

Abridged and Illustrated for Easy Understanding

Annual Report on the Environment in Japan 2004

Diffusing the Environmental Techniques and the Environmental Spirit



Ministry of the Environment

To Our Readers

This booklet was compiled based on the *Quality of the Environment in Japan 2004* (White Paper), an annual report on the environment by the Government, published on May 28, 2004. The content of this booklet was edited to reach out to a wider readership with a more readable publication. This booklet offers an overview on the subject of “Diffusing the Environmental Techniques and the Environmental Spirit” (in Part One) as well as a digest of environmental conservation policies and measures implemented by the Government in FY 2003 (in Part Two).

The *Quality of the Environment in Japan 2004* was printed by Gyosei Corporation. The *Annual Report on the Environment for Children*, which is edited to make it easier for primary and middle school students to understand, was published on September 30.

Back issues of *Quality of the Environment in Japan* and *Abridged and Illustrated for Easy Understanding Annual Report on the Environment in Japan* are available on the Ministry of the Environment website (<http://www.env.go.jp/en/w-paper/index.html>).

Besides the topics covered in this booklet, the *Quality of the Environment in Japan 2004* also introduces the following websites for your reference (in Japanese only):

- *Wa-no-kurashi* (<http://www.wanokurashi.ne.jp>)
- Biotope Information (<http://www.env.go.jp/nature/biodic/eap61/>)
- Vision for a Virtuous Circle for Environment and Economy in Japan
(<http://www.env.go.jp/policy/report/h16-01/index.html>)
- An example of an ecotourism website
 - Exciting Nature School WADA (<http://home.e03.itscom.net/np0-ns/>)
- Examples of environmental education websites
 - Zaidanhojin KEEP Kyokai (<http://www.keep.or.jp/indexe.html>) (English Website)
 - Okinawa Citizen’s Recycle Movement
(<http://www.ryucom.ne.jp/users/rec/kuru-e/welcome-e.htm>) (English Website)
 - Suita Environmental University for Senior Citizens
(<http://www.city.suita.osaka.jp/kobo/chikyu/page/004086.shtml>)

The drawing on the cover page is the work of Kozue Okamoto, a second-year student at the Kagawa Prefectural Takamatsu Technical Art High School. Ms. Okamoto won the Minister of the Environment Award (General Category) at the “Year 2004 White Paper on the Environment Cover Page Illustration Contest,” which was sponsored by the Ministry of the Environment and the Japan Environment Association.

Ms. Okamoto commented, “I used drawings of natural scenery and environment-friendly human technologies for the background to represent the coexistence of man and nature. Because the Earth, the man, the bird, the fish, and the dog in the middle of the picture will have to continue to coexist on this Earth, I used a leaf bud to represent the actions that must be taken to care for nature.”

The drawing on the back cover is the work of Shirou Urano, a fifth-grade student at the Fukuno Town Municipal Primary School in Toyama Prefecture. Mr. Urano won the Japan Environment Association Chairman Award (Elementary and Junior High School Student Category) at the “Year 2004 White Paper on the Environment Cover Page Illustration Contest.”

Mr. Urano commented, “I drew a world in which animals, plants, and humans all got along and were nice to the Earth’s environment.”

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Part One

Overview: Diffusing the Environmental Techniques and the Environmental Spirit

Introductory Chapter

Toward an Era of Environmental Revolution

<Summary of Introductory Chapter>

Our pursuit of convenience and comfort over the years has increased the environmental load. Fortunately, through technological advances, a possibility is arising to reduce the environmental load while simultaneously maintaining the quality of life. If we look at the fact that industrial activities are dependent on market needs, we can infer that it is possible to change the flow of goods and capital and to revolutionize industrial activities through consumer behavior. As a result, this can give rise to the “*Environmental Revolution*,” following in the footsteps of the “*Industrial Revolution*” and the “*IT Revolution*.”

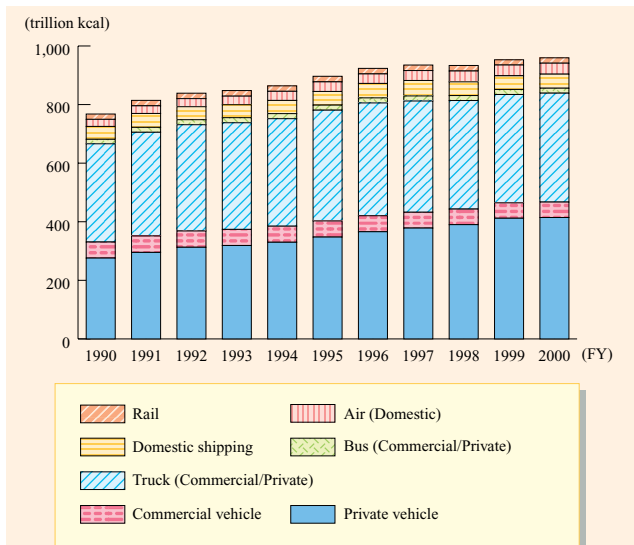
Section 1: Conventional Lifestyle in Pursuit of Convenience and Comfort

1. Increasing Energy Consumption and Global Warming

The convenient and comfortable lifestyle that we have pursued over the years has increased energy consumption. The rise in the drive distance of motor vehicles and deterioration in the actual driving fuel efficiency have increased energy consumption from fuel combustion. Changes in energy consumption categorized by transport mode show that private vehicles consume a large percentage of energy and consumption is rising rapidly. Diffusion of home electrical appliances and the greater number of households have also increased household energy consumption.

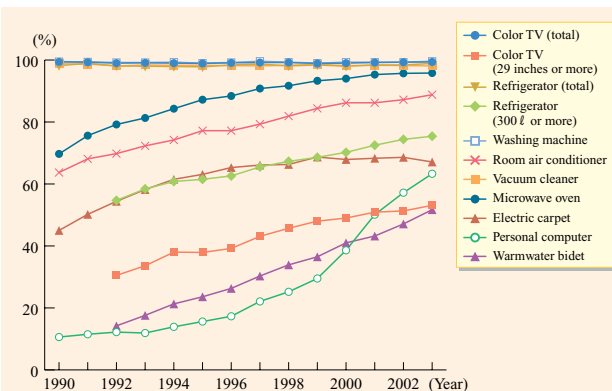
Energy consumption from motor vehicles and households place a load on the environment because the combustion of fossil fuels from the operation of motor vehicles and generation of electricity emit carbon dioxide. Rising carbon dioxide emissions is one of the main factors that trigger global warming.

Changes in Energy Consumption by Transport Mode in the Transport Sector



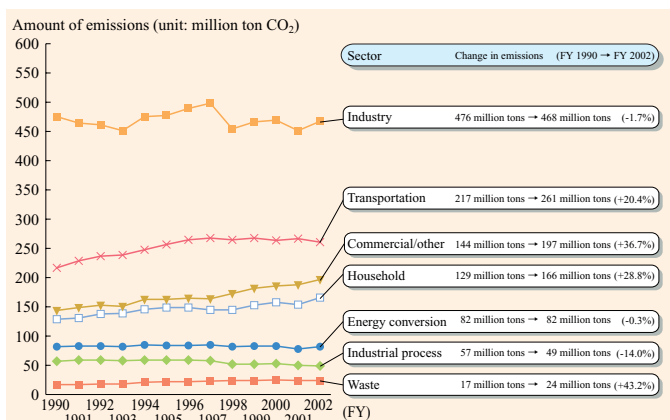
Sources: Compiled by the Ministry of the Environment based on the Ministry of Land, Infrastructure and Transport, *Annual Report on Domestic Shipping Transport Statistics*, *Annual Report on Air Transport Statistics*, *Annual Report on Rail Statistics*, and *Annual Report of Road Transport Statistics*; and materials issued by the Maritime Bureau and the Japanese Shipowners' Association.

Diffusion Rate of Major Home Electrical Appliances in Households



Source: Compiled by the Ministry of the Environment based on the Economic and Social Research Institute of the Cabinet Office, *Consumer Confidence Survey (Quarterly)*.

Emissions of Carbon Dioxide in Japan



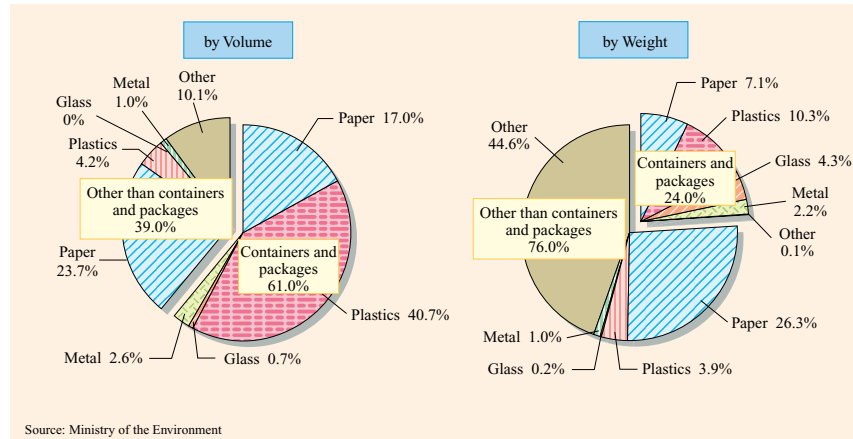
Source: Ministry of the Environment

2. Plastic Containers Discarded as Waste

A tremendous amount of waste is generated from daily life. The total amount of waste in FY 2001 in Japan was 52.1 million tons, with the per capita daily amount reaching approximately 1.1 kg. Of this amount, about 67% is domestic waste. In terms of volume, plastic containers account for about 40% of the domestic waste. Though they provide convenience to daily life, when plastic containers are discarded as waste, they place a load on the environment.

Despite progress in reducing the final disposal volume through recycling, securing enough final disposal sites continues to be a big problem. In addition to the strain on final disposal sites, illegal dumping has also become rampant. Its adverse effect on the living environment causes concern.

Percentage of Containers and Packaging Materials in Domestic Waste (FY 2001)



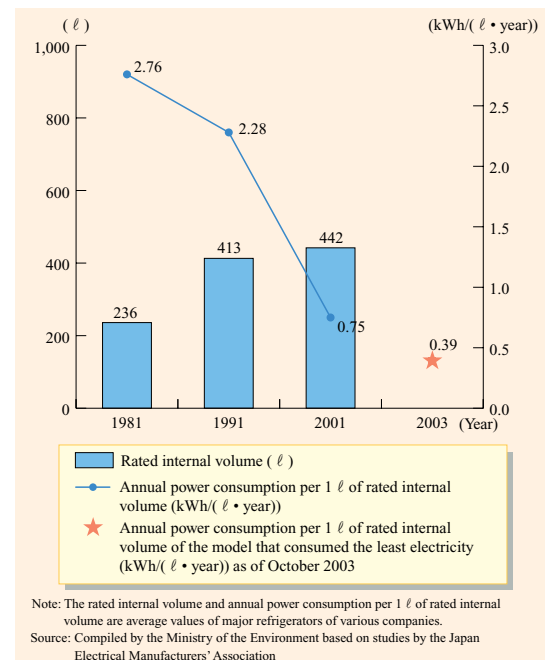
Section 2: Signs of the Environmental Revolution

Because industrial activities are dependent on demand, the directions of environmentally conscious efforts of businesses will change according to the choices consumers make everyday. By engaging ourselves in environmental conservation measures as the ultimate player and supreme ruler of the social economy, we can institute a drastic reform to the society as a whole, including industries.

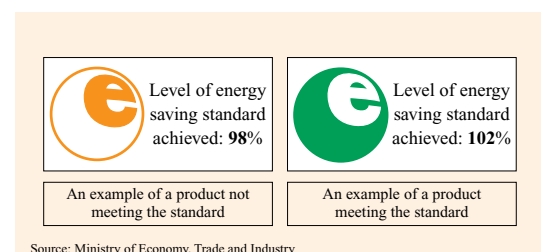
In recent years, a wide range of products incorporating various technologies to reduce environmental load have been launched. For example, the number of units of low-emission vehicles, such as hybrid vehicles and certified fuel-efficient, low-emission vehicles has increased to as much as 65.8% of all motor vehicles shipped in Japan. Thanks to energy-saving technology, the average annual electricity consumption of major refrigerators (per liter of internal volume) made by major companies has been reduced to one-third of the level of twenty years ago. Technological development has also made it possible to recycle used PET bottles into new ones.

The emergence of these signs of reform shows the possibility of revolutionizing industrial activities through changes in our daily lives.

Changes in Energy Efficiency of Refrigerator



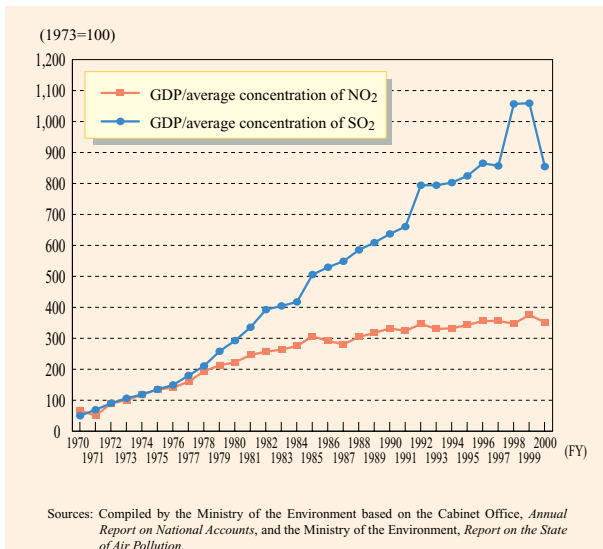
Energy Conservation Rate Mark



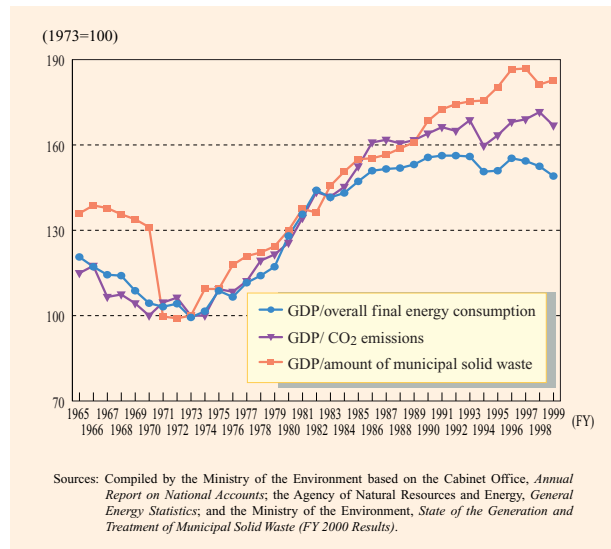
Section 3: Living in the Environmental Century

In Japan, eco-efficiency has shown some improvement in the areas of NO₂ and SO₂ emission reduction as a result of the increase in the number of units and processing capacity of flue gas denitration facilities and flue gas desulfurization facilities. In terms of energy and carbon dioxide, the improved energy efficiency of individual equipment and machinery is unfortunately cancelled out by the expansion of office areas in recent years. On the other hand, as the resource productivity is heightened, we can see the gradual advent of a society in which the consumption of natural resources is controlled and the environmental load is reduced.

**Changes in Eco-efficiency
(Average concentrations of NO₂ and SO₂)**

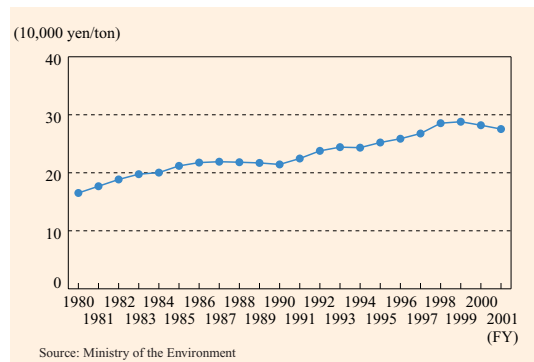


Changes in Eco-efficiency (Overall final energy consumption, CO₂ emissions, and amount of municipal solid waste)



The 20th century, marked by our tireless efforts to acquire as much as possible from the environment and by the tremendous burden we exerted on the environment, has ended. We must make the 21st century the Environmental Century by respecting environmental values and maintaining harmony with the environment. A fundamental reform of our mindset to reduce environmental load and to share the environmental blessings with future generations while improving the quality of life for all generations, and the technological innovation that the reform makes possible, will bring further growth to our daily lives and to socio-economic activities. We can call such development the “*Environmental Revolution*,” following in the footsteps of the “*Industrial Revolution*” and the “*IT Revolution*.” The actions taken by each one of us will bring new possibilities to the “*Environmental Century*.”

Changes in Resource Productivity



Chapter One

Life-Enhancing “Environmental Techniques”

<Summary of Chapter One>

Today, a wide range of ideas and activities aimed at protecting the environment is being undertaken at all levels of society. For example, environment-friendly products and environmentally conscious business operations have been made possible by technological development. These kinds of environmental conservation technologies and environmentally conscious methods and systems are called “environmental techniques” in this Annual Report. This chapter introduces various environmental techniques in the following three areas: residence and workplace, leisure, and manufacturing. While examining the effects of these techniques, the chapter will also introduce environmentally conscious management methods and corporate structures.

Section 1: Environmental Century Made Possible by Techniques

1. Examples of “Environmental Techniques” in Residence and Workplace

Japanese architecture has traditionally been designed with emphasis on good ventilation. Except in cold areas such as Hokkaido, insulation of buildings has not made much progress. For example, the installation of double-glazed glass windows is much less common in Japan compared to European countries.

It is said that 58% of the heating in a room during winter escapes and 73% of heat in an air conditioned room during summer enters through windows and door openings. Therefore, the use of double-glazed glass or window sashes with good insulation at the openings is effective in cutting down energy use for heating and air conditioning. Using better insulating materials for the walls can also improve the insulation of buildings. Installing window awnings or eaves, planting trees in the yard, utilizing blinds or curtains can also help create a cool and comfortable living space under the strong

Coefficient of Heat Transmission by Glass Type

Type of glass	Coefficient of heat transmission [W/(m ² · K)]
Float glass plate 3 mm	6.0
Double-glazed glass (air space 6 mm)	3.4
Double-glazed glass (air space 12 mm)	2.9
Heat shield double-glazed glass (air space 6 mm)	2.5
High performance heat shield double-glazed glass (air space 12 mm)	1.7~1.9

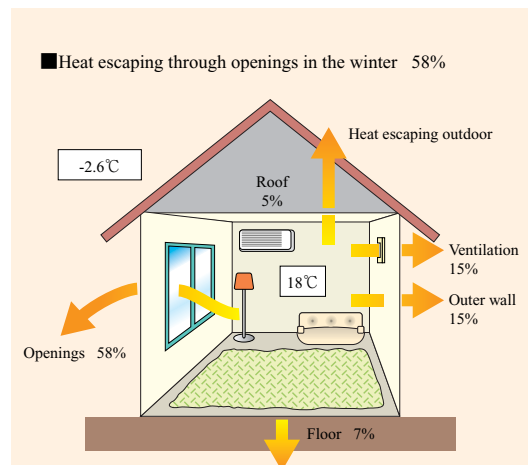
Notes:

1. All glass used for double-glazed glass is 3 mm thick.

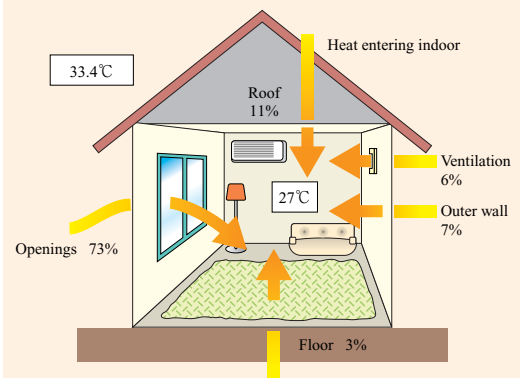
2. “Coefficient of heat transmission” refers to the easiness of heat transmitted from indoor to outdoor through walls, etc. Windows and walls with good insulation have smaller coefficients.

Source: Center for the Dissemination and Promotion of Energy Efficient Construction Materials under the Federation of Construction Materials Industries, Japan.

Heat Flowing In and Out of Openings (%)



■ Heat entering through openings in the summer 73%



Note: House model built based on the 1992 construction standard

Sources: Liaison Council for the Dissemination and Promotion of Insulation under the Institute for Building Environment and Energy Conservation; and the Center for the Dissemination and Promotion of Energy Efficient Construction Materials under the Federation of Construction Materials Industries, Japan, *Quick Guide to Energy Saving Standards for Residential Buildings*.

summer sun.

Due to market penetration, the price of photovoltaic power generation system for households is going down. In addition, 2005 is expected to see the market launch of fuel cells for household use. The use of energy-saving navigator or home energy management systems (HEMS) is also said to be effective in rationalizing energy use at home.

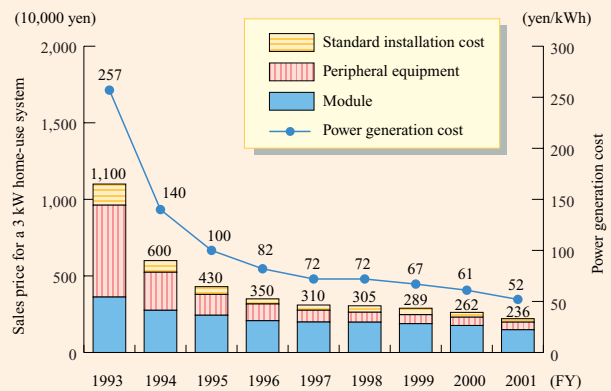
In the workplace as well, photovoltaic power generation equipment and cogeneration equipment are being installed. Energy service companies (ESCO), which provide comprehensive energy-saving services including necessary technologies, equipment, human resources, and capital for buildings and factories, have attracted attention.

Based on the Law concerning the Rational Use of Energy, the Top Runner method was adopted for home electrical appliances. It sets the standards for home electrical appliances, taking into account the functions of currently available products that are the most energy efficient and evaluating the prospect of further technological development. Adoption of the method has helped advance the development of energy-saving technologies. For instance, effort is made to lower electricity consumption not only during use but also when the television is in standby mode. Liquid crystal televisions, which consume less electricity than televisions using cathode-ray tubes, are rapidly gaining in popularity.

Electricity consumption for lighting accounts for about 16% of the electricity consumed in a household. Compared to incandescent lamps of the same brightness, electric bulb-type fluorescent lamps use only one-third of the electricity and their useful life is six times longer.

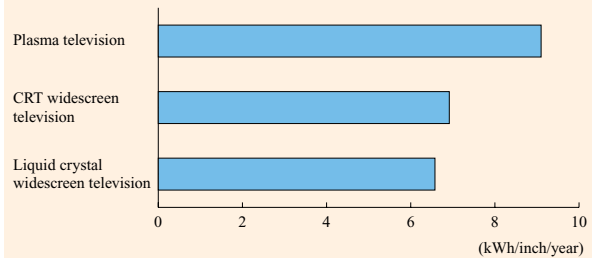
The energy used for air conditioning and heating accounts for about 25% of electricity used in a household. This appliance consumes the most energy. With advances in technology such as inverter control, energy conservation is making progress. Compared to five years ago, an air conditioner/heater with the same energy output uses 20% less electricity today.

Changes in the Price of Photovoltaic Power Generation System



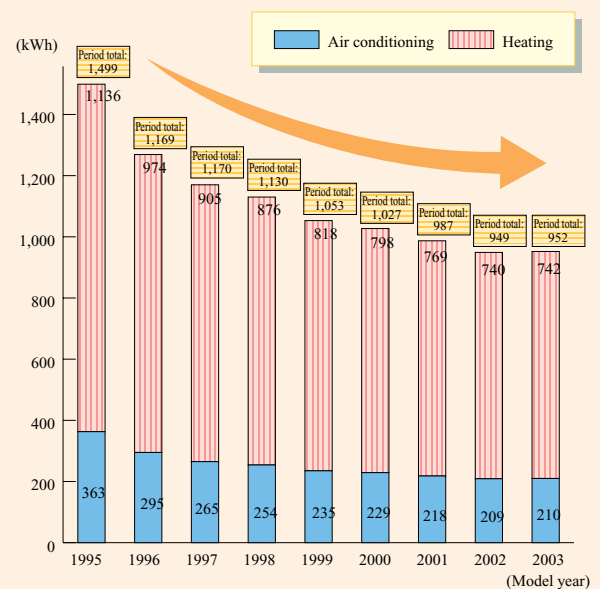
Source: New Energy and Industrial Technology Development Organization

Comparison of Power Consumption per Inch of CRT Widescreen Television, Liquid Crystal Television, and Plasma Television



Notes:
 1. "CRT widescreen television" includes "widescreen television" and "high-definition television" in the GPN database.
 2. To compare with CRT widescreen television, the sizes of liquid crystal television and plasma television are increased by 10% to compensate the difference in screen size (e.g. 17 inch liquid crystal TV → 18.7 inch liquid crystal TV).
 Source: Compiled by the Ministry of the Environment based on the Green Purchasing Network, GPN Database.

Changes in the Annual Power Consumption of Air Conditioners/Heaters



Notes:
 1. The power consumption of each period is calculated based on the JRA4046 standard (standard for calculating room air conditioner/heater's power consumption) set by the Japan Refrigeration and Air Conditioning Industry Association.
 2. The above values are for an air conditioner/heater with air-conditioning capacity of 2.8 kW.
 Source: Energy Conservation Center, Japan.

2. Examples of “Environmental Techniques” in Leisure

“Environmental Techniques” are useful not only in daily life but also in leisure activities.

Different individuals may have different interpretations of ecotourism. The Ministry of the Environment defines “ecotourism” as tourism having the following three elements and aiming at integration and continuous pursuit of these elements: (i) tourism that enhances understanding of the natural and cultural resources unique to the area and that contains educational and descriptive elements to facilitate enjoyment of their appeals; (ii) tourism that implements protection and conservation measures and that gives consideration for environmental load reduction to enable the sustainable use of resources; and (iii) tourism that contributes to revitalization of the local community and its economy. It is hoped that ecotourism will enable local residents to gain a new understanding of the natural and cultural values of their community and give vitality to their regions through exchanges with ecotour participants.

Hotels and Japanese inns are also taking environmentally conscious measures. For example, a Japanese inn in Toba City, Mie Prefecture, uses a facility inside the inn to reprocess the large amount of left over oil from cooking *tempura* into bio diesel fuel (BDF) and uses it for the bus that transports guests. Raw garbage is made into compost. Waste heat from private power generation is used to heat water for the inn. During the off-season months, the pool is used to collect rainwater for watering plants and washing cars.

The load put on the environment differs substantially depending on the means of transportation selected for traveling. For example, the use of railroads will emit only about 8% of carbon dioxide emitted from motor vehicle use.

3. Examples of “Environmental Techniques” in Manufacturing

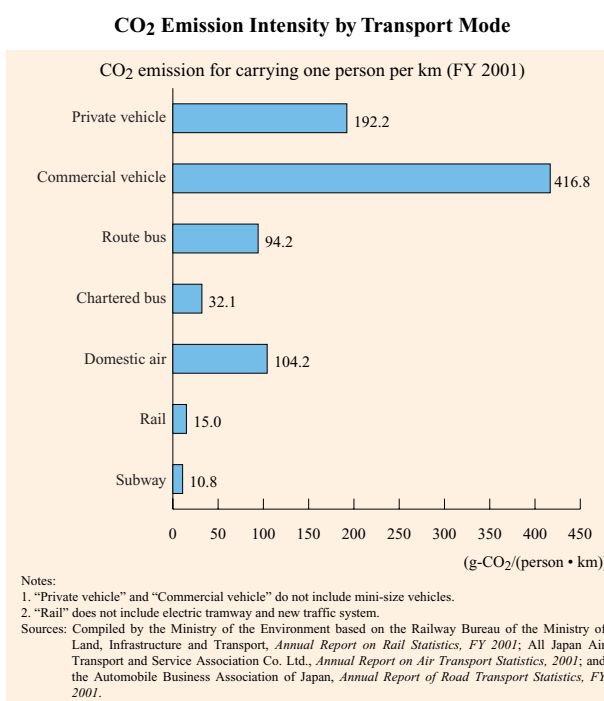
In the products that we use everyday, there are those that are designed not only to lower environmental load during use but also incorporate environmental considerations throughout the product lifecycle, from its production to disposal.

Measures are being taken to minimize waste at the time when a product is to be disposed of and to make recycling of the product easier. For example, to make scrapping easier, a computer manufacturer has reduced the number of screws used to one-tenth of that used ten years ago. It is said that the time consumed in scrapping is now shorter and the cost of parts is lower.

An iron and steel company has succeeded in cutting down the use of coking coal by replacing some of the coking coal needed in the process of reducing iron ore to pig iron by blowing waste plastics into the blast furnace. Used plastics can be utilized effectively as resources. They can be recycled as raw materials, and waste plastics can be collected and used eventually as blast furnace feed.



Ecotour in Karuizawa
(Courtesy of Japan Travel Bureau Foundation)



Section 2: Progress in Environmentally Conscious Business Activities

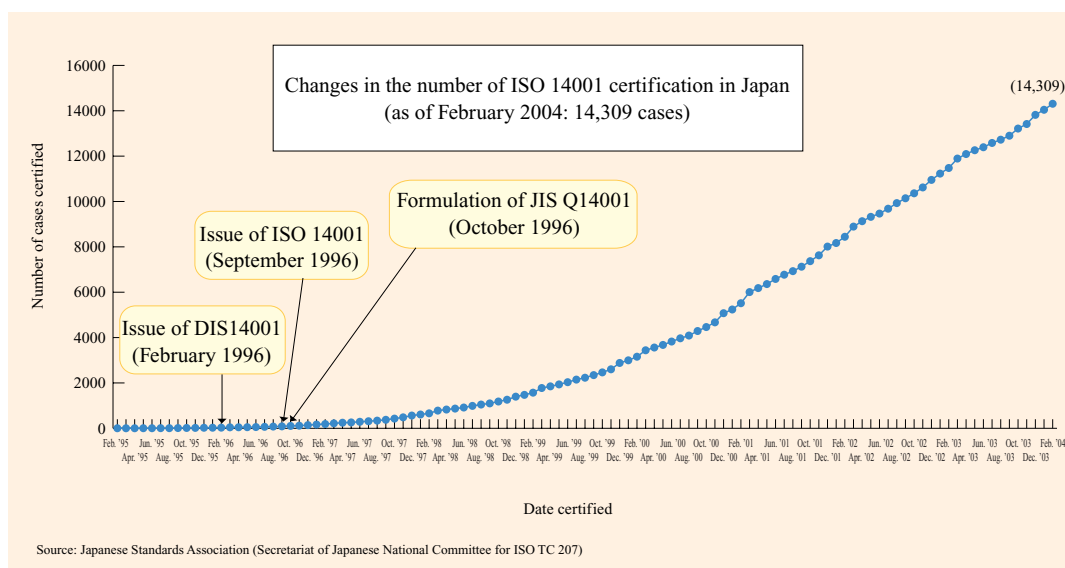
“Environmental Techniques” are also found in management methods and business structures. Many big corporations have adopted environmental management systems and environmental reports. The financial sector has also launched environmentally conscious initiatives.

1. Environmental Management System

“Environmental management system” is a means that enables a company to undertake environmental conservation measures on a voluntary basis. The company sets up its own environmental principles and goals, and establishes systems and procedures for its factories and business sites to implement measures for achieving the goals.

The ISO 14001 established by the International Organization for Standardization (hereinafter referred to as “ISO”) is a representative international standard for environmental management systems. The ISO 14001 aims at improving environmentally conscious efforts through the continuous implementation of PDCA (Plan, Do, Check, and Act).

Changes in the Number of ISO 14001 Certification in Japan



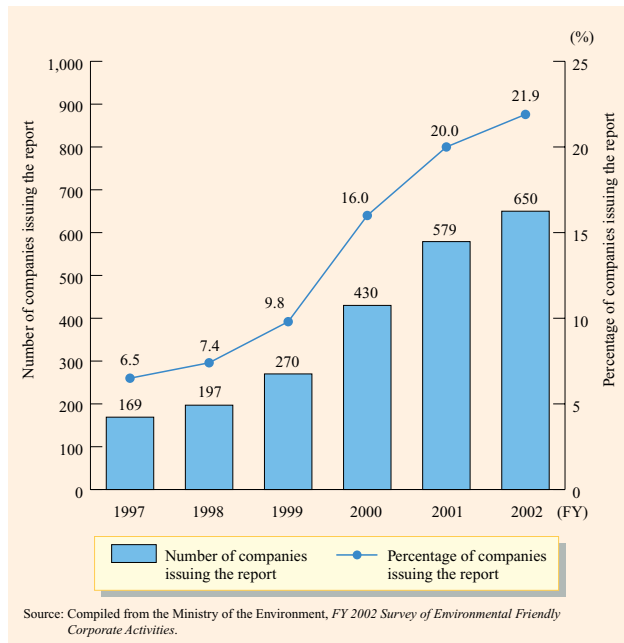
Because the acquisition of ISO 14001 certification imposes great strain on small and mid-sized companies, the Ministry of the Environment formulated the Eco Action 21 program in 1996 aimed at encouraging all businesses, including small and mid-sized companies, to undertake voluntary environmental measures. In FY 2003, the number of registered businesses exceeded one thousand. The Eco Action 21 program was revised in FY 2004 to introduce a certification/registration system that enables external assessment. It is hoped that this revision can further encourage small and mid-sized companies to take environmentally conscious measures.

2. Environmental Report

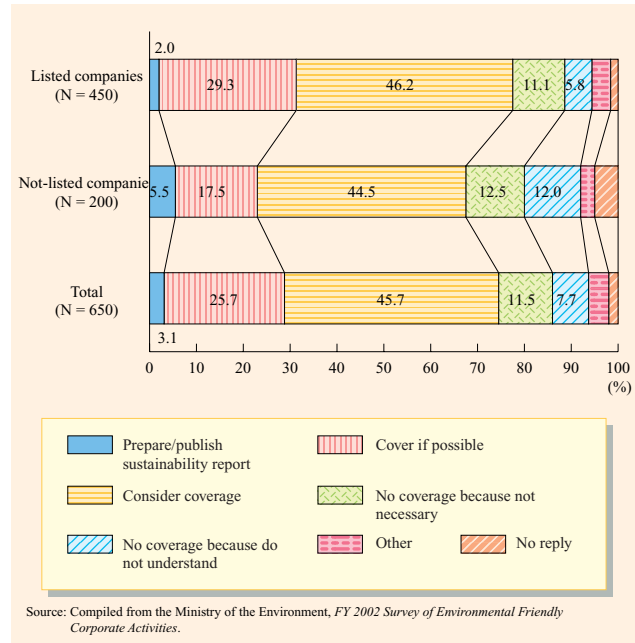
Businesses use environmental reports to give the public an overview of environmental information, which include their principles for environmental conservation, goals, plans, status of environmental management, and progress in measures to lower environmental load.

First of all, it serves as an important means of environmental communication that links businesses and society. If the consumers, business partners, and investors use the information provided in the environmental reports as a basis for selecting businesses, products, or services, then proactive measures with environmental consideration will become highly regarded by the society and the market. This will further enhance the environmental awareness of the society as a whole. Secondly, the preparation and publication of the environmental report provides the opportunity for a business to

Changes in the Number of Companies Issuing Environmental Report



Coverage of Social and Economic Aspects in the Report



formulate or review its own principles, goals, and action plans for environmental initiatives. Environmental reports are also useful as a means to familiarize employees with the contents of the company’s environmental initiatives and to enhance their environmental awareness.

The number of companies compiling and publishing environmental reports is increasing steadily. 21.9% of the businesses answered that they issued environmental reports. In FY 2002, 34% of the companies listed in the stock market and 12.2% of the companies not listed issued environmental reports.

Against the backdrop of intensive scrutiny on a company’s social responsibility in recent years, an increasing number of companies began issuing “sustainability reports” or “corporate social responsibility (CSR) reports” in order to add a social aspect to the conventional environmental aspect. These companies account for one-fourth of the companies that already compile and issue environmental reports.

3. Environmental Considerations by the Financial Sector

In recent years, financial institutions have shown increasing interest in the environment. In the background lies the possibility that environmental problems may affect the operations of financial institutions. (For example, a company being financed may present the risk (credit risk) of defaulting on payments when its cash flow is strained by unexpected expenditures incurred due to remedial measures for problems such as soil contamination or groundwater contamination.) At the same time, environmental problems also present new business opportunities for financial institutions.

Through the redistribution of capital to businesses, financial institutions indirectly exert great influence on the environment. They can appeal to businesses applying for funds to integrate the concern for environmental problems into their business operations.

Another example is that some banks offer low-interest financing for the purchase of low-emission vehicles. Some insurance companies offer lower insurance rates known as “Eco-car Discounts.”

Chapter Two

Life-Enriching “Environmental Spirit”

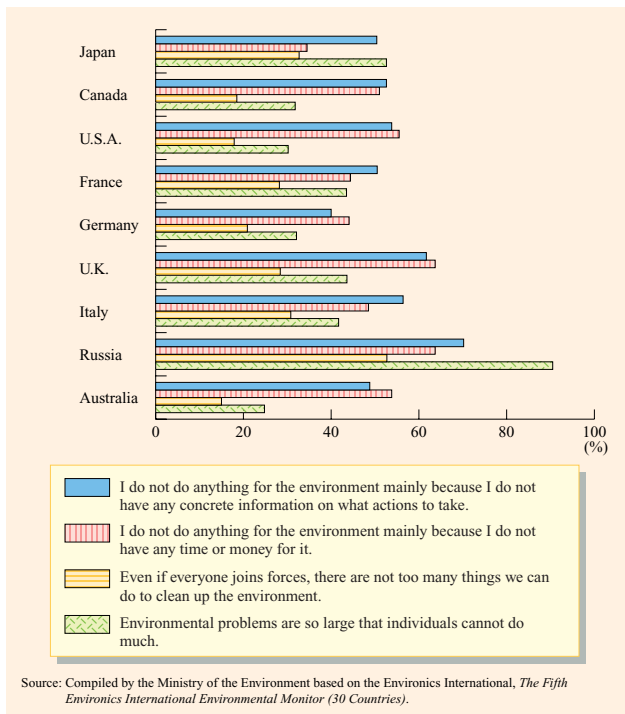
<Summary of Chapter Two>

Only when individuals, who consume and invest through their daily lives, support and guide businesses that develop “environmental techniques,” and only when the two parties support each other can “environmental techniques” be fully utilized. This chapter focuses on “environmental spirit,” the awareness that leads to such behavior, and looks at “environmental spirit” in the society and introduces actual examples in communities.

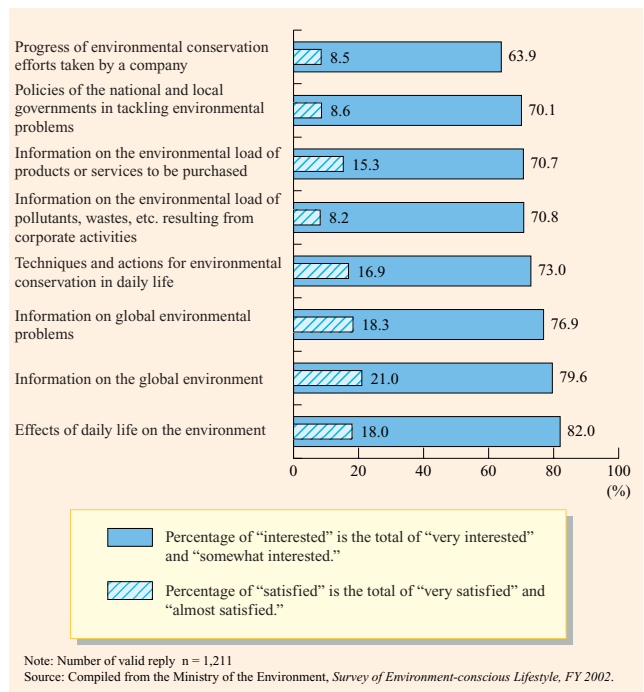
Section 1: “Environmental Spirit” Nurtured in the Society

In comparison to other countries, a greater number of people in Japan quoted “lack of information” as a reason for not actively trying to tackle environmental problems. Although it can be said that the interest in environmental information is high, only a few answered “satisfactory” to all items in terms of the level of satisfaction.

International Comparison of Environmental Awareness



Interest in Environmental Information and Level of Satisfaction



The gap in the level of interest in environmental information and the level of satisfaction indicates a need for the government, businesses, and civil organizations to make further efforts in the future to enrich easy-to-understand information. However, even if an individual has access to every environmental information and knows that certain efforts he/she makes can contribute to environmental conservation, the individual still tends to think that “a single person will not make any difference,” and thus chooses the comfort of everyday life. To avoid such a social dilemma, it is necessary to ensure that an individual’s efforts can also bring benefits to that person. At the same time, it is also important for every individual to respect the society as a whole and cultivate the “environmental spirit” that appreciates and gives consideration to the environment. The feeling of camaraderie peculiar to Japan, such as “*minnade* (Let’s do it together.)” or “*otagaisama* (Let’s share the inconvenience with each other.),” and an understanding of interdependent relationships can help overcome feelings generated by the social dilemma and encourage most suitable practices in the long run

in general. It is imperative to make connections between individuals so that related parties can share their concerns of the problems and cooperate in efforts to better the environment.

To reflect on the “environmental spirit” Japan has possessed since ancient times, to participate in international discussions on the sustainability of the commons, the Earth, and to nurture an “environmental spirit” that befits the 21st century are efforts that Japan needs to make in the future.

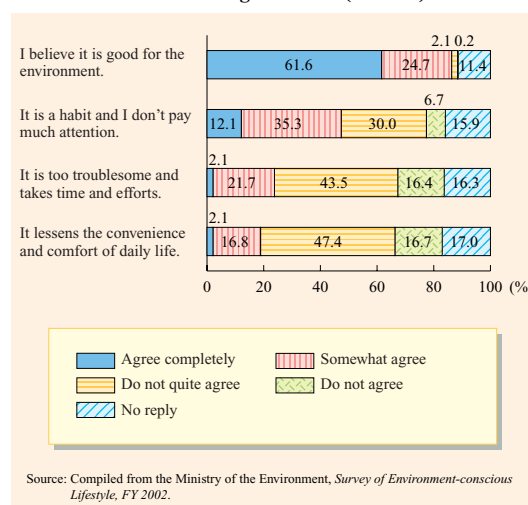
Section 2: Consumption and Investment Supporting “Environmental Techniques”

In our involvement with businesses as consumers and investors, we can advance environmental conservation through our “environmental spirit.”

Selecting and buying environmentally conscious products and services are known as “green purchasing.” Green purchasing is an approach that enables consumers to appeal, through the market, to businesses to take measures to lower environmental load and at the same time, to support businesses that are proactive in taking environmental measures.

More people believe that paying attention to the environment when making purchasing decisions is good. On the other hand, the green purchasing activities of individuals is low compared to energy-related environmentally conscious activities. While 36.4% of respondents answered they “did not feel any barriers” in green purchasing, among those who found barriers, 25.9% answered they “could not judge because of the lack of relevant information” and 16.5% answered “the price is higher compared to conventional products.” This shows that information availability and economic concerns are the main obstacles to green purchasing. To facilitate assessment of the environmental consciousness of businesses and products, the government and businesses must provide consumers with appropriate environmental information about business activities, products, and services. Environmental labels play an important role as a means for providing such environmental information.

Environmental Consideration when Making Purchase (Overall)



Implementation of Environmental Conservation Activities




Due to the higher level of environmental conservation awareness among individuals in recent years, environment-related financial products have drawn attention. Socially responsible investment (SRI) means to invest in businesses not only from the financial aspect of profitability but also according to efforts made by such businesses to tackle environmental and social problems. Among the socially responsible investment products, the ecofund is an investment trust that focuses on the environment and actively invests in businesses that undertake good environmental measures or have high environmental performance.

Japan's history of SRI is short compared to countries in Europe and the US. At one time, the asset value of the ecofund had reached an amount that exceeded 200 billion yen. Since then, due to a downturn in the stock market and other factors, the amount has shrunk to below 100 billion yen today.

Investors who have already made socially responsible investments, such as in the ecofund, account for only 0.4% in Japan as a whole. Many said that they do not have enough information on SRI. Providing the public with information on the contents and concept of SRI, preparing informative investment reports, and training sales people to become knowledgeable about such products, are effective measures for generating actual investment activities in the future.



Major Environmental Labels

(1) Environmental labels certified by a third party (Type I: ISO 14024)




Mark and name	Certifying body	Summary
 Eco Mark	Japan Environment Association	It is a product certification system that contributes to environmental conservation by taking into account the product's lifecycle as a whole. The system is applicable to a wide range of products and certification standards are set up for each type of products. This is the only Type I environmental labeling system in Japan that is in line with the ISO Standard (ISO 14024). It is operated by a committee, with wide representation of stakeholders, in Japan Environment Association under jurisdiction of the Ministry of the Environment.

(2) Environmental labels certified by a third-party or industrial association

[Energy-saving related]


Mark and name	Certifying body	Summary
 International Energy Star Program	Ministry of Economy, Trade and Industry	This mark is for office equipment, such as personal computers, that fulfills the standard of power consumption in standby mode. It is an international system implemented with the cooperation of the U.S., Japan, etc.
 Environment/ Energy Excellent Architecture Certification Mark System	Institute for Building Environment and Energy Conservation	This mark is for buildings that have a certain level of energy saving function while maintaining the level of indoor environment. Display of the mark can improve the image of a company by showing that it is taking environmental and energy measures. It also provides guidance to the public for choosing offices, stores, accommodation facilities, etc.

[Recycling-related]

Mark and name	Certifying body	Summary
 R Mark	Zero Waste Partnership Conference	This mark is used voluntarily to show the percentage of recycled pulp content in paper. This system was established by an NPO, Zero Waste Partnership Conference (formerly known as National Conference for Promoting Waste Reduction) founded to reduce waste.
 Green Mark	Paper Recycling Promotion Center	This system aims to promote paper recycling by increasing the use of recycled pulp in paper. This mark is for a product made with a certain percentage or more of recycled pulp as raw material.
 PET Bottle Recycling Recommendation Mark	The Council for PET Bottle Recycling	The mark is used on products made with recycled PET bottles. It is a system operated by The Council for PET Bottle Recycling, an industrial association consisted of PET bottle manufacturers and raw resin manufacturers.

(3) Voluntary environmental claims by businesses (Type II: ISO 14021)

(4) Indication of the environmental load of products using quantitative data (Type III: ISO 14025)

Mark and name	Certifying body	Summary
 Eco Leaf	Japan Environmental Management Association for Industry	This environmental label is used to accomplish the following: (i) provide quantitative environmental information of product using the LCA method and disclose it to the public using the Internet, etc. in order to assist label users in making green purchasing and procurement decisions, and (ii) give incentive to manufacturers to develop, manufacture, and sell products that place less load on the environment. In ISO classification, the label is categorized as Type III Environmental Label, which was determined to be an international standard in November 2002.

Source: Ministry of the Environment

Section 3: Environmental Conservation in Daily Life

Other than taking actions as consumers and investors, we can also take measures to lower environmental load and to protect and create a rich environment through our daily lives.

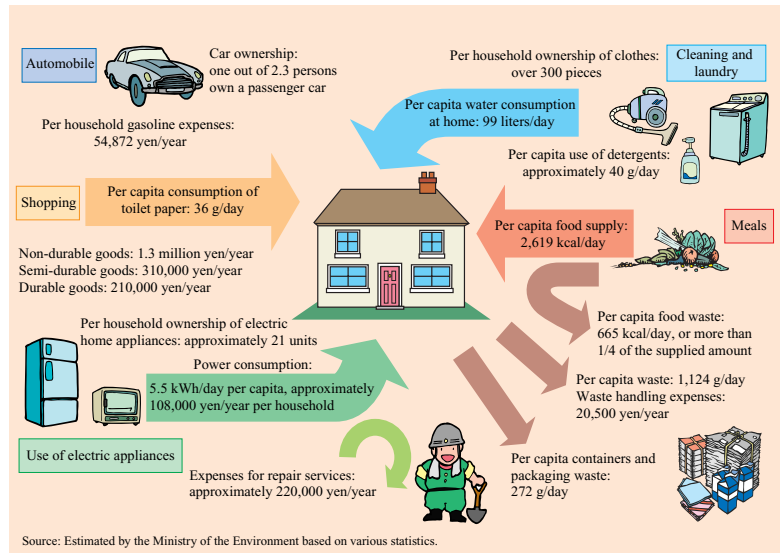
Our everyday living places a load on the environment, through various stages of the products we use, from the gathering of resources, to manufacturing, use, and disposal, and also in all stages of our daily lives through food, clothing, and shelter. As a result, approximately 588 million tons of waste is generated and about 404 million tons of energy consumed.

Besides green purchasing such as buying environment-friendly home electrical appliances, making efforts to switch off lights and reducing standby mode consumption by turning off the main power can also save energy. For example, being careful in the way we use appliances, such as “not leaving the air conditioner on all the time,” can have a tremendous effect on energy conservation, with relatively little discomfort. Cutting down on the frequency of doing laundry and opening the refrigerator door can also help reduce environmental load.

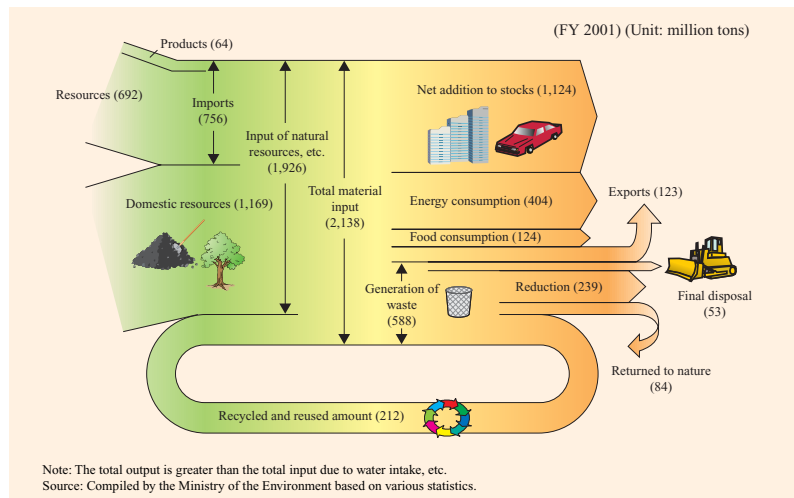
Recently, plant husbandry in heated facilities such as vinyl greenhouses has increased. These facilities made it possible for consumers to obtain a wide variety of produce irrespective of the season. However, temperature-regulated plant husbandry uses energy and increases carbon dioxide emissions. Eating foods that are in season can not only revive the vanishing sense of the seasons but can also contribute to environmental conservation.

Today, the diffusion rate of air conditioning and heating equipment has exceeded 100% of households. Just raising 1°C from the preset temperature of 27°C in the summer and lowering 1°C from the preset temperature of 21°C in the winter can lower carbon dioxide emissions from one air condi-

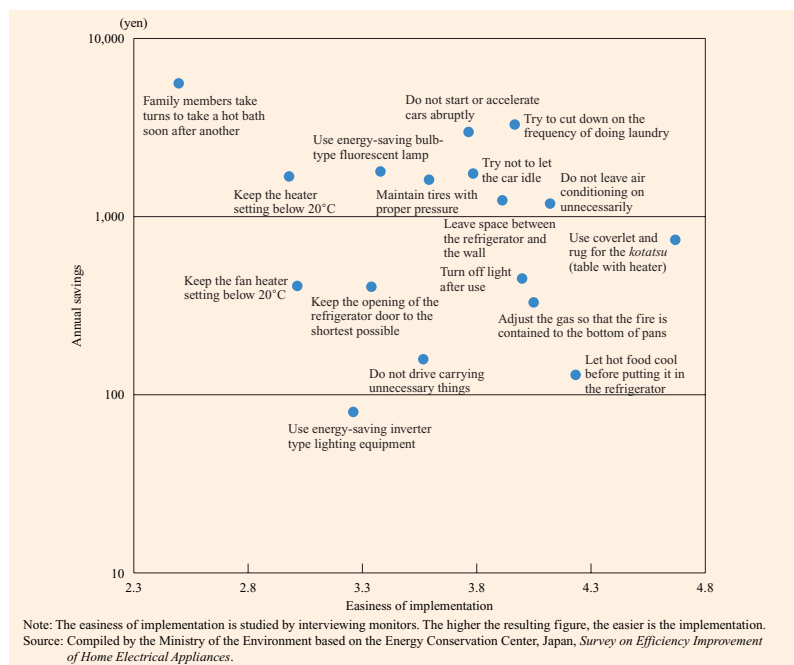
Environmental Load from Daily Life



Japan's Material Flow



Scattergram of Easiness of Energy Saving Efforts and Annual Savings

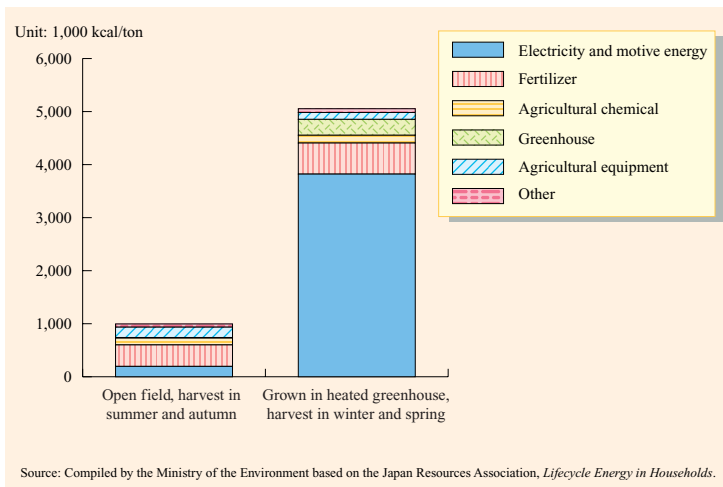


tioner by 5.9 kg and 25.7 kg per year, respectively. Changing clothing to adjust to temperature is the first step in curbing carbon dioxide emissions. Some workplaces encourage moderate air conditioning in the summer and light clothing by promoting the mindset that “casual clothing in the summer is not disrespectful to others. It is energy-saving, environmentally friendly, and makes good sense in a country like Japan that is blessed with four seasons.”

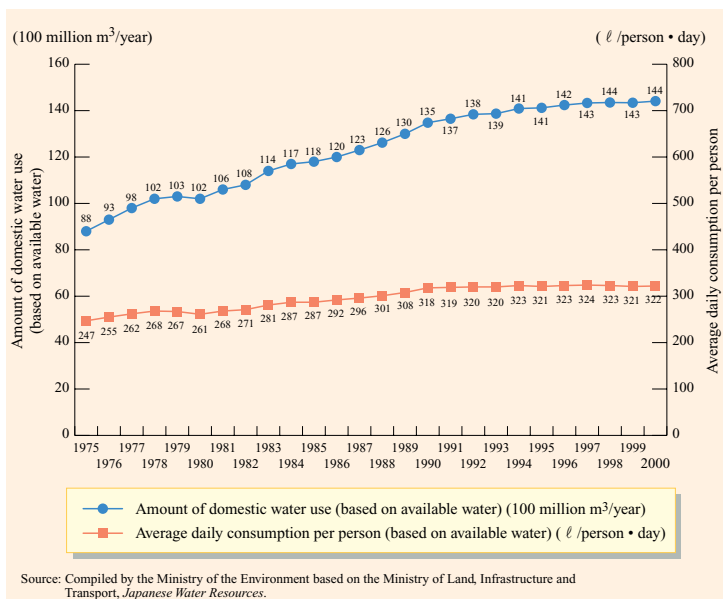
Having greenery on the rooftop or the walls can keep room temperatures down in the summer, saving energy from air conditioning. Greenery is also useful in reducing noise, protecting the buildings, purifying the air, and improving the heat island phenomena in urban areas.

In terms of biochemical oxygen demand (BOD), which indicates the load of domestic effluent on the environment, effluent from the kitchen exceeds 40% of the total environmental load. It is important to count not only on the development of domestic effluent treatment facilities, but to reduce environmental load at the source. Making efforts to reduce environmental load at households as much as possible by, for example, cooking only enough *miso* soup to avoid having leftovers or treating used cooking oil properly can help preserve the water quality of rivers, oceans, lakes, and marshes.

Amount of Energy Used for Growing Cucumbers (1990)



Changes in Domestic Water Use



How Much BOD and from What?

	BOD per 1 ℓ (mg/ℓ)	If drain away the following amount (mℓ)	Total BOD (g) would be
Water from washing rice (3 cups)			
When washed 4 times	2,400	3,500	8
Water after first wash	12,000	500	6
Miso soup (potato)	37,000	180	7
Water from boiling spaghetti	5,400	2,000	11
Oden broth	100,000	500	50
Cooking liquid of meat and potato	52,000	100	5
Corn soup	130,000	180	23
Ramen broth	27,000	300	8
Tempura oil	1,500,000	500	750
Coffee	6,000	180	1.1
Juice	77,000	180	14
Beer	81,000	180	15
Green tea	300	180	0.05
Milk	78,000	180	14
Synthetic detergent (appropriate amount: 1.3 g/ℓ)	180	30,000	5
Soap powder (appropriate amount: 1.7 g/ℓ)	1,250	30,000	38
Dish detergent (appropriate amount: 1.5 mℓ/ℓ)	300	3,000	1

Source: Compiled from the Ministry of the Environment, Guidelines for the Promotion of Measures against Household Effluents, 1988.

Section 4: Environmentally Friendly Community Planning

Developing regions and communities by adopting an environmental point of view and utilizing local features has drawn attention. In this section, we will look at local initiatives that have utilized and integrated the “environmental spirit” described in this chapter.

In the Yusuhara Town, Kochi Prefecture, environmental conservation measures using mainly wind power are being undertaken (“Let the wind blow. Let us develop our town.”). Electricity is produced using wind power to help reduce carbon dioxide emissions. Profits from electricity sales are used to set up an environmental fund to help finance photovoltaic power generation facilities for housing and to carry out thinning to pursue sound forest development. Furthermore, community-based environmental conservation activities, such as the Thousand Rice Fields Ownership System, are being carried out.

(<http://www.town.yusuhara.kochi.jp/>)

People of Toyooka City, Hyogo Prefecture, are working together to “build a city that can coexist with the stork.” Residents, businesses, and the local government have all joined forces to promote the “15 Menus to Become Healthy.” Farmers build “Rice Field Biotopes” and adopt the “Pesticide-free Duck Farming Method.” And citizens hold the “Stork Thanksgiving Festival.” In April 2000, the “Toyooka City Stork Fund” was set up to support activities to make rice paddies in Toyooka a habitat for stork. Such activities have paid off. In 2002, a stork flew from the Asian mainland and made Toyooka its home.

(<http://www.city.toyooka.hyogo.jp/>)

Citizens and city government officials in Hino City, Tokyo, formed partnerships to tackle environmental problems in their community. First of all, they proposed through direct petition to draw up the city’s Fundamental Environment Ordinance. The Basic Environment Plan was formulated with the participation of citizens through public invitation. Then in the year 2000, to “create a zero-waste city” with its citizens, the city government explained to about 30,000 residents the need for a “Waste Revolution.” Sorted waste is collected from each household and dust boxes were removed. Thanks to these activities, Hino City was successful in reducing waste by about 50% in a year’s time.

It helped extend the useful life of final landfill sites. (<http://www.city.hino.tokyo.jp/info/>)

Such improvements to the environment can invigorate the economy and a revitalized economy can, in turn, better the environment. To develop this kind of relationship in communities (a virtuous circle for environment and economy), the Ministry of the Environment has started “A Community Model Project of a Virtuous Circle for Environment and Economy” (“*Heisei Mahoroba* (Utopia)” Community Creation Project) since 2004. This project gathers ideas for protecting the environment, such as reduction of carbon dioxide emissions, and for revitalizing the economy from cities and towns nationwide. It commissions cities and towns that are successful in obtaining a wide participation of businesses and citizens through inventive ideas that utilize regional characteristics to carry out environmental conservation activities, and also subsidizes the establishment of facilities. It is hoped that models such as these will bring results, and community creation aimed at creating a virtuous circle for environment and economy will further spread.

(<http://www.chie-no-wa.com/>)



Primary school students visiting a wind power plant
(Courtesy of Yusuhara Town, Kochi Prefecture)



Rice field biotope
(Courtesy of Toyooka City, Hyogo Prefecture)



Lecture on waste revolution for citizens
(Courtesy of Hino City, Tokyo)

Chapter Three

In Japan, and Then All over the World

<Summary of Chapter Three>

In this Chapter, we look at a high-quality lifestyle that is made possible by properly integrating the “environmental techniques” we studied in Chapter One and the “environmental spirit” in Chapter Two. Diffusion of environmental techniques and the environmental spirit in Japan and dispatching them to the world will facilitate the creation of a virtuous circle for environment and economy in Japan and the world—a circle in which improving the environment can invigorate the economy and revitalizing the economy can improve the environment.

Section 1: A Virtuous Circle for Environment and Economy Beginning with the *Environmental Revolution in Daily Life*

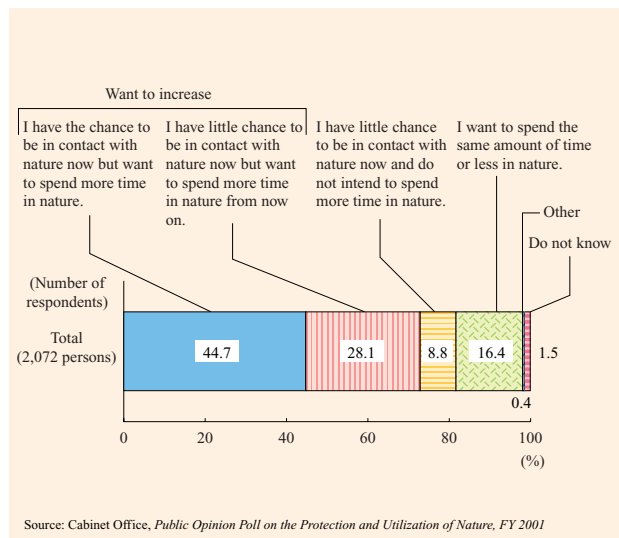
1. Striving for the *Environmental Revolution in Daily Life*

In recent years, there are signs of people reexamining their lifestyles in search of spiritually rich, high quality living.

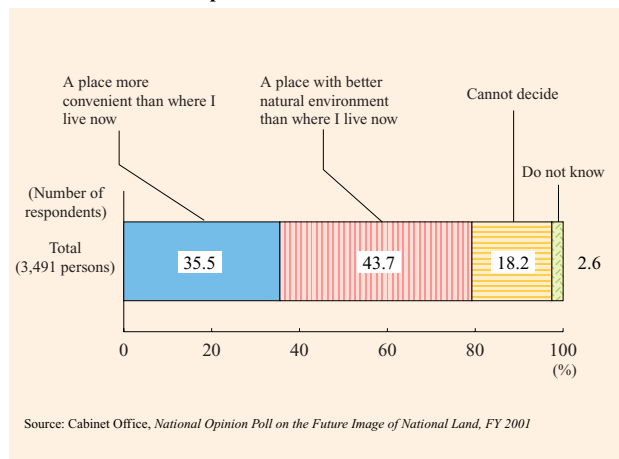
Today because many people are having a life surrounded by artificial things, they long for more opportunities to be in contact with nature. More people wish they could live in places blessed with more nature instead of more convenience. Another reason for protecting nature is that an increasing number of people believe “nature can give them peace of mind and make life interesting” and “it is important for a healthy upbringing for children and as a venue for learning about nature.” There may also be people who think that being surrounded by nature and enjoying the beautiful scenery, the fragrance from trees and flowers, the sounds from birds and the wind, and the quietness of the forests are far more attractive than the convenience of city life.

Combining “environmental techniques” with the “environmental spirit” can give birth to a new lifestyle that is expected to create a greater synergistic effect on environmental conservation. For example, notwithstanding any progress made in the “environmental techniques” of home electrical appliances, if the consumers do not utilize these techniques with the “environmental spirit,” there will not be any effect on environmental conservation. There is a system to promote the activities of environmental conservation by showing the environmental load from electricity consumed in the household. With this system alone, the environmental conservation effect has a tendency to fade away as time passes. Therefore, a system is developed to pursue both energy conservation and comfort by automatically controlling electricity supply according to the usual daily habits and to prevent forgetfulness in turning off the switch.

Do you want to increase contact with nature?



Do you want to live in a place that is convenient or in a place that is rich in nature?



2. “Environmental Businesses” and “Environment-induced Businesses”

In recent years, environment-related businesses have been on the rise. Among them, there are businesses in which environmentally conscious consumer behavior bring about the demand and market for environment-friendly equipment and services. The Ministry of the Environment named these businesses “environment-induced businesses” and predicted their market size and employment potential. They cover a greater range of businesses, including the “environmental businesses” classified by the Organisation for Economic Co-operation and Development (OECD).

According to the OECD classification, environmental businesses include waste treatment, development of equipment for preventing air pollution, and provision of education, training, and information services.

The Ministry estimated the potential market of the “environment-induced businesses,” that is the market for equipment and services arising from consumers’ environmentally conscious behavior. The forecast show that the

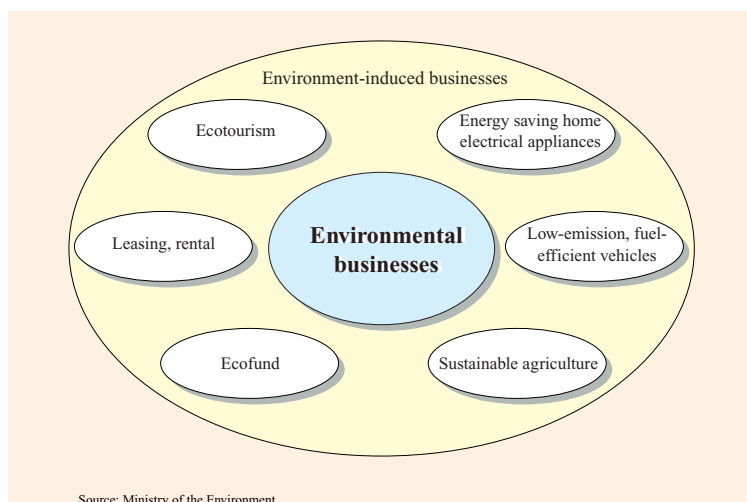
market size would increase from approximately 41 trillion yen in 2000 to 103 trillion yen in 2025 and the size of employment would increase from approximately 1.06 million people in 2000 to 2.22 million people in 2025. For instance, the development and sales of energy-saving home electrical appliances is a prime example of how the inclination for environmental conservation expands the need and market, with the purchase of energy-saving products superseding that of conventional home electrical appliances. As these markets expand with the support of consumers, businesses will increase their investment in promising environment-related businesses. It is hoped that this will stimulate development of environment-related businesses and further help improve the environment.

3. Reviewing the Relationship between the Environment and Economy

In April 2004, the “Expert Committee for a Virtuous Circle for Environment and Economy” under the General Policy Committee of the Central Environment Council put together a report entitled “Vision for a Virtuous Circle for Environment and Economy in Japan.” It proposed designating 2025 as one of the landmark years for gauging Japan’s progress in becoming a “Healthy, Rich and Beautiful Environmentally-Advanced Country.” In view of the importance of engaging businesses in actively undertaking voluntary environmental measures, the “Subcommittee for the Promotion of Environmentally Aware Business Activities” of the Central Environment Council compiled a report on “Measures for the Promotion of Environmentally Aware Business Activities.”

At the Ministry of Economy, Trade and Industry, the Industry and Environment Subcommittee under the Environment Division of the Industrial Structure Council is conducting in-depth discussions on how to achieve “a balance between the environment and economy” by reviewing the necessary policies and measures for promoting environmentally conscious business management through voluntary measures taken by private businesses.

Conceptual Diagram of Environment-induced Businesses



Estimates of the Current and Future Market Sizes and Employment Potential of Environment-induced Businesses

	Market size (trillion yen)		Workforce (10,000 persons)	
	2000	2025	2000	2025
Environment-induced businesses	41	103	106	222

Source: Ministry of the Environment

Vision for a Virtuous Circle for Environment and Economy in Japan
– Toward a Healthy, Rich and Beautiful Environmentally-Advanced Country –
 (April 2004 Report by the “Expert Committee for a Virtuous Circle for Environment and Economy”
 under the General Policy Committee of the Central Environment Council)

Groundwork for building a Virtuous Circle

Market that fully recognizes the value of the environment

Major actors who create a Virtuous Circle

Consumers who set the value standard and create demands
 Investors who provide funds
 Businesses who provide goods and services, and educational institutions that develop human resources
 Government agencies and civil groups that bring together members of the communities

Issues to be tackled

Technological development and incentive measures that bring about transition towards the environmental-conscious market
 Enhancement of environmental information and development of human resources for a virtuous circle

Immediate steps to build a Virtuous Circle

Life enriching environmental techniques

Increase in consumption and investment with environmental considerations will further motivate businesses to innovate eco-friendly technologies

Resources yielded by “feeling sorry for wastefulness”

The mindset of “feeling sorry for wastefulness” and cooperation among residents, civil groups, businesses, and government agencies will encourage a sound material cycle.

Spirit and power fostered by nature

Increase in people being in touch with nature through ecotour and utilization of new energy such as natural energy

Ideal image of 2025 when the Virtuous Circle is realized

Community and lifestyle

Countryside with beautiful nature attracts many visitors

- Development of ecotourism and enhancement of the environmental image of the region can increase sales of farm produce and local products, and create more jobs
- Residents are passionate about conservation of local natural environment and the global environment as well

Towns where excellent manufacturing techniques help build a sound material cycle

- Manufacturing of environment-friendly products and recycling business generate local employment
- Residents are passionate about green purchasing and recycling waste

Cities regenerated by environmental spirit

- Japan’s big cities pioneer world trends as a market supplying cutting-edge environmental technologies
- Increase of buildings with photovoltaic power generation facilities, and more greenery found such as roadside trees

Japan’s economy and society

- Income and employment generated by environmental-conscious consumers and eco-friendly technologies
- A society that cycles resources and achieves high energy efficiency
- Service industry contributes to environment improvement
- Transportation friendly to people and the environment
- Environment-induced businesses

The world

- Japan’s environmental technology contributes to the conservation of the global environment
- Japan’s lifestyle also influences consumers in Asia
- Significant improvement in eco-efficiency and resource productivity found worldwide.

※ Expect to incorporate specific measures in the next Basic Environment Plan

(“Vision for a Virtuous Circle for Environment and Economy” website (in Japanese):
<http://www.env.go.jp/policy/report/h16-01/index.html>)

Section 2: Promoting Environmental Education: Spirit Nurtured by the Environment and the Environment Protected by the Spirit

The first step toward the *Environmental Revolution* in daily life is reforming the conscious mind. In other words, it is to deepen understanding and knowledge of the relationship between humans and the environment and to voluntarily lead an environmentally conscious lifestyle and exhibit responsible behavior. Being able to familiarize ourselves with nature and to feel the environment with our five senses plays an important role in cultivating environmental consciousness in children and bringing relief to adults. We need to understand that environmental problems are consequences of our daily lives and our society, and we need to make efforts to solve the problems with our own initiatives. It is important to bring up individuals who are receptive to the environment and who are knowledgeable about it. Environmental education is a means to that end.

A piece of legislation on environmental education, known as the “Law concerning the Enhancement of Willingness for Environmental Conservation and Promotion of Environmental Education,” was enacted in July 2003, with part of it established in October of the same year. To facilitate its complete enforcement in October 2004, the government must proceed with the formulation of basic policies and actively implement policies and measures based on this Law. To prepare for the “United Nations Decade of Education for Sustainable Development” scheduled to start in 2005, the public and private sectors are working together to consolidate educational concepts for sustainable development and to explore long-term implementation plans.

To promote environmental education, it is important to not only have knowledge about the environment but also to train experts to equip them with practical experience, leadership for solving problems, and the ability to work with different groups.

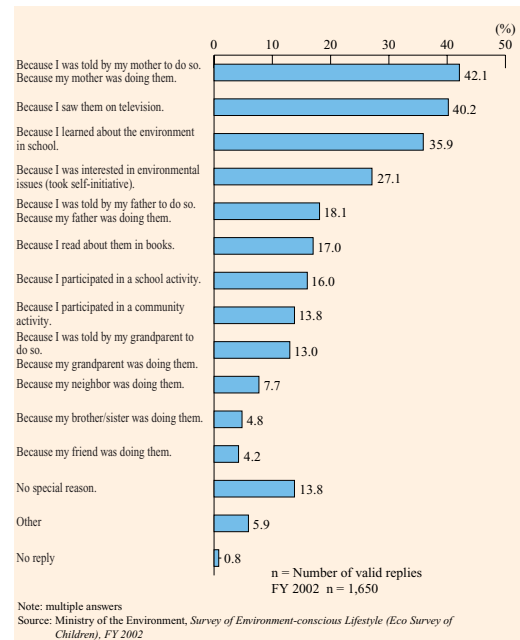
When children are asked what attracted them to environmental conservation, most of them replied that it was what their mothers said or did. This shows the important influence of family members on children. Furthermore, because primary and middle schools are readily available venues in every community, they are expected to become the centers of environmental education and training in various parts of the country

It has become necessary not only for children but also for adults to form environmentally conscious lifestyles through environmental education, including consumer education, offered by businesses or places of lifelong learning. We can also expect our seniors to do their job of passing on the traditional lifestyle of cherishing things, which gives testimony to their experiences and wisdom in life.

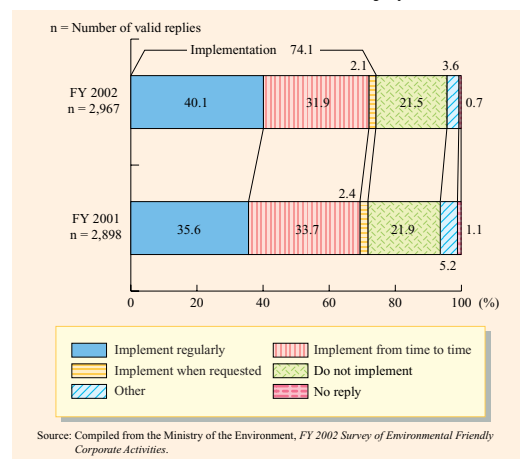
About three-quarters of all companies provide environmental education to employees. Some major companies in the community also cooperate with civil organizations in offering environmental education to children in the community. Such activities are expected to increase in the future.

Besides increasing support for environmental education in schools, businesses, and civil organizations in the areas of human resources, technology, and funding, the government needs to gather information on successful cases in Japan and overseas and conduct surveys to review the current state of environmental education. It is also important to build partnerships with concerned parties in various fields.

What inspire you to participate in environmental conservation activities?



Environmental Education for Employees



Section 3: Japan as a Major Player in Formulating International Standards for the Environmental Techniques

To spread Japan's sophisticated "environmental techniques," Japan must actively participate and contribute to the formulation of international standards.

In response to organizations such as the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC), Japan is carrying out international standardization activities in a wide range of fields. In the field of the environment especially, Japan is actively carrying out standardization activities such as creating test method for air purification performance of photocatalytic materials. For the international standardization of fuel cells, the "International Partnership for the Hydrogen Economy (IPHE)" was established to advance development, policies, rules and standards, and information exchange related to hydrogen and fuel cell technologies. In the IPHE Ministerial Meeting held in November 2003, Japan was appointed Vice Chair of the Steering Committee in charge of the overall planning and operations of IPHE. From now on, Japan must utilize its advanced fuel cell technologies to conduct strategic research and development through collaboration of the government, industries, and academics. At the same time, Japan must take an active role in the formulation of rules and standards for fuel cells.

Many of Japan's technologies in the environmental field are the most advanced in the world. The government, industries, and universities must cooperate to present Japan's recommendations for environmental standards and actively participate and contribute to the formation of international consensus. Strategically assigning human resources to forums where international standards are formulated is important for creating a world market with the virtuous circle for environment and economy pursued by Japan.

Section 4: Diffusing the Environmental Techniques throughout the World: International Environmental Cooperation

Japan's sophisticated "environmental techniques" are spreading worldwide through its national and local governments, businesses, and NGOs, and contributing immensely to solving global environmental problems.

Official Development Assistance (ODA), Japan's contribution to the international community, has become the backbone of Japan's policies on providing aid to developing countries. The Official Development Assistance Charter, the basic statement of ODA, was revised in August 2003 in response to changes in the domestic and international conditions. It continues to place emphasis on environmental problems, which are global issues, and on seeking a balance between the environment and development when providing aid. The government is also cooperating with various organizations to utilize the experience, knowledge, and technologies that Japan has acquired in international environmental cooperation such as dispatching experts, receiving trainees, and providing equipment.

Local governments also engage in international environmental cooperation. Some work directly with local governments overseas through such means as sister city affiliation. Some take part in ODA projects implemented by the Japan International Cooperation Agency (JICA), which carries out ODA projects approved by the Japanese government in providing aids to foreign countries upon their request. 87% of the prefectures, 100% of the ordinance-designated cities, and 21% of the core cities are involved in international environmental cooperation. For example, Hyogo Prefecture provided assistance to afforestation in Mongolia by dispatching technical experts after a forest fire took place there. At the same time, the Prefecture is trying to boost participation of companies in Hyogo Prefecture in the afforestation project by working with pioneering private



Tree-planting at China's Ocher Plateau
(Courtesy of "Green Earth Network (NPO)")

companies and organizations to explore the potential of implementing Clean Development Mechanism (CDM) projects in Mongolia.

Japanese companies are also engaging in international environmental cooperation in various other ways. For example, an automobile manufacturer has set up a system to fund activities for the improvement and conservation of the environment. It adopts “social investment for sustainable development” as its basic theme for supporting community-based projects that provide practical experience in the two areas of environmental technology and environmental learning. There are also examples showing that Japanese companies, which have high levels of environmental technology and awareness, have played an important role in the environmental conservation of developing countries through direct investment.

The well-organized, flexible efforts of civil organizations such as NGOs working in developing countries are playing an extremely important role in Japan’s international cooperation, including in the environmental field. The diverse nature of their activities, speediness of response, and community-oriented ideas have attracted attention. For example, the Green Earth Network (NPO) plants pine trees and bushes in China’s Loess Plateau to prevent soil erosion and improve water retention, and builds apricot and apple orchards for primary schools in poor villages so that they can use part of the profits made by the orchards for activities to improve the educational conditions.

Conclusion: Protecting the Global Environment with the Environmental Techniques and the Environmental Spirit

The reform begins when we apply “environmental techniques” and the “environmental spirit” to our daily lives. Some of Japan’s environmental technologies are of the highest levels in the world, including the energy efficiency of home electrical appliances and fuel efficiency of automobiles. The dissemination of such “environmental techniques” throughout Japan and the world can certainly contribute to protect the global environment. The traditional Japanese mindset of respecting nature can give rise to a sustainable lifestyle that enables the continued enjoyment of a beautiful nature and a sound and affluent living. If we can present this to the Japanese people and people in other countries in an appealing way, we can contribute to the sustainable development of the world.

If every one of us does not apply environmental techniques and does not act with the environmental spirit, we cannot protect the environment. On the other hand, if only one individual takes action, perhaps a small part of the environment can be improved. For this reason, it is desirable for all individuals, businesses, NGOs, and the government to cooperate in undertaking activities at home, in the community, in the country, and with other countries to better the environment.

By linking and disseminating “environmental techniques” and the “environmental spirit,” we can make environmental conservation into a motive force for developing a new social economy. In other words, we can start the “*Environmental Revolution*.” Let us develop and spread Japan’s environmental techniques and the environmental spirit so that the world can achieve new development in the 21st century.

Part Two

Current Environmental Issues and Environmental Conservation Measures by the Government

Part Two of the *Quality of the Environment in Japan 2004* (White Paper) introduces the environmental conservation policies and measures implemented in FY 2003, based on the state of environmental problems and in line with the Basic Environment Plan. Part Two of this booklet will report on the issues and current state of environmental problems in the major fields. Chapters in Part Two of the *Quality of the Environment in Japan 2004* are as follows:

- Chapter One: Conservation of the Global Atmospheric Environment
- Chapter Two: Conservation of the Atmospheric Environment (not including the global atmospheric environment)
- Chapter Three: Conservation of the Water, Soil, and Ground Environments
- Chapter Four: Measures and Policies related to the Material Cycle, including Waste and Recycling Measures
- Chapter Five: Measures for Chemical Substances
- Chapter Six: Conservation of the Natural Environment and Promoting Contact with Nature
- Chapter Seven: Basis of Various Measures, and Measures Facilitating the Participation of Various Actors and International Cooperation

1. Conservation of the Global Atmospheric Environment

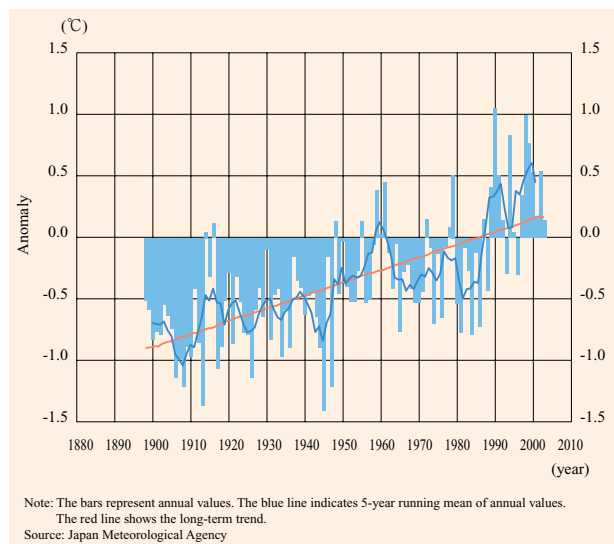
(1) Global Warming

In recent years, expanding human activities have discharged vast quantities of carbon dioxide, methane, and other greenhouse gases into the atmosphere. These gases have enhanced the greenhouse effect and given rise to the threat of global warming.

According to the Third Assessment Report of the Intergovernmental Panel on Climate Change (IPCC)—Climate Change 2001, the globally averaged surface temperature has risen approximately 0.6°C in the 20th century and consequently, the average sea level has risen by 10–20 cm. The progress of global warming may have far-reaching and serious effects on the living environment of humans and the natural habitats of other living organisms. The sea level is projected to rise by 88 cm at the maximum between 1990 and 2100. According to observations conducted by the Japan Meteorological Agency, Japan has also experienced an increase of about 1.0°C in its annual averaged temperature over the last one hundred years. The effects of global warming on the natural environment have already become apparent, as shown by the decrease in the sea-ice area in the Sea of Okhotsk and the range shifts of plants and animals.

Of the amounts of greenhouse gases emitted in Japan in FY 2002, carbon dioxide emission were 1,248 million tons, with a per capita emission of 9.79 tons. Compared to the FY 1990 figures, the total emission has increased by 11.2% and the per capita emission by 7.8%. A breakdown by sector shows that emission from the industrial sector has decreased by 1.7%, while that of the commercial and other

Annual Average Surface Temperature Anomalies in Japan from 1898 to 2003



Kyoto Protocol

Developed countries set up their legally binding numerical targets.

History	Adopted in December 1997 Ratified by Japan in June 2002
Targeted gases	CO ₂ , CH ₄ , N ₂ O, HFC, PFC, SF ₆
Base year	1990 (1995 for HFC, PFC, SF ₆)
Commitment period	2008 – 2012
Targets	An aggregated reduction of at least 5% by developed countries: Japan–6%, United States–7%, and EU–8%

Source: Ministry of the Environment

sector has increased by 36.7%, the residential sector by 28.8% and the transport sector by 20.4%.

In May 2002, Japan revised the “Climate Change Policy Law,” and in June of the same year ratified the Kyoto Protocol, which sets legally binding numerical targets for greenhouse gas emissions in developed nations. As of September 23, 2004, 124 countries and the EU have ratified the Kyoto Protocol. The Kyoto Protocol will enter into force after the total carbon dioxide emissions of the developed countries that have ratified the Protocol exceeds 55% of the total carbon dioxide emitted by all developed countries in 1990. Unfortunately, the condition for the Kyoto Protocol to enter into force has not been fulfilled. Currently, Japan is making appeals to unratified countries, such as Russia, to ratify the Protocol.

Drastic initiatives will be needed to devise a solution to the problem of global warming. These initiatives include strengthening policies in all areas of our socio-economic system, integrating various policies, and reengineering our current socio-economic system of mass production, mass consumption, and mass disposal in the future.

(2) Depletion of the Ozone Layer

It has become known that the ozone layer is being destroyed by ozone-depleting substances such as chlorofluorocarbons (CFCs). There is concern that depletion of the ozone layer may increase the quantity of harmful ultraviolet rays reaching the earth, causing health damages such as skin cancer and cataracts in humans.

The ozone layer is being depleted over almost the entire globe except for the tropics. In Japan, a long-term depletion of the ozone layer has been observed above Sapporo, Tsukuba, and Kagoshima. The decrease is especially notable above Sapporo. Over the Antarctica, the largest scale of ozone depletion ever appeared was recorded in 2003.

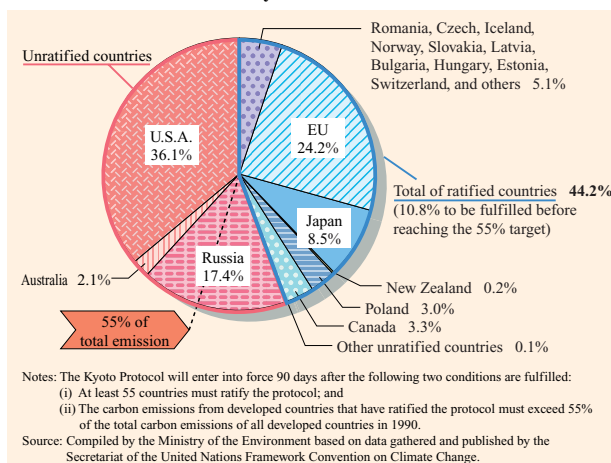
In Japan, the production of CFCs, etc. is regulated pursuant to the Ozone Layer Protection Law. In addition, the recovery and destruction of fluorocarbons at the disposal stage of products are mandated by the Law for the Recycling of Specified Kinds of Home Appliances and the Law for Ensuring the Implementation of Recovery and Destruction of Fluorocarbons concerning Specified Products.

2. Conservation of the Atmospheric Environment (not including the global atmospheric environment)

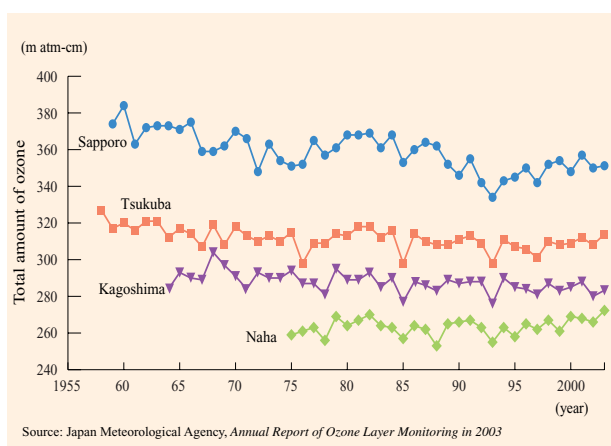
(1) Acid Deposition and Dust and Sandstorms

Acid deposition can produce the various effects on the environment and living creatures such as trees or fish by increasing acidity in soil, lake water, etc. Buildings, artificial constructions and cultural assets can be affected by the acid deposition. In the US and Europe, acidification of lakes and reservoirs and the decline of forests caused by acid deposition have been reported.

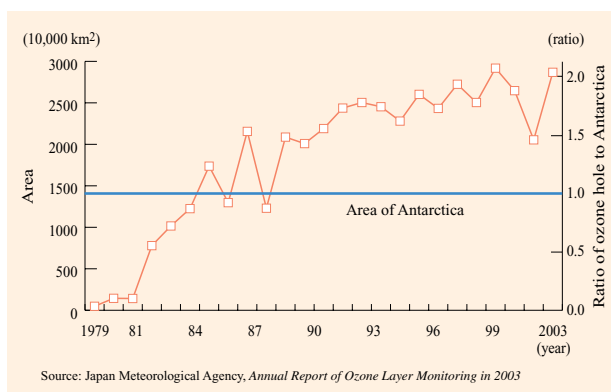
Percentages of Carbon Dioxide Emitted in 1990 by Annex I Countries



Changes in the Annual Average of Total Ozone Amount over Japan



Changes in the Size of Ozone Hole over Antarctica



Roughly the same levels of acid deposition are observed in Japan as in the US and Europe where damages have already been reported. Its impact on the ecosystem of Japan, however, is still not clear at this time. As it is generally believed that the impact of acid deposition may take a long time to become apparent, it may surface in the future if the current level of acid deposition continues.

The Acid Deposition Monitoring Network in East Asia (EANET) started its activities on a regular basis since January 2001 to share a common understanding of the state of the acid deposition problems in East Asia and to contribute to the cooperation on various issues related to acid deposition.

In Japan, long-term monitoring of acid deposition is carried out to detect its effects as early as possible and to forecast the effects in the future.

In recent years, the frequency and intensity of dust and sandstorm (DSS) has been increasing, so it has become a serious environmental problem in Northeast Asia. Japan has been conducting various monitoring of DSS inside Japan. In addition, an international project on the prevention and control of DSS is carried out by the cooperation of four countries (China, Mongolia, Korea and Japan) and four international organizations, e.g. the United Nations Environment Programme, co-financed by the Asian Development Bank and the Global Environment Facility.

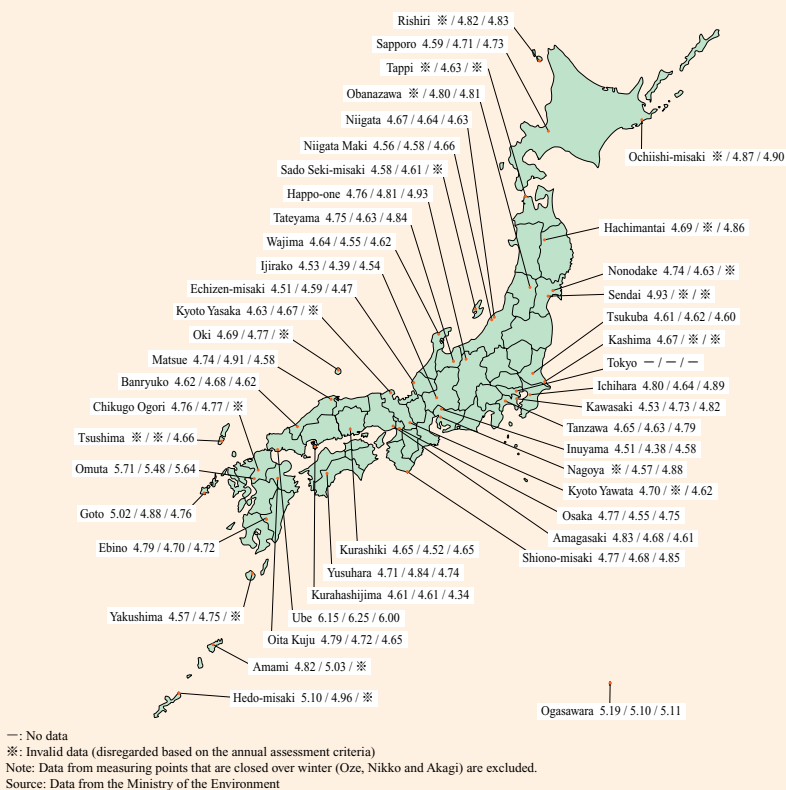
(2) Photochemical Oxidants

Nitrogen oxides (NOx) and volatile organic compounds (VOCs) emitted from factories, business establishments, and automobiles form primary pollutants, which react in the presence of sunlight (photochemical reaction) to form secondary substances such as ozone and other substances, known collectively as photochemical oxidants. Photochemical oxidants are the cause of photochemical smog, which causes eye and throat irritation and respiratory distress. In almost all regions throughout Japan, photochemical oxidants still exceed the environmental quality standard (EQS) (an one-hour value of 0.06 ppm or less).

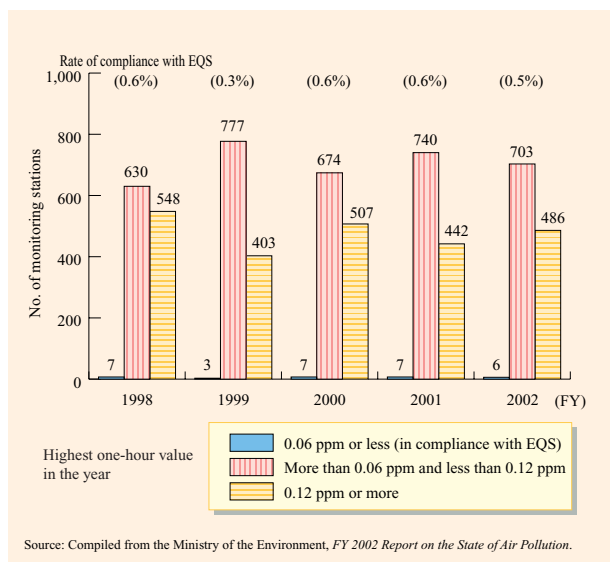
The emission reduction of some of the VOCs, such as benzene, is being promoted through voluntary control efforts. Regulations to control the emissions of exhaust gas from automobiles have also been strengthened pursuant to the Air Pollution Control Law. Through the Atmospheric Environmental Regional Observation System (nickname

Levels of pH in Precipitation

FY 2000 average / FY 2001 average / FY 2002 average



Changes in the Number of Monitoring Stations by Photochemical Oxidant Concentration Level (AAPMSs and RAPMSs) (FY 1998–2002)



Soramame-kun), real-time data on the atmospheric environment is measured, and information concerning the issuance of photochemical oxidants alarms or warnings by local governments nationwide is collected and announced on the Internet.

(3) Nitrogen Oxides

Nitrogen oxides (NO_x) that can damage the respiratory system in high concentrations are mainly generated from both stationary sources, such as factories, and mobile sources, such as motor vehicles.

The annual average nitrogen dioxide concentrations have remained steady over a long time. Concentrations achieved a 99.1% compliance with the EQS for nitrogen dioxide at ambient air pollution monitoring stations (AAPMSs) in FY 2002. Compliance with the EQS in areas designated for measures under the Law concerning Special Measures for Total Emission Reduction of Nitrogen Oxides and Particulate Matter from Automobiles in Specified Areas (Automobile NO_x/PM Law) remained at low levels, ranging from 43.1% to 69.3% at roadside air pollution monitoring stations (RAPMSs) between FY 1998 to FY 2002.

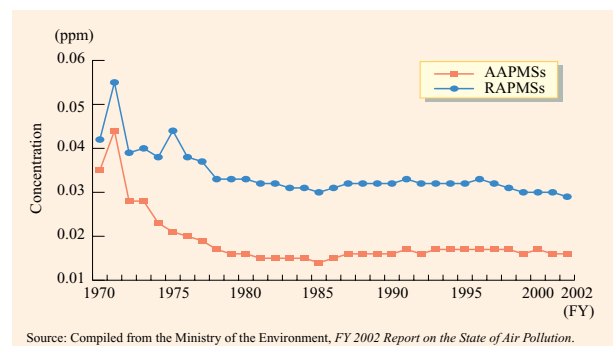
(4) Suspended Particulate Matter

Suspended particulate matter (SPM) in the air with a diameter of 10µm or less is classified into primary particles or secondary particles. Primary particles include soot and dust from factories, diesel exhaust particles (DEP) generated from diesel vehicles, and soil particles dispersed in the air. Secondary particles are those formed by chemical reaction within the atmosphere from gaseous substances, such as nitrogen oxides (NO_x). Because SPM is of a minute size, it remains in the air for extended periods of time. An accumulation of SPM in high concentrations in the lungs or the trachea can have damaging effects on the respiratory system.

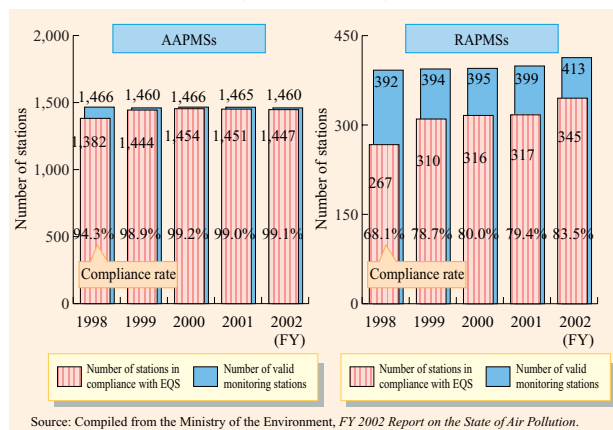
The annual average SPM concentrations in recent years have shown signs of a shift from a steady state to a steady decline. However, the compliance rates with the EQS have been in decline since FY 2000.

In FY 2001, under the Automobile NO_x/PM Law, particulate matter was added to the list of substances to be regulated. Furthermore, studies have been conducted on fine particulate matter with a diameter of 2.5 µm or less and diesel exhaust particles, because their impacts on human health have raised concerns in recent years.

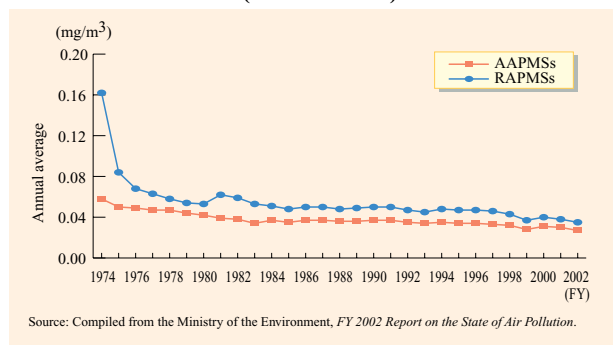
Changes in the Annual Averages of Nitrogen Dioxide Concentrations (FY 1970 – 2002)



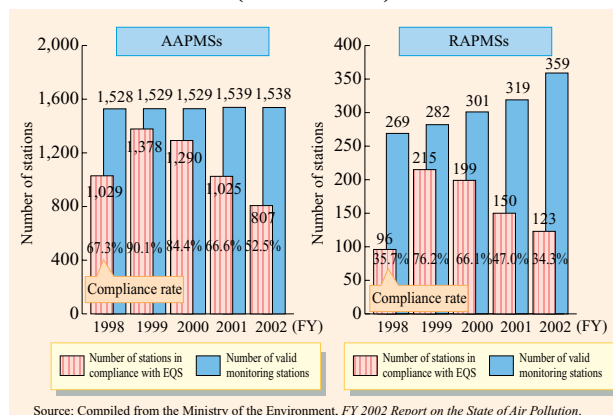
Changes in the State of Compliance with EQS for Nitrogen Dioxide (FY 1998 – 2002)



Changes in the Annual Averages of the Concentration of Suspended Particulate Matter (FY 1974 – 2002)



Changes in the State of Compliance with EQS for Suspended Particulate Matter (FY 1998 – 2002)

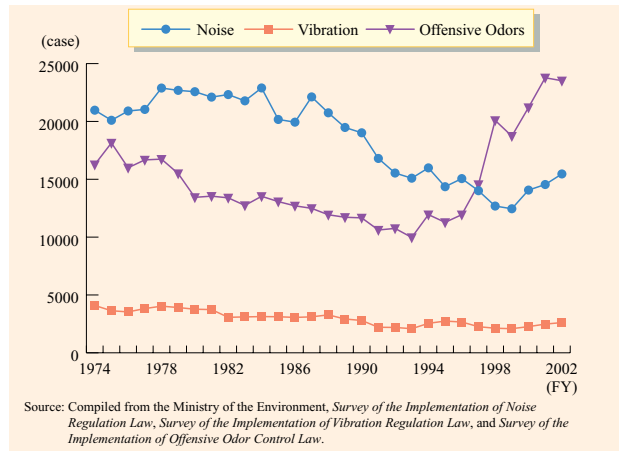


(5) Hazardous Air Pollutants

Various chemical substances, though low in concentrations, have been detected in the atmosphere, raising concern about the health effects of long-term exposure to these substances. In FY 2002, the level of benzene exceeded the EQS at 8.3% of the 409 monitoring points.

Pursuant to the Air Pollution Control Law, standards were set up to control the emissions of specified substances, such as benzene, and voluntary measures by businesses to control emissions were encouraged. Simple calculation of the total emissions of twelve substances that are targeted by the voluntary management plans in FY 2003 shows a substantial reduction rate of 49%, decreasing from approximately 38,000 tons in FY 1999 to 19,000 tons in FY 2002.

Changes in the Number of Complaints against Noise, Vibration, and Offensive Odors (FY1974 – 2002)



(6) Noise, Vibration, and Offensive Odors

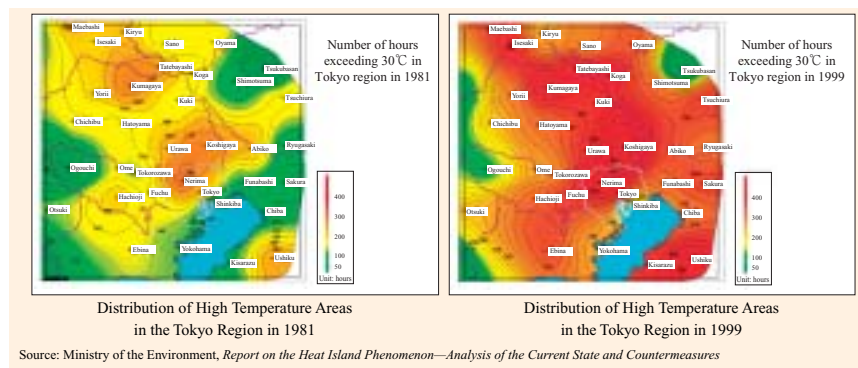
Noise and offensive odors are environmental issues closely related to our daily life. The sources of these issues are complex and diverse. Each year, complaints about noise and offensive odors account for the largest percentage of pollution-related complaints. Complaints about noise had been in decline over the last ten years but began to increase in FY 2000. Complaints about offensive odors, particularly odors from open incineration, have increased drastically since FY 1997. Complaints about the service industry and residences are also on the rise.

For noise and vibration coming from factories, business establishments, automobiles, and airplanes, permissible limits and EQSs were set up pursuant to the Noise Regulation Law and the Vibration Regulation Law in order to impose restrictions.

(7) Heat Island Phenomenon

The heat island phenomenon occurs when the temperature rises more in urban areas than in surrounding suburban areas. This phenomenon results in an increase in the number of sultry nights in the summer. As waste heat from air conditioners raises the temperature, more energy is consumed as air conditioning works harder still, creating a vicious cycle.

Distribution of High Temperature Areas in the Tokyo Region (1981 & 1999)



In March 2004, concerned ministries and agencies put together the “Outline of the Policy Framework to Reduce Urban Heat Island Effects.” It consists of four pillars of measures, including the reduction of anthropogenic exhaust heat, improvement of urban surface, improvement of urban structure, and improvement of lifestyle.

3. Conservation of the Water, Soil, and Ground Environments

(1) Water Environment

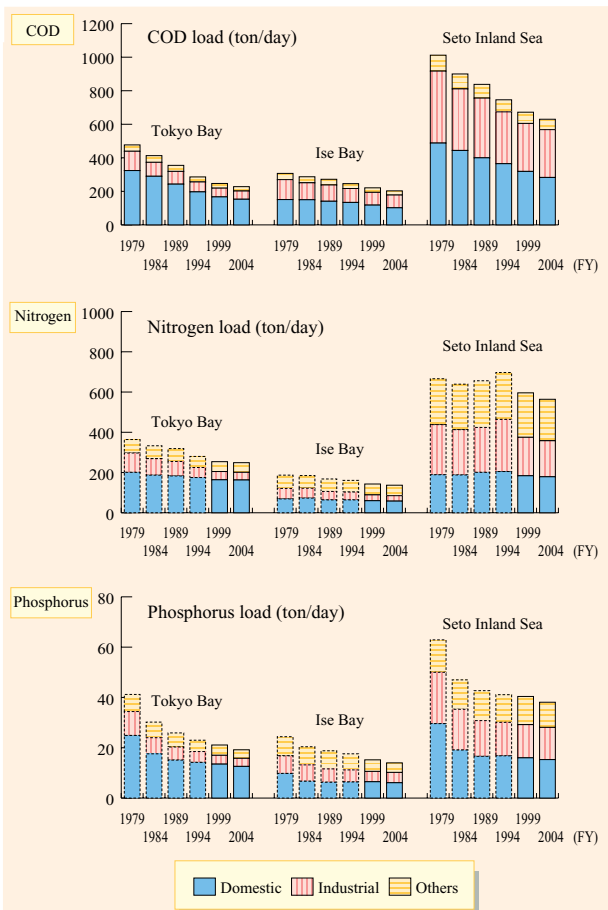
According to the Results of FY 2002 Measurement of Water Quality of Public Waters, the compliance rate to EQS for protecting human health from substances such as cadmium was 99.3%. The compliance rate of BOD (or COD), a typical water-quality indicator for organic contamination, to the EQS in regard to the conservation of the living environment was 81.7%. By water area, the compliance rates were 85.1% for rivers, 43.8% for lakes and reservoirs, and 76.9% for sea areas. In particular, the compliance rates for enclosed water areas, such as lakes, reservoirs, inner bays, and inland seas, were still low. In terms of COD, the compliance rates were 68% for Tokyo Bay, 44% for Ise Bay, and 69% for the Seto Inland Sea.

In response to these conditions, measures for lakes and reservoirs were taken pursuant to the Law concerning Special Measures for the Preservation of Lake Water Quality (Clean Lakes Law) and other laws. In Tokyo Bay, Ise Bay and the Seto Inland Sea, the Fifth Total Pollutant Load Control has been enforced in order to reduce COD further with the target year set at FY 2004. In addition to COD, Nitrogen and Phosphorus, which cause eutrophication of the sea, were newly designated as target substances of reduction.

According to the Results of FY 2002 Water Quality Survey of Groundwater, the exceeding rate to EQSs was 6.7% of the total wells surveyed. Especially, the exceeding rate of nitrate/nitrite nitrogen to the EQS was 5.9%. The pollution was caused by fertilizing to farmland, excreta of livestock, domestic drainage, etc., and immediate measures are needed to deal with the groundwater pollution by nitrate/nitrite nitrogen.

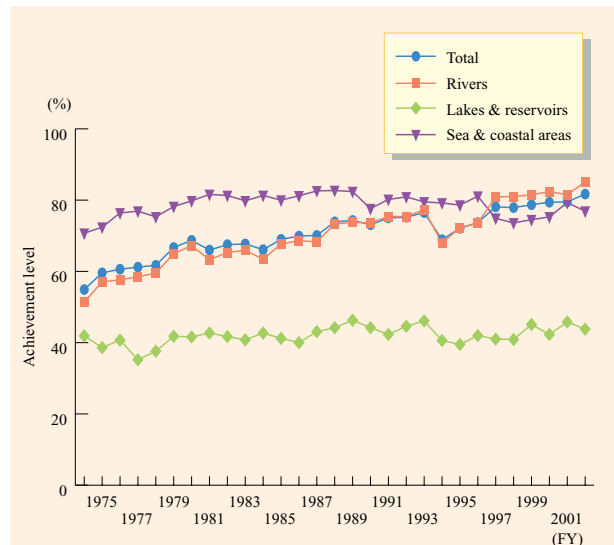
Measures are carried out systematically using an approach that treats the river basin as a unit and that seeks a comprehensive sound water cycle of surface water and groundwater.

Changes in Pollutant Loads and Reduction Targets



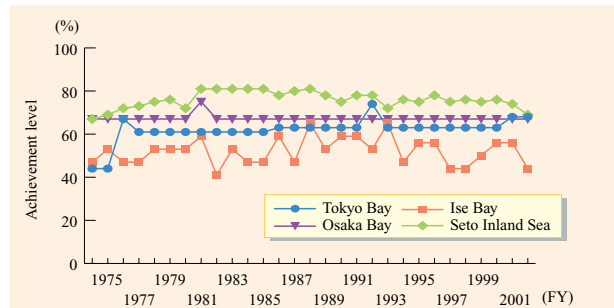
Notes:
1. Bars in dotted line are combined data of related prefectures.
2. Figures for FY 2004 are the reduction targets.
Source: Ministry of the Environment

Trends toward Achieving EQSs (BOD or COD)



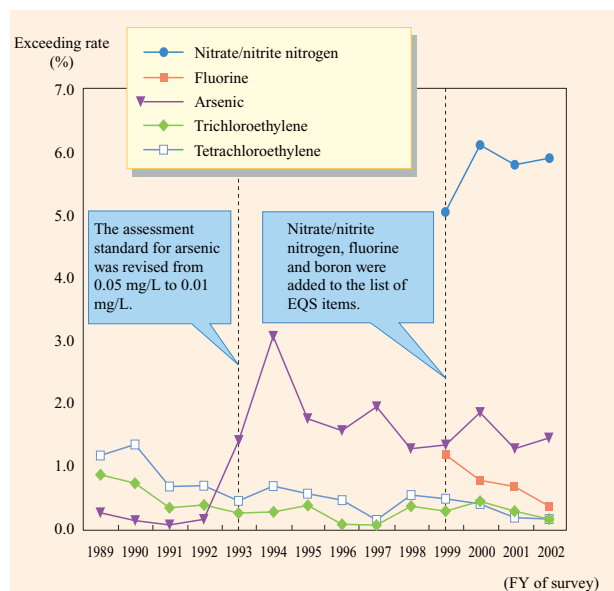
Notes:
1. BOD used for rivers, and COD used for lakes/reservoirs, and sea/coastal areas
2. Achievement level (%) = (no. of water bodies achieving/no. of designated water bodies) × 100
Source: Ministry of the Environment, Results of FY 2002 Measurement of Water Quality in Public Waters

Trends in Rate of Achievement with EQS (COD) in Three Coastal Regions



Note: Ise Bay includes Mikawa Bay, and Seto Inland Sea includes Osaka Bay
Source: Ministry of the Environment, Results of FY 2002 Measurement of Water Quality in Public Waters

Changes in Exceeding Rates to EQSs for Groundwater (Items with high rates)



Notes:
1. Wells measured in the General Monitoring Survey differ every year.
2. Before the EQSs for groundwater were established in FY 1997, the assessment standards had been used to evaluate groundwater quality.
Source: Ministry of the Environment, Results of FY 2002 Water Quality Survey of Groundwater

(2) Marine Pollution

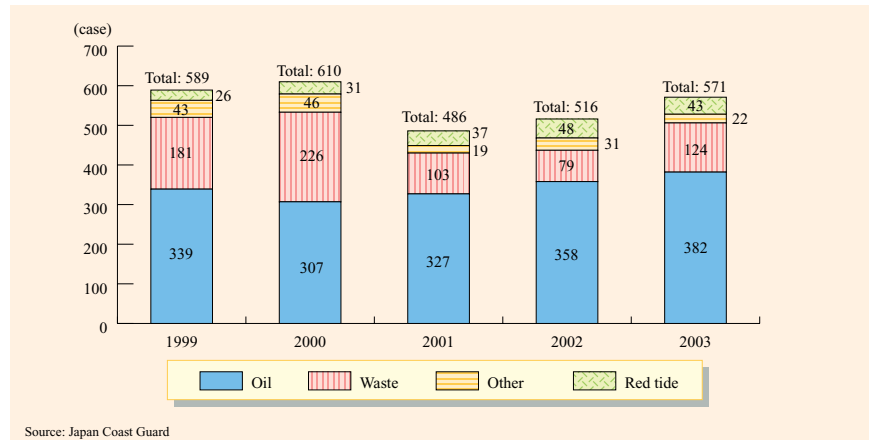
For conservation of the marine environment, Japan has concluded the London Convention, which regulates the dumping of waste from ships at sea, and the MARPOL73/78 Convention, which prevents marine pollution caused by ships. In response to these conventions, Japan has taken domestic measures to prevent marine pollution.

To assess and monitor the state of the marine environment, water quality, bottom sediment, and aquatic organisms are being monitored comprehensively and systematically. The monitoring is scheduled so that the survey of the ocean areas surrounding Japan will be completed in three to five years.

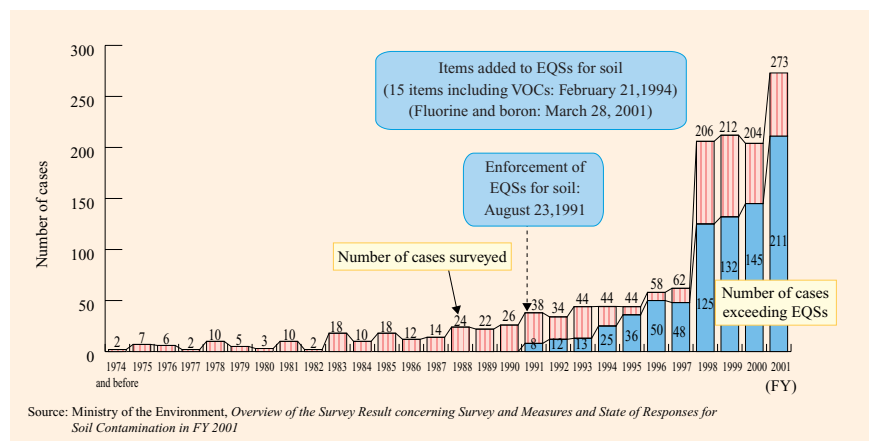
In terms of pollution caused by oil, waste, and red tide, 571 cases were identified in 2003, an increase of 55 cases from the 2002 total. Monitoring of drifting marine debris

by sight indicated that over 60% were petrochemical products such as foamed polystyrene and plastics. They were found in large quantities along the western coast of Kyushu and the southern coast of Honshu.

Changes in the Number of Identified Marine Pollution Cases



Number of Identified Soil Contamination Cases by Fiscal Year



(3) Soil Contamination

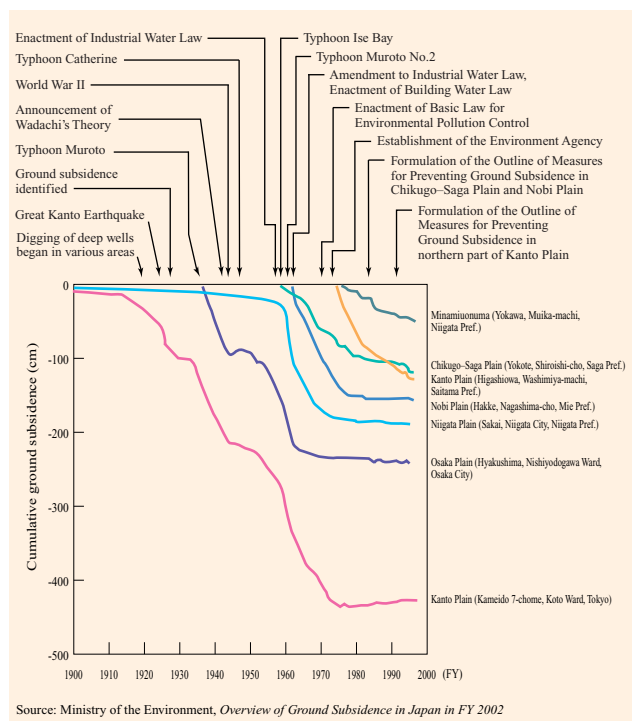
Once soil was contaminated, it accumulates hazardous substances, perpetuating the state of pollution. In recent years, an increasing number of urban soil contamination cases have been found during redevelopment of former factory sites. There were as many as 211 such cases in FY 2001.

The Soil Contamination Countermeasures Law was put into effect in February 2003 to tackle soil contamination. The Law was enacted to shed light on the state of soil contamination and to implement measures to prevent health damage caused by soil contamination.

(4) Ground Subsidence

Ground subsidence is caused by excessive pumping of groundwater which lowers the level of the groundwater and shrinks the clay layer. There were 61 areas in 37 prefectures that reported ground subsidence as of FY 2002. The restrictions on the pumping of groundwater have mitigated ground subsidence in the wards of Tokyo, Osaka City, and

Changes in Ground Subsidence in Selected Areas



Nagoya City, where remarkable ground subsidence had occurred.

However, ground subsidence has still occurred in certain areas such as the Kujukuri plains in Chiba Prefecture. Some areas that are lower than sea level due to ground subsidence may face the danger of huge damages caused by high tides or floods. For this reason, besides imposing restrictions on the pumping of groundwater, measures are being taken to deal with high tides and to build facilities to protect the coastline.

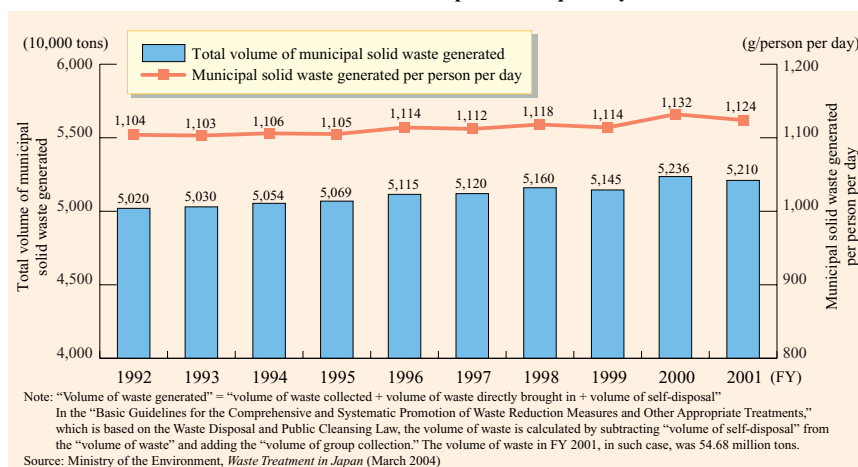
4. Measures for Waste and Recycling

Since FY 1989, Japan has been generating municipal solid waste at an annual volume of approximately 50 million tons or more. These annual volumes have remained steady over the last several years. In FY 2001, of all municipal solid waste, direct incineration accounted for 78.2% and recycling accounted for 16.5%. The final volume disposed of at landfill sites was 9.95 million tons, a decrease of 560,000 tons from the previous year.

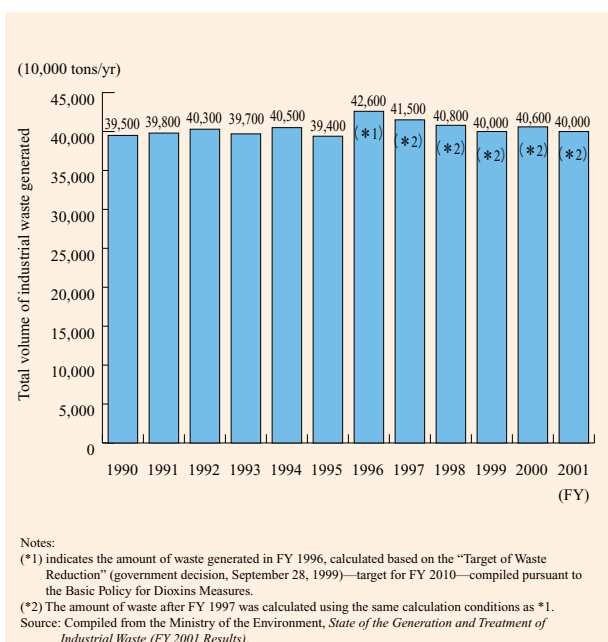
The total volume of industrial waste generated in Japan has also remained steady over the last several years. The volume in FY 2001 was approximately 400 million tons, a slight decrease from the previous fiscal year. Approximately 42 million tons were discarded at final disposal sites, a decrease from the previous fiscal year. Nationally, an average of 4.3 years of capacity in final disposal sites for industrial waste remained as of April 2002, presenting a serious situation.

To solve these problems, it is necessary to implement waste and recycling measures, taking into account the following priorities stipulated in the Fundamental Law for Establishing a Sound Material-Cycle Society: (i) reduce waste, (ii) reuse end-of-life products and parts, (iii) recycle as raw materials, (iv) recover heat as energy, and (v) appropriately dispose as final waste. The Law stipulated that the government should formulate the Fundamental Plan for Establishing a Sound Material-Cycle Society to ensure that waste and recycling measures are implemented in a comprehensive and systematic manner. The Plan, formulated in March 2003, defined a specific image of a

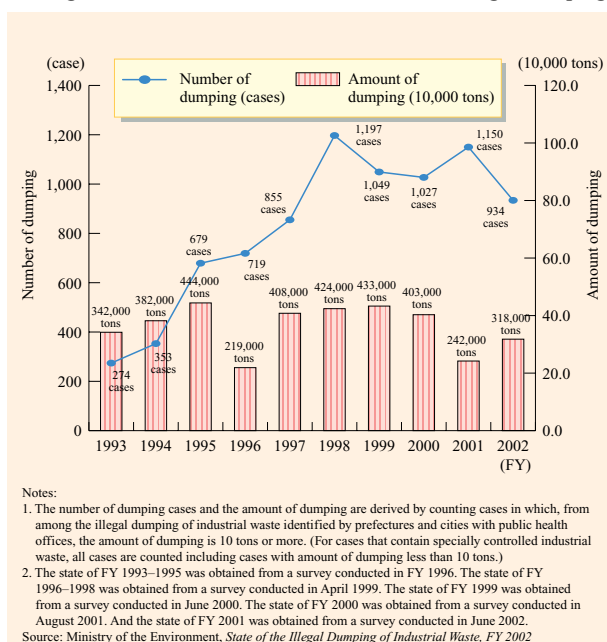
Changes in the Total Volume of Municipal Solid Waste and Volume Generated per Person per Day



Changes in the Volume of Industrial Waste Generated



Changes in the Number of Cases and Amount of Illegal Dumping



sound material-cycle society that Japan is aiming at, target values, and the respective roles of citizens, NPOs, NGOs, businesses, local governments, and the national government.

Illegal dumping of industrial waste has remained steady at around 400,000 tons for the past several years. Although the volume decreased drastically to about 240,000 tons in FY 2001, it rose to approximately 320,000 tons in FY 2002.

To tackle these issues, the government revised the Waste Management and Public Cleansing Law, which took effect in December 2003. The revised Law authorizes parties that have been certified by the Minister of the Environment to handle area-wide waste treatment to treat waste without the need to further obtain permits related to waste treatment businesses. The Law also stipulates the establishment of systems to enforce compliance with waste treatment standards, record keeping and record storage duties. In addition, the Law Making a Partial Amendment to the Waste Management and Public Cleansing Law was enacted in April 2004. It prescribes a strong role for the government in order to resolve cases of improper waste treatment and issues related to waste treatment facilities. It also prescribes penalties for improperly treating sulfate pitch and penalties for contractors collecting or transporting waste, who are found guilty of illegal dumping.

5. Measures for Tackling Environmental Risk from Chemical Substances

Among the more than 50,000 chemical substances in circulation in Japan today, some may be harmful to human health and to ecosystems if they are not properly managed and pollute the environment during the various stages of production, distribution, consumption, and disposal.

In order to prevent these harmful effects, the environmental risk (possible interference with environmental conservation) of these chemical substances must be assessed and appropriate measures must be taken.

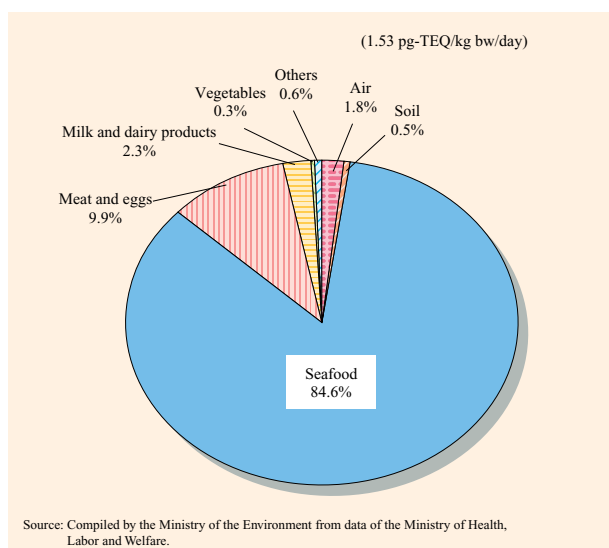
Pursuant to the Partial Amendment of the Chemical Substances Control Law that took effect in April 2004, from the view of evaluating the effect of chemical substances not only on human health but also on ecosystems, the toxicity of chemical substances to living organisms in the environment was added to the list of items to be evaluated. Where necessary, the manufacturing and import of these substances would be regulated. Furthermore, the amendment also prescribed (i) regulation of persistent and highly bioaccumulative existing chemical substances, (ii) an evaluation system that focuses on the possibility of release into the environment, and (iii) mandatory reporting of hazard information of substances acquired by manufacturer or importer.

The average daily intake of dioxin for humans has been decreasing annually and is now less than the tolerable daily intake level (4pg-TEQ/kg bw/day), which is low enough that even if this amount were to be absorbed throughout one's lifetime, it would not cause adverse health effects.

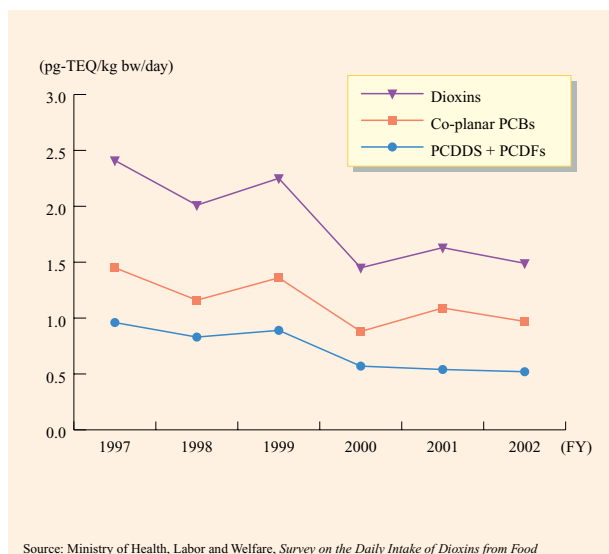
In addition, because the toxicity of endocrine disrupting chemicals, which might cause damage to or have harmful effects on the body through their impacts on the endocrine system (hormones), is mostly unknown, studies are being undertaken to gather scientific knowledge.

Japan has also adopted the PRTR (Pollutant Release and

Daily Intake of Dioxins in Japan (FY 2002)



Chronological Changes in Daily Intake of Dioxins from Food



Transfer Register) system for chemical substances that are suspected of being harmful to human health and to ecosystems. Under the PRTR system, businesses voluntarily identify and report to the government the amount of chemical substances that are released to the environment or transferred as waste materials; and the government aggregates the data from businesses and publishes them with estimated results of release quantities outside notification. Continued from the previous year, the second aggregate result was published in March 2004, and requests for the disclosure of individual data are being accepted. It is important to further promote risk communication to enable all parties, including citizens, industries, and the administrations, to share accurate information on chemical substances and to improve communication with each other.

6. Ensuring the Coexistence of Man and the Nature

(1) Ensuring the Coexistence of Man and the Nature in Japan

When we look at the current state of the natural environment in Japan, we see that natural forest is in decline while vegetation in planted forest, arable land, and other areas are increasing.

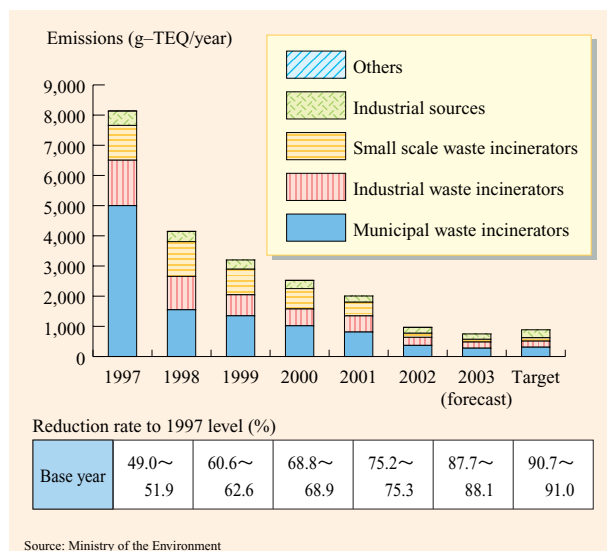
The areas of seaweed beds and tidal flats as well as natural coastlines are also in decline.

The Red List, which contains threatened wildlife species, listed 2,663 species that are facing extinction. They represent a little more than 20% of mammals, amphibians, brackish water and freshwater fish, and vascular plants (tracheophyte), a little less than 20% of reptiles, and a little more than 10% of bird species inhabiting Japan.

Furthermore, 62 species have been designated national endangered species of wild fauna and flora pursuant to the Law for the Conservation of Endangered Species of Wild Fauna and Flora, including two species of mammals and 39 species of birds.

In view of this situation, the new National Biodiversity Strategy has been approved in March 2002. The new National Strategy presented the following three main pillars as the basic principle for implementing practical and specific measures: (i) “strengthening conservation” to deal with the problems of species extinction, decline in wetlands, and alien species; (ii) “nature restoration” to actively rehabilitate and restore vanished nature in addition to conservation; and (iii) “sustainable use” of all national land, including community-based woods and rural landscapes and urban areas, or in other words, to advance the conservation of bio-

Changes in Total Emissions of Dioxins

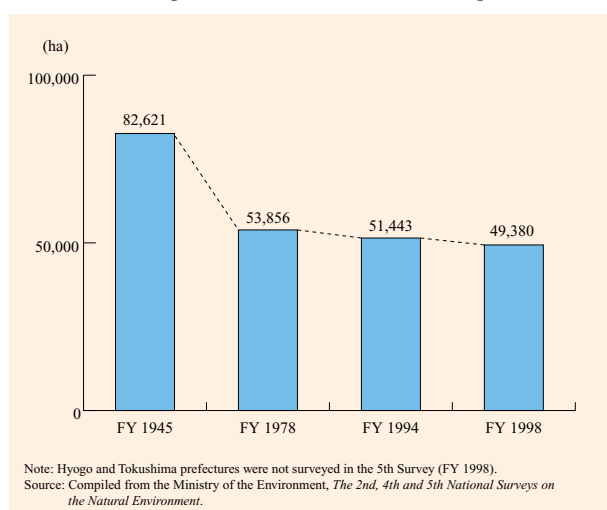


Changes in Vegetation Naturalness over Time

Vegetation Naturalness Survey	1st National Survey (implemented in FY 1973)	5th National Survey (implemented in FY 1994—1998)	Increase/decrease (%)
Natural vegetation of grassland and moorland	1.1	1.1	0.0
Natural vegetation of forest	21.7	17.9	-3.8
Substitutional vegetation close to natural vegetation of forest	4.5	5.3	0.8
Substitutional vegetation of secondary forest	21.0	18.6	-2.4
Planted forest	20.8	24.8	4.0
Substitutional vegetation of high profile grassland	1.9	1.5	-0.4
Substitutional vegetation of low profile grassland	1.6	2.1	0.5
Fruit orchards, mulberry plantations, tea gardens, and other horticultural areas	1.5	1.8	0.3
Paddies, fields, and other arable land, residential area with abundant trees	22.7	21.1	-1.6
Urban land, developed tracts, and other zones where plant life is virtually nonexistent	3.1	4.3	1.2
Natural bare land	—	0.4	
Open water	—	1.1	
Other (areas bare of vegetation, category unknown)	—	0.0	
All Japan	100.0	100.0	

Note: Natural bare land, Open water, and Other were not included in the 1st Survey
Source: Compiled from the Ministry of the Environment, *The 1st and 5th National Surveys on the Natural Environment*.

Changes in the Area of Tidal Flats in Japan



diversity in communities.

For conservation of biodiversity in natural parks, which represent the outstanding natural landscape of Japan, the Natural Parks Law has been revised and entered into force in April 2003, following the revision of the National Strategy on Biological Diversity. To promote the conservation of internationally important wetlands and in response to the resolution adopted at the Conference of the Parties to the Ramsar Convention, Japan is making preparations aimed at increasing Japan's Ramsar sites from the current number of 13 to over 22.

With the participation of experts, local governments, civil organizations, and local residents, the concerned ministries and agencies are collaborating to undertake restoration projects of natural environments that have been damaged in the past. In April 2003, the Cabinet approved the Basic Policy for Nature Restoration pursuant to the Law for the Promotion of Nature Restoration. In October, the Nature Restoration Promotion Council and the Nature Restoration Expert Committee were established. Nature restoration measures were launched at the Kushiro Shitsugen and Arakawa in accordance with the Law.

For living modified organisms, the Cartagena Protocol was adopted in 2000 and entered into force in September 2003. It establishes an international framework for the import and export of living modified organisms. In preparation for the ratification of the Protocol, Japan promulgated the "Law Concerning the Conservation and Sustainable Use of Biological Diversity through Regulations on the Use of Living Modified Organisms" in June 2003 to establish the necessary domestic system. The Law became effective on February 2004.

To review concrete measures for dealing with alien species, the Central Environment Council deliberated "Measures for Alien Species" and a report was issued in December 2003. In line with this report, the import and keeping of invasive alien species are going to be banned and the mitigation of invasive alien species will be conducted by the "Invasive Alien Species Act," which was submitted to the 159th Diet to prevent the damages to ecosystems.

Threatened Wildlife of Japan (species listed in the Red List and the Red Data Book)

(as of March 2004)

	Taxonomical group	Species assessed (a)	Extinct	Extinct in the wild	Threatened species		Near threatened	Data deficient	Threatened local population	Number of threatened species (b)	b/a (approx.)	
					Critically endangered + Endangered	Vulnerable						
					Category IA ; Category IB							
Animals	Mammals	Approx. 200	4	0	32 12	20	16	16	9	12	48	24%
	Birds	Approx. 700	13	1	42 17	25	48	16	15	2	90	12%
	Reptiles	97	0	0	7 2	5	11	9	1	2	18	19%
	Amphibians	64	0	0	5 1	4	9	5	0	4	14	22%
	Brackish water and freshwater fish	Approx. 300	3	0	58 29	29	18	12	5	12	76	25%
	Insects	Approx. 30,000	2	0	63		76	161	88	3	139	0.5%
	Land/freshwater molluscs	Approx. 1,000	25	0	86		165	206	69	5	251	25%
	Spiders/crustaceans	Approx. 4,200	0	1	10		23	31	36	0	33	0.8%
Subtotal for animals			47	2	303		366	456	223	42	669	
Plants	Vascular plants	Approx. 7,000	20	5	1,044 564	480	621	145	52	0	1,665	24%
	Bryophytes	Approx. 1,800	0	0	110		70	4	54	0	180	10%
	Algae	Approx. 5,500	5	1	35		6	24	0	0	41	0.7%
	Lichen	Approx. 1,000	3	0	22		23	17	17	0	45	5%
	Fungi	Approx. 16,500	27	1	53		10	0	0	0	63	0.4%
Subtotal for plants			55	7	1,264		730	190	123	0	1,994	
Total			102	9	1,567		1,096	646	346	42	2,663	

(1) Data on the assessed animal species (including subspecies) were derived from the Environment Agency, *Checklist of Japanese Species of Wildlife* 1993, 1995, and 1998.
(2) Data on the vascular plants (including subspecies, etc.) were gathered by the Japanese Society for Plants Systematics.
(3) Data on the species of bryophytes, algae, lichen, and fungi (including subspecies) were derived from Ministry of the Environment surveys.
(4) Data on the current state of threatened species (including subspecies) were derived from the Environment Agency, *Revised Red Data Book—Threatened Wildlife of Japan: Amphibians, Reptiles, Plants I, and Plants II* (2000); and the Environment Agency, *Red Lists on Mammals and Birds, Brackish Water and Freshwater Fish, and Invertebrates* (1998, 1999, and 2000).
The categories are considered as follows:
Extinct: Species that are extinct in Japan
Extinct in the wild: Species that can only survive by being raised or by cultivation
Critically endangered + Endangered: Species in danger of extinction
Vulnerable: Species facing increasing danger of extinction
Near Threatened: Species with weak foundation for survival
Threatened local population: Population of a species that is isolated in an area and has high possibility of extinction.
Source: Ministry of the Environment

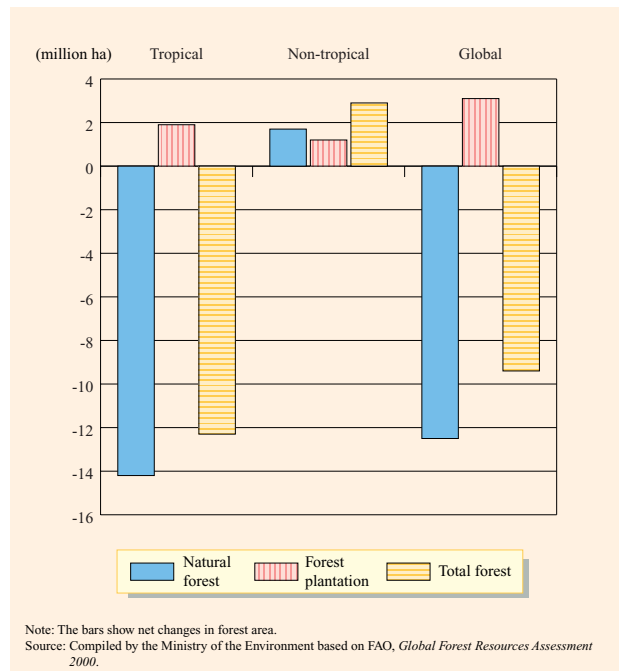
(2) Deforestation

Forests in the world were decreasing at a rate of about 9.4 million hectares per year averagely from 1990 to 2000. It was mainly attributed to the conversion of forests to farmland, forest fire, and illegal logging. Efforts for the sustainable forest management are being promoted worldwide under the United Nations Forum on Forests (UNFF), which was set up in 2001, and other initiatives.

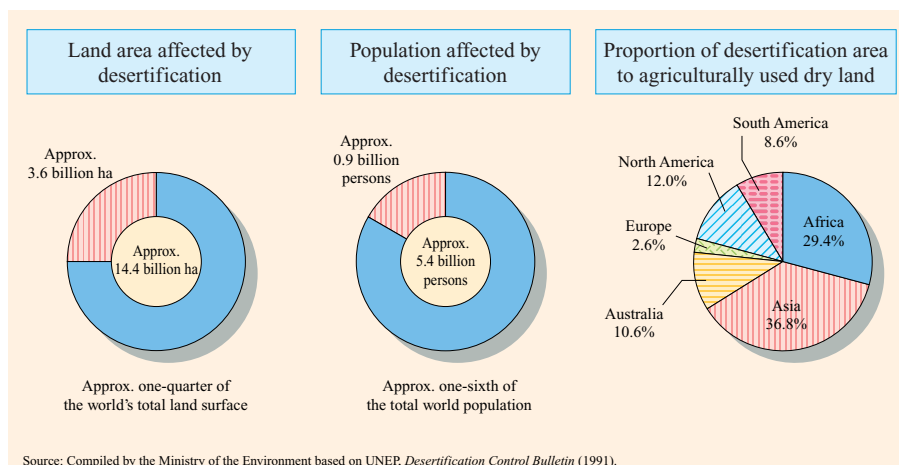
(3) Desertification

Desertification is defined as land degradation in arid and semi-arid areas. About one-quarter of all land areas in the world and 900 million people, accounting for one-sixth of the world's population, are affected by desertification. As the background of this problem, there are factors such as poverty and population growth in developing countries. Therefore, international efforts are being made under the UN Convention to Combat Desertification (UNCCD).

Annual Forest Area Changes in the World (1990 — 2000)



Current State of Desertification



○ Environmental Conservation Measures to be Implemented in FY 2004

In line with the Basic Environment Plan, environmental conservation measures to be implemented in FY 2004 are reported in chapters as follows:

- Chapter One: Conservation of the Global Atmospheric Environment
- Chapter Two: Conservation of the Atmospheric Environment (not including the global atmospheric environment)
- Chapter Three: Conservation of the Water, Soil, and Ground Environments
- Chapter Four: Measures and Policies related to the Material Cycle including Waste and Recycling Measures
- Chapter Five: Measures for Chemical Substances
- Chapter Six: Conservation of the Natural Environment and Promoting Contact with Nature
- Chapter Seven: Basis of Various Measures, and Measures Facilitating the Participation of Various Actors and International Cooperation



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 ● If you have any opinions and comments regarding this booklet, please contact the following:

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