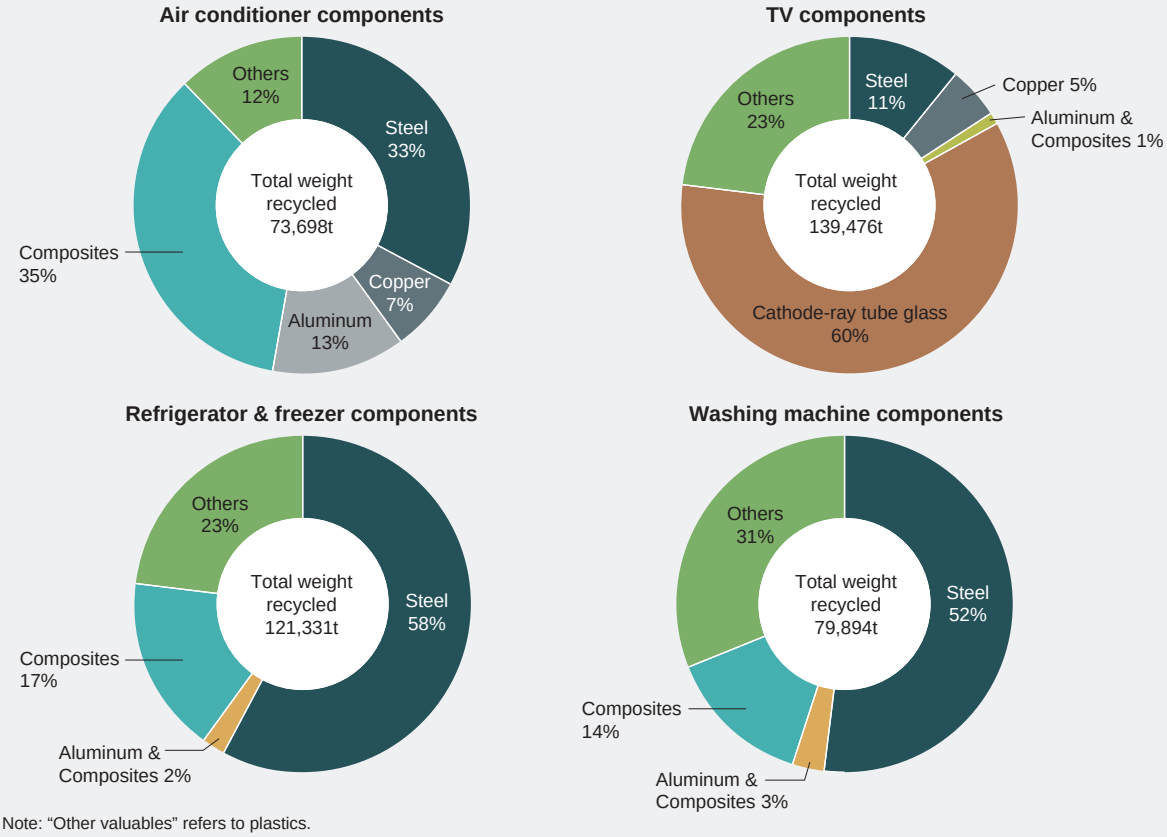
Concerning construction generated wood, the recycling

Figure 2-26 Results of recycling rate of waste home appliances: four items (fiscal year 2008)

Items		Air conditioner	TV	Refrigerator & freezer	Washing machine
Number of appliances collected from designated sites	[thousand units]	1,968	5,365	2,746	2,821
Number of appliances recycled or processed	[thousand units]	1,968	5,210	2,733	2,818
Weight of appliances recycled or processed	[tons]	82,746	156,546	163,056	94,010
Weight of appliances recycled	[tons]	73,698	139,476	121,331	79,894
Recycling rate	[%]	89%	89%	74%	84%

Note 1: The number of appliances recycled or processed, and the weight of appliances recycled or processed refers to the total number and gross weight of waste home appliances to which recycling processing and the like was applied.
Note 2: All decimal figures are discarded.
Note 3: Regarding the number of appliances collected at designated sites and the number of appliances recycled or processed, if manufacturers or other operators carrying out recycling have not been assigned, due to an error in recording a control sheet or the like, such waste appliances are not included.

◆Recycling status of parts and materials
○Total weight of parts and materials when they are processed into a condition that allows them to be transferred, with or without cost, to manufacturers who will use them as materials for or parts of a product



Note: "Other valuables" refers to plastics.
Source: Ministry of the Environment, Ministry of Economy, Trade and Industry

rate will continuously increase to attain the targeted recycling rate of 95%, which was set up for fiscal 2010 (Figure 2-28). Concerning construction generated polluted mud, effective utilization of the mud is developing, following the "Guidelines on the Reclamation of the Construction Generated Polluted Mud," drawn up in June 2006.

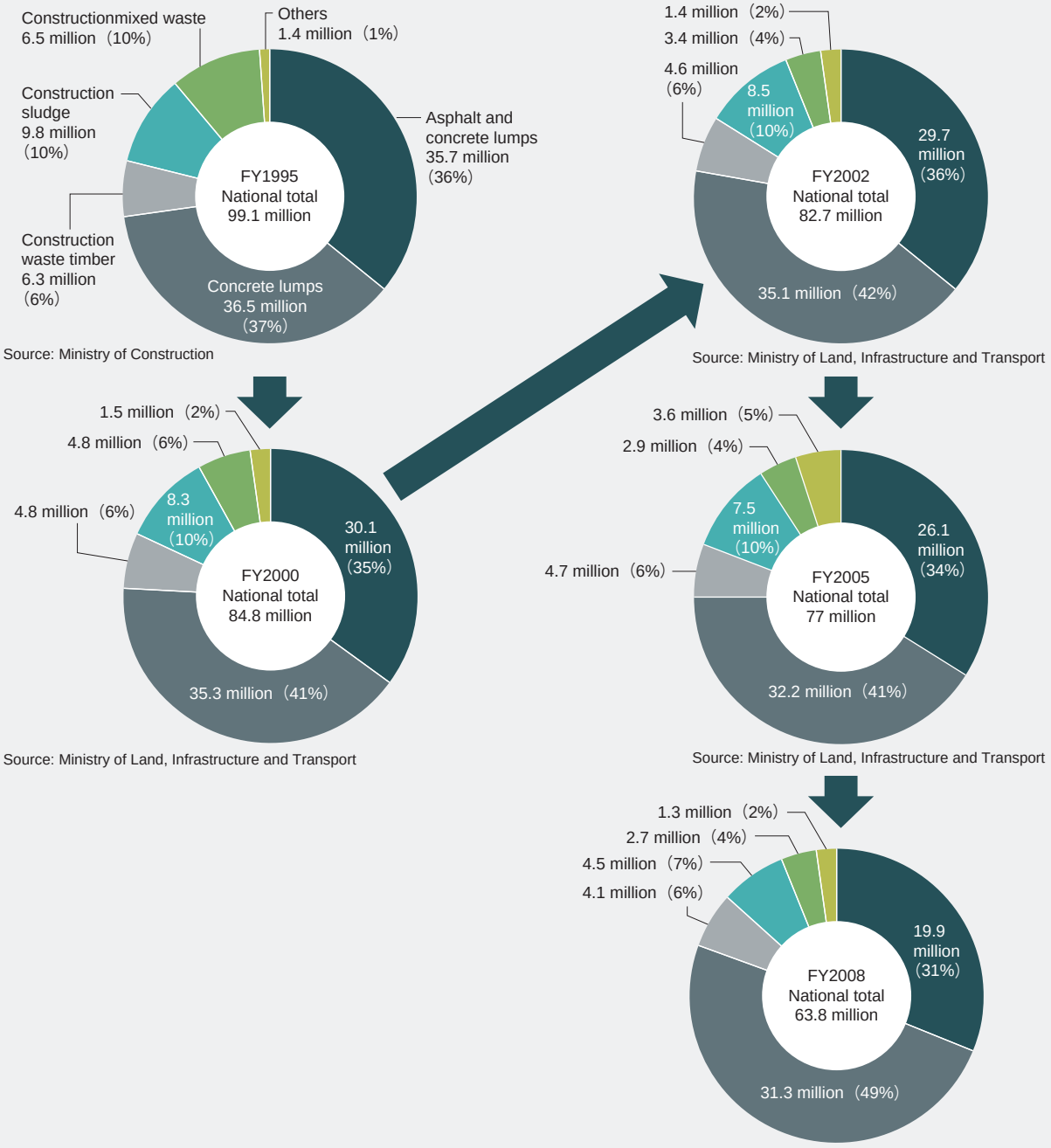
Moreover, concerning construction generated mixed waste, it has been thought that the segregation of construction by-products suitable for recycling purposes will be effective, therefore, it has been considered that the establishment of a "combined collection system for small lot wastes" would be necessary to effectively collect in their sorted state such small amounts of diversified construction wastes for recycling. The "Conference for Establishment of a Combined Collection System for Small-Lot Construction By-Products in the Tokyo Metropolitan District" was set-up in June 2005, in order to promote the examination of the matter.

F. Construction generated soil

The actual amount of construction generated soil from construction sites was about 140 million cubic meters in fiscal 2008, 34 million cubic meters were reused for other constructions, a rate of 24%. On the other hand, while the amount of new materials taken out of the soil used for construction decreased by 33% from fiscal 2005, the reuse rate of construction generated soil in fiscal 2008 was 78.6%. It was not possible to achieve the target of 87%, which was set in the "Construction Material Recycling Promotion Program 2008" for fiscal 2012. Various approaches are being developed to promote the reuse of construction generated soil in other constructions.

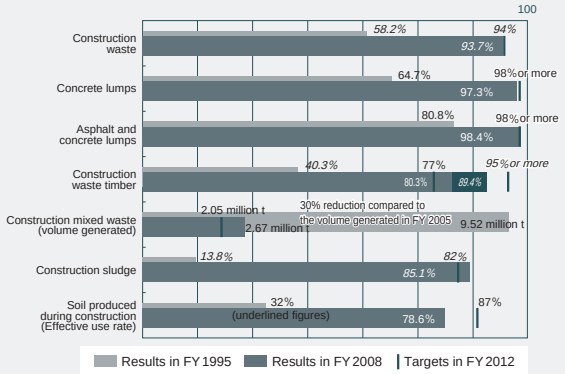
Figure 2-27 Construction waste generation by year and type

(Unit: tons)



Note: Due to rounding off, the breakdowns may not equal the total.

Figure 2-28 Construction waste: recycling status by type



* Figures in italics include reduction by incineration and dehydration.
* The results of soil produced during construction give an effective use rate that does not include soil completely used within sites for FY 1995.

Source: Ministry of Land, Infrastructure and Transport

G. Food waste

Food wastes are animal or vegetable remains from each stage of manufacturing, distribution, and consumption of food, and more concretely, they are unsalable food produced in the process of manufacturing and distribution of fabricated food, left-over food in consumption and cooking waste.

These food wastes are classified as industrial wastes when derived from food manufacturing processes and as municipal wastes when derived from domestic households, food distribution businesses and restaurants. The generated amounts are 3.07 million tons for industrial wastes, and 16.42 million tons for municipal wastes of which 11.19 million tons came from domestic households), giving a total of 19.48 million tons in fiscal 2007 (Table 2-4).

Food wastes derived from food manufacturing industries

are relatively easy to be reclaimed, because it is easy to meet the required volume and their composition is stable, therefore they are reclaimed in the form of 1.08 million tons of compost (35%), 1.32 million tons of animal feeding stuff (43%), and 240,000 tons of extracted oils and fats (8%), making a total of 2.64 million tons (a recycling rate of 86%).

The food wastes (business type municipal wastes) derived from food distribution industries and restaurants are reclaimed as 1.09 million tons of compost (21%), 560,000 tons of animal feeding stuff (11%), and 410,000 million tons of extracted oils and fats (8%), making a total of 2.07 million tons (a recycling rate of 40%).

On the other hand, food wastes derived from domestic households (household municipal wastes) are generated in small amounts and from numerous places, and the composition is too complicated, therefore, only 640,000 tons (6%) are now reclaimed.

As a result of the foregoing, in total, 5.35 million tons (27%) of the food wastes are reclaimed by composting or animal feeding, etc. and the remaining 14.14 million tons (73%) are incinerated and disposed by landfill.

Additionally, rubbish type biomass including food wastes have more possibility to be reclaimed for compost or animal feeds and to be converted to energy or electric power, it is required to further promote their reuse in the establishment of a Sound Material-Cycle Society and the creation of a society that does not contribute to global warming.

Table 2-4 Generation and treatment status of food waste (fiscal year 2007)

(Unit: ten thousand tons)

	Waste generation	Disposal				
		Disposal by incineration or landfill	Recycled			
			Composting	Livestock feed	Others	Total
Municipal waste:	1,642	1,371	—	—	—	271
Domestic	1,119	1,055	—	—	—	64
Business	522	316	109	56	41	207
Industrial waste	307	43	108	132	24	264
Total	1,948	1,414	—	—	—	535

Note 1: Above figures are rounded off; therefore, the total may not equal the breakdowns.
Note 2: The volume of food waste generated was provisionally calculated by the Ministry of the Environment, based on the generation and treatment status of municipal waste (results of fiscal year 2007), and the generation and treatment status of industrial waste (results of fiscal year 2007).
Note 3: The volume of recycled domestic waste was also provisionally calculated by the Ministry of the Environment in the same manner as Note 2.
Note 4: The volume of recycled business waste and industrial waste (including details) was provisionally calculated, based on the results of the Fiscal Year 2008 Status Survey on Recycling of Circulating Food Resources reported by the Ministry of Agriculture, Forestry and Fisheries.
Source: Ministry of Agriculture, Forestry and Fisheries, Ministry of the Environment.

H. Automobiles

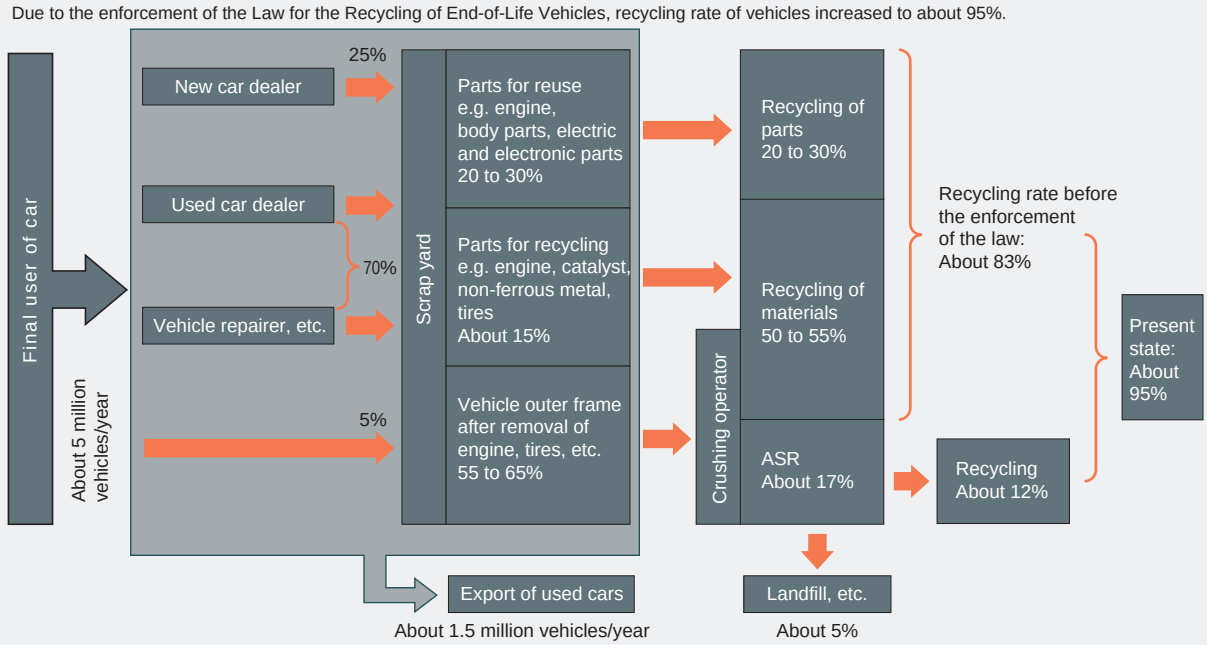
(a) Automobiles

Used automobiles are firstly sold from collecting companies (mostly car dealers) to fluorocarbon destruction operators to collect fluorocarbons used for car air-conditioners. Then they are sold to scrapping companies to collect useful parts and components such as engines and doors. The remaining scrap wastes are sold to shredding companies to collect iron materials and other useful metals and the remainder (shredder dusts) are disposed of as wastes (Figure 2-29). Concerning the percentage by weight of an automobile, about 20 to 30% are collected (reuse of parts) as useful parts by scrapping companies and about 50 to 55% are recycled (material recycling) as materials.

The “Law for the Recycling of End-of-Life Vehicles” (hereinafter referred to as “End-of-Life Vehicle Recycling Law”) has been enforced and in full operation since January 2005, in the period from enforcement until March 2009, recycling fees for about 92.77 million automobiles have been deposited and in Year 2008 alone. 3.58 million used automobiles were disposed of in accordance with the End-of-Life Vehicle Recycling Law.

Since October 2005, new support businesses were start-

Figure 2-29 End-of-life vehicle disposal flow (fiscal year 2008)



Source: Created based on "Report on Assessing and Reviewing the Execution Status of Automobile Recycling System" released in January 2010 by the Automobile Recycling Working Group in the Waste and Recycling Subcommittee under the Industrial Structure Council and the Automobile Recycling Technical Committee in the Waste and Recycling Committee under the Central Environment Council

ed, using the deposit money for specified recycling materials, for the municipalities on the isolated islands where there are problems in the delivery of used automobiles. In 89 municipalities deposit money disbursement was applied to 23,000 used automobiles, in Year 2008.

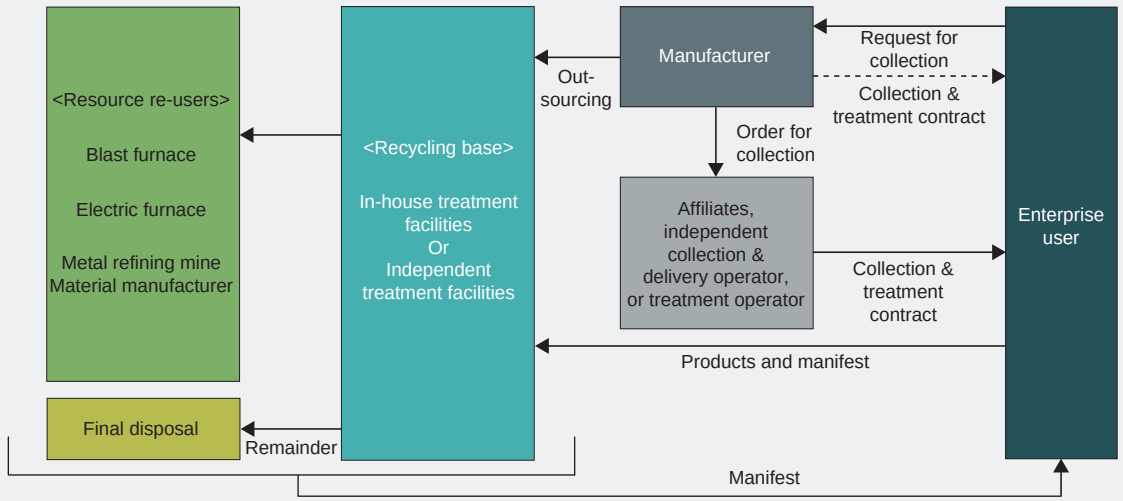
(b) Tires

According to the Recycling Business Division of the Japan Automobile Tire Manufacturing Association, out of 1,056,000 tons of waste tires generated in Year 2008, (Year 2007: 1,064,000 tons) 314,000 tons (Year 2007: 345,000 tons) were used in the original form or fabricated form for export, and used as the base for retreads or rubber powder, 624,000 tons (Year 2007: 607,000 tons) were used for smelting/cement burning or electric power generation, Concerning used waste tires, as it is not easy to distinguish a good tire from a waste one, there are cases where waste tires were falsely described as good ones and improperly stored in a field have caught fire and caused problems. The Ministry of Environment have already sent notices to the prefectural and city governments, instructing them to handle such cases strictly, as well as to take administrative actions and discipline, if there is a fear of disturbing the maintenance of the environment.

I. Personal computers and peripheral devices

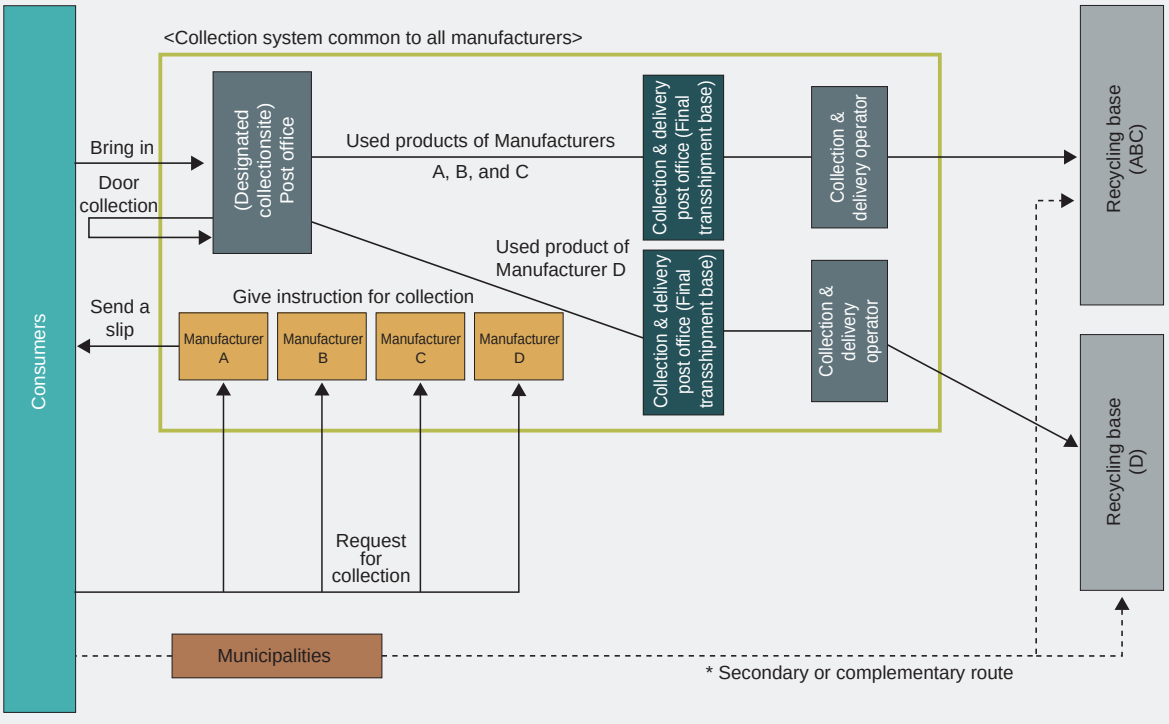
The manufacturers of business model personal comput-

Figure 2-30 Collection and recycling system for office computers (example)



Source: Ministry of the Environment, Ministry of Economy, Trade and Industry

Figure 2-31 Basic collection scheme of home-use personal computer



Source: Ministry of the Environment

ers (starting from April 2001) and home personal computers (starting from October 2003) are obliged to recycle such computers by The Law for Promotion of Effective Utilization of Resources. The target rates set for the promotion of recycling are 50% or over for the desk top computers (machine itself), 20% or over for notebook (laptop) personal computers, 55% or over for cathode-ray tube displays and 55% or over for liquid crystal displays (Figure 2-30 and 2-31).

The recycling rate of manufacturers in Year 2008 were, 77.3% for desk top computers (machine itself), 54.1% for notebook (laptop) personal computers, 75.4% for cathode-ray tube displays and 70.8% for liquid crystal displays, all categories exceeded the legal targets.

Personal computers are collected in other ways than shown above, such as direct collection by the wastes disposer from the user or through the leasing/rental company, sales shop or sales company, or by the collection/disposal of municipal entities.

J. Small-size secondary battery (nickel-cadmium battery, nickel-hydride battery, lithium battery, sealed lead acid battery)

For small-size secondary batteries, scarce resources such as〔Ni〕nickel,〔Cd〕cadmium,〔Co〕cobalt and〔Pb〕lead are used, recycling of small-sized secondary batteries has more effect than primary batteries, because the recycling of the latter is limited to only the metal casing.

The manufacturers of small-sized secondary batteries are obliged to recycle such batteries by The Law for Promotion of Effective Utilization of Resources. The target rates set for the promotion of recycling: are 60% or over for nickel-cadmium batteries, 55% or over for nickel-hydride batteries, 30% or over for lithium batteries and 50% or over for sealed lead acid batteries.

The recycling situation of small-sized secondary batteries (including the ones used for cellular phones and PHS – Personal Handy-phone System) in Year 2008 was, 886 tons recycled with a 73.3% recycling rate for nickel-cadmium batteries, 202 tons recycled with a 76.6% recycling rate for nickel-hydride batteries, 297 tons recycled with a 63.3% recycling rate for lithium batteries and 1,729 tons recycled with a 50.0% recycling rate for sealed lead acid batteries, all categories achieved the legal targets.

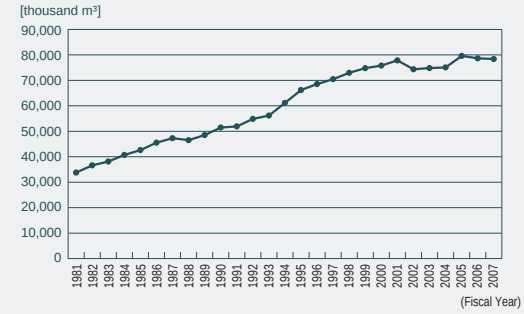
K. Sewage sludge

With the spread of sewage coverage, polluted sludge (sewage sludge) generated from sewage works increases year by year. (Figure 2-32). In Year 2007, about 78.40 million tons of sewage sludge was generated (a decrease of about 260,000 tons from the previous year achieved by converting into concentrated sludge), and this accounted for almost 20% of the generated total industrial wastes, the amount of sewage sludge brought into final disposal sites was 400,000 tons (a decrease of 40,000 tons from the previous year), approaches for decreasing weight have been promoted by various means such as intermediate processing including dehydration and incineration and reclamation. The effective usage rate of sewage sludge in Year 2007 was 77% when converted into specific dry weight.

While sewage sludge is mostly recycled for construction materials such as cement raw materials, its utilization form has expanded in a variety of ways, e.g., it has been used for green farming focusing on the nature of sewage sludge with its wealth of organic substances. As well as using it as a fertilizer in the form of compost for green farming, the effort to collect phosphorus contained in sewage sludge to use as a raw material for fertilizers has been advanced. Regarding efforts to use sewage sludge for energy, digestion gases such as methane gas which is generated in the process of anaerobic digestion are used for digestion gas power generation, sewage sludge is used as a solid fuel and waste heat generated from burned sewage sludge is used for various purposes.

1.72 million tons of sewage sludge, converted by specific dry weight, was reclaimed as cement material (870,000 tons), building material (510,000 tons) such as bricks or blocks, green farming (330,000 tons) such as fertilizer and solid fuel (10,000 tons).

Figure 2-32 Changes to sewage sludge by year



Source: Ministry of Land, Infrastructure and Transport

2 Municipal wastes

(1) Municipal wastes (garbage)

A. Changes of the generated amount of garbage

The total amount of garbage generated and the daily amount of garbage generated per person dropped slightly after 1979, the year of the second oil crisis, but from around 1985 there has been a sharp increase which leveled off in 1990; from 2001 until the present there has been a decreasing trend. (Figure 2-33)

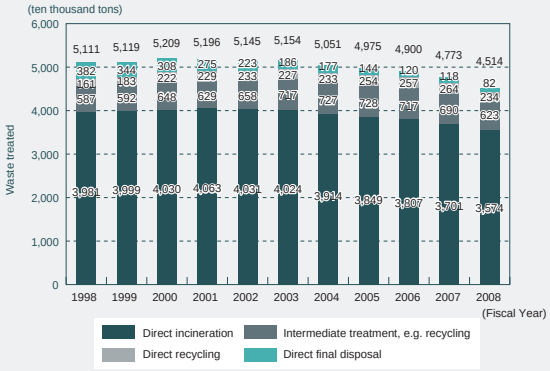
B. Changes of the garbage processing methods

When considering the changes of garbage processing methods, the ratio of direct recycling and recycling after intermediate processing in fiscal 2008 was 19.0%. The amount of garbage directly sent for final disposal has been steadily decreasing, with a ratio 1.8% in fiscal 2008. (Figure 2-34).

Figure 2-33 Changes to total waste generation and daily waste per person

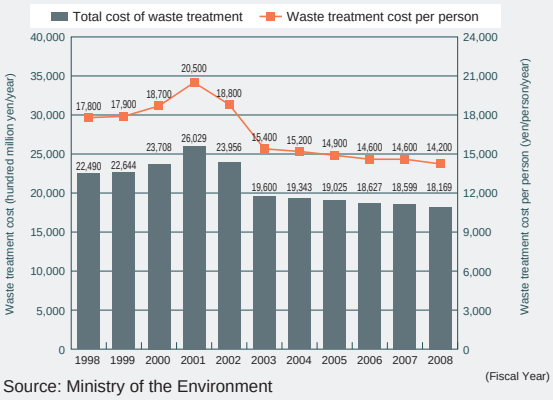
Note: Total volume of waste generated = Designed collection volume + Volume of waste directly brought in + Volume of group collection of recyclable waste
Source: Ministry of the Environment

Figure 2-34 Changes to the garbage processing methods



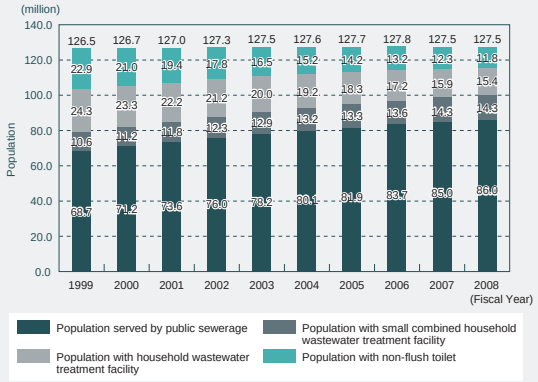
Source: Ministry of the Environment

Figure 2-35 Changes to waste treatment costs



Source: Ministry of the Environment

Figure 2-36 Changes to numbers using the different methods of night soil treatment



Note: Figures in the graph refer to population composition (million).
Source: Ministry of the Environment

C. Changes of the operating expenses for garbage processing

The total amount of operating expenses for garbage processing in fiscal 2008 was 1,823.5 billion yen, this averages out to about 14,200 yen per person. It has been flat since the previous year (Figure 2-35).

(2) Municipal waste (night soil)

A. Changes to the disposal of night soil

Concerning changes in the night soil disposal population, while the number of Johkasou (a compact high-performance on-site waste water treatment tank facility with bio-function) users remains at the same level, due mainly to the increase of public sewage system users (86.03 million in fiscal 2008), the total population of flush toilet system users

which includes the latter is increasing year by year (115.71 million in fiscal 2008) (Figure 2-36).

The number of individual waste water treatment facilities was 8,360,000 (8,420,000 in fiscal 2007) at the end of fiscal 2008, a decrease of 60,000 on the previous year. Johkasou (treating both kitchen and toilet waste) and night soil a decrease from purification tanks (only treating toilet waste) accounted for 2,900,000 (2,780,000 in fiscal 2007) and 5,450,000 (5,640,000 in fiscal 2007) respectively, which resulted in the ratio of Johkasou increasing to 35% (33% in fiscal 2007) of all individual waste water treatment facilities in 2007. These figures would seem to be influenced by a number of factors: the diffusion of Johkasou by increased subsidy rates for municipal governments; the prohibition of new construction of night soil purification tanks set in the revision of the Johkasou Law in Year 2000; an increasing number of abolished the night soil purification tanks impacted by the shift to the Johkasou; and the progress of sewage systems.

B. Changes to the processing situation of night soil and Johkasou sludge

In fiscal 2008, from the total of 24.55 million kiloliters night soil and individual wastewater treatment facility sludge, 99.0 % or 24.31 million kiloliters were processed at human-waste treatment plants or by discharge into sewage systems.

Disposal by discharge into the sea was prohibited in February 2007.

3. Industrial wastes

(1) Status of the generation and disposal of industrial wastes

A. Changes to the exhaust amount of industrial wastes

The figures for industrial wastes generated since fiscal 1990, have stayed more or less constant at around 400 million tons, with no major yearly differences (Figure 2-37).

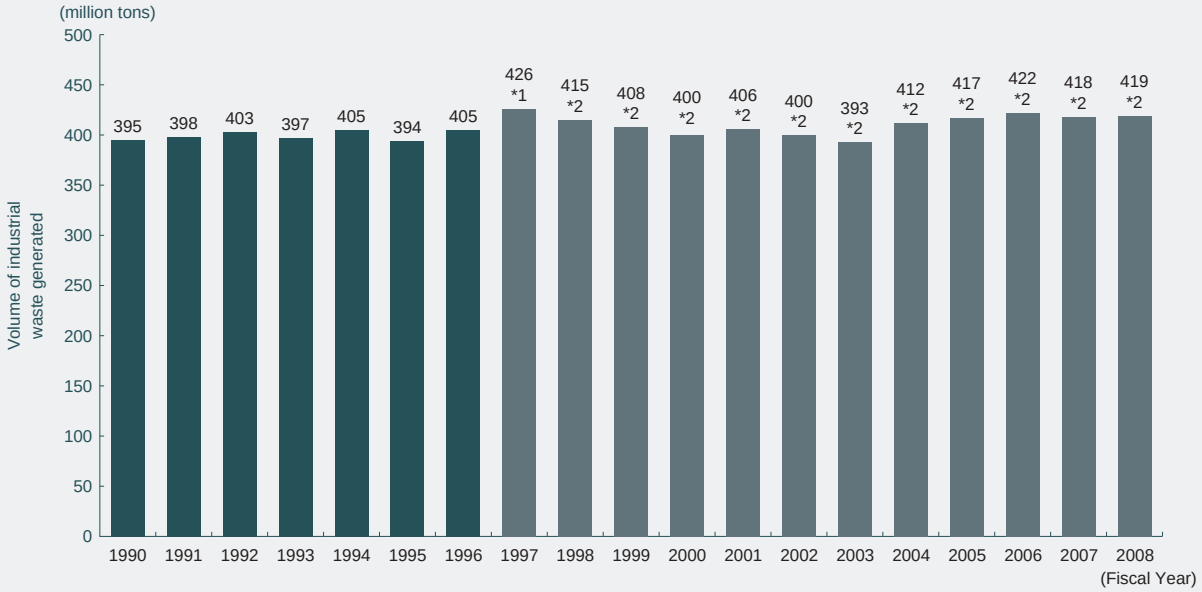
B. Changes to the number of intermediate processing facilities of industrial wastes

Intermediate processing facilities carry out incineration, breakup or dehydrate industrial wastes, there number decreased slightly on the previous year by 1.2% to a total of 18,935 licensed facilities for all of Japan. 21.3% are dehydrating facilities for polluted sludge, 45.1% are breaking-up facilities for wood-wastes or debris and 7.9% are other incineration facilities. (Figure 2-38).

C. Changes to the number of permits given to new facilities for disposal of industrial wastes (incineration facilities and final disposal sites)

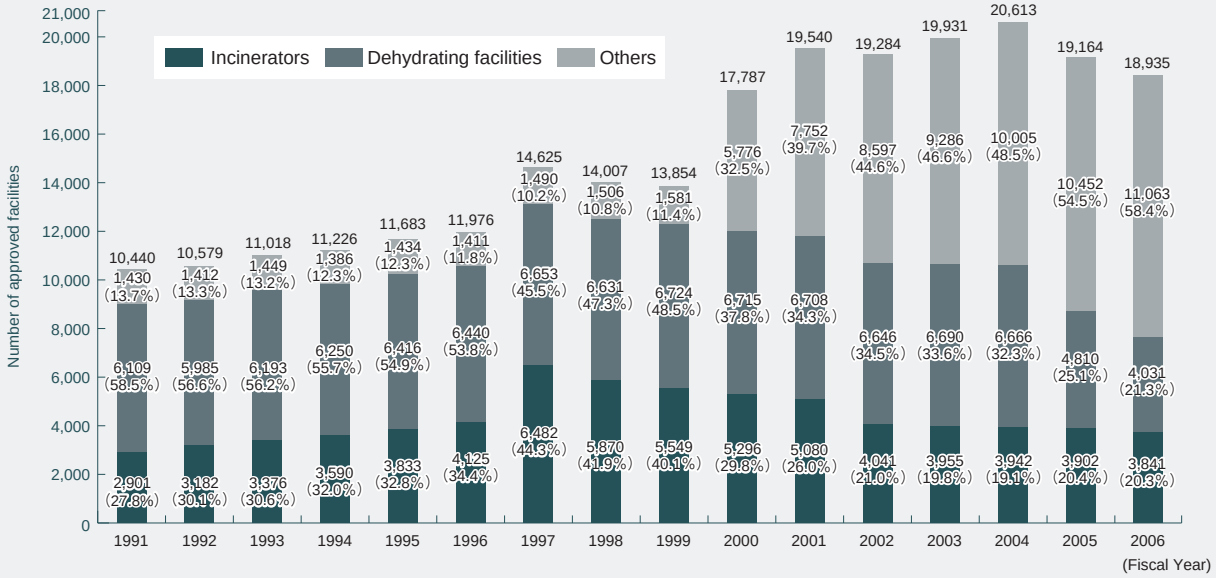
The number of permits given to new facilities for disposal of industrial wastes, both for incineration facilities and final disposal sites have sharply decreased, when compared with

Figure 2-37 Changes to the exhaust amount of industrial wastes



Note: From 1996 onward the method to estimate the volume of waste generated was partially amended.
*1: In accordance with the Basic Guidelines of Japan for the Promotion of Measures against Dioxins (decided by the Ministerial Conference on Dioxin Policy), in September 1999 the Government established waste reduction targets with an aim of attainment in fiscal year 2010; the volume of waste generated in fiscal year 1996 is given in relation to this target.
*2: The volume generated from 1997 onward is calculated based on the same precondition applied in *1.
*3: 19 types of industrial waste as stipulated by the Waste Disposal and Public Cleansing Law are covered by this graph.
Source: Ministry of the Environment

Figure 2-38 Changes to the number of intermediate processing facilities of industrial wastes



Note: Facilities to crush waste wood and debris were added to those facilities requiring approval in February 2001.
Source: Ministry of the Environment

Figure 2-39 Changes to the number of newly approved incinerators (industrial waste)

Note: The number of new facilities was surveyed by the Ministry of the Environment, but this could change in the future.
Source: Ministry of the Environment

Figure 2-40 Changes to the number of newly approved final disposal sites (industrial waste)

Note: The number of new facilities was surveyed by the Ministry of the Environment, but this could change in the future.
Source: Ministry of the Environment

the years before revision of the Wastes Management Law in Year 1997. (Figure 2-39 and 2-40).

(2) Wide-area movement of wastes in the greater metropolises

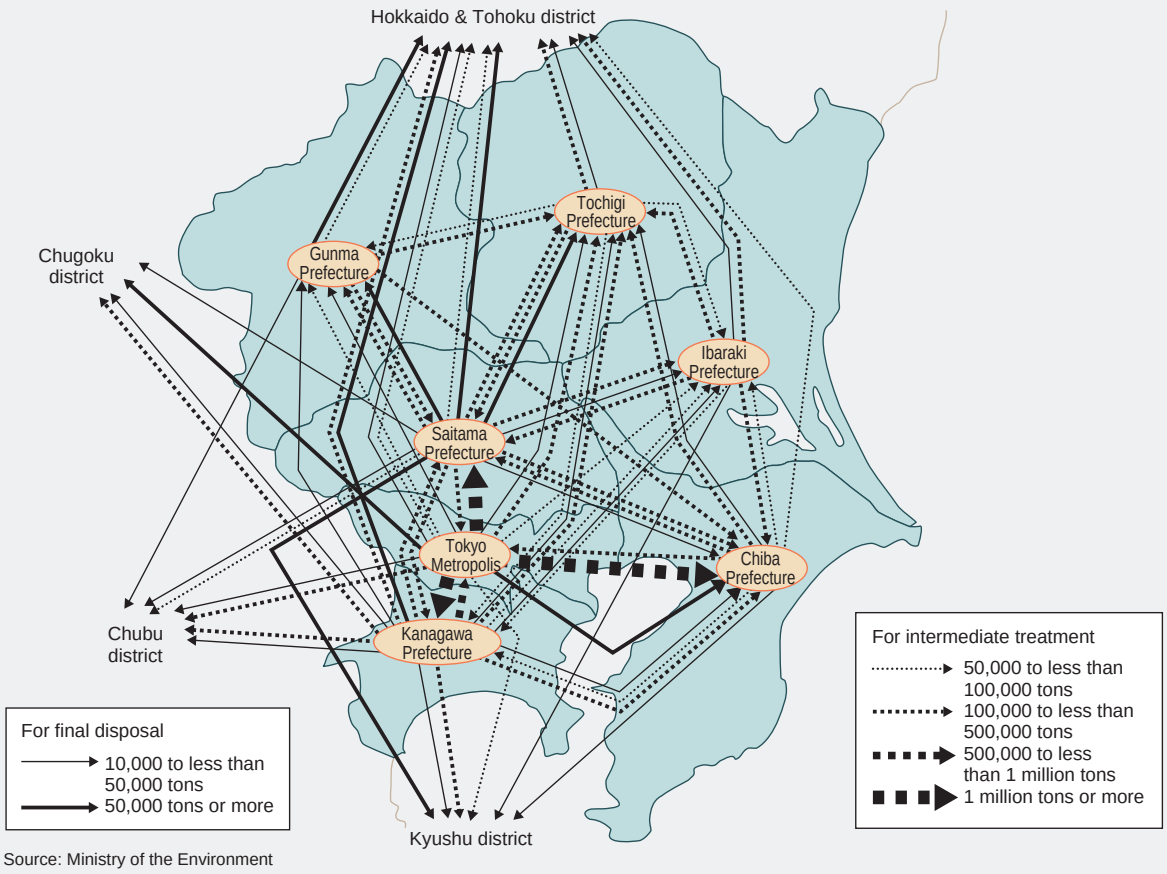
In such megalopolis as the Tokyo metropolitan district, it is becoming difficult to secure intermediate processing facilities such as incineration furnaces and final disposal sites, this is caused by the upgrading of land-use and environmental problems. Therefore, as it is not easy to process wastes in the local area, most of the municipal wastes and industrial wastes are transported across prefectural and city governmental borders to other areas for disposal.

In fiscal 2008, out of all municipal wastes generated from one Metropolis and six prefectures in the Tokyo metropolitan district, 1,360,000 tons were sent for final disposal, of these 210,000 tons were transported to an area other than where they originated, 160,000 tons - about little under 80% - were sent for final disposal to other areas outside the Tokyo metropolitan district. The final disposal amount of municipal wastes transported from the nationwide municipalities to prefectures outside their boundaries was 310,000 tons, the Tokyo metropolitan district accounts for a little over 70% of these.

In fiscal 2008, the amount of industrial wastes transported for the purpose of intermediate processing or final disposal from the Tokyo Metropolitan district to an area other than where they originated was 16.49 million tons, 8.78 million tons of these – which accounts for a little over 50% - were transported from the Tokyo metropolis, and of these 1.32 million tons flowed-out from the Tokyo metropolitan district to other areas. (Figure 2-41).

It is worthy of note that as the amounts transported from the Tokyo metropolis to Saitama, Chiba and Kanagawa prefectures for intermediate processing are noticeably large, and the amounts transported for final disposal from Saitama and Kanagawa prefectures to other prefectures are also distinctly large, it is presumed that industrial wastes transported from Tokyo metropolis to outside are, after being sent for intermediate processing in the neighboring prefectures,

Figure 2-41 Status of wide-area movement of industrial waste generated in the Tokyo Metropolitan district (fiscal year 2007)



Source: Ministry of the Environment

transported again to other prefectures for final disposal.

There is a deep concern about such movement of waste across wide areas; if waste is illegally dumped in the area accepting waste and causes environmental pollution, this may trigger many regional conflicts resulting in increased restrictions on the acceptance of waste. This is coupled with feelings of unease and unfairness about accepting waste transported from other generation areas.

In the areas around Tokyo, as is shown in the state of residual years of the sites, securing of final disposal sites, especially final disposal sites for industrial wastes is becoming more difficult, and this shortage is supposed to be the main cause of the wide-area movement of wastes to neighboring prefectures.

4 Wastes-related Information

(1) State of Final Disposal Sites

A. Municipal wastes

(a) State of Final Disposal

Final disposal volume in 2008 (total of direct final disposal volume and final disposal volume after intermediate treatment) is 5.53 million tons, and final disposal volume per person daily is 119 grams. This indicates that the final disposal volume continues to decrease (Figure 2-42).

(b) Residual Number of Years and Residual Volume of Final Disposal Sites

As of the end of 2008, the number of final disposal sites is 1,823, and residual volume is 121.84 million m3. The national average residual number of years is 18.0. Because the final disposal volume in 2008 is smaller than that of the previous year, the residual number of years is increasing although the residual volume is decreasing (Figure 2-43).

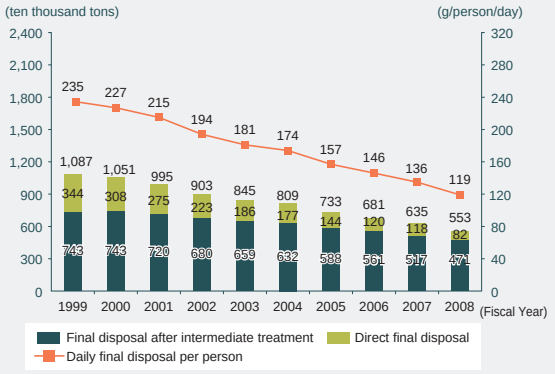
(c) Municipalities Where There Is No Final Disposal Site

As of the end of 2008, among Japan's 1,800 municipalities, 352 of them need to dispose of wastes but have no final disposal sites and entrust private final disposal sites with landfill (however, when they landfill wastes in the public disposal sites of municipalities targeted for the Osaka Bay Phoenix Plan, use other municipalities, public corporations, etc. although they have no final disposal sites, they are included in the number as having final disposal sites) , and Figure 2-44 shows the distribution of the municipalities.

(d) Future actions and initiatives

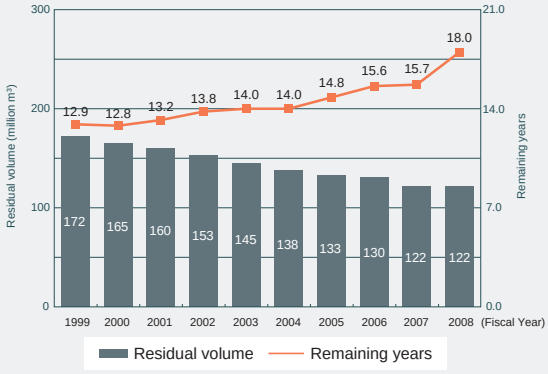
Because waste treatment facilities, such as final dis-

Figure 2-42 Changes to final disposal and daily final disposal per person



Source: Ministry of the Environment

Figure 2-43 Changes to residual volume and remaining years of final disposal sites (municipal waste)

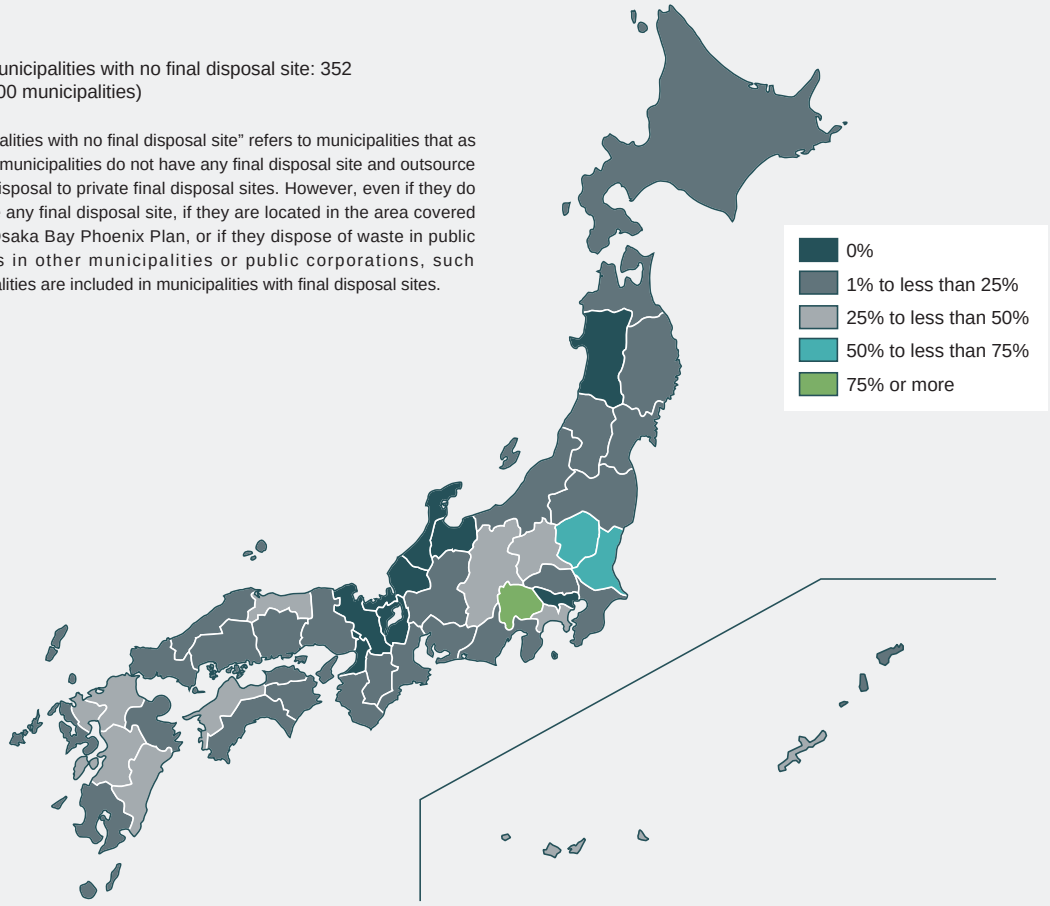


Source: Ministry of the Environment

Figure 2-44 Municipalities with no final disposal site (as of the end of fiscal year 2008)

Number of municipalities with no final disposal site: 352
(19.6% of 1800 municipalities)

Note: "Municipalities with no final disposal site" refers to municipalities that as relevant municipalities do not have any final disposal site and outsource landfill disposal to private final disposal sites. However, even if they do not have any final disposal site, if they are located in the area covered by the Osaka Bay Phoenix Plan, or if they dispose of waste in public landfills in other municipalities or public corporations, such municipalities are included in municipalities with final disposal sites.



Source: Ministry of the Environment

posal sites, are public-nuisance facilities, it is difficult to find new locations to build them, and the municipalities all have difficulty in finding locations for final disposal sites in particular. Against this background, each municipality has been making efforts to find locations for final disposal sites across a broader area. However, they should not act based on the idea that they aim to secure locations in other areas because it is simply difficult to do so in their own areas, they need to develop final disposal sites in broader areas as a final measure after having decreased the number of facilities to be managed, and taken certain and high-level environment-conserving measures as well as reducing the amount of wastes and thoroughly promoting appropriate recycling and reuse of wastes.

Municipalities need to develop waste treatment facilities needed for the establishment of such a sound material-cycle society after having established specific goals related to the 3Rs of wastes and having formulated a definite plan of comprehensive measures for achieving the goals.

B. Industrial Waste

The residual volume of final disposal sites for industrial

wastes at the end of fiscal 2006 is 162.86 million m³, a decrease of 23.39 million m³. In addition, the national average residual number of years is 7.5, which indicates the situation has gradually improved. However, the residual number of years in the Greater Tokyo Metropolitan area is 4.4, and, in greater metropolitan areas in particular, their residual number of years has been decreasing (Figure 2-45).

Basically, final disposal sites of industrial wastes should be developed by private business operators. However, based on the development situation, the final disposal volume regarded as necessary needs to be secured with the development of facilities by the public sector.

(2) Efforts at Thermal Recycling in Waste Incinerators

A. Use of Residual Heat from Waste Incineration

About 70% of all facilities around the country make effective use of residual heat from waste incinerators for hot water, steam, electric power generation, etc (Figure 2-46). More specifically, the residual heat is used for various purposes, such as waste power generation described later, heating and hot water supply in waste incinerators. The heat is also used in places other than waste incinerators for heated pools, supply of hot water and heat to social welfare organizations, such as welfare facilities for the elderly, regional heating, etc.

Saving of natural resources and energy used in waste disposal facilities and contribution to regional communities account for the majority of reasons for using residual heat.

In addition to the promotion of such use of residual heat in waste incinerators, a system for further promoting the supply of heat, etc. to places other than waste incinerators needs to be created. In order to develop such a system, technical problems, such as dealing with changes in the volume and quality of wastes, cost comparison with heat supplied by gas and petroleum, coordination with relevant laws and regulations, such as the Electricity Enterprises Law, and so forth need to be fully examined.

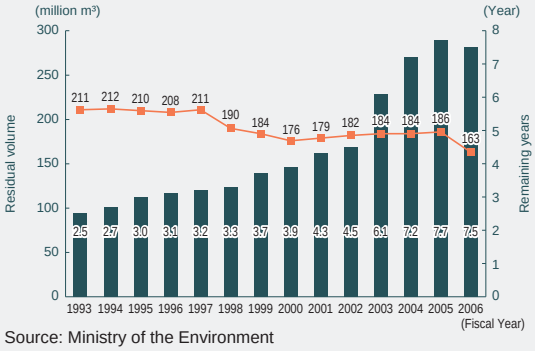
B. Waste Power Generation

In waste power generation, the thermal energy of high temperature exhaust gas generated when wastes are incinerated is collected by a boiler, which generates steam to rotate a turbine for electric power generation. Waste power generation is one of the effective ways of using residual heat from waste incinerators.

At the end of fiscal 2008, among waste incinerators in operation or under construction, 300 incinerators are generating electrical power or scheduled to do so (Table 2-5). In addition, larger-scale waste incinerators tend to conduct waste power generation. Therefore, while such incinerators account for 23.6% of all incinerators, their waste treatment capability accounts for about 58.5% of that of all waste incinerators. The total amount of generated electricity of the waste incinerators conducting waste power generation is about 6.9 billion kWh. If annual electric power consumption per household is 3,600 kWh, the total amount equals to the annual electric power consumption of about two million households. In addition, 193 waste incinerators use electric power generated with waste power generation in places other than their facilities.

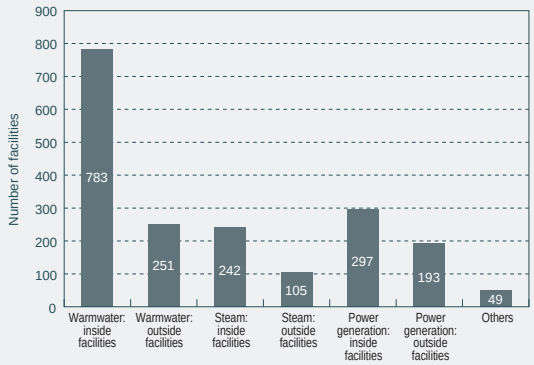
Power generation efficiency with waste power generation is about 11.2%, but it varies from a few percent to about 20%, depending on the incinerator. Recently, more efficient power generating facilities have been introduced.

Figure 2-45 Changes to residual volume and remaining years of final disposal sites (industrial waste)



Source: Ministry of the Environment

Figure 2-46 Waste heat utilization of incinerators (fiscal year 2008)



State of waste heat utilization		Utilized								Not utilized
		Utilization of warmwater		Utilization of steam		Power generation		Others		
		Warm-water: inside facilities	Warm-water: outside facilities	Steam: inside facilities	Steam: outside facilities	Power gene-ration: inside facilities	Power gene-ration: outside facilities			
Number of facilities	849 (856)	783 (792)	251 (258)	242 (244)	105 (103)	297 (297)	193 (188)	49 (51)	420 (429)	

Figures in the brackets are data for fiscal year 2007.

Source: Ministry of the Environment

Table 2-5 Number of waste power generation facilities and generating capacity (fiscal year 2008)

Number of power generation facilities	300 (298)
Power generating capacity (thousand kW)	1,615 (1,604)
Power generation efficiency (%)	11.19 (11.14)
Total power generation (GWh)	6,935 (7,132)

Data in the brackets are for fiscal year 2007.

Source: Ministry of the Environment

Note 1: The facilities shown above are established by municipalities or affairs associations, and include facilities for which construction work had already started and facilities out of service, but exclude closed facilities.

Note 2: Power generation efficiency was calculated using the following formula.

$$\text{Power generation efficiency [\%]} = \frac{860\ [\text{kcal/kWh}] \times \text{Total power generation [kWh/year]}}{1{,}000[\text{kg/t}] \times \text{Volume of waste incinerated [t/year]} \times \text{Volume of waste heat generation [kcal/kg]}} \times 100$$

Note 3: Figures in the brackets are figures for the previous fiscal year.

However, under the present circumstances, about three quarters of the heat amount generated by incineration is lost even with power generation and other uses of residual heat combined.

On the other hand, attempts to effectively use low-temperature hot water after electrical power generation with a heatstoring heat pump for regional air-conditioning systems are found. In order to increase such facilities it is effective to develop units which combine both heat supply and heat use.

C. RDF (Refuse Derived Fuel)

RDF (Refuse Derived Fuel) has the following characteristics: it putrefies less than normal wastes, it can be stored for a relatively long period of time, it can be delivered easily because its volume and weight can be reduced, and stable incineration is possible because its form and calorific value are almost constant.

In a sound material-cycle society it is required to use RDF, based on the priority order of waste treatment and regional characteristics.

(3) Present State of Illegal Dumping, etc.

A. Cases of Illegal Dumping of Industrial Waste Found in Fiscal 2008

(a) Number of Illegal dumping Activities and Amount of Illegally Dumped Wastes

Concerning the cases of illegally dumped and improperly treated industrial wastes (hereinafter referred to as "illegal dumping, etc.") reported in fiscal 2008, the number of illegal dumping is 308 cases, 203,000 tons, and those of improper treatment is 308 cases, 1.228 million tons (Figure 2-47 and 2-48).

In addition, the numbers of newly reported illegal dumping and improper treatment cases in fiscal 2008 where 5,000 or more-ton wastes were dumped/treated are four and ten respectively.

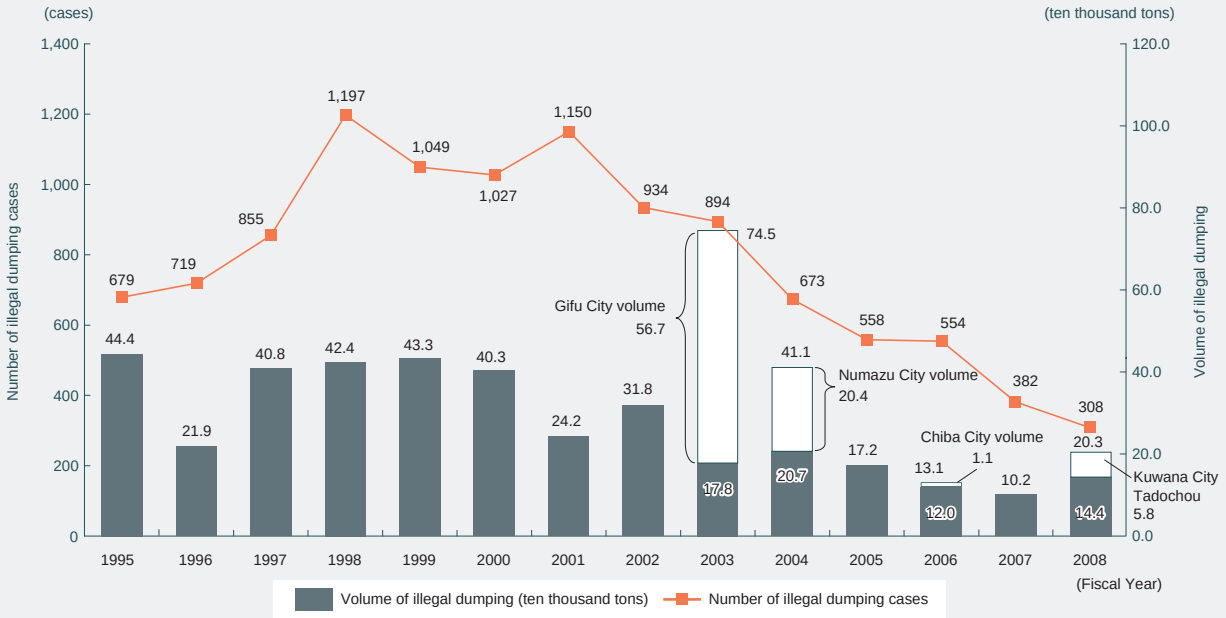
(b) Types of Illegally Dumped Industrial Wastes

According to the types of illegal dumping, etc. reported in fiscal 2008, construction wastes such as debris and waste wood account for 72.7% of all illegal dumping cases (224 cases) and 87.5% of all dumped wastes (177,000 tons) and for 74.7% of all improper treatment cases (230 cases) and 35.9% of all improperly treated wastes (441,000 tons), and the ratio of construction-related waste to all wastes continues to be high (Figure 2-49 and 2-50).

(c) Business Operators that Dumped Waste Illegally

Among business operators that carried out illegal dumping, etc. newly reported in fiscal 2008, waste-discharging enterprises account for about 48.4% (149 cases) of all the illegal dumping cases. About 23.1% (71 cases) were dumped by unknown business operators, about 9.7% (30 cases) by unlicensed ones, and about 9.1% (28 cases) by multiple-business ones. Concerning the amount of illegally dumped wastes, waste-discharging enterprises account for 48.3% (98,000 tons) of all the illegal dumping cases. 27.1% (55,000 tons) were dumped by multiple-business operators,

Figure 2-47 Changes to the number of illegal dumping cases of industrial waste and volume dumped



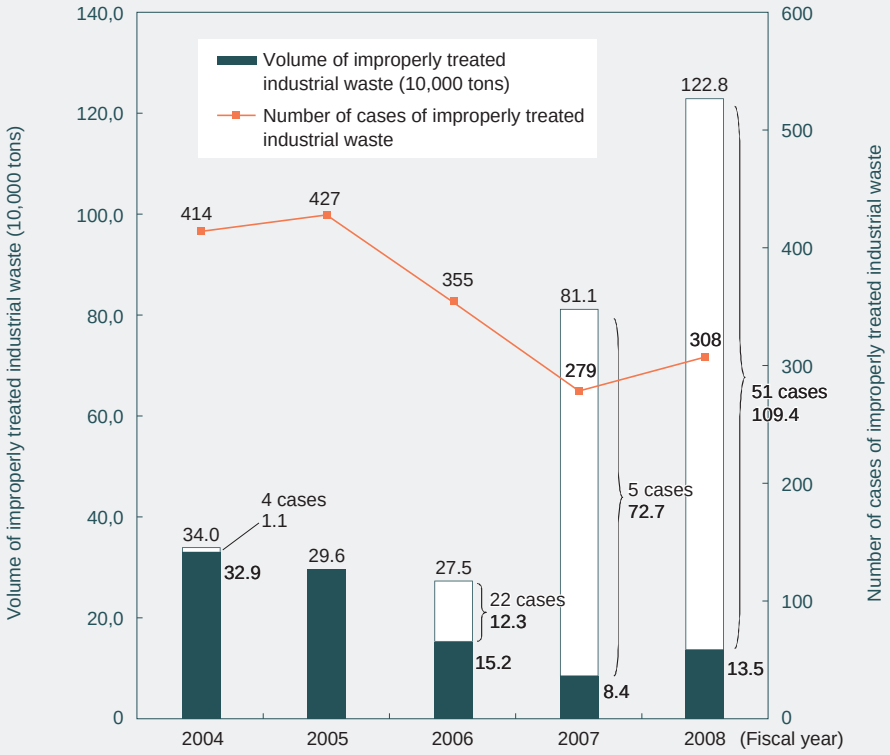
Note 1: Regarding the number of cases and volume of illegal dumping shown above, from among illegal dumping of industrial waste identified by prefectures and ordinance-designated cities, cases where the volume of dumping per case was 10 tons or more were totalized (however, cases including specially controlled industrial waste were all counted individually).

Note 2: As shown in the above graph, the cases of Gifu City and Numazu City were only discovered in 2003 and 2004 respectively; however, illegal dumping had already been carried out for several years previously and as a result, these cases were reported as a large-scale case in the relevant fiscal years.
The case of Chiba City in fiscal year 2006 was actually revealed in 1998, but the report was made in fiscal year 2006.
The case of Tadocho, Kuwana City in fiscal year 2008 was actually revealed in 2006, but the report was made in fiscal year 2008.

Note 3: Sulfate pitch cases and ferrosilt cases were excluded from the survey. Ferrosilt was used as refill materials, and its sales and use started in August 2001. Approx. 720,000 tons were sold and used, but later this was identified as illegal dumping cases. The illegal dumping was confirmed at 45 sites in four prefectures, and removal of ferrosilt had been completed at 39 sites (as of the end of September 2009).

Source: Ministry of the Environment

Figure 2-48 Changes in the number of cases and volume of improperly treated industrial waste



Note 1: Regarding the number of cases and volume of improper treatment shown above, from among improperly treated industrial waste identified by prefectures and ordinance-designated cities, cases where the volume of improper treatment per case was 10 tons or more were totalized (however, cases including specially controlled industrial waste were all counted individually).

Note 2: As shown in the above graph, the numbers of cases reported were 4, 22, 5 and 51 in fiscal year 2004, 2006, 2007 and 2008 respectively, but were discovered by the municipalities before those reported fiscal years. The volume of improperly treated industrial waste in fiscal 2007 includes 714,000 tons in a large-scale case, i.e., the case of Ritto City, Shiga Prefecture. The volume of improperly treated industrial waste in fiscal 2008 includes large-scale cases, i.e., 857,000 tons in the case of Uda City, Nara Prefecture, 22,000 tons in the case of Nagano City, Nagano Prefecture and 12,000 tons in the case of Tsukubamirai City, Ibaraki Prefecture.

Note 3: Sulfate pitch cases and ferrosilt cases were excluded from the survey. Ferrosilt was used as refill materials, and its sales and use started in August 2001. Approx. 720,000 tons were sold and used, but later this was identified as illegal dumping cases. The illegal dumping was confirmed at 45 sites in four prefectures, and removal of ferrosilt had been completed at 39 sites (as of the end of September 2009).

Source: Ministry of the Environment

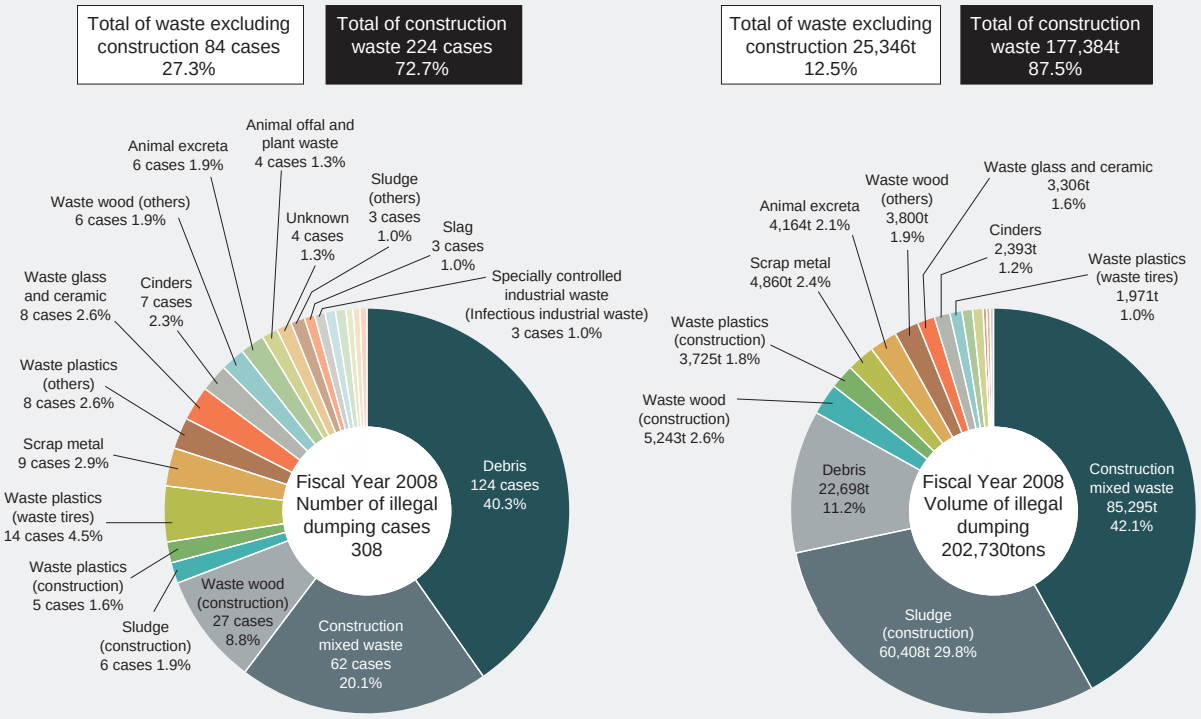
9.8% (20,000 tons) by unlicensed ones and 8.8% (18,000 tons) by unknown ones (Figure 2-51). Regarding the cases of improper treatment, waste-discharging enterprises account for about 59.4% (183 cases) of all the improper treatment cases. About 15.9% (49 cases) were improperly treated by multiple-business operators, about 12.0% (37 cases) by licensed ones and about 5.2% (16 cases) by unknown ones. As for the amount of improperly treated wastes, licensed operators account for 89.4% (1.098 million tons) of all the cases. 5.6% (68,000 tons) were improperly treated by waste-discharging enterprises, 3.6% (44,000 tons) by multiple-business ones and 0.8% (10,000 tons) by unknown ones (Figure 2-52).

(d) State of Removing Problems

Among illegal dumping cases newly reported in 2008 (308 cases, 203,000 tons), measures concerning removal of problems are to be carried out for five cases reported that problems have happened. Of them, the measures concerning removal of problems have been completed for four cases within the fiscal year, and the same measure has been taken for remaining one case. Concerning 15 cases reported that problems may happen, preventive measures against problems are to be carried out for 12 cases and on-the-spot inspections are to be implemented for three cases to confirm the situations in the future. Of 12 cases in which preventive measures against problems are to be carried out, the preventive measures have been completed for eight cases within the fiscal year. Regarding six cases reported as under survey on problems, the survey to clarify the situations of problems, etc. is carried out or will be carried out in the next fiscal year (Table 2-6).

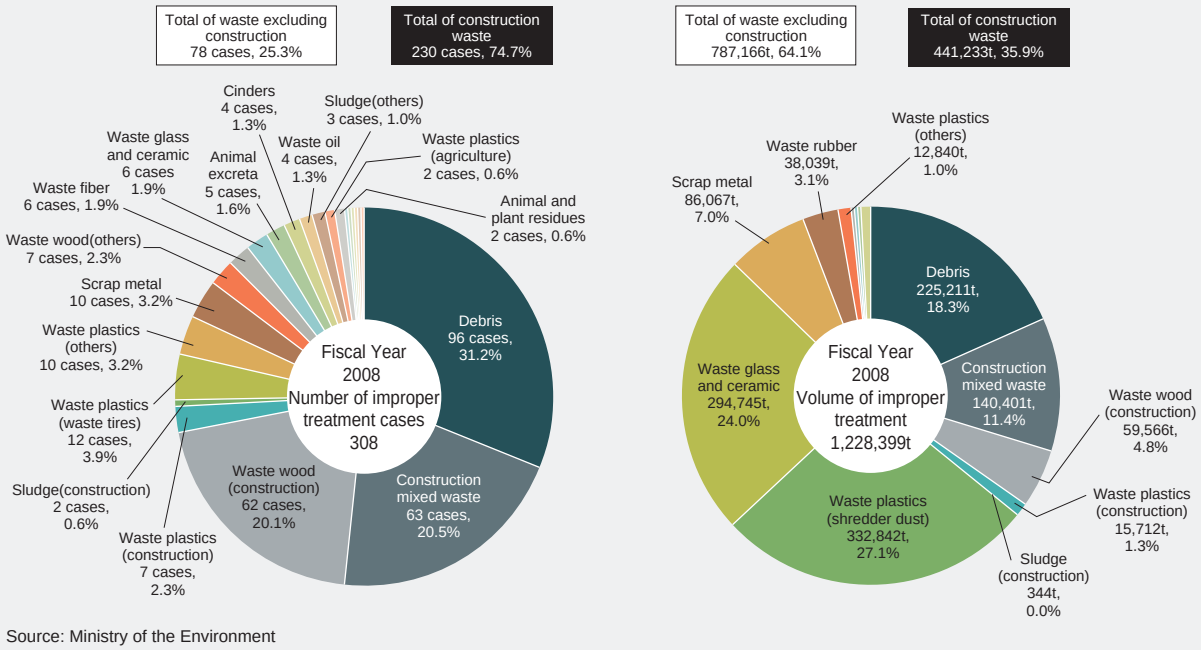
Among improper treatment cases newly reported in 2008, there was no case reported that problems have happened. As for 16 cases reported that problems may happen, preventive measures against problems are to be carried out for 12 cases and on-the-spot inspections are to be implemented for four cases to confirm the situations in the future. Of 12 cases in which preventive measures against problems are to be carried out, the preventive measures have been completed for seven cases within the fiscal year. Concerning six cases reported as under survey on problems, the survey to clarify the situations of problems, etc. is carried out or will be carried out in the next fiscal year (Table 2-7).

Figure 2-49 Types of illegally dumped industrial waste (fiscal year 2008)



Source: Ministry of the Environment

Figure 2-50 Types of improperly treated industrial waste (fiscal year 2008)



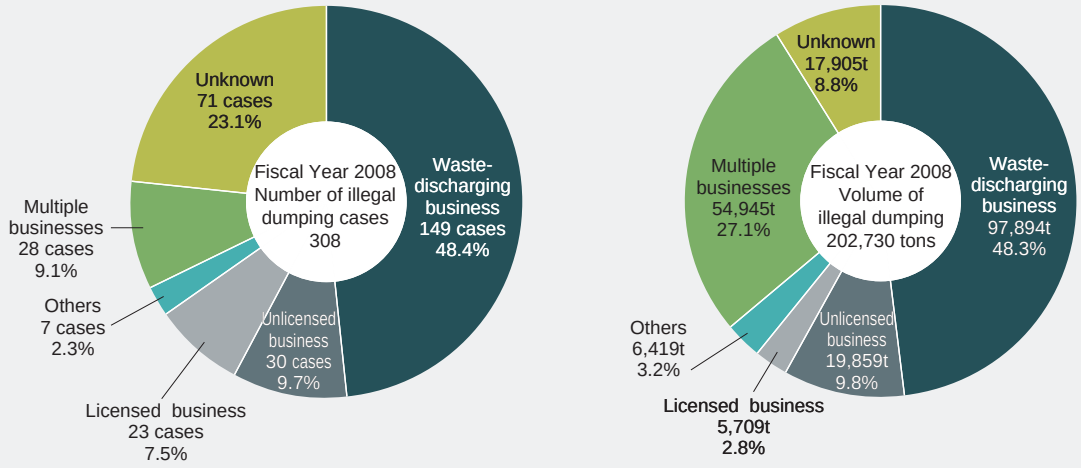
Source: Ministry of the Environment

B. Unsolved Cases of Illegally Dumped Industrial Wastes as of the End of Fiscal 2008

As of March 31, 2009, the number of unsolved cases of illegally dumped but inappropriately treated industrial waste found by the 47 prefectures, etc. all over the country was 2,675, and the residual amount of the waste was 17.26 million tons (Figure 2-53).

Of this, measures concerning removal of problems are to be carried out for 16 cases in the future. Among 159 cases reported that problems may happen, preventive measures are to be taken for 33 cases, monitoring of surrounding areas is to be implemented for 11 cases and on-the-spot inspections are to be conducted for 115 cases in the future. Of 33 cases in which preventive measures against problems are to be carried out, the preventive measures have been implemented for six cases by the administrative authorities. As for 199 cases reported as under survey on problems, the survey to clarify the situations of problems, etc. is carried out or will be carried out in the next fiscal year. In addition, periodic on-the-spot inspections, monitoring, etc.

Figure 2-51 Perpetrators of illegally dumped industrial waste (fiscal year 2008)



Source: Ministry of the Environment

Figure 2-52 Perpetrators of improperly treated industrial waste (fiscal year 2008)

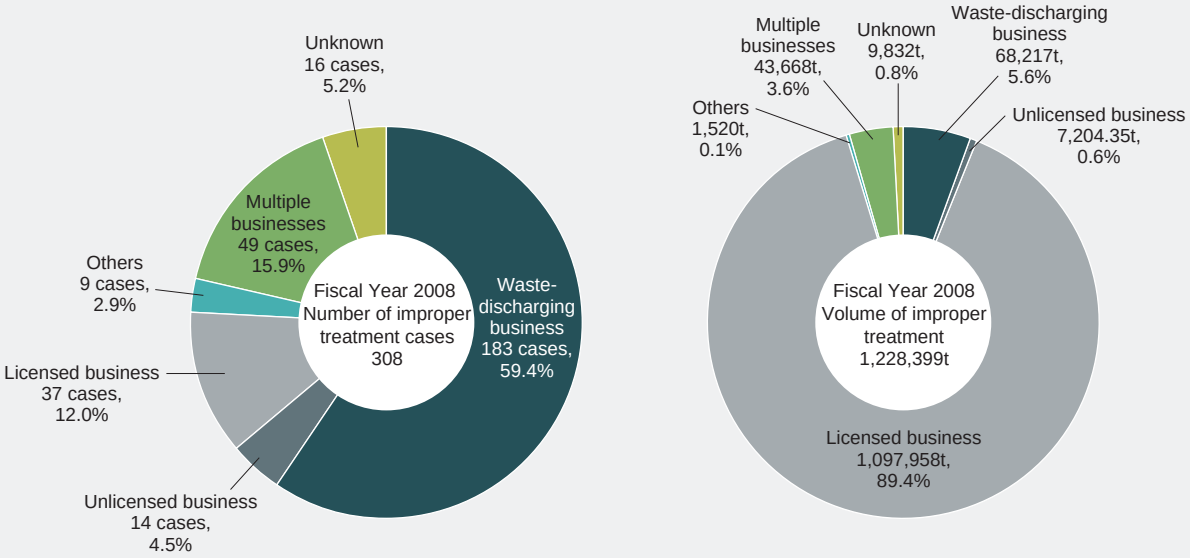


Table 2-6 Problems caused by illegal dumping cases and status of prefectures' measures against the problems (fiscal year 2008)

	Number of dumping	Percentage	Volume of dumping (t)	Percentage
Problems have happened.	5	1.6%	1,725	0.9%
Measures concerning removal of problems (including taken and partially taken ones)	5	1.6%	1,725	0.9%
Measures completed*2	4	1.3%	1,425	0.7%
Problems may happen.	15	4.9%	7,620	3.8%
Preventive measures against problems (including taken and partially taken ones)	12	3.9%	2,091	1.0%
Measures completed*2	8	2.6%	1,623	0.8%
Periodic on-the-spot inspections	3	1.0%	5,530	2.7%
No problem at present	282	91.6%	191,795	94.6%
Others (guidance of removal, follow-up survey, etc.)	106	34.4%	127,996	63.1%
No particular measures	176	57.1%	63,799	31.5%
Under survey on problems	6	1.9%	1,590	0.8%
Survey in order to clarify the problems	6	1.9%	1,590	0.8%
Total*1	308	100.0%	202,730	100.0%

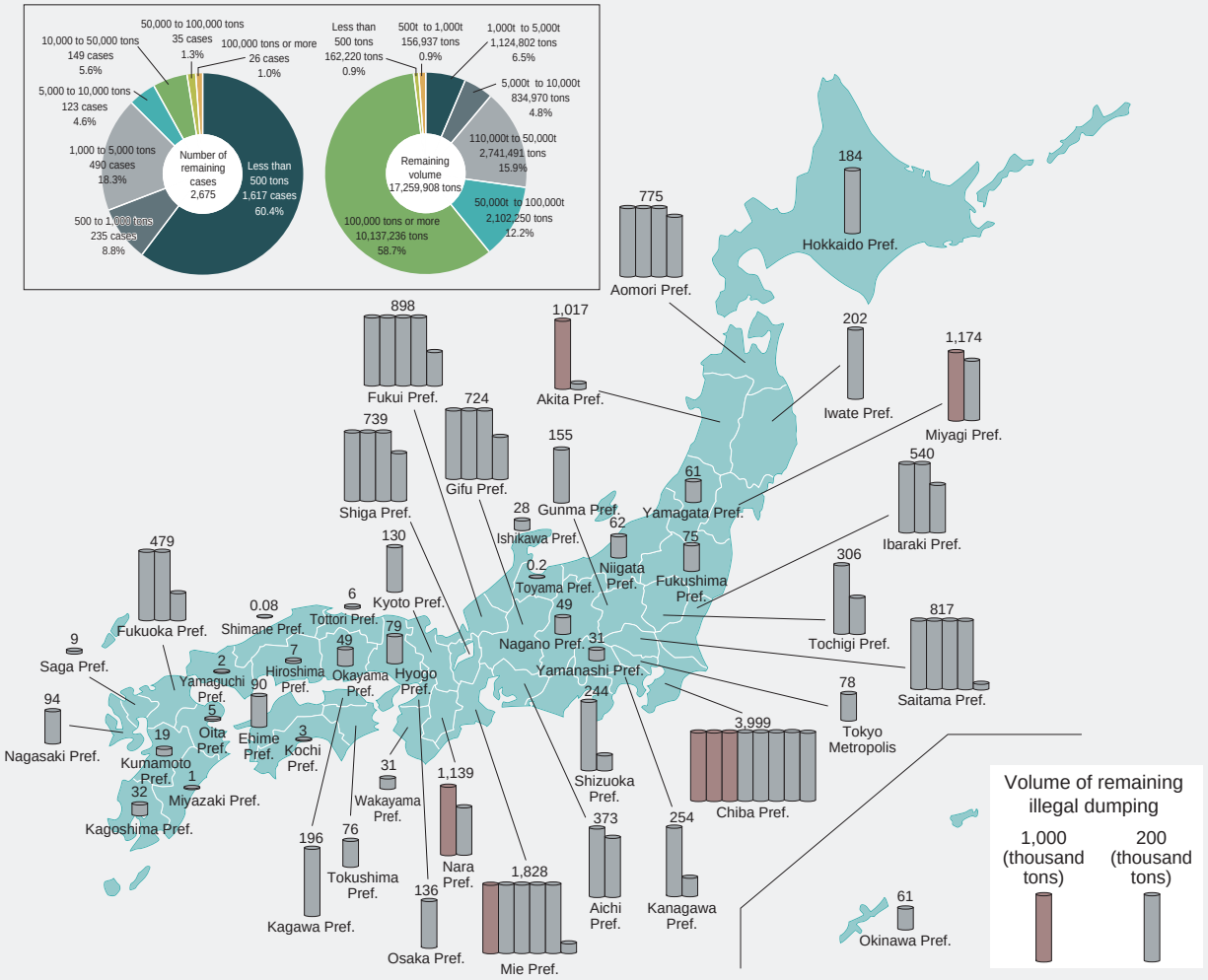
*1: Number of reported cases which were identified as illegal dumping ones within the fiscal year
*2: Cases completed within the fiscal year from among above ones, which are not included in the remained cases as of the end of the fiscal year
Source: Ministry of the Environment

Table 2-7 Problems caused by improper treatment cases and status of prefectures' measures against the problems (fiscal year 2008)

	Number of improper treatment	Percentage	Volume of improper treatment (t)	Percentage
Problems have happened.	0	0.0%	0	0.0%
Problems may happen.	16	5.2%	899,405	73.2%
Preventive measures against problems (including taken and partially taken ones)	12	3.9%	869,408	70.8%
Measures completed*2	7	2.3%	320	0.0%
Periodic on-the-spot inspections	4	1.3%	29,997	2.4%
No problem at present	286	92.9%	318,454	25.9%
Others (guidance of proper treatment, periodic on-the-spot inspections, etc.)	96	31.2%	226,899	18.5%
No particular measures	190	61.7%	91,555	7.5%
Under survey on problems	6	1.9%	10,540	0.9%
Survey in order to clarify the problems	6	1.9%	10,540	0.9%
Total*1	308	100.0%	1,228,399	100.0%

*1: Number of reported cases which were identified as illegal dumping ones within the fiscal year
*2: Cases completed within the fiscal year from among above ones, which are not included in the remained cases as of the end of the fiscal year
Source: Ministry of the Environment

Figure 2-53 Remaining volume of illegally dumped industrial waste by prefecture (by prefecture and ordinancedesignated city, as of the end of fiscal year 2008)



Note: The above data concern cases of illegal dumping, etc. of industrial wastes identified by all prefectures and 12 ordinance-designated cities as of the end of fiscal 2008; from among these cases, the above data were created by counting those cases for which it was possible to ascertain the remaining volume of wastes.
Source: Ministry of the Environment

Table 2-8 Problems caused by illegal dumping cases, etc. and prefectures' measures policies dealing with the problems (remained cases, as of the end of fiscal year 2008)

		Number of remained cases	Percentage	Remained volume (t)	Percentage
Problems have happened.		16	0.6%	4,140,295	24.0%
	Measures concerning removal of problems*	16	0.6%	4,140,295	24.0%
Problems may happen.		159	5.9%	4,915,197	28.5%
	Preventive measures against problems (including partially taken ones)	33	1.2%	4,097,342	23.7%
	Monitoring in surrounding area	11	0.4%	70,418	0.4%
	Periodic on-the-spot inspections	115	4.3%	747,437	4.3%
No problem at present		2,301	86.0%	6,501,483	37.7%
	Others (guidance of improvement, periodic on-the-spot inspections, monitoring, etc.)	630	23.6%	1,738,658	10.1%
	No particular measures	1,671	62.5%	4,762,826	27.6%
Under survey on problems		199	7.4%	1,702,932	9.9%
	Survey in order to clarify the problems	199	7.4%	1,702,932	9.9%
Total		2,675	100.0%	17,259,908	100.0%

*As of December 2009, measures concerning removal of problems have been taken in all cases.
Source: Ministry of the Environment

Table 2-9 Specially controlled wastes

Classi-fication	Major groups		Description
Specially controlled municipal waste	Parts containing PCBs		Parts containing PCBs, and included in waste air conditioner, waste TV or waste microwave
	Soot and dust		Generated at incinerators in waste treatment facilities
	Soot, dust, cinders, sludge		Generated from municipal waste incinerators, which are facilities specified by the Law Concerning Special Measures against Dioxins, and including dioxins
	Infectious municipal waste		Generated from hospitals or similar, and that may contain infectious pathogens or have such pathogens attached
Specially controlled industrial waste	Waste oil		Volatile oils, kerosene, light oils
	Waste acid		Extremely corrosive waste acid with pH2.0 or lower
	Waste alkali		Extremely corrosive waste alkali with pH12.5 or higher
	Infectious industrial waste		Generated from hospitals or similar, and that may contain infectious pathogens or have such pathogens attached
	Specified hazardous industrial waste	Waste PCB, etc.	Waste PCBs and waste oils including PCBs
		PCB-contaminated material	Sludge subject to PCB-permeation, waste paper subject to PCB-application or impregnated with PCB, waste wood or waste fiber subject to PCB-permeation, waste plastics or scrap metal subject to adherence of PCBs, or have enclosed PCBs, waste ceramic or debris subject to adherence of PCBs
		Treated PCB material	Treated in order to dispose of waste PCBs or PCB-contaminated materials, and including PCBs
		Designated sewage sludge	As stipulated by Article 13-4 of the Enforcement Ordinance of the Sewerage Law
		Slag	Slag including heavy metals
		Waste asbestos	Generated by construction asbestos removal businesses, or from sites with designated particulate emitting facilities installed, and with a risk of dispersion
		Soot, dust, cinders	Waste including heavy metals or dioxins
		Waste oil	Waste oils including organochlorine compounds
		Sludge, waste acid, waste alkali	Waste including heavy metals, PCBs, organochlorine compounds, agricultural chemicals, dioxins

Source: Ministry of the Environment

have been carried out for even 2,301 cases reported as no problem at present (Table 2-8).

Note: The Ministry of the Environment conducts research concerning (3) every year in cooperation with the 47 prefectures and ordinance-designated cities of Japan under the Waste Management and Public Cleansing Law (hereafter referred to as "47 prefectures, etc."). Among the cases of illegal dumping, etc., the research covers cases where the dumped amount of each case is 10 tons or more except sulfate pitch- and ferrosilt-related cases. However, it covers all cases related to specially-controlled industrial wastes.

(4) Specially-controlled Wastes

A. Overview

"Specially-controlled wastes" refer to those specified by a Cabinet Order as wastes which are explosive, toxic, infections or of a nature otherwise harmful to human health and the living environment (specially-controlled municipal wastes or specially-controlled industrial wastes).

These wastes are appropriately treated according to a special treatment criteria based on the types of specially-controlled wastes. A licensed business operator is entrusted with the treatment of the specially-controlled wastes.

B. Wastes Included in Specially-controlled Wastes

To date wastes shown in Table 2-9 have been designated as specially-controlled wastes.

(5) Measures for Treating Asbestos

A. Industrial Wastes

The revised Air Pollution Control Law (Act No. 5 of 2006) that amended the Air Pollution Control Law, etc. was completely enforced in April 2007 in order to prevent damage caused by asbestos to the health, etc. of people. In order for the national government to promote safe and rapid treatment of wastes containing asbestos, started under this law is a system (called "Toxicity Eliminating or Decomposing Treatment Certification System) when the Minister of the Environment certifies an operator to be able to eliminate or decompose toxicity with advanced techniques, such as fusion, no license for a specific type of business and facility installation is required of a business operator by the governor, etc. of the prefecture.

B. Municipal wastes

The Ministry of the Environment is requesting municipalities to deliver the wastes of household appliances containing asbestos, such as irons, toasters, and dryers, distinguish them from other wastes, collect them without damaging them, not to smash them if possible after collection, and to finally dispose of them by sprinkling with water or immediately covering them with soil, or to distinguish them from other wastes when stored.

On the other hand, as a permanent measure, the ministry laid down technical guidelines based on advice by professionals about how to treat the wastes of household appliances containing asbestos, showed the guideline to municipalities, and requested them to treat the wastes appropriately.

(6) Development of a System for Treating Polychlorinated Biphenyl (PCB) Wastes

A. Development of a Nationwide System for Treating PCB Wastes

The Japan Environment Safety Corporation developed a system for treating high-pressure transformers, capacitors, etc. containing PCB, based on this system, five broader-area treatment facilities have been established in Japan (Kitakyushu City, Toyota City, Tokyo Metropolis, Osaka City, and Muroran City in Hokkaido). Treatment operations started in Kitakyushu in December 2004, in Toyota in September 2005, in Tokyo in November 2005, in Osaka in October 2006, and in Hokkaido in May 2008.

The national government, in cooperation with 47 prefectures, has been making efforts to establish a fund (PCB Waste Treatment Fund) to facilitate treatment by small and medium size companies that cannot bear the burden of such expenses.

B. Measures for Treating Waste Electric Equipment Contaminated with Very Small Amounts of PCB

Concerning PCB wastes, it has been found that transformers, etc. in which no PCB is used actually contain a large quantity of insulating oil contaminated with very small amounts of PCB (hereafter referred to as "waste electric equipment contaminated with very small amounts of PCB). This waste electric equipment contaminated with very small amounts of PCB may damage the environment because of loss, etc. Therefore, it is necessary to develop a comprehensive system for treating such waste equipment. In order to develop a system for the treatment of the equipment by the private sector, the national government has been conducting 16 experiments in total for incineration verification in nine facilities from 2005 to 2008. The "Expert Committee on Treatment of Waste Electric Equipment Contaminated with Very Small Amounts of PCB" that was set up in the Central Environment Council has been discussed the results of verification tests and how to promote the treatment of such waste equipment. In March 2009, the result of study was summarized in "Treatment Measures for Waste Electric Equipment, Etc. Contaminated with Very Small Amounts of PCB". Based on this summarized result, the related ministerial ordinances and notifications were revised in November 2009, e.g., waste electric equipment contaminated with very small amounts of PCB was covered by the special system on eliminating treatment in the Waste Management and Public Cleansing Law (Table 2-10 and 2-11).

Table 2-10 PCB waste storage status (as of March 31, 2008)

Type of waste	Number of business establishments that store PCB waste	Storage quantity
High voltage transformer	6,246	33,887 units
High voltage capacitor	51,630	267,800 units
Low voltage transformer	918	44,861 units
Low voltage capacitor	4,040	1,678,375 units
Pole-mounted transformer	253	2,655,163 units
Ballast	15,095	6,094,353 units
PCB	296	50 t
Oil including PCB	2,495	132,973 t
Carbonless paper	384	704 t
Rag	1,711	437 t
Sludge	313	22,484 t
Other machinery and equipment	6,403	470,001 units

Remarks: Regarding items that cannot be measured as a number of units, weight or volume, e.g., transformers, etc. (high-voltage transformers, high-voltage capacitors, low-voltage transformers, low-voltage capacitors, pole-mounted transformers, ballasts and other machinery and equipment) and PCB, etc. (PCB, oil including PCB, paper, carbonless paper, rag and sludge) stored in a drum or any other bulk containers, only the number of business establishments were counted. PCB, etc. recorded by volume were totalized after converting into weight assuming 1 liter = 1kg.
Source: Ministry of the Environment

Table 2-11 Use status of products containing PCBs in business establishments that store PCB waste (as of March 31, 2008)

Type of waste	Number of business establishments that store PCB waste	Storage quantity
High voltage transformer	2,078	9,235 units
High voltage capacitor	6,336	21,938 units
Low voltage transformer	167	54,944 units
Low voltage capacitor	235	28,904 units
Pole-mounted transformer	27	1,164,296 units
Ballast	1,456	279,530
PCB	26	549 kg
Oil including PCB	21	4,138 kg
Other machinery and equipment	2,367	14,665 units

Remarks: PCB, etc. (PCB, oil including PCB, paper, carbonless paper, rag and sludge) recorded by volume were totalized after converting into weight assuming 1 liter = 1kg.
Source: Ministry of the Environment

(7) Dioxins Emission Control

A. What Are Dioxins?

Dioxins are substances generated naturally in the process of substance incineration (by-product).

Polychlorinated dibenzo-para-dioxin (PCDD) has 75 types of isomers, polychlorinated dibenzofuran (PCDF) has 135 types of isomers, and coplanar polychlorinated biphenyl (coplanar PCB) has a dozen types of isomers. Among these types of isomers, 29 types are regarded as being toxic.

B. Position of Waste Incinerators in the Dioxin Problem

The main generation source of dioxins is garbage incineration. In addition to this, there are various generation sources, such as electric furnaces for steelmaking, cigarette smoke, and automobile emissions. It is said that dioxins are also generated in the natural world by forest fires, volcanic activities, etc. In addition, a research report says that dioxins contained in once used PCB and some types of agrochemicals as impurities may be accumulated in the environment, such as in mud found at the bottom of rivers or the sea.

The movement of dioxins after they have entered the environment is not known clearly. However, it is known, for example, that dioxins that have stuck to particles in the air fall to the ground and contaminate the soil and water. It is also known that dioxins including ones that have already been accumulated in the environment over a long time, including bottom mud, are taken up by plankton, fish and shellfish and on through the food chain into other animals.

C. Details of the Dioxin Problem

In November 1983, newspapers drew attention to the dioxin problem when they reported that dioxins had been detected from ashes in a municipal solid waste incinerator.

The dioxin problem in waste treatment was discussed earlier, and measures were taken according to “Guidelines for Prevention, etc. of Dioxins Generation Related to Waste Treatment” (new guideline) created by the former Ministry of Health and Welfare in January 1997.

In the new guidelines, an emission concentration of 80 ng-TEQ/m^3 was set as a criterion for judging the necessity of urgent measures. The new guidelines were positioned as a new structural standard and maintenance management standard, etc. through the revision in August 1997 of the Enforcement Ordinance of the Waste Management and Public Cleansing Law and the Implementation Ordinance of the same law, and was enforced in December of the same year. The Ministry of the Environment also decided to impose legal regulations on dioxins as designated substances of the Air Pollution Control Law and established emission control standards for emissions from incinerators and electric furnaces for steelmaking in December 1997, thereby regulating emissions of dioxins. Due to these regulations, dioxin concentration in emissions was required to be measured in December 1997, and the concentration standard to be met was applied in December 1998. In December 2002, it was decided that a stricter concentration standard would be applied.

In addition, the national government held its first Ministerial Conference on Countermeasures against Dioxin in February 24, 1999. In the Ministerial Conference on Countermeasures against Dioxin held in March 30, 1999, “Basic Guidelines of Japan for the Promotion of Measures against Dioxins” were laid down, which urged the national government as a whole to vigorously pursue various countermeasures, such as considerably decreasing the emission amount of dioxins. According to the guidelines in particular, it was decided that the total emission amount of dioxins would be reduced by “about 90%” by the end of March 2003, compared to the amount in 1997.

In 1999, the “Law concerning Special Measures against Dioxins” was enacted. In 2000, based on the same law, a target reduction amount was set by the “Plan for Reducing the Amount of Dioxins Emitted Through Business Activities in Japan”, and the plan required an emission inventory of dioxins to be drawn up every year. It was confirmed that the estimated emission amount of dioxins in 2003 was about 95% smaller than that in 1997, and the plan was evaluated because the target emission amount was achieved.

According to the report by the Central Environment Council (in November 2004) it was stated that the risk of dioxins needs to be continuously controlled, the plan was changed in June 2005 in order to take further measures for reducing dioxins, and a new reduction target for 2010 was set. The total estimated emission amount in 2008 fell below this target, and it is considered that dioxins have been steadily reduced (Table 2-12).

In addition, the total amount of dioxins emitted from waste incinerators in 2008 was about 98% less than that in 1997. This is probably because many of the incinerators that could not meet the emission standard and other structural and maintenance management standards, were either suspended or closed their operations due to the support measures, etc. related to tighter regulations and the development of standard-meeting incinerators, and because new incinerators that met the standards were developed. The achievement rate in fiscal 2008 of the environmental quality standards set according to the Law concerning Special Measures against Dioxins was 100.0 % for the atmosphere, and the environmental quality standards were met for all measurement points.

(8) Other Measures against Hazardous Wastes

In March 2009, a guideline on response to Pandemic Influenza was formulated for safe and stable treatment of wastes even during Pandemic Influenza season, and an infectious waste treatment manual (revised version) was summarized and notified in May 2009 in order to deal with revision, etc. of the Waste Management and Public Cleansing Law or the Infectious Disease Law.

In addition, proper treatment measures against wastes containing hazardous chemical substances such as mercury and persistent organic pollutants (POPs) have been studied responding to international movement.

Moreover, regarding wastes with safety from the viewpoint of radiation protection, information management system is operated to ensure the traceability.

(9) Transboundary Movement of Hazardous Wastes

According to the “Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal” (hereafter referred to as the “Basel Convention”.

Table 2-12 Reduction targets concerning estimated emissions of dioxins by business sectors in Japan

(WHO-TEF used)

Business sectors	Reduction targets in FY 2010 (g-TEQ/year)	(Reference) Estimated emissions		
		FY 1997 (g-TEQ/year)	FY 2003 (g-TEQ/year)	FY 2008 (g-TEQ/year)
1. Waste treatment sector	164 ~ 189	7,205 ~ 7,658	219 ~ 244	132 ~ 137
(1) Municipal waste incinerator	51	5,000 [Water] 0.044	71 [Water] 0.004	42 [Water] 0.001
(2) Industrial waste incinerator	50	1,505 [Water] 5.3	75 [Water] 0.60	42 [Water] 0.6
(3) Small scale waste incinerator, etc.	63 ~ 88	700 ~ 1,153	73 ~ 98	48 ~ 53
2. Industrial sector	146	470 [Water] 6.3	149 [Water] 0.93	80 [Water] 0.5
(1) Electric furnace for steel-making	80.3	229	80.3	33
(2) Sintering facility for steel making	35.7	135	35.7	22.5
(3) Zinc-collection facility (Calciner, sintering furnace, blast furnace, smelting furnace, drying furnace)	5.5	47.4 [Water] 0.0036	5.5 [Water] 0.0066	3.1 [Water] 0.0006
(4) Aluminum alloy manufacturing facility (Calciner, smelting furnace, drying furnace)	14.3	31.0 [Water] 0.34	17.4 [Water] 0.029	11.3 [Water] 0.001
(5) Copper-collection facility	0.048	0.053	–	–
(6) Pulp manufacturing facility (bleaching process)	0.46	0.74 [Water] 0.74	0.46 [Water] 0.46	0.27 [Water] 0.27
(7) Other facilities	9.9	26.5	9.9	9.6
3. Others	4.4 ~ 7.7	4.8 ~ 7.4 [Water] 1.2	4.4 ~ 7.3 [Water] 0.56	3.6 ~ 6.3 [Water] 0.20
Total	315 ~ 343	7,680 ~ 8,135 [Water] 12.8	372 ~ 400 [Water] 2.1	215 ~ 223 [Water] 1.3

Note 1: As a toxicity equivalent factor, WHO-TEF (2006) was used for emissions in 2008 and WHO-TEF (1998) was used for those in other years.
Note 2: The reduction targets represent annual dioxin emissions after measures to reduce dioxins in exhaust gas and effluent have been taken.
Note 3: "3. Others" refers to crematoriums, cigarette smoke, vehicle exhaust, terminal sewage treatment facilities, and final landfill sites for waste.
Note 4: "Water" shown in the table refers to the discharge into water (included figure).
Note 5: The symbol "–" indicates there was no operation in the relevant year.
Source: Created by the Ministry of Environment, based on the Government Plan to Reduce Dioxin Levels Resulting from Business Activities in Japan (enacted in September 2000 and amended in June 2005) and Dioxins Emissions Inventory (November 2009)

As of December 2009, 171 nations and the EC were parties to the Basel Convention.) adopted to address the problems of environmental pollution, etc. resulting from the trans-boundary movement of hazardous wastes, Japan enacted the "Law for the Control of Export, Import and Others of Specified Hazardous Wastes and Other Wastes" (Act No. 108 of 1992) (hereafter referred to as the "Basel Law"), and it has imposed the necessary regulations on export and import of wastes by revising the Waste Management and Public Cleaning Law. Table 2-13 shows enforcement of the regulations on export and import based on the Basel Law.

In recent years, against the backdrop of the globalization of economic activities and increase in demand for resources due to rapid economic growth in Asian countries, an international movement of recyclable resources aiming at recycling has been activated. Under such circumstances, because there is a fear of inappropriate export and import of wastes, etc., the Ministry of the Environment has been cooperating with the relevant domestic authorities and the government agencies of each country to take measures for preventing them (for information on cooperation with the government agencies of each country, refer to C in Section 5).

In Japan, the pre-application consultation services regarding export and import of hazardous wastes, etc. and on-site responses such as on-the-spot inspections have been carried out, information sessions about the Basel Law for exporters and importers have been held (11 places in fiscal 2009),

Table 2-13 Status of export and import based on the Basel Law (2009)

	Weight (tons)	Partner countries	Items	Purpose of export and import
Export	84,878 (54,204)	South Korea, Belgium, USA, Germany, Singapore	Lead ash, lead scrap (lead-acid battery), solder waste, nickel sludge, etc.	Collection of metals
Import	4,075 (3,874)	Philippines, Singapore, Indonesia, Thailand, Malaysia, China, etc.	Copper sludge, silver sludge, zinc sludge, used fluorescent lamp, waste substrate, electronic component scrap, nickel-cadmium battery scrap, etc.	Collection of metals, etc.

The figure in parenthesis indicates the numerical value in 2008.
Source: Ministry of the Environment

views have been exchanged with the Customs House and each country's information on import/export regulations has been put on the website. Following the last year, as one of "Reduction, Reuse and Recycling (3Rs) Promotion Month" activities, the Regional Environment Offices made efforts for enhanced monitoring of illegal hazardous waste import/export in conjunction with the Customs House. In addition, "Used Products Criteria for Exporting Used CRT-based Televisions" have been applied since September 1, 2009 so that used CRT-based televisions which are unfit for reuse are not exported or treated improperly.

Section 3. State of Implementation of Legal Systems for Establishment of a Sound Material-Cycle Society

(1) Fundamental Law for Establishing a Sound Material-Cycle Society

The "Fundamental Law for Establishing a Sound Material-Cycle Society" was promulgated in July 2000 and enforced in January 2001, with the aim of securing a material cycle in society by revising the present state of our mass-production, mass-consumption, and mass-disposal society and the lifestyles of people, to thereby establish "a sound material-cycle society" where consumption of natural resources is curbed and the environmental load is decreased.

This law provides the following: (1) objects subject to this law should be understood as "wastes, etc." in an integrated manner regardless of whether they are valuable or of no value and products should be prevented from becoming wastes, etc., (2) the usefulness of generated wastes, etc. should be paid attention to and wastes, etc. should be re-recognized as "recyclable resources" for them to thereby be subject to cyclical use (reuse, recycling, and heat recovery) , (3) wastes that are not capable of cyclical use should be appropriately disposed. With these processes, this law aims to realize "a sound material-cycle society", that is "a society where the consumption of natural resources can be reduced and as much of the environmental load as possible can be decreased." (Figure 3-1)

The Sound Material-Cycle Society Fundamental Law promotes two concepts as the base of its policies: the responsibility of waste generator and extended producer responsibility.

A. Responsibility of Waste Generator

A waste generator must bear the primary responsibility for the reduction of environmental load caused by its disposal of wastes. "Responsibility of waste generator" is an idea that a business operator that generates wastes should bear the responsibility for proper treatment of the wastes, and it is one of the basic principles of measures for recycling wastes. More specifically, proper treatment of wastes means that a business operator must sort its generated wastes and treat them by itself.

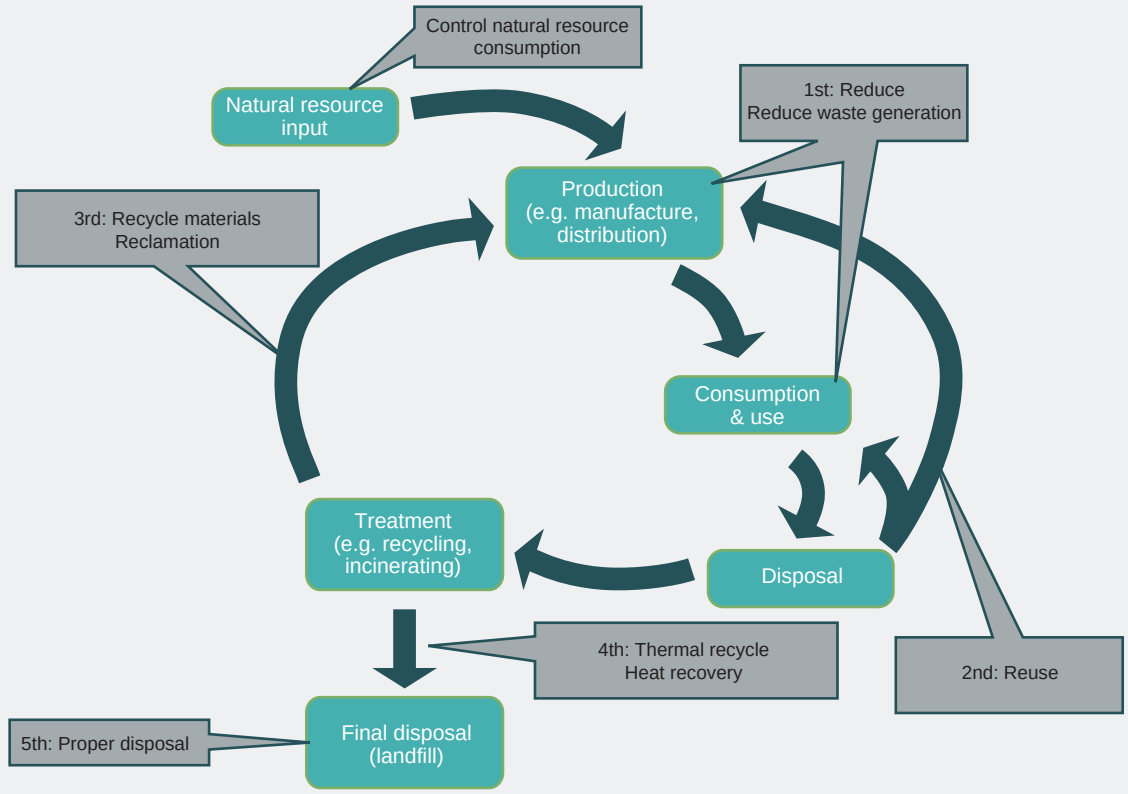
Because the perpetrator of environmental load caused by the disposal of wastes is the generator of the wastes, it is rational to think that the generator is responsible for the reduction of environmental load caused by its disposal of wastes. The root of this idea lies in the so-called Polluter-Pays Principle.

This idea of "responsibility of waste generator" must be continuously and thoroughly promoted. In addition, ordinary citizens cannot be free from their responsibility as a generator of wastes and need to play their roles positively.

B. Extended Producer Responsibility

Extended Producer Responsibility (EPR) is an idea that a producer bears a certain responsibility (physical or financial responsibility) for the reuse, recycling, and disposal of the products it produced even after the products were used and then disposed of. This idea gives producers incentives to develop and produce products that are difficult to

Figure 3-1 Flowchart for a sound material-cycle society



Source: Ministry of the Environment

be disposed of and easy to be reused or recycled. Now we have problems that there are an excessively large amount of wastes and that it is difficult to reuse or recycle them. Therefore, the extended producer responsibility is one of the important ideas for solving such problems. (Table 3-1)

C. Fundamental Plan for Establishing a Sound Material-Cycle Society (Sound Material-Cycle Society Fundamental Plan)

The Fundamental Law for Establishing a Sound Material-Cycle Society provides that the Fundamental Plan for Establishing a Sound Material-Cycle Society should be formulated as a fundamental plan related to the establishment of a sound material-cycle society.

The Fundamental Plan for Establishing a Sound Material-Cycle Society is a central device for comprehensively and systematically implementing policies related to the establishment of a sound material-cycle society, and it provides the image of what a sound material-cycle society should be like, sets numerical targets for the establishment of a sound material-cycle society, and shows the direction of actions taken by the national government and other actors.

The second Sound Material-Cycle Society Fundamental Plan decided upon by the Cabinet in March 2008, provides that all actors, including ordinary citizens, business operators, NPOs, NGOs, universities, local public bodies, and the national government should cooperate with one another to take actions for the establishment of a sound material-cycle society.

Above all, the plan states that the national government should take the following comprehensive actions: (1) the integrated creation of both a low-carbon society and a society in harmony with nature, (2) the promotion of creation of "regional resource recycling zones," (3) the promotion of a people's movement for the 3Rs, (4) the thorough promotion of businesses for a sound material-cycle society, such as green purchasing, (5) improvement of the mechanism of the 3Rs focused on waste generation reduction, (6) improve increasingly sophisticated techniques and systems for the 3Rs, (7) understand information and develop of human resources, and (8) establish an international sound material-cycle society.

In order to steadily implement the Sound Material-Cycle Society Fundamental Plan, the Central Environment Council is required to check how the policies based on the Sound Material-Cycle Society Fundamental Plan have been implemented every year and as necessary report the direction of future policies to the national government. In fiscal 2009, for the second time, the council checked how the second Sound Material-Cycle Society Fundamental Plan had been implemented.

Specifically, the council had seven intensive deliberations, based on the actions taken by the industrial world, business operators, and local public bodies and four public hearings with relevant government ministries and agencies, and compiled the results of the audit in March 2010. The report of these results highlighted, as future issues to tackle, consideration of a new shape of sound material-cycle society from a long-term perspective, further promotion of the achievement of regional resource recycling, strategic advancement of establishing a sound material-cycle society through the promotion of businesses for the society, further efforts toward penetration of 3Rs to the world centered on Asia through the Regional 3R Forum in Asia based on the possibility that there are great changes in conventional systems such as changes in prices of resources including recyclable ones, changes in industrial structures and development of infrastructures and the numerical target, i.e., reduction of greenhouse gas emissions by 25% (Figure 3-2).

(2) Waste Management and Public Cleansing Law (Waste Management Law)

A. Comprehensive Actions in Waste Management

In May 2001, the Minister of the Environment decided and officially announced the "Basic Guidelines for the Comprehensive and Systematic Promotion of Waste Reduction Measures and Other Appropriate Treatments" (Basic Guidelines).

Table 3-1 Extended producer responsibility described in Extended Producer Responsibility: A Guidance Manualfor Governments by OECD

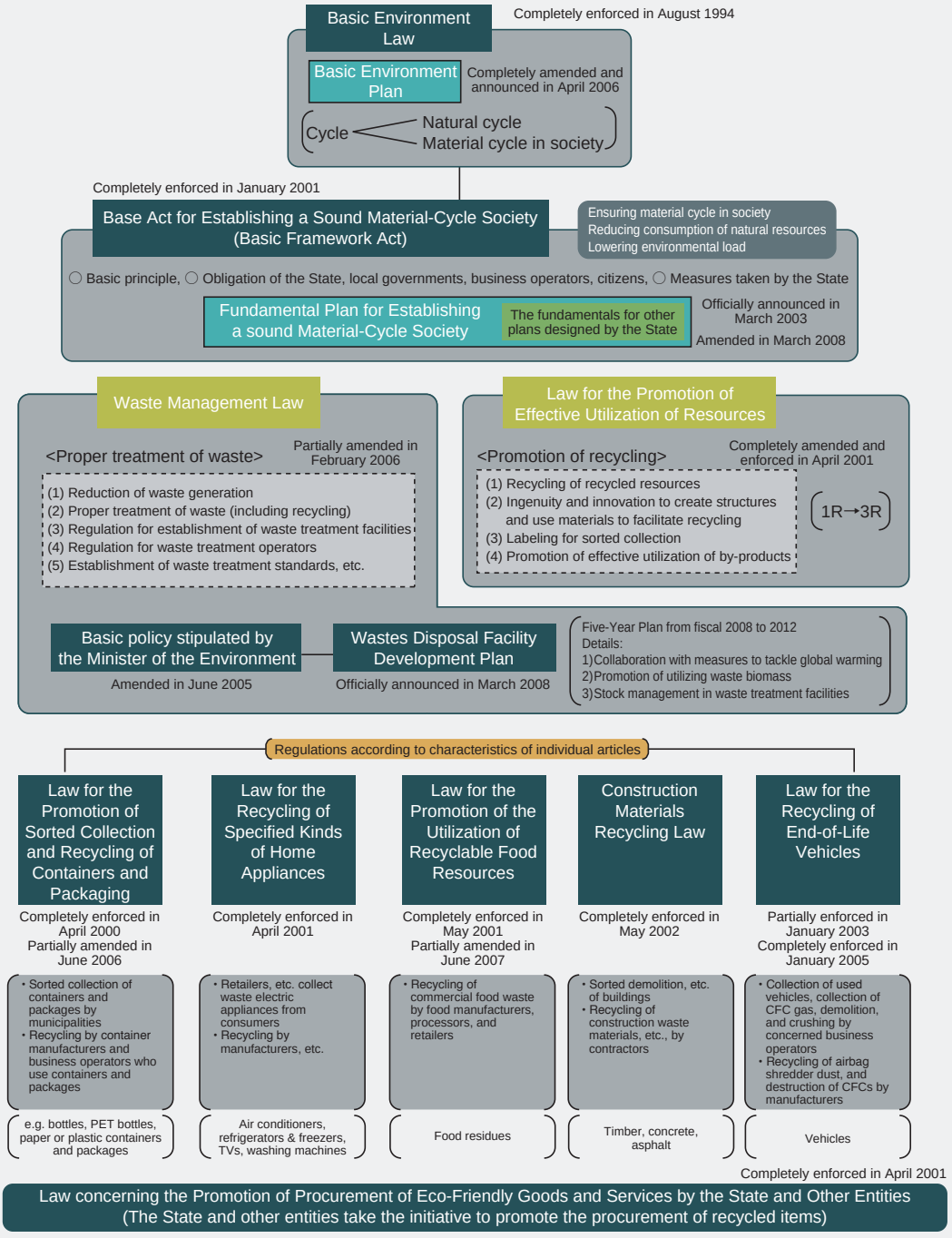
(1) Definitions	An environmental policy approach in which a producer' s responsibility, physical and/or financial, for a product is extended to the post-consumer stage of a product' s life cycle. More specifically, (1) Producers accept responsibility when they design their products to minimize environmental impacts over the product' s life cycle (2) Producers accept physical and/or economic responsibility for those environmental impacts that cannot be eliminated by design.
(2) Primary function	To transfer the financial and/or physical responsibility, in whole or part, of waste treatment from local government authorities and the general taxpayer to the producer
(3) Four principal goals purposes	(1) Source reduction (natural resource conservation, materials conservation) (2) Waste prevention (3) Design of more environmentally compatible products (4) Closure of material-use loops to promote sustainable development
(4) Effectiveness	To pressure parties concerned in the upstream side design and selection of materials for a product; and to enable sending of appropriate signals to producers so that they will include external environmental costs incurred by their products
(5) Shared responsibilities	In the product chain, from manufacturing to disposal, shared responsibilities among all actors are an inherent part of extended producer responsibility
(6) Examples of specific policy approaches	(1) Product take-back (2) Deposit/refund (3) Surcharge/tax (4) Advance disposal fees (5) Minimum recycled content requirements (6) Leasing

Source: Created by the Ministry of the Environment, based on Extended Producer Responsibility: A Guidance Manual for Governments (2001) by OECD

The guidelines basically provide the following: (1) the generation of wastes should be controlled as much as possible, (2) then actual wastes should be used as cyclically as possible in the order of reuse, recycling, and heat recovery in consideration of prevention of improper waste treatment and reduction of the environmental load, and (3) wastes unable to be subject to proper and cyclical use, even after such generation control and proper and cyclical use have been thoroughly carried out should be treated properly. With these processes, it is required for the final disposal volume of municipal waste and that of industrial waste to be reduced by about 50% by fiscal 2010, compared with fiscal 1997, and, also in fiscal 2009, efforts to achieve the target were steadily made.

In addition, when the Waste Management Law was revised in June 2003, provisions concerning the formulation of the Wastes Disposal Facility Development Plan were added to the law, resulting in the repeal of the Law for Special Measures for the Improvement and Construction of Waste Treatment Facilities. The Waste Disposal Facility Development Plan, whose target was changed from “amount of projects” to “results to achieve” based on the discussions about the revision of the ideal state of social capital development by the national government, was decided on by the Cabinet in October 2003. Because this plan was supposed to reach its final year in fiscal 2008, the new Wastes Disposal Facility

Figure 3-2 A system of policy measures to promote establishing a sound material-cycle society



Source: Ministry of the Environment

Development Plan into which a perspective on cooperation with measures against global warming was incorporated was decided on by the Cabinet in March 2008.

"Subsidy System for Promoting the Establishment of a Sound Material-Cycle Society," under which targets for promoting the 3Rs of wastes were set to promote the development of waste treatment and recycling facilities cross-jurisdictionally and comprehensively, was established in fiscal 2005. Under this system, municipal waste treatment facilities, such as heat recovery facilities, high-efficiency raw material and fuel recycling facilities, sludge recycling centers, final disposal sites, recycling centers, have been developed to promote the generation control, cyclical use, and proper treatment of wastes. In fiscal 2009, 40 regional plans for effectively using this subsidy were formulated.

Furthermore, social capital development programs that utilize private finance initiatives (PFI) to develop municipal waste treatment facilities (PFI programs) were subsidized.

When the Waste Management and Public Cleansing Law was revised in June 2000, requirements for business operators to be designated as waste treatment center operators were relaxed in order to promote the further use of the Solid Waste Treatment Center System. In addition, in order to support the development of first-class waste treatment facilities that include the private sector, such excellent facilities are qualified as specified facilities, based on the "Law to Promote the Development of Specified Facilities for the Disposal of Industrial Waste." In fiscal 2009, one corporation was designated as a waste treatment center, and, at the end of the same fiscal year, 19 corporations were designated. In addition, the subsidy system created in fiscal 2000 for model development projects by industrial waste treatment facilities has promoted the further development of industrial waste treatment facilities operated by the public sector. In fiscal 2009, four projects for developing controlled landfill sites for domestic wastes and industrial waste, etc. were subsidized.

Among the greater metropolitan areas where final disposal sites are especially difficult to secure, in the Kinki area, the Osaka Bay Regional Offshore Environmental Improvement Center promoted the smooth development of regional waste disposal facilities and landfill facilities.

In addition, soft measures seen in the sorting and collecting garbage, etc. by municipalities, which would lead to more reduction and recycling of wastes, were assisted. The Waste Management and Public Cleansing Law revised in 1992 was enforced in December 1993, and, since then, necessary regulations, such as for the export of wastes to be checked by the Minister of the Environment and import of wastes to be approved by the same minister, have been imposed on the export and import of wastes under the principle of domestic treatment. In 2009, 27 exports were checked and 18 imports approved by the minister, according to the Waste Management and Public Cleansing Law. (For information on the transboundary movement of hazardous wastes, refer to (9) in 4, Section 2.)

In addition, in order to improve conditions for waste-discharging enterprises to select excellent waste-treating enterprises, a project for developing a larger number of excellent industrial waste-treating enterprises has been carried out. Created as part of this project was the "Excellence Evaluation System," in which the 47 prefectures, at the time of license renewal, check that waste-treating enterprises meet certain standards and as of the end of March 2009, 2,968 projects and 306 enterprises has been certified. On the other hand, some local public bodies operate a system in which waste-treating enterprises can be checked if they meet the necessary evaluation standards, regardless of the time of license renewal. Also in this system, 730 projects and 191 enterprises are certified to meet the standards, showing a steady increase in numbers.

Moreover, the introduction of the electronic manifest system has a lot of advantages, such as higher-efficiency administrative work, compliance improvement, and forgery prevention, which rapidly increased the adoption rate of the system to about 19% at the end of fiscal 2009. However, the number is still smaller than expected. Therefore, in order to achieve the target that the adoption rate of the electronic manifest system should be increased to 50%, which is set in "IT New Reform Strategy" (January 19, 2006) compiled by the IT Strategy Headquarters, systematic and comprehensive efforts are being made to spread and promote the system.

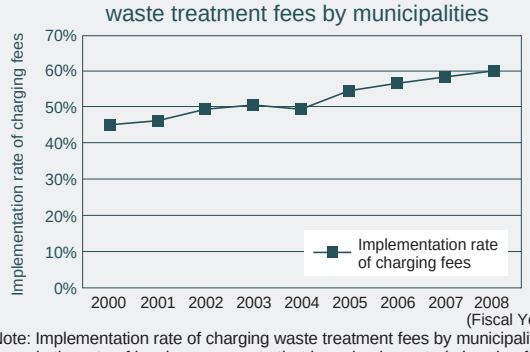
B. Promotion of Waste Reduction, etc. Based on the Waste Management and Public Cleansing Law

According to the Waste Management and Public Cleansing Law revised in 1997, a so-called "Recycling Certification System" was created. In this system, an enterprise does not need a license for a specific type of business and facility installation when the means of recycling specific wastes by a waste-treating enterprise has been certified by the Ministry of the Environment to meet certain standards, such as no expected problem with the conservation of the living environment. At the end of fiscal 2009, 63 cases were certified in municipal waste treatment and 48 cases in industrial waste treatment.

In addition, according to the Waste Management and Public Cleansing Law revised in 2003, a so-called "Wider-area Treatment Certification System" was created. In this system, when a waste-treating enterprise is certified by the Minister of the Environment as suitable for proper waste treatment including waste reduction because of its wider-area operation, no license for a specific type of business is required of the enterprise. In October 2008, waste printing machines and waste devices for cellular phones were included in municipal waste subject to the Wider-area Treatment Certification System. In order to promote the collection and recycling of wastes by manufacturers, etc. themselves, by the end of fiscal 2009, 81 cases were certified in municipal waste treatment and 184 cases in industrial waste treatment.

According to the report "Ideal State of Municipal waste Treatment by Municipalities for the Establishment of a Sound Material-Cycle Society" submitted by the Central Environment Council in February 2005, the Ministry of the Environment decided that the whole national government would build appropriate recycling and treatment systems focused on the 3Rs, this was based on the fact that the objective of the waste-recycling administration has been shifting from conventional matters, such as conservation of the living environment, improvement of public health, and solutions to pollution problems, to the establishment of a

Figure 3-3 Changes to implementation rate of charging waste treatment fees by municipalities



Note: Implementation rate of charging waste treatment fees by municipalities is the rate of local governments that have implemented charging fees for domestic waste treatment (excluding waste directly brought in and bulky waste); in recent years the rate is steadily increasing apart from fiscal year 2004, in which the rate appears to decrease due to the merger of municipalities.
Note: The 23 wards of Tokyo were counted as one city.
Source: Ministry of the Environment

sound material-cycle society.

Accordingly, the ministry revised its basic policy formulated according to the provision of Paragraph (1), Article 5-2 of the Waste Management and Public Cleansing Law in May 2005.

The basic policy laid out tasks for municipalities to achieve for the optimization of municipal waste treatment systems for the establishment of a sound material-cycle society, the following three points are now clearly described (Figure 3-3).

1) To analyze and provide costing information needed for projects related to municipal waste treatment, examine the analysis results from various angles, and utilize PFI as necessary, so that the projects becomes socioeconomically efficient

2) To further charge a fee for municipal waste treatment in order to promote the generation control and recycling of municipal waste with economic incentives used to share costs fairly according to the amount of generated waste, and to raise the awareness of citizens

3) To clearly explain to citizens and business operators the necessity and environmental load and economy-related advantages when the current municipal waste treatment system categories for sorted collection of wastes, waste treatment methods, etc. are changed or when a new system is introduced

According to the statements shown above, in June 2007, the Ministry of the Environment created “Municipal waste Accounting Standards” that gave a standard method of analyzing costs for a municipal waste treatment project, “Guidance for Charging a Fee for Municipal waste Treatment” that showed how to carry out procedures for charging a fee, and “Guidelines for a Municipal waste Treatment System for the Establishment of a Sound Material-Cycle Society in Municipalities” that showed the standard categories for sorted collection of municipal waste and ideas on how to recycle and treat them.

At the fiscal 2009, the ministry gave briefings on these guidelines to local public bodies and technically assisted their reform for realization of the 3Rs.

C. Examination and Evaluation of How the Waste Management and Public Cleansing Law Has Been Enforced

Ten years have passed since the Waste Management and Public Cleansing Law revised in 1997 was enforced, and the national government has examined how the law had been enforced according to the supplementary provisions of the revised law. It was necessary to examine the enforcement state of the law stage by stage. Therefore, in July 2008, the “Expert Committee on Waste Treatment System” was set up in the Central Environment Council to examine and evaluate how the rules for the generation control, proper treatment, etc. of wastes based on the Waste Management and Public Cleansing Law were observed, focus on the most important points on the current Waste Management and Public Cleansing Law and examine proper treatment of wastes and measures for 3Rs promotion comprehensively. Based on results of these debates and public comments, the Committee summarized a report. In response to this, the Waste and Recycling Committee of the Central Environment Council offered an opinion, “Direction of Reviewing Waste Treatment System” in January 2010.

On the basis of this opinion, a bill of the Law Making a Partial Amendment to the Waste Management and Public Cleansing Law was submitted to the 174th Diet in March 2010.

(3) Johkasou Law (Household Wastewater Treatment Facility Law)

The Johkasou Law enforced in October 1985 aims to properly treat raw sewage and miscellaneous wastewater with household wastewater treatment facilities, to thereby contribute to the conservation of the living environment and the improvement of public health from the viewpoint of conservation of the water quality of the public water area. The law also understands the series of processes of manufacturing, installing, and managing household wastewater treatment facilities in an integrated manner and imposes tighter regulations on them. At the same time, it requires people engaged in the operations of installation and management of the facilities to have certain qualifications.

The law provides that an examination should be carried out to check if each household maintains and manages its household wastewater treatment facility properly. The ratio of households that undertook an examination of water quality conducted at the end of fiscal 2008 according to Article 7 of the law was 89.9%, a 2% increase from fiscal 2007. In addition, the ratio of households that undertook a regular examination of their household wastewater treatment facilities carried out according to Article 11 of the law was 27.2% (48.5% for combined household wastewater treatment facilities), 1.5% increase (1.5%increase for combined household wastewater treatment facilities) from fiscal 2007.

(4) Law for the Promotion of Effective Utilization of Resources (Resources Effective Utilization Law)

The Resources Effective Utilization Law enforced in April 2001 specifies the following business categories: 1) business that should control the generation of or recycle by-products (specified businesses in which resources are saved: steel business, paper and pulp manufacturing business, etc.), 2) business that should use recycled resources and recycled parts (specified reuse business: paper manufacturing business, glass container manufacturing business,

etc.), 3) products for which raw materials, etc. should be made rational use of (specified products for which resources are saved: automobiles, electric home appliances, etc.), 4) products for the use of recycled resources or recycled parts should be promoted (designated reuse-promoting products: automobiles, electric home appliances, etc.), 5) products that should have labels for promoting sorted collection (products with designated labels: plastic containers and packages, paper-made containers and packages, etc.), 6) products that should be collected and recycled by their manufacturers (designated recycled products: personal computers, small rechargeable batteries), 7) by-products the use of which is promoted as recycled resources (designated by-products: coal ash generated by the electricity industry), and the law imposes certain obligations on business operators engaged in each business mentioned above and promotes their voluntary efforts to make effective use of resources.

In addition, in January 2008, the basic policy working group of the Waste Treatment and Recycling Subcommittee under the Environment Division of the Industrial structure Council offered opinions concerning the vision of a new 3Rs policy for the establishment of a sound material-cycle society in the future. According to this vision, the Ministry of the Environment is taking measures for reducing the amount of various types of resources to be used.

First of all, in order to reduce the amount of resources to be used in a whole product supply chain, the ministry has selected 20 and 30 enterprise teams consisting of supply chains in fiscal 2008 and 2009 respectively and tries to create outstanding cases of resource-saving manufacturing through material flow cost accounting, environment-conscious design, etc.

In addition, the ministry is discussing a method or system for evaluating the activities carried out by manufacturers in their 3Rs-related product design and manufacturing in order to expand the market for 3Rs-conscious products so that consumers can accurately and easily understand and evaluate the manufacturers' efforts.

(5) Law for the Promotion of Sorted Collection and Recycling of Containers and Packaging (Containers and Packaging Recycling Law)

A. Enforcement Status

Among the items sorted and collected in fiscal 2008, particularly the amount of paper-made containers and packages and plastic bottles and containers increased. On the other hand, the amount of glass containers, steel containers, aluminum containers, cardboard containers and paper-made containers for beverages decreased from the previous year (Table 3-2).

Concerning plastic containers/packages other than plastic bottles and paper-made containers/packages that were added to target items in April 2000, the volume of sorted collection has increased steadily and the sorted collection executing rates of those plastic and paper-made containers/packages were 72.7% and 35.8% respectively in fiscal 2008. However, the executing rates are still lower than that of other items, and it is a question of increasing the number of municipalities which execute sorted collection (Figures 3-4 and 3-5 and Table 3-3).

B. Enforcement of the Containers and Packaging Recycling Law

In April 2008, the revised Containers and Packing Recycling Law was enforced completely, and a system was implemented in which business operators provided money to municipalities that contributed to rational recycling of containers and packages. With this system, the quality of sorted collection was improved and, therefore, the efficiency of the whole social system was improved.

In addition, in the joint meeting of the Expert Committee on Recycling Method for Plastic Containers and Packages under the Central Environment Council with the Evaluation Committee on Recycling Method for Plastic Containers and Packages under the Industrial Structure Council held in September 2009, the Ministry of the Environment and the Ministry of Economy, Trade and Industry set the upper limit on total amount of preferentially-treated material recycling method to be introduced in fiscal 2010 as a recycling method for plastic containers and packages as well as carrying out comprehensive evaluation for the quality improvement of material recycling method to reflect it in the preferentially-treated operation and releasing an interim report on the improvement other than bidding system. Moreover, in order to promote 3Rs for waste containers and packages, the Ministry of the Environment encouraged the spread of 3Rs to consumers by using promoters for controlling the generation of waste containers and packages (nickname: 3Rs promoting meister) who were commissioned according to the Containers and Packaging Recycling Law, and as a measure to encourage the spread of reducing waste containers and packages including plastic shopping bags, the Ministry of the Environment and Toyama Prefecture jointly held "National Forum for Promotion of No Plastic Grocery Bag" in Toyama City in November 2009.

(6) Law for the Recycling of Specified Kinds of Home Appliances (Home Appliance Recycling Law)

A. Enforcement Status

The Home Appliance Recycling Law was enforced completely in April 2001. Currently, there are 379 designated collection sites where manufacturers of four types of waste home appliances (household air-conditioners, televisions, refrigerators and freezers, washing machines and clothes dryers) subject to the law collect them, and recycling plants for the four types of collected waste home appliances are operating in 49 locations across the country (Figure 3-6). In these recycling plants, iron, aluminum, copper, glass, and rare metals used for printed-circuit boards are collected as well as fluorocarbons used as a refrigerant in household air-conditioners, refrigerators, freezers and electric washing machines, and fluorocarbons contained in heat insulating materials used for refrigerators and freezers.

The number of these four types of home appliances collected in designated collection sites and their recycling ratio in recycling plants are shown in 1-(3)-D., Section 2, and each ratio of recycling by manufacturers of the four types of home appliances exceeds the legal standard.

B. Revision of the Home Appliance Recycling System

In April 2006, five years have passed since the enforcement of the Home Appliance Recycling Law, and it was

Table 3-2 Sorted collection plan and recycling plan

(1) Number of municipalities with sorted collection

	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012
Glass containers: colorless	1,779 97.4%	1,780 97.4%	1,781 97.5%	1,784 97.6%	1,788 97.9%
Glass containers: brown	1,782 97.5%	1,783 97.6%	1,783 97.6%	1,786 97.8%	1,790 98.0%
Glass containers: other colors	1,782 97.5%	1,784 97.6%	1,786 97.8%	1,790 98.0%	1,794 98.2%
Paper containers and packages	896 49.0%	915 50.1%	942 51.6%	965 52.8%	974 53.3%
PET bottles	1,791 98.0%	1,792 98.1%	1,802 98.6%	1,804 98.7%	1,806 98.9%
Plastic containers and packages	1,429 78.2%	1,465 80.2%	1,489 81.5%	1,504 82.3%	1,517 83.0%
Steel cans	1,819 99.6%	1,819 99.6%	1,819 99.6%	1,819 99.6%	1,821 99.7%
Aluminum cans	1,820 99.6%	1,820 99.6%	1,820 99.6%	1,820 99.6%	1,822 99.7%
Cardboard boxes	1,744 95.5%	1,749 95.7%	1,753 95.9%	1,756 96.1%	1,759 96.3%
Drink cartons	1,568 85.8%	1,575 86.2%	1,585 86.8%	1,587 86.9%	1,591 87.1%

[Upper row: number of municipalities, lower row: percentage of all municipalities]
Total number of municipalities: 1,827 (as of April 1, 2007)

(2) Estimated sorted collection (Unit: thousand tons)

	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012
Glass containers: colorless	359	359	358	357	356
Glass containers: brown	309	309	308	308	307
Glass containers: other colors	183	184	184	184	184
Paper containers and packages	146	153	161	168	171
PET bottles	303	312	324	332	340
Plastic containers and packages	804	858	945	978	1,004
Steel cans	314	312	311	309	307
Aluminum cans	149	150	151	152	152
Cardboard boxes	752	763	770	776	781
Drink cartons	25	26	27	28	28

(3) Estimated recycling (Unit: thousand tons)

	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012
Glass containers: colorless	180	180	180	180	180
Glass containers: brown	160	170	170	170	170
Glass containers: other colors	130	130	130	130	130
Paper containers and packages	356	356	356	356	356
PET bottles	370	384	384	385	386
Plastic containers and packages	1271	1291	1291	1293	1,293

Source: Ministry of the Environment

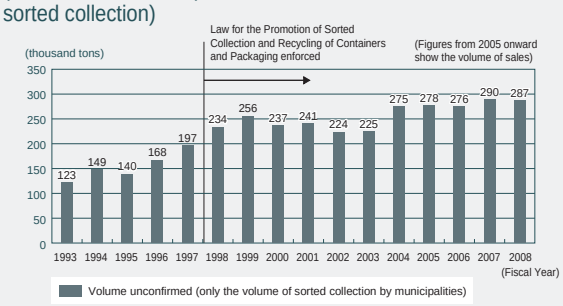
Table 3-3 Collection by designated corporations of waste conforming to sorted collection criteria

FY 2008	Plastic containers and packages	Paper containers and packages	PET bottles	Glass bottles		
				Colorless	Brown	Other colors
Number of municipalities conducting sorted collection	1,308	644	1,765	1,723	1,724	1,716
Number of municipalities transferring waste to designated corporations	1,017	148	1,137	921	983	1,184

Source: Created by the Ministry of the Environment, based on materials published by the Japan Container and Package Recycling Association

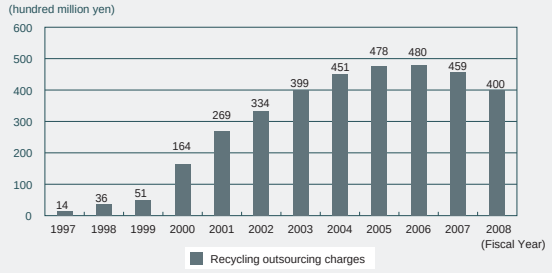
time to revise the Home Appliance Recycling System according to a provision of the law. In June of the same year, the system was examined and evaluated in the joint conference of the Central Environment Council and the Industrial Structure Council. As a result in February 2008, “Report on the Evaluation and Examination of the Implementation Sta-

Figure 3-4 Changes to the unconfirmed volume of PET bottles (*difference between production/volume of sales and volume of sorted collection)



Source: Ministry of the Environment

Figure 3-5 Changes to recycling outsourcing charges paid by specified businesses to designated corporations



Source: Created by the Ministry of the Environment, based on materials published by the Japan Container and Package Recycling Association

tus of the Home Appliance Recycling System" was compiled. The Ministry of the Environment has concretized the measures shown by the report as follows:

- In order to prescribe the addition of home appliances subject to the law (liquid crystal and plasma televisions and laundry driers) and the raising of the recycling ratio of the existing home appliances subject to the law, the enforcement ordinance of the Home Appliance Recycling Law was revised in December of the same year (enforced in April 1, 2009).
- For the establishment of a cooperative framework among concerned parties including financial support concerning measures against illegal dumping, and the improvement of the collection and transportation of waste home appliances in isolated islands, with financial cooperation from the manufacturers of home appliances cooperative projects have started for the prevention of illegal dumping and to provide measures for isolated islands.
- Regarding designated collection sites that were divided into two groups, in order to reduce the burdens and inequalities among retailers, etc., concerning the collection and transportation of waste home appliances, such sites have been commoditized since October 1, 2009. This allowed collecting waste home appliances of all manufactures at all designated collection sites nationwide(379 sites).
- Because distribution by retailers for reuse of specified home appliances is expected to improve convenience for consumers who dispose of waste home appliances, "Guidelines on the creation of standards for sorting for reuse and recycling" were laid down to promote appropriate reuse and recycling for retailers.

(7) Law Concerning Recycling of Materials for Construction Works (Construction Materials Recycling Law)

A. Enforcement Status

The Construction Materials Recycling Law was enforced in May 2002, targeting concrete mass, asphalt and concrete mass, and waste lumber disposed of at construction sites. In fiscal 2008, the recycling rate of concrete mass and that of asphalt and concrete mass was 97.3% and 98.4% respectively, which are high values. The recycling rate of lumber disposed at construction sites is 80.3% and the rate with reduction included is 89.4%, showing steady recycling.

B. Revision of the Construction Recycling System

In order to address issues related to construction recycling, "Plan 2008 for Promoting the Construction Waste Recycling" was formulated in April 2008, and measures based on this plan are being taken. In addition, in order to understand the actual state of construction by-products after the formulation of "Plan 2008 for Promoting the Construction Waste Recycling", research on the actual state of construction by-products for fiscal 2008 was carried out. Because five years passed since the complete enforcement of the Construction Materials Recycling Law in May 2002, a report was compiled in December 2008 after seven deliberations by the joint conference of the Social Capital Development Council and the Central Environment Council. According to the report, the Ministry of the Environment partially revised its ministerial ordinances concerning review of notification forms and detailed construction order for demolition work.

(8) Law for the Promotion of the Utilization of Recyclable Food Resources (Food Recycling Law)

The rate of recycling, etc. of recyclable food resources in fiscal 2007 was 54% for the whole food industry. Concerning the recycling rate of each business category, 81% for the food manufacturing industry, 62% for the food wholesaling industry, 35% for the food retailing industry, and 22% for the food service industry, showing differences among the industries.

According to the law that revised part of the Law for the Promotion of the Utilization of Recyclable Food Resources, which was enforced in December 2007, the Ministry of the Environment is making efforts including approval of the recycling business plan implemented by the parties concerned in cooperation with one another to achieve the target implementation rate (shown in the basic policy based on the provision of Paragraph (1), Article 3 of the same law) of the recycling, etc. of recyclable food resources by food-related business operators.

(9) Law for the Recycling of End-of-Life Vehicles (End-of-Life Vehicle recycling Law)

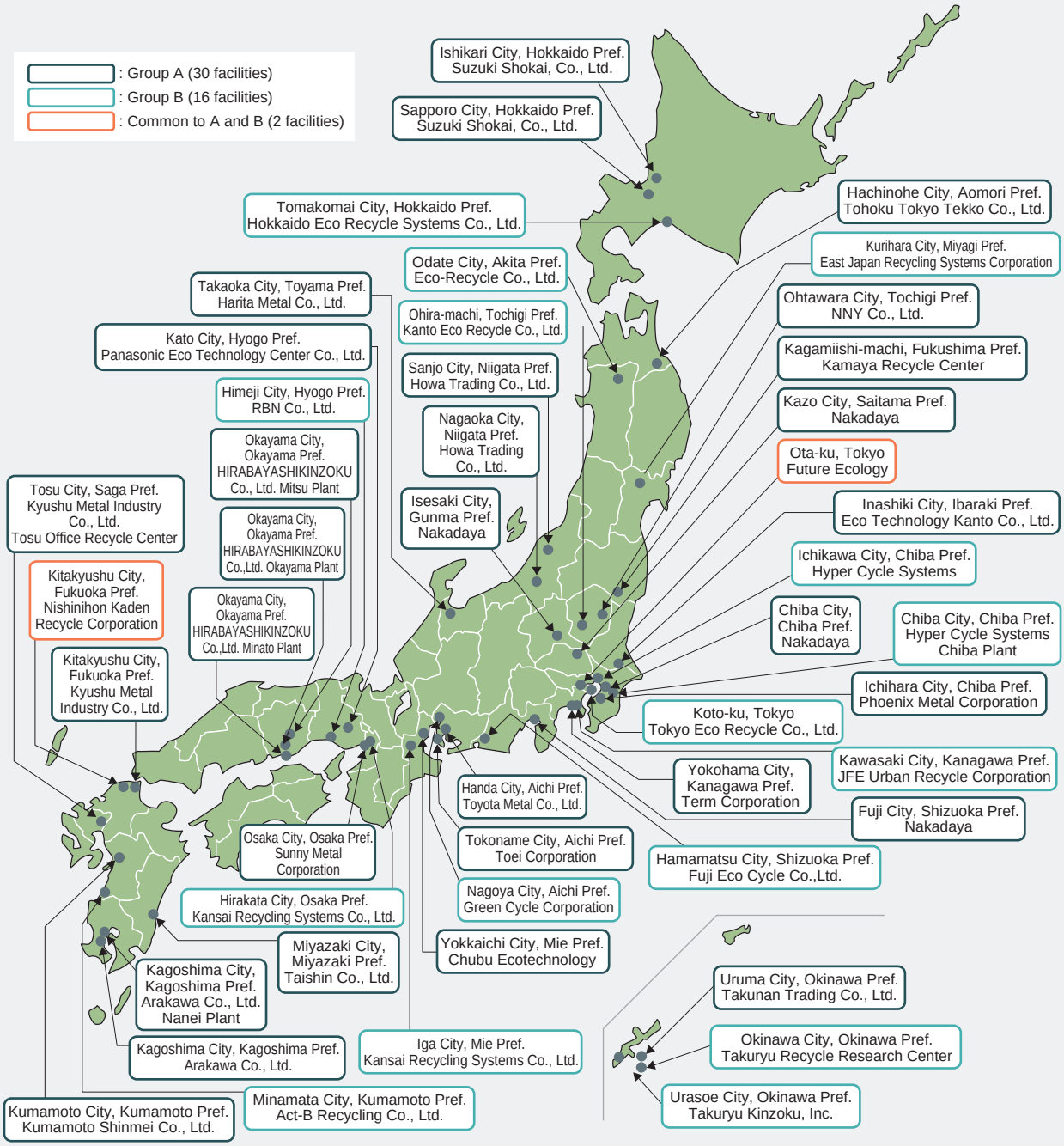
A. Enforcement Status

Since the Vehicle Recycling Law was enforced completely in January 2005, among the business operators affected by the law, the following have been registered and approved by the 47 prefectures, etc,: about 77,600 vehicle collecting companies, about 17,600 fluorocarbons collecting companies, about 6,700 vehicle dismantling companies, and about 1,300 vehicle crushing companies.

The national government, in cooperation with the relevant

Figure 3-6 Development status of major home appliance recycling plants

(As of March 2010)



■ Classification of Groups A and B
Group A: Led by Panasonic Corporation and Toshiba Corporation to recycle waste products.
Group B: Led by Hitachi Appliances, Inc. Sharp Corporation, Mitsubishi Electric Corporation, Sanyo Electric Co., Ltd., Sony Corporation and Fujitsu General to recycle waste products.
Source: Ministry of the Environment

administrative agencies of the 47 prefectures, etc, aimed to ensure fair application of the law and took measures against improper treatment of vehicles, targeting the last users of vehicles, relevant business operators, and exporters.

In addition, in order to enforce the law efficiently, the government using various types of media conducted public relation activities and held briefings for relevant business operators, vehicle owners, etc.

Costs needed for recycling of fluorocarbons, air bags, and shredder dusts (fluorocarbons are destroyed) are set and announced officially by automobile manufacturers, etc. As an organization that handles costs needed for managing recycling charges (charge management cost) and costs needed for managing the information on end-of-life vehicles (information management costs), the Japan Automobile Recycling Promotion Center is approved by the Minister of Economy, Trade and Industry and the Minister of the Environment, and the costs are announced officially.

The number of reports by vehicle collectors on used vehicles (electronic manifest report) was about 3.58 million in fiscal 2008. In addition, the total number of vehicles charged a fee for recycling in the period from January 2005 to March 2009 was 92.77 million, and the total amount of charged fees was 912.1 billion yen.

In addition, for municipalities on isolated islands that have difficulty collecting used vehicles, a support program with specified recycling deposits was started. In fiscal 2008, deposits for 23,000 vehicles were given to 89 municipalities.

B. Evaluation and Examination of the Vehicle Recycling System

Because five years passed since the complete enforcement of the End-of-Life Vehicle Recycling Law in January 2005, in the joint meeting of the Automobile Recycling Technical Committee under the Central Environment Council and the Automobile Recycling Working Group under the Industrial Structure Council, the law enforcement status was evaluated and examined, and was reported in January 2010. As recommended by this report, the Ministry of the Environment will make a guideline for the judgment of end-of-life vehicles or used ones.

(10) Law for the Promotion of Use of Agriculture, Forestry and Fisheries Resources as Raw Materials of Biofuel (Agriculture, Forestry and Fisheries Resources Biofuel Law)

In October 2008, "Agriculture, Forestry and Fisheries Biofuel Law" was newly enforced to promote the use of biomass originating from agriculture, forestry, and fisheries as biofuel, and to expand the production of domestic biofuel.

This law states the following: (1) the national government approves plans related to the "Production and Manufacturing Cooperation Project" in which farmers, foresters, fishers, and biofuel manufacturers, in cooperation with one another, are engaged in the process from production of raw materials to the manufacturing of biofuel (ethanol, wood pellet, etc.) and a "Research and Development Project" in which research and development is carried out to improve biofuel manufacturing techniques and (2) according to the approval by the government, support measures are taken, such as reduction of fixed property taxes on newly built biofuel manufacturing facilities and prolongation of the redemption period of improvement funds for farmers, foresters, and fishermen.

In December 2008, the first plan related to "Production and Manufacturing Cooperation Project" was approved.

(11) Law concerning the Promotion of Procurement of Eco-Friendly Goods and Services by the State and Other Entities (Law on Promoting Green Purchasing)

A. Promotion of Actions by the National Government and Local Public Bodies According to the Law

According to the "Basic Principles for Promoting Green Purchasing" (Basic Principles), organizations of the national government and others officially announced their procurement plans for fiscal 2009 and procured eco-friendly goods and services, based on the plans.

Designated procurement items and criteria for judgment of what should be procured specified in the Basic Principles are subject to revision as necessary according to the development and popularization status of the items and the improvement of scientific knowledge. Also in fiscal 2009, the Basic Principles were revised in February 2010, and the number of designated procurement items became 256 in 19 fields.

B. Promotion of Green Purchasing by Various Types of Participants

The activities of the Green Purchasing Network, which started as an organization composed of companies, the administration, consumer groups, etc. that took the initiative in working on green purchasing in cooperation with one another, were actively assisted, and, through their green purchasing seminars and educational and awareness activities, the idea was introduced that they preferentially purchased products with less environmental load, such as products with less generation of waste and recyclable products. In addition, briefings were given to help people to know and understand the "Guidelines for Labeling concerning the Environment;" the guidelines describe how information on eco-friendly goods and services should be provided to promote green purchasing.

(12) Law concerning Special Measures for Promotion of Proper Treatment of PCB Wastes (PCB Special Measures Law)

The Kanemi rice oil disease incident that occurred in 1968 revealed the toxicity of PCB to humans. Accordingly, in October 1973, the "Law concerning the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. " was enacted, and the manufacture, import, and use of PCB were banned. However, no treatment system for waste home appliances, etc., was built because the cooperation of local public bodies and people around possible construction sites for treatment facilities was not forthcoming, and for other reasons. Therefore, PCB waste was securely stored over a long period of time. In addition, the "Stockholm Convention on Persistent Organic Pollutants" (POPs Convention) adopted in May 2001 requires that the use of PCB be wholly abolished by 2025 and PCB waste be controlled appropriately till 2028. Under such circumstances, in order to prevent environmental pollution by PCB to protect public health in the future and conserve the living environment, the PCB Special Measures Law was enacted in June 2001. According to this law, the national government should take measures for building a PCB waste treating system, such as establishment of the PCB Waste Treatment Fund and the development of base treatment facilities by the Japan Environmental Safety Corporation (JESCO). With these measures, the treatment of PCB waste is supposed to be completed by 2016. In April 2003, the "Basic Plan for PCB Waste Treatment" specified in the PCB Special Measures Law was formulated in order to comprehensively and systematically promote the certain and proper treatment of PCB waste. In order to develop a comprehensive system for treating waste electric equipment contaminated with very small amounts of PCB and promote treatment of PCB-contaminated material, the basic plan was revised in November 2009.

(13) Law on Special Measures concerning Removal of Environmental Problems Caused by Specified Industrial Wastes (Law on Special Measures against Specified Industrial Wastes)

In Japan, industrial wastes generated because of improper treatment, such as illegal dumping, have caused problems with the conservation of the living environment. In addition, the industrial wastes left as they are for a long time,

have created public distrust in industrial waste treatment, which prevents a sound material-cycle society from being established. In view of such circumstances, it is essential to solve problems originating from industrial wastes and systematically and steadily prevent them from being generated. To tackle these issues, the “Law on Special Measures concerning Removal of Environmental Problems Caused by Specified Industrial Wastes” (Act No. 98 of June 2003: hereafter referred to as “Law on Measures against Specified Industrial Wastes) was enacted in June 2003, and enforced as a temporary law until 2012 before the enforcement of the revised Waste Management and Public Cleansing Law (in June 17, 1998). The reason why this special measures law was enforced was for the national government to provide financial assistance to the 47 prefectures, etc. if they by themselves remove problems concerning the conservation of the living environment originating from improperly treated industrial wastes (specified industrial wastes) against the treatment standards specified in the revised Waste Management and Public Cleaning Law or they prevent such problems from occurring (removal, etc. of problems).

The Law on Measures against Specified Industrial Wastes provides the following: (1) the Minister of the Environment should lay down “Basic Guidelines for Promoting the Removal, etc. of Problems Originating from Specified Industrial Wastes Systematically and Steadily by 2012” (Basic Guidelines), (2) 47 prefectures, etc. can formulate a plan for implementing the removal, etc. of problems originating from specified industrial wastes existing in their jurisdictions (Implementation Plan), (3) when the Industrial Waste Proper Treatment Center contributes funds for the 47 prefectures, etc. that implement the removal, etc. of problems originating from specified industrial wastes, the national government can provide financial assistance to the funds needed for the removal, etc. from within its budget, and (4) the costs incurred by the 47 prefectures, etc. to implement the removal, etc. of problems originating from specified industrial wastes are supplemented with their local bonds.

For the 12 projects for the removal, etc. of specified industrial wastes in Teshima Island in Kagawa Prefecture, the border between Aomori Prefecture and Iwate Prefecture, Sutamacho in Yamanashi Prefecture (present Hokuto City), Noshiro City in Akita Prefecture, Kuwana City in Mie Prefecture, Sanwamura in Niigata Prefecture (present Jouetsu City), Tsuruga city in Fukui Prefecture, Murata Town in Miyagi Prefecture, Yokohama City in Kanagawa Prefecture, Gifu City in Gifu Prefecture, Niigata City in Niigata Prefecture (former Maki Town), and Miyawaka City in Fukuoka Prefecture, some of the 47 prefectures, etc. formulated implementation plans, and the Minister of the Environment approved them. Among these prefectures, etc., Tsuruga City in Fukui Prefecture has the largest illegal dumping amount of about 1.1 million m3, and the national government provides financial assistance, etc. to these prefectures, etc. that carry out projects of removing, etc. of the problems.

Section 4. Infrastructure Development for Establishing a Sound Material-Cycle Society

(1) Financial measures

In the Basic Law for Establishing a Sound Material-Cycle Society, the Government calls for the adoption of financial measures necessary for implementing the tasks to establish a Sound Material-Cycle Society. Of the national budget for the Cabinet Office and each ministry, expenditure for promoting the establishment of a Sound Material-Cycle Society is approx. 760,881,670,000 yen, as planned in the FY 2009 original budget (of which, approx. 448,365,000,000 yen are to be used as subsidies for sewage work expenses).

(2) Promotion of the Sound Material-Cycle Society business

A. Market size of the Sound Material-Cycle Society business

The market and workforce sizes of the Sound Material-Cycle Society business in fiscal 2007 were 1.29 times and 1.22 times larger than that in fiscal 2000, the base year for the goal, respectively. Compared with last fiscal year, fiscal 2006, they increased by 9.9% and 3.1% respectively (Table 4-1).

Concerning the estimated market size, since the source of renovation/repair market was changed, the statistics application method was reviewed.

B. Efforts toward the promotion of Sound-Material-Cycle Society business

In coordination with the Green Purchasing Network, etc., purchasing of eco-friendly goods has been promoted under the Act on Promoting Green Purchasing. Designated procurement items provided by "Basic Policy for the Promotion of Procurement of Eco-Friendly Goods and Services" under the law (types of procurement items in which state institutions, etc. focus on promoting the procurement) and the evaluation criteria are reviewed accordingly. In 2009, 10 items were added, 1 item was deleted and 39 items were reviewed including the introduction of a comprehensive evaluation indicator for "copy paper".

In addition, the Guideline for Green Purchasing Efforts formulated to promote green purchasing efforts of local authorities has been spread. A hand book which clearly explains the evaluation criteria referring to market's environmental indicators is to be made in fiscal 2009.

Good waste businesses have been fostered and the environment of "bad money does not drive out good" has been created. In fiscal 2008, in order to further promote good industrial waste treatment services, a goodness evaluation system for industrial waste treatment services has been spread and a workshop aiming to raise awareness about good waste treatment businesses was held.

Table 4-1 Sound material-recycle society business: market scale in Japan

		Supply of machinery, equipment and plants	Supply of services	Supply of materials, final consumer goods	
Business examples		• Intermediate treatment plants • Melting equipment • RDF manufacturing/using facilities • Oil manufacturing facilities from plastics • Composting equipment from kitchen waste • Plant construction • Construction of final disposal sites	• Waste treatment • Resource recovery • Recycling	• Reclaimed oil from plastics • PET-recycled fiber • Products made of timber from forestthinning • Recycled products (e.g. scrap metals) • Products made from reclaimed items (e.g. recycled paper) • Refillable products • Repairs of machinery, furniture • Housing improvement, repairs	Total
Market and employment scale		• Manufacture of equipment and materials for preventing pollution (waste-related) • Construction and installation of machinery and equipment (waste-related)	• Supply of services (waste-related)	• Recycled materials • Repairs	
	2000	806.5 billion yen	2753.6 billion yen	26025.4 billion yen	29585.5 billion yen
	2007	456.2 billion yen	3007.7 billion yen	34600.5 billion yen	38064.4 billion yen
	2000	1,872 people	195,292 people	331,513 people	528,677 people
	2007	8,275 people	130,392 people	511,736 people	650,403 people

Source: Ministry of by the Environment

C. Efforts toward the establishment of regional resource recycling

In order to establish a "regional resource recycling zone" which is optimum size for the characteristics of the recyclable resources and the regional character, the consideration toward the formulation of regional plans at regional block level has been advanced. Particularly, centered on each Regional Environment Office, the bodies surveyed for formulating regional plans in concert with each other in Chubu, Kinki and Kyushu blocks.

Also, projects for fostering so-called regional community businesses have been carried out.

(3) Utilization of economic instruments

As for waste problems generated by the day-to-day activities of large numbers of people, there are certain limits to the results that can be achieved through the existing regulatory measures, which are centered on the regulation of large-scale sources and certain activities. Therefore, to cope with the problem, it is necessary to combine various policy instruments such as regulatory, economic and voluntary approaches, and implement their appropriate utilization.

Responding to the establishment of a discretionary tax system for specific purposes by the Omnibus Decentralization Act enforced in April 2000, from the viewpoint of respecting tax autonomy, many of the local governments are making moves toward the introduction of waste taxes.

According to a Ministry of the Environment survey, as of April 2009, ordinances concerning local discretionary taxes for specific purposes related to industrial wastes are enacted in 27 prefectures out of 47 (Mie, Tottori, Okayama, Hiroshima, Aomori, Iwate, Akita, Shiga, Nara, Yamaguchi, Niigata, Miyagi, Kyoto, Shimane, Fukuoka, Saga, Nagasaki, Oita, Kagoshima, Miyazaki, Kumamoto, Fukushima, Aichi, Okinawa, Hokkaido, Yamagata, Ehime) and in one ordinance-designated city out of 60 (Kitakyushu) .

In addition, a method utilizing the market mechanism to encourage concerned parties to voluntarily deal with 3Rs has been examined. In fiscal 2009, in order to link great awareness of consumers and citizens on 3Rs with concrete activities, the current situation and issues of 3Rs promotion method using a point system were organized.

(4) Promotion of education and learning, enhancement of public relations activities, support for civil activities, and human resources development

“Community Support Projects toward the Realization of a Sound Material-Cycle Society” were implemented by first collecting ideas from the public for efforts toward the realization of a Sound Material-Cycle Society centering on the 3Rs. Such projects would be carried out through the cooperation of each body including civil groups such as NGOs and NPOs, business operators and local governments,; the projects should be pioneering, ingenious, and at the same time, generally applicable to other areas.

In order to constantly keep younger generations using Internet informed, a Web magazine, "Re-Style" (www.re-style.jp for PC and www.re-style.jp/k for cell phone) has been issued to post the latest data and report on the establishment of a Sound Material-Cycle Society, inform the Fundamental Plan for Establishing a Sound Material-Cycle Society, put out the information on various activities toward a Sound Material-Cycle Society and promote activities of the public, private organizations, businesses, etc.

The Ministry of Economy, Trade and Industry implemented projects such as the lending of “Let’s Go, 3Rs”, a DVD for heightening awareness aimed at people of all ages, in order to promote the ordinary citizen’s active and voluntary participation in 3Rs activity in an easy-to-understand manner. Also, along with installing or lending learning materials for 3Rs education such as container and package recycling materials to local learning bases, local energy-saving reuse promotion projects were implemented with the cooperation of local business operators and consumers.

Also, projects such as the holding of the Japan Environmental Learning Fair and lectures for teachers in charge of environmental education, implementation of research regarding the future direction of new environmental education, and the designation of model schools for Global Learning and Observations to Benefit the Environment program (GLOBE) has been carried out, with the aim to promote environmental education in schools.

On top of this, the holding of basic courses for training environmental education leaders, program development for promoting environmental education and the development

Column Community Support Projects toward a Sound Material-Cycle Society

The Fundamental Plan for Establishing a Sound Material-Cycle Society requires that the State should support regional model efforts carried out by various bodies such as NPOs and NGOs.

In response to this, the Ministry of the Environment is promoting the development of regional efforts, through publicly seeking approaches toward the establishment of a Sound Material-Cycle Society to be cooperatively carried out by NPOs, NGOs or business operators and the local governments; such should also serve as models for other regions, and be implemented as community support projects toward the realization of a Sound Material-Cycle Society.

In FY 2009, from around Japan, 54 projects were submitted, of which 7 were adopted. The outlines of the adopted projects are as follows:

○ Reuse and Recycling of Waste Bicycles and Promotion of Tourism with a Bicycle Rental Service (Kiritappu Wetland Trust (NPO), Hamanaka, Hokkaido)

Waste bicycles are reused to make up a recycling system.

- A mechanism of take-it-here and leave-it-there bicycle rental service was built by asking for volunteers to support in the town.
- It contributes to the promotion of tourism, e.g., tourists can move with ease and the number of stayers increases.
- Promotion of reusing waste bicycles, segregation of waste bicycles for disposal and implementation of recycling

○ Collection of Drifted Foamed Polystyrene Using Limonene as a Solvent
(Ichida Laboratory, Tohoku University of Community Service and Science in Sakata City, Yamagata)

Salt-adhered drifted foamed polystyrene having a treatment problem is soluble in limonene.

- Reaction impact experiment of salt-adhered drifted foamed polystyrene with limonene
- Examination and improvement of problems when solving foamed polystyrene

○ Eco-city Sendai Creating Project in Professional Sports
(Miyagi Environmental Life Out-reach Network in Sendai City, Miyagi)

Aimed at implementation of 3Rs such as garbage generation control in the games of professional sport teams based in Sendai

- Human resource development, e.g., 3Rs learning events, cultivation of eco-station volunteers and information service, and promotion of environment-friendly sports by dividing responsibilities of professional sport team operating companies, the municipality and spectators
- Promotion of reduction, establishment of a recycling system and measures against global warming by using public transportation services
- Spread of the project and enlightenment of people utilizing images, goods, etc.

○ "Establishment of a Sound Material-cycle Society in the Region by Composting All Raw Garbage in Tokyo Metropolis: Collaboration between Citizens, the Government and Plans" (Machida Zero Waste Association (NPO), Machida City, Tokyo)

Aimed at composing all raw garbage generated from all households in Machida City, composting facilities using fallow fields and experimental farms are demonstrated and residents in collective housing are encouraged to participate in this project.

- Expansion and strengthening of groups doing the similar activities, meeting to explain how to expand into collective housing and implementation of questionnaire survey
- Establishment of "Raw Garbage Composting Organization"
- Holding of workshops

○ Taketori Monogatari – 3Rs Project – (Environment-Education Seminar of Energy in Yokkaichi University, Yokkaichi City, Mie)

Universities, the government (Yokkaichi City), private companies, businesses and citizens are linked by recycling food residues in the region.

- Utilization of feed consisting of bamboo powder, bran, bony parts of fish, vegetable wastes, etc. with degrading enzyme
- Advancement of hog/poultry raising technologies by using recycled materials consisting of bamboo powder and wooden chips with degrading enzyme for flooring of livestock barns

○ Secondhand Clothing Recycling Project Nurtured by Universities, Craftsmen, Shops and the Local Community, Kasadera R Project
(Kandera Monzen Tei, Nagoya City, Aichi)

In partnership with local university students taking fashion designs and craftsmen of local industries, a sustainable circular system is established by recycling secondhand clothing and old clothes as value-added bags and caps/hats with their design abilities and skills and is expanded into a recycling system for other unnecessary items.

- A class of making bags and caps/hats from secondhand clothing is launched for local residents as a university program with a technical assistance from local craftsmen.
- The products are sold at fashion shops in the local shopping street and flea markets as "Kasadera R" brand.

In order to enhance the eco-brand image, the products are provided as exchange products of EXPO Eco-money which is the succession business of the Aichi Expo.

○ Raw Garbage Loop Formation Project Taking Advantage of Okinawa – Establishment of Comprehensive Raw Garbage Circulation System by Food-Circle Hog Raising and Composting (Okinawa Recycling Movement People Association)

Aimed at establishing a complete recycling loop for raw garbage from business activities, raw garbage is processed into feed and pigs raised with the feed are test-marketed.

- Survey on composition of raw garbage from business activities
- Processing raw garbage into feed
- Test marketing of pigs raised with feed made from raw garbage
- Conference with farmers, supermarket owners, the Kuimaru Cooperative Association and persons in charge of the administration

of information provision framework has been promoted under the coalition/cooperation of the Ministry of Education, Culture, Sports, Science and Technology and the Ministry of the Environment, and the "Environmental Education/ Environmental Learning Database" has been publicized on the website.

Where environmental conservation efforts by local governments and businesses such as the formulation of environmental conservation plans and environmental measuring are concerned, the Ministry of Education, Culture, Sports, Science and Technology has been giving the title of "professional engineer (environmental category)" to competent engineers who have passed the professional engineer examinations and had been registered based on the Professional Engineer Act (Act No. 25 of 1983), and has been promoting the utilization of the title.

The number of registered professional engineers (environmental category) is 970, as of the end of December, 2008.

(5) Implementation of research and promotion of science and technology

Research on 3Rs technology was selected as one of the research subjects to be handled specifically during the following five years in the environmental field, in the "Field-Specific Promotional Strategy" decided by the Council for Science and Technology Policy in March 2006, based on the 3rd Term of the Science and Technology Basic Plan decided by the Cabinet in March 2006. Also, the Central Environment Council discussed "the desirable state of the strategy for intensively promoting environmental studies and environmental technology development", summarized the Central Environment Council report clarifying the "emphasized fields" such as the field of "the establishment of a Sound Material-Cycle Society", formulated the "Enforcement Policy of the Promotion Strategy for Environmental Research and Environmental Technology Development" in March 2007, and has been following up such efforts every year. In addition, alternative materials and recovery technology of rare metals had been selected as countermeasure technology for rare resources, in the "Strategy for Innovative Technology" decided by the Council for Science and Technology Policy in May 2008.

Where grant-in-aid scientific research such as those for waste treatment are concerned, tasks were widely sought utilizing the competitive research fund, and 87 research projects and 5 technology development projects were implemented in FY 2009.

As for research projects, research/technology development in Asia and eventually in the international society concerning the 3Rs have been promoted, and in order to contribute to the establishment of an international 3Rs, great emphasis was placed on researches for solving the various problems surrounding the waste issue that would also contribute to the establishment of a Sound Material-Cycle Society, namely "Research for Promoting the 3Rs" "Research for Promoting the Utilization of Waste Biomass" "Combined Social-Scientific Research Toward the Establishment of a Sound Material-Cycle Society" "Research Concerning Waste Management Technology for Safety and Security, Such as the Solution of the Asbestos Issue " and "Research Concerning the Solution of Driftwood and Drift-waste Issues", along with establishing a "Special Category for 3Rs Initiatives".

As for technology development projects, great emphasis was placed on themes such as "Development of Waste Biomass Utilization Technology" and "Development of Technology concerning the Detoxification of Asbestos Waste", with the aim to develop technologies that will influence the next generation, such as waste treatment technology.

Also, where research and development expenses for pollution prevention from among other research and development expenses for global environmental conservation are concerned, "Research to Contribute to the Establishment of a Sound Material-Cycle Society" continued to be among the items requiring special enhancement on the previous fiscal year, and research and development for five issues such as the development of waste treatment/reuse technologies was implemented.

Also, efforts were made by the Ministry of Agriculture, Forestry and Fisheries to establish a biomass utilization model for implementing comprehensive utilization of biomass as fuel and material according to their regional characteristics, along with developing the technology for producing low-cost high efficiency bio fuel and the technology for utilizing biomass as materials, in order to promote the utilization of organic resources such as wood waste, livestock manure or waste edible oil as biomass.

The Ministry of Education, Culture, Sports, Science and Technology and the Ministry of Economy, Trade and Industry have been collaborating to promote the "Element Strategy/ Rare Metal Substitute Materials Development Project". The Ministry of Education, Culture, Sports, Science and Technology is promoting research development for creating new materials, by substituting rare elements with more common elements, from the viewpoint of studying the roles of elements that determine the characteristics/ functions of substances/materials and utilizing them, in the "Element Strategy Project".

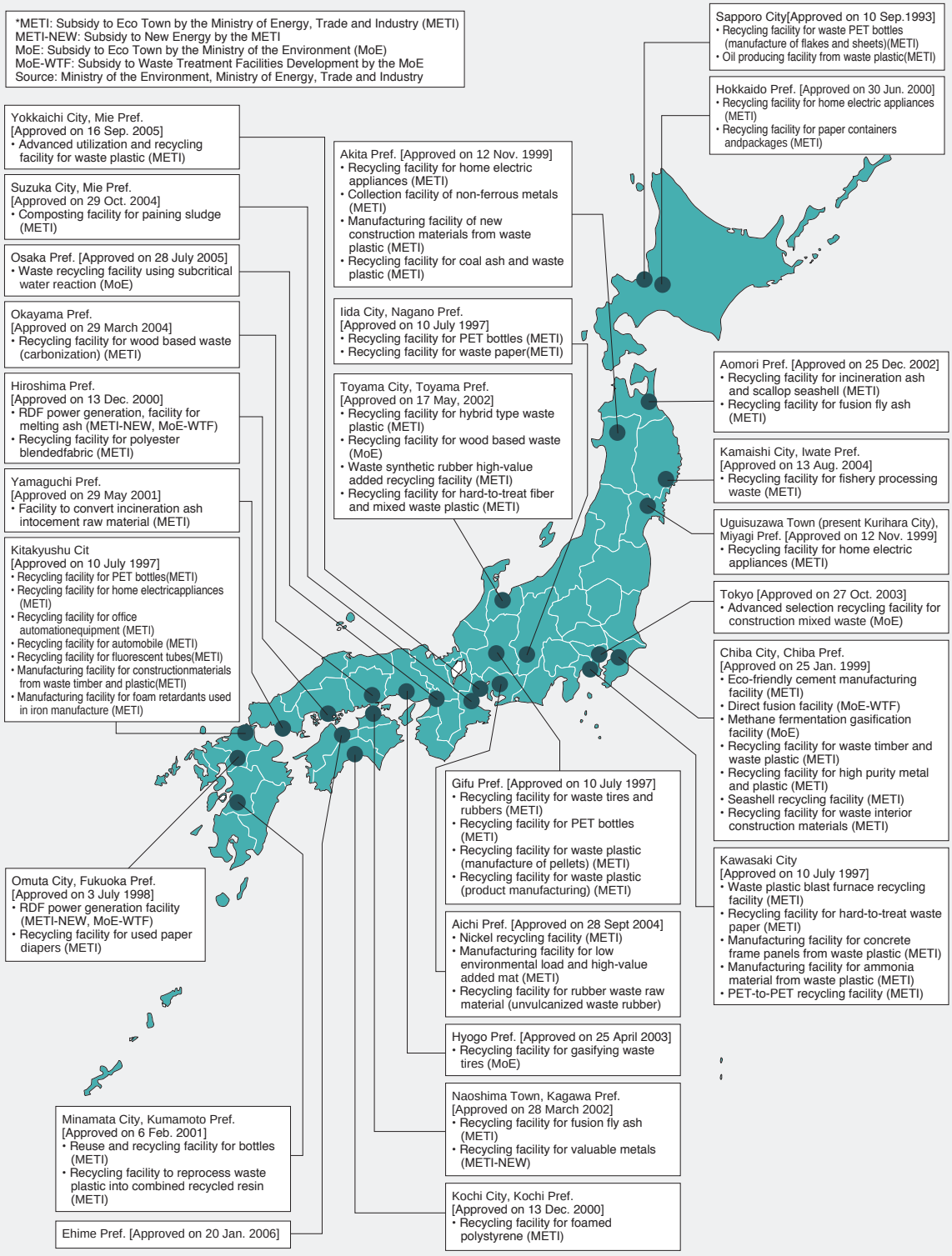
On the other hand, the Ministry of Economy, Trade and Industry through the "Rare Metal Substitute Materials Development Project" has launched technology development toward substituting/ reducing usage of indium for transparent electrodes used in liquid crystal panels, dysprosium for rare-earth magnets, and tungsten for carbide tools.

Also, the Ministry of Education, Culture, Sports, Science and Technology is promoting the development of photocatalysts that obtain hydrogen by dissolving water using sunlight, and of solid acid catalysts that dissolve non-edible parts of plants such as cellulose, converting them into sugar.

In addition, the Ministry of Economy, Trade and Industry has formulated a research and development project where multiple technology developments and related policies toward their realization are bundled together as technology development strategies, and has been implementing research and development of technology for practical application to contribute to the promotion of the 3Rs in the field of the environment - 3Rs within the project, and in FY 2008, has conducted technology development for making high strength building materials, for recycling rare metals, and for resource conservation.

Figure 4-1 Map of approved Eco Town Project areas

26 areas as of March 2010



Source: Ministry of the Environment, Ministry of Economy, Trade and Industry

The National Institute for Environmental Studies worked on the steady implementation of the "Priority Program for Sustainable Material Cycles", which is one of the priority programs mentioned in the Second Medium-Term Plan (program period: FY 2006 to 2010).

(6) Facilities

Support was provided for advanced projects to improve recycling-related facilities, within the "Eco-Town Plan" (Figure 4-1) implemented under the coalition of the Ministry of the Environment and the Ministry of Economy, Trade and Industry, with the aim of establishing a socio-economic system with environmentally sound resource cycles in the local area.

As for livestock manure generated by the livestock industry, implementation of appropriate treatment and effective utilization were promoted, based on the Act on the Appropriate Treatment and Promotion of Utilization of Livestock

Manure (Act No. 112 of 1999).

Under such circumstances, wide-ranging efforts were made for such projects such as the improvement of composting facilities, along with creating plans for distributing and utilizing compost/rice straw, in order to promote distribution/utilization through strengthening the cooperation between livestock farmers and crop farmers in the cyclical use of livestock manure and rice straw.

In addition, support for improving facilities to reduce sewage sludge and promotion of new technology development had been implemented.

In the Kinki region, the Osaka Phoenix Project was promoted, based on the Law for Bay Area Marine and Environment Consolidation Centers (Act No. 76 of 1981), and disposal sites in Amagasaki, Izumi-Otsu, Kobe and Osaka which was available from October 2009 are accepting wastes discharged from 6 prefectures and 168 municipalities of the Kinki region (As of March 21, 2010).

As a waste treatment countermeasure at ports, subsidies were provided for sea wall construction for landfill sites of 21 ports, during FY 2008. Also, a project to effectively utilize surplus soil generated from construction works in the national capital region cross-jurisdictionally as resources for constructing ports (the so-called "Super Phoenix") was commenced in FY 1994 in order to promote resource recycling, and in FY 2008, surplus soil generated from construction works were accepted at Hiroshima Port and other areas.

(7) Preventive measures against and measures to block the spread of illegal dumping, etc. and measures against remained cases

As preventive measures against and measures to block the spread of illegal dumping, etc., the period from May 30 to June 5 has been set as "Nationwide Illegally Dumped Waste Monitoring Week" since fiscal 2007 and the government and prefectural governments, with a strong association, have concurrently implemented efforts toward the eradication of illegal dumping, etc. through the spread activities as well as strictly applying the Waste Management and Public Cleansing Law. In addition, information technologies have been utilized, an illegal dumping hotline which directly receives information on illegal dumping, etc. from the public was opened and the responsibility of illegal dumping performers was pursued in the prefectures by dispatching specialists who are familiar with field survey and relevant laws and regulations. Moreover, a model project of preventive measures against and measures to block the spread of illegal dumping, etc., utilizing satellite images has started to further promote the eradication of illegal dumping, etc. since 2009.

Regarding measures against remained cases, the Act on Special Measures concerning Industrial Wastes for illegal dumping, etc. which occurred on and before June 16, 1998 will be expired at the end of fiscal 2012. It is necessary to continuously secure understanding of and cooperation with industries on the support under the Waste Management and Public Cleansing Law for the cases of illegal dumping, etc. which occurred on and after June 17, 1998. Therefore, the detailed survey on cases remained nationwide was carried out, and the way of response to all remained cases and the way of financial support for cases having problems with living environment preservation have been examined including extension of the Act on Special Measures concerning Industrial Wastes based on such survey results.

(8) Other governmental efforts

A. Promotion of urban redevelopment project

The Council for Promoting Zero-waste Cities in Tokyo Metropolis and the Council for Promoting Zero-waste Cities in the Keihanshin Metropolitan Areas have formulated a medium to long-term plan concerning the achievement of waste reduction targets, development of waste treatment/recycling facilities and the establishment of a reverse physical distribution system, and have been following up on the efforts every year, through means such as checking of the progress and consideration of new tasks, in order to realize the "Reconstruction to Create Zero-Waste Cities in the Metropolitan Areas" promoted as an urban redevelopment project. The Council for Promoting Zero-waste Cities in the Chubu Areas has been working for waste reduction, based on the medium to long-term plan formulated in FY 2006. In FY 2008, The Council for Promoting Zero-waste Cities in Tokyo Metropolis had been working with the aim to reduce the final disposal volume of waste to zero, based on the second medium to long term plan formulated during the previous fiscal year.

B. Promotion of the zero emission plan

Support was provided for advanced projects to develop recycling-related facilities toward realizing the establishment of a resource-recycling socio-economy in the local area, and Eco Town Plans of 26 regions throughout Japan were approved by the end of March 2010.

C. Establishment of a reverse physical distribution system to realize a Sound Material-Cycle Society

When considering transportation of wastes, recycled resources and products, it is anticipated that its quantity will increase, along with transport distances, due to the increase in items now subject to recycling and improvements in the recycling rate. Also, owing to the concentrated building of waste/ recycling facilities and the formation of bases in the metropolitan areas, it will be necessary to create a distribution system to adequately respond to waste treatment such as additional recycling, implemented by cooperation among bases.

It was also mentioned in the "New Comprehensive Distribution Policy (2005 to 2009)" decided by the Cabinet in November 2005, that it is necessary to promote the construction of an effective reverse physical distribution system ensuring proper treatment and transportation, so as to work toward the establishment of a Sound Material-Cycle Society. Thus, support was provided for the reverse physical distribution project proposed during the Green Logistics Partnership Conference.

In order to realize a Sound Material-Cycle Society, ports that serve as bases for the reverse physical distribution system responding to the location of recycling facilities covering wide areas are specified as "integrated reverse physical distribution recycling hub ports (recycling ports)" (21 ports throughout Japan), and comprehensive support measures are implemented such as the promotion of private-public

cooperation and the improvement of port facilities. In FY 2008, demonstration experiments for transporting recycled resources by ship via recycling ports had been carried out, and verification of the appropriate techniques to pack/handle the cargo and of the information management technology was conducted.

Also, construction of recycled resource treatment facilities such as buildings and facilities for interim storage by joint public-private ventures and other bodies was supported.

D. Appropriate handling of wastes from agricultural production materials such as used agricultural plastics

In order to promote the appropriate treatment of wastes from agricultural production materials such as used agricultural plastics, cooperation among related groups was established, the treatment/reduction plan was formulated, verification of the introduction technologies of biodegradable plastic films was implemented at the level of prefectures and municipalities, and popularization/awareness activities were set up in order to increase demands for recycled products, at a nationwide level.

E. Promoting the recycling of used FRP vessels (boats)

As for FRP (fiber reinforced plastic) vessels, supportive and cooperative actions were made through means such as the popularization and awareness concerning the "Recycling System for FRP Vessels" and project evaluation, in order to support the Japan Boating Industry Association in its efforts for the phased construction and operation of the "Recycling System for FRP Vessels" starting from November 2005, utilizing the wide-area recognition system based on the Waste Management and Public Cleansing Law, in light of the recycling technology established by the Ministry of Land, Infrastructure and Transport. In FY 2008, actual operation of the above-mentioned system has been launched throughout Japan, and approx. 750 FRP vessels have been recycled.

F. Promotion of the proper treatment and recycling of used aerosol products

As for the used aerosol products disposed as garbage which is not used up after consumer use, they have been causing fire accidents in collection vehicles during garbage collection at municipalities, explosion accidents during processing work at crushing facilities, and have been the source of recycling problems. In order to promote the proper treatment and recycling of these aerosol products, the municipalities and the product industry has worked in cooperation to popularize the necessity of disposing them as garbage after removing the filler with an appropriate tool, while the product industry worked to switch products to those equipped with devices that enable easy removal of the filler.

G. Promotion of standardization

Japanese Industrial Standards Committee (JISC), the standardization institute of our State, is working on the adjustment of environmental JIS, based on the "Environmental JIS Development Action Program" formulated in April 2002. In FY 2008, research/consideration of the environmental JIS utilization status in green purchasing by the local governments/businesses/ consumers was implemented identifying the position of the environmental JIS among other environment-related laws, and tasks toward the further promotion of the environmental JIS utilization were extracted.

H. Formulation of the Waste Recycling Governance Guidelines

The "Waste Recycling Governance Guidelines for Waste Generating Companies" were formulated in September 2004 by the Industrial Structure Council, in order to have the waste discharging enterprises implement thorough waste management, and to promote voluntary efforts for conducting waste and recycling management from the managerial viewpoint. In FY 2005, efforts were made to promote the proper treatment of waste and recycling by businesses, through means such as the holding of briefing sessions for various trade associations, human resources development assistance within medium and small-sized businesses and seminars, toward the popularization of the Waste Recycling Governance Guidelines. In addition, research with the aim to review the Waste Recycling Governance Guidelines was implemented in FY 2008, due to the fact that the social responsibility required of businesses concerning social/economic/environmental aspects have been changing.

I. Revision of the Guideline for Waste Treatment and Recycling by item/industry

The Guideline for Waste Treatment and Recycling by item/ industry was formulated in 1990 for each item/industry, with the aim to promote voluntary efforts by business operators concerning the 3Rs (Reduce, Reuse and Recycle). In the revision made in FY 2006, efforts concerning useful metals (including rare metals) for three items and four industries were included, along with new target values toward the reduction of paper (paper containers and packages, cardboard containers and packages, beverage containers and packages), glass bottles, steel cans, aluminum cans, plastics (plastic bottles, plastic containers and packages), accompanying the revision of the Containers and Packaging Recycling Law.

J. Acceleration of biomass utilization

Fostering of national understanding through means such as information provision and holding of various briefing sessions, support in the formulation of the biomass town concept, and support in improving the biomass utilization facilities utilizing new technologies were implemented, based on the new "Biomass Nippon Strategy" decided by the Council in March 2006.

Particularly where the promotion of biofuel utilization is concerned, approaches were made toward the efficient enforcement of the Act on Promotion of Utilization of Organic Resources Originated from Agriculture, Forestry or Fisheries as Materials for Biomass Fuels newly put into effect in October 2008, and support was provided for cooperative efforts by agriculture/ forestry/fishery workers and biofuel manufacturers.

Also, a project aiming at the establishment of an effective technology for producing biofuels using soft cellulose materials such as rice straw, which can also serve as a food supply, has been launched.

As for the acceleration of biomass towns, support has been provided for the concept formulation and its realization, and 197 municipalities have issued their biomass town concept as of the end of March, 2009.

Apart from this, cyclical use of resources through the recycling of shells which are seafood processing by-products has been promoted.

Also, in the Agricultural Community Effluent Treatment Program, volume reduction of excess sludge has been promoted according to the actual situation of the region, along with promoting recycling through means such as compost creation and the utilization of construction materials, concerning the sludge generated in the treatment process.

K. Collection of rare metals from used small household appliances and the Advanced Disposal Promotion Project

The Ministry of Economy, Trade and Industry and the Ministry of the Environment held a meeting of "Study Group for Collecting Rare Metals from Used Small Household Appliances and Implementing Proper Treatment" following the previous meeting in 2008, conducted model projects at seven regions nationwide and considered the matter of proper treatment, along with considering the efficient and effective recovery method with the aim to construct a proper and effective recycling system for rare metals.

Section 5. Creation of an International Sound Material-Cycle Society

A. Promotion of the 3R Initiative in G8 countries

G8 Environment Ministers Meeting had been held in Kobe in May 2008, and the "Kobe 3R Action Plan", where concrete actions to be taken by each of the G8 countries toward the further promotion of the 3Rs were listed and agreed. This plan was also supported by the leaders of G8 countries in the Lake Toya G8 summit, which was held alongside Lake Toya in Hokkaido, in July 2008.

Also, "Japan's New Action Plan towards a Global Zero Waste Society" was presented during the G8 Environment Ministers Meeting, where international efforts to be promoted toward the establishment of a Sound Material-Cycle Society in Asia and other regions were listed.

B. Efforts in Asia

(a) Supporting the formulation of 3Rs plan/strategy by each country

In countries such as Vietnam and Indonesia, and according to the conditions in each country, Japan has been supporting the formulation of plans and strategies for promoting the 3Rs nationally, working in cooperation with the United Nations Centre for Regional Development (UNCRD), United Nations Environment Programme (UNEP), Regional Office for Asia and the Pacific and the Institute for Global Environmental Strategies (IGES). In FY 2009, a national strategy was formulated in Vietnam.

(b) Policy dialogues

In order to promote the 3Rs, Japan has been promoting proactive policy dialogues, with the departments in charge of waste treatment and the 3Rs of the countries where efforts are being made toward the reinforcement of the domestic system and the systematic implementation of 3Rs policies.

In May 2009, "The 3rd Japan-China Waste Recycling Policy Dialogue" between department head representatives was implemented with the Ministry of Environmental Protection of China. It was agreed with the Ministry of Environmental Protection of China and the Administration for Quality Supervision, Inspection and Quarantine to promote cooperation between relevant ministries and agencies of Japan and China concerning examination of the possibility of concrete cooperation on proper management of electrical and electronic wastes, medical wastes, etc. and import/export management of wastes.

In August 2009, "The 4th Japan-Korea Waste Recycling Policy Dialogue" between department head representatives was implemented with Korea's Ministry of the Environment. Opinions were exchanged concerning the Fundamental Plan for Establishing a Sound Material-Cycle Society, recycling of electrical/electronic products and automobiles, utilization of biomass gas, progress of measures for reduction of plastic grocery bags, import/export of wastes, trend of international efforts for 3Rs, etc. explaining the summary and issues of both countries' policies (Figure 5-1).

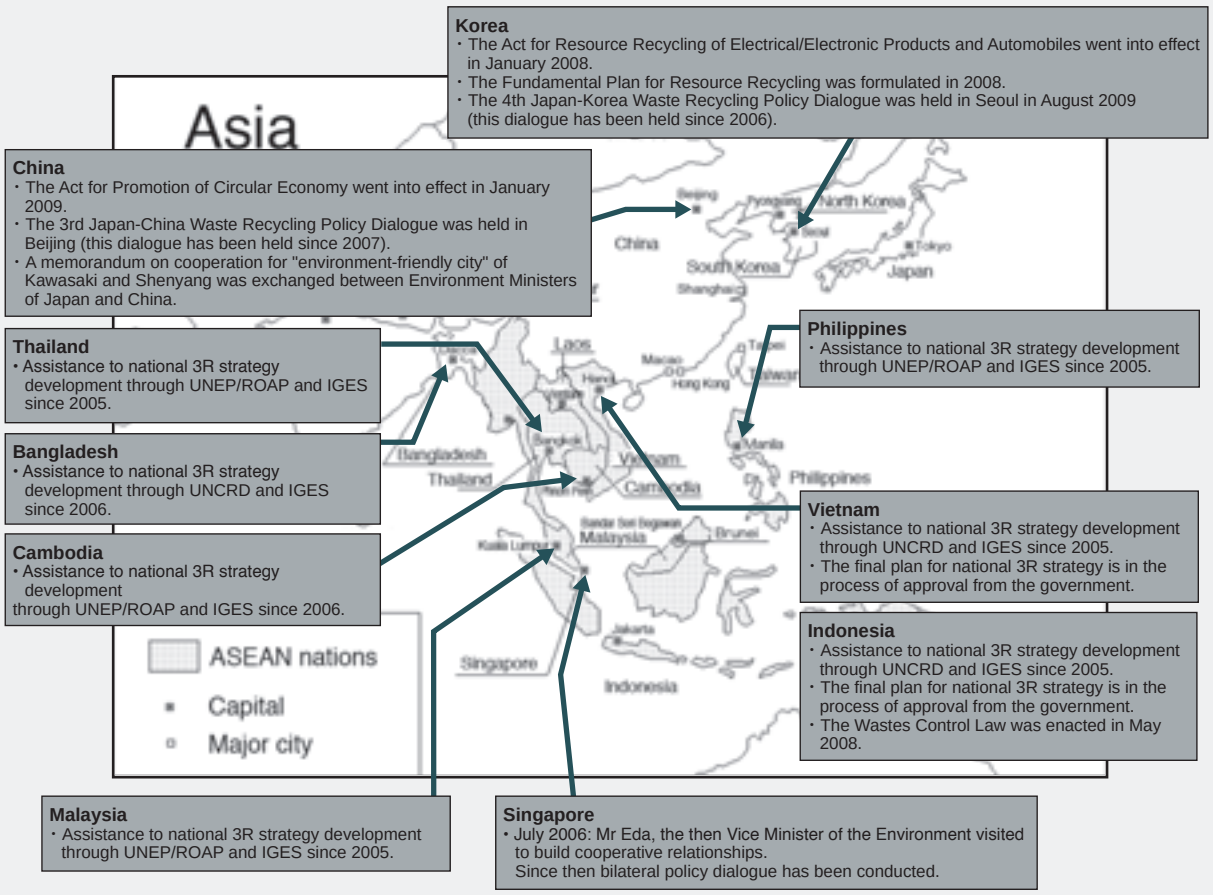
(c) Regional 3R Forum in Asia

Japan proposed the inauguration of the "Regional 3R Forum in Asia", in the Meeting of the Environment Ministers during the East Asia Summit held in Hanoi, Vietnam in October 2008, and has obtained approval from the other participating countries. The Asian Forum for the Promotion of 3Rs is a platform for inter-regional cooperation for promoting the 3Rs, through means such as the creation/implementation of pilot projects and the promotion of research cooperation, with the participation of wide-ranged related parties such as international organizations, aid agencies, research institutes and private sectors.

To that end, the Ministry of the Environment and UN Center for Regional Development jointly hosted "Inaugural Meeting of Regional 3R Forum in Asia" in November 2009, and 15 Asian government representatives, international institutions and experts on 3Rs participated in the meeting. In the meeting, "Tokyo 3R Statement Regarding Establishment of Regional 3R Forum in Asia" was agreed by the participants and "Regional 3R Forum in Asia" was established.

Under the Regional 3R Forum in Asia, high-level policy dialogues on 3Rs will be promoted, support for the implementation of 3Rs projects in each country will be promoted, information which is useful for 3Rs promotion will be shared and networking of concerned parties will be advanced in the future.

Figure 5-1 3R-related bilateral cooperation with Asian countries



Source: Ministry of the Environment

Malaysia proposed the next meeting within fiscal 2010 and was welcomed by the participants.

In addition, aimed at international cooperation between various bodies, “Asia 3R Citizen’s Forum” held in November 2009 with participants from NGOs/NPOs of Japan, China, Korea and Indonesia and “3R Conference for Asian Local Governments” held in October 2009 with participants from seven Asian municipalities were supported in cooperation with the Regional 3R Forum in Asia.

(d) Creation of information bases/research networks regarding the 3Rs

The Ministry of the Environment has supported the collection of good 3Rs approach cases and findings on 3Rs for “3R Knowledge Hub” established by Asian Institute of Technology (AIT) as an information base to develop and spread technologies, policy information and knowledge on 3Rs promotion in each Asian country, and organized the center of information and technologies.

The Ministry of the Environment has also undertaken an international joint study with the Institute for Global Environmental Strategies (IGES) to evaluate the impact and effect on resource recycling and economy in Asia including international flow for waste treatment and examine proper resource recycling in Asia.

(e) Efforts under the Tripartite Environment Ministers Meeting (TEMM) among China, Japan and Korea

Through the summit meeting between Japanese, Chinese and Korean leaders and the Tripartite Environment Ministers Meeting (TEMM), the cooperation toward establishing a Sound Material-cycle Society in East Asian region has been deepened. In the 2nd summit meeting between Japanese, Chinese and Korean leaders held in October 2009, it was confirmed to strengthen the cooperation on the environment field including 3Rs and the formulation of collective action plan between Japan, China and Korea was encouraged. In addition, under TEMM, the 5th Sound Material-Cycle Society/Circular Economy/3R Seminar was held in November 2009 to exchange information on comprehensive efforts toward establishing a Sound Material-cycle Society and a low-carbon society and information on each country’s effort on E-waste and examine the collective action plan between Japan, China and Korea on 3Rs.

(f) Cooperation between Kawasaki and Shenyang on the establishment of environment-friendly cities

In June 2009, Japan’s Environment Minister and the Minister of Environmental Protection of China exchanged memorandums to support the cooperation on the establishment of environment-friendly cities through the development of circular economy and industry between Kawasaki and Shenyang, China. As one of cooperation projects, the Ministry of the Environment, with the Ministry of Environmental Protection of China, held workshops for the purpose of information sharing of policies and technologies on the

Table 5-1 Waste generation: sectors and countries

(Unit: thousand tons)

Country	Year	Agriculture and forestry	Mining and quarrying	Manufacturing	Energy manufacturing	Waterworks	Construction	Others	Municipal waste	Total
Canada	2004	–	–	–	–	–	–	–	13,380	–
Mexico	2006	–	–	–	–	–	–	–	36,090	–
USA	2005	–	–	–	–	–	–	–	222,860	–
Japan	2001	90,430	13,770	122,880	6,970	8,310	76,150	3,860	54,930	455,180
South Korea	2004	–	–	38,330	–	–	54,200	–	18,250	110,780
Australia	2002	–	–	9,470	–	–	13,740	–	8,900	32,380
New Zealand	1999	150	–	800	–	–	800	–	1,540	3,290
Austria	2004	–	–	–	–	1,910	28,600	18,900	4,590	54,000
Belgium	2002	1,150	120	13,650	850	200	10,490	6,300	4,750	36,360
Czech	2005	460	650	6,040	2,310	650	9,110	2,770	2,950	24,940
Denmark	2005	–	–	1,850	1,080	820	5,270	1,850	3,340	14,210
Finland	2004	860	23,820	15,710	1,570	510	20,840	100	2,370	65,790
France	2004	–	–	90,000	–	960	–	–	33,780	128,610
Germany	2004	–	50,450	53,010	–	–	187,480	–	48,430	339,370
Greece	2003	–	–	–	–	–	5,000	–	4,710	–
Hungary	2004	–	13,080	5,200	3,330	–	1,740	2,050	4,590	29,990
Iceland	2004	50	0	50	0	0	20	230	150	490
Ireland	2004	60,170	4,050	5,300	290	60	2,680	–	3,000	57,160
Italy	2004	440	900	37,780	2,800	13,550	46,460	5,530	31,150	138,620
Luxemburg	2004	–	50	730	0	130	6,980	90	310	8,300
Holland	2004	2,390	90	16,900	1,430	170	24,000	6,150	10,160	61,290
Norway	2005	160	190	3,800	40	–	1,500	2,260	1,840	9,790
Poland	2005	–	39,620	58,440	19,840	3,280	240	2,740	9,350	133,960
Portugal	2002	–	3,630	8,980	320	50	–	110	4,620	17,710
Slovakia	2004	4,490	–	8,680	–	260	1,690	–	1,400	16,590
Spain	2004	–	21,780	28,510	5,940	–	–	9,510	27,590	–
Sweden	2004	–	58,640	29,470	1,250	920	11,270	–	4,170	105,710
Switzerland	2004	–	–	1,130	–	210	11,900	–	4,910	18,140
Turkey	2004	–	–	17,500	13,890	3,240	–	–	29,740	64,350
UK	2002	540	96,390	45,000	6,180	1,390	109,000	30,320	36,120	323,430

Source: OECD

establishment of a Sound Material-cycle Society in Beijing and Shenyang in March 2010.

C. Environmentally sound management of hazardous wastes

In order to implement proper regulation on the transboundary movements of hazardous wastes, etc., the activities of the "Asian Network for Prevention of Illegal Transboundary Movement of Hazardous Wastes" led by the Ministry of the Environment have been expanded and efforts to promote dialogues and strengthen partnerships between the officials responsible for the Basel Convention, customs officials and relevant international organizations have been implemented. In addition, in order to carry out environmentally-sound management of E-waste and end-of-life computers in Asia-Pacific region, Japan financially and technically has been contributing to implement national and regional projects advanced by each country under the Basel Convention.

D. Cooperation with the United Nations

UN Commission on Sustainable Development (CSD) which evaluates the implementation status of "Agenda 21" adopted by 1992 Earth Summit deals with "waste management" as one of subjects for two years from 2010 to 2011. In order to actively contribute to the discussions of CSD, the Ministry of the Environment held a meeting of "International Consultative Meeting on Expanding Waste Management Services in Developing Countries" with experts in worldwide waste management and 3Rs in Tokyo in March 2010 and the results were input to the 18th CSD Meeting held in May 2010.

E. Other efforts

Projects concerning material flow and resource productivity implemented by OECD are regarded as significant, and discussions are held in a proactive manner. Support is also provided for the "International Panel for Sustainable Resource Management" established by the United Nations Environment Programme (UNEP) in 2007 aiming at the implementation of scientific assessment on the influence of natural resource utilization on the environment, from the viewpoint of promoting the 3Rs Initiative.

The latest data since 1998 on the amount of wastes generated by each country collected by OECD are shown in Table 5-1 (Data on the amount of wastes generated by each of the OECD member countries).

Ministry of the Environment
Office of Sound Material-cycle Society Waste Management and Recycling Department

1-2-2, Kasumigaseki Chiyoda-ku, Tokyo 100-8975 Japan
URL : http://www.env.go.jp e-mail : junkan@env.go.jp