Tentative Translation

White Paper on Nuclear Energy 2008

<Summary>

March 2009

Japan Atomic Energy Commission

1. Heightening Expectations for the Utilization of Nuclear Energy in the International Community and the Roles of Japan.

(1) Measures to combat global warming and nuclear power generation

In recent years, expectations for nuclear energy have heightened in the international community as a measure to combat global warming and securing stable energy supply. Under such circumstances, the year of 2008 saw an increase in a shared understanding in the international community that nuclear energy is effective as a measure to combat global warming.

In the recent discussions held by the Intergovernmental Panel on Climate Change (IPCC), International Energy Agency (IEA), etc., the usefulness of nuclear power that does not emit carbon dioxide gas in the power generation process has come to be increasingly recognized (see the Column). The Leaders Declaration of the G8 Hokkaido Toyako Summit held in July 2008 indicated an increase in the number of countries that express their interest in nuclear power programs as a means to addressing the concern of climate change (Fig. 1-1).

In addition, the Nuclear Energy Agency (NEA) of the Organization for Economic Cooperation and Development (OECD), whose members are developed countries, in response to the expectations and concerns about nuclear energy that have begun to be expressed by many member states, published the "Nuclear Energy Outlook 2008" in October 2008 as a new attempt, and forecasted therein changes in the nuclear power generation capacity up to 2050.

The year of 2008 also saw an expansion of the understanding of the significance of nuclear energy as a measure against global warming among developing countries. The second Executive Committee Meeting (Ministerial Level) of the Global Nuclear Energy Partnership (GNEP) that consisted of 25 countries including countries in Africa, East Europe and Middle East and 3 international organizations held in Paris in October 2008 issued a joint statement that included a Japan's proposal to pursue the global consensus that the peaceful use of nuclear energy is an effective measure against global warming. Also, the Ministerial Level Meeting of the Forum for Nuclear Cooperation in Asia (FNCA), (10 Asian countries are joining), held in Manila Philippines, in November 2008, adopted a resolution to raise the global awareness on the contribution of civilian nuclear power to the mitigation of global warming (Fig. 1-2, Table 1-1).

Fig. 1-1 G8 Working Session in the G8 Hokkaido Toyako Summit (July 8, 2008)

Fig. 1-2 Ms. Seiko Noda, Minister of State for Science and Technology Policy, Japan, going into talks with Ms. Alabastro, Department of Science and Technology, Philippines (October 5, 2008)

Table 1-1 Main international meetings that discussed nuclear energy as a measure against global warming

- G8, China, India and Korea Energy Ministers Meeting (June 2008, Aomori, Japan)
- G8 Hokkaido Toyako Summit (July 2008, Hokkaido, Japan)
- 2nd GNEP Executive Committee Meeting (October 2008, France)
- 9th FNCA Ministerial Level Meeting (November 2008, Philippines)

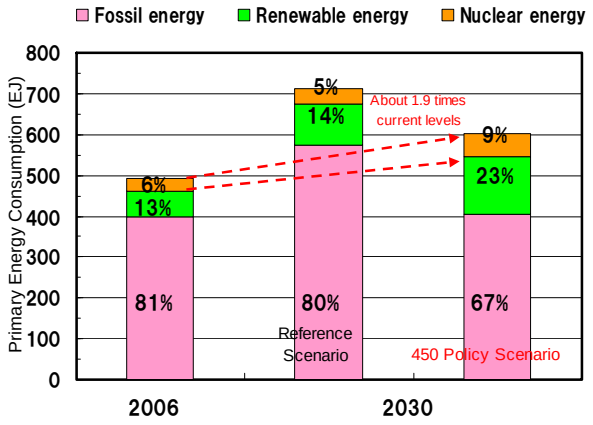
<Column>

Position of nuclear energy in the international discussion of measures for combating global warming

In the international discussion of measures against global warming, the expanded use of nuclear energy as well as renewable energy and so on is recognized as a reasonable choice on the supply side for measures against global warming.

For example, the 4th Assessment Report released by the Intergovernmental Panel on Climatic Change (IPCC) in 2007, indicating several stabilization levels for the atmospheric concentrations of greenhouse-gases, stated that the most stringent level (stabilizing at 445-490 ppm CO_2 equivalent) could limit global mean temperature increases to 2.0-2.4°C above the pre-industrial level and that CO_2 emissions should be reduced to a level below 50% of the 2000 level by 2050 to attain this level. The Assessment Report regarded, of the examples introduced therein for mitigation technology in the energy supply sector, nuclear energy as an energy source that emits very limited amount of greenhouse gases in its life-cycle.

The World Energy Outlook 2008, issued by the International Energy Agency (IEA), provides a policy scenario produced as a result of discussions on the reasonable combination of measures that will be required to achieve the foregoing most stringent stabilization level of greenhouse gas concentration suggested by the IPCC. This scenario refers to efforts to increase nuclear energy supply to about 1.9 times the current level in the coming 25 years as well as considerably save energy as compared with a scenario that continues the existing policies .



In the left chart, the Standard Scenario continues the existing policies, while 450 Policy Scenario aims at a 50% reduction in CO_2 emissions by 2050. The results of 450 Policy Scenario as of 2030 are as follows.

- **Energy consumption: about 1.2 times the current level (about 16% decrease over the reference scenario)**
- **Fossil energy: About 1.02 times current levels**
- **Nuclear energy: About 1.9 times current levels**
- **Renewable energy: About 2.2 times current levels**

(2) Trends of nuclear energy utilization in various countries

The recent extreme fluctuations in oil prices, as well as associated ups and downs in the price of corn, a source of bio-fuel, have seriously affected the life of people in various countries. European countries have also recently suffered two times from an unstable supply of natural gas that is provided through Ukraine. These events suggest that the mechanisms of the international economy are still insufficient, even in the 21st century, to endure fluctuations in the fossil fuel price and linked moves in the commodity prices,

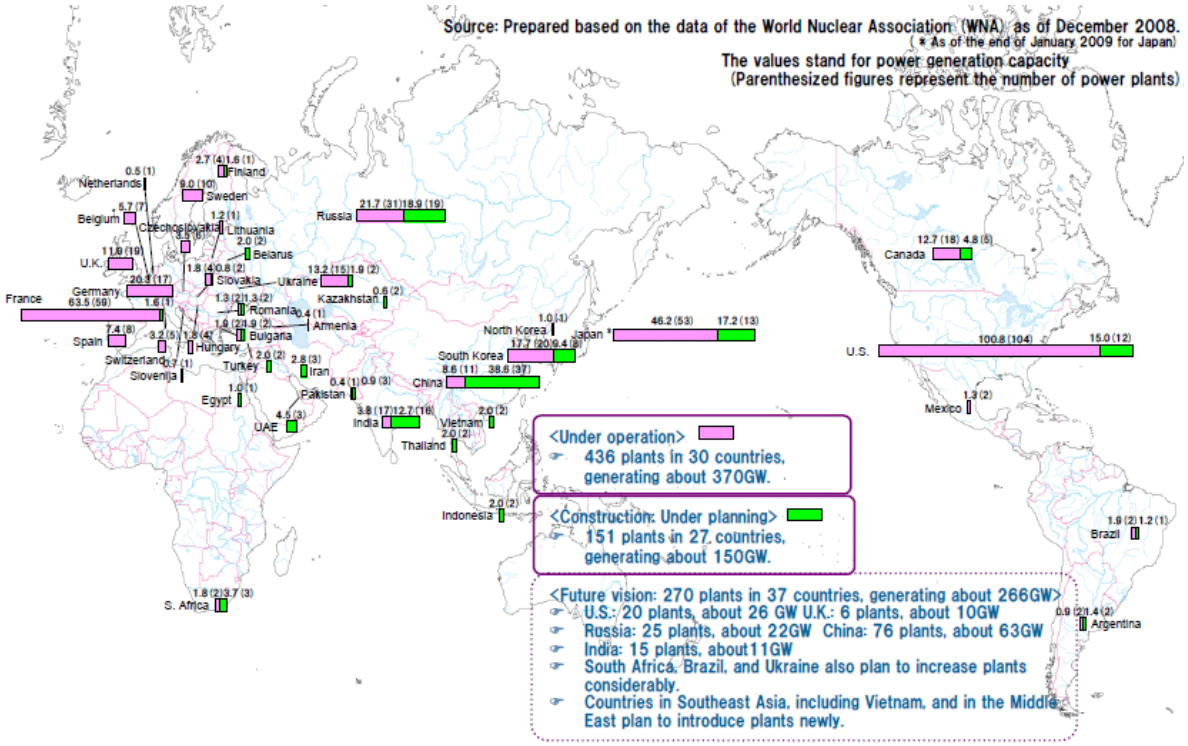
although many countries have been striving to use energy sources other than oil more and more since the oil crisis in the 1970's.

On the other hand, nuclear power has served for a stable power supply source, while showing high safety and reliability as a result of the efforts to improve design and operation management in view of the lessons learned from the Chernobyl Accident and others. As of December 2008, a total of 436 nuclear power plants are operating in 30 countries and regions and its total capacity is about 370GW. The electricity generated by them accounted for 5.6% of the primary energy supply and 16% of total electricity generation in the world in 2007.

In recent years, in the countries that have not placed new orders for nuclear power plants for a long time or newly emerging countries where economic growth is remarkable, nuclear power is attracting strong attention as a measure for combating global warming as well as for securing stable energy supply. Consequently, countries that plan the construction of new or additional nuclear power plants or that express interest in the introduction of nuclear power are increasing. As of the end of 2008, the nuclear power plants under construction or planning in 27 countries amounted to 151 in total number, of which total generating capacity is 150GW, It is estimated that about 60% of them will be located in Asian countries including China and India where demand for energy is growing remarkably (Fig. 1-3).

In the following, described are therefore the trends of nuclear power, disposal of radioactive waste in main countries and the efforts of the international community whose focus is to secure nuclear non-proliferation, safety and security, which is the major premise for promoting nuclear power (Fig. 1-4).

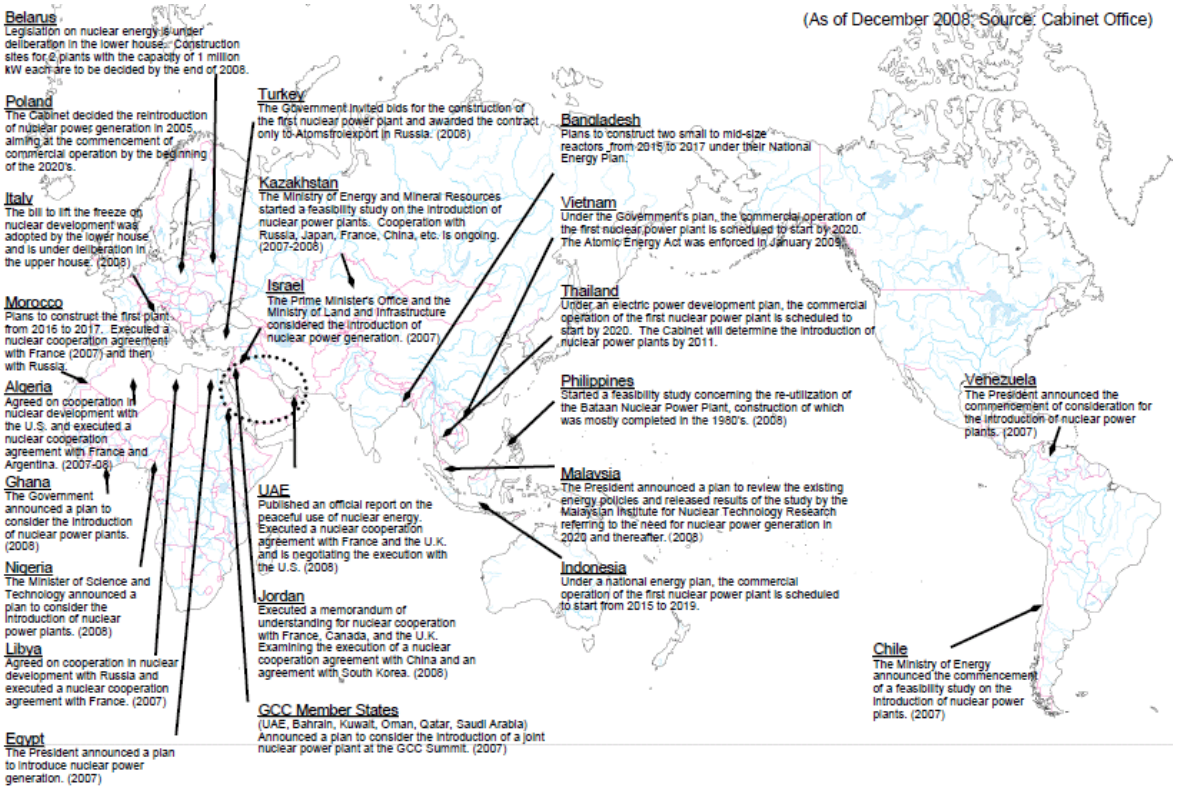
Fig. 1-3 Current Status of Nuclear Power Reactor in the World



(Nuclear power)

In the U.S., there had been no orders for new nuclear power plants since 1979. In the 21st century, however, the U.S. Government, considering that the continuous use of nuclear energy will play an important role for energy security, greenhouse gas emission reduction, etc., released the "Nuclear Power

Fig. 1-4 Countries and regions planning or considering the introduction of nuclear power reactor



2010 Program" in February 2002 and presented therein a road map to construct and operate new nuclear power plants by 2010. The U.S. Government has also established a loan guarantee program in order to reduce the financial risk of nuclear operators that entails new business. In response to this Program, more than 30 new plant construction plans have been announced, and as of January 2009, applications of combined license for the construction and operation (COL) of 26 plants were submitted to the Nuclear Regulatory Commission (NRC). In addition, the Obama Administration, which was inaugurated in January 2009 and had not yet clarified its policy on nuclear energy as of February 2009, appointed Mr. Steven Chu (former Director of the Ernest Orlando Lawrence Berkeley National Laboratory) as the Secretary of Energy, and he has clearly stated the continuous commitment to nuclear power at a public hearing held in the U.S. Senate.

France has the second-largest share of the total nuclear power plant capacity of the world, and the domestic share of nuclear power in the total electricity generation amounts to about 80%. In 2006, for the purpose of securing the transparency and safety of nuclear energy, the two regulatory agencies involved in the safety of nuclear facilities and radiation protection, respectively, were reorganized into the Autorite de Surete Nucleaire (ASN), an independent administration under the direct control of the President. In addition, in preparation for the replacement demand for light water reactors, France started the construction of Flamaville Nuclear Power Plant Unit 3 in 2007, which was to use the EPR design jointly developed with Germany, through the national debate concerning the nuclear energy policy in 2006. Moreover, France is also committed to the international development of their nuclear power industry. President Sarkozy actually went to the Middle East, North Africa, etc. to express his intention to cooperate actively with such countries who desire to introduce nuclear power. In response to such intention of the President, the Agence France Nucleaire International (AFNI) was established in May 2008 as an organization under the Administration in order to control the activities of relevant administrative agencies to support developing countries in

introducing nuclear power.

Russia operates nuclear power facilities of which total capacity is about 22GW. They generated about 16% of the total electricity generation in the country.[*1] Russia reorganized its nuclear agency in December 2007 to establish the state-run public corporation "Rosatom", and announced a new federal program in September 2008 to establish the infrastructure of a domestic nuclear power industry so as to enable the construction of 3 or 4 nuclear power plants annually, considering that many existing reactors will reach their design life and have to discontinue operation in and after 2015. In addition, the country had exported nuclear power plants to East European countries and now exports to China and India. In view of such performance, it has established a nuclear company "Atomenergoprom" in order to continue to sell nuclear fuel products and services on the international market and receive orders for the construction and operation of nuclear power plants in the future. This company is expected to play the main role in such activities.

In China, the total electricity generation capacity of nuclear power plants currently in operation is only 9GW. However, in order to cope with both the rapid increase in energy demand and a serious air pollution problem, the Government announced a plan to expand the utilization of nuclear power up to 40GW in 2020 and 160GW in 2030. As of the end of January 2009, 11 plants are in operation and 11 plants are under construction.[*1] China is also accelerating the move to secure uranium resources, such as the conclusion of the Australia-China Uranium Export Agreement in January 2007, which includes the conditions for preventing the military utilization of uranium. Moreover, China is now constructing an experimental fast reactor (the first criticality is scheduled in 2009) and advancing the research and development for nuclear fuel cycle and reprocessing technologies.

In India, 17 plants were in operation and 6 plants were under construction as of the end of January 2009.[*1] The Special Board of Governors of the International Atomic Energy Agency (IAEA), held in August 2008, approved the proposal for the India-IAEA Safeguards Agreement, and the Ad-hoc Meeting of the Nuclear Suppliers Group (NSG), held in September of the same year, adopted the "NSG Statement on Civil Nuclear Cooperation with India" concerning the exemption of India from the duties under the NSG Guidelines. Subsequently, India signed a nuclear cooperation agreement with France (Sep. '08), the U.S. (Oct. '08), and Russia (Dec. '08), and a memorandum of understanding for civil nuclear cooperation with Kazakhstan in January 2009. India plans to expand its nuclear power capacity to secure stable energy supply in view of the rapid increase in energy demand resulting from recent economic growth.

In addition, other countries that have already introduced nuclear power plants, including South Africa, Brazil, and Ukraine, are also planning for a considerable increase in the nuclear power supply capacity. Even the government of the U.K., where no nuclear power plants have been constructed since the 1990's, presented a view in the Energy White Paper released in May 2007 that new nuclear power plants will play an important role as a measure against global warming and construction thereof by private sector companies will "benefit people." Further, the Energy Act that took effect in 2008 also provided for the promotion of the construction of new nuclear power plants from a viewpoint of energy security and climate change measures. Italy, which had closed nuclear power plants and frozen the construction of new plants in response to the result of the 1987 Referendum, also announced its intention to formulate a national energy plan that includes nuclear power generation by the spring of 2009 after the victory of the right-wing coalition in the general election held in April 2008, which takes a policy to resume nuclear power.

Further, more than 20 countries are considering or planning the construction of new nuclear power plants. In the Middle East, the summit meeting of the Cooperation Council for the Arab States of the Gulf

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*1 Source: World Nuclear Association (WNA)

(Gulf Cooperation Council (GCC)[*2]) in December 2006 issued a joint statement that includes the concept of joint development of nuclear energy, and moves to execute a nuclear cooperation agreement with France, Russia, the U.S., etc. are gaining momentum. Turkey invited international bids for the construction of the first nuclear power plant and awarded the contract to a Russian enterprise. In East Europe and the former Soviet Union block, Kazakhstan, Belarus, Poland, etc. are advancing plans to introduce nuclear power. In Africa, such countries as Egypt, Algeria, and Morocco announced plans to introduce nuclear power from a long-term viewpoint and are gradually advancing cooperation with Western countries. In South America, Chile, Venezuela, etc., announced plans to introduce nuclear power. In Asia, where energy demand is increasing remarkably, Vietnam, Indonesia, and Thailand plan to individually introduce nuclear power so as to start power supply around 2020.

(Disposal of radioactive waste)

Nuclear developed countries are faced with a critical issue of opening disposal facilities for radioactive wastes, particularly for high-level radioactive waste in the form of spent fuels arising from the operation of a nuclear power plant and / or glassified fission products separated in the course of reprocessing of spent fuels. Finland has already decided the sites for disposal facilities for high-level radioactive wastes[*3] and some other countries are working on the siting for such disposal facilities.

Sweden has been continuing site surveys since 2002 at two areas (Oskarsham, Osthammar), of which local government subscribed for the central government's invitation of applications for candidate sites, and will select one site by 2009 with plans to start operation of a disposal facility in 2020.

France established the law on sustainable management of radioactive materials and waste in 2006, which ask thre relevant agency to promote research and surveys with a view to preparing for applying the construction permit of disposal facility by 2015 and starting the operation of the facility by 2025. The site of the disposal facility will be selected from the land surrounding the Bure Underground Research Laboratory with an area of about 250 km^2 (Meuse Province and Haute-Marne Province), from which the implementing entity, Agence Nationale pour la Gestion des Dechets Radioactifs (ANDRA), will propose a number of candidate sites in 2009.

The U.K. published a White Paper on radioactive waste management in June 2008 to provide the framework for implementing its geological disposal, and, in parallel with this, invited applications from local governments that may accept the siting of a disposal facility as the first step of the disposal site selection process. In response to this invitation, Cumbria State decided in December 2008 to announce its interest in the disposal site selection process.

In the U.S., Yucca Mountain, Nevada, was selected as a candidate site, and, based on the results of the long-term research by the Department of Energy, the application for construction permit was submitted to the NRC in 2008 and is now under examination.

(International initiatives responding to the enhancement of the interest in nuclear energy)

The IAEA published a milestone document describing how to promote the development of infrastructure such as developing necessary human-resources and establishing the regulatory framework, which would be needed for countries that introduce nuclear power plants for the first time. The IAEA has also indicated that it will take more than 10 years from the start of the infrastructure development to the commencement of the operation of a nuclear power plant, and held several meetings to share information

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*2 GCC: Consisting of United Arab Emirates, Saudi Arabia, Bahrain, Kuwait, Oman, and Qatar

*3 Finland has adopted a method of direct geological disposal of high-level radioactive wastes, without reprocessing spent fuels.

on how to promote such development between nuclear developed countries and the countries expressing interest in such development. Japan is contributing to such activities of the IAEA and promoting such kind of cooperative activities through multilateral and bilateral frameworks.

International concerns about nuclear safety, security, and non-proliferation are also rising in accordance with the increase in the number of countries expressing interest in nuclear development. At the G8 Hokkaido Toyako Summit held in July 2008, the leaders reiterated that the 3S (Non-proliferation / Safeguards, Safety, and Security) are fundamental principles for the promotion of peaceful use of nuclear energy.

For “Non-proliferation,” various countries concluded comprehensive safeguards agreement with the IAEA under the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) and started the development of domestic safeguards systems and the acceptance of safeguards activities of the IAEA. The relevant issue at present is to increase countries that accept the IAEA Additional Protocol, which provides for surprise inspections of nuclear facilities and sampling at nuclear facilities, which are not enforceable under the comprehensive safeguards agreement. Various countries also operate a export control system based on the NSG Guidelines, which prohibits the transfer of sensitive substances, plants, and technologies to countries that have not yet developed a safeguards system with the IAEA. Further, Japan and six countries (France, Germany, the Netherlands, Russia, the U.K., and the U.S.), have proposed the concept of nuclear fuel supply assurance, which provides guarantees for nuclear fuel supply to countries that might face difficulty in assuring fuel supply due to political reasons.

For “Nuclear Safety,” Japan is working for the establishment of international safety standards and the maintenance and improvement of the safety level of nuclear facilities and activities in the international community and promoting cooperation and collaboration through regional and international cooperative frameworks, including the acceptance of an IAEA review service for safety regulation activities[*4] On the other hand, the IAEA, has, established, in response to the increasing international concern about the impact of earthquakes on nuclear facilities, the "International Seismic Safety Center (ISSC)" in October 2008 for the purpose of sharing information in the international community concerning the seismic safety of nuclear facilities, and been promoted efforts for utilizing lessons learned from earthquakes incurred by various countries in studies on seismic safety and those from Niigata-ken Chuetsuoki earthquake, in particular.

For “Nuclear Security,” the international community has been showing very strong concern about the adequacy of the measures for its assurance since the terrorist attacks on the U.S. in September 2001, and many countries are requested to make efforts based on the various international agreements such as U.N. Security Council Resolution No. 1540. In addition, the 52nd IAEA general meeting in September 2008 adopted a resolution to request early ratification of the International Convention for the Suppression of Acts of Nuclear Terrorism by countries that have not yet done so, and to promote the universalization of the revised Convention on the Physical Protection of Nuclear Material. In view of such circumstances, the IAEA is also working on the revision of the guideline titled as “Physical Protection of Nuclear Material and Nuclear Faciliites (INFCIRC 225 Rev. 4)”. In September 2008, the World Institute for Nuclear Security (WINS) was established as a new organization for promoting the sharing of information on best practices among nuclear security experts in various countries.

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*4 Japan accepted Transportation Safety Appraisal Services (TranSAS) in 2005 and Integrated Regulatory Review Services (IRRS) in 2007, and received an evaluation stating that "Japan has comprehensive legal and administrative frameworks for nuclear safety, and the current regulatory framework has been revised recently and keeps on improving."

2. Current status of research, development, and utilization of nuclear energy in Japan

(1) Trends in recognizing nuclear energy as a measure to combat global warming

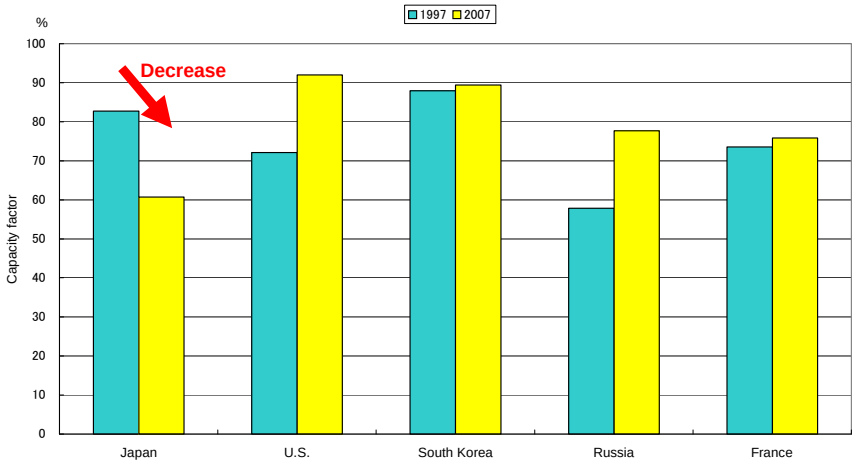
In recent years, expectations for nuclear energy as a measure to combat global warming have been growing even in Japan. The Atomic Energy Commission (AEC) published a report entitled “Actions Japan Should Take for the Expansion of Nuclear Energy Use in the World as a Measure to Combat Global Warming” in March 2008 that discussed issues related with the use of nuclear energy to halve the greenhouse gas emissions by 2050 while ensuring stable energy supply. This report, while considering the significance of using nuclear energy as a measure to combat global warming, describes a vision for the global expansion of the peaceful use of nuclear energy and issues Japan should address now to realize the vision. Various elements proposed in the report were reflected in the “Action Plan for Achieving a Low-carbon Society”, which was decided by the Cabinet in July 2008, as seen in the description that nuclear power is a key low-carbon energy source and it will occupy an extremely important position in the promotion of global warming counter-measures." It also clarified the necessity for aiming to increase the share of nuclear power generation in the power supply in Japan by a considerable degree. (Table 1-2)

Furthermore, the Council for Science and Technology Policy formulated the "Low Carbon Technology Plan" in May 2008 that identified technologies necessary for Japan to realize a low carbon society and provided a road map for the development of such technologies. The Report refers to the "advanced use of light-water reactors" as a necessary technology as the short- to mid-term measures (by around 2030) and "next generation light-water reactors", "fast breeder reactor and its fuel cycle technology," etc. as necessary technologies as the mid- to long-term measures (after around 2030). In order to provide an input to the Council, the AEC published a guideline for nuclear research and technical development activities to contribute for combating global warming titled as "The innovative nuclear technology roadmap for contributing to the mitigation of global warming" in July 2008.

Table 1-2 Main descriptions about nuclear energy in the "Action Plan for Achieving a Low-carbon Society" (Cabinet Decision, July 29, 2008)

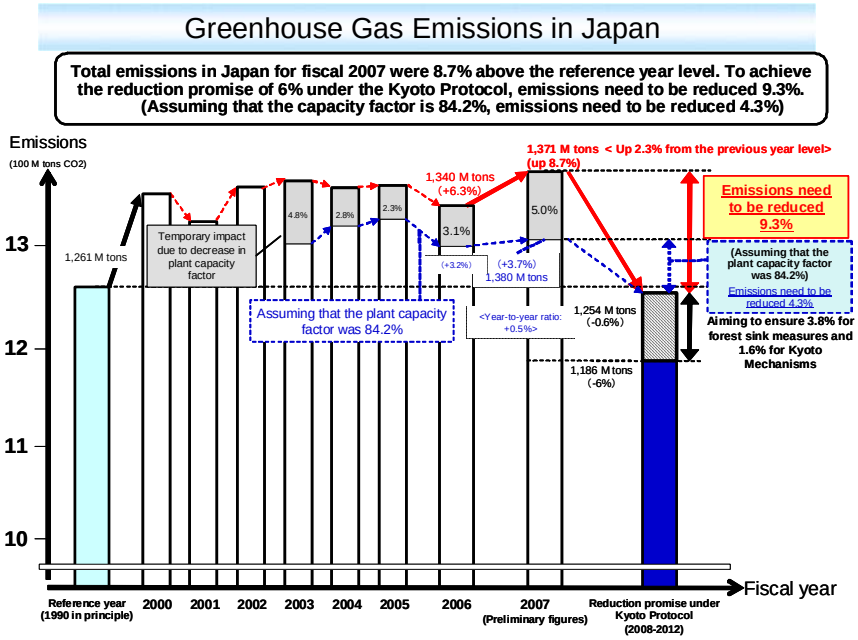
- Nuclear power as a key low-carbon energy source will occupy an extremely important position in the promotion of global warming counter-measures.
- The aim is to greatly increase the proportion of electricity coming from nuclear power, as part of the effort to increase the proportion of electricity output from zero-emission sources to over 50 percent by around 2020
- Japan will promote development of next-generation light-water reactor technology in the light of expected demand for replacement of existing light water reactors around 2030, and also from the perspective of the global market
- Japan will promote establishment of a nuclear fuel cycle as well as research and development of the fast breeder reactor and its fuel cycle technology so as to commercialize them at an early stage.
- Japan will contribute to the international community’s action for trend toward introducing nuclear energy, making use of through the use of its outstanding nuclear power technology, through and by means of intergovernmental cooperation and nuclear industry’s international activities of the nuclear industry, while ensuring nuclear non-proliferation/safeguards, safety, and security (3S) as a prerequisite for peaceful uses of nuclear energy.
- The government will support the international activities of the Japanese nuclear power industry, establishing bilateral agreements with each individual country that specify the frameworks for the transfer of nuclear materials and equipment, as well as other relevant frameworks to deal with specific needs and other related issues and making use of government financial institutions.

Fig. 1-5 Changes in Plant Capacity Factor in Various Countries (1997-2007)



Source: Prepared by the Cabinet Office in reference to the Annual Report on Nuclear Facility Operation Management by the Japan Nuclear Energy Safety Organization JNES.
Note: Based on fiscal year for Japan and calendar year for other country

Fig. 1-6 FY 2007 Greenhouse Gas Emissions (Preliminary figures)



(Source: Press release of the Ministry of Environment on November 12, 2008)

(2) Efforts concerning nuclear energy

(Nuclear power generation)

In Japan, the share of nuclear power generation in total power generation had been more than 30% before the occurrence of the Niigata Chuetsu-Oki Earthquake in July 2007, which caused the shutdown of all 7 Units of Tokyo Electric Power Company's Kashiwazaki Kariwa Nuclear Power Plant and consequently reduced the ratio of nuclear power generation to the total power generation for fiscal 2007 to 25.6%. The capacity factor of nuclear power plants in fiscal 2007 also from 69.9%, to 60.7% (Fig. 1-5). This shutdown had also a considerable impact on other figures. The domestic greenhouse gas emissions for fiscal 2007 (preliminary figures) recorded the highest level ever, 1,371 million tons CO_2 equivalent, that was 2.3% higher than that of the previous year and 8.7% higher than the reference level specified by the Kyoto Protocol If it is assumed that the capacity factor of these nuclear power plants in this year were equal

to 84.2%, which is that in fiscal 1998:,when the plants were not affected by the long-term shutdown, total emissions of greenhouse gases for fiscal 2007 would have been 3.7% higher than the reference level (Fig. 1-6).

With regard to the Kashiwazaki Kariwa Nuclear Power Plant, the Nuclear and Industrial Safety Agency (NISA) and other organizations have been continuing the verification of integrity and the review of seismic safety of the plant and the activities have entered the final stage regarding Unit 7, from which these works started. In addition, each electric power company is working on the verification (back-check) of the compliance of its power plants with both the NSC's Seismic Safety Review Guidelines revised in September 2006, and the NISA's Notification "Concerning the Matters to be Reflected in the Evaluation of Seismic Safety of Nuclear Power Plants, etc. in View of the Impact of the Niigata Chuetsu-Oki Earthquake" issued in September 2008.

As for the operation and management of nuclear power plants, a new inspection system that is incorporated within the maintenance program has been introduced for streamlining / improving efficiency of periodic inspection work, under the recognition that practices of thorough information disclosure including problems in the past and high quality operation management in compliance with the safety regulations continuously improved through PDCA was established. Consequently, the measures for safe operation of aging facilities have been improved and it has been allowed to optimize the period of inspections, which is now required to be within 13 months, to a period from 13 to 24 months according to the condition of the plant.

As regards the construction of new nuclear power plants, construction of the Oma Nuclear Power Plant of Electric Power Development Co., Ltd. started in May 2008. In December 2008, Chubu Electric Power Co., Inc. terminated the operation of Units 1 and 2 of their Hamaoka Nuclear Power Plant and announced a plan to construct Unit No. 6 (Fig. 1-7). In January 2009, Kyushu Electric Power Co., Inc. made an offer of adding Unit No. 3 of Sendai Nuclear Power Plant. to the local government

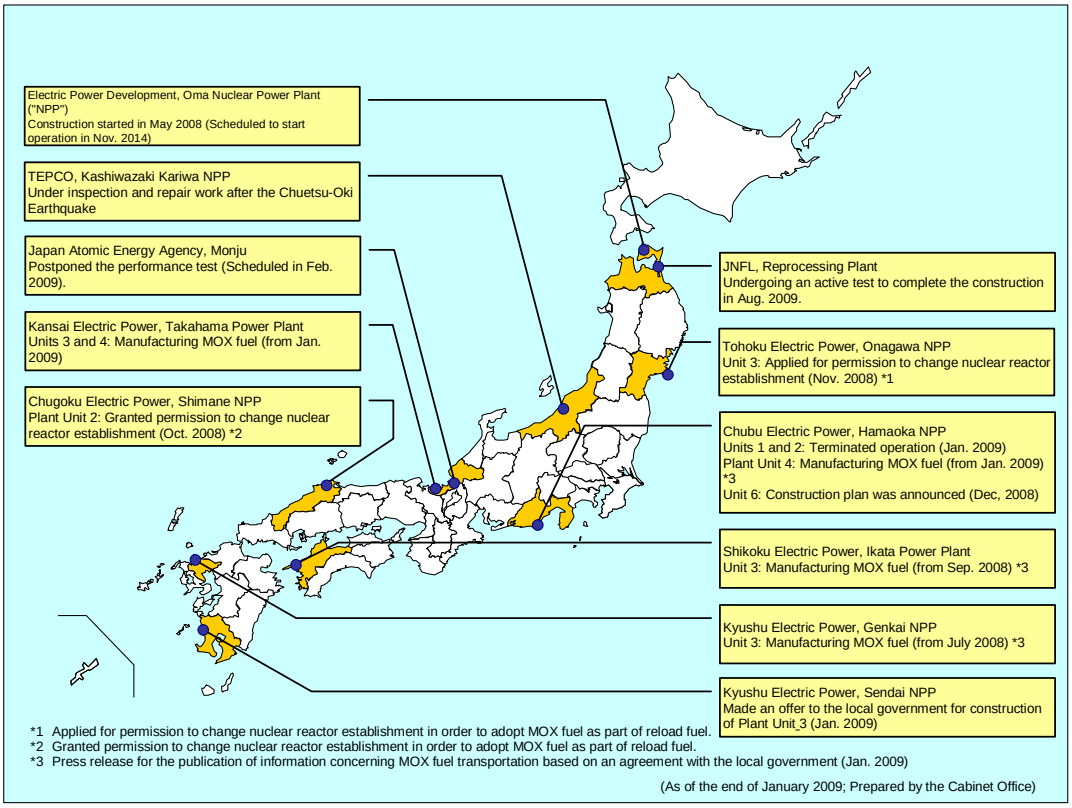
(Nuclear fuel cycle)

The reprocessing plant (Rokkasho Village, Aomori Pref.) of Japan Nuclear Fuel Limited (JNFL), the core facility for nuclear fuel cycle in Japan, is now undergoing an active test (overall test to be conducted using spent fuel at the final stage of construction) to start full-scale operation. This test is now at the final stage, although spending time much more than expected on the establishment of operation conditions for the facility to vitrify high-level radioactive waste liquid.

In addition, the business license application for the Recyclable Fuel Storage Center (Mutsu City, Aomori Pref.) of Recyclable-Fuel Storage Company, in which spent fuel will be stored until reprocessing, was submitted in March 2007, but is still under safety review as it has taken time to explain the seismic safety of the design reflecting lessons learned specified in the documents mentioned above.

Fig. 1-7 Ms. Seiko Noda, Minister of State for Science and Technology Policy, inspected the Hamaoka Nuclear Power Plant (December 26, 2008).

Fig. 1-8 Main Events concerning Nuclear Power Generation / Nuclear Fuel Cycle



In 2008 there was significant progress in the promotion of "Pu-thermal" operation which means to to use in a light water reactor the mixed-oxide (MOX) fuel manufactured utilizing plutonium that is extracted from reprocessing the spent light water reactor fuel. For example, MOX fuel for Genkai Plant Unit 3 of Kyushu Electric Power, Ikata Plant Unit 3 of Shikoku Electric Power, and Hamaoka Plant Unit 4 of Chubu Electric Power had been fabricated at Melox fuel fabrication facility in France so as to start "Pu-thermal" operation by the end of fiscal 2010. In addition, Kansai Electric Power started the manufacturing of MOX fuel for Takahama Units 3 and 4: Shimane Plant Unit 2 of Chugoku Electric Power was granted permission to load MOX fuel: Tohoku Electric Power applied for permission to change nuclear reactor establishment for their Onagawa Plant Unit 3 to load MOX fuel: and Hokkaido Electric Power made an offer to load MOX fuel to Tomari Plant Unit 3 to the local government (Fig. 1-8).

(Management of radioactive waste)

With regard to the disposal of high-level radioactive waste, the Nuclear Waste Management Organization (NUMO) is calling open solicitation for volunteer municipalities for preliminary investigation of their area as a site for the repository, but no local government has answered the solicitation. In the Ministry of Economy, Trade and Industry (METI), the Radioactive Waste Subcommittee under the Nuclear Energy Subcommittee of the Advisory Committee for Natural Resources and Energy established measures to strengthen efforts for increasing the possibility to obtain positive answer from municipalities, and, in accordance with these measures, the Agency for Natural Resources and Energy (ANRE) and NUMO are striving for the reinforcement of public relations activities, such as holding many meetings for briefings in various locations of the country. As part of such efforts, the ANRE has been holding 35 such briefings throughout Japan within the framework of "Country-wide Energy-Caravan" from fiscal 2007. The ANRE has also started the events titled as "Radioactive Waste Workshop -- Let's Talk about Waste from the

Electricity Generation" in fiscal 2007 in cooperation with civil groups and held it in 15 cities as of fiscal 2008. NUMO has also been developing awareness raising activities by holding workshops, round-table discussions, etc. in various locations in Japan with the theme of Japan's energy situation or geological disposal of radioactive waste (7 workshops and 18 round-table discussions in 2008).

The Advisory Committee on the Evaluation of Framework for Nuclear Energy Policy of the Japan Atomic Energy Commission (AEC) published a report concerning the evaluation of activities related with the promotion of the treatment and disposal of radioactive waste in September 2008. The AEC asked the relevant organizations to strengthen measures to promote the selection of the site for high-level radioactive waste disposal facility, noting that the Committee proposed the Commission to deliberate the need for reconsidering the method of determining the site for disposal facilities if there is no prospect for obtaining expected results despite the continuation of efforts for the coming 2 or 3 years.

As for waste generated at research facilities, the Japan Atomic Energy Agency (JAEA) was designated as the implementation entity of the disposal of the wastes in accordance with the partial amendment to the Law for the Independent Administrative Agency, Japan Atomic Energy Agency in May 2008 and the Ministry of Education, Culture, Sports, Science and Technology (MEXT) established the basic disposal policy in December 2008. From now on, the JAEA is to select disposal sites in accordance with this policy.

Fig. 1-9 Radioactive Waste Workshop (in Saitama City, August 30, 2008)

(Utilization of radiation)

Utilization of radiation is promoted both at home and abroad in industrial, agricultural, and medical fields: examples are nondestructive testing, species improvement, and diagnostics and treatment of cancer. In the Japan Proton Accelerator Research Complex (J-PARC) that the JAEA and the High Energy Accelerator Research Organization have jointly established, the research and development to utilize quantum beams[*5] has partly started in December 2008. A bill to amend the Law for the Promotion of Public Utilization of the Specific Advanced Large Research Facilities was submitted to the Diet in February 2009 in order to include J-PARC's neutron beam facilities in the Law. Research and development using new radiation beams and technologies, etc. is also expected to flourish in Japan since researches using accelerators such as the RI Beam Factory of the Institute of Physical and Chemical Research, a unique accelerator in the world, are gradually producing results.

Whereas food irradiation is permitted for more than 200 types of foods in 50 or more countries, irradiation is permitted only to control the growth of potato buds in Japan. It is expected that the food safety authority will promote the review of the basis for the acceptance of radiation treatment of foods for safety in many countries from a viewpoint of expanding the choices of food safety measure in Japan.

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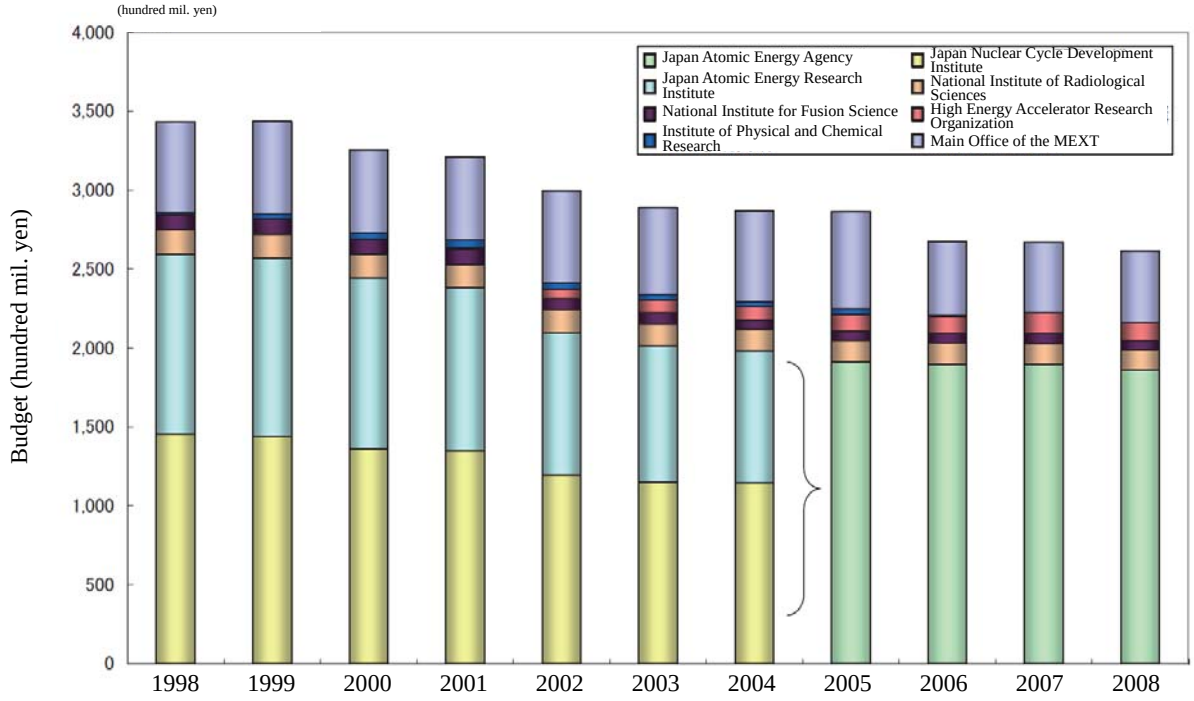
*5 Quantum beam: General term representing electromagnetic waves such as light quantum and synchrotron orbital radiation, and corpuscular beams such as neutron beams, electron beams, and ion beams.

(Research and development of nuclear energy)

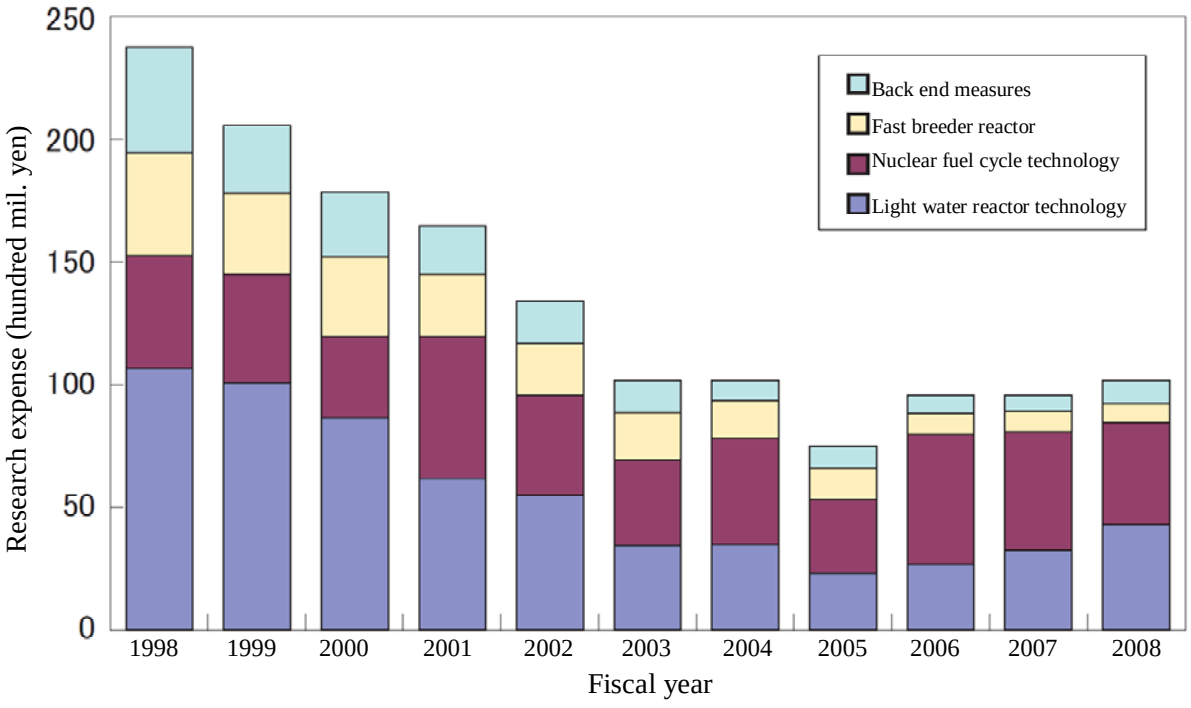
Research and development of nuclear energy has been conducted by various organizations including the JAEA. As the budget and personnel in these organizations are decreasing recently (Fig. 1-10), they are required to implement its R&D efficiently. It should be noted that the budget for common research of electric power companies also has remained at a low level of about 10 billion yen after the deregulation in the power industry (Fig. 1-11).

Fig. 1-10 Transitions in Budget for Nuclear Energy Research and Development (MEXT)



* The Japan Atomic Energy Research Institute and the Japan Nuclear Cycle Development Institute were integrated into the Japan Atomic Energy Agency in October 2005.

Fig. 1-11 Transitions in Budget for Electric Power Common Research



Main objectives of research and development activities in Japan include (i) next-generation light water reactors, (ii) fast-breeder reactor cycle technology, and (iii) nuclear fusion.

The research and development of the next-generation light water reactors are being promoted by the METI as a government-industry cooperative activity in order to meet demand of replacement for aging reactors that is expected to occur from 2030 or so.

Research and development of fast-breeder reactor cycle technology, which is positioned as “the state's key technology in the 3rd-Term Science and Technology Basic Plan”, is being promoted as a government-industry collaborative activity, aiming to commercialize it by 2050. The JAEA is in charge of the research and development that aims at providing conceptual designs of both commercial facility and the demonstration facility and a research and development plan up to its commercialization by 2015. The prototype fast-breeder reactor "Monju," which is an essential facility for the research and development was expected to resume operation within fiscal 2008. However, operation is still pending due to the successive problems that occurred during the plant validation test including malfunction of sodium leakage detectors, and the indication of insufficient safety management identified by the NISA’s special inspection. Much time has also been spent on the verification of seismic safety in view of the lessons learned from the Niigata Chuetsu-Oki Earthquake.

In the field of research and development of nuclear fusion, development of the International Thermonuclear Experimental Reactor (ITER), an international joint project, is progressing. Under the ITER Agreement, the ITER Organization was inaugurated in October 2007 and the JAEA was designated as a domestic organization under the ITER Agreement. Further, in accordance with the "Broad Approach (BA) Agreement" executed by Japan and European countries, research and development activities for supplementing the ITER Project have started at the research sites in Rokkasho Village of Aomori Prefecture and Naka City of Ibaraki Prefecture.

In the field of basic and fundamental research and development “the Experimental Nuclear Research Initiative” that has been promoted for many years was restructured into “The Nuclear Energy Basic and Interdisciplinary Strategy Research Initiative" in order to expand its capability and activity. And the new initiative started in fiscal 2008 as a new competitive research funding system. In addition, research on nuclear safety is ongoing in accordance with the "Important Research Programs on the Nuclear Safety," formulated by the Nuclear Safety Commission.

(International initiatives)

In recent years, competition to secure uranium resources has been intensifying since demand for uranium is expected to increase in the future due to the world-wide increase in projects to construct new and additional nuclear power plants. Accordingly, in order to secure stable uranium resources, Japan is actively conducting diplomacy on resources, such as agreement of bilateral cooperation with Kazakhstan, which has the second-largest uranium reserves in the world.

Moreover, countries that aim to expand or introduce nuclear power plants are expected to become new markets for Japanese manufacturing products. Therefore, Japan provides cooperation in the projects of Vietnam, Indonesia, Kazakhstan, and the United Arab Emirates for infrastructure development related to the introduction of nuclear power plants. Also, in response to the high expectation of equipment supply in the U.S. where is planning a lot of construction of nuclear power plants, the Government Ordinance was revised to enable the Japan Bank for International Cooperation (JBIC), which is the international division of the Japan Finance Corporation, to provide loans to developed countries for nuclear power plants projects. In accordance with this revision, the JBIC started business in October 2008.

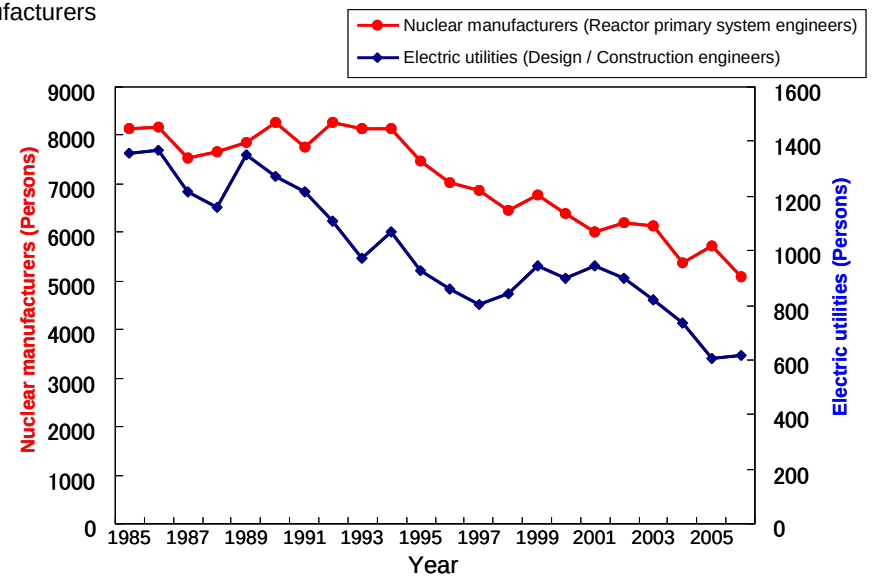
In accordance with such circumstances, the Agency for Natural Resources and Energy of METI established “The International Strategy Subcommittee” in the Nuclear Energy Subcommittee of the Electricity Industry Committee under the Advisory Committee for Natural Resources and Energy in October 2008 to study Japan's future international response in view of such international trends.

In addition, the NISA organized “The International Nuclear Safety Working Group” in the Nuclear Safety Infrastructure Subcommittee under the Subcommittee on Nuclear and Industrial Safety of the Advisory Committee for Natural Resources and Energy to discuss how to provide international cooperation, etc. in the field of nuclear safety.

(Human resources development)

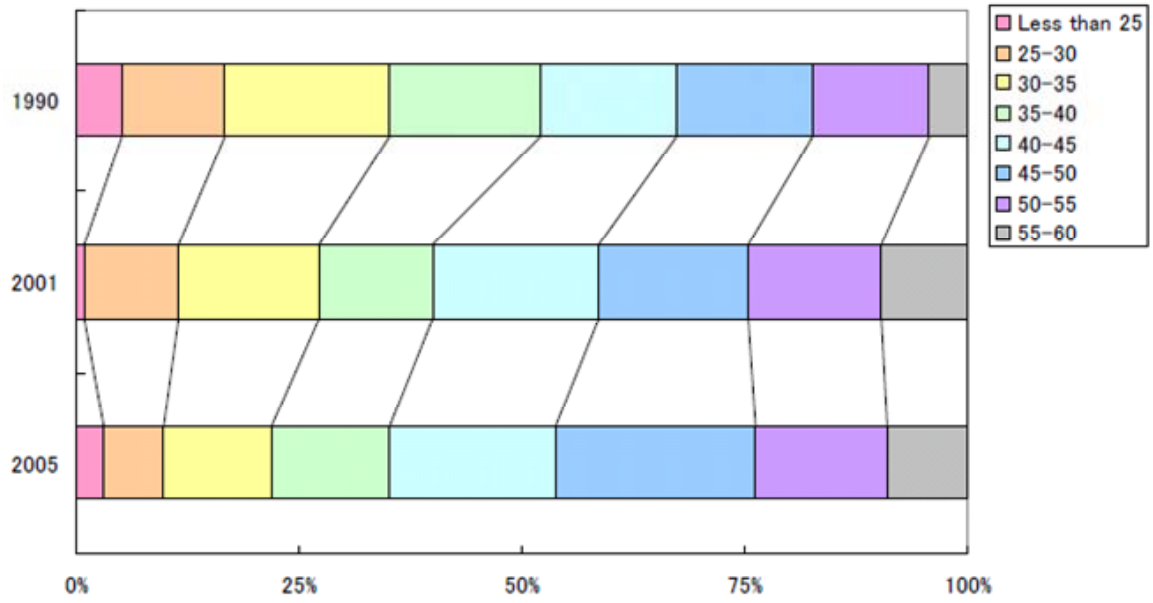
In recent years, skilled technicians and engineers for design, manufacture, construction and operation in the nuclear power industry are aging and the number of them is decreasing, in addition to the number of students who major in nuclear engineering or nuclear-related subjects at universities. In light of such situations, various sectors are working on new initiatives to secure human resources related to nuclear energy because of concern about the expected shortage of human resources to support the infrastructure of nuclear energy utilization on a mid- to long-term basis, and particularly those who will support the new construction and replacement in the near future (Figs. 1-12 & 1-13). Specifically, universities are recently expanding their capacity to educate students who desire to major in nuclear engineering: e.g., the Musashi Institute of Technology (present, Tokyo City University) established a Department of Nuclear Safety Engineering in the Faculty of Technology , and Tokai University added a nuclear technical course to the Energy Engineering Department of the Faculty of Technology in fiscal 2008. In addition, the MEXT and METI started through mutual cooperation in fiscal 2007 the "Nuclear Human Resources Development Program" to fund for activities to develop human resources at universities and technical colleges. Moreover, “The Nuclear Energy Human Resource Development Council”, consisting of persons concerned with nuclear energy from industry, universities, and government, was established in the Japan Atomic Industrial Forum, Inc. (JAIF) and is working to develop road maps, etc. of human resource development for nuclear industry.

Fig. 1-12 Transitions in the Number of Design / Construction Engineers in Electric Utilities and Nuclear Manufacturers



Source: Prepared by the Cabinet Office based on the July 2008 Report of JAIF Nuclear Energy Human Resource Development Council

Fig. 1-13 Transitions in Age Structure of Engineers in Nuclear Departments of Nuclear Manufacturers



Source: Prepared by the Cabinet Office based on the July 2008 Report of JAIF Nuclear Energy Human Resource Development Council

(Enhancement of education concerning nuclear energy)

"The Framework for Nuclear Energy Policy" points out the significance of enhancing guidance on education about energy issues including radiation and nuclear energy in accordance with the developmental stages of students in primary, junior high, and high schools concerning. In the revision of "The government curriculum guidelines" in March 2008, the contents of energy education including nuclear energy was enhanced. Particularly, "The characteristics and utilization of radiations should be referred" has been newly added to the curriculum of science in junior high schools, and it was decided that new curriculum based on the revised guidelines would be implemented from fiscal 2011, earlier than the initial schedule (Table 1-3).

Table 1-3 Excerpt from "the Government Curriculum Guidelines for Junior High Schools" (MEXT, March 2008)

Chapter 2 Each Subject

Section 4 Science

2. Objective and contents of each field

[The first field]

……

2 Contents

(7) Science and technology and human beings

To deepen the understanding of relations between human life and the use of energy resources and development of science technology, and build scientific mindsets for thinking about and determining how natural environment should be conserved and science and technology should be used.

A. Energy

(b) Energy resources

To understand that mankind obtains energy from hidraulic, thermal, and nuclear power, etc. and that the effective use of energy is important.

3 Use of the contents

(8) The section of "(7)" of Contents should be used as follows.

B. The characteristics and utilization of radiations should be referred.

3. Subjects to be addressed in the future

Expectations for nuclear energy are growing in and outside the country as described in Chapter 1 and 2, but activities in Japan concerning nuclear energy are not necessarily progressing in a direction to meet such expectations sufficiently. In order for Japan to meet the expectations of society for nuclear utilization from the viewpoints of measures for combating global warming and assuring stable supply of energy and to support countries interested in expanding nuclear power generation, it is important to promote initiatives for domestic nuclear power generation, nuclear fuel cycling, treatment and disposal of radioactive waste, steadily and comprehensively managing risks associated with them.

(1) Steady promotion of nuclear power generation and nuclear fuel cycling

In order for nuclear power generation to steadily play its expected roles in the future, it is necessary to ensure progress in the improvement of the capacity factor of nuclear power plants, progress in the completion of construction of the Rokkasho Reprocessing Plant, progress in the determination of the areas for site survey with a view to locate high-level radioactive waste disposal facilities, as well as progress in the new and additional construction of nuclear power plants.

(Improvement in the capacity factor of nuclear power plants)

Since the usefulness of nuclear power generation as a measure to combat global warming greatly depends on the capacity factor of nuclear power plants, it should be a goal for the present to improve the capacity factor to a level not inferior to those in other nuclear developed countries. In the short term, for the resumption of operation of the Kashiwazaki Kariwa Nuclear Power Plant, which has been shut down due to the impact of the Niigata Chuetsu-Oki Earthquake, their seismic safety should be verified and necessary measures should be taken. It is also important to steadily conduct activities to verify the seismic safety of each nuclear power plant in Japan. Parallel to this, for the effective utilization of the new inspection system enforced in January 2009, information concerning measures against the aging of facilities should be shared in the nuclear power industry and efforts should be made to realize efficient operation through more effective maintenance activities. Moreover, since the power uprates for existing nuclear power plants also promote the effective use of facilities, electric utilities should consult with regulatory agencies to share a road map for necessary initiatives to realize them and steadily implement those initiatives.

(Progressing to the operation stage in the Rokkasho Reprocessing Plant)

Since the Rokkasho Reprocessing Plant is the core facility for the nuclear fuel cycle in Japan, it is essential to establish the operating conditions for its glassification facility and to steadily proceed to the operation stage. In addition, since the Plant is the first commercial-scale reprocessing facility in Japan, it should be anticipated to face various problems in the future and to overcome them on the condition that safety is ensured. Moreover, it is also important to incorporate the progress of technology effectively in implementing the reprocessing project. To this end, the government and operators should jointly work to maintain and reinforce the knowledge base that can serve to solve technical issues concerning the nuclear fuel cycle project.

(Siting of high-level waste disposal facilities)

For disposal of high-level radioactive waste, it is necessary to build an environment for local governments to consider application for candidate sites via the survey on possible installation of disposal

facilities. Accordingly, the entities concerned, including the central government and NUMO, should develop more effective activities for public hearings and relations so that all levels of people may have the common understanding that the present generation, who enjoys the benefits of nuclear power generation, has the responsibility to make efforts to realize the disposal of high level waste, and, at the same time, should learn from the experiences in the siting of industrial waste disposal facilities in local governments, and make their best efforts for initiatives to deepen mutual understanding, including the provision of opportunities to discuss the disposal of radioactive waste in various locations.

(Development of next-generation light water reactors)

The government, electric utilities, and manufacturers are working in a unified manner as a National Project on the development of a next-generation light water reactor with an eye on the demand expected to arise on the world market as well as that expected in Japan due to the need for replacement of existing light water reactors from around 2030. It is essential for the government and industry to continue the promotion of this project in an integrated manner since the development is expected to contribute greatly to the maintenance and reinforcement of the technical capabilities of Japanese nuclear industry through the development of technology that is highly innovative and may become a global standard.

(2) Strengthening basic activities for supporting nuclear utilization

(Steady promotion of nuclear research and development)

Research and development of nuclear energy are activities for finding valuable knowledge for continuing and expanding the nuclear utilization that contributes to the improvement of the level of living of the people and welfare of human society, the promotion of industries, etc., and are essential initiatives for the creative utilization of radiation in various ways and the sustainable use of nuclear power as a competitive and stable energy source in future years.

As a result of the recent economic situation in Japan, the JAEA, the core organization for Japan's nuclear research and development, has suffered a decrease in the budget, and electric utilities are also withholding investment in long-term research and development due to the impact of deregulation in the power industry. It is feared that leaving such situations as they are might lead to a gradual decrease in the intellectual input that activates creative initiatives and research and development projects in the nuclear energy field, and might lower the level of overall activities in Japan over the years. Accordingly, the Japanese government should not only realign research and development projects to determine what is essential but also consider the basic and fundamental research that should be maintained by the state and large research and development facilities and equipment that should be improved and or of which operation should be maintained, the allocation of monetary and human resources between research / development projects and basic / fundamental research, etc.

In some cases, much time is spent on solving problems that arise on sites in the commercial facilities constructed based on the result of the research and development projects led by the government, because of insufficient transfer of experiences and knowledge accumulated in the research and development teams to the operator who intends to commercialize the result. The main causes of such cases are insufficient efforts to explicitly systematize knowledge accumulated so far in the process of research and development projects, and a failure to utilize experts who engaged in such research and development in applying the result of research and development in the commercial stage. In view of such circumstances, in promoting research and development aiming at commercialization, it is necessary for government and industry to ensure the improvement of basic / fundamental research to clarify the principles dominating in the prototype facilities

and the limitation to the extrapolation of the result obtained in that level of development in the commercial stage, knowledge management including the systematization of findings, utilization of R&D personnel for the effective use of R&D findings in the commercial stage, etc. Recognizing their importance, the Atomic Energy Commission has been considering measures, etc. for promoting future nuclear research and development in the Research and Development Special Committee since August 2008.

(Nuclear research and development: fast breeder reactor and its fuel cycle technology)

Research and development of fast breeder reactor and its fuel cycle technology is being promoted in front-running countries in the field of nuclear power generation, including Japan, as a key technology to be commercialized in order for nuclear energy to contribute to stable energy supply on a long-term basis, etc. In research and development of such technology, the persons concerned should identify issues at an early stage in order to realize the performance objectives provided by the government, and create appropriate solutions and pursue their realization. For Monju, which has suspended operation since a sodium leak accident, relevant technologies and organization should be assuredly improved in order to resume operation as early as possible since Monju is expected, as its mission, to demonstrate the reliability, as a power plant, of a sodium-cooled fast breeder reactor, which is a promising technology to be commercialized, and to establish the technology to handle sodium.

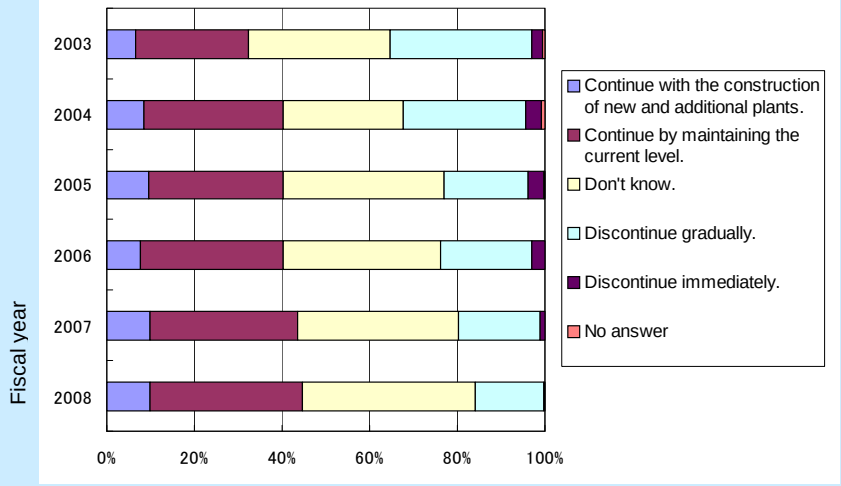
(Securing and developing nuclear personnel)

Securing and developing personnel are important issues to address in promoting nuclear research, development, and utilization on a mid- and long-term basis. For this reason, in order that universities and technical colleges may continuously provide excellent human resources to nuclear-related workplaces, both the government and industry should, from their own positions, support the activities of educational

<Column> Changes in Public Opinions Concerning Nuclear Energy

According to the results of the public opinion survey annually conducted by the Institute of Applied Energy (Metropolitan Area, 500 respondents) concerning the attitude toward the use of nuclear energy, the number of respondents who answered either "Continue the construction of new and additional plants" or "Maintain the operation of the current level of nuclear power generation capacity" is increasing every year, while those who answered either "Discontinue gradually" or "Discontinue immediately" are annually decreasing in number. (Fig. 1-14) These results suggest that the attitude of people toward nuclear energy has been gradually changing.

Fig. 1-14 Changes in Attitudes of People toward Nuclear Energyobserved in the Answer to the Question:Do you think Japan should continue or discontinue to use nuclear power generation in the future? (Source: Questionnaires by the Institute of Applied Energy)



organizations related to nuclear energy and strive to ensure that nuclear-related workplaces become attractive to job applicants as well as to promote improvement of education and research facilities, dispatch of lecturers, acceptance of internships, etc.

(Winning the trust of society)

For the steady promotion of nuclear research, development, and utilization, it is indispensable to obtain the understanding of the people about the roles of nuclear energy in their life and society, as well as to win the trust of people concerning safety, etc. According to the results of an awareness survey, the number of people who showed a positive attitude toward nuclear energy has recently been increasing, but it is imperative to enthusiastically pursue transparency in nuclear initiatives, information disclosure, and an improvement in activities for public hearings and relations. (See the column above.)

Since it is necessary to impart accurate basic knowledge concerning energy and nuclear power for living in a modern society, "quality and use of radiation" was added to the government curriculum guidelines for science to be taught in junior high schools. Nuclear-related persons should fully cooperate in constructive manner with teachers' activity to incorporate meaningful content into curriculums.

(3) Strengthening international response

Various countries are considering and announcing plans to expand the use of nuclear energy, acknowledging its effect on reducing greenhouse gas emissions and providing a stable supply of energy. A country that intends to use nuclear energy for the first time will have to develop the necessary infrastructure, including developing and securing human resources, which will take more than 10 years. Expansion of nuclear energy use is desirable for human society from the viewpoints of the sustainable development of societies through improvements in energy security and progress in measures against global warming, while, response to risks such as nuclear proliferation, nuclear terrorism, and nuclear accidents has been a serious issue in the international community alongside any expansion of nuclear energy use. Japan should, therefore, advance the following initiatives from the perspective of further promoting international cooperation in the peaceful use of nuclear energy, while ensuring nuclear non-proliferation / safeguards, safety and security (3S's).

(i) Raising the awareness of the effectiveness of nuclear energy use as a measure to combat global warming

The global consensus that utilization of nuclear energy is the leading initiative in the portfolio of measures to combat global warming has been build in the international community through the opportunities provided by GNEP, FNCA, etc. As nuclear energy is one of the effective measures for reducing greenhouse gas emissions, Japan will continue to work actively with the international community, in cooperation with the countries pursuing the same goal, to include nuclear energy in the Clean Development Mechanism (CDM) and the Joint Implementation (JI) and to address other matters under the next-term framework starting in 2013 after the first commitment period of the Kyoto Protocol expires, taking the opportunity of international discussions of measures for combating global warming.

(ii) Support to countries introducing nuclear power for the first time

For countries that intend to introduce nuclear power for the first time, Japan, making the best use of the potential accumulated so far, will cooperate in the infrastructure development, such as ensuring the 3S,

establishing safety management systems that encompass human resource development, and establishing regulatory systems and quality assurance systems in such countries. To be specific, Japan will support the initiatives of various countries led by the Asian countries through the dispatch of experts to supporting activities of the IAEA, promotion of multilateral or bilateral cooperative activities including initiatives of FNCA, etc. In addition, in the FNCA Ministerial Level Meeting of November 2008, the foundation of a "Study Panel on the Approaches toward Infrastructure Development for Nuclear Power" was decided and a consensus was built on further cooperation among member countries. Japan will continue to promote close cooperation (Fig. 1-15).

Fig. 1-15 Mr. Yoshitake Masuhara, Senior Vice-Minister of State for the Cabinet Office, stating opinions at the FNCA Ministerial Level Meeting (November 28, 2008).

(iii) International development of the nuclear power industry

No considerable growth is expected for the present regarding activities to construct new or additional plants in Japan. Accordingly, in order for the nuclear equipment supply companies in Japan to maintain their soundness at the present scale, they need to develop customers in overseas markets, where superiority in supply chain is sought as well as equipment supply, including the provision of know-how on construction / execution management and operation control, and fuel supply. For this reason, from the perspective of international cooperation, individual companies are expected to build a superior supply chain in cooperation with electric utilities and associated companies.

In this connection, since international development of the nuclear power industry is important in the fulfillment of international duties as a nuclear developed country to introduce an ideal nuclear culture to the international community and in the maintenance of industries, technologies, and human resources in order to address the future replacement demand in Japan, the government should actively support necessary for appropriate progress in international development. Specifically, the government will support the international development of Japan's nuclear power industry by supporting infrastructure development in relevant countries that will enable the transfer of materials and equipment through bilateral agreements, providing initiatives for utilizing government-affiliated financial institutions, etc.

(iv) Contribution to the initiatives for ensuring the conditions for the peaceful use of nuclear energy

Expansion of nuclear energy in and outside the country must not result in an increase in the risk of nuclear proliferation and terrorism. Japan has been implementing safeguards, export controls, physical protection of nuclear materials, etc. based on international agreements including the NPT, NSG Guidelines, and U.N. Security Council Resolution No. 1540, and should also encourage other countries that introduce or expand nuclear power to ensure such actions and provide support to them as needed. Further, Japan should also be actively involved in international initiatives concerning nuclear non-proliferation and security, such as cooperation in criteria formulation in the IAEA and OECD / NEA and participation in the construction of a multilateral framework for assuring nuclear fuel supply, and help establish systems for such initiatives.

(v) Formulation of international cooperation strategy concerning nuclear energy

International cooperation concerning nuclear energy includes cooperation through international organizations that pursue jointly international public good, multilateral cooperation that pursues common interests between countries, and bilateral cooperation that pursues mutual interests between two countries. In recent years, international developments in nuclear energy have taken a new turn, e.g., many countries in Asia are considering introducing nuclear power, China is planning rapid expansion of nuclear energy, and India has successively executed nuclear agreements with the USA, France, and Russia. In view of such situations, Japan needs to further consider how it should be involved in international cooperation in a new era of nuclear energy.