

ELECTRICITY REVIEW JAPAN

2005 ▶ 2006



**The Federation of Electric
Power Companies
of Japan**

History of Japan's Electric Power Industry

Electricity was first used in Japan on March 25, 1878 at the Institute of Technology in Toranomon, Tokyo when an arc lamp was switched on in commemoration of the opening of the Central Telegraph Office. Eight years later in 1886, Tokyo Electric Lighting commenced operations as the nation's first electric power company, and began supplying electricity to the public in the following year.

Early on, electricity was used primarily for lighting and gradually found more broadly based applications as a power source. By 1896, the number of electric utilities established throughout the nation reached a total of 33, and the number of electric lights with a power supply increased to 120,000.

The early 20th century marked the establishment of long-distance transmission technology. As larger power plants were introduced, generation cost fell and electric lights came into wider use throughout the country. Consequently, electricity became indispensable as a power source for industry as well.

In the years that followed, the electric power industry had grown in tandem with modernization and development of Japan's industry. At the same time, the industry experienced a major restructuring that led to the dissolution of 700 electric utilities, which merged to create five major electric utilities after the First World War. During the Second World War, the electric power industry was completely state-controlled and utilities were integrated into

Nihon Hatsusoden Co. (a nationwide power generating and transmitting company) and nine distribution companies.

At the end of the war in 1945, Japan's electric power facilities had been devastated and deteriorated from overuse and bombing damage suffered during the conflict. While the restructuring of the industry was being discussed, the Korean War broke out in 1950. The resulting war boom, allowed utilities to rapidly recover, and as a result, nine regional private electric power companies (Hokkaido, Tohoku, Tokyo, Chubu, Hokuriku, Kansai, Chugoku, Shikoku and Kyushu) were established in 1951. This structure remains to this day, and with the return of Okinawa to Japan in 1972, Okinawa Electric Power Co. joined as a tenth member.

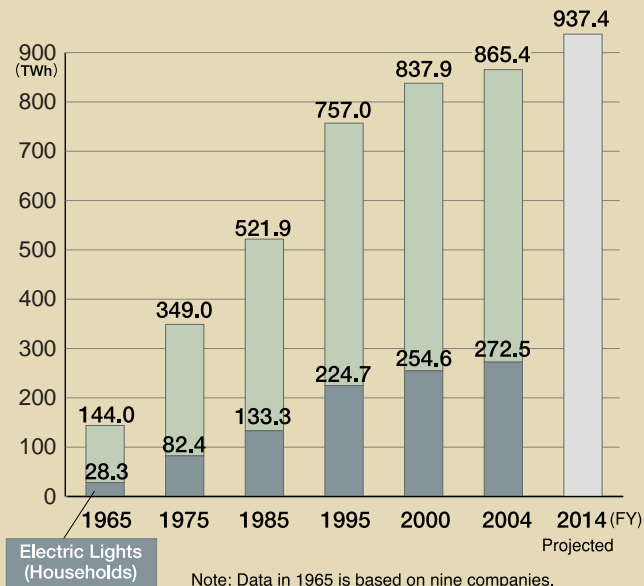
From March 2000, due to the revision of the Electricity Utilities Industry Law, partial liberalization of electric retail supply for extra-high voltage users started. Subsequent in the revised Electricity Utilities Industry Law that was promulgated in June 2003, as a result of the Electricity Industry Committee's (an Advisory Committee for Natural Resources and Energy, a consultative body to the Minister of Economy, Trade and Industry) survey on the current system and discussion on how the electric power industry should operate in the future, it supports a vertically integration of generation, transmission, and distribution. At the same time it establishes a Japanese model of liberalization based on fair



competition and transparency.

Today, the ten electric power companies that make up the membership of the Federation of Electric Power Companies (FEPC) provide reliable electricity supplies to the entire nation of Japan. As in the past, the industry continues to grow and change, with issues, such as environmental protection, global warming, and market liberalization, coming to the fore.

Power Demand for Ten Companies



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Note:
Nine Companies include Hokkaido, Tohoku, Tokyo, Chubu, Hokuriku, Kansai, Chugoku, Shikoku and Kyushu.
Ten Companies include the above Nine Companies plus Okinawa.

The Need for a Stable Energy Supply

Japan's Vulnerable Energy Supply Situation

Resource-poor Japan is dependent on imports for 96% of its primary energy supply – even if nuclear energy is included, dependency is still at 84%. Thus, our country's energy supply structure is extremely vulnerable to supply disruptions. Following the two oil crises in 1970s, Japan has diversified its energy sources through increased use of nuclear energy, natural gas and coal, as well as the promotion of energy efficiency and conservation. Despite these improvements, oil still accounts for about 50% of Japan's primary energy supply, and nearly 90% of imported oil comes from the politically unstable Middle East. Moreover, prospects are very poor for importing electricity from neighboring countries. Finally, there are growing concerns about environmental problems due to energy use and the need to reduce carbon dioxide emissions to cope with global warming. Therefore, Japan's energy situation forces the country to focus on the two prime concerns of energy security and environmental protection.

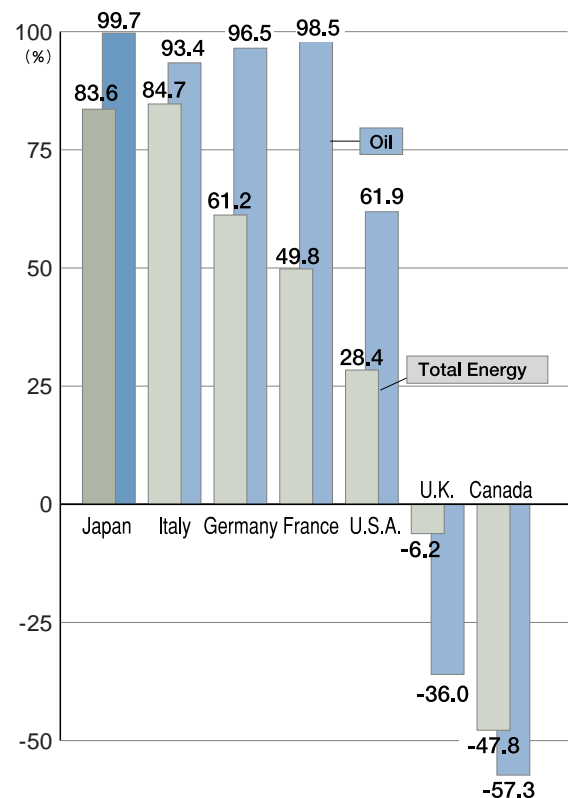


LNG tanker



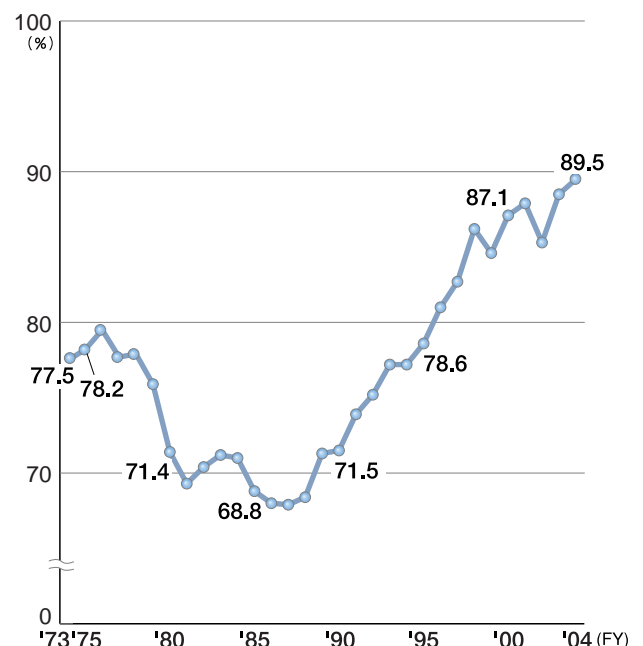
Coal storage yard

Dependence on Imported Energy Sources by Country (2003)



Source: IEA, "Energy Balances of OECD Countries, 2002-2003"

Japan's Reliance on Middle East Crude Oil of Total Imports



Source: METI

Japan's Energy Policy

On the basis of this energy situation, the Basic Law on Energy Policy Making was promulgated by the national government in June 2002. Such a comprehensive law had never existed before in Japan. The law has three overarching objectives on energy supply and demand:

- 1) Securing stable supply,
- 2) Ensuring environmental compatibility,
- 3) Increasing the role of market principles, which should be coordinated with the first two objectives.

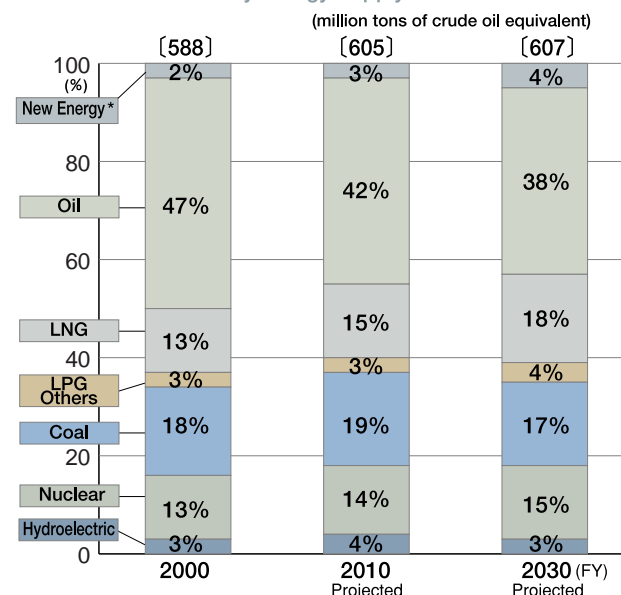
In accordance with the law, the first national Basic Energy Plan was endorsed by the Cabinet in October 2003, which presents the basic directions of the overall energy demand and supply policy. The plan contains energy conservation for demand controlling measures, and for development, it focuses on the promotion of nuclear power generation including the nuclear fuel cycle, renewable energy, natural gas and coal. In particular, the plan clearly states that nuclear power generation, including the nuclear fuel cycle, will be promoted as a key power source, based on the premise that safety will be guaranteed.

On March 2005, The Energy Supply and Demand Subcommittee of the Advisory Committee for Natural Resources and Energy to the Minister of Economy, Trade and Industry (METI) announced the Long-term Energy Supply and Demand Outlook. It says that energy demand will be increasing at a lower rate up to 2030 and reach its peak in fiscal 2021, after which demand will then decrease. According to the projection, the energy supply structure will gradually change with increased natural gas demand expected due to the expansion of dispersed generators. Nuclear power, which is deemed a base-load power source, will retain a stable share of total supply.

Long-term Energy Supply & Demand Outlook

-Reference Case-

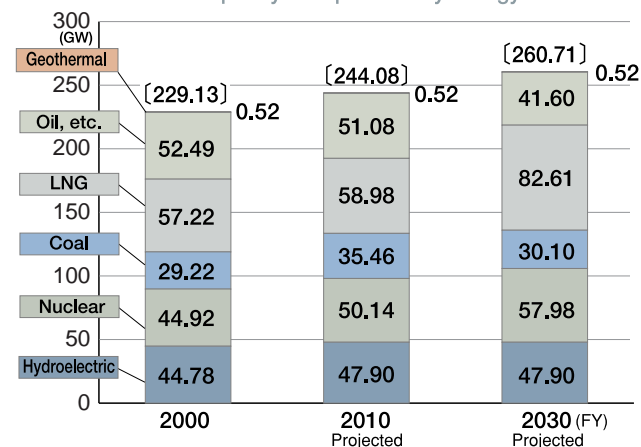
Domestic Primary Energy Supply



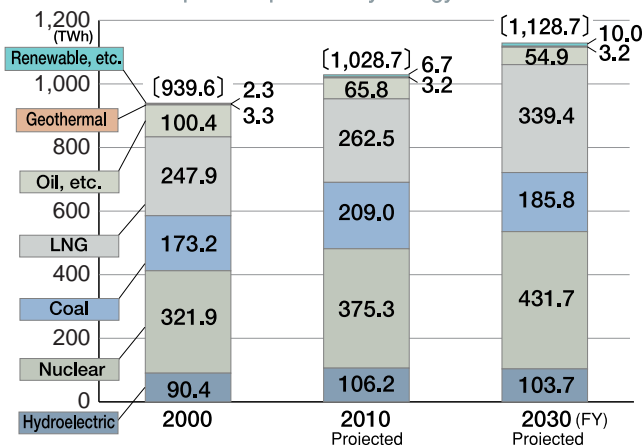
(*)most renewable energies including waste power generation

Note: Figures do not necessarily total to 100% due to rounded numbers.

Generation Capacity Composition by Energy Source



Power Output Composition by Energy Source



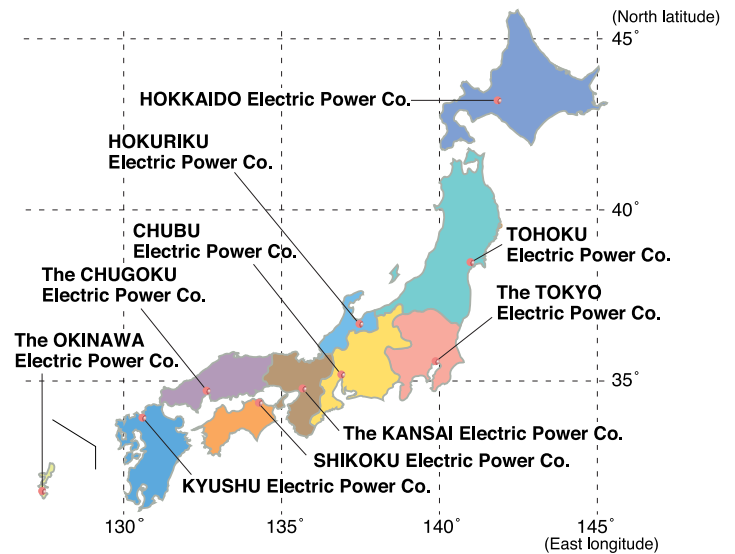
Sources: the Energy Supply and Demand Subcommittee of the Advisory Committee for Natural Resources and Energy

Electricity in Japan is supplied by the dynamic activities of ten

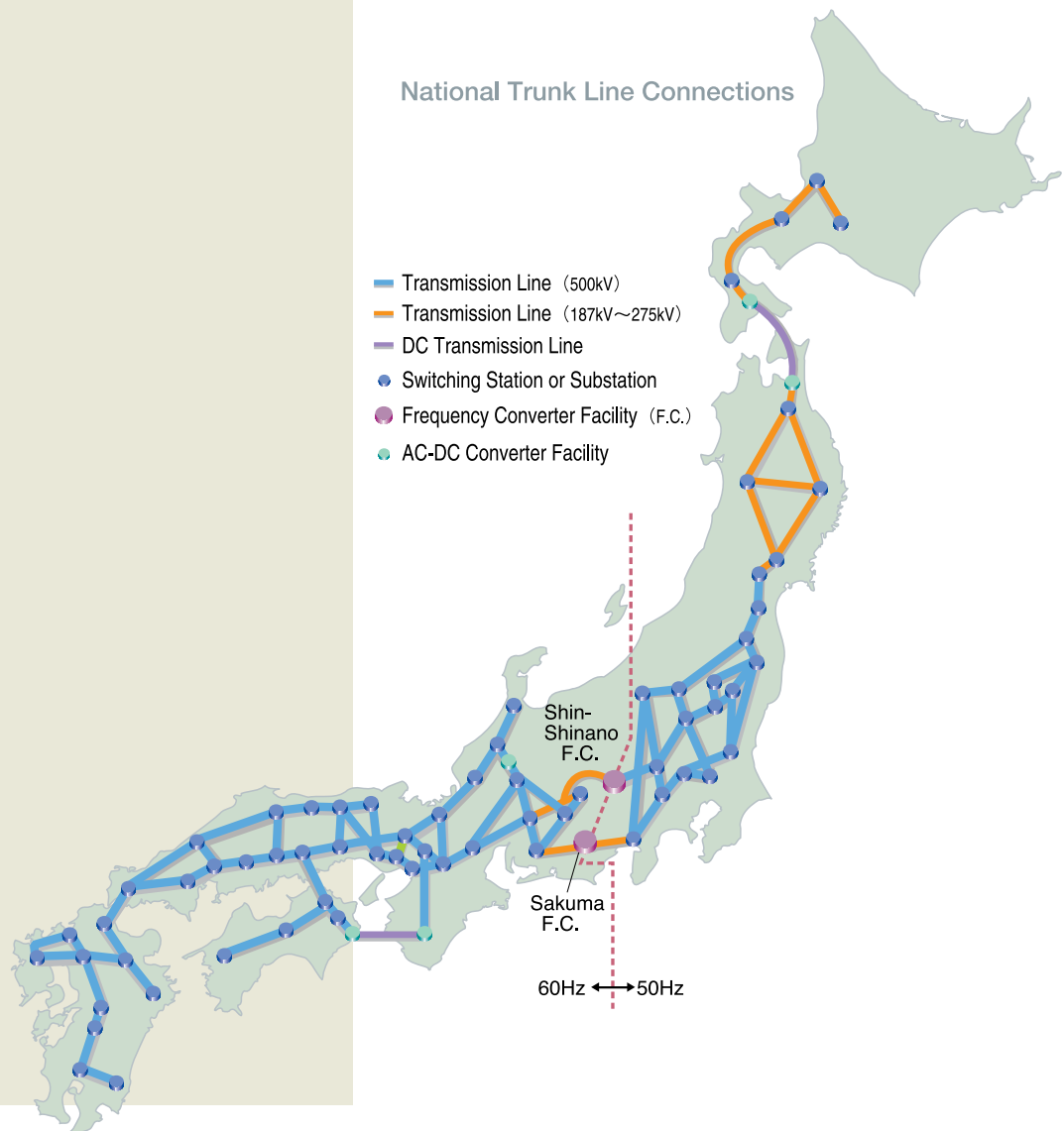
Ten Electric Power Company Structure

The ten privately-owned regional electric power companies in Japan are responsible for providing local operations from power generation to distribution and supplying electricity to their respective service areas. In addition, the ten electric power companies cooperate with each other to ensure a stable supply. For example, the electric power companies work together to exchange or provide electricity in order to cope with emergency situations resulting from accidents, breakdowns, or summer peak demand. To ensure the smooth operation of power exchange, extra-high voltage transmission lines link the entire country from Hokkaido in the north to Kyushu in the south.

The Ten Electric Power Companies by Service Area



National Trunk Line Connections



private electric power companies

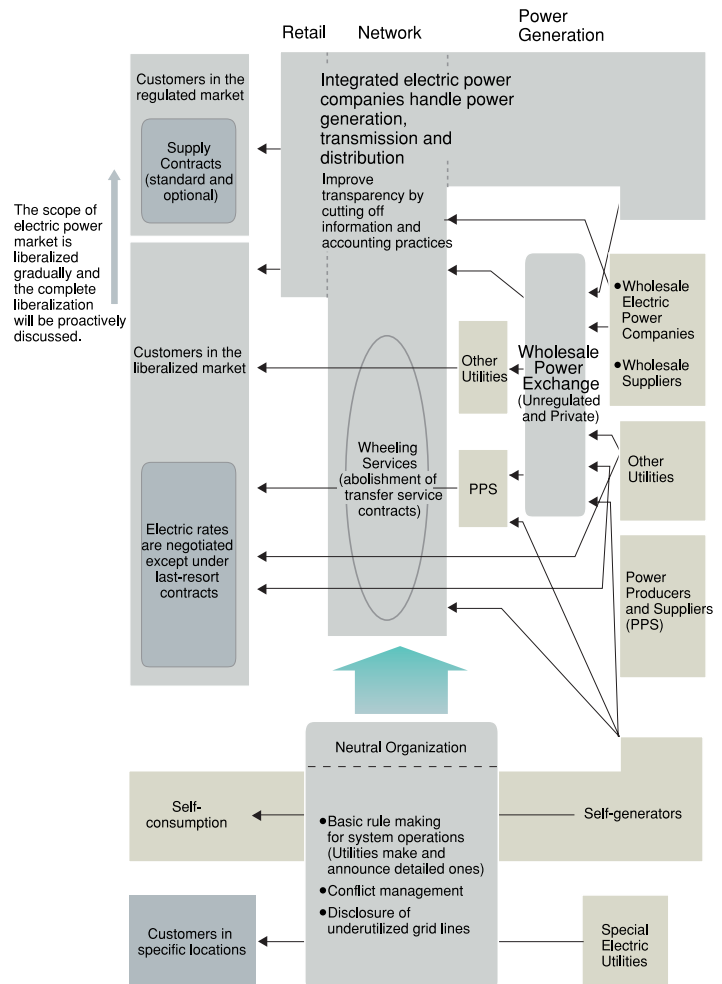
Fair Competition and Transparency

Electric power market liberalization is gradually advancing in Japan, while existing regional ten electric power companies, as “responsible entities,” continue to handle their overall operations of generation, transmission, and distribution to ensure stable supply of electricity. Japan has adopted an electric power market model that will be liberalized on a step-by-step basis. In March 2000, the retail market was partially liberalized to allow Power Producer and Supplier (PPS) to sell electricity to extra-high voltage users whose demand is approximately over 2MW. From April 2005, the scope of liberalization was further expanded to all high voltage users whose demand is approximately over 50kW. All customers in the regulated market continue to receive electricity supplied by each regional electric power company that is responsible for supplying electricity within its designated service area. Full liberalization, including residential customers, will be proactively discussed beginning in April 2007.

To ensure fair and transparent operations of electric power transmission and distribution, the Electric Power System Council of Japan (ESCJ) was established as a rule-maker and supervisor started operation from April 1, 2005. In addition, Japan Electric Power Exchange (JPEX), which is formed by electric power companies, PPSs and self-generators, was established in November 2003 and started business from April 1, 2005.

* In Okinawa, market liberalization is differently scheduled.

The New Electricity Supply System (from April 2005)



Column

Establishment of Electric Power System Council of Japan

On February 2004, “Electric Power System Council of Japan (ESCJ)” was established in order to secure the fairness and transparency in transmission and distribution segments, and started support from April 2005. ESCJ formulates basic rules as well as implement market oversight and dispute-settlement.

Establishment of Japan Electric Power Exchange

On November 2003, a private non-profit organization “Japan Electric Power Exchange (JEPX)” was established through the voluntary participation of electric power companies, new entrants (Power Providers and Suppliers) and power producers to provide electric power in both spot and forward trading. JEPX started operation from April 1, 2005, and its aim is to promote competition and revitalize the distribution of electricity nationwide.

To provide stable supply into the future, we are developing and

Electric Power Development Plan

Electric power companies are steadily promoting the diversification of power sources for long-term stable supply, taking into consideration the high dependence on imported energy sources, the demand and supply outlook, as well as environmental issues.

Electricity demand (TWh) will be increasing annually by 1.1% on average up to fiscal 2014, with peak demand (GW) increasing every August by 1.3%.

By fiscal 2014, electric power companies will develop power generation facilities with a total capacity of 30.42GW, 48% of which will be accounted for by nuclear.

Demand Outlook

	FY2003 (Results)	FY2004 (Results)	FY2005 (Plan)	FY2009 (Plan)	FY2014 (Plan)	Annual Growth(%) 2003-2014
Electricity Demand (TWh)	(837.0) 834.3	865.4	854.1	888.8	937.4	(1.0) 1.1
Peak Demand (GW)	(1,671.5) 1,639.8	1,718.2	1,725.0	1,796.4	1,892.0	(1.1) 1.3
Annual Load Factor (%)	(60.5) 61.2	60.7	59.7	59.7	59.8	

Note: Figures in parentheses are adjusted temperature variations.

Electric Power Development Capacity

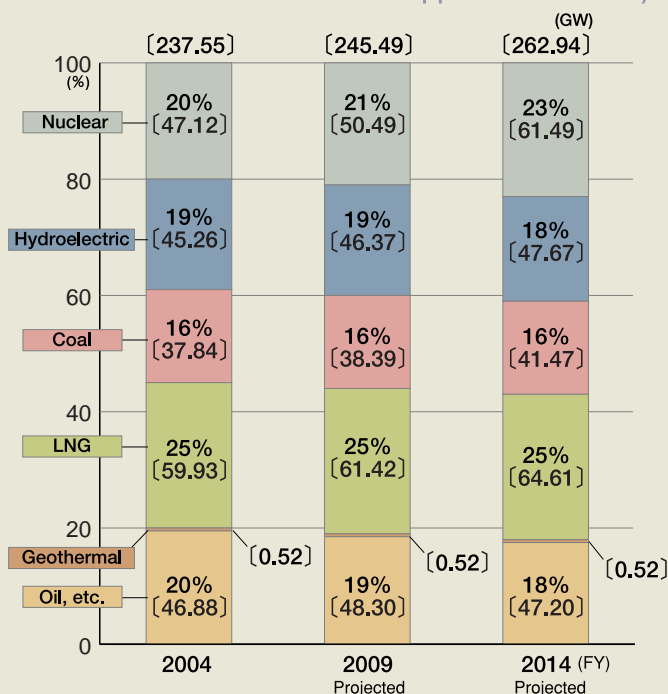
	FY2005-FY2014		Breakdown	
	GW	%	FY2005-FY2009	FY2010-FY2014
Nuclear	14.72	48	3.37	11.35
Hydro	2.46	8	1.13	1.34
Conventional	0.32	1	0.06	0.27
Pumped-storage	2.14	7	1.07	1.07
Thermal	13.23	44	6.78	6.45
Coal	4.79	16	1.29	3.50
LNG	8.12	27	5.25	2.87
Geothermal	—	—	—	—
Oil, etc.	0.33	1	0.24	0.08
Total	30.42	100.0	11.28	19.13

Note: Figures do not necessarily total to 100% due to rounded numbers.

Source: Long-Term Electric Power Facilities Development Plan

Generation Capacity Composition by Energy Source

(For Ten Companies, Wholesale Utilities,
Wholesale Suppliers and Others)

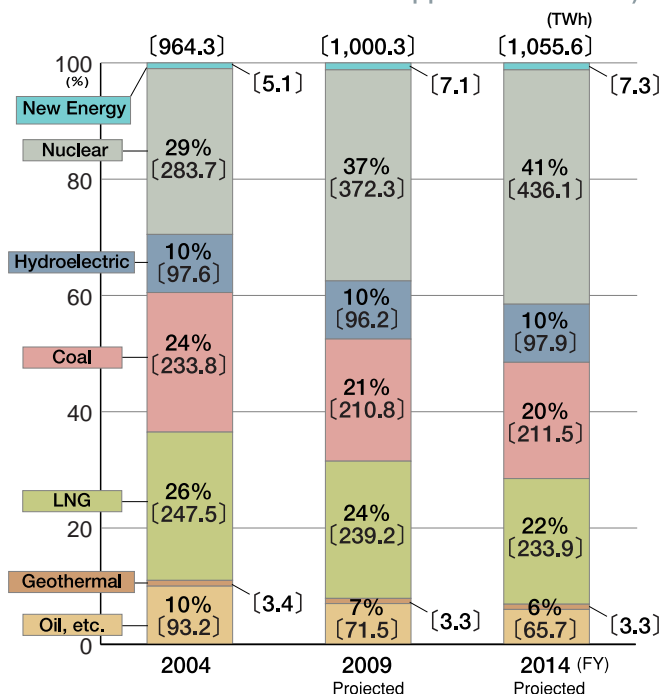


Note: Figures do not necessarily total to 100% due to rounded numbers.

Sources: Long-Term Electric Power Facilities Development Plan and others

Power Output Composition by Energy Source

(For Ten Companies, Wholesale Utilities,
Wholesale Suppliers and Others)



Note: Figures do not necessarily total to 100% due to rounded numbers.

Sources: Long-Term Electric Power Facilities Development Plan and others

diversifying our power sources

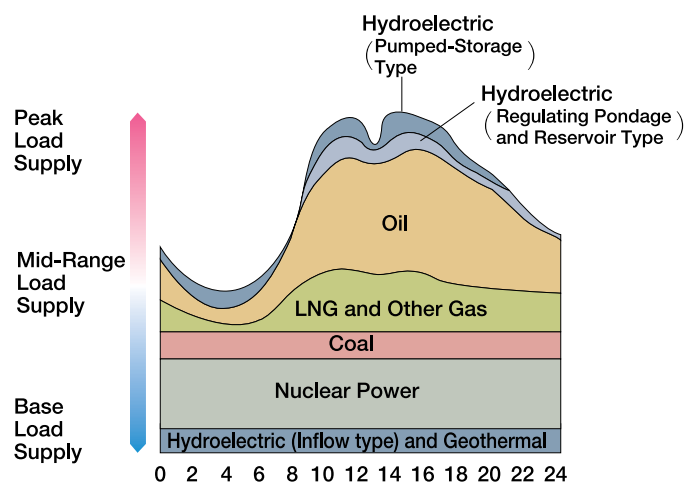
Optimal Combination of Power Sources

Due to the nature of supplying electric power – a commodity that is nearly impossible to store – electric power companies generate electricity by combining various power sources based on optimal operational and economic performances to always meet the fluctuating demand.

Nuclear power generation is the key base-load power source and will continue to play an important role in contributing to stable supply and help to deal with global environmental issues. Hydroelectric and geothermal power generation, which have excellent environmental characteristics, will be developed considering environmental impacts as well as reduction in development costs. Coal-fired power generation excels in stable base-load supply and economic performances, and so electric power companies will develop it while improving thermal efficiency and considering environmental impacts. Liquefied natural gas (LNG) fired power generation excels in high thermal efficiency and environmental characteristics, and its use will also continue to be expanded. Finally, photovoltaic and wind power generation are clean, indigenous sources of energy, which electric power companies will cooperate with the national government in attaining the new energy (most renewable) utilization goal.



(Example) Combination of Power Sources



Hydroelectric and nuclear power provides base load supply, while coal and LNG are major power sources for mid-range load supply. Oil-fired and pumped-storage hydroelectric power respond to peak demand variation and contribute to consistent stable supply of electricity.

Profile of Japan's Major Power Generation Sources

Hydroelectric Power

Hydroelectric power is one of the few resources of self-sufficient energy in resource-poor Japan. Hydroelectric power is an excellent source in terms of stable supply and generation cost over the long term. Hydroelectric power saw a rebirth in development following the oil crises of the 1970s. Although steady development of hydroelectric power plants is desired, Japan has nearly exhausted the sites available for construction of large-scale hydroelectric facilities. Recent development has been made on a smaller scale.

As demand gaps continue to grow between daytime and nighttime, electric power companies are also developing large-scale pumped-storage power generation plants to meet peak demand. Pumped-storage generation facilities are growing in terms of their share of the total hydroelectric power capacity in Japan.

Thermal Power

Initially, coal was the dominant fuel for thermal power generation in Japan, but it later lost that place to oil. Today, a diverse range of fuels including coal, oil, and LNG are used for the important generating role that thermal power plants play. In particular, in response to global environmental concerns, electric power companies are promoting the introduction of LNG fired plants, as they emit less CO₂ and other pollutants.

In efforts to further enhance thermal efficiency, combine-cycle generating plants with both gas and steam turbines have been installed. As a result, gross thermal efficiency (maximum designed value) has reached 50%. In the future, we will continue efforts to research and develop new technologies in order to further increase thermal efficiency as well as the use of integrated coal gasification combined cycle (IGCC) power generation.



Daini Numazawa Hydroelectric Power Plant (Pumped Storage)



Shin Nagoya Thermal Power Plant (LNG fired)



Futtsu Thermal Power Plant (LNG fired)

Nuclear Power

Japan's first commercial nuclear power plant started operation in Ibaraki Prefecture in 1966. As of end of December 2005, Japan has fifty-four reactors operating around the country, usually accounting for around one-third of the country's total electric power output. By fiscal 2014, there is a goal of increasing the nuclear power output percentage to 41 percent. Currently, there are three plants under construction, as well as another eleven that are in advanced planning stages. While placing the highest priority on nuclear safety and public trust, Japanese electric power companies will continue their efforts to develop nuclear power generation as a base-load power source that plays an important role in Japan's electric power supply in order to secure steady supply of electricity and address global environmental issues.

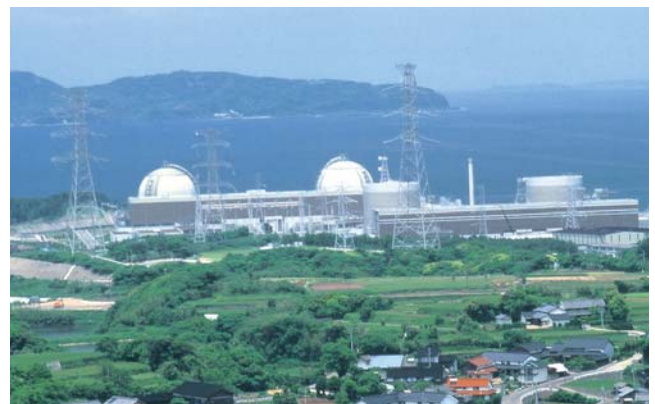
Nuclear power makes a great contribution to energy security for resource-poor Japan by producing the energy-equivalent of approximately 350 million barrels of oil per year, which corresponds to about 20 percent of total annual crude imports. In addition, nuclear power generation does not emit carbon dioxide (CO₂), and thus helps to cope with growing concerns about global warming. So far, nuclear power generation has had the net effect of reducing Japan's total CO₂ emissions by about 20%. For these reasons, nuclear power is expected to play a major role as a central power source in the years to come.



Tomari Power Plant (PWR)



Shika Nuclear Power Plant (BWR)



Genkai Nuclear Power Plant (PWR)

Column

Establishment of new nuclear support organization

On April 13, 2005, the Japan Nuclear Technology Institute (JNTI) was established through the integration of the Nuclear Information Center of Central Research Institute of Electric Power Industry and Nuclear Safety Network (NS Net). In cooperation with the Japanese nuclear industry, JNTI will formulate guidelines to promote nuclear technology.

Start of Japan's largest nuclear research institute

On October 1, 2005, the Japan Atomic Energy Agency (JAEA) was established as the only institute in Japan in the field of nuclear energy through the integration of the Japan Atomic Energy Research Institute and the Japan Nuclear Cycle Development Institute. JAEA aims to implement basic and applied research on nuclear energy, in tandem with research and development of nuclear fuel cycle in an integrated, systematic and efficient manner.

Japan has adopted a closed nuclear fuel cycle policy. Because Japan lacks sufficient natural resources, it has decided to recycle spent nuclear fuel domestically in order to establish nuclear power as a homegrown energy source. Reprocessing is a chemical process that recovers plutonium and reusable uranium from spent fuel and separates radioactive wastes into more manageable forms. Once recovered, the plutonium is ready to be re-introduced into the nuclear power plants in the form known as uranium-plutonium mixed oxide (MOX) fuel. Japan's electric power companies remain committed to a plan to utilize recovered plutonium – in the form of MOX fuel – in 16 – 18 nuclear reactors by fiscal 2010. The benefits of a closed nuclear fuel cycle for Japan are clear: it adds to long-term energy security by further reducing dependence on imported fuels; it conserves uranium resources; and it reduces the amount of highly radioactive waste that must be disposed of.

In the past, Japan has relied on countries such as the U.K. and France to reprocess most of the spent fuel it produced. However, to place Japan's domestic nuclear fuel cycle on firmer footing, Japan Nuclear Fuel Limited(JNFL) is preparing for the start-up of the commercial operation of a reprocessing plant in August 2007 at a site in Rokkasho-mura in the northern prefecture of Aomori. In addition, JNFL engages in uranium enrichment, temporary storage of vitrified waste, and disposal of low-level radioactive waste. JNFL also has plans to construct a MOX fuel fabrication plant expected to start operation in April 2012.

The diagram illustrates the nuclear fuel cycle facilities in Japan, showing the flow from uranium mining to final disposal of waste. The cycle includes stages like refining, enrichment, conversion, fuel fabrication, power generation, reprocessing, and waste management. A map of Japan highlights the locations of the JNFL (Rokkasho-mura) and Aomori, and Tokyo.

Uranium Mine
 Uranium ore

Refining Plant
 Yellow cake (U_3O_8)

Uranium Enrichment Plant
 UF_6

Conversion Plant
 UF_6

Reconversion Plant
 UO_2 (Depleted Uranium)

MOX Fuel Fabrication Plant
 UO_2

Fuel Fabrication Plant
 UO_2

Reprocessing Plant
 Recovered Uranium, Plutonium

MOX Fuel Assemblies

Fuel Assemblies

Nuclear Power Plant
 Spent fuel

Spent-fuel Storage Center (Interim Storage Facility)
 Spent fuel

Low-level Radioactive Waste Disposal Center
 Low-level radioactive waste

Vitrified Waste Storage Center
 High-level radioactive waste

Final disposal of high-level radioactive waste

JNFL (Rokkasho-mura)
 Aomori

Tokyo

Nuclear Fuel Cycle Facilities

As of February 20, 2006

Outline of JNFL's Nuclear Fuel Cycle Facilities

Facility	Reprocessing Plant	MOX Fuel Fabrication Plant	Vitrified Waste Storage Center	Uranium Enrichment Plant	Low-level Radioactive Waste Disposal Center
Site	Iyasaki, Rokkasho-mura, Kamikita-gun, Aomori Prefecture			Oishitai, Rokkasho-mura, Kamikita-gun, Aomori Prefecture	
Capacity	Maximum capacity: 800 ton-U/year Storage capacity for spent fuel: 3,000 ton-U	Maximum capacity: 130 ton-HM/year (*)	Storage capacity for wastes returned from overseas plants: 1,440 canisters of vitrified waste Planned to be expanded to 2,880 canisters	Initial capacity: 150 ton-SWU/year Planned to be expanded to a maximum capacity of 1,500 ton-SWU/year	Authorized capacity: 200,000m³ (equivalent to 1 million 200 liter drums) Planned to be expanded to 600,000m³
Current Status	Under construction	Planning for construction	Cumulative number of stored canisters: 1,016	Present capacity: 1,050 ton-SWU/year	Cumulative number of stored drums: 181,715
Construction Cost	about 2.19 trillion yen	about 120 billion yen	80 billion yen(**)	about 250 billion yen	about 160 billion yen(***)
Schedule	Start of construction: 1993 Start of operation: 2007(planned)	Start of operation: 2012(planned)	Start of construction: 1992 Start of storage: 1995	Start of construction: 1998 Start of operation: 1992	Start of construction: 1990 Start of operation: 1992

(*) "ton-HM" stands for "tons of heavy metal" which indicates the weight of plutonium and uranium metallic content in MOX.

(**) Construction expense regarding 1,440 canisters of vitrified waste.

(***) Construction expense regarding 200,000 m³ low-level radioactive waste (equivalent to 1 million 200 liter drums)

Sources: JNFL's Brochure and others

The Peaceful Use of Nuclear Energy

Japan's electric power company is fully committed to implementing the closed nuclear fuel cycle and plutonium utilization program consistent with all domestic laws and international nonproliferation standards. Since 1955, the domestic laws of Japan require that all nuclear activities, including commercial activities, be conducted only for peaceful purposes. Also, since 1968, Japan has embraced the "Three Non-Nuclear Principles," which state that Japan will not possess, produce, or permit the entry of nuclear weapons into its territory. In addition, in 1976, the Government of Japan ratified the Nuclear Non-Proliferation Treaty (NPT) and thereby obligated itself to a national policy not to produce or acquire nuclear weapons. In order to ensure the application of more extensive safeguards, Japan signed the IAEA Additional Protocol in 1998. The Additional Protocol allows the IAEA to carry out a range of additional inspection measures. In accordance with national laws, Japan's electric power companies submit reports on material accounting and safeguard activities to the Minister of Education, Culture, Sports, Science and Technology, and accept joint inspections by the IAEA and Japanese regulatory authorities to check the reports.

In June 2004, IAEA officially authorized Japan's commitment to peaceful use of nuclear activities. From September 2004, more effective IAEA safeguards known as integrated safeguards is applied, and consequently, Japan will receive fewer inspections at its nuclear facilities. Thus its pursuit of all nuclear technology is limited to peaceful purposes by adherence to international regimes, such as the NPT, as well as strict domestic laws.



Construction site of JNFL's reprocessing plant



Central control room of all reprocessing facilities

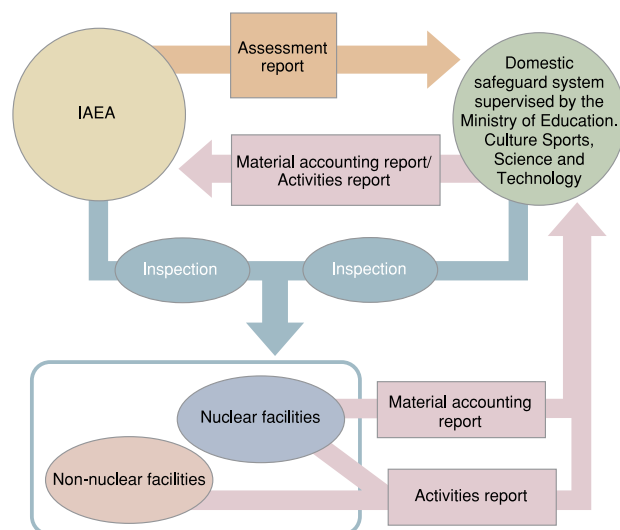
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Construction of an interim storage facility

On October 19, 2005, Aomori Prefecture, the city of Mutsu, Tokyo Electric Power Company (TEPCO) and the Japan Atomic Power Company (JAPC) signed an agreement for the construction of an interim storage facility. On November 21, 2005, TEPCO and JAPC established a new company "Recyclable Fuel Storage Company (RFS)" which store and manage the spent fuel from nuclear power plants. The interim storage facility to appropriately store spent fuel that accumulates in excess of the Rokkasho Reprocessing Facility's capacity gives significance of the flexibility granted to nuclear fuel cycle policy.



The Safeguard Program



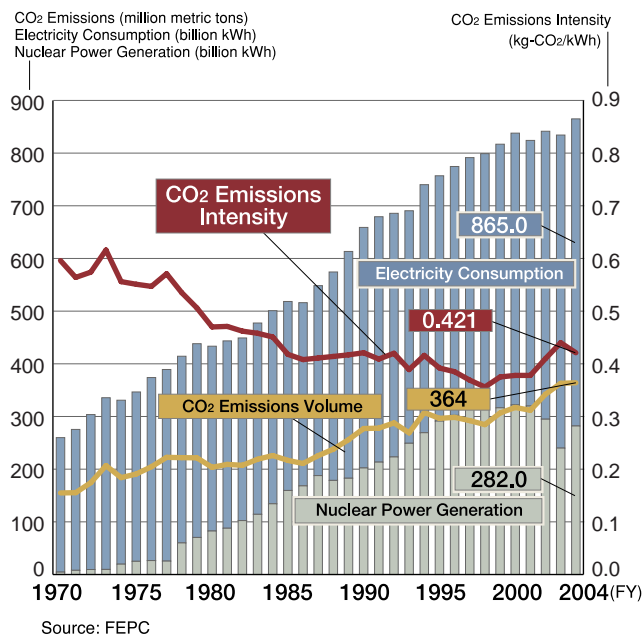
Electric power companies aim to reduce CO₂ emissions to cope with global

Environmental Protection

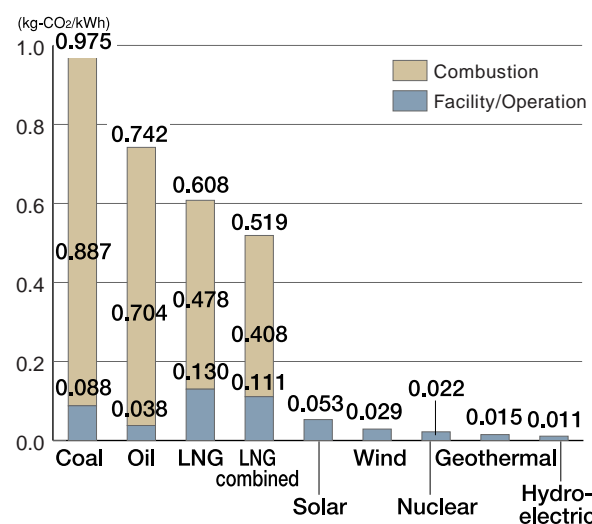
Harmonizing the natural environment with energy needs is one of the most important issues in the electric power industry. We, electric power companies, promote nuclear power that emits no carbon dioxide (CO₂) in the process of power generation. If we consider the entire life cycle of all available energy sources, CO₂ emissions from nuclear power are lower than thermal power, and are even lower than solar or wind power. Thus nuclear power is an outstanding power source in terms of clean air goals. The industry also continues to expand the use of LNG-fired power plants, improve thermal efficiency in all thermal power plants, and reduce transmission and distribution losses. Since the oil crises of the 1970's, Japan's electricity consumption has increased by approximately three-fold, but CO₂ emissions intensity level (end use electricity) in fiscal 2004 was 0.421 kg-CO₂ per kWh, meaning that emissions per kWh used has fallen by around 30% since 1970.

In addition, we have combined environmental protection with stable electricity by improving fossil fuel quality and reliability for power generating facilities. Consequently, sulfur oxide (SO_x) and nitrogen oxide (NO_x) emission levels per kWh of thermal power output in Japan rank among the lowest in the world.

Trend in Japan's CO₂ Emissions from Electricity Generation (excluding self-generators)



Japan's Lifecycle Assessment CO₂ Emissions Intensity by Source



Note: (1) Based on total CO₂ emissions from all energy consumed in energy extraction, transportation, refining, plant operation and maintenance, etc. in addition to burning of the fuel.
(2) Data for nuclear power includes reprocessing of spent fuel in Japan (now in the planning stages), use of Plu-thermal technology (assumes recycling once) and disposal of high level radioactive waste.
(3) CO₂ emissions from the uranium enrichment process are calculated according to the ratio of uranium enriched in Japan. If it is assumed that all uranium is enriched domestically, the figure for nuclear power would be 0.010kg-CO₂/kWh.
(4) In some cases, the sum of "fuel" and "equipment/operation" do not correspond exactly with the total values listed due to the rounding up of numerical data.

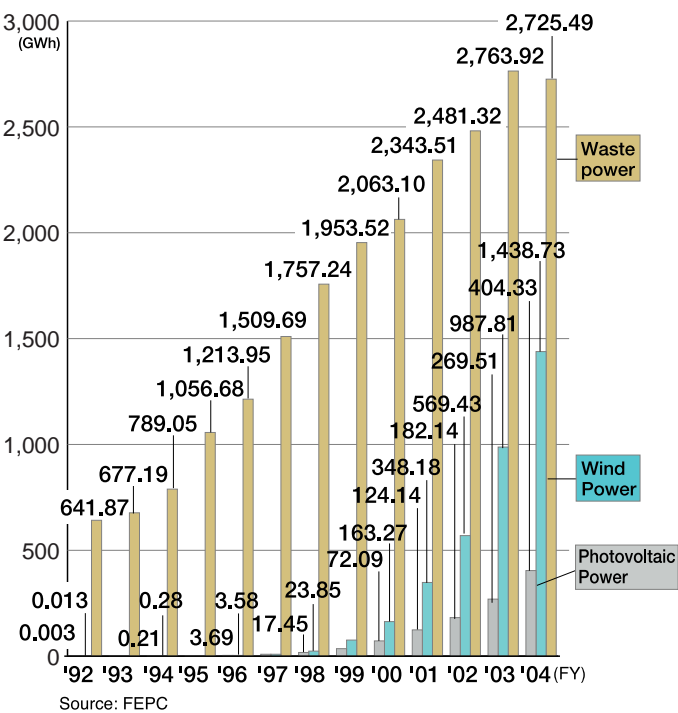
Source: Report of the Central Research Institute of Electric Power Industry

warming issues, while continuing to meet growing power demand

Renewable Energy Sources

Recently, more and more photovoltaic and wind power plants have been installed across the country as clean energy sources that emit no CO₂. Electric power companies are also focusing aggressively on research and development to solve negatives associated with renewable energy sources, such as low efficiency in generation, high generation cost and technical difficulties in power system interconnection. In order to promote such renewable energy, electric power companies implemented an additional power purchasing system in 1992 as well as the Green Power Fund established in October 2000, which collects donations from customers to construct photovoltaic and wind power facilities. Electric power companies are also firmly committed to the renewable portfolio standard (RPS) system promulgated by the national government in April 2003, which requires each electric power company to generate or purchase a designated volume of “new energy” (mostly renewable) or its equivalent. Japan’s electric power companies continue to make efforts to expand and promote renewable energy sources.

Ten Electric Power Companies’ Purchasing Volume of Green Power



Wind Power



Photovoltaic Cells

Major Power Plants

Japan's electric power industry operates some 1,800 hydroelectric, thermal, nuclear, and other power plants to meet the required demand. Here is a list and map of the country's major power plants:

Principal Thermal Power Plants

(1,000MW or greater)

As of March 31, 2005

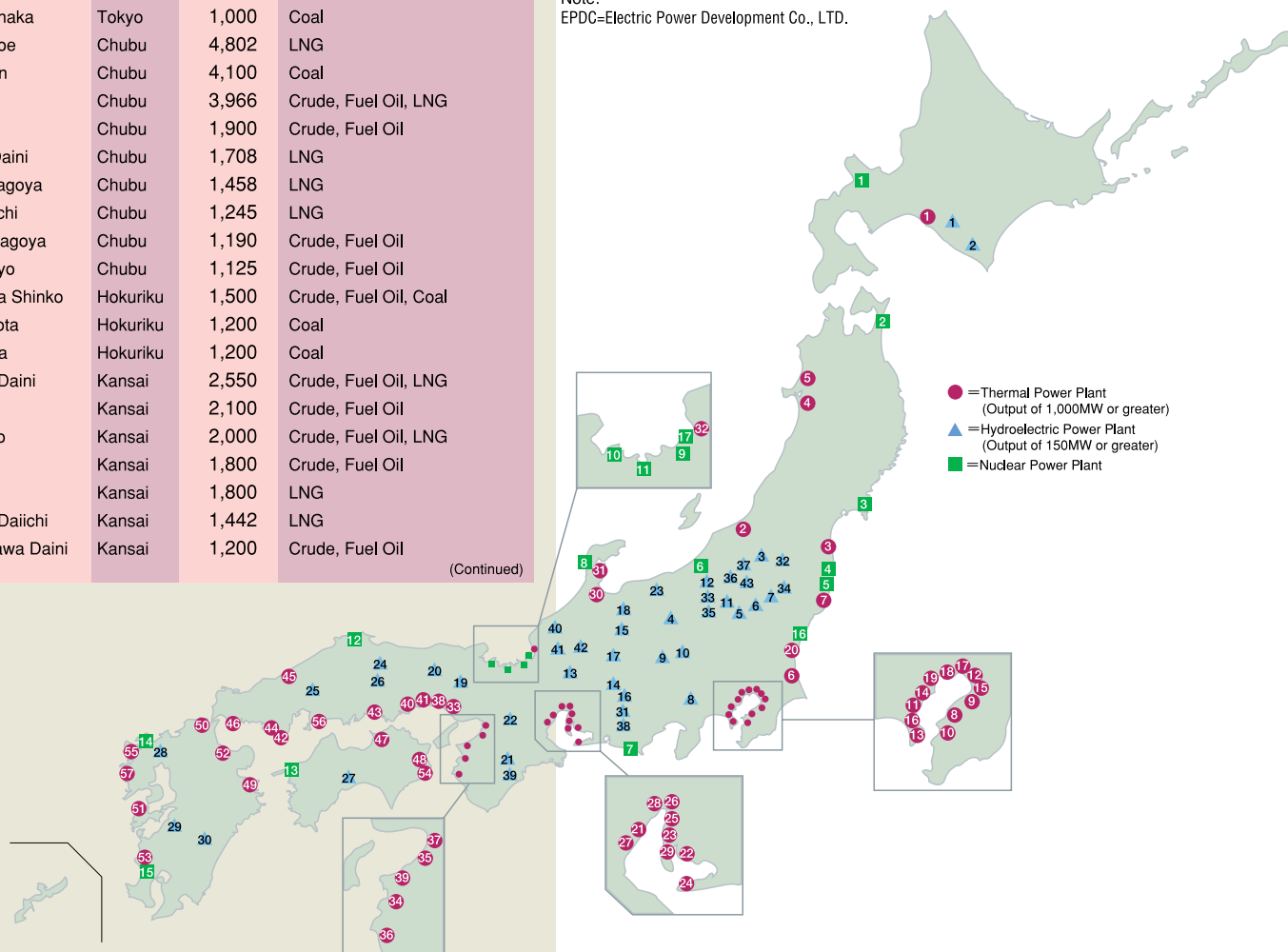
	Name of Plant	Company	Installed Capacity (MW)	Fuel
1	Tomato-atsuma	Hokkaido	1,735	Coal
2	Higashi Niigata	Tohoku	3,816	LNG, other Gas
3	Haramachi	Tohoku	2,000	Coal
4	Akita	Tohoku	1,300	Crude, Fuel Oil
5	Noshiro	Tohoku	1,200	Coal
6	Kashima	Tokyo	4,400	Crude, Fuel Oil
7	Hirono	Tokyo	3,800	Crude, Fuel Oil, LNG, Coal
8	Sodegaura	Tokyo	3,600	LNG
9	Anegasaki	Tokyo	3,600	Crude, Fuel Oil, LNG, LPG
10	Futtsu	Tokyo	3,520	LNG
11	Yokohama	Tokyo	3,325	Crude, Fuel Oil, LNG
12	Chiba	Tokyo	2,880	LNG
13	Yokosuka	Tokyo	2,365	Crude, Fuel Oil
14	Higashi Ogishima	Tokyo	2,000	LNG
15	Goi	Tokyo	1,886	Crude, Fuel Oil, LNG, Naphtha
16	Minami Yokohama	Tokyo	1,150	LNG
17	Shinagawa	Tokyo	1,140	City Gas
18	Ohi	Tokyo	1,050	Crude Oil
19	Kawasaki	Tokyo	1,050	LNG
20	Hitachinaka	Tokyo	1,000	Coal
21	Kawagoe	Chubu	4,802	LNG
22	Hekinan	Chubu	4,100	Coal
23	Chita	Chubu	3,966	Crude, Fuel Oil, LNG
24	Atsumi	Chubu	1,900	Crude, Fuel Oil
25	Chita Daini	Chubu	1,708	LNG
26	Shin Nagoya	Chubu	1,458	LNG
27	Yokkaichi	Chubu	1,245	LNG
28	Nishi Nagoya	Chubu	1,190	Crude, Fuel Oil
29	Taketoyo	Chubu	1,125	Crude, Fuel Oil
30	Toyama Shinko	Hokuriku	1,500	Crude, Fuel Oil, Coal
31	Nanaoota	Hokuriku	1,200	Coal
32	Tsuruga	Hokuriku	1,200	Coal
33	Himeji Daini	Kansai	2,550	Crude, Fuel Oil, LNG
34	Kainan	Kansai	2,100	Crude, Fuel Oil
35	Sakaiko	Kansai	2,000	Crude, Fuel Oil, LNG
36	Gobo	Kansai	1,800	Crude, Fuel Oil
37	Nanko	Kansai	1,800	LNG
38	Himeji Daiichi	Kansai	1,442	LNG
39	Tanagawa Daini	Kansai	1,200	Crude, Fuel Oil

(Continued)

	Name of Plant	Company	Installed Capacity (MW)	Fuel
40	Ako	Kansai	1,200	Crude, Fuel Oil
41	Aioi	Kansai	1,125	Crude, Fuel Oil
42	Yanai	Chugoku	1,400	LNG
43	Tamashima	Chugoku	1,200	Crude, Fuel Oil
44	Kudamatsu	Chugoku	1,075	Crude, Fuel Oil
45	Misumi	Chugoku	1,000	Coal
46	Shin Onoda	Chugoku	1,000	Coal
47	Sakaide	Shikoku	1,345	Crude, Fuel Oil, other Gas
48	Anan	Shikoku	1,245	Crude, Fuel Oil
49	Shin Oita	Kyushu	2,295	LNG
50	Shin Kokura	Kyushu	1,800	LNG
51	Reihoku	Kyushu	1,400	Coal
52	Buzen	Kyushu	1,000	Crude, Fuel Oil
53	Sendai	Kyushu	1,000	Crude, Fuel Oil
54	Tachibanawan	EPDC	2,100	Coal
55	Matsuura	EPDC	2,000	Coal
56	Takehara	EPDC	1,300	Coal
57	Matsushima	EPDC	1,000	Coal

Note:

EPDC=Electric Power Development Co., LTD.



Nuclear Power Plants

(In operation, Under construction, Preparing for Construction, Closed, Others) As of December 31, 2005

	Name of Plant	Unit Number	Company	Installed Capacity (MW)	Type of Reactor	Start
1	Tomari	1	Hokkaido	579	PWR	1989.6
		2		579	PWR	1991.4
2	Higashi-Dori	1	Tohoku	1,100	BWR	2005.12
3	Onagawa	1	Tohoku	524	BWR	1984.6
		2		825	BWR	1995.7
		3		825	BWR	2002.1
4	Fukushima Daiichi	1	Tokyo	460	BWR	1971.3
		2		784	BWR	1974.7
		3		784	BWR	1976.3
		4		784	BWR	1978.10
		5		784	BWR	1978.4
		6		1,100	BWR	1979.10
5	Fukushima Daini	1	Tokyo	1,100	BWR	1982.4
		2		1,100	BWR	1984.2
		3		1,100	BWR	1985.6
		4		1,100	BWR	1987.8
6	Kashiwazaki Kariwa	1	Tokyo	1,100	BWR	1985.9
		2		1,100	BWR	1990.9
		3		1,100	BWR	1993.8
		4		1,100	BWR	1994.8
		5		1,100	BWR	1990.4
		6		1,356	ABWR	1996.11
		7		1,356	ABWR	1997.7
7	Hamaoka	1	Chubu	540	BWR	1976.3
		2		840	BWR	1978.11
		3		1,100	BWR	1987.8
		4		1,137	BWR	1993.9
		5		1,380	ABWR	2005.1
8	Shika	1	Hokuriku	540	BWR	1993.7
9	Mihama	1	Kansai	340	PWR	1970.11
		2		500	PWR	1972.7
		3		826	PWR	1976.12
10	Takahama	1	Kansai	826	PWR	1974.11
		2		826	PWR	1975.11
		3		870	PWR	1985.1
		4		870	PWR	1985.6
11	Ohi	1	Kansai	1,175	PWR	1979.3
		2		1,175	PWR	1979.12
		3		1,180	PWR	1991.12
		4		1,180	PWR	1993.2
12	Shimane	1	Chugoku	460	BWR	1974.3
		2		820	BWR	1989.2
13	Ikata	1	Shikoku	566	PWR	1977.9
		2		566	PWR	1982.3
		3		890	PWR	1994.12
14	Genkai	1	Kyushu	559	PWR	1975.10
		2		559	PWR	1981.3
		3		1,180	PWR	1994.3
		4		1,180	PWR	1997.7
15	Sendai	1	Kyushu	890	PWR	1984.7
		2		890	PWR	1985.11
16	Tokai Daini		Japan Atomic Power Co.	1,100	BWR	1978.11
17	Tsuruga	1	Japan Atomic Power Co.	357	BWR	1970.3
		2		1,160	PWR	1987.2
Total		54 Units		48,222MW		

Under Construction

(Estimated start)

Tomari	3	Hokkaido	912	PWR	2009.12
Shika	2	Hokuriku	1,358	ABWR	2006.3
Shimane	3	Chugoku	1,373	ABWR	2011.12
Total		3 Units	3,643MW		

Closed

Tokai		Japan Atomic Power Co.	166	GCR	1998.3
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Others

Fugen		Japan Atomic Energy Agency	165	ATR(Prototype)	
Monju		Japan Atomic Energy Agency	280	FBR(Prototype)	

Note: PWR=Pressurized Water Reactor, BWR=Boiling Water Reactor, APWR=Advanced Pressurized Water Reactor, ABWR=Advanced Boiling Water Reactor, GCR=Gas Cooled Reactor, ATR=Advanced Thermal Reactor, FBR=Fast Breeder Reactor

Principal Hydroelectric Power Plants

(150MW or greater)

As of March 31, 2005

	Name of Plant	Company	Installed Capacity (MW)	Type
1	Niikappu	Hokkaido	200	Pumped Storage
2	Takami	Hokkaido	200	Pumped Storage
3	Daini Numazawa	Tohoku	460	Pumped Storage
4	Shin Takasegawa	Tokyo	1,280	Pumped Storage
5	Tamahara	Tokyo	1,200	Pumped Storage
6	Imaichi	Tokyo	1,050	Pumped Storage
7	Shiobara	Tokyo	900	Pumped Storage
8	Kazunogawa	Tokyo	800	Pumped Storage
9	Azumi	Tokyo	623	Pumped Storage
10	Midono	Tokyo	245	Pumped Storage
11	Yagisawa	Tokyo	240	Pumped Storage
12	Shinanogawa	Tokyo	177	
13	Okumino	Chubu	1,500	Pumped Storage
14	Okuyahagi Daini	Chubu	780	Pumped Storage
15	Takane Daiichi	Chubu	340	Pumped Storage
16	Okuyahagi Daiichi	Chubu	315	Pumped Storage
17	Mazegawa Daiichi	Chubu	288	Pumped Storage
18	Arimine Daiichi	Hokuriku	265	
19	Okutataragi	Kansai	1,932	Pumped Storage
20	Okawachi	Kansai	1,280	Pumped Storage
21	Okuyoshino	Kansai	1,206	Pumped Storage
22	Kisenyama	Kansai	466	Pumped Storage
23	Kurobegawa Daiyon	Kansai	335	
24	Matanogawa	Chugoku	1,200	Pumped Storage
25	Nabara	Chugoku	620	Pumped Storage
26	Shin Nariwagawa	Chugoku	303	Pumped Storage
27	Hongawa	Shikoku	615	Pumped Storage
28	Tenzan	Kyushu	600	Pumped Storage
29	Ohira	Kyushu	500	Pumped Storage
30	Hitotsuse	Kyushu	180	
31	Shin Toyone	EPDC	1,125	Pumped Storage
32	Shimogo	EPDC	1,000	Pumped Storage
33	Okukiyotsu	EPDC	1,000	Pumped Storage
34	Numappara	EPDC	675	Pumped Storage
35	Okukiyotsu Daini	EPDC	600	Pumped Storage
36	Okutadami	EPDC	560	
37	Tagokura	EPDC	380	
38	Sakuma	EPDC	350	
39	Ikehara	EPDC	350	Pumped Storage
40	Tedorigawa Daiichi	EPDC	250	
41	Nagano	EPDC	220	Pumped Storage
42	Miboro	EPDC	215	
43	Otori	EPDC	182	

Preparing for Construction

(Estimated start)

Namie-Odaka		Tohoku	825	BWR	2016
Higashi-Dori	2	Tohoku	1,385	ABWR	2016
Fukushima Daiichi	7	Tokyo	1,380	ABWR	2011.10
	8		1,380	ABWR	2012.10
Higashi-Dori	1	Tokyo	1,385	ABWR	2013
	2		1,385	ABWR	2015
Kaminoseki	1	Chugoku	1,373	ABWR	2014
	2		1,373	ABWR	2017
Ohma		EPDC	1,383	ABWR	2012.3
Tsuruga	3	Japan Atomic Power Co.	1,538	APWR	2014.3
	4		1,538	APWR	2015.3
Total		11 Units	14,945MW		

Improving communication and cooperation with friends and

Strengthening international cooperation

Japan's electric power companies remain active on a worldwide basis. In order to cope with global warming and to ensure the safety of nuclear power generation, international cooperation is dispensable from the global point of view. Each of the electric power companies in Japan has individual agreements with overseas utilities in order to facilitate exchanges on a wide range of information such as power generation, customer relations, distribution and quality control. The industry's top executives participate in international meetings such as the International Electricity Summit and the World Association of Nuclear Operators (WANO) to exchange views, while we also accept trainees from Asia, east Europe and Russia. We import most of our fuel from overseas countries and also keep our doors open to foreign companies on the purchase of equipment such as generators.

Overseas Offices

Please feel free to contact your nearest office.

WASHINGTON, D.C.

● The Federation of Electric Power Companies of Japan, Washington Office

The Federation's Washington Office was established in January 1994. Its principal objectives are to study U.S. energy policies and to exchange information with U.S. energy opinion leaders in order to promote a greater understanding of the Japanese electric power industry.

1901 L Street, N.W., Suite 600, Washington, D.C. 20036, U.S.A.
Tel: (202) 466-6781 Fax: (202) 466-6758
<http://www.japannuclear.com/>
Established in 1994

WASHINGTON, D.C.

● Tokyo Electric Power Co., Inc., Washington Office

1901 L Street, N.W., Suite 720, Washington, D.C. 20036, U.S.A.
Tel: (202) 457-0790 Fax: (202) 457-0810
Established in 1978

● Chubu Electric Power Co., Inc., Washington Office

900 17th Street, N.W., Suite 1220, Washington, D.C. 20006, U.S.A.
Tel: (202) 775-1960 Fax: (202) 331-9256
Established in 1982

LONDON

● Tokyo Electric Power Co., Inc., London Office

Berkeley Square House, Berkeley Square, London W1J 6BR, U.K.
Tel: (020) 7629-5271 Fax: (020) 7629-5282
Established in 1982

● Chubu Electric Power Co., Inc., London Office

Nightingale House, 65 Curzon Street, London W1Y 7PE, U.K.
Tel: (020) 7409-0142 Fax: (020) 7408-0801
Established in 1985



International Exchange Activities for Each Electric Power Company

NORTH AMERICA

CANADA

Ontario Power Generation
TOHOKU

U.S.A.

Portland General Electric Co.
HOKKAIDO
Progress Energy Carolinas, Inc.
TOHOKU
Georgia Power Co. (GP)
TOHOKU
PJM Interconnection
TOKYO
Duane Arnold Nuclear Power Station
CHUBU
Consumers Energy Co.
CHUBU
Florida Power & Light Co. (FPL)
KANSAI
Entergy Operations, Inc. (EO)
KANSAI
New York ISO
KANSAI
Nuclear Management Company
SHIKOKU

EUROPE

GERMANY

Hamburgische Electricitäts-Werke AG
HOKKAIDO
E.ON Energie AG
TOHOKU
RWE AG
TOKYO / KANSAI

FRANCE

Électricité de France (EDF)
TOKYO / CHUBU / KANSAI /
SHIKOKU / KYUSHU
Réseau de Transport d'Électricité (RTE)
TOKYO / KANSAI / KYUSHU

UNITED KINGDOM

National Grid Transco plc.
TOKYO
Northern Electric plc.
CHUBU
British Energy plc.
KANSAI
Scottish Power plc.
KYUSHU

SWEDEN

Vattenfall AB
TOKYO / KANSAI
Forsmark Kraftgrupp AB.
CHUBU
Sydkraft AB
HOKURIKU

FINLAND

Teollisuuden Voima Oy Industrial Power Co., Ltd. (TVO)
CHUBU

BULGARIA

Bulgaria Natsional Elektricheska Kompania (NEK)
CHUBU

ITALY

Ente Nazionale per l'Energia Elettrica (ENEL)
CHUBU / KANSAI

RUSSIA

Sakhalinenergo
HOKKAIDO
Daljenergo
HOKURIKU

SWITZERLAND

Nordostschweizerische Kraftwerke AG (NOK)
KANSAI

SPAIN

Unión Eléctrica-FENOSA SA
KANSAI
Empresa Nacional de Electricidad, SA (ENDESA)
KANSAI

AFRICA

SOUTH AFRICA

ESKOM
TOKYO

ASIA

CHINA

Jilin Electric Power Company Ltd.
HOKKAIDO
China Electricity Council
TOHOKU
Heilongjiang Electric Power Co., Ltd.
TOHOKU
State Grid Corporation of China
TOKYO / KANSAI
State Power Central Company
CHUBU
Liaoning Electric Power Company
HOKURIKU
Northeast China Grid Company Ltd.
HOKURIKU
State Power Corporation of China
HOKURIKU
Beijing Guohua Electric Power Corporation
KANSAI
East China Grid Company Ltd.
KANSAI
Zhejiang Provincial Energy Group Company Ltd.
KANSAI
Sichuan Electric Power Corporation
CHUGOKU
Northwest China Grid Company Ltd.
SHIKOKU

China Huadian Corporation
KYUSHU
Shandong Electric Power Corp.
KYUSHU
Sichuan Test and Research Institute
KYUSHU

SINGAPORE

Tuas Power Ltd.
KYUSHU

TAIWAN

Taiwan Power Company
TOKYO / CHUBU / HOKURIKU /
KANSAI / CHUGOKU / KYUSHU /
OKINAWA

KOREA

Korea Electric Power Corp.
TOKYO / KANSAI / KYUSHU
Korea Power Exchange
KYUSHU

THAILAND

Electricity Generating Authority of Thailand
HOKKAIDO / TOKYO
Provincial Electricity Authority
KYUSHU

MALAYSIA

Tenaga Nasional Berhad (TNB)
TOKYO

INDONESIA

P.T. PLN (PERSERO)
TOKYO

VIETNAM

Electricity of Vietnam (EVN)
TOHOKU / KYUSHU

MYANMAR

Department of Electric Power (DEP)
TOHOKU
Myanma Electric Power Enterprise (MEPE)
TOHOKU / CHUBU

PHILIPPINES

The Manila Electric Co. (MERALCO)
KANSAI
National Power Corporation
KYUSHU

QATAR

Qatar General Electricity & Water Corporation
CHUBU

OCEANIA

AUSTRALIA

Western Power Corporation
KYUSHU

The Federation of Electric Power Companies represents Japan's ten electric power companies

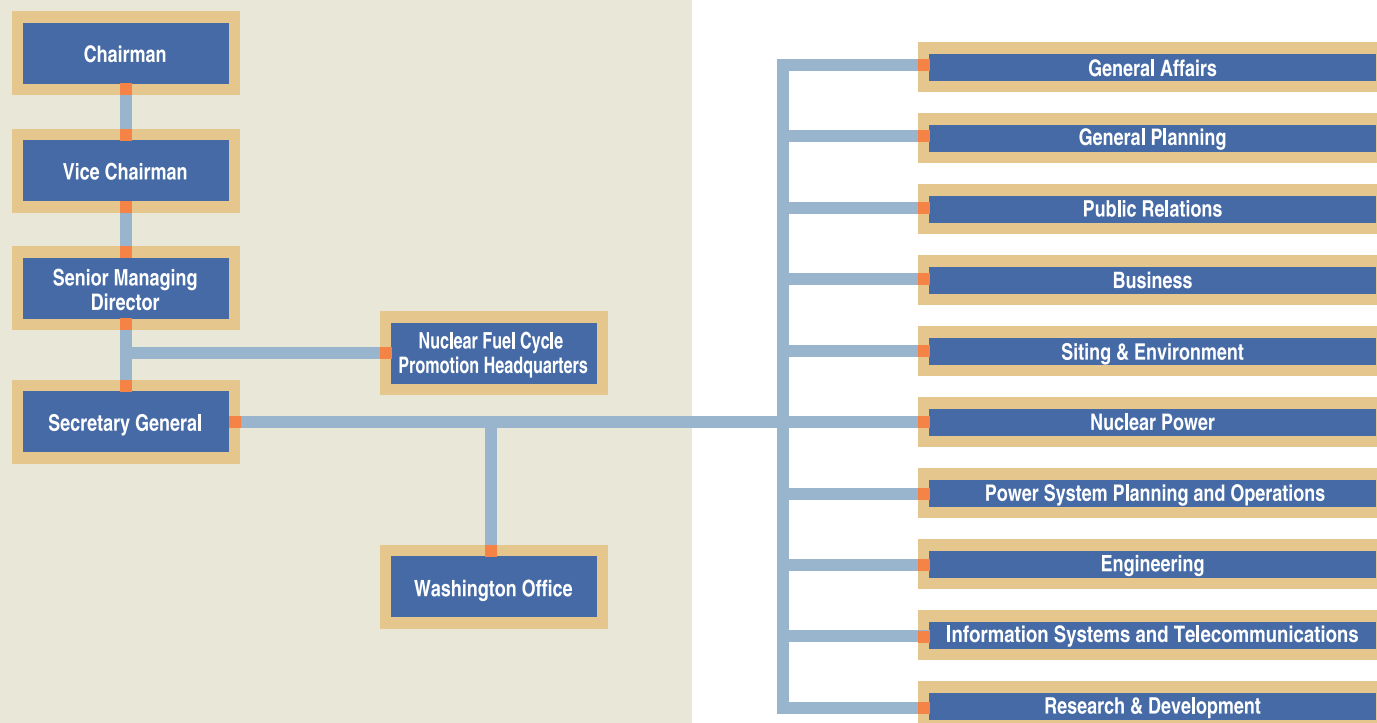
The Federation of Electric Power Companies

Electricity supply in Japan is carried out by privately-owned independent regional electric power companies which require close communication to operate efficiently. In 1952, the nine major electric power companies established the Federation of Electric Power Companies (FEPC) to promote smooth operations within the industry. Since then, FEPC has played an important role as a base for close communication between the electric power companies and as a forum for seeking and creating a new working environment for the electric power industry. FEPC undertakes various activities aimed at ensuring operations of the electricity industry in keeping with the development of the country as a whole.

With the return of Okinawa in 1972, the Okinawa Electric Power Company resumed its participation in Japan's electric power industry, becoming a full FEPC member in March 2000.

Organization of FEPC

As of June 28, 2006



Board of Directors



Chairman
Tsunehisa Katsumata



Vice Chairman
Shingo Matsuo



Vice Chairman
Tatsuo Kondo



Vice Chairman
Teruaki Masumoto



Senior Managing Director
Norihisa Ito



Director
Secretary General
Takashi Teramoto



Director
Deputy Secretary General
Hideaki Tanaka

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Company Data (Fiscal year ending March 31, 2005)

Company	Capitalization (Million yen)	Total Assets (Million yen)	Generating Capacity (MW)	Electricity Supplied (GWh)	Electricity Sales (GWh)	Revenues from Electricity Sales (Million yen)	Number of Customers (Thousands)	Number of Employees
Hokkaido	114,291	1,379,303	6,584	33,989	30,192	509,707	3,874	5,924
Tohoku	251,441	3,757,983	15,515	85,253	77,329	1,446,648	7,673	12,523
Tokyo	676,434	13,101,186	62,825	311,797	286,741	4,798,641	27,720	38,360
Chubu	374,519	5,434,999	32,585	137,995	126,663	2,044,640	10,338	16,771
Hokuriku	117,641	1,557,961	6,754	29,765	26,874	458,043	2,004	4,752
Kansai	489,320	6,294,612	35,761	157,991	144,886	2,422,583	13,156	22,478
Chugoku	185,527	2,447,205	12,205	63,984	58,140	951,809	5,206	10,821
Shikoku	145,551	1,305,437	6,861	30,688	27,211	523,537	2,873	6,016
Kyushu	237,304	3,806,567	19,422	88,055	80,199	1,322,995	8,291	13,493
Okinawa	7,586	367,861	1,916	8,163	7,193	136,984	784	1,555
Total	2,599,614	39,453,114	200,428	947,680	865,428	14,615,587	81,919	132,693

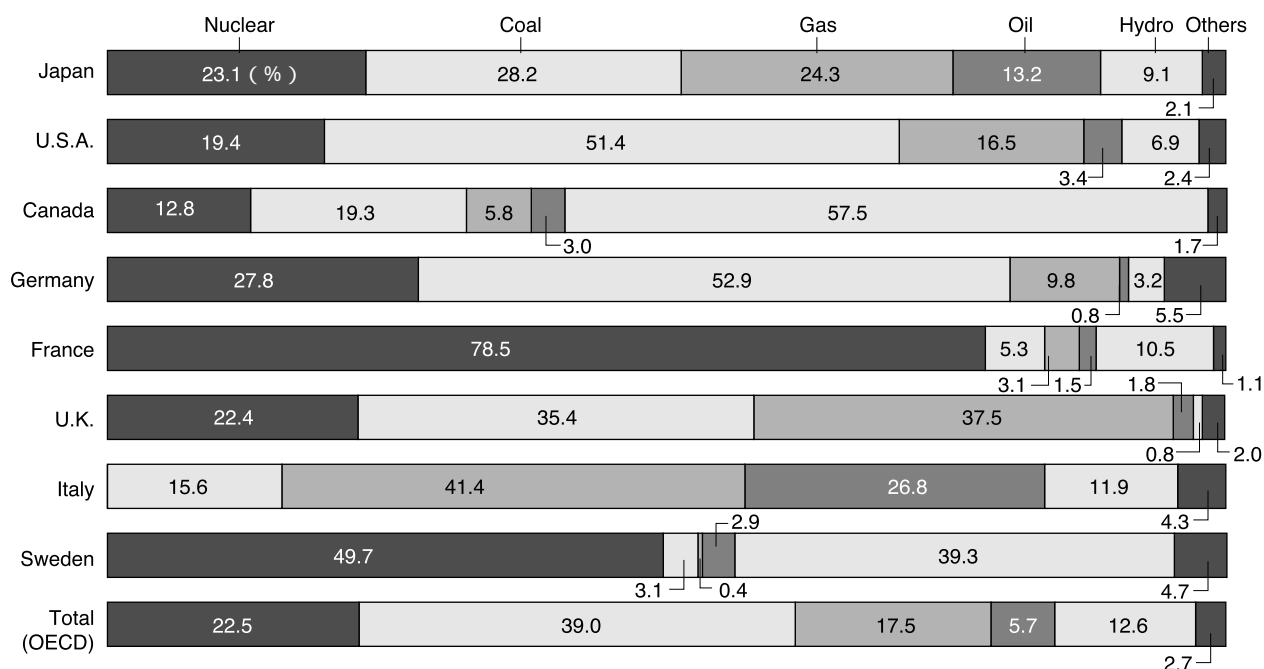
Source: Handbook of Electric Power Industry

Changes in Electric Power Generation

(TWh)

Fiscal Year	1985	1990	1995	2000	2002	2003	2004
Ten Companies							
Hydro	61.0	65.4	62.3	66.5	63.3	72.4	70.9
Thermal	295.2	392.0	401.1	426.4	443.4	462.9	454.7
Geothermal	1.2	1.4	2.8	3.0	3.1	3.1	3.0
Nuclear	148.0	181.1	271.4	302.5	275.5	220.5	262.5
Subtotal	505.5	639.9	737.6	798.4	785.3	759.0	791.2
Industry-Owned and Others	166.4	217.4	252.4	293.1	311.8	335.0	346.2
Total	672.0	857.3	990.0	1,091.5	1,097.2	1,094.0	1,137.3

Source: Handbook of Electric Power Industry

Electric Power Generation by Energy Source for Major Countries (2003)


Source: ENERGY BALANCES OF OECD COUNTRIES 2002—2003

Changes in Electricity Sales for Ten Companies (Nine Companies)

(TWh)

Fiscal Year	1985	1990	1995	2000	2002	2003	2004
Residential (Lighting)	(131.9)	177.4	224.6	254.6	263.4	260.0	272.5
Commercial and Industrial	(386.4)	481.5	532.4	583.3	578.1	574.6	592.9
Commercial	(77.1)	116.3	152.8	157.9	162.5	162.9	125.0
Small Industrial	(88.2)	100.1	108.0	115.8	112.4	110.3	112.9
Large Industrial	(203.5)	248.1	254.7	74.8	73.2	72.8	
Others	(17.6)	17.0	16.9	15.0	14.2	13.5	12.8
Eligible Customers' Use				219.8	215.7	215.1	342.2
Total	(518.3)	658.9	757.0	837.9	841.5	834.3	865.4

Source: Handbook of Electric Power Industry

Changes in Electricity Sales for Ten Companies (Nine Companies) (to large industrial and commercial customers)

(TWh)

Fiscal Year		1985	1990	1995	2000	2002	2003	2004
Mining and Industry	Mining	(1.7)	1.5	1.4	1.3	1.0	0.9	0.9
	Foodstuffs	(7.5)	11.3	13.2	15.3	15.5	15.4	15.4
	Textiles	(6.2)	6.8	5.1	3.9	3.3	3.1	3.0
	Pulp and Paper	(12.8)	11.9	9.5	10.5	10.3	10.1	9.9
	Chemicals	(27.3)	27.4	25.4	25.9	25.7	25.9	26.9
	Oil and Coal Products	(2.6)	2.4	2.6	1.5	1.4	1.4	1.5
	Rubber	(2.7)	3.5	3.4	3.5	3.6	3.6	3.5
	Clay and Stone	(13.3)	15.0	14.4	11.9	11.0	10.9	10.7
	Iron and Steel	(38.7)	41.3	38.3	36.5	34.7	35.2	36.6
	Non-ferrous Metals	(11.0)	12.3	13.1	14.2	13.2	13.1	13.3
	Machinery	(38.0)	57.3	62.9	69.8	67.2	68.4	71.8
	Others	(13.9)	22.1	24.4	27.0	26.4	26.2	27.1
Subtotal		(175.7)	212.7	213.8	221.2	213.4	214.2	220.5
Railways		(13.4)	16.4	17.9	18.1	18.5	18.4	18.8
Others		(14.4)	19.0	23.0	27.7	29.5	29.3	29.8
Total		(203.5)	248.1	254.7	267.0	261.4	261.9	269.1

Source: Handbook of Electric Power Industry

Changes in Electricity Sales for Major Countries

(TWh)

		1997	1998	1999	2000	2001	2002	2003
U.S.A. All electric utilities	Residential	1,078.6	1,127.8	1,140.7	1,183.1	1,206.1	1,267.0	1,285.0
	Commercial and Industrial	1,956.7	2,008.9	1,988.4	2,018.6	2,079.6	2,088.4	2,195.3
	Others	103.3	103.5	106.8	107.8	110.1	107.1	6.7
	Total	3,138.6	3,240.2	3,235.9	3,309.6	3,395.8	3,462.5	3,487.0
U.K. All electric utilities	Residential	108.3	109.6	110.4	111.8	115.3	114.5	115.8
	Commercial and Industrial	183.4	182.8	165.0	189.8	192.8	192.1	178.0
	Others	9.6	12.9	32.7	12.9	13.6	13.1	31.2
	Total	301.3	305.3	308.1	314.6	321.8	319.8	325.0
Germany All electric utilities	Residential	178.9	179.0	179.8	175.0	169.1	N/A	N/A
	Commercial and Industrial	260.2	268.3	270.9	284.7	340.0	N/A	N/A
	Others	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	439.1	447.3	450.7	459.7	509.0	N/A	N/A
Canada All electric utilities	Residential	134.5	129.3	133.3	138.2	N/A	142.6	147.6
	Commercial and Industrial	173.5	175.5	175.7	183.6	N/A	181.1	183.7
	Others	186.1	184.4	135.0	138.9	N/A	132.5	145.2
	Total	494.1	489.2	443.9	460.7	N/A	465.6	476.5
France EDF and municipal power utilities	Residential	147.5	154.8	157.1	N/A	N/A	N/A	N/A
	Commercial and Industrial	221.8	226.8	232.4	N/A	N/A	N/A	N/A
	Others	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	372.3	381.6	389.5	N/A	N/A	N/A	N/A
Italy ENEL	Residential	49.5	50.1	60.7	61.1	61.5	N/A	N/A
	Commercial and Industrial	152.1	162.1	159.7	184.0	191.1	N/A	N/A
	Others	17.6	14.0	10.0	10.4	10.6	N/A	N/A
	Total	219.3	226.2	230.5	255.5	263.2	204.5	186.3
Japan Ten Companies	Residential	232.4	240.9	248.2	254.6	254.5	263.4	259.7
	Commercial and Industrial	559.1	558.0	568.7	583.3	569.6	578.0	574.7
	Others	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	791.5	799.0	816.9	837.9	824.1	841.5	834.3

Source: Overseas Electric Power Industry Statistics (2005)

Country Comparison of Thermal Efficiency, Transmission and Distribution Loss, Annual Load Factor

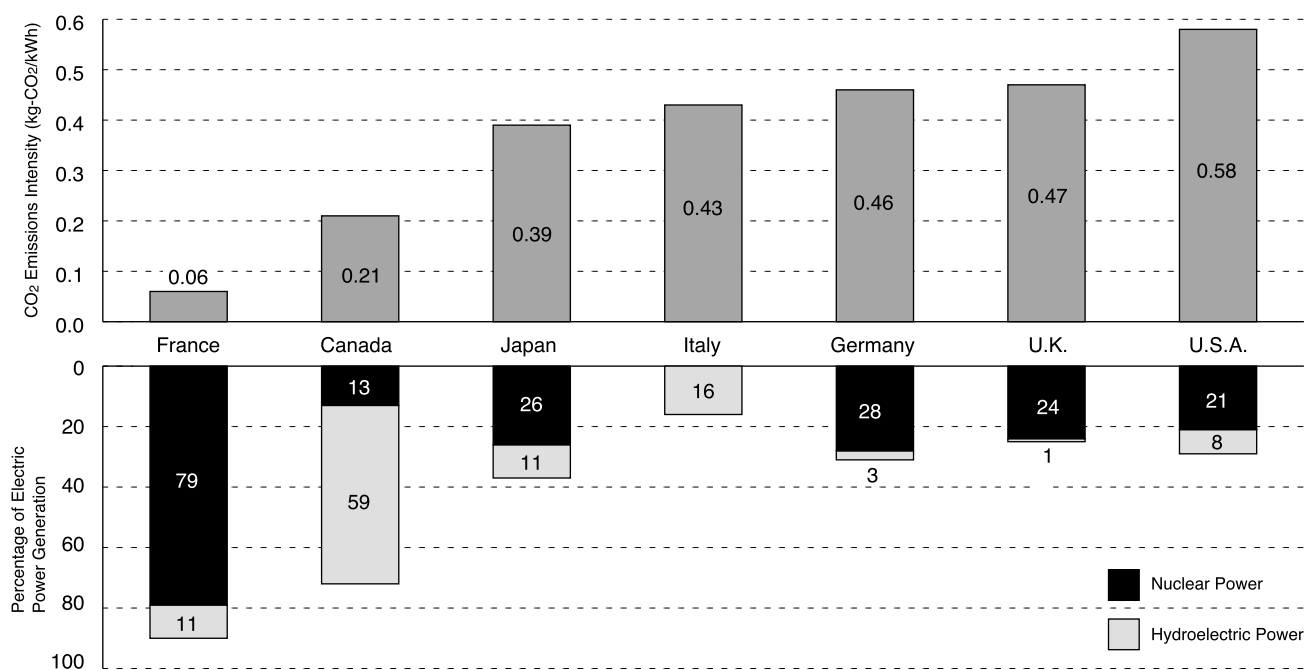
(%)

		1985	1990	1995	2000	2002	2003
U.S.A.	Thermal Efficiency	32.7	32.9	33.5	36.4	33.1	33.5
	Transmission and Distribution Loss	6.1	5.7	7.9	6.3	7.0	6.3
	Annual Load Factor	62.0	60.4	59.8	61.2	59.8	59.7
U.K.	Thermal Efficiency	32.9	33.9	36.2	36.2	36.1	36.0
	Transmission and Distribution Loss	8.7	8.1	8.6	9.0	8.7	8.6
	Annual Load Factor	57.8	62.2	65.4	67.4	64.6	67.0
Germany (Former W. Germany)	Thermal Efficiency	(39.3)	(39.8)	39.9	40.4 *	40.4 *	40.4 *
	Transmission and Distribution Loss	(4.8)	(4.3)	5.0	4.6 ***	4.6 ***	5.2
	Annual Load Factor	(63.2)	(68.6)	(71.9)	74.5 **	77.2	77.2 ****
Canada	Thermal Efficiency	32.0	34.5	32.6	32.3	32.1	33.2
	Transmission and Distribution Loss	9.2	7.7	6.8	8.0	7.6	5.4
	Annual Load Factor	65.1	65.7	66.8	69.7	73.6	73.6 ****
France	Thermal Efficiency	33.1	35.8	34.5	37.6 **	37.6 **	37.6 **
	Transmission and Distribution Loss	7.7	7.5	7.4	7.0 *	6.8	6.9
	Annual Load Factor	57.6	62.9	67.9	69.3	67.0	66.4
Italy	Thermal Efficiency	37.1	37.7	38.6	39.0	39.8	40.6
	Transmission and Distribution Loss	9.0	7.0	6.7	6.4	6.4	6.5
	Annual Load Factor	53.7	52.4	50.3	59.0	56.5	57.6
Japan Ten Companies (Nine Companies)	Thermal Efficiency	(38.2)	38.8	38.9	40.6	41.0	41.1
	Transmission and Distribution Loss	(5.8)	5.7	5.5	5.2	5.4	5.3
	Annual Load Factor	(60.4)	56.8	55.3	59.5	58.5	61.2

* Actual figures for 1998 ** Actual figures for 1999 *** Actual figures for 2000 **** Actual figures for 2002

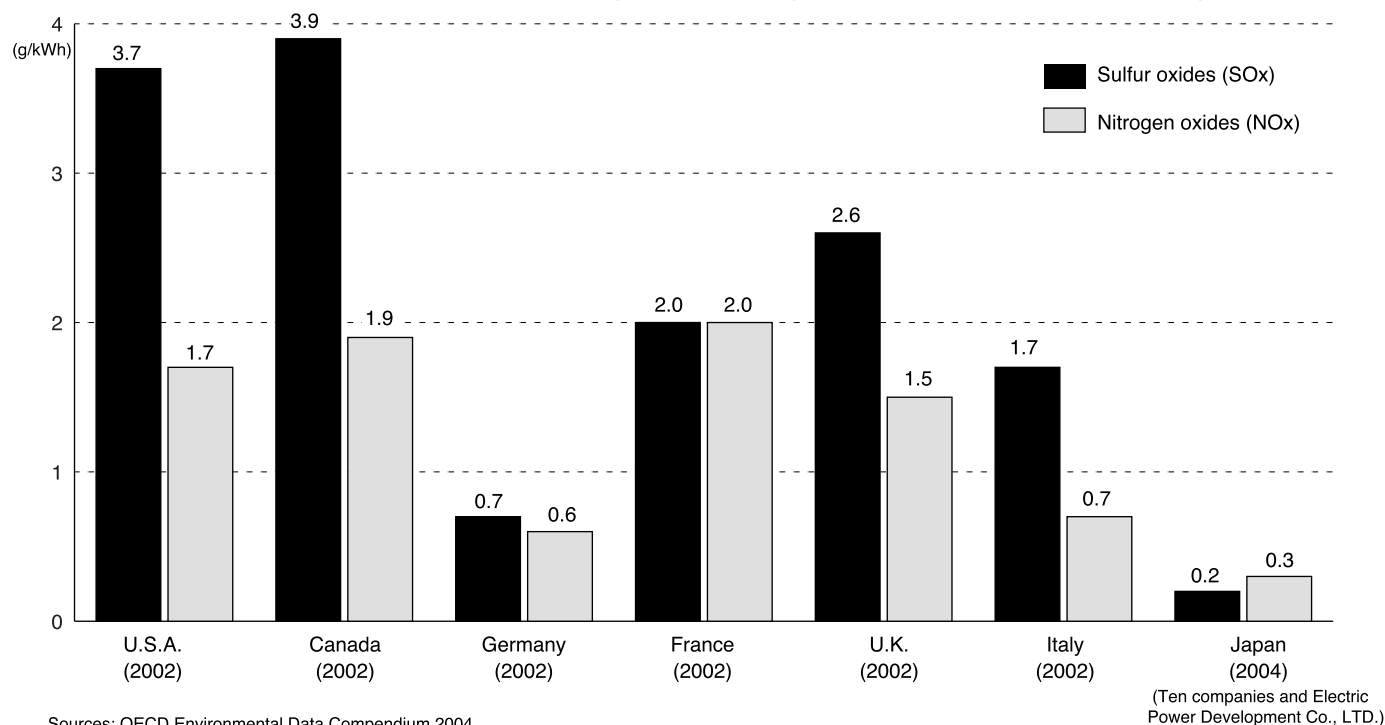
Source: Overseas Electric Power Industry Statistics (2005)

CO₂ Emissions Intensity in Seven OECD Countries (2003)



Sources: Energy Balances of OECD Countries 2002-2003 and others

SOx and NOx Emissions per Unit of Electricity Generated by Thermal Power in Each Country



Revenues and Expenditures for Ten Companies

(Billion yen)

Fiscal Year		1999	2000	2001	2002	2003	2004
Revenues	Residential	5,724	5,875	5,799	5,751	5,582	5,783
	Commercial and Industrial	8,796	9,008	8,804	8,318	8,088	8,154
	Subtotal	14,520	14,883	14,604	14,070	13,670	13,938
	Intercompany Power Sales	600	618	615	528	477	448
	Power Sales to Other Utilities	16	20	19	22	34	48
	Other Revenues	238	235	282	305	296	360
	Total	15,376	15,758	15,521	14,927	14,478	14,796
Expenditures	Personnel	1,835	1,816	1,758	1,883	1,796	1,665
	Fuel	1,698	2,008	1,911	2,021	2,044	2,178
	Maintenance	1,768	1,701	1,588	1,392	1,362	1,422
	Interest	1,152	1,052	883	737	616	574
	Depreciation	2,897	2,791	2,761	2,617	2,477	2,376
	Taxes and Public Charges	1,050	1,063	1,052	1,041	1,017	1,020
	Intercompany Power Purchases	600	618	615	528	477	448
	Power Purchases	1,078	1,186	1,231	1,297	1,277	1,360
	Drought Reserves	-4	-0	-7	-3	32	33
	Corporate Taxes	196	359	364	339	348	416
	Other Expenditures	2,759	2,528	2,713	2,474	2,398	2,575
	Total	15,033	15,125	14,873	14,329	13,849	14,074
	Net Income	342	633	647	595	628	722

Note: Figures rounded down to nearest digit

Source: Handbook of Electric Power Industry

Annual Balance Sheet for Ten Companies

(Billion yen)

Fiscal Year		1999	2000	2001	2002	2003	2004
Assets	Fixed Assets	41,632	41,822	41,110	40,149	39,075	37,836
	(Operating Fixed Assets)	(32,537)	(32,188)	(31,855)	(30,514)	(29,529)	(28,719)
	(Investments, etc.)	(2,659)	(3,230)	(3,210)	(3,315)	(3,508)	(3,669)
	Current Assets	1,591	1,602	1,635	1,534	1,493	1,616
	Deferred Assets	—	—	0	0	0	0
	Total Assets	43,223	43,425	42,746	41,684	40,570	39,453
Liabilities, Capital	Fixed Liabilities	28,525	27,630	27,390	26,930	26,177	24,789
	(Long-term Debt)	(9,895)	(9,401)	(8,843)	(7,953)	(7,197)	(6,298)
	Current Liabilities	7,846	8,293	7,727	6,951	6,116	5,934
	Reserves	41	40	32	29	61	95
	Total Liabilities	36,413	35,963	35,151	33,911	35,355	30,819
	Capital	2,599	2,599	2,599	2,599	2,599	2,599
	Paid-up Advances on New Stocks	—	—	—	—	—	—
	Capital Surplus	270	270	270	270	271	271
	Earned Surplus	3,940	4,271	4,563	4,868	5,211	5,643
	Unrealized Gain on Securities	—	320	172	84	222	227
	Treasury Stock	—	—	-11	-50	-90	-108
	Total Capital	6,809	7,461	7,594	7,772	8,214	8,633
	Total Liabilities and Capital	43,223	43,425	42,746	41,684	40,570	39,453

Note: Figures rounded down to nearest digit

Source: Handbook of Electric Power Industry

Investment by Type of Power Facility for Ten Companies

(Billion yen)

Fiscal Year			1999	2000	2001	2002	2003		2004
Expansion	Generation Source	Hydro	113	89	77	67	64	Generation	516
		Thermal	492	491	481	260	236		
		Nuclear	212	224	233	199	153		
		Subtotal	819	805	792	526	453		
	Other	Transmission	477	357	237	199	146	Distribution, others	996
		Transformation	233	172	96	71	58		
		Distribution	302	271	223	174	161		
		Supply, etc.	46	50	45	42	37		
Total		1,878	1,657	1,395	1,014	856			
Improvement		887	841	782	596	606			
Survey Fees		46	50	17	16	23			
Combined Total		2,812	2,549	2,194	1,627	1,486			
Nuclear Fuel		445	377	437	448	283	Total	1,512	
Grand Total		3,258	2,927	2,632	2,075	1,770			

Note: Figures rounded down to nearest digit

Source: Handbook of Electric Power Industry

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