

Chapter 2

Human Activities in Japan and Overseas and their Environmental Impacts

Our activities including economic activity have a variety of impacts on the global environment. On the other hand, trends toward reducing the environmental burden and approaches to resolving environmental issues are emerging. This chapter overviews the relationships between economic affairs and the environment, and also movements toward resolving environmental issues.

1 The Burden on the Global Environment from Human Beings and the Impact of the Global Warming on the Foundation of Human Existence

(1) The total global environmental burden including increases in population and energy consumption

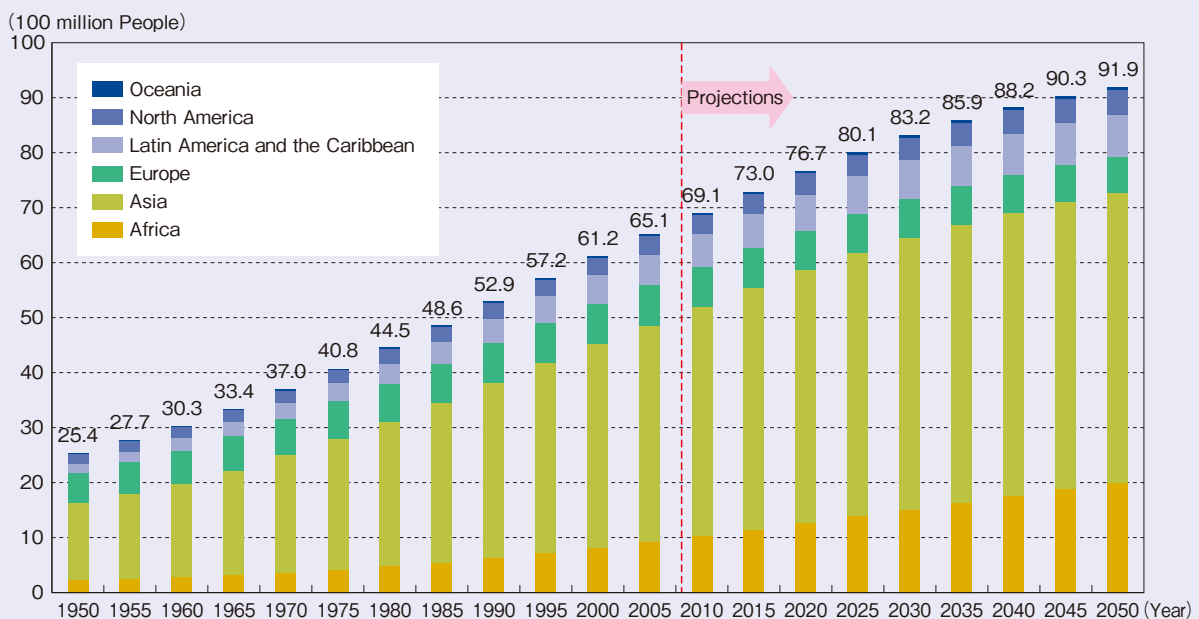
The global environmental burden caused by human activities due to increases in population, energy use and agricultural land and also deforestation are certainly increasing. Particularly in regions such as East Asia, where population is increasing rapidly and industrialization is progressing, use of resources and energy consumption has also been increasing (Figure2-1-3). In order to prevent security problems

that may threaten the foundation of our existence, we will have to take urgent actions to prevent global warming that may accelerate the deterioration of the global environment.

(2) World water problems

Regarding the world's water resources, the amount of freshwater easily accessible for human use is about 40 liters per person per day, based on the world population in 2008. However, Japan's daily domestic water use in 2005 was 307 liters per person per day.

Figure2-1-1 Changes in the World Population



Source: Compiled by the Ministry of the Environment from UN Population Division "2006 World Population Prospects"

Figure2-1-2 Changes in Primary Energy Supply by Region

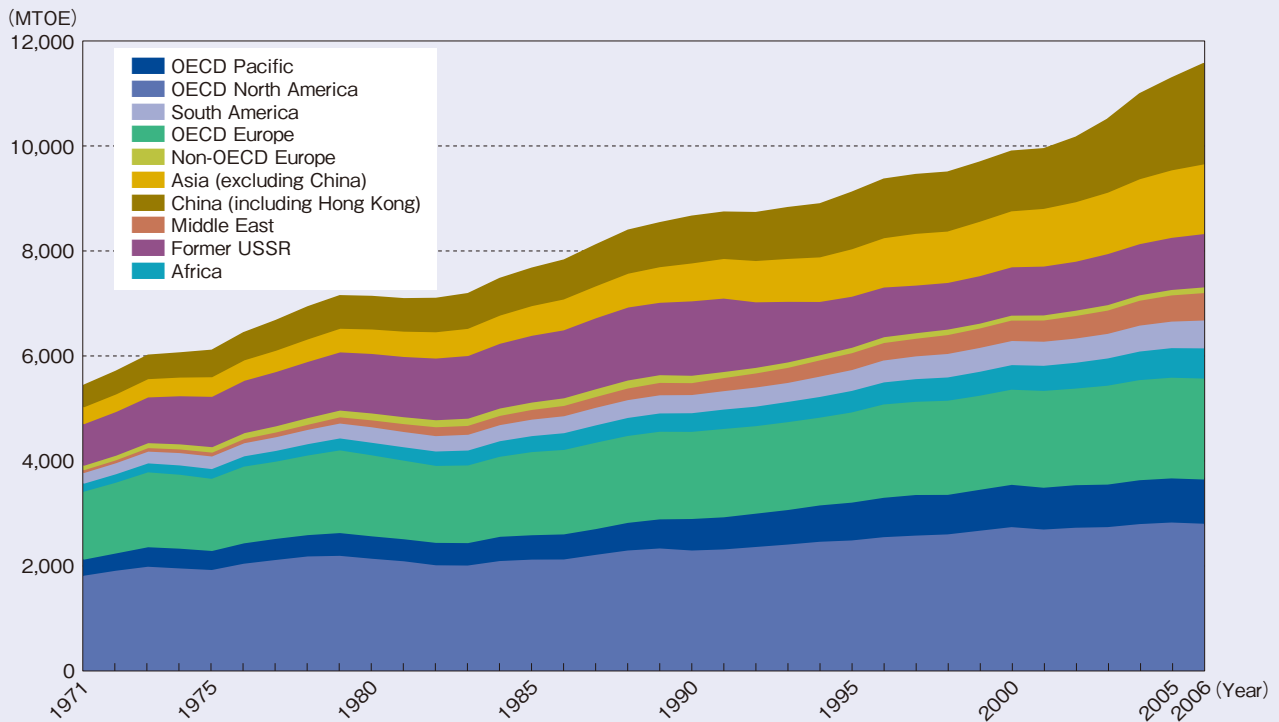
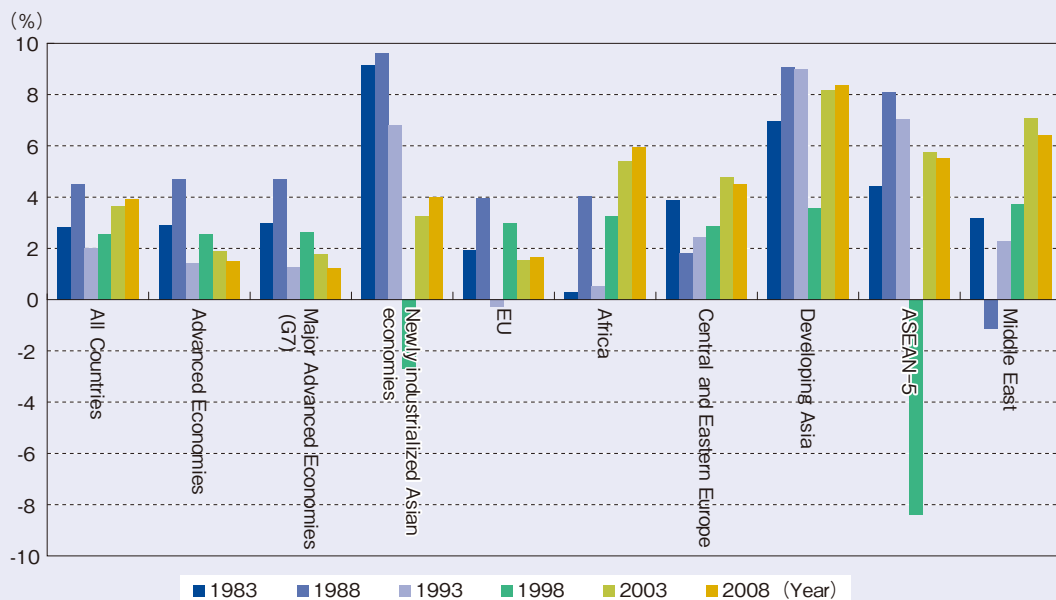


Figure2-1-3 Changes in World Economic Growth Rate by Region



Japan relies on other countries for the majority of its food supply and some areas in overseas areas are more suffering from water shortages or turn into large scale flooding due to climate change.

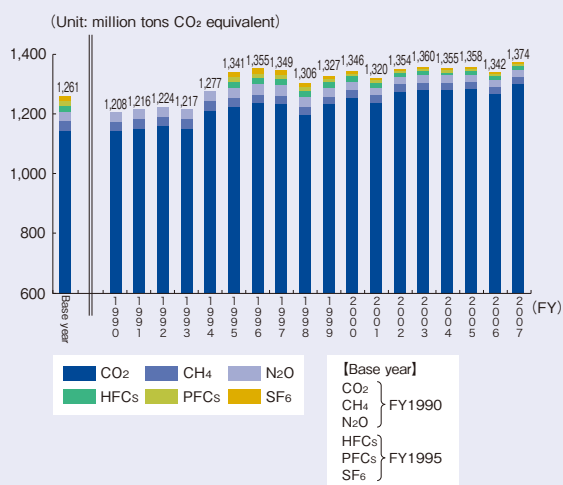
(3) Status of the major environmental burden in Japan

The total amount of Japan's greenhouse gas (GHG) emissions in FY2007 was 1,374 million tons (carbon dioxide equivalent), increasing 9.0% from 1,261

million tons in the base year under the Koto Protocol (FY 1990, however, the base year for the three CFC alternatives, including HFCs, PFCs, and SF₆ is FY1995) (Figure2-1-4). In terms of segmental breakdown, GHG emissions are especially increasing in the commercial and other sectors and the residential sector, and further GHG reductions will be required (Figure2-1-5).

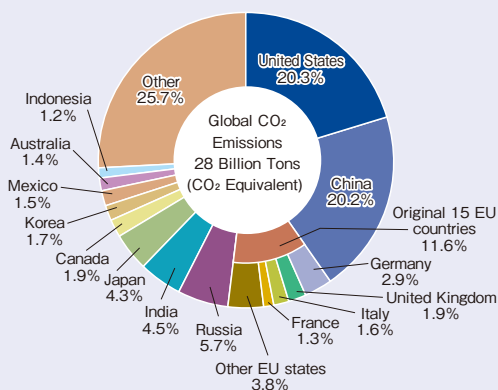
If we make an international comparison of CO₂ emissions resulting from energy use in 2006, Japan accounts for 4.3% of the world's total, being the ninth highest, in terms of emissions per capita (Figure2-1-6, Figure2-1-7).

Figure2-1-4 Japan's GHG Emissions



Source: Ministry of the Environment

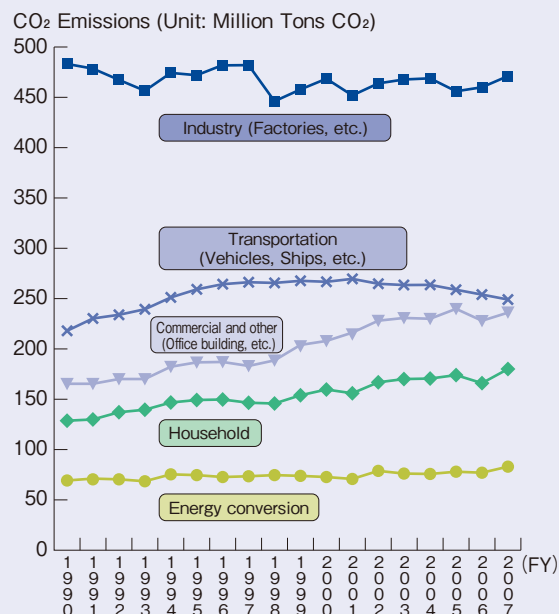
Figure2-1-6 CO₂ Emissions by Country (2006)



*Original 15 EU countries are the member countries as of COP3 (Kyoto Conference)

Source: Compiled by the Ministry of the Environment from IEA "CO₂ EMISSIONS FROM FUEL COMBUSTION" 2008 EDITION

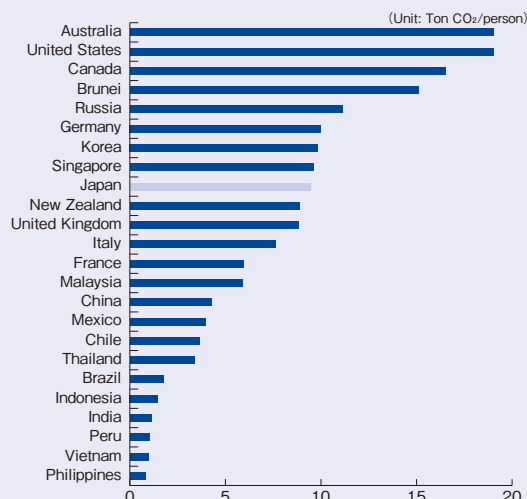
Figure2-1-5 Changes in CO₂ Emissions Resulting from Energy Uses by Sector and the 2010 Targets



Note: A detailed audit and review will be required, as the volume of the emissions on the base year (1990 in principle) has been inconsistent with that of the year when the Kyoto Protocol Target Achievement Plan was formulated, due to the audit of the inventories for GHG emissions.

Source: Ministry of the Environment

Figure2-1-7 Per Capita CO₂ Emissions by Nation (2006)

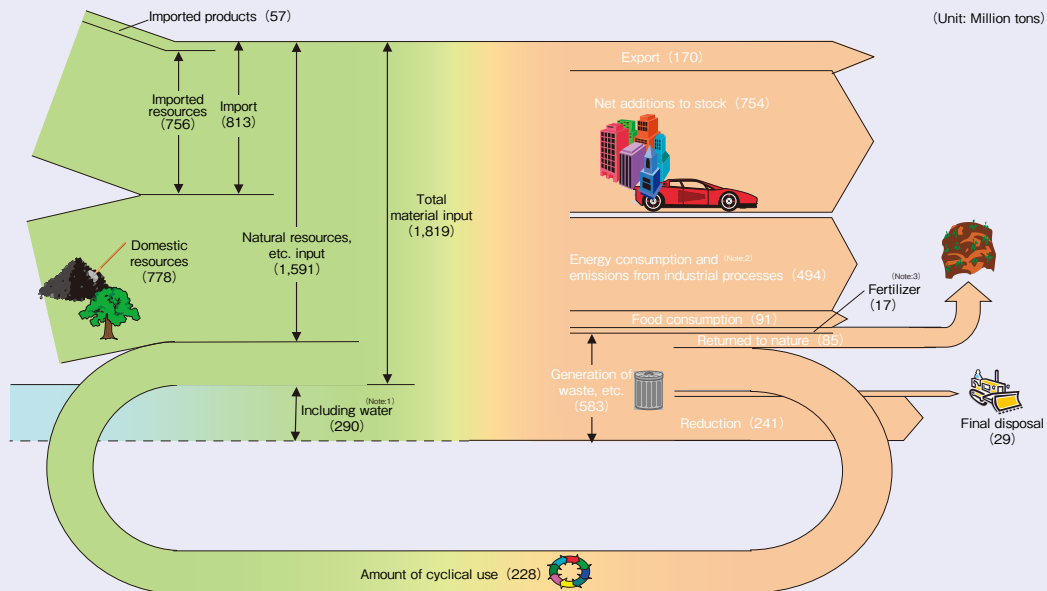


Source: Compiled by the Ministry of the Environment from IEA, CO₂ Emissions from Fuel Combustion 2008

Material flows in Japan's economic society (Figure2-1-8) show a positive trend in resource productivity - the inlet indicator was about 350,000 yen per ton in FY2006, an improvement of about 33% from the first year of the so called sound material-cycle society in FY2000 (Figure2-1-9). The cyclical use rate, that shows the percentage of cyclical use of

total material input in Japan, was about 12.5% in FY2006, increasing by about 2.6 points from FY2000. Daily waste disposal per person was 1,116 grams in FY2006, reduced by 5.8% compared to FY2000 (Figure2-1-10, Figure2-1-11). Final disposal volume in Japan was about 29 million tons in FY2006, reduced by about 49% from FY2000 (Figure2-1-12).

Figure2-1-8 Material Flow in Japan (FY2006)



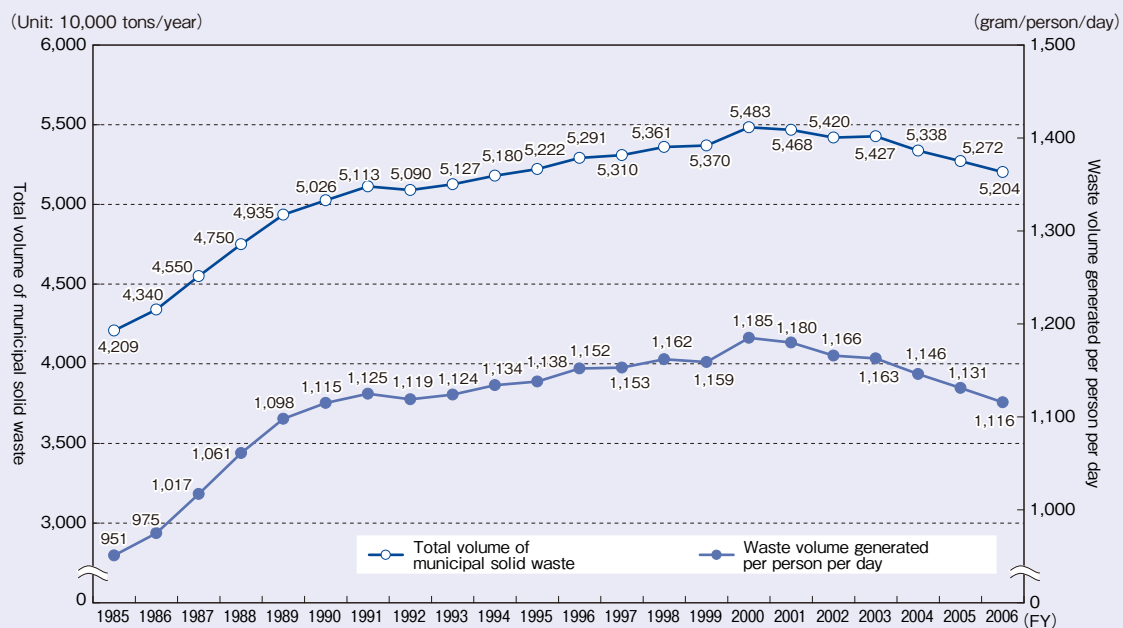
Note 1: Including water is the input of water during the processes of socio-economic activities (sludge from mining, building and water works and tailing from mining) and input of water included in waste and the like (sludge, animal manure, human waste, waste acid and waste alkali) and sediment and the like associated with economic activities.

Note 2: Energy consumption and emissions from industrial processes are estimated water and others contained in raw materials that evaporated during the manufacturing process of industrial products.

Note 3: Information data was mainly drawn from the net addition to stock, as spread fertilizers in fact, do not accumulate, but decompose in the soil.

Source: Ministry of the Environment

Figure2-1-11 Changes in the Total Volume of Municipal Solid Waste and Waste Volume Generated per Person per Day



Note: "Total Volume of Municipal Solid Waste" = "designed collection volume" + "volume of waste directly brought in" + "group-based recyclable resource collection"

Source: Ministry of the Environment

Figure2-1-10 Targets and Achievements of Effort Indices

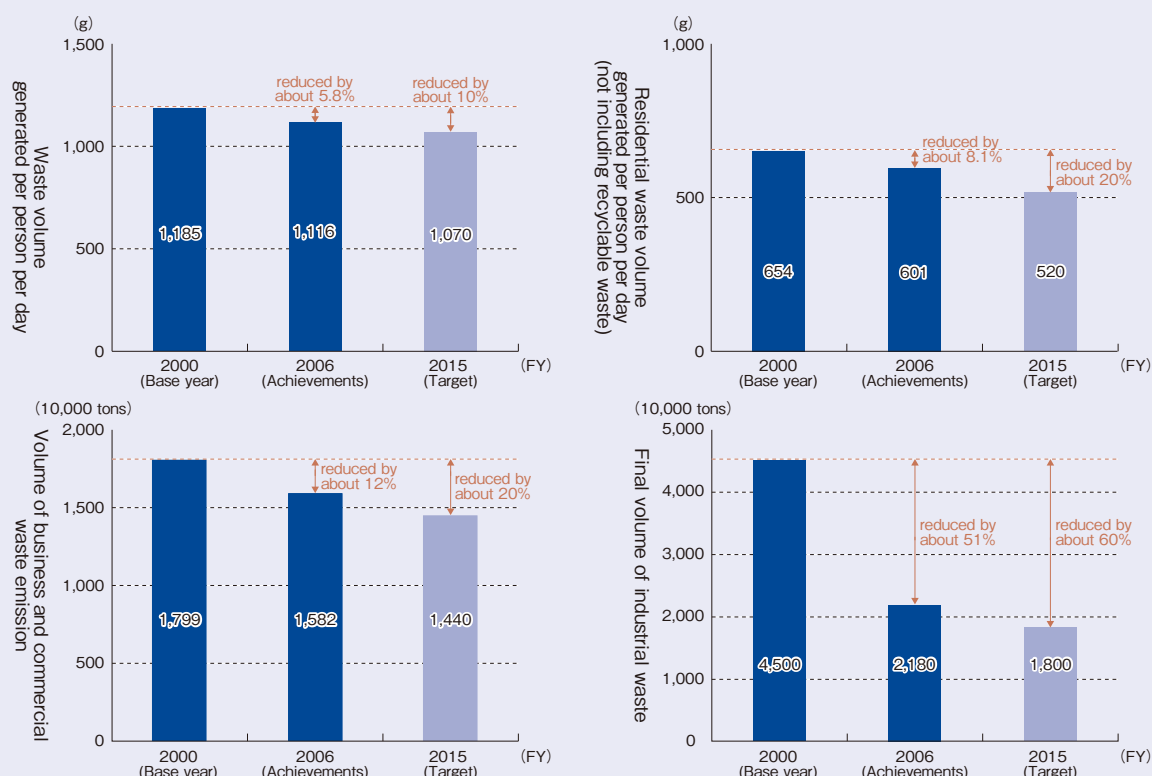


Figure2-1-9 Changes in Resource Productivity and the Cyclical Use Rate

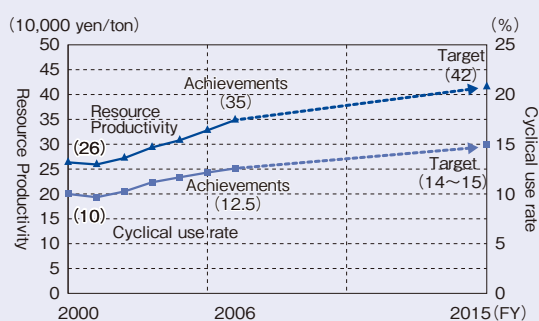


Figure2-1-12 Changes in the Final Disposal Volume of Waste



2 Economic Activities and their Environmental Impacts

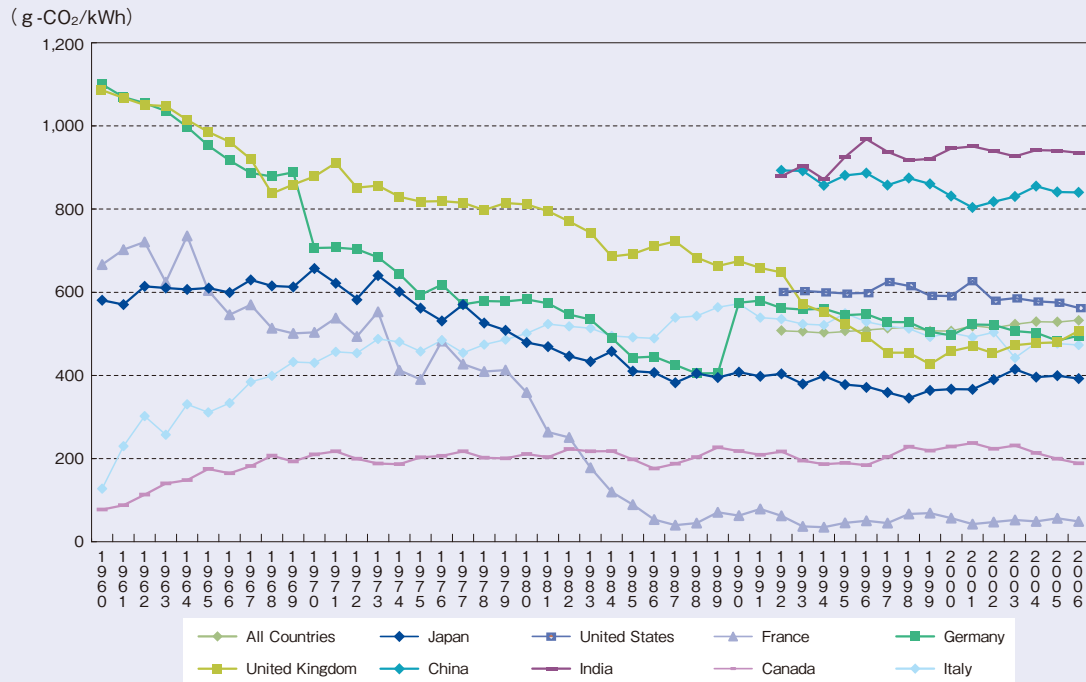
(1) Deterioration of CO₂ emission intensity for electricity power

Changes in the electric power generation mix that serves as a foundation of economic activity will significantly impact the total CO₂ emissions. Japan's CO₂ emission intensity for electricity (sending end) in FY2007 was 453g-CO₂/kWh. In recent years emission intensity has tended to deteriorate.

Due to the suspension of operations at nuclear power plants caused by the Niigataken Chuetsu-oki

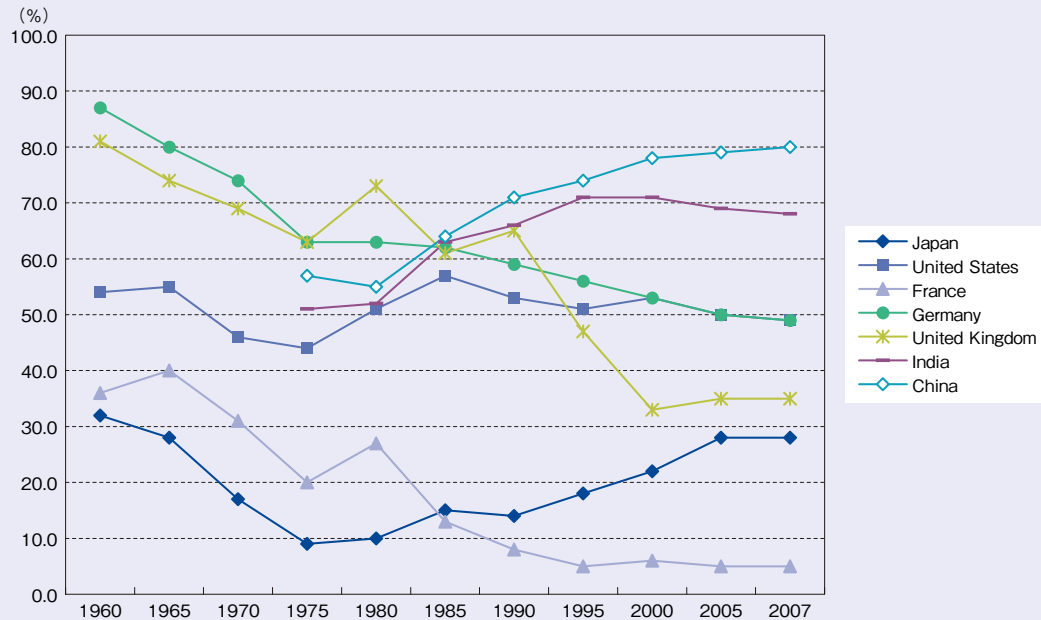
Earthquake in July 2007, the emission intensity is expected to further deteriorate for the time being. In recent years the percentage of thermal power generation, in particular coal-fired power generation, has been increasing. According to the Ministry of the Environment's estimate, CO₂ emissions from coal-fired power plants have increased and the percentage of Japan's CO₂ emissions resulting from energy use has increased by nearly 2.5 times in about 15 years (Figure2-2-3).

Against this background, Japan is required to reduce

Figure2-2-1 CO₂ Emissions Intensity for Electric Power by Country

Note: Assessment is made on electric utility companies, excluding private power generation. The values are obtained only from electric power plants and do not include CHP Plants (co-generation) and heat supply.
Source: Compiled by the Ministry of the Environment from IEA, "CO₂ EMISSIONS FROM FUEL COMBUSTION" 2008 EDITION

Figure2-2-2 Percentage of Coal-Fired Power Generation in Electric Power Volume by Country



Note: 2007 columns for China and India are the values from 2006.
Source: Compiled by the Ministry of the Environment from the data of IEA, Energy Balance of OECD Countries 2008 and Energy Balances of NON-OECD Countries 2008.

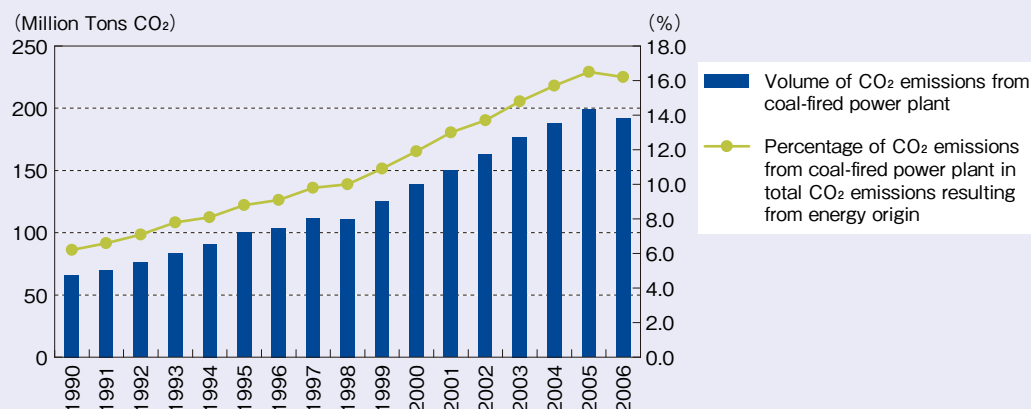
coal fired CO₂ emissions, while promoting the development of CCS technology etc., as stipulated in the Action Plan for Achieving a Low-carbon Society.

Japan shall increase the proportion of the renewable energy in final energy consumption (including heat pumps etc.) to the world's highest level of 20% by 2020, through new introduction and utilization

measures on renewable energy including solar power generation (Figure2-2-4). As stated in the Action Plan for Achieving a Low-carbon Society, Japan shall also increase the percentage of power supply with zero-emission (renewable energy and nuclear power generation etc.) by more than 50% by 2020.

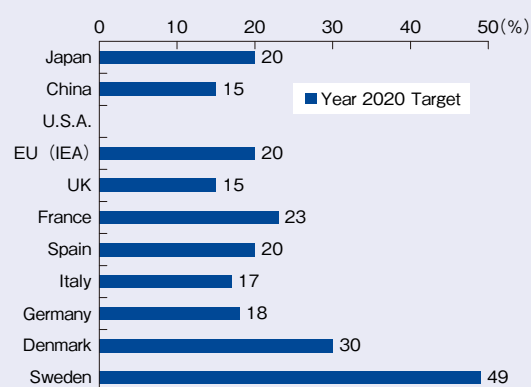
While maintaining maximum efforts toward expanding

Figure2-2-3 Japan's CO₂ Emissions from Coal-Fired Power Plant and Percentage of its Emissions to CO₂ Emissions from Energy Origin



Source: Compiled by the Ministry of the Environment from the data of the Agency of Natural Resources and Energy's "Overview of Electric Power Development," "Overview of the Demand and Supply of Electricity" and the "Overview of Electric Power Supply Plan."

Figure2-2-4 Percentage of Renewable Energy in Final Energy Consumption (Target Value)



Note: All countries except for China and U.S.A are calculated on the final energy consumption base. For China, IEA's primary energy supply base is used, and the U.S.A. has not set any target on this subject.

Source: Compiled by the Ministry of the Environment from the EU Directive (Jan. 2008), "Medium and Long-Term Development Plan for Renewable Energy in China" (Aug. 2007), and the "Future Development Strategy (Cabinet Office and Ministry of Economy, Trade and Industry, April 2009)."

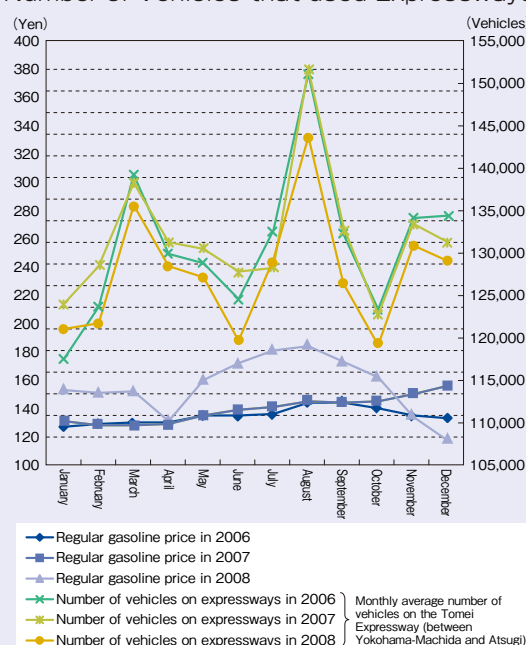
the usage of non-fossil energy, Japan shall promote the usage of nuclear power while securing thorough safety. In addition to these measures, by resuming nuclear power plant operations that have been suspended due to the Chuetsu-oki Earthquake, Japan's CO₂ emission intensity is expected to improve further.

(2) Relationship between rapid increases in gasoline prices and vehicle use

FY2008 saw unprecedented increases in global gasoline prices. The number of vehicles on expressways during this period remained lower than usual (Figure2-2-5), and the sales volume of gasoline showed a similar trend (Figure2-2-6).

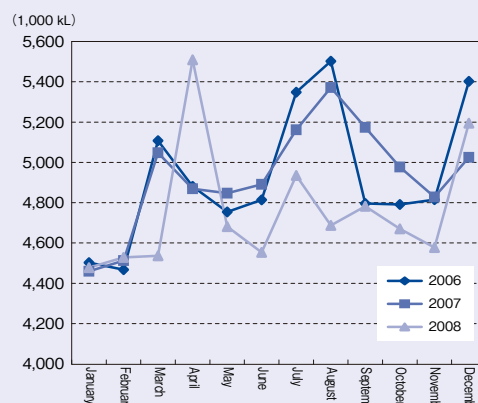
Consumers are considered to have refrained from using vehicles or devised ways of using them less.

Figure2-2-5 Increase in Gasoline Prices and Number of Vehicles that used Expressways



Source: Compiled by the Ministry of the Environment from the data of Central Nippon Expressway Company Limited's research and sources from Japan Energy and Economy Institute's Oil Information Center.

Figure2-2-6 Sales Volume of Regular Gasoline Between 2006 and 2008



Source: Compiled by the Ministry of the Environment from the Ministry of Economy, Trade and Industry's Current Survey of Petroleum Product Supply and Demand (Resources and Energy Statistics)

(3) Impacts on the material circulation caused by sudden changes in market conditions

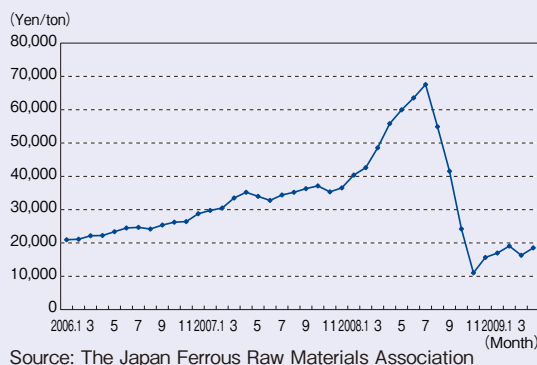
Many natural resource prices plunged due to decline in demand, following the global economic slow down since the latter half of 2008. This also influenced prices of recyclable resources.

For example, since the summer of 2008, the prices of scrap iron have fallen sharply (Figure2-2-7), and the prices of Polyethylene Terephthalate (PET), raw materials for plastic bottles, have also drastically declined since around the fall (Figure2-2-8).

Therefore, concerns were raised that the used plastic bottles may remain in export businesses and municipal recycling facilities in large quantities, and the domestic price of flakes, reproduced from used plastic bottles, may significantly drop.

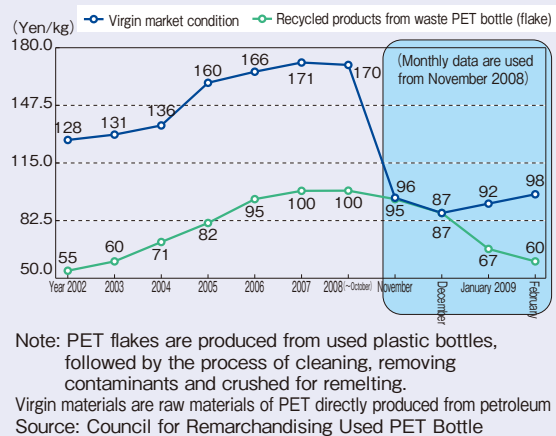
Thus, the prices of recyclable resources will be strongly affected by the price fluctuations of natural resources, when traded in the market. Therefore, in

Figure2-2-7 Trends in Scrap Iron Prices



improving a stable domestic recycling system, it is important to understand the impacts of the economic factors, such as the global market conditions and to build a mechanism considering these factors.

Figure2-2-8 Market Condition Changes in Japan's PET Flake and Virgin Materials



Considering the circumstances mentioned above, trends in economic activities have various effects on energy consumption, fuel and resource prices and capital investment in environmental facilities. When considering environmental measures, incorporating economic affairs such as energy price fluctuations are important. The Action Plan for Achieving a Low-carbon Society stipulates to promote the provision of information on CO₂ emissions and in addition to utilize market mechanisms by pricing CO₂ emissions in order to promote CO₂ emission reductions in all sectors. Improving the integrated performance of environmental, economic and social aspects based on the Basic Environment Plan is also necessary.

3 Trends in Activities to Reduce Environmental Burdens

Next in this section, we look at the trends of entities addressing on environmental issues including the national government, local governments, companies, NPOs and NGOs.

(1) Approaches of the Japanese Government

Japan is addressing various environmental conservation-related policies. The Ministry of the Environment coordinates each ministry and government office's budget related to environmental conservation, as the expenditure for environmental conservation, every fiscal year in order to develop environmental conservation-related policies efficiently and effectively as the whole government. In recent years, the ratio of environmental conservation expenditure to the national budget has mostly leveled off, and the total amount of the environmental conservation budget is declining in response to the reduction of the overall budget, and is on a downward

trend in general (Figure2-3-1).

(2) Approaches of Local Governments

Local governments, familiar to their residents, are playing an increasingly important role on environmental measures. The number of officials in charge of environmental administration in local governments was 75,235, 3.0% of the number of officials in charge of general account field (general administration field) as of April 1, 2008, showing a downward trend (Figure2-3-2). One of the reasons for this is considered outsourcing of collection and management operations, including waste and night soil to the private sector in the cleanup field. Although the number of officials in the cleanup field and pollution field is on a downward trend, the number of officials in the environmental conservation field has been slightly increasing in recent years.

Although the Figure2-3-3 and the Figure2-3-4 show that the position of environmental administrations in

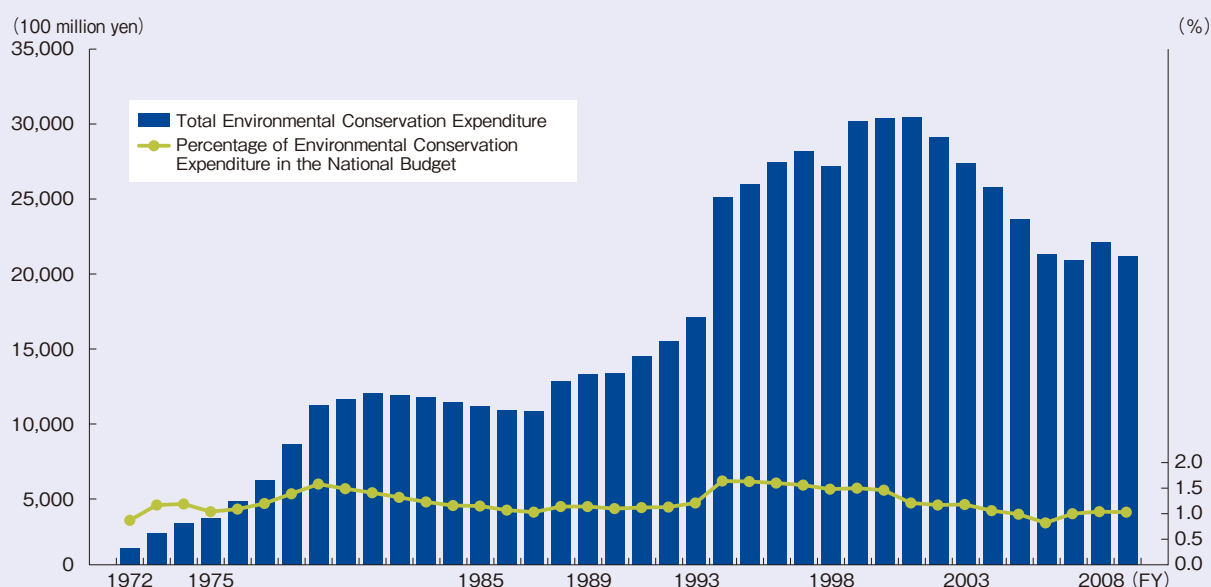
local governments is becoming stronger due to the budget changes related to prefectural and municipal environmental administration and their ratio to the general account budget, they are under severe budget restrictions.

(3) Environmental Education in Schools

According to the research on the current situation

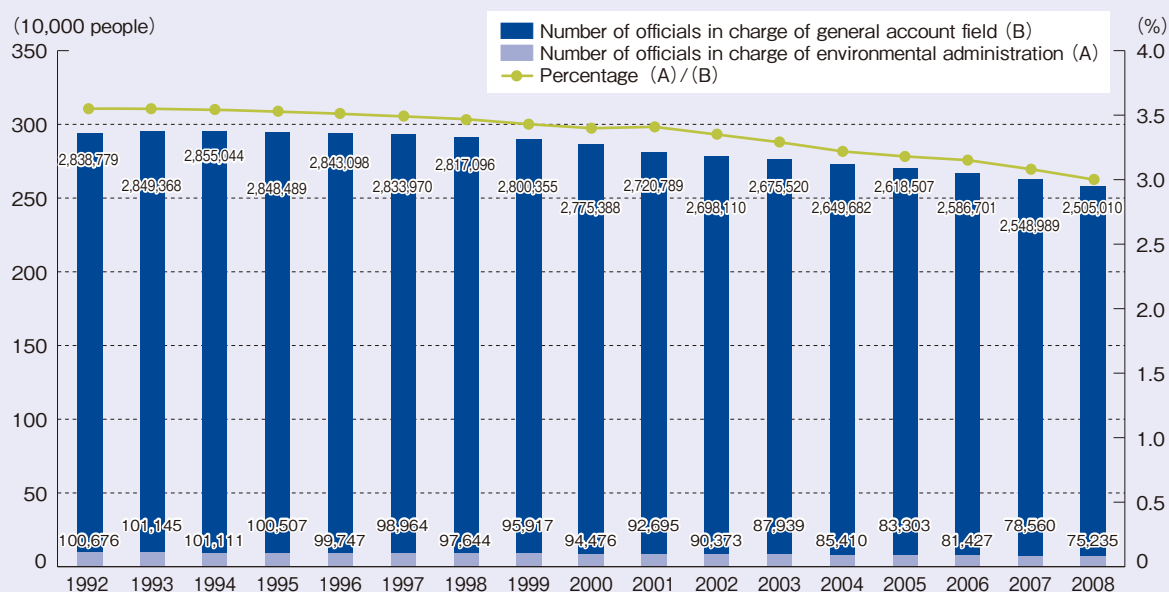
of environmental education, new energy facilities such as solar, wind power and energy saving equipment including auto sensor lighting system are being focused as facilities schools want to install (Figure2-3-6). The results also showed that enrichment of students materials including supplementary reading materials and learning materials were required for the promotion of environmental education (Figure2-3-7).

Figure2-3-1 Trends in Percentage of Environmental Conservation Expenditure in the National Budget



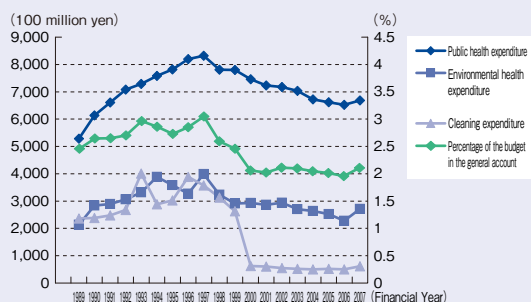
Note 1: Regarding on the Environmental Conservation Budget for FY1994, the scope was expanded and the relevant expenditure was allocated to deal with the Basic Environment Plan, formulated under the provisions of the Basic Environment Law in 1994.
 2: Regarding on the Environmental Conservation Budget for FY2000, the relevant expenditure was allocated, excluding the reduce adjusted expenditure posed by the establishment of independent administration institutes from FY2001.
 3: Expenditure related to the promotion of locating nuclear power plants was allocated to the Environmental Conservation Budget from FY2008.
 4: Regarding on the Environmental Conservation Budget for FY2009, the amount is taken from the draft budget.
 Source: Data from the Environmental Strategy Division, Environmental Policy Bureau, Ministry of the Environment

Figure2-3-2 Changes in Number of Officials in Charge of Environmental Administration in Local Government's General Account Field



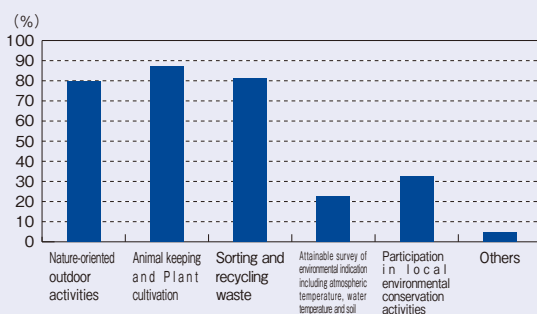
Source: Compiled by the Ministry of the Environment from the Local Administration Bureau, Ministry of Internal Affairs and Communications' "Survey on the Total Number Management of Civil Servants in Local Governments."

Figure2-3-3 Changes in Prefectural Environmental Budgets



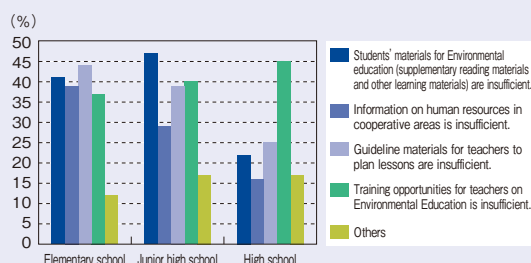
Source: Compiled by the Ministry of the Environment from the Local Administration Bureau, Ministry of Internal Affairs and Communications' "Annual Report of Local Finances."

Figure2-3-5 Experiential Activities Implemented as Part of Environmental Education (Elementary school)



Note: 980 schools responded
Source: Research by the Ministry of the Environment and the Ministry of Education, Culture, Sports, Science and Technology (FY2008)

Figure2-3-7 Challenges and Requests for Promoting Environmental Education



Note: Numbers of elementary, junior high and high schools responded were 980, 1,028 and 1,082 respectively.

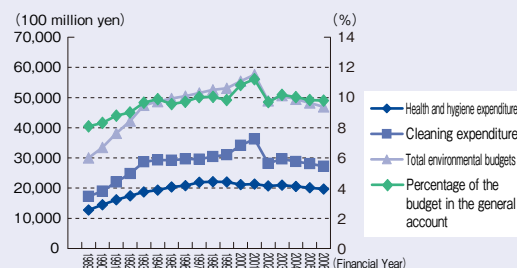
Source: Research by the Ministry of the Environment and the Ministry of Education, Culture, Sports, Science and Technology (FY2008)

(4) Environmental approaches of companies, NPOs and NGOs

According to the survey by the Ministry of the Environment, the number of companies that implemented environmental information disclosure was 1,631 in FY2007, and majority of them disclosed the information by posting it on their websites or by issuing printed paper environmental reports (Figure2-3-8). Although 761 companies have already introduced environmental accounting, many companies have not considered introducing the system yet (Figure2-3-9). Beside these actions, companies efforts toward environmental conservation including the promotion of green purchasing are expanding.

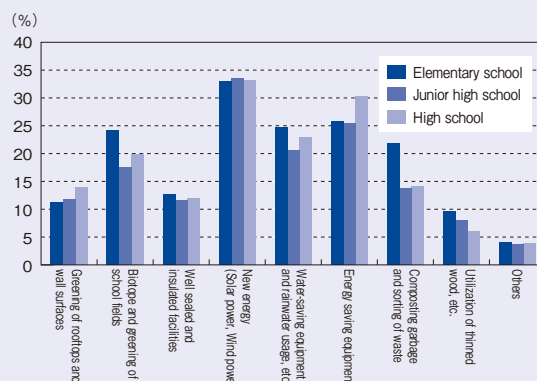
Regarding the approaches to environmental conservation, non-profit organizations such as NGOs

Figure2-3-4 Changes in Municipal Environmental Budgets



Source: Compiled by the Ministry of the Environment from the Local Administration Bureau, Ministry of Internal Affairs and Communications' "Annual Report of Local Finances."

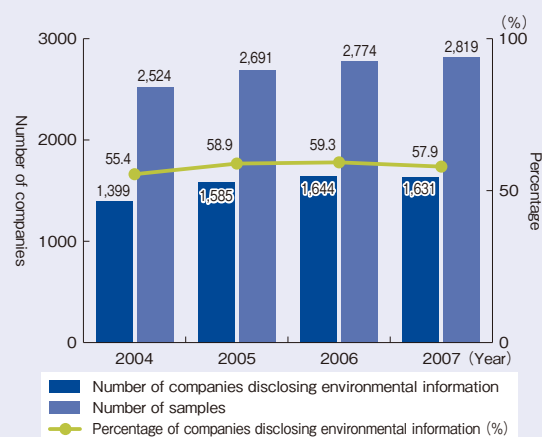
Figure2-3-6 Facilities Planned for Future to Conduct Environmental Conservation Activities and Environmental Education



Note: Numbers of elementary, junior high and high schools responded were 980, 1,028 and 1,082 respectively.

Source: Research by the Ministry of the Environment and the Ministry of Education, Culture, Sports, Science and Technology (FY2008)

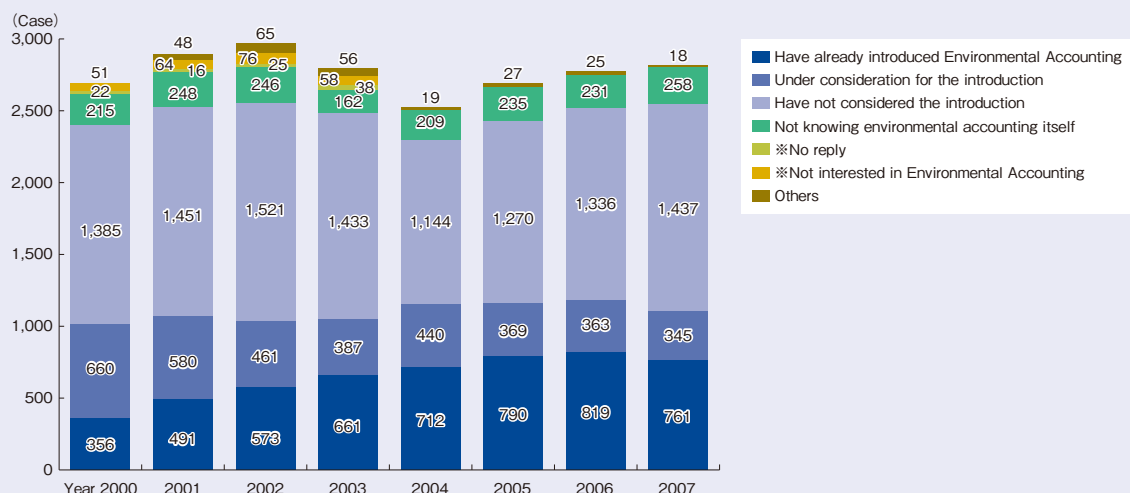
Figure2-3-8 Number of Companies Implementing Environmental Information Disclosure



Note: Including listed and unlisted companies
Source: Compiled from the Ministry of the Environment's "Survey on Corporate Activities Amiable to the Environment"

and NPOs play an important role, and the number of environmental NGOs was 4,532 in FY2007. Looking at activities by field (multiple answers), fields where more than 500 organizations are carrying out activities were such as environmental education, nature protection, community planning, forest conservation and afforestation, beautification and cleanup, water and soil conservation, recycling and clearing waste and prevention of global warming (Figure2-3-11).

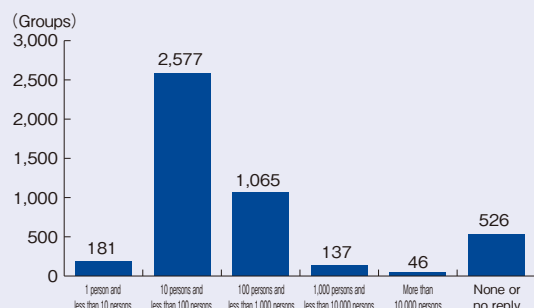
Figure2-3-9 Status of Introduction of Environmental Accounting



Note: The question form has been changed since the survey of FY2004 and the selections marked as * have been deleted.

Source: Compiled by the Ministry of the Environment from Environment and Economy Division, Environmental Policy Bureau, Ministry of the Environment, "Survey on Corporate Activities Amiable to the Environment."

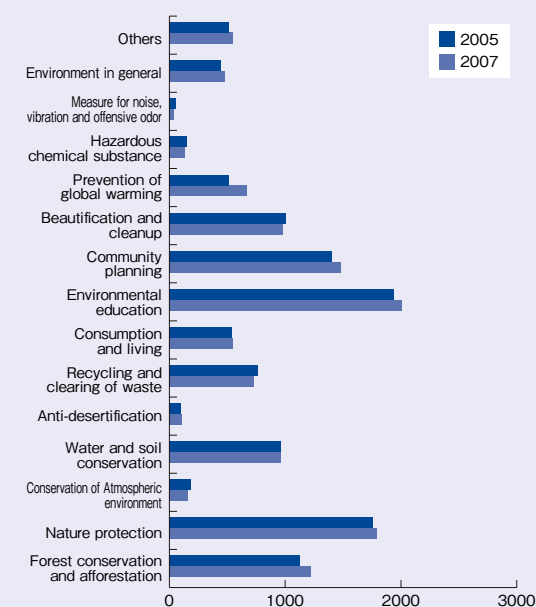
Figure2-3-10 Number of Individual Members of Environmental NGO



Note: The questionnaire survey was held among 16,137 groups in December 2007, and the data contains 4,532 groups that provided valid responses.

Source: Environmental Restoration and Conservation Agency of Japan "Environmental NGOs Compendium (2008 edition)"

Figure2-3-11 Activity Fields of Environmental NGOs (Multiple Answers)



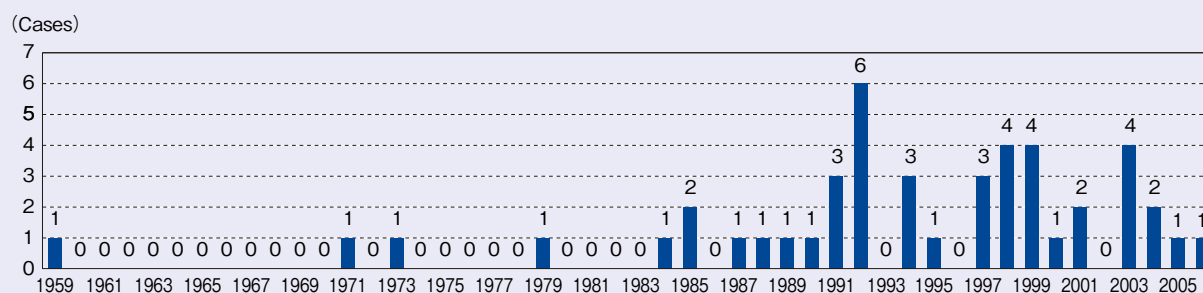
Note: For 2007, the questionnaire survey was held among 16,137 groups in December 2007, and the data contains 4,532 groups that provided valid responses. For 2005, the questionnaire survey was held among 14,935 groups in November 2005, and the data contains 4,463 groups that provided valid responses.

Source: Environmental Restoration and Conservation Agency of Japan "Environmental NGOs Compendium (2008 and 2006 edition)"

(5) Environmental approaches of the global society

In the midst of transnational environmental problems, which are becoming a more of an issue, global society is also leading approaches to problems, related to the global environment. The number of treaties, related to the global environment that has entered into force has increased in recent years, and their fields are becoming diversified (Figure2-3-12).

Figure2-3-12 Changes in Number of Adoption of Global Environmental Treaties



Source: Ministry of Foreign Affairs, "List of Global Environmental Treaties and International Organizations" and the United Nation's United Nations "Multilateral Treaties"

4 Forming New Values for the Sustainable Development of the Environment and Economy

The leaders of the group of eight (G8) nations issued their declaration at the Hokkaido Toyako Summit held in July 2008, that all Parties to the United Nations Framework Convention on Climate Change to seek to share and adopt a declaration with respect to the long-term goal of achieving at least 50% reduction of global CO₂ emissions by 2050. The Former Kenyan Deputy Environment Minister and Nobel Peace Prize laureate, Wangari Maathai, propounded “MOTTAINAI” around the world as a slogan, and global activities aiming to build a sustainable sound material-cycle society are developing through campaigns. The 10th meeting of the Conference of the Parties to the Convention on Biological Diversity (COP10) is scheduled to be held in the city of Nagoya, Aichi prefecture in 2010. Japan will propose a model where the conservation of biodiversity and the

sustainable use of natural resources can coexist, under the name of Japan’s Satoyama as the “SATOYAMA Initiative,” to the world. Meanwhile, Japan needs to take steps based on a precautionary approach depending on the situation, regarding issues such as global warming that could cause irreparable damages for the future generations once they occur.

Thus, in order to lead a healthy and affluent life while developing a good balance between the conservation of the environment and the economy, sharing common goals including the prevention of global warming, the creation of a sound material-cycle society and coexistence with nature are essential. These essential common goals have now raised the awareness of the individual as well as a global movement.

Column

The Japanese Crested Ibis (Toki) Returning to the Wild

Ten Japanese Crested Ibises were released into the wild on Sado Island, Niigata prefecture in September 25, 2008. This was the first time in 27 years for them to fly in the Japanese sky since the last surviving wild ibises were captured in 1981.

Although the Japanese Crested Ibis was very common nationwide in the Edo period (1603-1867), its numbers decreased sharply due to hunting and other factors. In 1981, the last five Ibises were captured and the Sado Japanese Crested Ibis Conservation Center has attempted to artificially breed them. In 1999, the Center has succeeded in artificially breeding the Ibises for the first time with Ibises donated by China, and now its numbers have increased to over 100.

On Sado Island, Niigata prefecture, administrative bodies, farmers, universities and

NGOs have been building Environmentally-Friendly Farming and feeding grounds through their collaboration and cooperation while making efforts towards consensus-building, in order to create an environment where the Ibises can safely inhabit, aiming to settle 60 Ibises or so, by around 2015. Some of the released birds have flown to Honshu—the main island of Japan, traveling widely and some others have returned to Sado Island after flying to Honshu. While watching over these movements of the Ibises, the Ministry of the Environment is gathering information on their ecological features through monitoring. The Reintroduction Center is also carrying on re-introduction training so that the Japanese Crested Ibises in captivity can independently coexist in the nature.



Their Imperial Highness Prince and Princess Akishino releasing the Japanese Crested Ibis



Japanese Crested Ibis pecking food in a rice field