

Handbook on Resource Recycling Legislation and 3R Trends in 2003

Ministry of Economy, Trade and Industry

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Forward

In the course of economic activities based on mass-production/consumption/disposal, Japan has been discharging an enormous amount of waste, about 450 million ton a year, and is currently facing various problems, such as a shortage of final disposal facilities and adverse environmental effects of inappropriate waste disposal, as well as concern over the depletion of mineral resources in the future. It has become an urgent task to establish a new economic system that is favorable both for the environment and economy, regarding measures to cope with such environmental and resource constraints, not as factors restricting economic growth, but as factors promoting it. It will be impossible to continue economic and social activities in a sustainable and progressive manner in the 21st century without dealing with these environmental and economic constraints appropriately.

Based on such awareness, Japan has been making active efforts to confront environmental and resource constraints by establishing appropriate laws: They include – Law for Promotion of Utilization of Recycled Resources in 1991; Containers and Packaging Recycling Law in 1995; Home Appliance Recycling Law in 1998; Basic Law for Promoting the Creation of a Recycling-Oriented Society, Law for Promotion of Effective Utilization of Resources, Construction Materials Recycling Law, Green Purchasing Law, and Food Recycling Law in 2000; and End-of-Life Vehicles Recycling Law in 2002. In accordance with these laws and policies and under the principle of discharger's responsibility, Japan has been working on smooth promotion of the 3Rs, reduction of waste generation, reuse of parts, and recycling of used products as raw materials, with the aim of decreasing the amount of natural resources utilized and migrating environmental burden.

The Ministry of Economy, Trade and Industry has been promoting measures to create a recycling-oriented society. We have arranged the outline of legislation concerning the creation of a recycling-oriented society and the latest information on the 3Rs in individual fields. We hope that this handbook will be helpful for those who engage in 3R-related activities.

I. Creation of a Recycling-Oriented Society

1. Necessity for Creating a Recycling-Oriented Society

In the course of economic activities based on mass-production/consumption/disposal, Japan is facing various problems, such as a shortage of final waste disposal facilities and adverse environmental effects of hazardous substances, as well as concern over depletion of mineral resources in the future. There is the possibility that these environmental and resource constraints will restrict economic activities or reduce the size of the economy.

(1) Environmental problems

In Japan, as much as 450 tons of waste is produced every year, and the number of remaining sustainable years of waste disposal facilities is becoming stringent accordingly, 12.2 years for general waste and 3.9 years for industrial waste. Under these circumstances, it is necessary to promote measures concerning waste disposal and the 3Rs, including construction of waste disposal facilities and recycling facilities.

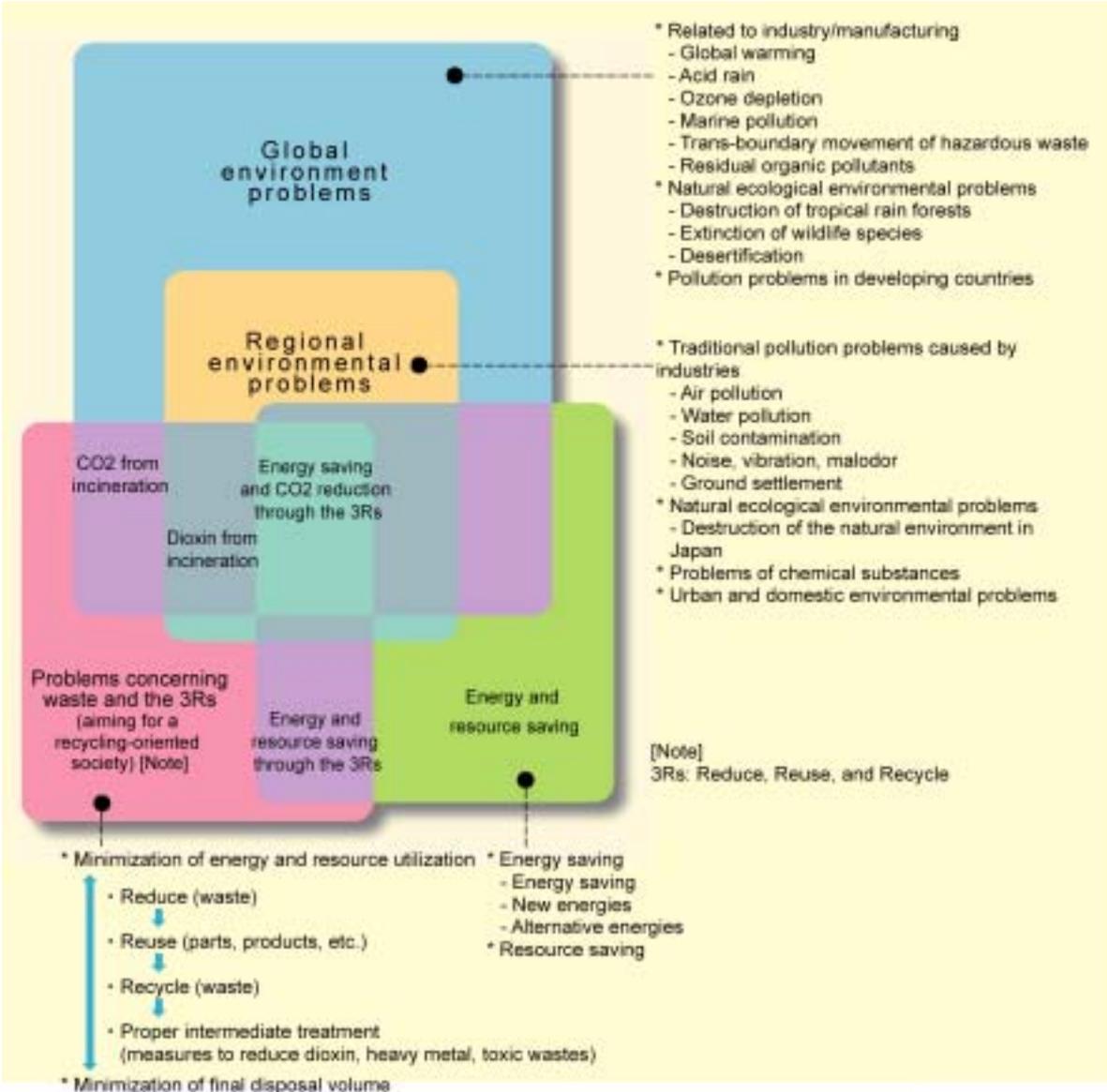
Furthermore, environmental problems have recently expanded, due to industrial pollution, to a global level, including long-term environmental effects of hazardous substances such as dioxin, PCB, and endocrine-disrupting chemicals, as well as global warming.

(2) Resource constraints

In the 20th century, human beings mined and consumed limited mineral resources such as oil and metal at a rapid pace. As a result, the current number of sustainable years is about 40 years for oil and about 50 years for copper.

According to the overview of Japan's material balance, Japan utilized about 2.04 billion tons of resources in total, consuming 350 million tons of energy and discharging 410 million tons of waste for producing 1.28 billion tons of products. Most of the 1.05 billion tons of resources accumulated in Japan, which are utilized as roads, bridges, and buildings, will be industrial waste in about 10 years. On the other hand, the amount of resources that were recycled and reused was about 270 million tons, only accounting for slightly over 10% of the total amount of resources utilized.

Fig. 1 Environmental Problems



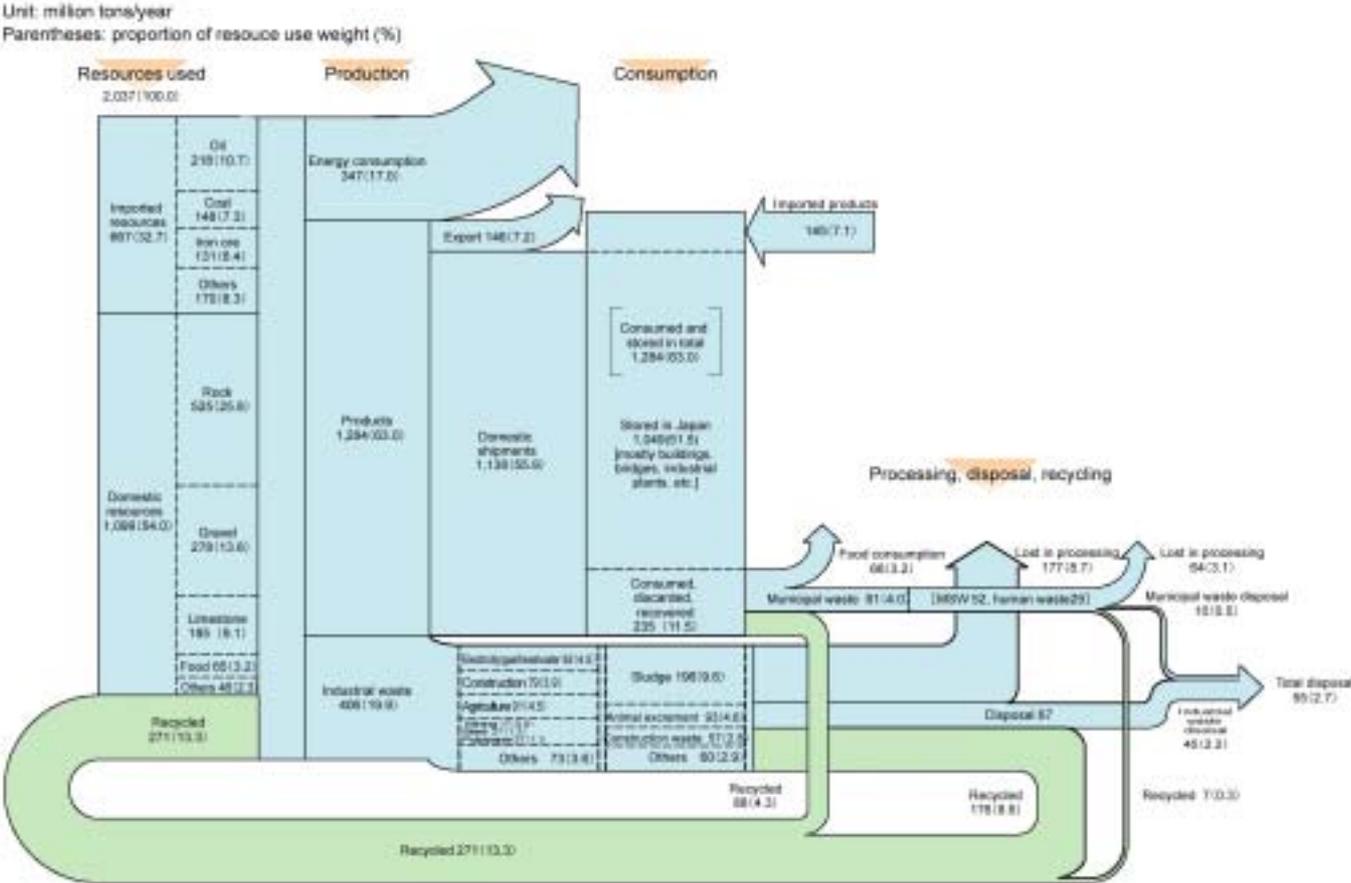
Source: Clean Japan Center (<http://www.cjc.or.jp>)

There is also a “hidden flow” of resources that are byproducts in the process of mining intended resources and discharged as wastes, such as the soil of mountains leveled for the purpose of mining aggregate used for civil engineering and construction and surface soil or rocks removed for the purpose of mining raw mineral ores. By estimate, the amount of those resources which are byproducts is about 1.09 billion tons at home and about 2.83 billion tons abroad.

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

More specifically, for sustainable development of Japan, it is essential to get out of the conventional economic system that is based on mass-production/consumption/disposal and create a recycling-oriented economic system and society while promoting “environmentalization of industry (incorporating measures for environmental and resource constrains into business activities)” and “industrialization of the environment (generating market value through measures for environmental and resource constrains)” with effective use of the power of the private sector.

Fig. 2 Japan’s Material Balance (FY 2000)



Source: Clean Japan Center

2. Present Situation of Waste in Japan

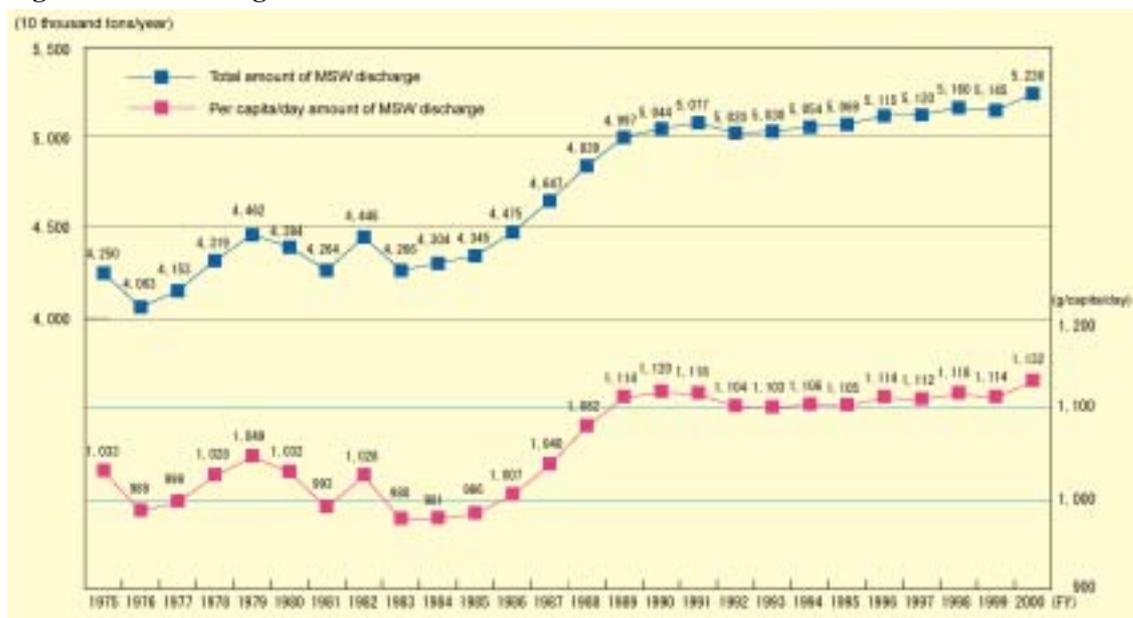
Municipal Solid Waste (MSW)

[1] Total amount of municipal solid waste discharged

The total amount of municipal solid waste discharged (MSW: wastes discharged from households) in FY 2000 was 52.36 million tons, accounting for 114 times as much as the volume of the Tokyo Dome Stadium (0.3 tons per m³), the per capita/day amount being 1,132g (see Fig. 3).

The total amount of MSW discharged and the per capita/day amount of discharge started to increase rapidly around FY1985, but remained almost flat during the period from FY1989 to FY2000. The downward trend seen after FY1979 was in line with the influence of the second oil shock, and the trend that went upward to reach a peak in FY1990, has been flat and subsequently seems to be in parallel with the bubble economy and its collapse. In the future, however, we should endeavor to reduce waste generation in an economic boom or bust.

Fig. 3 MSW Discharge



Note: Total MSW discharge = MSW collected + MSW directly delivered + MSW in-house treated. According to the “Basic Policy for Comprehensive and Systematic Promotion of Measures for Reduction and Other Proper Treatment of Waste” under the Waste Management Law, the amount of MSW discharged is defined as being calculated by deducting the “amount of MSW in-house treated” from the “total amount of MSW discharged” and adding “the amount of recyclable waste recovered by citizen groups.”

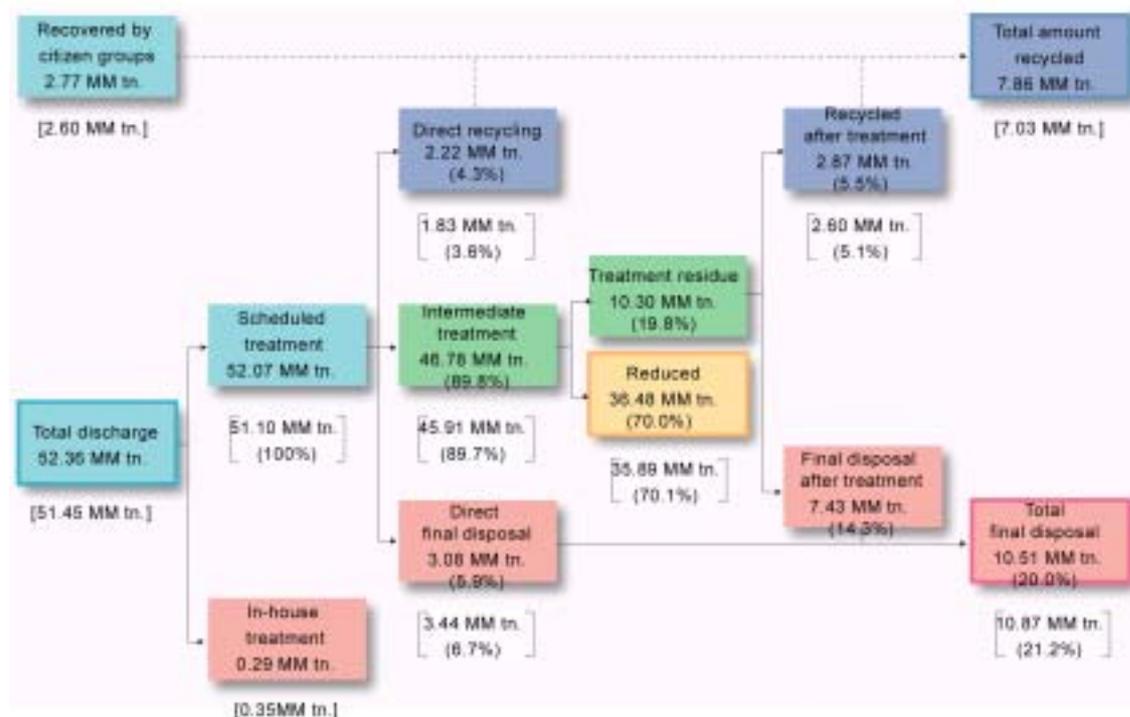
Source: Ministry of Environment (<http://www.env.go.jp>), *Discharge and Treatment of MSW (in FY 2000)*, January 24, 2003 (revised)

[2] Waste treatment

In the total amount of MSW treated in FY 2000, 46.78 million tons went through intermediate treatments by municipalities such as incineration, comminution and selection, 2.22 million tons were directly delivered to recycling industries, collectively accounting for 94.1% of the total amount of MSW treated (rate of waste reduced in treatment). Out of 46.78 million tons of MSW delivered to intermediate treatment facilities, 2.87 tons were reused after treatment. The total amount of MSW recycled, the sum of the amount of MSW recycled through intermediate treatment, the amount of MSW directly recycled, and the amount of recyclable resources recovered by citizen groups, was 7.86 million tons. 3.08 million tons of MSW were delivered to direct final disposal without going through intermediate treatment (direct landfill) and 36.48 million tons were reduced through intermediate treatment (see Fig. 4).

The share of MSW directly incinerated in the total amount of MSW treated increased considerably during the period from FY1975 to FY1989 and it has continued to increase slightly since then. The share of MSW recycled through intermediate treatment has also been increasing slightly. Consequently, the share of direct final disposal (final landfill) of MSW has been decreasing (see Fig. 5).

Fig. 4 Flow of MSW Treatment in Japan (FY 2000)



- Note:
1. The total amount of MSW treated does not correspond to the "amount of scheduled treatment" due to errors in measurement.
 2. Rate of waste reduced in treatment (%) = [(intermediate treatment) + (directly recycling)] / (total MSW treated) x 100

Source: Ministry of Environment (<http://www.env.go.jp>), *Discharge and Treatment of MSW (in FY 2000)*, January 24, 2003 (revised)

Fig. 5 Waste Treatment Methods



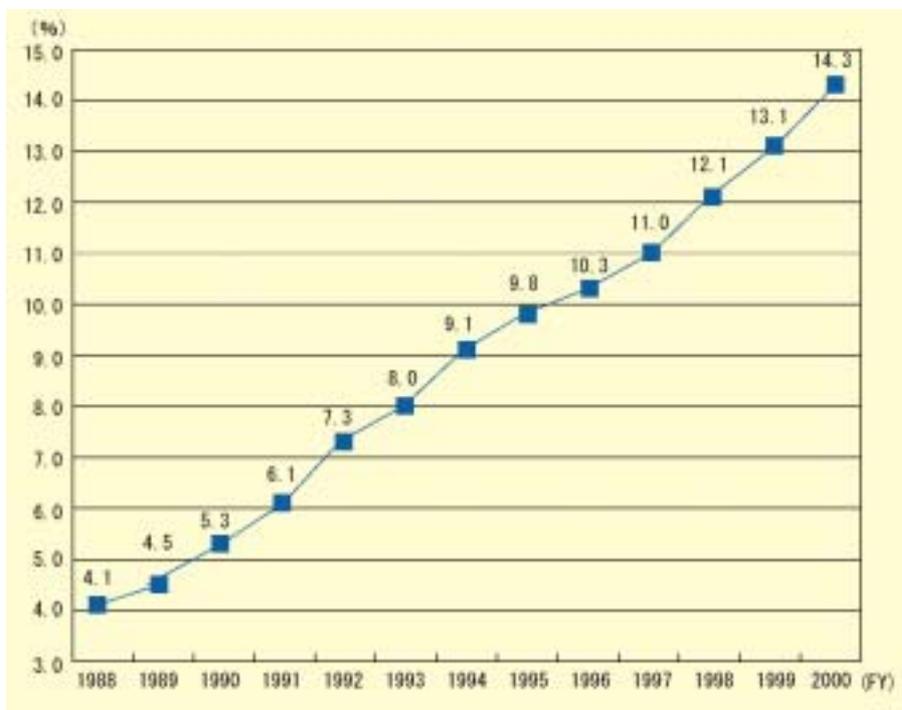
Note: 1. Direct recycling is a category introduced in 1998, which refers to the amount of MSW that is directly delivered to recycling industries without going through recycling facilities.
 2. Until FY1997, the amount of “direct recycling” was included in the amount of “recycling through intermediate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

Source: Ministry of Environment (<http://www.env.go.jp>), *Discharge and Treatment of MSW (in FY 2000)*, January 24, 2003 (revised)

[3] Recycling

In FY 2000, 2.22 million tons of MSW were separately collected and recycled by municipalities (directly recycled), 2.87 million tons were recycled through intermediate treatment, and 2.77 million tons, were collected by citizen groups for recycling. The total amount of MSW recycled, aggregating all of them, was 7.86 million tons (see Fig. 4). The recycling rate was 14.3%, about three times higher than FY1988. Fig. 6 shows that the rise of the recycling rate was accelerated by the effect of the Containers and Packaging Recycling Law that partly came into force in 1997. However, recycling has yet to be promoted sufficiently for some kinds of MSW such as kitchen garbage.

Fig. 6 Recycling Rate



Note:

(MSW directly recycled + MSW recycled after intermediate treatment + MSW recovered by citizen groups)

$$\text{Recycling rate} = \frac{\text{MSW directly recycled + MSW recycled after intermediate treatment + MSW recovered by citizen groups}}{\text{Total MSW treated and MSW recovered by citizen groups}}$$

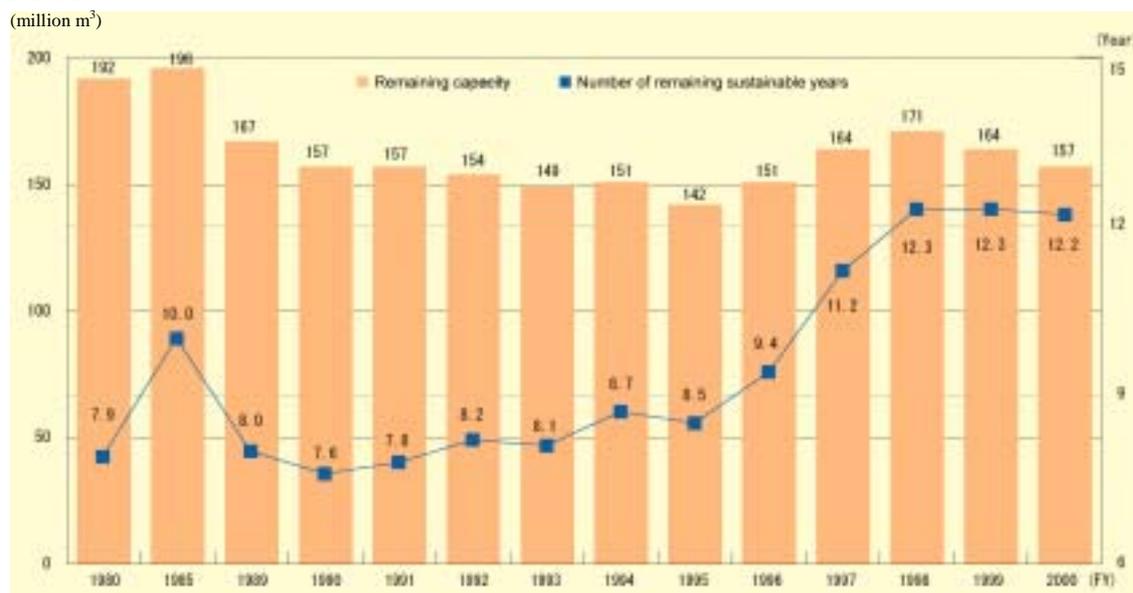
The amount of "MSW recycled after intermediate treatment" is the amount of iron, aluminum, etc. recovered and recycled through treatment of recyclable waste and bulky waste.

Source: Ministry of Environment (<http://www.env.go.jp>), *Discharge and Treatment of MSW (in FY 2000)*, January 24, 2003 (revised)

[4] Final disposal facilities

As of FY 2000, there were 2,077 final disposal facilities for MSW. The remaining capacity was 157.2 million m³ and the national estimated number of remaining sustainable years was 12.2 years. As the distribution of final disposal facilities is regionally uneven, the number of remaining sustainable years may differ among regions (see Fig. 7).

Fig. 7 Remaining Capacity and Number of Remaining Sustainable Years of Final Disposal Facilities for MSW



Note:

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

(Weight of landfill waste = 0.8163)

Source: Ministry of Environment (<http://www.env.go.jp>), *Discharge and Treatment of MSW (in FY 2000)*, January 24, 2003 (revised)

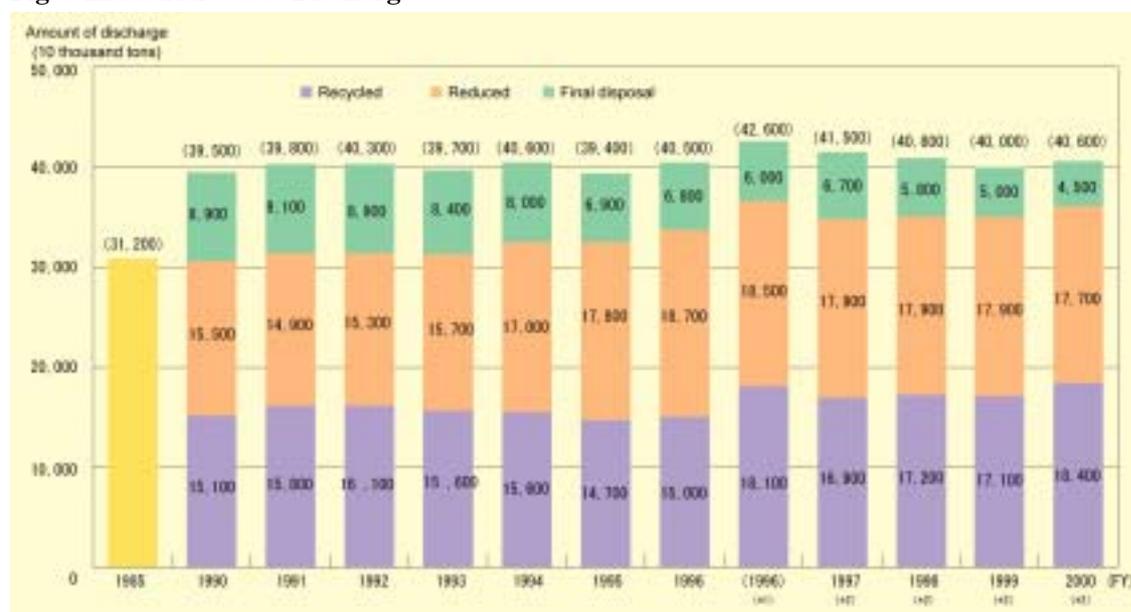
Industrial Waste

[1] Total amount of industrial waste discharged

The total amount of industrial waste discharged in Japan in FY 2000 was about 400 million tons, remaining almost flat since FY 1990. The amount of industrial waste recycled has not fluctuated significantly while the amount of industrial waste reduced through intermediate treatment has been increasing gradually, therefore the amount of final disposal has been decreasing gradually (see Fig. 8).

Based on the estimate by the Ministry of Environment as to the amount of final disposal in FY 2000 (45 million tons) and the remaining capacity of final disposal facilities as of April 2001, the national average number of remaining sustainable years of final disposal facilities is 3.9 years, which reveals that we are facing a severe situation.

Fig. 8 Industrial Waste Discharge



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

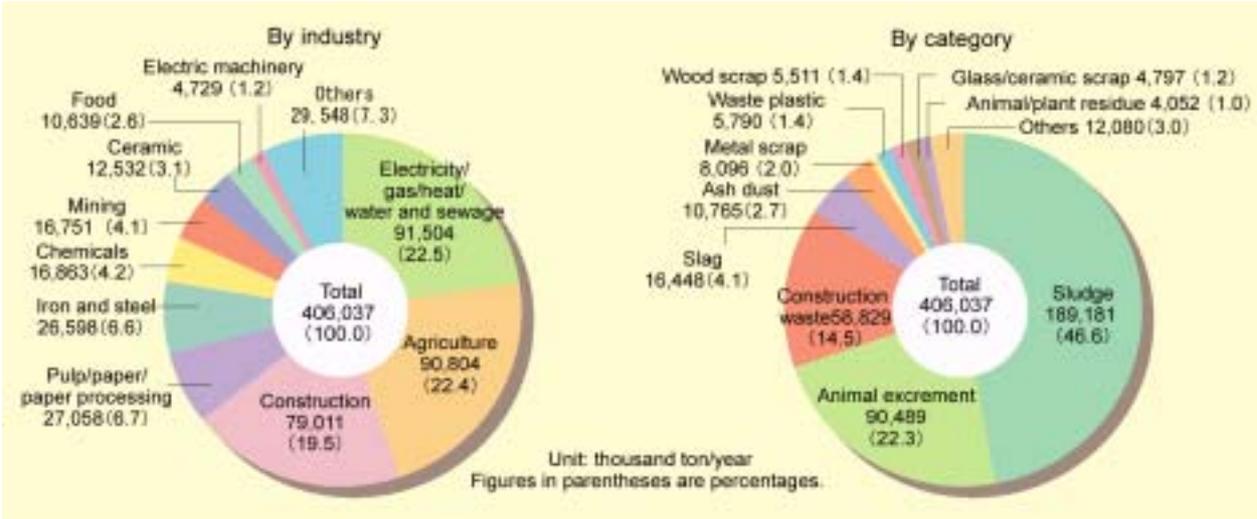
Source: Ministry of Environment (<http://www.env.go.jp>), *Discharge and Treatment of Industrial Waste (in FY 2000)*, January 24, 2003 (revised)

[2] Amount of discharge by industry and by category

The amount of discharge by four industries, electricity/gas/heat/water and sewage, agriculture, construction, and pulp/paper/paper processing, accounted for about 70% of the total amount of industrial waste discharged. (see Fig. 9).

In terms of category, sludge, animal excrement, and construction waste accounted for about 80% of the total amount of industrial waste discharged (see Fig. 9).

Fig. 9 Amount of Industrial Waste Discharged by Industry and Category (FY 2000)



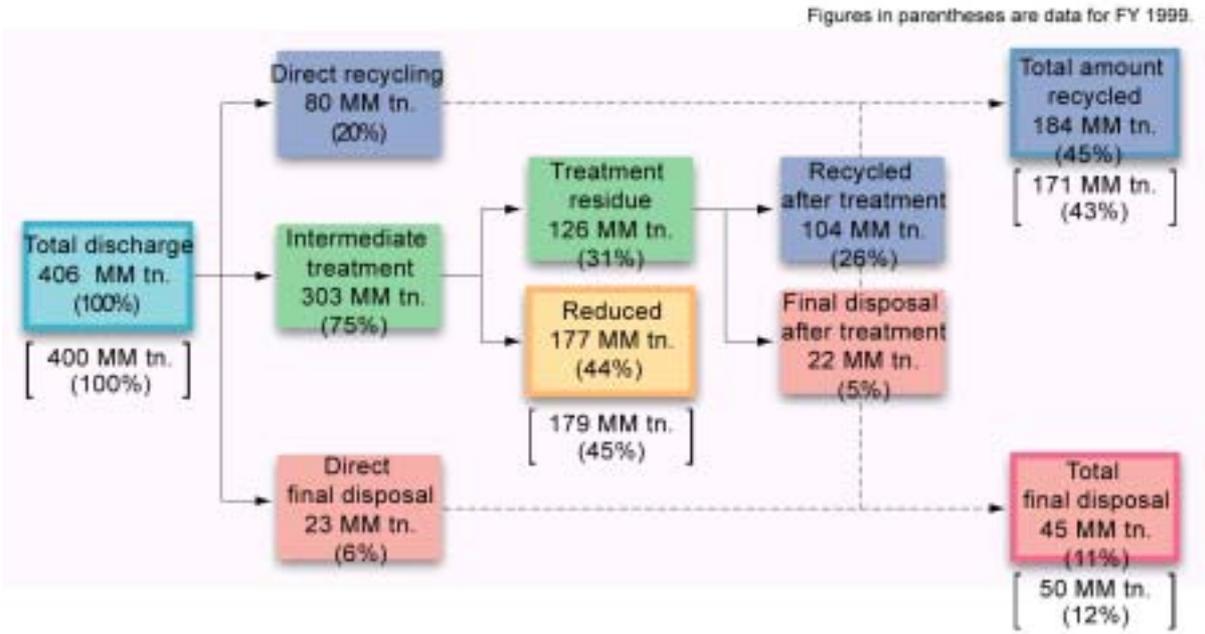
Source: Ministry of Environment (<http://www.env.go.jp>), *Discharge and Treatment of Industrial Waste (in FY 2000)*, January 24, 2003 (revised)

[3] Flow of Industrial waste treatment

Of the total amount of industrial waste discharged (about 460 million tons), about 80 million tons were directly recycled (20% of the total), and about 330 million tons were delivered to intermediate treatment, which were further reduced to about 126 million tons and then recycled or finally disposed (see Fig. 10).

Finally, 45% of the total amount of industrial waste discharged was recycled and 11% was finally disposed (see Fig. 10).

Fig. 10 Flow of Industrial Waste Treatment in Japan (FY 2000)



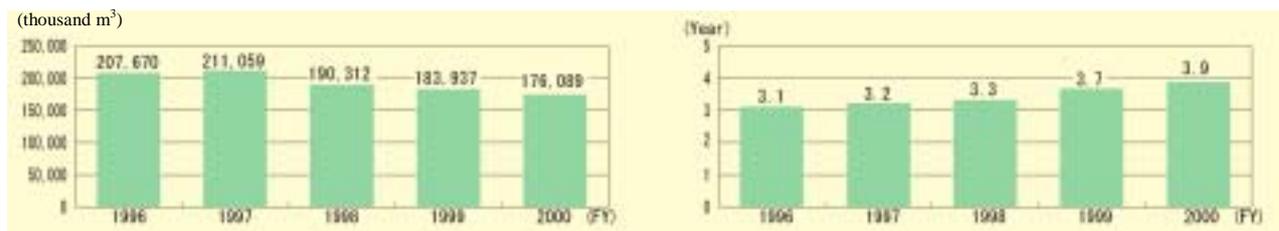
Note: 1. The aggregate total may not correspond to the total amount because figures for individual amounts are rounded off.
 2. Figures in parentheses are data for FY 1999.

Source: Ministry of Environment (<http://www.env.go.jp>), *Discharge and Treatment of Industrial Waste (in FY 2000)*, January 24, 2003 (revised)

[4] Final disposal facilities

As of FY 2000, the remaining capacity of final disposal facilities for industrial waste was about 100,007,609 m³, decreasing by about 7.85 million m³ (4%) from the previous year. The national average number of remaining sustainable years of final disposal facilities was 3.9 years.

Fig. 11 Remaining Capacity and Number of Remaining Sustainable Years of Final Disposal Facilities for Industrial Waste



Note: Number of remaining sustainable years = Remaining capacity (m³) / amount of final disposal (tons)
(Conversion ratio between ton and m³ = 1)

Source: Ministry of Environment (<http://www.env.go.jp>), *Discharge and Treatment of MSW (in FY 2000)*, January 24, 2003