

Nuclear Development and Asian Collaboration in 21st Century

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1.Recent Steps in the Nuclear Development

Atomic Energy Basic Law and Atomic Energy Commission

Inspired by U.S. President Dwight D. Eisenhower's speech "Atoms for Peace" in the United Nations, Japan embarked on nuclear development in 1955 as part of its efforts to build a peaceful, affluent nation. Japan's basic nuclear development policy is defined in the Atomic Energy Basic Law. The policy is based on the principles of peaceful use, international contribution, and selfstanding, democratic, disclosure and is fully meaningful in modern days.

Japan's nuclear development started with energy development and the use of radiation, and has now entered the stage of working as part of comprehensive science and technology. It is a characteristic of Japan's nuclear research, development and utilization that the state formulates action plans, makes R and D works mainly by the governmental organizations and the private sector carries them out if the technology enters the stage of commercialization. ("state planning and private implementation"). The nuclear policy has so far been embodied in the nation's long-term nuclear program that is revised every five years or so. It is now required that the program, which has been revised seven times in the past, be formulated from a new perspective in consideration of new developments in nuclear power generation, radiology, and expansion and privatization of industrial use of nuclear science and technology in the 21st century.

What State Planning and Private Implementation Means?

In the early stage of the nuclear development in Japan when Japan's nuclear industry was in a stage of growth, nuclear development was led largely by the state. In any country, some kind of state leadership is expected and is indispensable for the long term nuclear development.

The policy in the days of the cold war was to develop and maintain total technology entirely within the Japanese nuclear industry. In accordance with the state policy, in consideration of the importance of reliability of technology and nuclear nonproliferation, the Japan Atomic Energy Research Institute and the Power Reactor and Nuclear Fuel Development Corporation (PNC) mainly carried out research and development while transferring technology to end users, primarily

electric power companies and providing support for the commercial use of the technology in national projects concerning enrichment, fuel reprocessing, ATR, fast reactor, safety research etc.

In fact, the state gradually transferred nuclear research and development activities to the private sector, extending support for the commercial use of nuclear energy with light water reactors in particular. It is worthwhile to note that the voluntary efforts by the utilities as well as manufacturers for light water reactor system standardization and improvement resulted in the early design and construction of advanced BWRs and PWRs.

Can Nuclear Community Fully Privatized?

In short, the efforts at the private sector are those for achievement of economy, improvement of safety and social relevance. The cost is a keyword in the present society and the efforts for economy enhancement is a task of the private sector. At the same time, mutual confidence with the society is essential with the understanding and support by the society including the host regions being a precondition. In the private sectors, the utilities among others are paying great efforts for this purpose.

It may be without question that the principal player in the matured stage of nuclear utilization will be the private sector, however, nuclear development activities in Japan are oriented to private operation based on the national policies.

It is unlikely that the results of researches on fast reactors, advanced fuel reprocessing, stratum disposal of high-level waste, nuclear safety, and so forth will be transferred to the private sectors so smoothly as in the 400-meter relay, well within the relay zone. Who will be recipients at home and abroad? Will it be possible for developers themselves to become recipients in different positions (partial privatization)? Will it be practicable to completely privatize the nuclear industry?

The general consensus of the Japanese people for the nuclear policy would be as follows: Local governments and residents should cooperate in the implementation of state policies; the state should play the leading role in securing safety; and it is clearly impracticable to leave everything to profit-seeking private companies from the beginning.

There is a situation in which all cooperate activities may not be able to address a private profit from the very beginning.

Peaceful Use of Nuclear Energy in Japan

The history of Japanese peaceful use of nuclear energy is based on the people's understanding and support. During the past four decades, Japan has constructed as many as some 50 nuclear power stations. They now supply one third of electric power demand in the country. Thanks to the efforts

of those in the industry and being strictly observed by the people, Japan's nuclear power generation has grown favorably, without causing any radiation disasters, although there have been some slight mishaps. Japanese light water reactor technology is now at the stage of maturity.

Unlike the United States and Canada, Japan, a resource-poor country, has taken the position of using its uranium resources carefully. Therefore, Japan has followed the policy of extracting the generated plutonium and unburned uranium from nuclear reactors in order to reprocess them and reuse them as nuclear fuel. This is a policy that makes full use of resources and reduces radioactive waste. In comparison with nuclear power generation, which is growing smoothly, the nuclear fuel cycle has several issues to be solved, particularly economic issues.

In Japan, nuclear development has been considered not only as an energy source but also as something that should grow so as to constitute a part of science and technology in its broad sense.

Use of radiation is a particularly important area. Beginning with the use of radioisotopes, efforts in this area have produced a number of fields of advanced application that use particle accelerators and nuclear reactors. There are still other promising fields such as radiology and use of radiation for food.

National Consensus and Decision Making

As to what the future decision on national policies should be, in which process a highly democratized country reaches a decision making is a question to be decided by the Japanese society. Information disclosure, transparency, leadership and accountability are among the factors to be required.

Who supports a long term development? How should investment be done? Although there are many cases where a state of the art technology was developed within the frame work of military efforts, how is it possible to cope with a huge technology development which is limited a peaceful use only? Is a huge investment possible in a democratic society? How will social consensus be obtained? We face to many challenges.

It seems that Japanese society recognizes at highly rate the success of the nuclear development that has been carried out to date. However, changes in the times have expanded the opportunities for social participation by individuals. Although expert opinions are made much of, ours is a society in which individuals take part in decision making. In this trend, discussions are under way on the gigantic characteristics of nuclear energy system and on the presence of radioactive substances. People also desire that something be done to overcome the absence of relevance, lack of marketability, closed character and difficulty of obtaining general understanding in the realm of nuclear energy. Partly because of the "Monju" incident a few years ago, Japanese society is

experiencing anxiety about and distrust in nuclear energy. Society now demands that Japan's nuclear research and development should be reviewed and reexamined before the turn of the new century. I understand that such a review is logically inevitable, though it may be partly prompted by the unhappy series of incidents at the PNC.

I would also like to refer to the actions the nuclear circles have taken to establish a consensus since the Monju incident. These actions include people's involvement in the policy making process, disclosure of meetings of the Atomic Energy Commission, people's participation in specialist meetings and round-table conferences.

MITI, STA and the utility companies have also made efforts to establish a consensus. I would like to pay respect to the Japanese participants in this meeting who play many major roles in this series of actions. Although there are still some problems to be addressed in the future, the results of these actions reflect Japanese society's positive expectations on nuclear energy. In this respect, I feel as though I see a bright light ahead.

2. Departure for the 21st century

Nuclear Fuel Cycle and New Organization for PNC

The Atomic Energy Commission has so far consistently maintained that one of the main objectives of Japan's nuclear energy policy is to establish a nuclear fuel cycle. The importance of establishing a nuclear fuel cycle was also referred to in the Diet.

Needless to say, it is not easy to complete a nuclear fuel cycle in view of the present difficult economic situation of Japan, deregulation and cost reduction efforts in the nuclear industry. With regard to light water reactor, steady, strenuous efforts are now being made to realize a long sustainable nuclear fuel cycle. These efforts are being directed at the use of plutonium in light water reactors, in-site storage of used fuel, temporary storage of used fuel outside the sites and so forth. Observed in these efforts is Japan's will not to hold more plutonium than is necessary. Japan has been announcing the quantity of plutonium it holds every year.

However, the goal of the nuclear development does not exist only in the extension of this way. When the significance of COP3 and a distant future are considered, it is a must for Japan to make a contribution in the advanced nuclear energy system development. Based on the recognition of the importance of securing adequate energy resources and protecting the natural environment for human society in the 21st century, Bills to revise the Atomic Energy Basic Law and the PNC Law was deliberated to the House of Representatives and the House of Councilors. In the debate over a

drastic reform of the PNC. JNC (Japan Nuclear Fuel Cycle Development Institute) is founded on October 1, 1998 with the consent of all parties, excluding the Japan Communist Party.

It seems to me that few other countries in the world have been able to directly address this problem from the viewpoint of peaceful use. Fully considering the fact that the bill was passed under the weight of Japanese society's expectations about the future of nuclear energy, the nuclear community should endeavor to meet people's expectations.

The new organization is required to develop a fast reactor and a corresponding fuel cycle along with technology for geological disposal of high-level radioactive waste. In the past, the PNC played the central role in the successful development of uranium mining, uranium enrichment, reprocessing, and MOX fabricating technologies. The fruits of the development so far are willingly offered to the foreign industry on request.

In view of the need to secure adequate energy resources and protect the natural environment, the basic stance for nuclear energy systems that can function harmoniously in human society in the 21st century should probably be directed at establishing a nuclear fuel cycle that contributes also to nuclear nonproliferation and nuclear disarmament. That is, we must create nuclear energy systems that are less liable to cause nuclear proliferation. Put more simply, these must be systems and fuel forms in which plutonium is not given any special position. Research and development efforts are being made on an advanced cycle in which uranium, plutonium, and other transuranium elements can be handled at the same time. This is one of the main subjects to be handled by the JNC. I expect that the world will start working on the completion and establishment of a closed system for nuclear fuel cycle.

Needless to say, international cooperation should be totally welcome. In fact, it is part of Japan's basic attitude toward nuclear development to make an international contribution. Japan is ready to provide its abilities, facilities, and so on for international activities conducted to realize peaceful use of nuclear energy. Although the end of the cold-war structure may not have completely eliminated international tensions, it still seems to have given Japan an opportunity to express itself to the rest of the world.

Long Term Program for Nuclear Research, Development and Utilization

It appears that many of the discussion at present on the nuclear energy relate to the revision of the Long Term Program. Efforts for revision will be started in near future.

It is my opinion that the next Long Term Program should focus the orientation of the human

civilization in the 21st century. What should be considered is what Japan, a country which aims to be a state of creative science and technology, can do for the society of the 21st century in search of science and technology that can coexist with the environment and to draw an overview and a long term perspective for the nuclear development from such a point of view.

The most significant objective is an effort to foster nuclear energy as a comprehensive science and technology for the coming century. In this context, what is important should be to contribute to the international community including Asia in the area of energy supply, establishment of the nuclear fuel cycle, application to the medical and food science, advanced technology development by particle accelerators and lasers and peaceful utilization technology.

The nuclear policy should show realistic measures as well. Providing a guideline for the challenges we face now, developments that are going on, such as utilization of plutonium in light water reactors, intermediate storage of spent fuel, reprocessing, development of a fast reactor and geological disposal of high level radioactive waste and responding flexibly taking the sharing of role between the government and private sectors into consideration will also be treated as important as the long term vision.

International Collaboration after Collapse of Cold War Era

In consideration of the importance of overcoming its handicap as a small country not well blessed with natural resources, Japan has been basically pursuing the energy policy that emphasizes both securing energy resources and protecting the natural environment. Since COP3, environmental protection has grown in importance. Following the collapse of the cold-war structure, the wave of globalization has been hitting the world nuclear industry, promoting an international sharing of roles or international competition. In addition, while many industrial countries are losing interest in nuclear development, Asian countries place a great deal of emphasis on nuclear energy in their energy policies.

Japan's current cooperation with the rest of Asia, which is extended primarily from the viewpoint of nuclear nonproliferation and safeguards, is not sufficient. The Japanese nuclear community has so far been very hesitant to use its technology in international cooperation. This is partly because Japan has been afraid of nuclear proliferation and partly because such cooperation may arouse fears not only in the domestic society but also among other countries, especially Asian countries, that Japan may arm itself with nuclear weapons. Probably Japan has lacked confidence that its position would be properly understood. The collapse of the cold-war structure has given Japan an opportunity to declare to the world its readiness to cooperate in the peaceful use of nuclear energy. It has given Japan the courage to position its nuclear development efforts in an international

framework. I firmly believe that Japan should take the position of positively pursuing nuclear development from an international perspective. This position agrees with the nation's interests.

In recent years, Japanese industry as well as governmental organization such as JAERI and PNC has gradually been stepping up its Asian cooperation in the PWR, ABWR, research reactors and other fields and on the state side, the Atomic Energy Commission has been sponsoring International Conferences for Asian Regional Atomic Energy Cooperation for the past nine years.

I expect that Japan's Asian cooperation will gradually be better focused. When the present significance of technology transfer is considered, it is no longer meaningful to limit the recipients to domestic companies. It is equally important to introduce excellent technology from abroad and to transfer Japanese technology to foreign countries. International competition over light water reactor plant, which has already been put to practical use, has now been staged in Asia, especially in China.

The Atomic Energy Commission recognizes the need for policy dialogue among Asian countries, The future of Asian region where we live holds the certainty of increasing population and increasing demand for energy. Under these circumstances, Japan's plan for increased use of nuclear power and establishment of the nuclear fuel cycle make it well placed for major contribution to the region. We are determined to make efforts for a peaceful and affluent future, hand in hand with Asian countries.

The nuclear cooperation with Korea, a country only separated by a sea, has been carried out in several areas of interest. I would like to expect its further promotion. I myself have a lot of friends and graduates in Korean nuclear society. I would like to foster a fruitful bilateral cooperation while tendering that friendship.