Japan's Sixth National Communication

Under the United Nations Framework Convention on Climate Change

The Government of Japan

Dec. 2013

Chapter 1

National Circumstances Relevant to Greenhouse Gas Emissions and Removals

1.1 National Land Use

Japan, located on the east side of Eurasia, is a long, thin archipelago that lies approximately between latitudes 24 and 46 north, and consists of four major islands—(from north to south) Hokkaido, Honshu, Shikoku, and Kyushu—as well as more than 6,800 other islands.

As of FY2010 Japan's land area equaled 37.79 million hectares, or 0.3% of the total global land area, of which nearly 80% is accounted for by 24.97 million hectares (66.1%) of forests and 3.94 million hectares (10.4%) of agricultural land. Current land use statistics indicate that forests, agricultural land, and marshes are declining, while grasslands and developing areas are increasing.

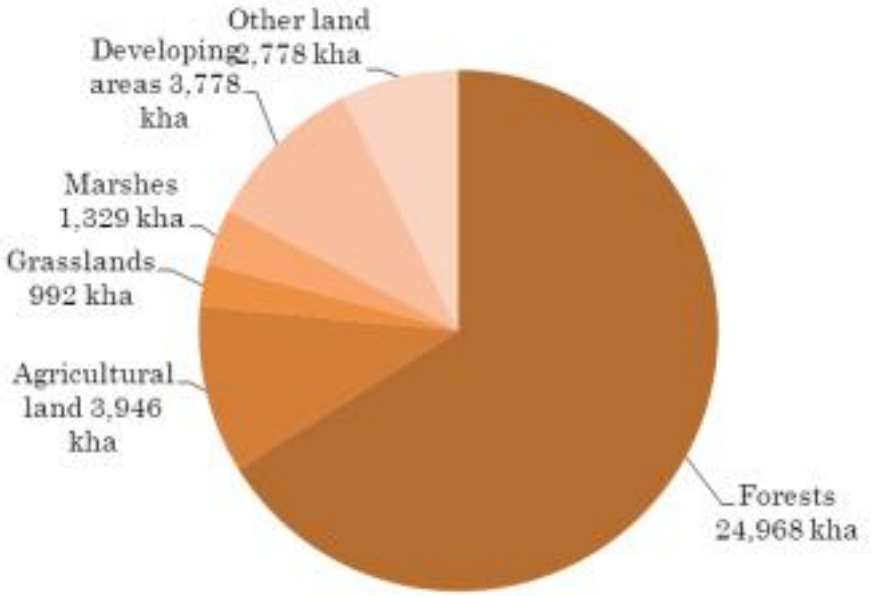


Figure 1.1 Current Land Use in Japan[1]

Source: National Greenhouse Gas Inventory Report of Japan (NIR) (April 2013)

[1] "Developing areas" are urban regions that do not correspond to forests, agricultural land, grasslands, or marshes. Figures are from the National Institute for Environmental Studies and consist of those directly assessed using existing statistics and those estimated for a portion of lands that could not be directly assessed.

1.2 Climate

Japan stretches over a great distance from north to south, with subtropical zones in the south and subarctic zones in north. In addition, Japan has rich seasonal changes. Topographically, mountain ranges stretching from south to north also serve to produce significant climatic diversity between different regions of Japan. In winter, seasonal cold winds from Siberia bring a large amount of snowfall to the coastal areas facing the Japan Sea, while seasonal warm winds from the south make summer hot and humid.

With such a varied natural environment, Japan is home to a wide variety of species. With regard to fauna, about 4,800 vertebrates and about 55,500 invertebrates have been identified, while amongst the flora, some 8,800 vascular plants and approximately 25,400 other plants have been found.

The major climate statistics averages (30-year averages for the period 1981–2010)[2] are shown in Table 1.1 for several meteorological stations which are considered to have been only slightly affected by urbanization.

Table 1.1 Major Climate Components of Japan

		Latitude	Longitude	Elevation (m)	Annual Mean Temperature (°C)	Annual Mean of Daily Maximum Temperature (°C)	Annual Mean of Daily Minimum Temperature (°C)	Annual Precipitation (mm)
Northern Japan	Abashiri	44 ° 01.0'	144 ° 16.7'	37.6	6.5	10.4	2.9	787.6
	Nemuro	43 ° 19.8'	145 ° 35.1'	25.2	6.3	9.5	3.3	1,020.8
	Yamagata	38 ° 15.3'	140 ° 20.7'	152.5	11.7	16.7	7.5	1,163.0
	Ishinomaki	38 ° 25.6'	141 ° 17.9'	42.5	11.6	15.5	8.1	1,066.9
Eastern Japan	Fushiki	36 ° 47.5'	137 ° 03.3'	11.6	13.9	18.0	10.5	2,226.0
	Mito	36 ° 22.8'	140 ° 28.0'	29.0	13.6	18.7	9.2	1,353.8
	Choshi	35 ° 44.3'	140 ° 51.4'	20.1	15.4	18.4	12.5	1,659.8
	Iida	35 ° 31.4'	137 ° 49.3'	516.4	12.8	18.6	8.0	1,611.5
Western Japan	Sakai	35 ° 32.6'	133 ° 14.1'	2.0	15.1	19.3	11.4	1,895.7
	Hamada	34 ° 53.8'	132 ° 04.2'	19.0	15.5	19.4	11.8	1,663.8
	Hikone	35 ° 16.5'	136 ° 14.6'	87.3	14.7	18.8	11.1	1,570.9
	Miyazaki	31 ° 56.3'	131 ° 24.8'	9.2	17.4	22.0	13.2	2,508.5
	Tadotsu	34 ° 16.5'	133 ° 45.1'	3.7	16.2	20.3	12.5	1,068.4
Nansei Islands	Naze	28 ° 22.7'	129 ° 29.7'	2.8	21.6	24.8	18.8	2,837.7
	Ishigakijima	24 ° 20.2'	124 ° 09.8'	5.7	24.3	26.9	22.2	2,106.8

Source: Japan Meteorological Agency
http://www.data.jma.go.jp/obd/stats/etrn/index.php

In order to examine the long-term changes in temperature and precipitation in Japan, the average of anomalies from the normal for annual mean surface temperatures and annual precipitation ratios to the normal at observation stations of the Japan Meteorological Agency in the period 1898–2012 were taken, and the results[3] of the analysis of the data are presented here.

[2] Average mean temperatures, annual means of daily maximum, and minimum temperatures are obtained by calculating monthly mean normals over a 30-year period and then calculating a 12-month average from that figure.

[3] For the analysis of surface temperature, we used 17 stations for which the observed data maintained homogeneity over the long term and for which changes in the environment due to urbanization, etc., were relatively minor. For the calculation of precipitation, we used 51 stations for which the observed data maintained homogeneity over the long term. It should be noted that, in the calculation of surface temperature, although 17 stations that are only impacted to

The annual mean surface temperature in Japan has repeatedly fluctuated, but over the long term it is on a rising trend, and is currently increasing at a rate of about 1.15ºC per century (Figure 1.2). In particular, markedly high temperatures have been frequently recorded since the 1990s. The temperature anomaly in Japan for 2012 was +0.06°C, which was the twentieth-highest figure since statistics began in 1898. The cause of recent frequent high temperature years in Japan, and the rest of the world, is considered to be the coinciding of the impact of global warming, which accompanies increases in greenhouse gasses (such as CO_2), with cycles in nature that repeat every decade or so. Japan had a hot summer in 2013 across the country. In particular, the average summer temperature anomaly in western Japan increased 1.2°C, which was the highest since statistics began in 1946. The Pacific high pressure (low-level high pressure) and Tibetan high pressure (upper-level high pressure) that influence Japanese summers were higher than the normal-year values in both July and August. Particularly the Pacific high pressure was very strong in Okinawa, Amami, and western Japan as the strong pressure continued to project westward. Due to these intensified high pressures, Japan had high temperatures throughout the country, and especially in western Japan. Sea temperatures of Japanese coastal waters went far higher than a normal year because of factors including the increased intensity of solar radiation.

a minor degree by urbanization were selected for this analysis, the impact of urbanization has not been completely eliminated from the analysis.

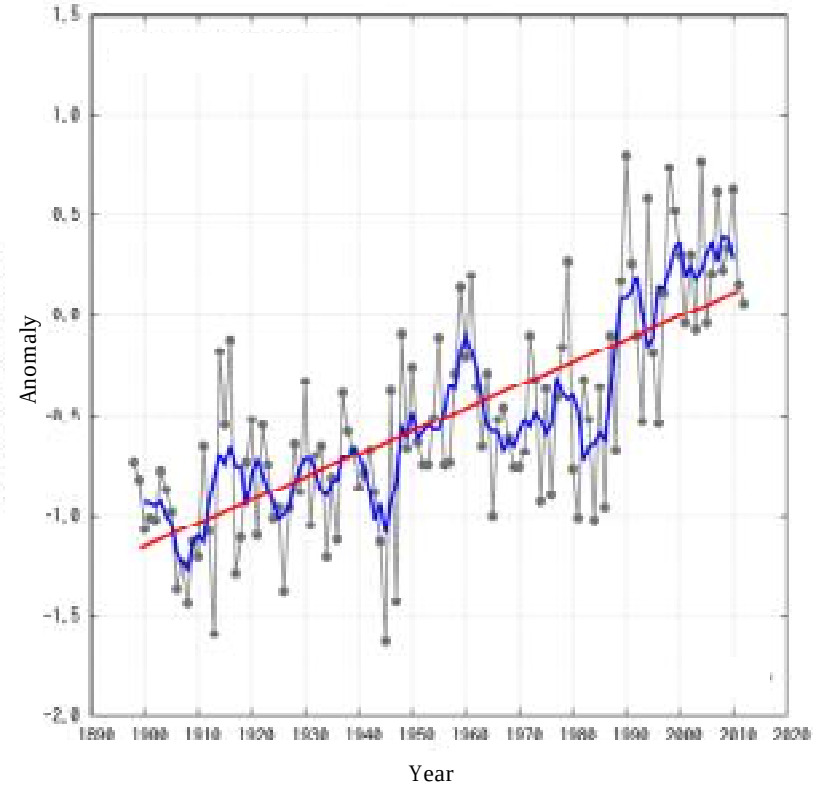


Figure 1.2 Variations in Annual Mean Surface Temperature in Japan (1898–2012)

The bar graph shows anomalies from the normal; the thick line (blue) indicates the five-year running mean, and the straight line (red) represents the long-term trend. The normal is derived from the average of the 30 years between 1981 and 2010.

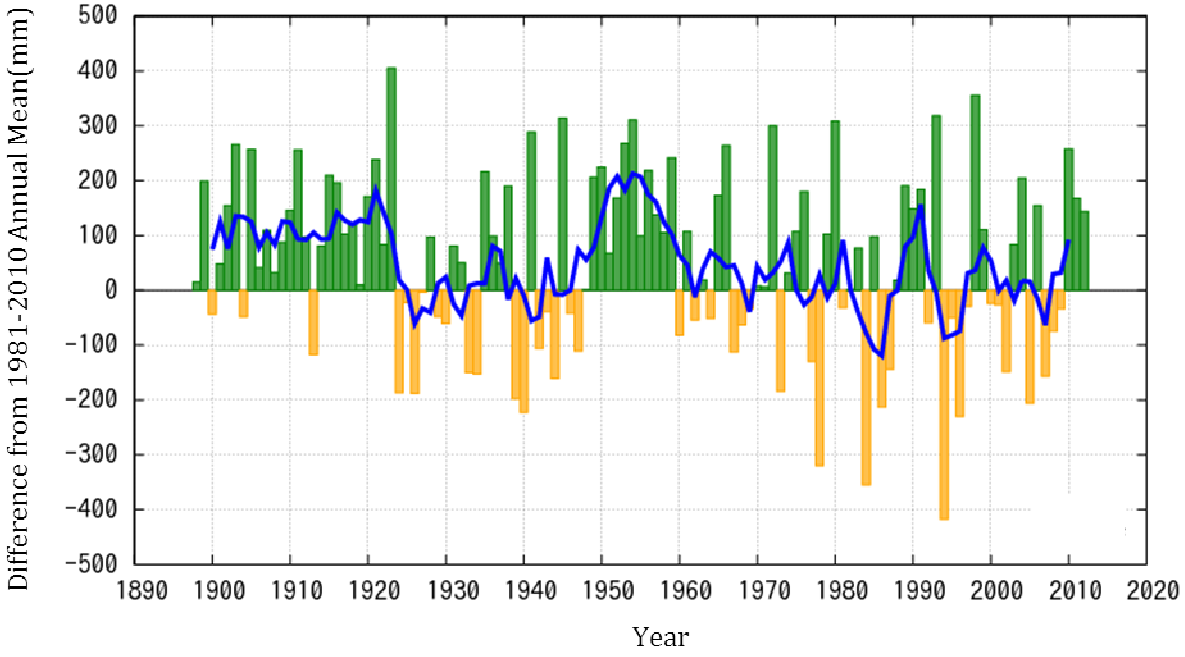


Figure 1.3 Variations of Annual Precipitation Ratios in Japan from 1898–2012

The bar graph shows averages of annual precipitation ratios to normal for 51 stations in Japan (expressed in percentages compared to annual means); the thick line (green) represents the five-year running mean. The normal is derived from the average of the 30 years between 1981 and 2010.
Source: Japan Meteorological Agency

The annual precipitation of Japan (Figure 1.3) does not provide any clear long-term trend. On the other hand, the variations between years have widened since records began in 1898. It is noticeable that there are both more years with a lot of rain as well as years with little rain.

1.3 Population and Households

According to the Population Census, as of October 1, 2012, Japan's population was 128,057,352, representing a 0.2% increase over the October 2005 Population Census. The population density was 343 inhabitants per square kilometer. In line with the falling birthrate and increased average longevity, the proportion of the elderly amongst the population is rapidly increasing at a higher rate than ever, and the population segment aged 65 or older as of 2010 reached 23%. This rate is the highest level in the world.

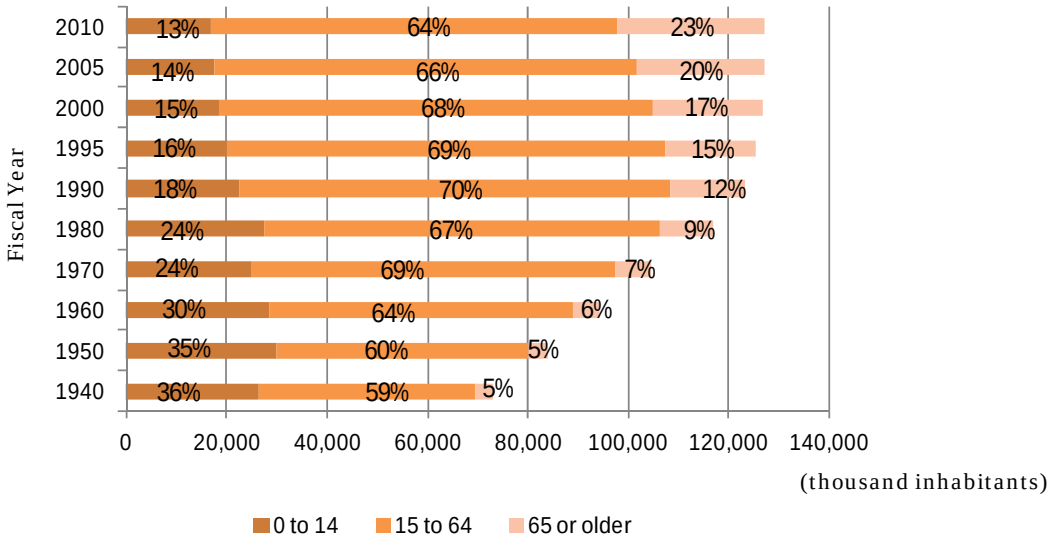


Figure 1.4 Population for Three Age Segments

Source: Ministry of Internal Affairs and Communications, "Population Census"
* (Note) Figures in 1940: Total population excluded foreigners (39,237) except the people in former Japanese territories as Korea, Taiwan, Karafuto and Kanyo-gunto.

One of the major factors behind the aging of the population is the decline in the number of births. The number of births generally increased during the 1960s but peaked in 1973, and has continued to gradually decline ever since. In 2005, the number of births reached the lowest-ever level, and the number of deaths exceeded the number of births, creating a natural decline of 21,266 people. Although 2006 showed a positive figure, natural decline has continued since 2007, resulting in a

record-low natural decline of 125,708 people in 2010. Japan is facing an era of a declining population.

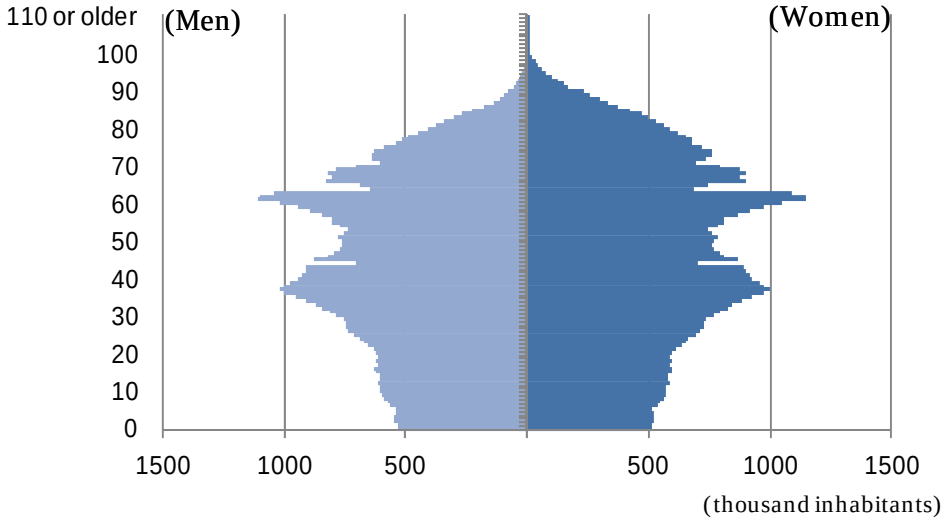


Figure 1.5 Population Pyramid for Japan in 2010

Source: Ministry of Internal Affairs and Communications, "Population Census"

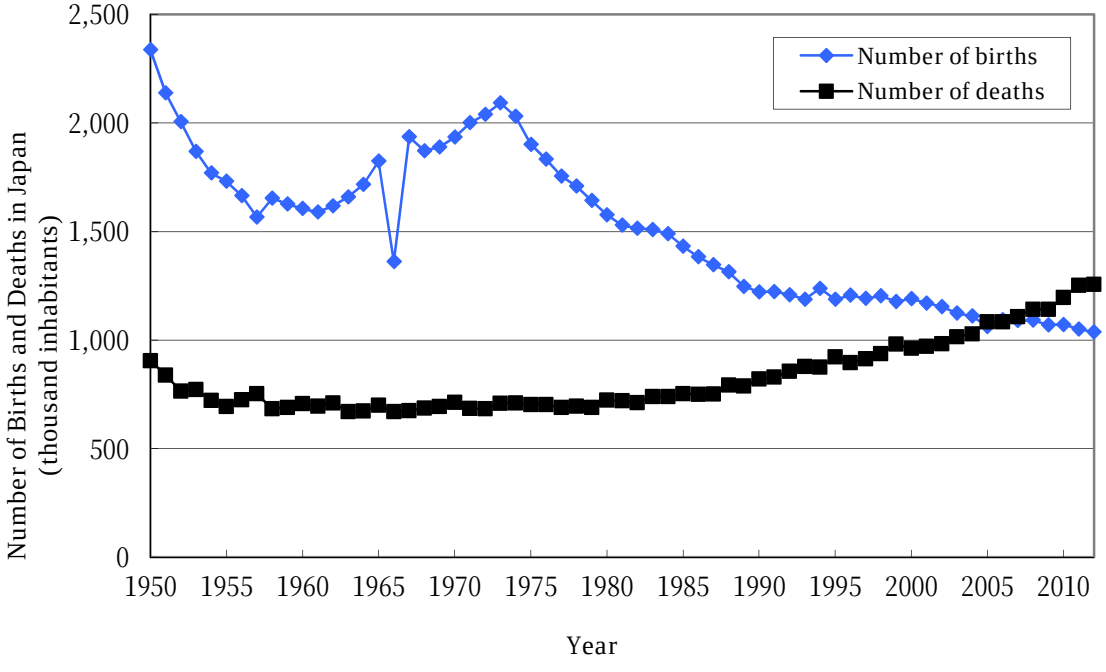


Figure 1.6 Changes in the Number of Births and Deaths in Japan

Source: Ministry of Health, Labour and Welfare, "The Vital Statistics 2012"

During the 1960s, when the economy grew very rapidly, the number of people migrating into Japan's three metropolitan areas substantially exceeded the number leaving, with a net excess immigration into such areas of approximately 500,000 people per year. Further excess immigration has been seen

again since 1996, and since 2004 this excess has been markedly increasing. In addition to the three metropolitan areas, as of October 2010 67.3% of Japan's total population was concentrated in densely inhabited districts,[4] indicating that the concentration of Japan's population in urban regions is advancing.

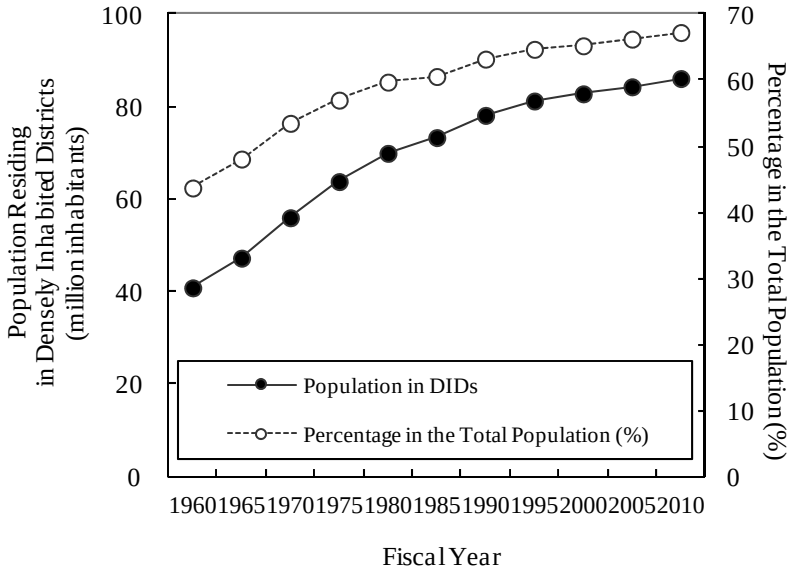


Figure 1.7 Population Residing in Densely Inhabited Districts

Source: Ministry of Internal Affairs and Communications, "Population Census"

In 2010, there were 51.84 million households in Japan, which was the highest level since records began, and 5.7% more than that recorded in the 2005 Population Census. In 2010, the average number of people per household was 2.42 persons. Since 1970, the number of households has continued to increase and the average number of people per household has continued to decline, reflecting changes in household formation patterns, such as a shift from extended families to nuclear families, an increasing number of single-person households, and a reduction in the number of children as a result of the falling birthrate.

[4] Regions within a city, town, or village and adjacent to basic unit districts with a high population density (a population density of at least 4,000 people per square kilometer in principle), and with a population of at least 5,000 people.

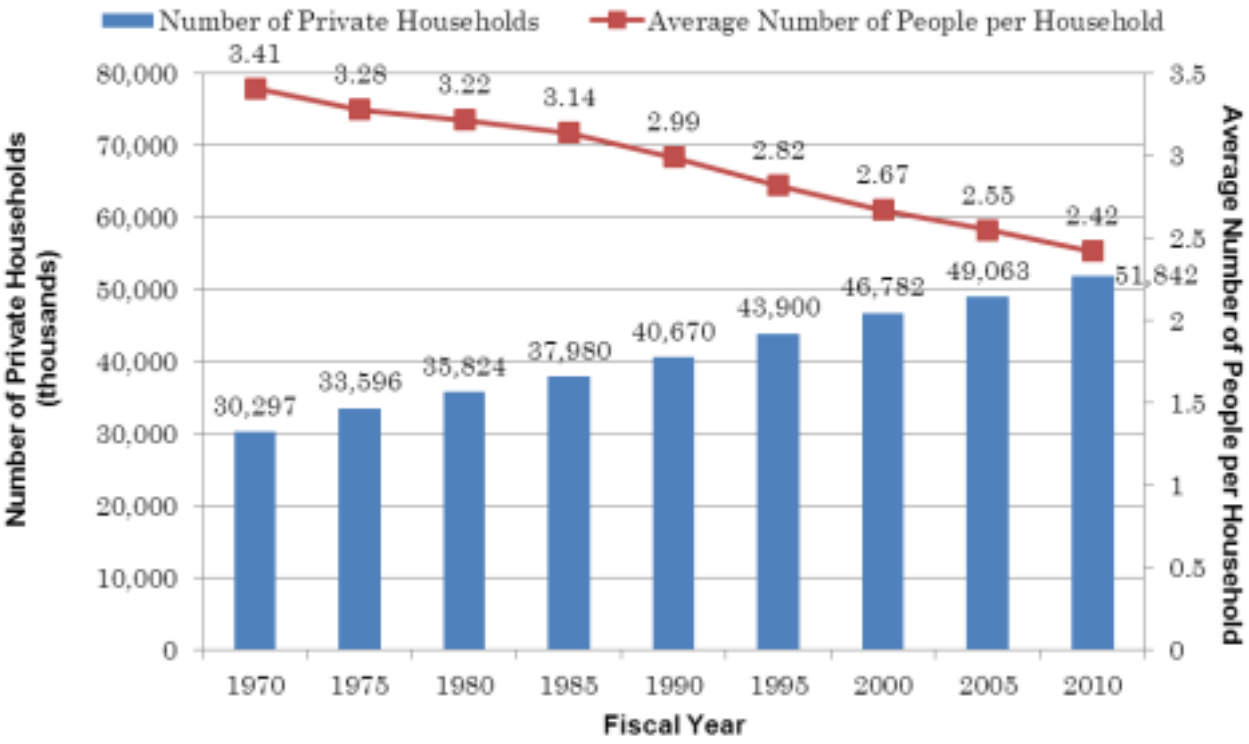


Figure 1.8 Number of Private Households and Average Number of People per Household
Source: Ministry of Internal Affairs and Communications, "Population Census"

1.4 Houses and Commercial Facilities

According to the "2008 Housing and Land Survey of Japan," the total number of houses has reached 57.59 million for a total of 49.97 million households. As a result, the number of houses per household has reached 1.15, representing a continuing improvement.

Meanwhile, in terms of the quality of such accommodations, the average area of floor space per home has risen to 94.13 square meters, demonstrating a steady improvement overall; but when the details are analyzed, a stark contrast can be seen between owned houses (122.63 square meters) and rented houses (45.49 square meters), illustrating the prominence of small rented houses.

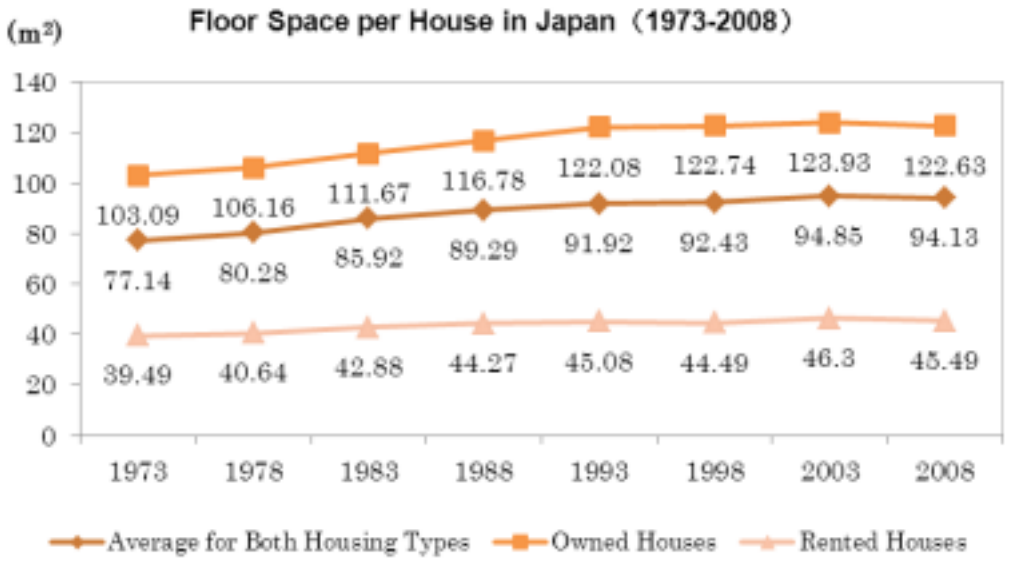


Figure 1.9 Floor Space Area per House in Japan
Source: Ministry of Internal Affairs and Communications, “2008 Housing and Land Survey of Japan”

Since the period of rapid economic growth, the ratio of tertiary industries in Japan has increased in terms of the industrial structure and particularly with regard to employment. The importance of “soft” work, including technology, information, planning, and design, has also increased in each industry, and the weight of indirect sectors has increased. In line with this shift towards service and other tertiary industries, the amount of floor space devoted to the commercial sector has steadily increased. Since 1965, it has increased at an average of 4.1% annually. However, between 2000 and 2011 the annual rate of increase has been in decline, with an annual average of 1.0%.

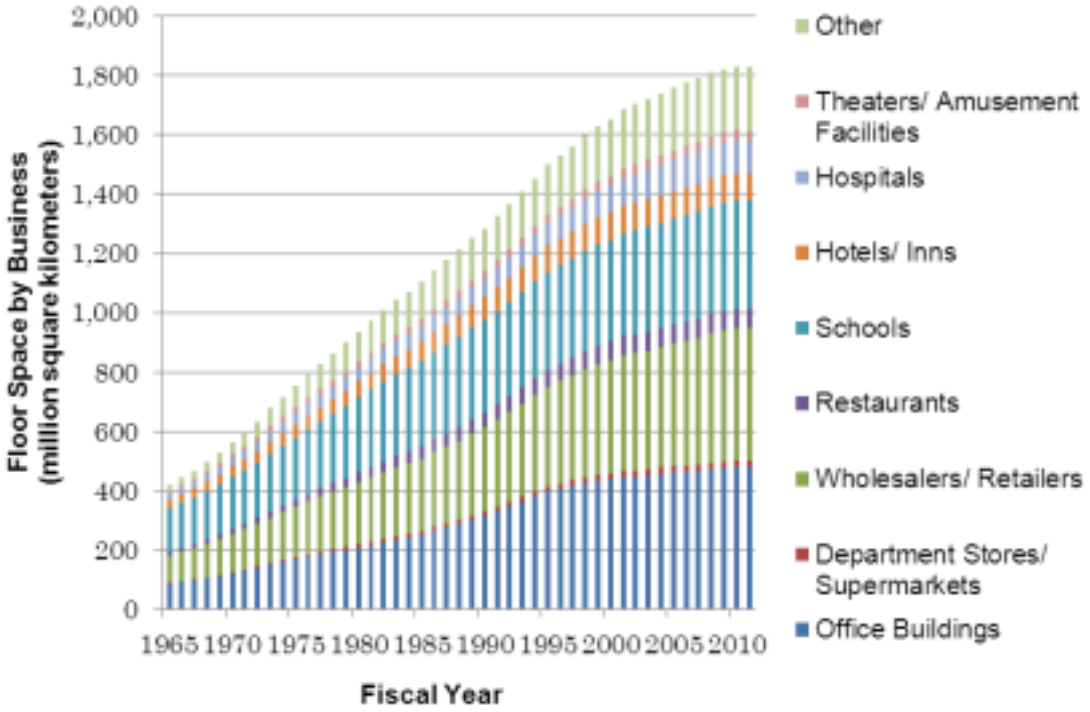


Figure 1.10 Change in the Amount of Floor Space in the Commercial Sector by Business Type

Source: The Institute of Energy Economics, Japan, "Handbook of Energy & Economic Statistics in Japan"

1.5 Japan's Industry and Economy

Japan's real gross domestic product (GDP)[5] became 520 trillion yen in 2012, and per capita real GDP was 4.02 million yen. The process of the growth of the Japanese economy up until the present day is explained below.

Japan's economy grew extremely rapidly in the 1960s, resulting in the significant development of heavy industry, producing such essentials as steel and petrochemical materials. As a result, the Japanese economy increased its consumption of resources and energy. During the same period, the workforce shifted from primary to secondary and tertiary industries. Agricultural production increased despite a reduction in the number of agricultural laborers. Nevertheless, because of the growing income gap compared with other industries, along with depopulation and other factors, the number of younger laborers working in agriculture decreased while the average age of the nation's farmers increased. Japanese forestry was primarily practiced by dispersed, extremely small businesses operating in steep mountainous areas. It was therefore difficult to improve labor productivity, so forestry faced various problems including a price differential versus imported lumber and income disparity with other domestic industries. As a result, depopulation of mountain villages continued, the average age of forestry workers increased, and production stagnated.

[5] Real GDP according to the fixed base year method (base calendar year 2005).

In the 1970s, following the first oil shock (1973), in 1974 Japan's real economic growth rate recorded its first contraction since the Second World War. Economic growth remained sluggish for some time thereafter. At the same time, the impact of the oil shock caused energy-intensive basic industries, such as the steel and petrochemical industries, to lose speed, while high value-added processing and assembly industries, such as electrical appliances and machinery, developed further. As income levels rose, the economy's services and software components expanded. Tertiary industry came to account for over 50% of gross domestic product and total employment. In agriculture, the ratio of vegetables and dairy products increased as Japanese dietary habits changed, and the nation ended up with a surplus of rice.

Following the Plaza Accord of 1985, the yen began to grow ever stronger, severely impacting Japanese export industries in particular. The subsequent structural adjustment of the Japanese economy, however, expanded domestic demand, which in turn enlarged the economy, increased the sector shares of the financial, wholesale and retail industries, and made the prices of land, securities and other assets skyrocket.

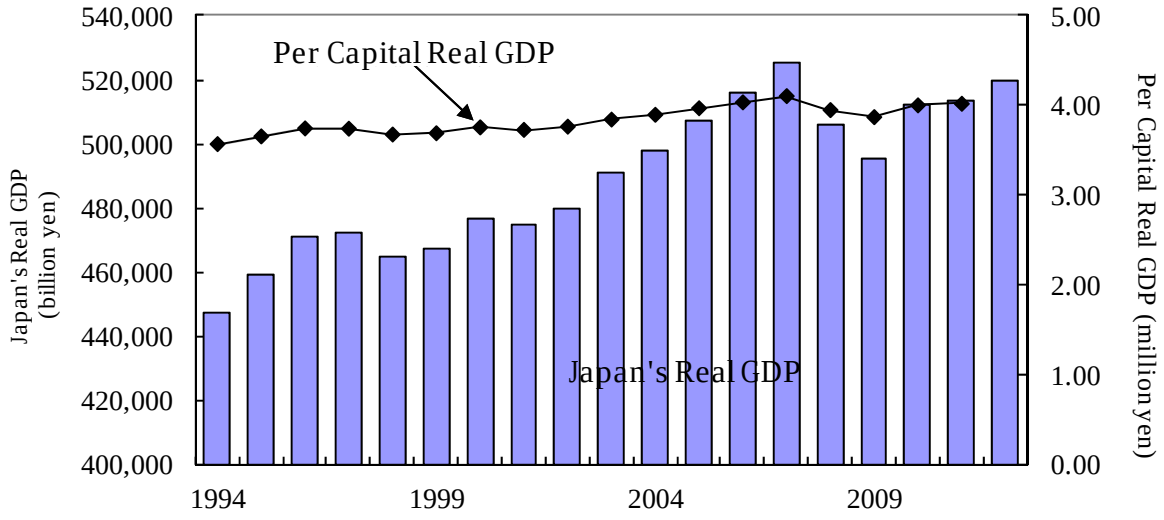


Figure 1.11 Change in Real Gross Domestic Product
(Fixed Base Year Method, Base Calendar Year 2005)

Source: Economic and Social Research Institute, Cabinet Office, Government of Japan, "Annual Report on National Accounts of 2011"

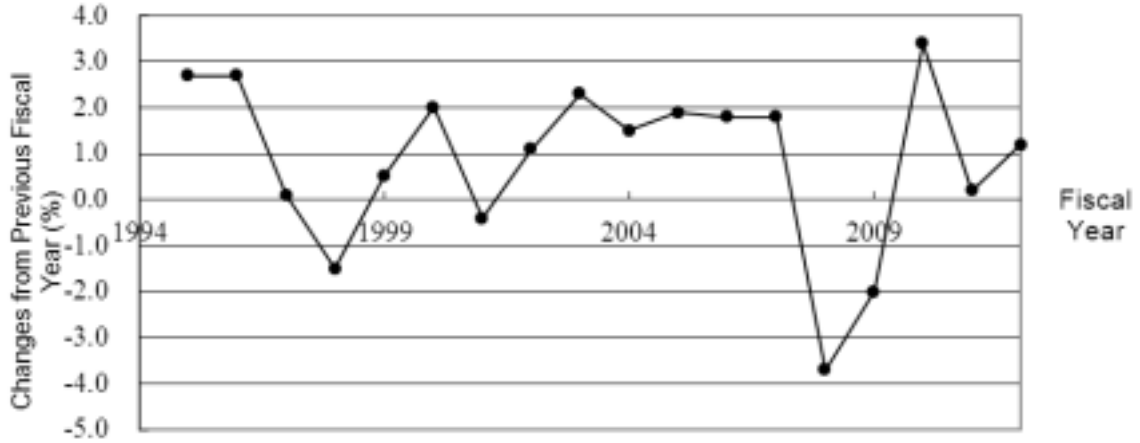


Figure 1.12 Change in Year-on-Year Real Gross Domestic Product Growth Rate (Fixed Base Year Method, Base Calendar Year 2005)

Source: Economic and Social Research Institute, Cabinet Office, Government of Japan, "Annual Report on National Accounts of 2011"

Then, in the early 1990s, the prices of land, securities, and other assets collapsed due to monetary tightening, among other factors. The collapse in asset prices led to a reduction in expenditures on consumables as well as to adjustments in consumer durables and capital stock. These in turn led to the stagnation of economic activities and to irrecoverable debts among the nation's financial institutions. The Asian economic and currency crises also had an impact, and the economy continued to be marked by low growth. For example, in 1998, Japan recorded negative growth. This difficult period for the economy lasted approximately ten years. However, the three excesses – excessive employment, excessive capital stock, and excessive debt – were largely eliminated, and as the financial position of companies strengthened, investment and consumption also began to rise. In addition, at the beginning of 2002, an increase in exports served to revive production, leading to the greatest period of economic recovery since the Second World War, which was longer than the expansion period of the "Izanagi boom" (57 months between October 1965 and July 1970). During this period, the annual mean real growth rate surpassed the 2% level. However, in 2007, during the sixth year of economic recovery, changes in the financial and capital markets originating from the United States subprime housing loan crisis, as well as skyrocketing crude oil and material prices, put pressure on corporate earnings and business confidence, thereby making corporate and household spending behavior more cautious. The direct impact of the economic downturn in the United States became real, and began to impact even exports from Japan. An anticipated wave of economic recovery being transmitted from corporations to households has not been realized, as the corporate sector has been losing its strength.

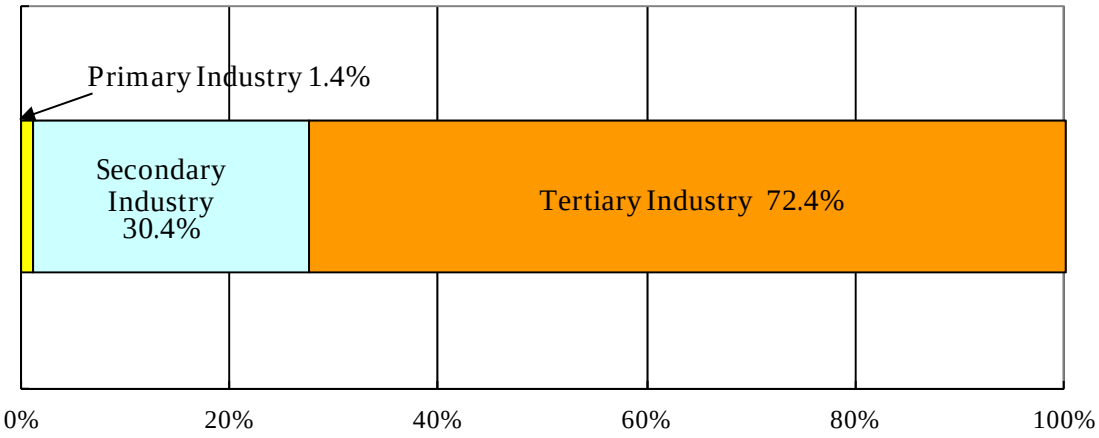


Figure 1.13 Gross Domestic Product by Economic Activity in 2011
(Real Base, Base Calendar Year 2005)

Source: Economic and Social Research Institute, Cabinet Office, Government of Japan, "Annual Report on National Accounts of 2011"

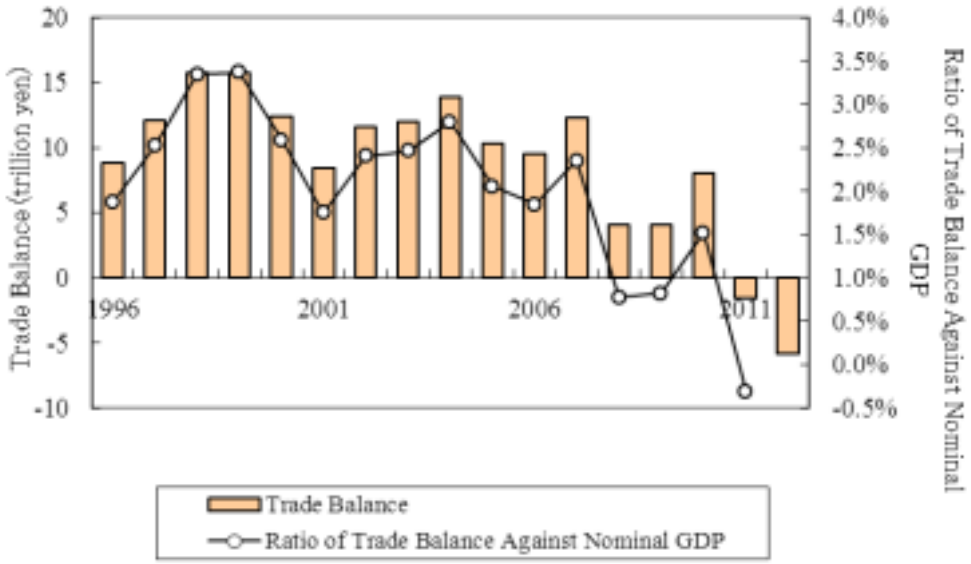


Figure 1.14 Changes in Trade Balance

Sources: Ministry of Finance, "Balance of Payments Monthly;" Economic and Social Research Institute, Cabinet Office, Government of Japan, "National Accounts of 2011"

In terms of the industrial sector, the yen continued to appreciate from the spring of 1990 through the spring of 1995, impacting the processing and assembly industries and spurring on a structural shift among Japanese firms towards greater overseas production. On the other hand, information, telecommunications, and other industries have been recording large growth. In agriculture, competition with foreign producers has intensified as the volume of imports has been increasing sharply. In response, Japanese farmers have been strengthening their operations by moving towards larger-scale production and pursuing other rationalization measures.

Looking at the trade balance, a surplus of between 10 and 15 trillion yen has been recorded each year since the 1980s but the ratio of the surplus to nominal GDP has been declining since its peak year of 1986.

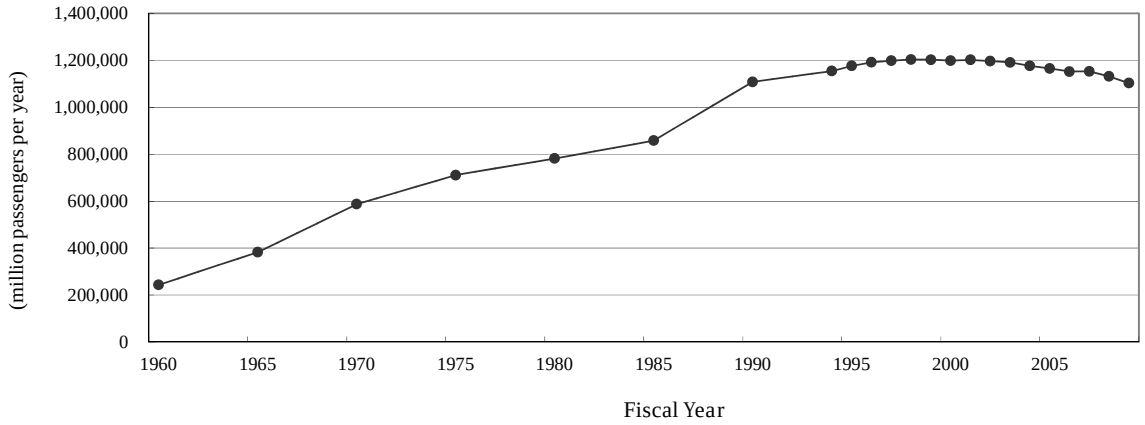
1.6 Transport

1.6.1 Passenger Transport

Domestic passenger traffic grew significantly throughout the period of rapid economic growth as a result of the popularization of automobiles, improvements to the transport system, and the reduction of travelling time accompanying network expansion. Private automobile ownership began to grow from around 1960 in line with the growth of income levels. As a result, rail traffic's share decreased significantly throughout the 1960s as road traffic's share increased significantly. Air traffic represented a small fraction of all traffic, but its transport volume grew significantly due to its timesaving features and the introduction of jet aircraft by domestic airlines, which resulted in an increase in the size and speed of air transport services.

Following the oil shock, the growth in domestic passenger traffic slowed as a whole, but the rise in the standard of living and the increase in leisure time pushed up passenger travel by automobile. The introduction of jumbo jet services, relatively low airfares, and a growing preference for faster modes of transportation caused an increase in the volume of air traffic and its share. On the other hand, the share of railways decreased, sinking to barely above 40% at the end of the 1970s, down from 75% in 1960.

The growth rate of passenger traffic during the early 1980s lowered, but suddenly increased in the latter 1980s along with the economic boom due to the bubble economy. From the 1990s, however, passenger traffic volume, along with the share of each transportation mode, has remained almost constant.



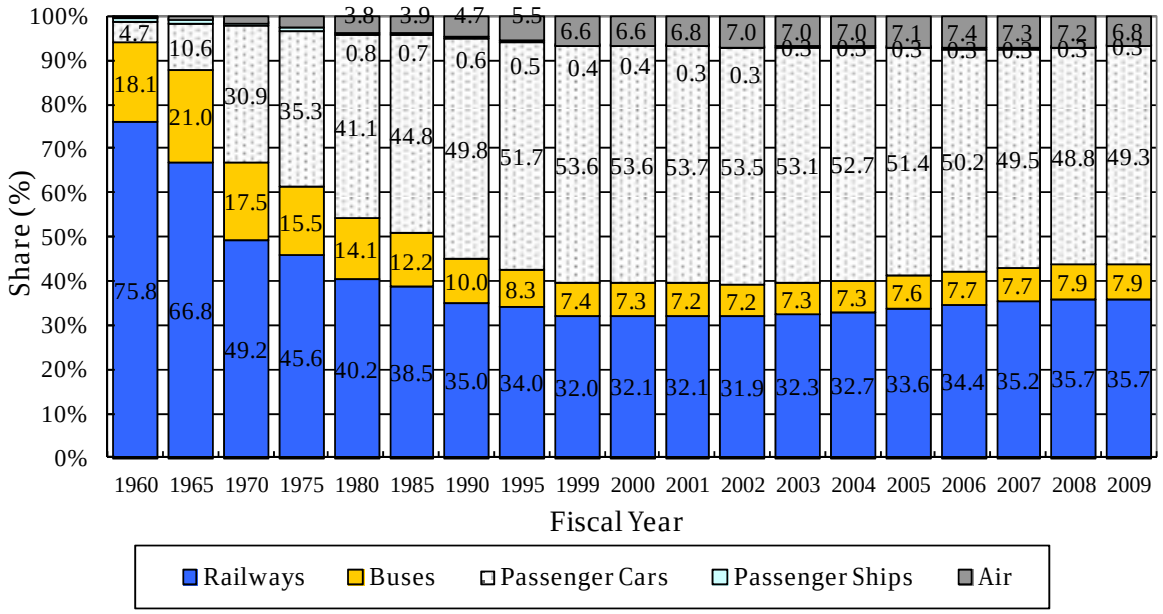


Figure 1.15 Volume of Domestic Passenger Traffic (above) and Modal Shares (below) in Passenger-Kilometers[6]

Source: Ministry of Land, Infrastructure and Transport, "Domestic Transportation Statistics Handbook"

1.6.2 Freight Transport

Domestic freight traffic followed the same upward path as the economy during the period of rapid economic growth. Freight road transport showed especially rapid growth, because of an increased demand for the transportation of relatively light processing components and shortened transport distances as industries moved their offices to coastal complexes near major cities. With the shift from coal to oil as an energy source and the development of heavy industry in coastal areas, domestic sea freight traffic grew, mainly carrying raw materials for the petrochemical, steel, cement, and other key heavy industries. In contrast, the growth of freight traffic by rail barely increased.

The first oil shock in 1973 sharply decreased domestic freight traffic in FY1974 and 1975. Freight traffic then gradually increased until FY1979 as the transport of civil engineering-related cargos grew due to robust public works expenditures resulting from policies to stimulate the economy. When the second oil shock struck in 1979, however, domestic demand and shipments of basic and material industries again stagnated and freight traffic shrank as oil consumption decreased with the conversion from oil to other forms of energy.

[6] Passenger cars do not include light motor vehicles or household freight vehicles. Numeric data on passenger cars for fiscal 1994 does not include figures for Hyogo prefecture between January and March 1995 due to the Great Hanshin-Awaji Earthquake.

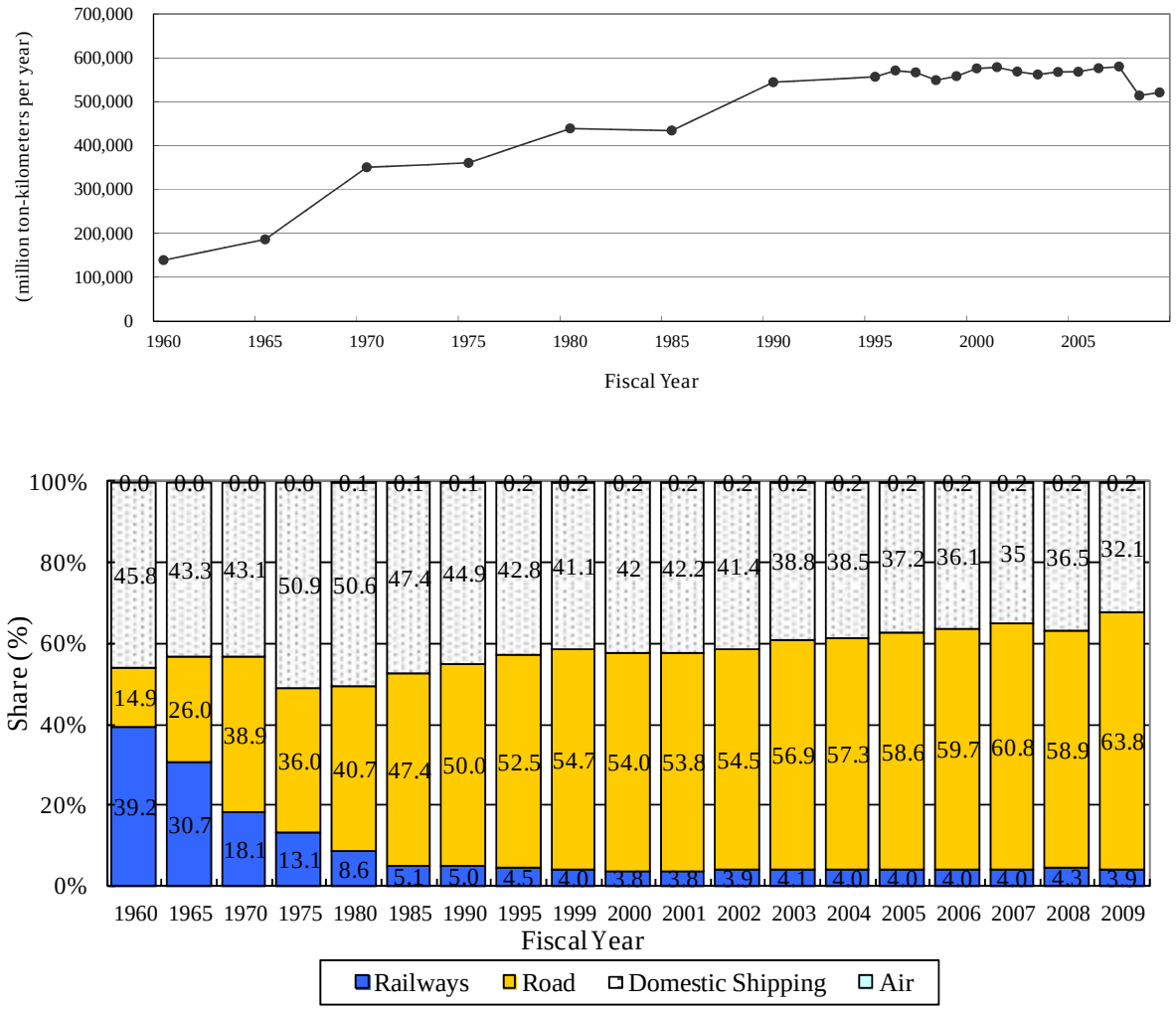


Figure 1.16 Domestic Freight Traffic (above) and Modal Shares (below) in Ton-Kilometers[7]

Source: Ministry of Land, Infrastructure and Transport, "Domestic Transportation Statistics Handbook"

From the 1980s, Japan experienced industrial restructuring, including a shift from basic materials to processing and assembly, the growth of knowledge-intensive industries, and the transformation of the industrial structure towards tertiary industries. Transport demand generated through industrial activities has been reduced in line with the shift to a service-oriented economy. As a result, freight traffic remained generally flat during this period, and decoupled from economic growth. In the latter half of the 1980s, freight traffic increased due to a major economic expansion led by domestic demand. The modal share of road freight traffic topped 50% in 1987, as the characteristics of truck transport met the need for high-frequency small-lot transportation brought on by the advance of the small-volume production of a wide variety of products, and as small packet delivery services were upgraded. As a result of the decline in the basic material industries, growth of domestic sea transportation remained rather slack overall, but it showed some growth with the economic expansion

[7] Passenger cars do not include light motor vehicles. Numeric data on passenger cars for fiscal 1994 does not include figures for Hyogo prefecture between January and March 1995 due to the Great Hanshin-Awaji Earthquake.

in the late 1980s. Domestic sea shipments exceeded their second oil shock freight traffic level in FY1990. Although the share of airfreight was small, it has been growing to meet the demand for shipping relatively small, light items including machine parts, fresh foods, and books. The share of rail freight transportation has steadily declined, but the advance of containerized transport in recent years has slowed this decline.

The total freight volume (ton-kilometers) has remained generally flat since FY1991 due to the impact of streamlined distribution and changes in the industrial sector following the collapse of the bubble economy at the beginning of the 1990s. However, on a ton basis, volumes have been slightly decreasing since their peak in FY1991.

1.6.3 Motor Vehicle Traffic

Road transport accounts for a large portion of both passenger traffic and freight traffic. In this section, trends in the number of motor vehicles owned and vehicle mileage are both explained. Changes in the number of motor vehicles owned show that total motor vehicle ownership has increased consistently since the 1960s, but has been flat in recent years.

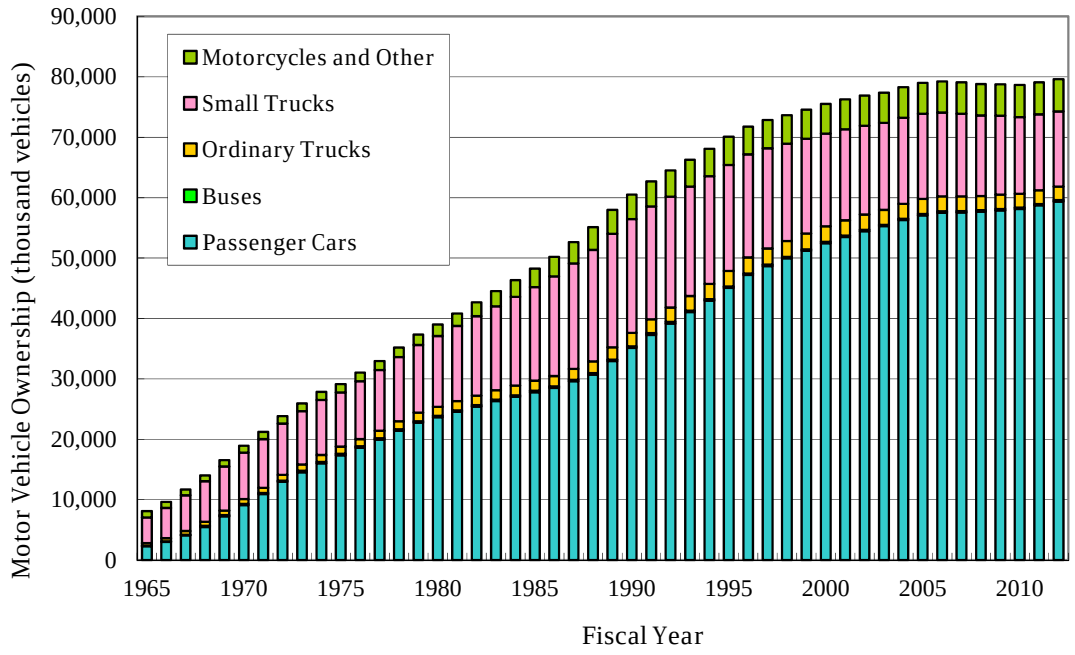


Figure 1.17 Motor Vehicle Ownership[8]

Source: Ministry of Land, Infrastructure and Transport, "Annual Statistical Report for Motor Vehicle Transport;" Automobile Inspection & Registration Information Association, "Statistical Data for Motor Vehicle Ownership"

Motor vehicle mileage was on an upward trend until 2003, and began to decline in 2004. This was due to a decrease in the number of freight vehicles and business-use passenger cars in addition to the

[8] "Passenger cars" includes lightweight cars. "Small trucks" includes lightweight trucks. Special categories of small-size vehicles, Type I motorcycles (up to 50 cc) and Type II motorcycles (up to 125 cc), are not included.

decline in the number of household-use passenger cars, which had been increasing until 2003. The decrease in mileage for household-use passenger cars can be attributed to a change in people's perception of cars, such as a decrease in the number of people who enjoy leisure-time driving.

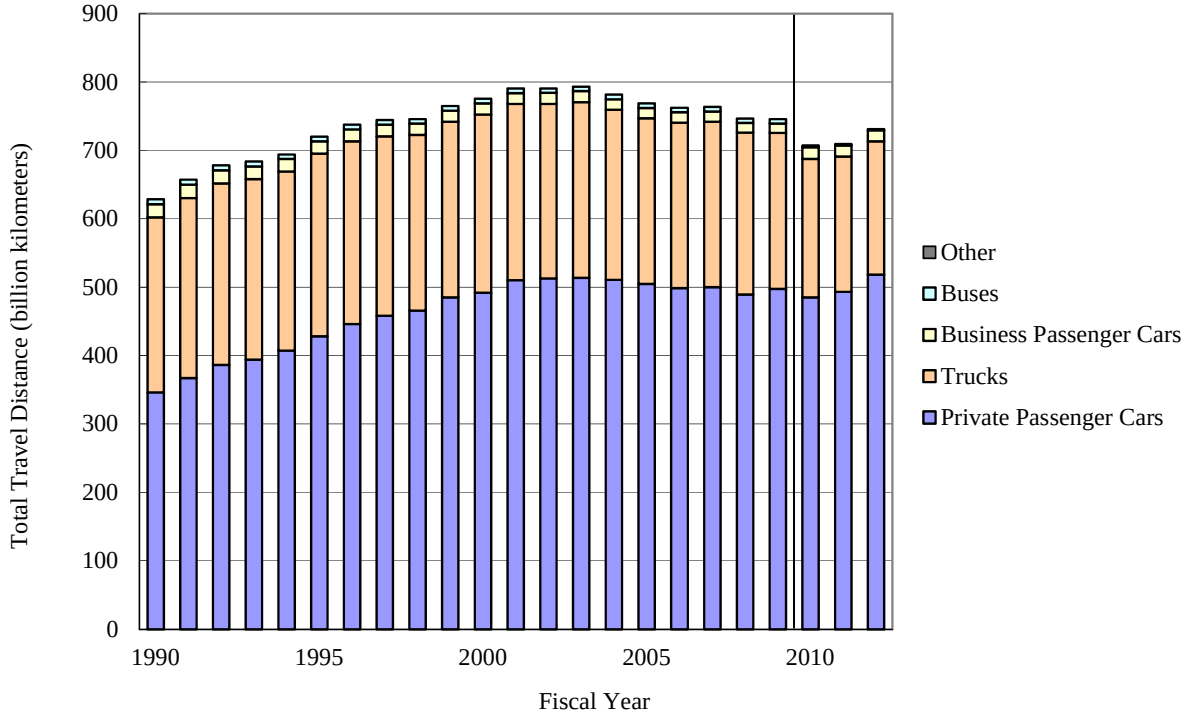


Figure 1.18 Change in Vehicle Total Travel Distance

Source: Ministry of Land, Infrastructure and Transportation, "Annual Statistical Report on Automobile Transport" and "Annual Report on Fuel Consumption of Automobiles"

※1: Since the survey and counting methods used in the "Annual Statistical Report on Automobile Transport" changed in October 2010, the data before FY2009 has a gap compared to the data after FY2010. Therefore, the data after FY2010 uses figures from the "Annual Report on Fuel Consumption of Automobiles." It must be noted that continuity of the data is not necessarily ensured.

※2: "Other" is the total of "other LPG automobiles" and "CNG automobiles" in the "Annual Report on Fuel Consumption of Automobiles."

With regard to passenger cars, which account for a large proportion of the total number of owned vehicles, preferences have shifted to luxury vehicles and RVs since 1980. The ratio of heavier vehicles has increased, due in part to safety measures. In particular, excluding light motor vehicles, there is a marked trend for ordinary passenger cars and compact passenger cars to increase in size, and the ratio of passenger cars 1,000 kilograms or lighter in FY2010 was approximately 37.2% fewer than in FY1980. Meanwhile, during the same period the number of passenger cars between 1,001 kilograms and 1,500 kilograms increased by nearly 2.9 times, while the number of passenger cars 1,501 kilograms or heavier increased 67.0 times.

However, the rise in ownership of ordinary and compact passenger cars recently peaked, and the share of lightweight cars is increasing overall. The average weight of lightweight cars has also been increasing following legislation to improve their safety implemented in 1994. Nevertheless, as they

are still relatively lighter than ordinary and compact passenger cars, the increase in average weight of all passenger cars has peaked.

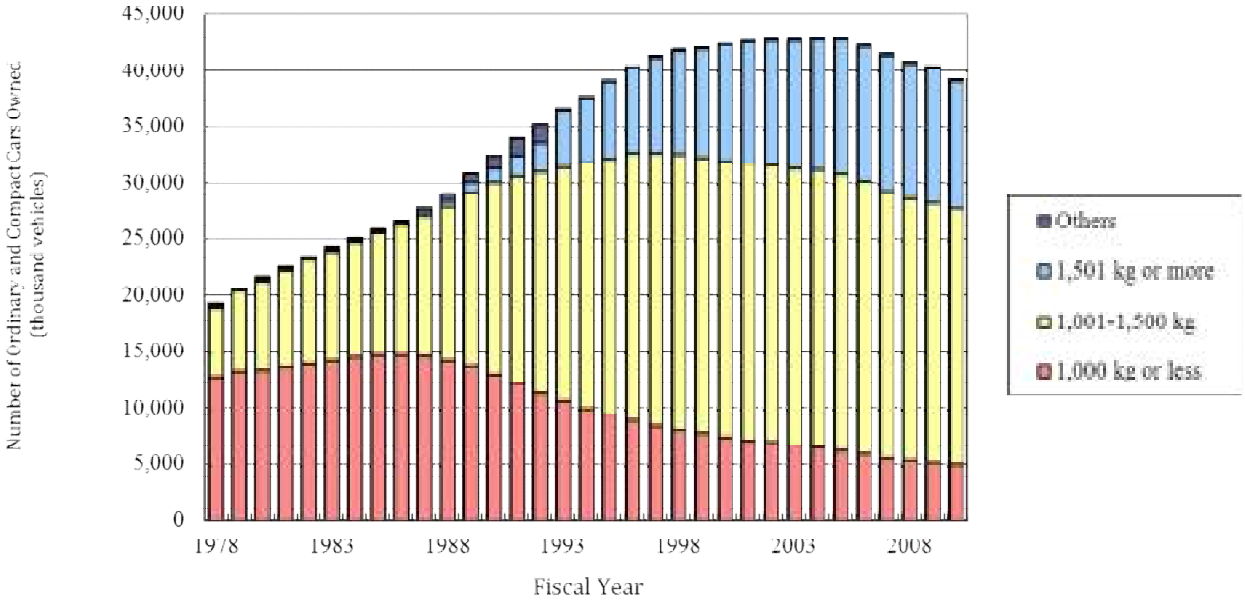


Figure 1.19 Increase in Size (Weight) of Ordinary and Compact Passenger Cars[9,10]

Source: Automobile Inspection and Registration Association, "Car ownership by category"

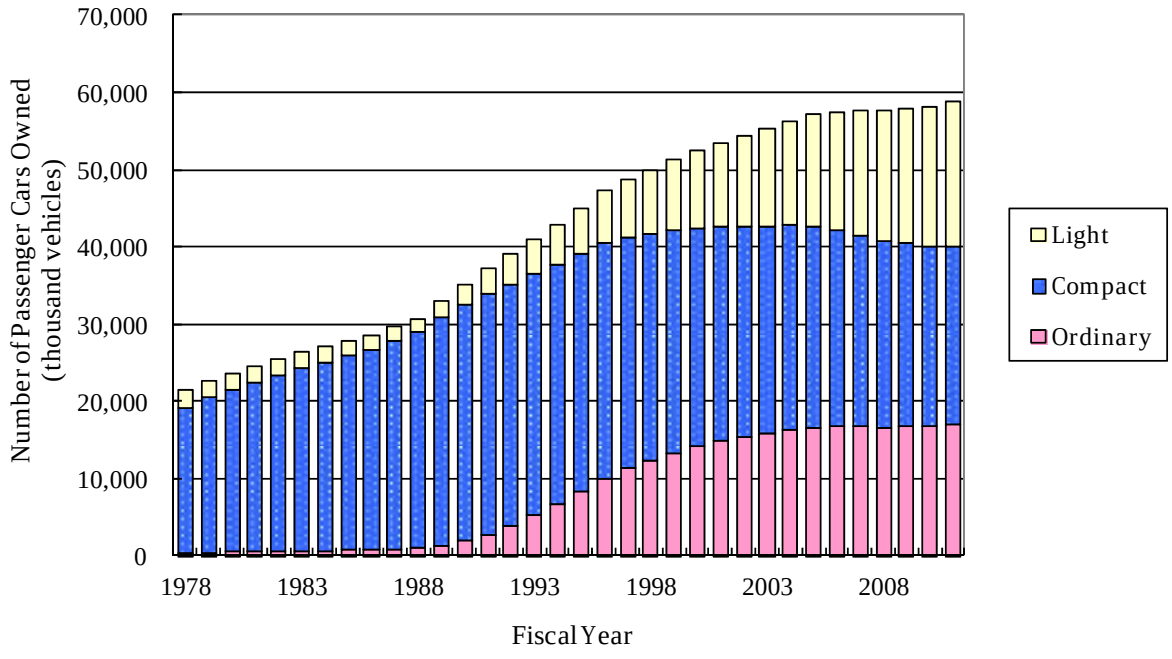


Figure 1.20 Ownership of Passenger Cars (Ordinary, Compact, and Lightweight)

Source: Automobile Inspection and Registration Association, "Car ownership by category," "Car Ownership"

[9] Lightweight cars are not included. Minivans, etc., that weigh 1,501 kg or more were included under "Other" until 1992, but they are categorized by weight from 1993 onwards.

[10] "Other" includes vehicles for which a category assignment is unclear.

1.7 Energy

1.7.1 Consumption

Final energy consumption continued to increase significantly with the Japanese economy's rapid growth until the 1970s (Phase I). It then leveled off following the two oil shocks of the 1970s, followed by a period represented by a downward trend (Phase II). A strong economy and relatively lower crude oil prices in the late 1980s, however, pushed consumption to increase again (Phase III), after which it has nearly leveled off since 2000 (Phase IV). Energy consumption in FY2011 was $14{,}527 \times 10^{15}$ J.

These trends can be summarized for different consumption sectors as follows. Until the first oil shock in 1973 (Phase I), energy consumption in the industrial, commercial and residential, and transport sectors grew rapidly. From FY1973 until FY1986 (Phase II), energy consumption in the commercial and residential sector and transport sector continued to grow, but industrial energy consumption began to decrease. From FY1986 until FY2000 (Phase III), the strong economy and drop in crude oil prices in the latter half of the 1980s boosted energy consumption in all four sectors. From 2001 onward (Phase IV), energy consumption in the industrial and transport sectors has decreased overall, but energy consumption in the commercial and residential sector has continued to increase. The share of final energy consumption for Japan in FY2011 was 43% for the industrial sector (including non-energy uses), 34% for the commercial and residential sector, and 23% for the transport sector.

Energy consumption trends differ according to the type of energy in question. Electricity and city gas consumption have grown without interruption; in FY2007, they were 2.5 times and 4.3 times their FY1973 levels, respectively. The commercial and residential demand for electricity, which includes the total consumption for electric lighting and commercial power, accounted for 70% of the overall demand, and the growth in demand was led by commercial and residential consumption. In the residential sector, this increase was spawned by the rapid spread of electrical equipment due to a higher standard of living, while in the business sector the increase was supported by a larger number of office buildings and the swift diffusion of office automation equipment in response to economic informatization and the advancement of the services industry. The electrification ratio[11] was 12.7% in FY1970 and reached 26.1% by FY2011. City gas consumption was once centered on the residential sector, but the share for residential consumption has fallen below 50% since the 1990s, while the shares for industrial and commercial gas consumption have increased and exceeded 50% in 2010. The reasons for this jump can be attributed to factors such as the implementation of a payment system that realizes large-scale and heavy-load industrial demand (with minimal fluctuation in usage amounts between seasons) for major general gas companies that have introduced LNG, the advancement of technological innovation related to city gas systems, and the demand for a response to global environmental problems. Coal consumption has gradually increased at a rather steady pace, while oil

[11] The electrification ratio is the ratio of consumed electricity within "Final Consumer Energy Consumption" as shown in the "General Energy Statistics."

consumption increased during Phase I and Phase II, but then gradually decreased during Phase III and Phase IV.

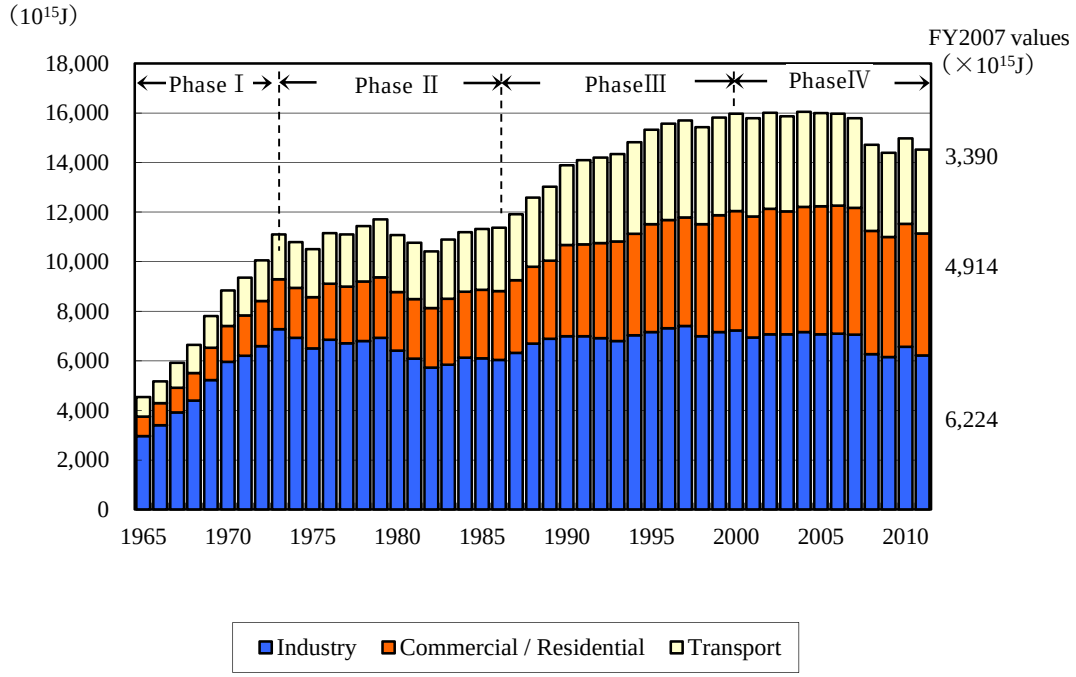


Figure 1.21 Final Consumer Energy Consumption[12]

Source: Based on the data from 'Agency of Natural Resources and Energy, "General Energy Statistics"'

1.7.2 Supplies

Japan has almost no domestic fossil fuel resources. The ratio of domestic production volumes for the total fossil fuel supply volume is 0.4% for crude oil and 3.1% for natural gas (all data as of FY2011). Japan's dependence on foreign energy sources peaked in FY1973 at 88.6% of its energy supply. Although this dependence has been reduced since then by efforts to find substitutes for oil, in recent years foreign dependence has remained at about 80%, putting the nation in a vulnerable energy supply situation.

Japan's total primary energy supplies reflect increases in final energy consumption; supplies continued to grow at a substantial rate until FY1973 but leveled off after the first oil shock. After FY1986 there was another surge of growth, but supply has leveled off again in recent years. In FY2011, Japan's total primary energy supply was $21,960 \times 10^{15}$ J.

[12] Figures for the industrial and transport sectors include non-energy use. Furthermore, the compilation methods of the "General Energy Statistics" for FY2001 and before and for FY2002 onwards are different, and it should also be noted that there are points where data for FY1989 and before differs from data for FY1990 and onwards.

Oil supplies grew continuously during Phase I, and shrank in Phase II due to the promotion of oil substitution policies and energy conservation policies implemented in response to the oil shock. In Phase III, oil supplies increased overall due to Japan's strong economy and a drop in crude oil prices. However, they have been decreasing since FY1995 for reasons such as the promotion of substitute energy sources, for example. Coal supplies have gradually increased, while natural gas and nuclear energy supplies have increased significantly.

Different energy sources have contributed different shares of the total primary energy supply: during Phase I, oil increased its share while coal and hydroelectric power decreased. As a result, oil's share of total primary energy (the "oil dependency" rate) rose to a peak at 77% in FY1973, and the oil dependency rate then began to decrease with the promotion of substitute energy sources including nuclear energy and natural gas, the introduction of coal, and the development of new energies. This resulted in a significant decrease in the share of oil supplies during Phase II, and its share was 46.1% in FY2011. At the same time, natural gas rapidly increased its share, reaching 21% (from 2% in FY1972) in FY2007. With regard to the nuclear energy generation, despite its increase during Phase II, it slowed down its increase in FY2011 and the share fell into 4% compared with 1% of FY1972 due to the impact of the Great East Japan Earthquake. The share of coal also increased to reach 21% (from 15% in FY1972) in FY2011.

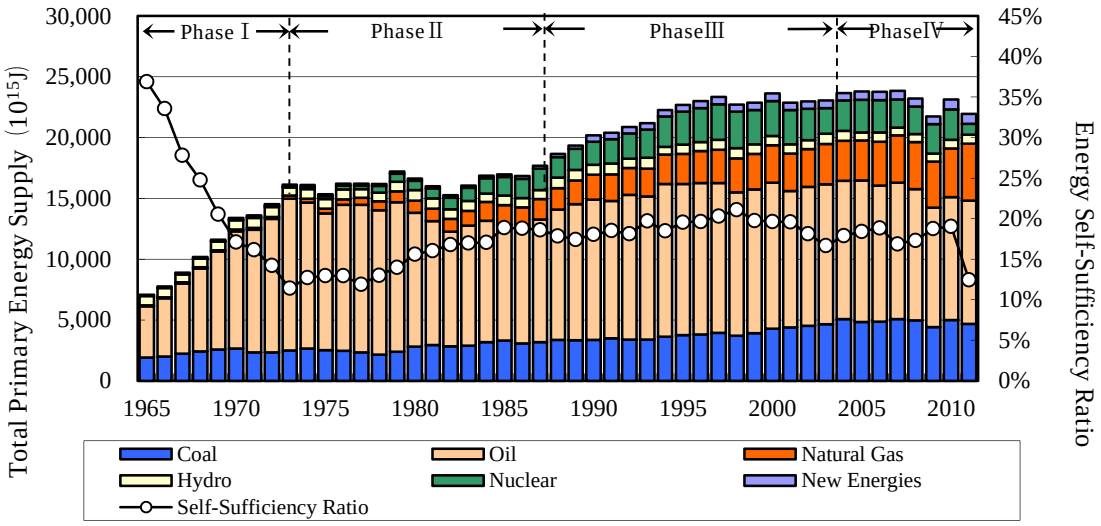


Figure 1.22 Total Primary Energy Supply and Self-Sufficiency Ratio[13]

Source: Based on the data from 'Agency of Natural Resources and Energy, "General Energy Statistics"'

Total electric power generation in FY2007 was 2.5 times greater than FY1973 levels. In FY2011, the sources of electrical power generation were nuclear power (10.7%), coal-fired thermal power (25.0%), LNG thermal power (39.5%), oil and other thermal power (14.4%), and hydroelectric power (9.0%).

[13] "New energies" includes geothermal heat.

The power generation from nuclear power in FY2011 amounted to 101.8 billion kWh which was substantially decreased from the figure in FY2010 (288.2 billion kWh) due to the impact of the Great East Japan Earthquake and consequent decline of the nuclear power generation. Coal power generation in FY2011 amounted to 239.2 billion kWh, which was approximately 14 times greater than the 1973 level. LNG power generation reached 377.2 billion kWh in FY2011, which was nearly 42 times the level in 1973. Oil power generation dropped dramatically, amounted to 137.3 billion kWh in FY2011, which was approximately 30% of the 1973 level. The drop in oil usage is due to a shift from base and middle load power resources to peak power optimization by such means as beginning new nuclear power operations and increasing operating efficiency. Since FY2007, oil-fired power generation levels have risen on a short-term basis in order to make up for a shortfall in power generation from nuclear generation. The development of hydroelectric power commenced before the Second World War. Development of large-scale hydroelectric power plants has been substantially completed and their power generation amounts generally continue to remain flat. The amount of hydroelectric power generation in FY2011 was 86.3 billion kWh, a level 1.3 times higher than in FY1973.

1.7.3 Per Capita Total Primary Energy Supply and Total Primary Energy Supply per Unit of GDP

Japan's total primary energy supply per capita as of 2011 is 172×10^9 J, and has been declining in recent years.

Japan's total primary energy supply per unit of GDP (total primary energy supply per gross domestic product) increased during Phase I, but has improved significantly since Phase II. This is a result of the introduction of world-leading energy-saving facilities and technologies brought about by the oil shock. Levels remained generally static during Phase III. This was due to the significant contribution of the industrial sector's extensive investments in energy-saving reductions, which had already shown a marked decrease in energy input per unit of output, as well as increased energy consumption in the commercial, residential, and transport sectors in line with the public's pursuit of a more comfortable and affluent standard of living. In Phase IV, amounts declined overall in response to changes in the industrial sector's structure and a shift to reductions in the transport sector.

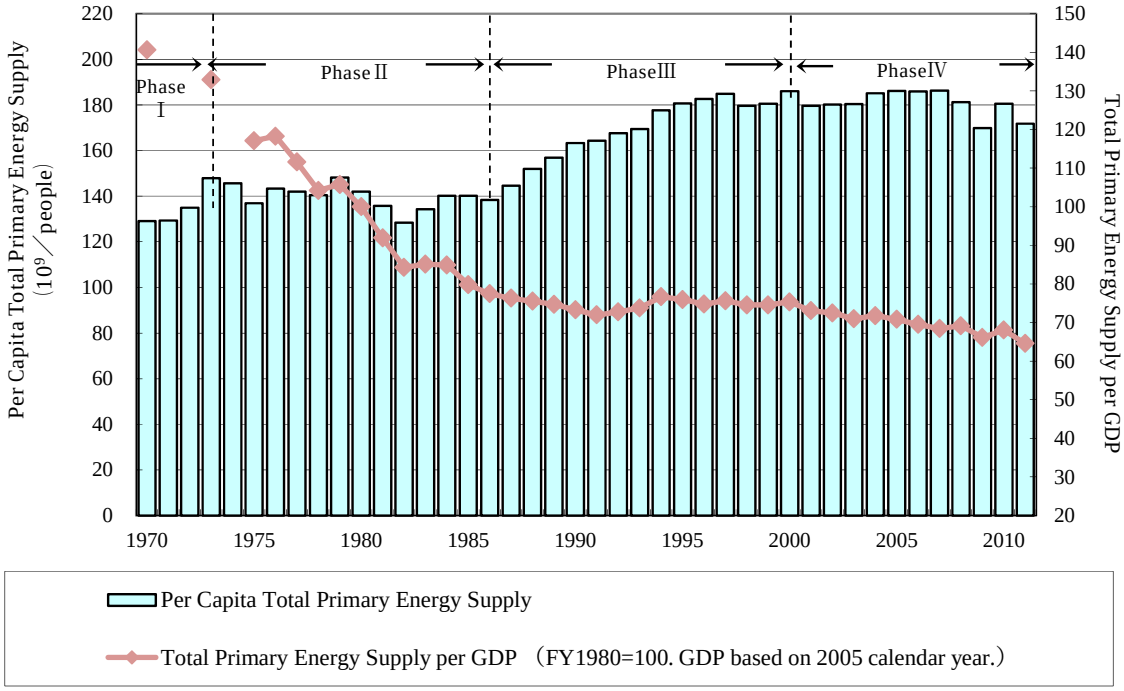


Figure 1.23 Per Capita Total Primary Energy Supply and Total Primary Energy Supply per GDP

Sources: Based on the data from 'Agency of Natural Resources and Energy, "General Energy Statistics;" Economic and Social Research Institute, Cabinet Office, Government of Japan, "Annual Report on National Accounts;" Ministry of Internal Affairs and Communications, "Population Census" and "The Annual Report on Current Population Estimates"'

1.7.4 Prices

Imported energy price was low and shifted stable during Phase I; prices skyrocketed as a result of the two oil shocks, peaking in FY1981 then beginning to fall, and have been steady since FY1986. Partially due to the substantial appreciation of the yen, the FY1990 yen-denominated real price of crude oil[14] was only slightly higher than it was prior to the oil shock.

Crude oil prices shot up temporarily at the outbreak of the 1990 Gulf War, but soon returned to the prior prevailing levels. In 1996, however, the price of crude oil topped US$20 a barrel, due to the strong growth of worldwide oil demand, the low inventory system for crude oil, oil products adopted by international oil companies in an effort to reduce costs, and the unstable political situation in the Persian Gulf region.

[14] Crude oil prices are adjusted using an indicator (deflator) to correct for price fluctuations after converting dollar-based crude oil prices to yen using an exchange rate from the period concerned.

As stated above, in the first half of the 1990s, the price per barrel changed to around US$20, but the crude oil price fell to US$10 per barrel when global oil stocks increased in line with a slowdown in the rate of demand, mainly in Asia. This was a result of the faltering Asian economy during the financial and currency crises from 1997 to 1998. Soon after, crude oil prices increased to the lower US$30s per barrel level as the OPEC countries repeatedly reduced production and Asian economies began to recover, among other factors. The September 11, 2001 terrorist attacks on the United States led to a slowdown in the world economy and, as a result, crude oil prices fell to low levels.

However, after the price of crude oil per barrel bottomed out at US$17 (OPEC basket) in January 2002, it began to rise dramatically. Even though the price briefly fell in December 2004, it once again began to rise, and in 2005 remained above US$40 per barrel.

Crude oil prices continued to skyrocket and surpassed the price levels of the second oil shock, even recording a CIF import price of US$136 per barrel in August 2008. Nevertheless, CIF prices began to drop, and the price after 2009 declined to US$40 per barrel. This was due not only to the fall in global crude oil prices from mid-July 2008, but also the appreciation of the yen (Figure 1.24). In the context of crude demand rising to recovery, the CIF price rose to US$52 per barrel in May 2009, and to around US$70 in July of the same year as economic stimulation measures were implemented by various nations. Since 2010, the price has fluctuated between US$74 per barrel and US$127, generally on an upward trend, and it was priced at more than US$100 as of April 2012.

There are various reasons for skyrocketing crude oil prices, including: (1) a marked growth in demand for oil in the Asia-Pacific region, particularly in China and India, due to their high levels of growth; (2) the reduction in oil production in non-OPEC oil-producing countries, and specifically the significant decline in the United States' oil production in response to Hurricane Katrina in August 2005; and (3) the influx of funds into the oil market from investments by speculators.

Crude oil prices dropped drastically following the financial crisis in September 2008, which can be ascribed to reasons such as: (1) a significant reduction in OECD demand, as well as a quick deceleration in the growth of non-OECD demand, due to the impact of a rapidly worsening real economy; and (2) the increase in the withdrawal of funds from the crude oil futures market in order to evade risk following the financial crisis-induced credit crunch, as well as the accelerating concern over the future of the United States and global economies.

In Japan, the ratio of fossil fuels to all imports is falling (at a rate of 10% to 20%) due to oil substitution and energy-saving policies, both implemented after the oil shock, as well as the effects of yen appreciation on crude oil transactions conducted in US dollars. In addition, due to the transformation of the industrial sector, the structure of the Japanese economy is changing into a form that is resilient to the impact of rising crude oil prices. Thus the impact on the Japanese economy of these skyrocketing crude oil prices is relatively low compared with the first and second oil shocks.

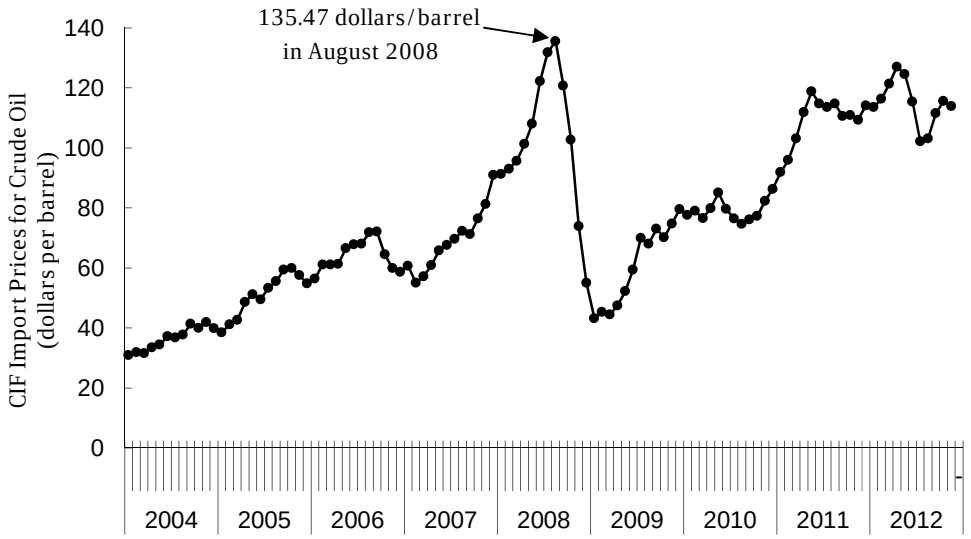


Figure 1.24 CIF Import Prices for Crude Oil (Dollars/Barrel)

Source: Ministry of Finance, "Trade of Japan"

1.7.5 National Energy Budget and Taxation System

Japan now finds it necessary to reform its energy supply and demand structure in order to increase national energy security and positively address global environmental problems.

On the demand side, the government is trying to promote efficient energy usage, beginning with energy conservation measures. In terms of supply, efforts are being made to promote the introduction of non-fossil energy, including new energy resources, and to strengthen measures to secure a stable supply of oil. In order to further advance these policies, the funds for energy-related measures in the national budget are secured via special accounts. Until FY2006 the Special Accounts for Petroleum and Sophisticated Structure of Energy of Supply and Demand and the Special Accounts for Electric Power Development Acceleration Measures were responsible for this role. However, from FY2007, the two were integrated to form the Special Accounts for Measures for Energy. The Special Accounts for Measures for Energy is composed of the Accounts for Supply and Demand of Energy (formerly the Special Accounts for Petroleum and Sophisticated Structure of Energy of Supply and Demand) and the Accounts for Promotion of Power Development (formerly the Special Accounts for Electric Power Development Acceleration Measures).

The Accounts for Supply and Demand of Energy focus on measures for both a stable fuel supply and for advancing the supply and demand structure for energy. Measures for a stable fuel supply include increasing stockpiles of oil and promoting the development of oil, combustible natural gas and coal resources, as well as measures for streamlining the production and distribution of these resources. Measures for advancing the supply and demand structure for energy include developing technology related to non-fossil energy (including energy conservation), and promoting the introduction of

facilities using alternative energy as well as high-capacity energy-saving facilities. The Accounts for Supply and Demand of Energy in FY2013 (budget plan) amounted to 328.8 billion yen as measures to upgrade the energy supply and demand structure.

Table 1.2 Accounts for the Supply and Demand of Energy and Accounts for the Promotion of Power Development

(Unit: hundred million yen)

Special Accounts for Measures for Energy	FY2013 (budget plan)
Accounts for Supply and Demand of Energy	
Measures for stable fuel supply	3,890
Measures for advancing te supply and demand structure for enery	3,288
Accounts for Promotion of Power Development	
Measures for electrical power plant location	1,412
Measures for electrical power generation diversification	285
Budget for safety regulatory measures for nuclear power plants	290

Japan has a system of energy-related taxes that include the Petroleum and Coal Tax, imposed on crude oil, imported oil products, coal, etc., and the Promotion of Power-Resources Development Tax, which is levied on the electricity sold by general electrical power suppliers. The Tax Reform adopted in FY2003 revised the former Petroleum Tax and reduced the Promotion of Power-Resources Development Tax in order to more fairly allocate the public costs of ensuring a stable supply of energy and stronger policies to combat global warming. Regarding the Petroleum Tax, the government increased the tax rate on LPG and LNG and at the same time created a new tax on coal, and renamed the tax the Petroleum and Coal Tax. Tax rates on LPG, LNG, and coal were raised in three stages: in FY2003, FY2005, and FY2007.

In addition, an investment-promoting taxation system that relates to Japanese energy infrastructure was implemented from FY1981. The Energy Demand Structure Reform investment promotion tax system was established in FY1992, which aimed to promote reforms to the supply and demand structure for energy. This overall system was established in order to promote the introduction of energy-saving facilities, new energy facilities, etc. It allows for such measures as special depreciation and corporate tax or income tax credits in the event that an entity acquires facilities that implement energy supply and demand reforms, as long as these reforms are applied to their operations within a one-year period (only certain small and medium-sized enterprises below a level of 100 million yen in capital can elect to use the tax credit).

1.8 Waste

Waste mainly falls into two categories: municipal solid waste and industrial waste. Industrial waste refers to waste generated through business activities and comprises 20 types specified by Cabinet Order. Municipal solid waste covers waste other than industrial waste, and mainly includes household waste disposed of by families and business waste disposed of from offices and restaurants, as well as sewerage.

Even though the total amount of municipal solid waste and waste disposal per capita per day had decreased since the second oil shock (1979), it rapidly increased again during the bubble economy period from around 1985. It continued to increase gradually between 1989 and 2000, but has been decreasing since 2001. The total amount of municipal solid waste disposed of in 2011 was 45.39 million tonnes, which equates to about 1.0 kilograms per capita per day. This is composed of 28.7% business waste and 71.3% household waste. In terms of disposal methods, most waste is directly incinerated (79.3%), some is recycled (19.3%), and the rest buried as direct landfill (1.4%).

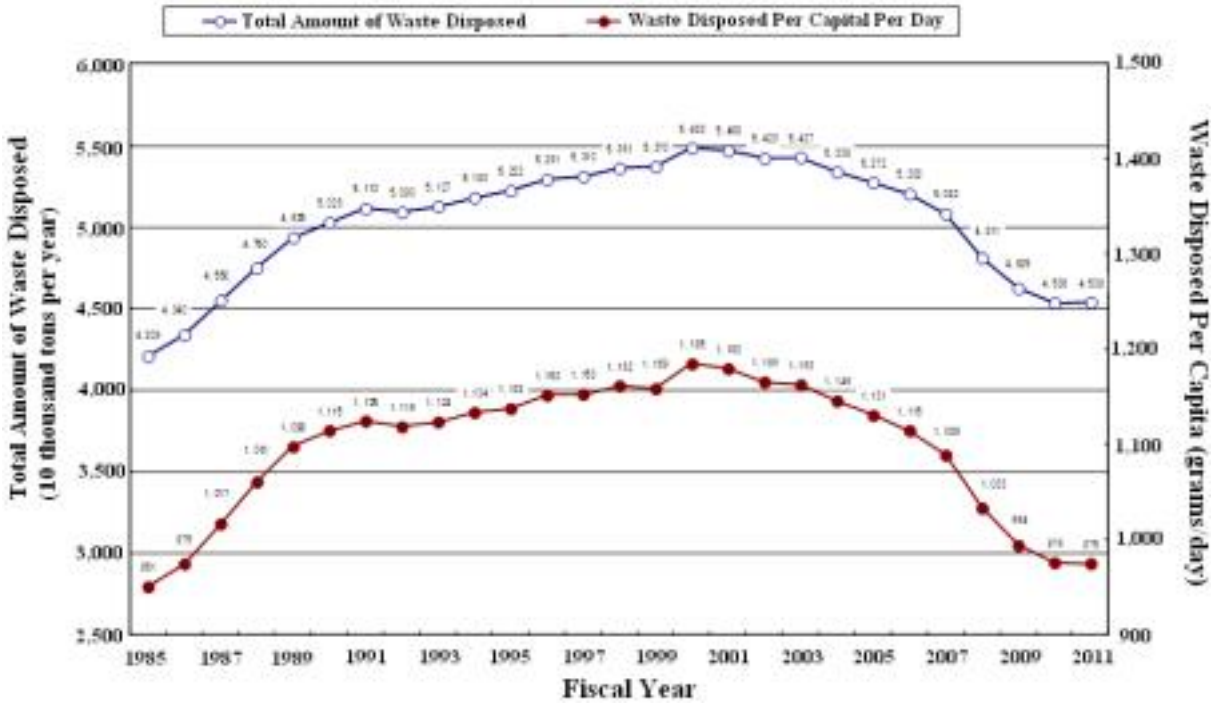


Figure 1.25 Changes in the Amount of Total Disposed Waste and Per Capita Disposed Waste

Source: Waste Disposal in Japan (FY2011)

*The "Total Amount of Waste Disposed" is using the data from results gathered in FY2005 so as to be the same as "Municipal Solid Waste Discharge Amounts (the amount of planned collection of waste + direct delivery + mass collection of recyclable waste)" under the "Basic Policy for Comprehensive and Planned Promotion of Measures for Proper Waste Management Focusing on Waste Reduction, Etc.", based on the Waste Disposal and Public Cleansing Law.

*The 'Per Capita Disposed Waste per Day' is a value obtained by dividing the amount of total disposed waste by 365 days or 366 days multiplied by the total population.

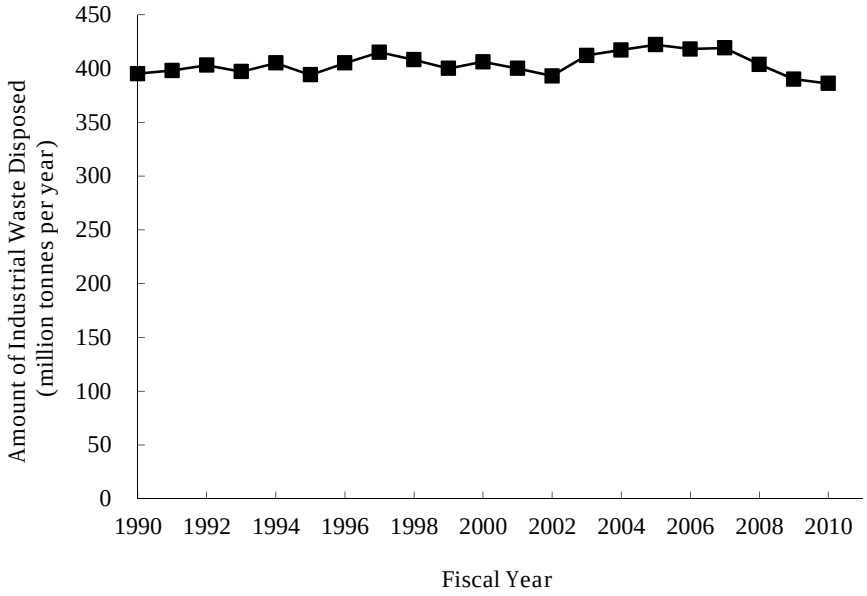


Figure 1.26 Changes in Amounts of Industrial Waste Disposed
Source: Ministry of the Environment, "Status of Industrial Waste Discharge and Disposal"

The amount of industrial waste disposed of has not changed significantly since 1990, but has remained fairly static. The total amount of industrial waste disposed of in 2010 was about 439 million tonnes. After such industrial waste is disposed of, about 205 million tonnes (53%) is recycled and about 14 million tonnes (4%) is finally disposed of.

1.9 Agriculture

In Japan, which falls within the Asian Monsoon region, rice cultivation in paddy fields has long formed part of the agricultural system suited to the humid and rainy summer conditions. In order to develop paddy field cultivation, measures to improve irrigation have been implemented, and, as a result, the ratio of irrigated paddy fields out of the total agricultural area in Japan (54.4%) is quite high compared to other countries.

However, as Japan is mountainous and does not have much flat land (mountainous areas account for 61% of the national land area), there is intense competition over land use. The ratio of the national land area used for agriculture is about 12% and the cultivated fields per household are small (approximately 1.8 hectares). Furthermore, the cultivated area has been decreasing each year, and in 2012, it had fallen about 24% from the 1965 level, to 4.55 million hectares. In terms of paddy fields, new development was restricted in 1969, and since then the total area has declined by a rate of 1% per year due to the conversion of paddy fields to fields for other crops and/or non-agricultural land use. Since the latter half of the 1980s, farmland development has been reduced and much farmland is being left uncultivated, mainly in hilly and mountainous regions. As a result the total area under cultivation has also reduced. This trend remains current.

Japan's food self-sufficiency ratio has also fallen significantly. During the period from FY1965 to FY2012, the food self-sufficiency ratio decreased from 73% to 39% on calorie supply basis[15], from 86% to 68% on production value basis[16], and from 62% to 27% of grains[17]. The main long-term cause for the decrease is the significant change in Japanese eating habits, including decreased consumption of rice and increased consumption of meat and fats, which rely on imported feed grains and oilseeds due to the restrictions of the national land area.

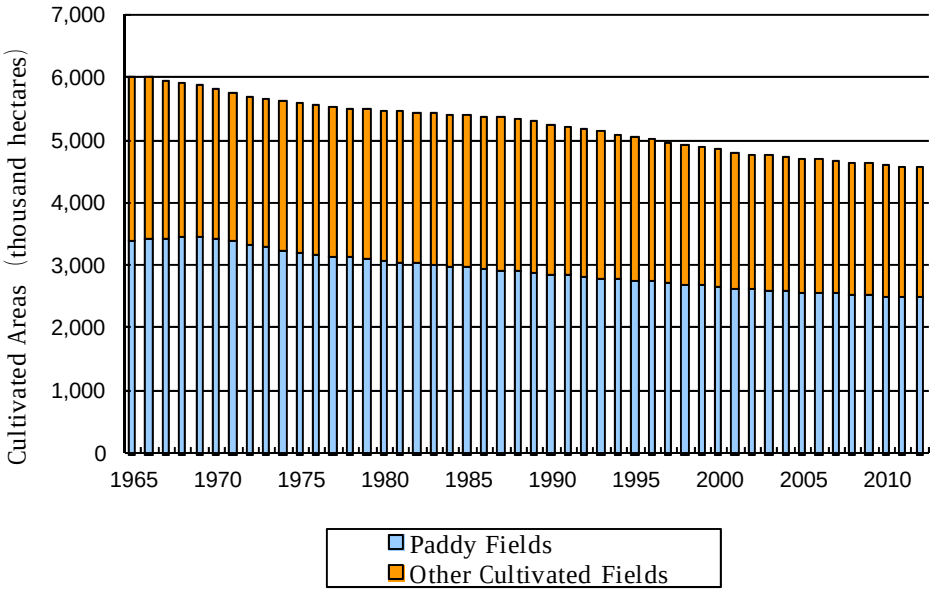


Figure 1.27 Changes in Cultivated Areas

Source: Ministry of Agriculture, Forestry and Fisheries of Japan, "Statistics on Cultivated Land and Planted Areas"

1.10 Forestry

Forestry plays an important role in Japan in maintaining and fulfilling functions of forests for the public benefit. This includes national land conservation through forestry activities, including thinning and tending, as well as providing products such as timber.

Forest currently covers about 25 million hectares, or about 70%, of Japan's national land area. It comprises national forests (approximately 30%) and non-national forests (approximately 70%). In Japan, trees were planted on over 300,000 hectares of land each year between the early 1950s and the early 1970s, and at the peak of these efforts, over 400,000 hectares were planted in a single year. This

[15] The food self-sufficiency ratio on calorie supply basis is the ratio of the calorific value of food produced domestically over the total calorific value of food supplied to the total population.

[16] The food self-sufficiency ration on production value basis is the ration of the value of food produced domestically over the total production value of food supplied to the total population,

[17] The food self-sufficiency ration of grains is the ratio of the weight of grains which were produced domestically over the total amount of grains (rice, wheat, barley, rye, maize, sorghum, and the other miscellaneous grains) supplied to the total population.

active effort reached to establishing over 10 million hectares of planted forests. As a result of the growth of these planted forests, the volume of Japan's 25 million hectares of forest has amounted to approximately 4.9 billion cubic meters, which is more than double compared to the level between 1965 and 1974.

Meanwhile, the demand for wood in Japan has recently declined to about 70 million cubic meters per year. However, the domestic wood supply is increasing slightly, and the ratio of domestically-produced wood supply to the total domestic demand in 2012 was approximately 28%.

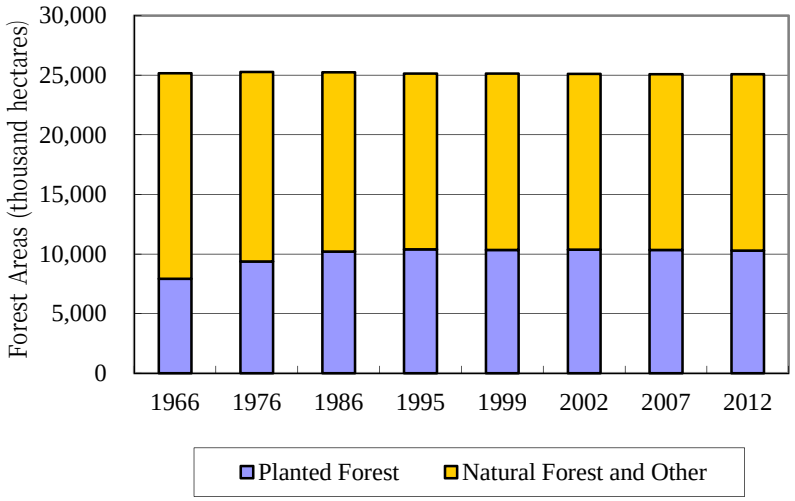


Figure 1.28 Changes in Forested Area
Source: Forestry Agency "Statistics on Forests and Forestry"

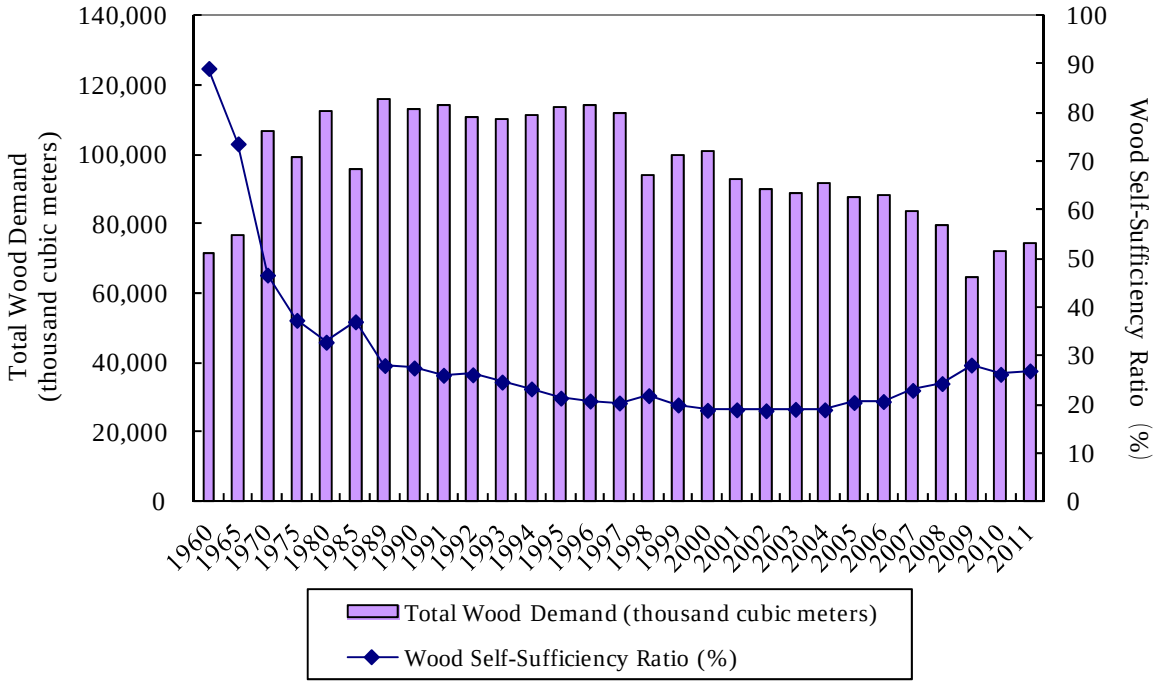


Figure 1.29 Change in Total Wood Demand and Wood Self-Sufficiency Ratio
Source: Forestry Agency, "Demand and Supply of Wood"

1.11 Information and Telecommunications

There were 96.52 million Internet users in Japan at the end of 2012, while the diffusion rate among the Japanese population was 79.5%, a figure which continues to increase, although the rate of increase has a tendency to decrease (Figure 1.30).

By the end of 2012, 47.3% of the entire population above the age of six were using broadband connections, while 88.4% of people who used the Internet from household personal computers and other devices[18] used broadband lines[19] to connect to the Internet from these devices. The number of broadband connection contracts at the end of 2012 was 6.1 million, of which 5.42 million were DSL contracts. While the number of DSL contracts is on the decline, the number of FTTH contracts (23.86 million) and the number of 3.9G (LTE) mobile phone contracts (20.36 million) are on the rise. In addition, FTTH contracts accounted for 39.1% of all broadband contracts, and 3.9G (LTE) mobile phones accounted for 33.4 % (Figure 1.31).

Regarding the purpose of Internet usage, more than 50% of each generation between the twenties and fifties accessed the Internet for purposes such as browsing websites and blogs, sending and receiving E-mails, and online shopping (Figure 1.32).

E-commerce websites targeting consumers using personal computers and mobile phones are also spreading. This can be attributed to factors such as the tremendously vast variety of products sold through Internet shopping and the ability to conveniently purchase products that would otherwise be unavailable without traveling to a faraway location. The size of the consumer-targeted e-commerce market in Japan had expanded to 8.5 trillion yen in 2011, and personal computers and mobile phones are currently becoming the second-most prominent purchasing method behind actual store visits (Figure 1.33).

[18] “Broadband lines” includes cable television lines, fixed wireless access (FWA), third-generation (3G) mobile phone lines, fiber optic lines (FTTH), and DSL lines.
[19] “Broadband lines” includes cable television lines, fixed wireless access (FWA), third-generation (3G) mobile phone lines, fiber optic lines (FTTH), and DSL lines.

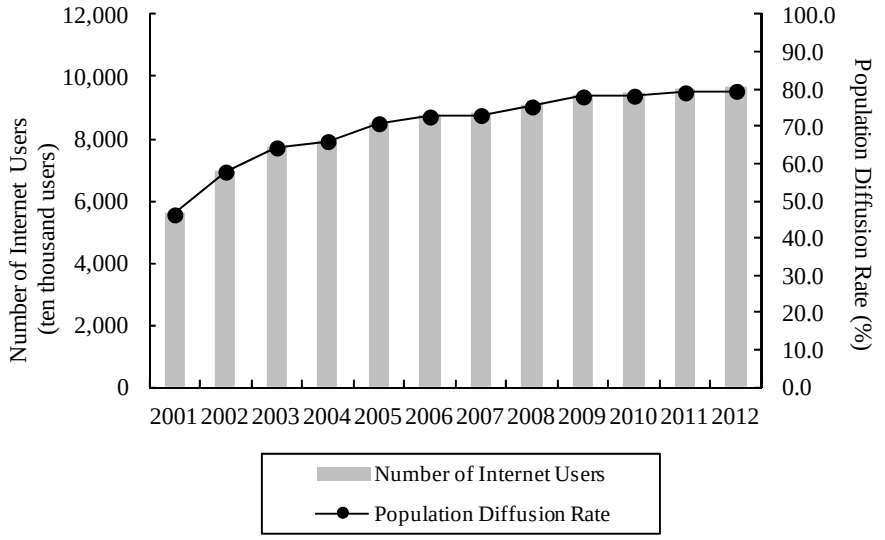


Figure 1.30 Number of Internet Users and the Internet Diffusion Rate

*The target age was all people over the age of six.
*The number of Internet users (estimate) is an estimated figure based on the results of a survey conducted over the past year on people over the age of six who use the Internet. Internet connection devices include personal computers, mobile phones and PHS, smartphones, tablet computers, gaming devices, and all other devices (subjects were not asked whether they possessed such devices). The purpose of Internet use also includes all purposes, such as personal use, business use, and academic use.
*The number of Internet users is calculated based on the estimated population over the age of six (estimated using the results of the census and life tables) multiplied by the Internet usage rate gained from this survey conducted on people over the age of six who use the Internet.
*Non-respondents are excluded.
Source: 2012 Survey Point of Usage Trend for Telecommunications

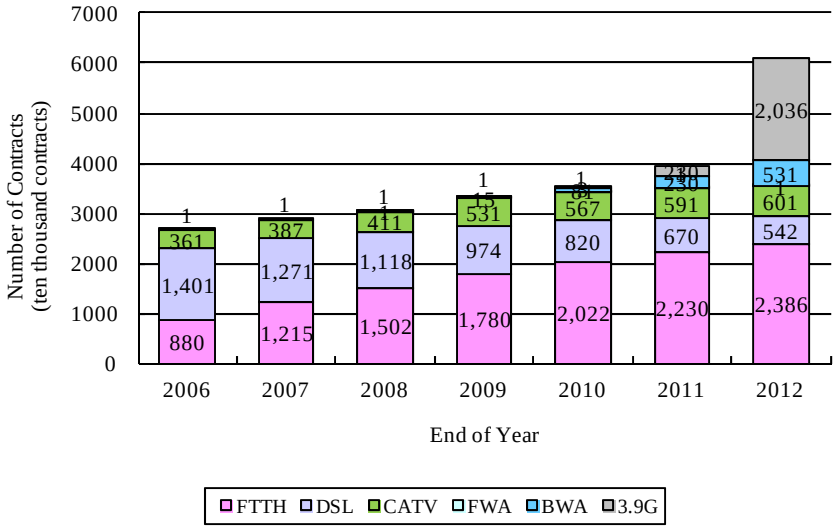


Figure 1.31 Changes in the Number of Broadband Contracts

Source: Information and Communications in Japan 2013

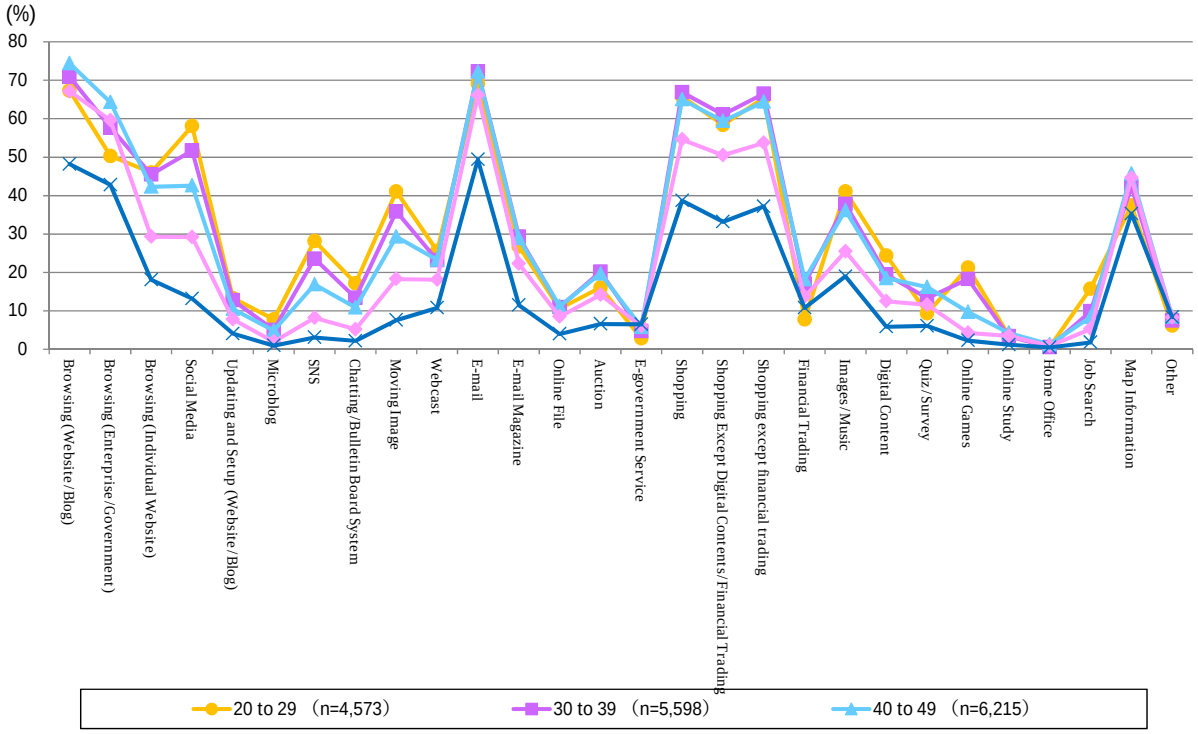


Figure 1.32 Functions and Services Used on Websites

Source: Information and Communications in Japan 2013

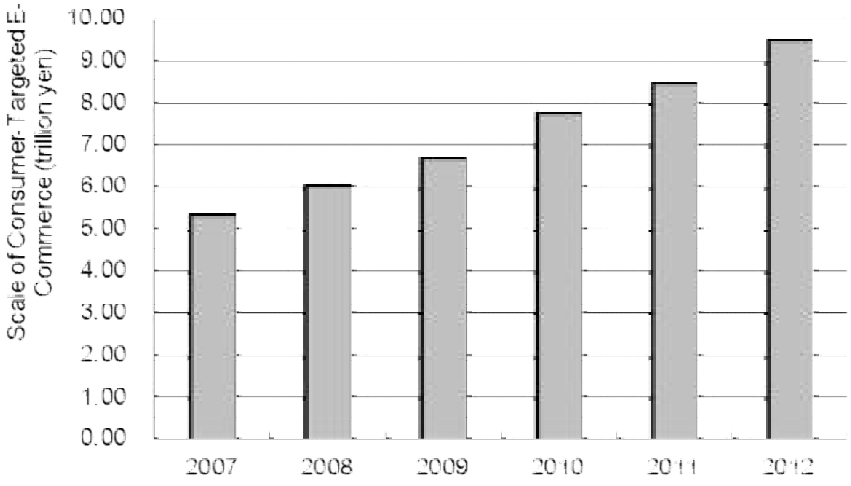


Figure 1.33 Scale of Consumer-Targeted E-commerce

Source: 2012 Infrastructure Development Report on the Information Economic Society in Japan (market research related to e-business)

1.12 Administration and Finances

1.12.1 Administration

Under the Japanese Constitution enacted in 1947, sovereign power resides with the people while the judicial, legislative, and executive powers of government are vested in the mutually independent courts, Diet, and Cabinet, respectively. The constitution establishes a parliamentary cabinet linking the Cabinet to the Diet; the Diet designates the Prime Minister; the Prime Minister and a majority of the Ministers of State must be Diet members; and the Cabinet is collectively responsible to the Diet.

Organs of national administration under Cabinet jurisdiction are established, namely, the Cabinet Office and eleven ministries: Internal Affairs and Communications; Justice; Foreign Affairs; Finance; Education, Culture, Sports, Science and Technology; Health, Labour and Welfare; Agriculture, Forestry, and Fisheries; Economy, Trade and Industry; Land, Infrastructure and Transport; Environment; and Defense. As the chief ministers of state, the Prime Minister and the individual ministers divide responsibility for national administrative duties. Councils are among the representative organs established by law with the object of ensuring that expert opinions and the views of the people are reflected in administrative actions. The main duty of the councils and other advisory bodies is to investigate and deliberate on the jurisdiction and stipulation of laws and to inform administrative organs of their views.

Concerning the global warming issue, government-level plans have been drawn up and countermeasures advanced. These include, for example, the Action Program to Arrest Global Warming of October 1990, the Guidelines for Measures to Prevent Global Warming of June 1998 (drawn up in response to the adoption of the Kyoto Protocol in December 1997), and the revision of the Outline for Promotion of Efforts to Prevent Global Warming in March 2002, in response to the adoption of the Marrakesh Accords (November 2001). Concerning structures for the promotion of global warming countermeasures, in December 1997 the Global Warming Prevention Headquarters was established with all of the government cabinet ministers as its members. The Headquarters annually checks the level of progress of the specified measures for ways to address global warming.

In October 1998, the Law Concerning the Promotion of the Measures to Cope with Global Warming (the Act on Promotion of Global Warming Countermeasures) was enacted and the basic framework for the promotion of measures to cope with global warming in Japan was constructed. The law was amended in June 2002, and the Kyoto Protocol Target Achievement Plan was formulated when the Kyoto Protocol came into force. After the development of this domestic framework, Japan ratified the Kyoto Protocol in June 2002.

The Outline for Promotion of Efforts to Prevent Global Warming, revised in 2002, divided the years from 2002 until the completion of the first commitment period into three periods of steps, adopting a step-by-step approach of evaluating the progress of measures and emissions in 2004 and 2007, as well

as adopting additional policies and measures as necessary. A complete evaluation and revision was conducted in 2004. Meanwhile, in February 2005 the Kyoto Protocol came into force and it became necessary to make a decision on the Kyoto Protocol Target Achievement Plan based on the Act on Promotion of Global Warming Countermeasures. In response to this need, in April 2005 the Cabinet approved the Kyoto Protocol Target Achievement Plan, which stipulated the countermeasures and policies necessary to reliably achieve Japan's 6% reduction commitment under the Kyoto Protocol. Afterwards, the whole plan is amended in March 2008, based on the review commissions.

In January 2010, Japan agreed to the Copenhagen Accord and reported a quantitative emissions reduction target considering the whole economy in 2020 to the UN as "Japan will reduce its emissions by 25% compared to the 1990 level with the precondition of an international agreement with the participation of the all member states on an equal and effective international framework and aspirational emissions reduction targets."

In March 2011, however, the Great East Japan Earthquake occurred and struck the Fukushima nuclear power plants, which caused severe damage in the northeast region and the surrounding areas. Since the disaster, there has been more use of thermal power generation as a consequence of the long-term halt of nuclear power plants, and thus GHG emissions from Japan have massively increased. Furthermore, it has become necessary to reexamine Japan's whole energy policy in response to the unprecedented situation caused by the accident at the nuclear power plants.

In these circumstances, the 4th Basic Environmental Plan was formulated in April 2012 by the Cabinet, which regulated the holistic and long-term principles on policies for protecting the environment based on the Basic Environment Law. In this plan, Japan announced a long-term target for tackling global warming as reducing GHG emissions by 80% by 2050.

In addition, in January 2013, the Prime Minister ordered a complete reconsideration of the current emissions reduction target of 25% before COP19.

Moreover, the first commitment period of the Kyoto Protocol was to be terminated at the end of 2012, and for Japan, as a member state without joining the second commitment period, that meant the action period of the Kyoto Protocol for pursuing the target achievement would also be terminated. In response to this situation, the Global Warming Prevention Headquarters decided on "The Principle of Global Warming Policies for the Time Being," and decided on action principles to fill the gap before the national global warming action plan is confirmed, to seamlessly implement global warming policies. The action principles include: the government requires local governments, business operators and nations to promote the activities to tackle global warming which were listed in the Kyoto Protocol Target Achievement Plan; and the government would implement global warming policies by supporting such activities by local governments, business operators, and the nation. In May 2013, the Act on Promotion of Global Warming Countermeasures was approved, and it will

regulate the principles of national global warming policies instead of the Kyoto Protocol Target Achievement Plan.

Just before COP19, at the meeting of the Global Warming Prevention Headquarters in November 2013, Japan's GHG emissions reduction and absorption target to 2020 was announced as being that Japan will reduce its emissions by 3.8% compared to the 2005 level based on the order from the Prime Minister. Additionally, Japan also announced a target of reducing GHG emissions from the whole world by 50% and from industrialized countries by 80% by 2050, and reported the "Proactive Diplomatic Strategy for Countering Global Warming," which aims to make a global contribution with Japan's advanced technology, with the three pillars of innovation, application, and partnership.

On November 29, the Government of Japan submitted the target, replacing the 25% reduction target, which had been submitted to the UNFCCC, in accordance with the Copenhagen Accord. This target is a target at this point, which has not yet taken into account the emission reduction effect resulting from nuclear power, given that the energy policy and energy mix, including the utilization of nuclear power, are still under consideration.

A firm target will eventually be set, based on further review of the energy policy and energy mix.

As of January 2013, local public organizations in Japan included 47 prefectures and 1,719 municipalities (cities, towns, and villages) with local assemblies serving as their legislatures; their executive branches are headed by a governor in the case of prefectures and by a mayor in the case of municipalities. The sizes of the prefectures and municipalities vary.

It is becoming increasingly more important for these local public organizations to make active efforts in response to global warming.

The Act on Promotion of Global Warming Countermeasures, revised in June 2008, requires that local public organizations in prefectures, designated cities, core cities, and specially designated cities expand their action plans to include measures in response to area-wide natural conditions commensurate to traditional regional promotion plans. Moreover, the Act on Promotion of Global Warming Countermeasures requested that efforts be made to collaborate between related policies, including new local public organization action plans (such as area-based measures), city plans, and development plans for agricultural promotion areas.

As of October 2012, local public organization action plans (clerical affairs) had been drafted by all 47 prefectures and by 1,362 municipalities (cities, towns, and villages). In addition, 54 more municipalities were planning to establish plans within FY2012. Moreover, as of October 2012 regional promotion plans—the area-based local public organization action plans—had been drafted for 37 prefectures as well as for 200 municipalities, while 91 more municipalities planned to draft them within FY2012.

Furthermore, 6,914 volunteers to promote activities to mitigate global warming have been commissioned by 46 prefectures and six cities (there were 3,677 as of April 2005). Prefectural centers for the promotion of activities to stop global warming have been designated in all prefectures, and 461 global warming countermeasure regional councils have been established in 47 prefectures (there were 128 as of April 2005).

In addition, as a part of the structure for promoting the Kyoto Protocol Target Achievement Plan, the government will establish Regional Committees on Energy Supply and Demand and Prevention of Global Warming in nine regional blocks from Hokkaido to Okinawa. This will allow for the relevant ministries and agencies to cooperate to back up efforts in the regions for global warming countermeasures, in collaboration with local governments, etc.

Among local public organizations, Tokyo is implementing particularly advanced undertakings. In December 2006, Tokyo set a goal of reducing its greenhouse gas emissions by 25% in comparison to 2000 by 2020. In June 2007, the Tokyo Climate Change Strategy was drafted, which defined the basic policy for climate change countermeasures in Tokyo over the ensuing ten years. Based on this strategy, the Tokyo Metropolitan Ordinance on Environmental Preservation was revised in June 2008. In April 2010 it required large business establishments to cut total greenhouse gas emissions and introduced an emissions trading system. It also implemented a global warming countermeasures reporting system for small- to medium-sized enterprises, amongst other revisions. In addition, in January 2009 environment-related tax breaks (a tax system promoting energy conservation for small- to medium-sized enterprises, a tax system promoting the introduction of next-generation automobiles, etc.), which are unique to Tokyo, were implemented. Continuing these efforts, Tokyo created the Action Program 2013 for Tokyo in 2020 in January 2013, which established action plans emphasizing disaster prevention, energy, water and greenery, and the transportation system, targeting 3 years between 2013 and 2015.

Regarding the creation of a low-carbon society, the Action Plan for Achieving a Low-Carbon Society sets high targets for significantly cutting greenhouse gas emissions. The plan selects Eco-Model cities nationwide to challenge themselves with pioneering efforts in creating an Eco-Model city. Twenty cities had been selected as of April 2013. Support and results follow-ups will be conducted with regard to these efforts by fiscal year and by city in order to promote distinguished cases nationwide. In addition, partnerships will be formed with overseas cities that are aggressively addressing environmental measures so that Japan can transmit its leading efforts to the rest of the world. The Promotion Council for the Low Carbon Cities (PCLCC), which consists of local public organizations and other entities eager to create a low-carbon society, was established in December 2008 as a venue for nationally promoting the aforementioned distinguished cases and for forming partnerships with overseas cities, among other activities. The Council is currently promoting activities aimed at constructing a low-carbon society (membership of 231 organizations as of April 1, 2013). The PCLCC selected eleven cities as Eco-Model Cities (EMCs) in December 2011, with the basic concept that the

city is for creating new human-centered value in order to respond to the environment and a super-aging society.

In this way, the efforts of Japan's local governments are steadily growing, and it is expected that they will develop even more in future.

1.12.2 Finances

Japan's national finances are administered as follows. Every fiscal year (April 1 to March 31 of the following year) the government prepares a budget, which must be approved by the Diet before it is implemented by the administrative organs. The national budget consists of three parts: the general account, special accounts, and government-related operating accounts.

The general account is the record of the national government's ordinary revenues and outlays. It is sourced from taxes and, when necessary, national bonds. This account covers the most fundamental national expenses, such as social welfare, education, and defense. In FY2013, ordinary expenditures totaled 53.9774 trillion yen, 4.0% more than the initial budget for the previous year. The general account totaled 92.6115 trillion yen, an increase of 2.5%.

Special accounts are specially established under the Finance Law independent of the general account in cases where the national government runs certain enterprises, invests certain funds, or allots certain revenues to particular expenditures. As of February 2013 there was a total of 18 accounts, including transitional ones. Government-related organizations are wholly state-owned financial institutions established via special legislation. Currently, the Okinawa Development Finance Corporation, Japan Finance Corporation, and Japan International Cooperation Agency are, respectively, two banks and one organization set up in this way in the loan assistance sector.

Table 1.3 FY2013 General Expenditure Budget

(Hundred million yen)

	FY2012 budget			FY2013 estimates		
		2011-2012 change	Growth rate (%)		2012-2013 change	Growth rate (%)
Social Security	263,901	-23,177	-8.1	291,224	27,323	10.4
Education and Science	54,057	-1,043	-1.9	53,687	-370	-0.7
Science and Technology Promotion	12,943	-409	-3.1	13,007	65	0.5
Government Employee Pensions and Other	5,712	-722	-11.2	5,045	-668	-11.7
National Defence	47,138	-614	-1.3	47,538	400	0.8
Public Works	45,734	-4,009	-8.1	52,853	7,119	15.6
Economic Assistance	5,216	-82	-1.6	5,150	-66	-1.3
(Reference)ODA	5,612	-115	-2.0	5,573	-39	-0.7
Small- and Medium-sized Businesses	1,802	-167	-8.5	1,811	9	0.5
Energy Measures	8,202	-357	-4.2	8,496	294	3.6
Major Foodstuff Measures	11,041	-545	-4.7	10,539	-502	-4.5
Miscellaneous	62,554	6,894	12.4	59,931	-2,623	-4.2
Economic Emergency Response Preparation and Regional Development Preparation	9,100	1,000	12.3	-	-	-
Contingencies	3,500	0	0.0	3,500	0	0.0
General Expenditure Total	517,957	-22,823	-4.2	539,774	21,817	4.2

Source: Ministry of Finance, Foreign Ministry

Beginning in FY2003, funds related to global warming countermeasures in the draft budgets of the relevant ministries and agencies have been classified under the Outline for Promotion of Efforts to Prevent Global Warming. In response to Cabinet approval on April 28, 2005 of the Kyoto Protocol Target Achievement Plan, the budget from FY2006 was classified according to the countermeasures category of the budget related to the Kyoto Protocol Target Achievement Plan. The budget related to the Kyoto Protocol Target Achievement Plan in FY2012 was 379.4 billion yen for “items directly affecting the six percent emission cut commitment of the Kyoto Protocol,” 299.8 billion yen for “items affecting greenhouse gas cuts in the medium to long term,” 206.9 billion yen for “other items that result in contributing to greenhouse gas cuts,” and 93.8 billion yen for “basic measures, etc.” The FY2013 budget plan related to the global warming countermeasures was announced on March 22, 2013. The budget was 330.9 billion yen for “items affecting greenhouse gas cuts until 2020,” 153.4 billion yen for “items affecting greenhouse gas cuts after 2021,” 267 billion yen for “other items that result in contributing to greenhouse gas cuts,” and 76.3 billion yen for “basic measures, etc.” The following table is a breakdown of the budget.

Table 1.4 Budget Related to Global Warming Countermeasures (by Ministry and Office)

(Unit: 100 million yen)

	A	B	C	D
	Items affecting greenhouse gas cuts until 2020	Items affecting greenhouse gas cuts after 2021	Other items that result in contributing to greenhouse gas cuts	Basic measures, etc.
Education, Culture, Sports, Science and Technology		294		253
Agriculture, Forestry and Fisheries	1,189	106	611	28
Economy, Trade and Industry	1,244	988	1,002	264
Land, Infrastructure and Transport	91	14	303	89
Environment	604	124	488	37
Other	181	9	266	92
All ministries and offices	3,309	1,534	2,670	763

Note 1: Totals may not be consistent due to the processing of fractions (rounding).