

12 Energy

Energy Situation

According to the Agency for Natural Resources and Energy, in fiscal 2003 the final energy consumption in Japan was 411 million/kl (oil equivalent), a 0.8% decrease from a record high of 414 million/kl (oil equivalent) in fiscal 2002. Of the total, 48.0% was in industry, 28.0% in households, and 24.0% in transportation.

On the supply side, Japan depends heavily on imports. According to the International Energy Agency, imports accounted for 83.6% of total energy use in 2003 and about 100% of total oil consumption. The share of oil in all energy sources fell substantially from a peak of 78% before the first oil crisis in 1973 to 50.0% in fiscal 2003. In 2004, 89.2% of crude oil came from the Middle East. Japan started to stockpile imported oil after the first oil crisis, and according to the Agency for Natural Resources and Energy, as of January 2006, Japan had a stock of 88 million/kl, equivalent to 167 days' consumption. The average retail price of regular gasoline in Japan in March 2006 was ¥131 per liter.

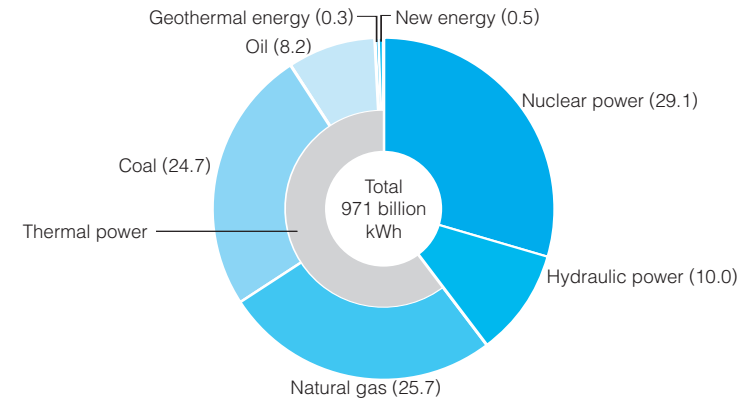
From the viewpoint of energy security and the global environment, the importance of natural gas as an energy source is increasing. In fiscal 2003 the share of natural gas in all energy sources in Japan stood at 14.3%, up from 10.2% in 1990, and the government says that necessary measures may bring its level up to 20%, on a par with Europe and the United States.

In 1998 the Advisory Committee for Energy compiled an interim report on the long-term energy supply-demand outlook. The report recommended that the final energy consumption in fiscal 2010 should be kept to 400 million/kl (oil equivalent), the same level as fiscal 1996, so that the carbon dioxide emissions from energy would drop to the fiscal 1990 level of 287 million tons (carbon equivalent), thus meeting the target set in the Kyoto Protocol adopted at the Third Session of the Conference of the Parties (COP3) to the UN Framework Convention on Climate Change in Kyoto, which went into effect on February 16, 2005.

However, a report by the reorganized Advisory Committee for Natural Resources and Energy in July 2001 found that, if the current trend continues, the final energy consumption in fiscal 2010 is expected to grow to 409 million/kl and the volume of carbon dioxide emissions from energy will reach 307 million tons. The report therefore called for more efforts toward energy conservation and the development of new energy.

The government has set the target amount for the introduction of new energy, such as photovoltaic, wind, waste, and biomass power, at 19.1 million kl (crude oil equivalent) in fiscal 2010, about 3% of total energy supply, compared with 9.23 million kl in fiscal 2002. For the fiscal 2005 budget, the government allocated ¥166.6 billion for promoting the introduction and development of new energy.

Japan's Electrical Energy Output, FY 2004 (%)



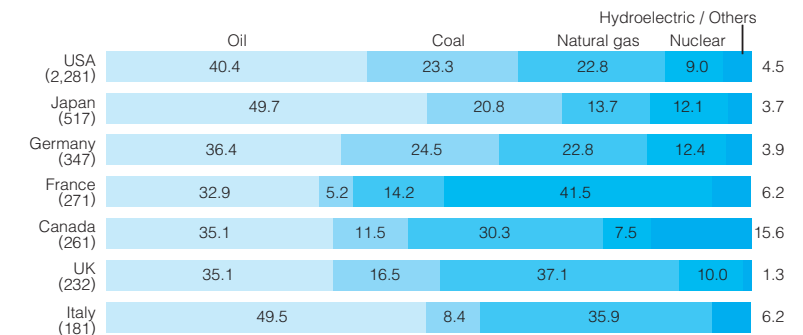
Source: Agency for Natural Resources and Energy.

Number of Power Plants in Japan, March 2005

	Plants	Capacity (1,000 kw)
Hydraulic power	1,577	45,191
Geothermal power	12	497
Thermal power	197	140,742
Nuclear power	16	47,122
Total	1,807	233,556

Source: Agency for Natural Resources and Energy.

International Comparison of Energy Sources Used, 2003 (%)



Source: Organization for Economic Cooperation and Development / International Energy Agency, *Energy Balances of OECD Countries (2002-2003)*.

Note: Figures in parentheses are total energy consumption (million tons of oil equivalent).

Energy Consumption and Dependence on Imports, 2003

	Consumption (million tons, oil equivalent)	Per capita consumption (tons, oil equivalent)	Dependence on imports (%)	
			Total	Oil
USA	2,299	7.8	28.4	61.9
Japan	505	4.1	83.6	99.7
Germany	332	4.2	61.2	96.5
France	260	4.4	49.8	98.5
UK	225	3.9	-6.2	-36.0

Source: Agency for Natural Resources and Energy; Organization for Economic Cooperation and Development / International Energy Agency, *Energy Balances of OECD Countries (2002–2003)*; BP Amoco, *Statistical Review of World Energy 2004*.

Note: Calculated on a primary energy basis. Negative figures for dependence on imports indicate exports.

Import of Oil

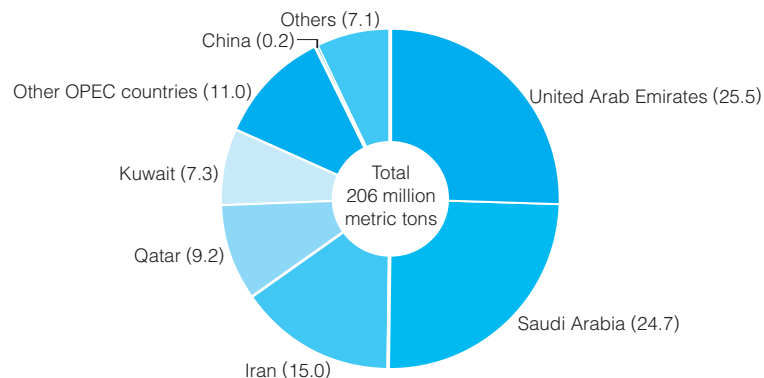
(million tons of oil equivalent)

FY	Crude oil		Imports of oil products
	Imports	Consumption	
1990	198.53	199.54	64.91
1995	232.15	230.41	52.24
1996	229.07	228.52	58.90
1997	236.16	233.63	52.88
1998	221.85	225.72	45.49
1999	220.08	223.49	53.51
2000	220.36	220.72	54.29
2001	212.12	213.41	49.37
2002	209.76	210.24	52.04
2003	212.64	213.61	51.84

Source: Organization for Economic Cooperation and Development / International Energy Agency, *Energy Balances of OECD Countries (2002–2003)*.

Sources of Crude Oil Imports, 2004

(%)



Source: International Energy Agency, *Oil, Gas, Coal & Electricity, Third Quarter, 2005*.

Supply and Consumption of Gas

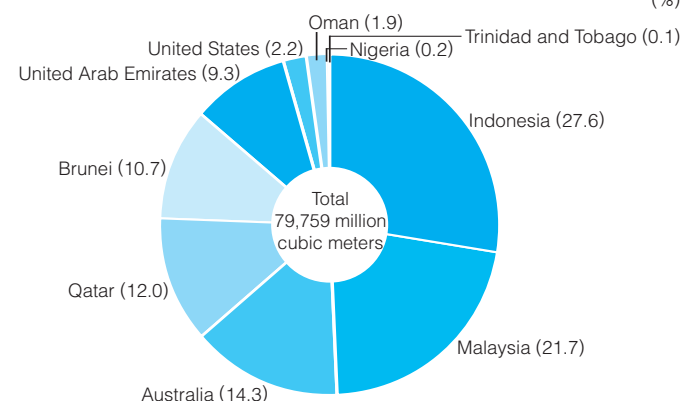
(million metric tons of oil equivalent)

FY	Indigenous Production	Imports	Consumption
1990	1.80	41.66	43.26
1995	1.95	50.00	52.02
1996	1.97	54.27	56.06
1997	2.01	53.02	54.95
1998	2.03	57.63	59.57
1999	2.01	60.27	62.11
2000	2.20	63.83	65.87
2001	2.17	62.03	64.80
2002	2.42	64.44	66.35
2003	2.47	68.42	70.95

Source: Organization for Economic Cooperation and Development / International Energy Agency, *Energy Balances of OECD Countries (2002–2003)*.

Sources of Liquefied Natural Gas Imports, 2004

(%)



Source: International Energy Agency, *Oil, Gas, Coal & Electricity, Third Quarter, 2005*.

Nuclear Power

Heavily dependent on fuel imports, Japan has been promoting the development of nuclear power as a domestically generated energy source. Japan's first commercial nuclear power station started operation in 1966, and as of March 2006 there were 55 atomic power reactors in operation and 2 under construction. The government's initial budget for nuclear development in fiscal 2005 was about ¥473 billion.

March 2006 saw some significant steps forward in Japan's nuclear fuel recycling program. Japan Nuclear Fuel Co.'s spent nuclear fuel reprocessing plant in Aomori Prefecture started a test operation to extract plutonium from spent nuclear fuel with

full operation scheduled to start in August 2007; Kyushu Electric Power Co. obtained local government approval for its plutonium-thermal project at its Genkai Nuclear Power Station in Saga Prefecture; and Shikoku Electric Power Co. was given central government approval for a similar project at its Ikata reactor in Ehime Prefecture.

However, public concern about the safety of nuclear power generation has been heightened in recent years by such accidents as a sodium leak at the Monju fast-breeder reactor in December 1995 and criticality at the JOC Co. Tokai-mura uranium-reconversion plant in September 1999, which led to the first fatality in the history of Japan's nuclear development. Furthermore, Japan's plutonium-thermal project was put on hold after it was discovered in late 1999 that MOX fuel data had been falsified by a British company, and in September 2002 Tokyo Electric Power Co. admitted its involvement in covering up evidence of damage at its nuclear power plants. In August 2004 five workers were killed in a steam leak accident at Kansai Electric Power Co.'s Mihama Nuclear Power Plant in Fukui Prefecture, the first fatal accident at an operating nuclear power plant in Japan.

Some of the recent court rulings have also cast doubts on the safety of nuclear facilities. In January 2003 a high court ruling nullified government approval in 1983 to construct the Monju fast-breeder reactor, but in May 2005 the Supreme Court overturned the high court decision and endorsed the government authorization of the facility's construction. In March 2006 Kanazawa District Court ordered Hokuriku Electric Power Co. to stop operating one of its reactors in Ishikawa Prefecture, pointing out inadequate earthquake-resistance designs based on government guidelines, and the company immediately appealed to a high court.

Nuclear Power Plants by Country, December 2004

	In operation		Under construction	
	Capacity (megawatts)	Plants	Capacity (megawatts)	Plants
USA	102,590	103	n/a	n/a
France	66,130	59	n/a	n/a
Japan	45,742	52	5,030	5
Russia	22,556	30	3,000	3
Germany	21,728	18	n/a	n/a
World total	379,207	434	28,052	33

Source: Japan Atomic Industrial Forum, Inc.