

Framework for Nuclear Energy Policy¹

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Thank you, Mr. Chairman for your kind introduction. Good morning, distinguished delegates, Ladies and gentlemen, it is a great honor and pleasure for me to be given this opportunity of presenting you major points of a new framework for nuclear energy policy in Japan.

The Atomic Energy Commission of Japan (AECJ) recently decided the “Framework for Nuclear Energy Policy”, which was a result of the AECJ’s regular review of its basic policies in every five years. It was decided by Cabinet meeting on October 14 that the Government respects this framework as a basic principle for nuclear energy policy and promotes research, development and utilization of nuclear energy.

The draft of this framework was prepared by the New Nuclear Policy-Planning Council based on its year-long careful deliberation. The members of the Council were not only leading experts in the nuclear energy field but also leaders and well-informed persons from various fields of society, including academia, businesses, labor unions, local governments, mass media, non-governmental organizations, and citizens groups, in addition to Commissioners. We included among them those who were critical of the utilization of nuclear energy so as to reflect diverse public opinions in the deliberation of the policies.

The Framework presents guidelines for the policy design and implementation in five policy areas including a) maintenance of the basis for the promotion of nuclear activities, b) utilization of nuclear energy and radiation, c) research and development, and d) international coordination and cooperation, after defining basic objectives of nuclear energy policy and common principles for policy design and implementation.

The basic objectives of nuclear energy policy defined in the Framework are 1) to maintain and enrich basic measures for the promotion of nuclear activities such as assurance of safety and security, limitation of nuclear activities to strictly peaceful purposes, safe disposal of radioactive wastes, and coexistence of nuclear activities with communities, 2) to increase the contribution of nuclear energy to the stable supply of energy and to the reduction in carbon-dioxide emissions, 3) to improve and expand the use of radiation technologies, 4) to make government initiatives with regard to nuclear activities more effective and efficient.

The Framework sets five common principles that be emphasized in policy design and implementation as we feel it important to make clear what we AEC regard as essential for the successful administration in the current public policy environment. They are 1) to assure safety and security as a prerequisite for actions: 2) to pursue multilateral and comprehensive approaches in

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cooperation with even policy actions and/or actors in other fields, 3) to pursue a set of actions across several different time frames, e.g., short term, mid-term, and long-term, in parallel, in order to enjoy the contribution of nuclear science and technology to the welfare of the nation for a long term, 4) to pursue international partnership and cooperation as hard as possible, 5) to execute policy reviews for improving the effectiveness and efficiency of policies and use the result to facilitate the public understanding of them.

The Framework presents diverse performance objectives to maintain and enrich the basis for the promotion of nuclear activities. They include to

1. Restore the public confidence in both the plant operator's safety and security management and the effectiveness of regulator's activities.
2. Maintain Japan's nonproliferation credentials by faithfully executing the obligation of the IAEA safeguards agreement and Additional Protocol, and by further improving the transparency of plutonium utilization activities.
3. Establish necessary arrangements for radioactive waste disposal and make steady progress toward the determination of the site for high-level waste disposal.
4. Secure necessary number and quality of talents or human resources in nuclear businesses by improving the attractiveness of nuclear businesses, supporting the nuclear science and engineering education in universities, and organizing training programs for technicians necessary for the maintenance of nuclear facilities.
5. Pursue the co-existence of nuclear activities with society by improving the transparency of activities, strengthening the public hearing and public communication activities, and increasing the opportunity for public participation in policy making processes.
6. Improve energy and nuclear science and engineering education in school educations and lifelong educations to enrich diverse opportunities for the public to learn about them.
7. Improve the system for subsidizing the local governments that locate nuclear facilities so that they can utilize the subsidy in wider and more comprehensive development projects come up from the area, in cooperation with plant operators and neighboring universities as partners.
8. Improve communication between central government and local governments on the effectiveness of safety and security regulation and on the policy of promoting nuclear activities.

The reason why the first of them is to restore the public confidence in both plant operators and regulators is because the public confidence in them has deteriorated severely in Japan due to a series of operators' misconducts during the last few years, and the average availability factor of nuclear power plants has dropped to miserably low levels in recent years on that account. And even the characteristic of nuclear energy as a secure power supply source has been questioned in several occasions on account of the drop. .

The Framework therefore requests operators of nuclear facilities to reconfirm safety-first principle by top management, implement a mechanism to prevent misconducts and establish safety culture to deter them, and facilitate risk communication with local communities, placing priority on the understanding of what the people wants to know. At the same time, the Framework is expecting that regulators also restore their credibility by improving and clarifying rules and regulation based on the most un-to-date available knowledge obtained from research and operational experience, legalizing periodic safety review to enforce the operators to reflect the advanced knowledge on the safe operation, and enhancing communication with the public, local governments, and the licensees

on the principles and practices of their regulatory activities.

The next area is utilization of nuclear energy and radiation and the pursuance of the increase in the contribution of nuclear energy to the stable supply of energy and to the reduction in carbon dioxide emissions, in particular. At present 53 nuclear power plants are in operation in Japan, including 23 PWRs and 30 BWRs, and their total capacity is about 47GWe. Furthermore 3 units are under construction and 8 units are in preparation for applying the construction permit in 5-10 years. The operating units are supplying about one-third of the country's electricity and becoming a safe, reliable and competitive energy source. They contribute to the energy security as they push up the energy self-sufficiency ratio of Japan by 15%, though the ratio itself is still about 19%, which is the lowest among developed countries.

Nuclear power is also one of the most important means to cope with the request to reduce carbon dioxide emissions for the observation of the Kyoto Protocol. In fact, though annual electricity generation last year was more than 21% higher than that in 1990, carbon dioxide emissions in the electricity generation sector has increased less than 7% owing to the fact that nuclear power plants have been the major portion of electricity generation capacity added during this period. It should be also noted that this share of nuclear power plants is the reason why the electricity price is essentially stable in Japan in spite of the significant jump of oil price in these months.

In the discussion of the position and the role of nuclear energy in Japan's long-term energy policy, it is important to take notice of the prediction that Asian countries' dependence on oil and gas will increase in accordance with their rapid economic growth and progress in the modernization of their societies. Taking this into consideration, the Framework points out that Japan, as a geographically isolated island country, should do everything in her power to improve the degree of self-sufficiency in energy supply.

The Framework points out, at the same time, that though energy is an indispensable ingredient of economic development, energy supply is the source of most of the human emissions of greenhouse gases that are altering the global climate and that the experts in the science of climate change have recently proposed that global fossil fuel use should be halved within this century to stabilize atmospheric carbon dioxide concentrations below 550ppm. Taking these observations into consideration, Japan should aim at reducing the carbon dioxide emissions in 2100 to less than 50% of the current level by reducing the share of fossil fuels in primary energy supply and improving the efficiency of energy utilization.

In order to realize such a large scale reduction of the share of fossil fuel in this period, it is reasonable for Japan to pursue the increase in the utilization of both renewable energy and nuclear energy rather than either ones as Japan is at present enjoying such a large capacity of nuclear power generation and struggling to increase the contribution of renewable energy.

It is also important in the formulation of future energy policy to pay due attention to the prediction that in Japan, the electricity demand will be maintained at constant level all the time in this century at best after reaching the maximum in a few decades, while the final energy consumption will soon start decreasing due to the progress in energy conservation and gradual decrease in population. Therefore the Framework proposes that we should prepare ourselves for maintaining the share of nuclear power in electricity generation after the year 2030 at current level of 30-40% or greater than that, making positive utilization of the occasion when the existing plants will retire.

One of the issues discussed most extensively as well as intensively at the Council in connection with this policy is the validity of current nuclear fuel cycle strategy in Japan, which has been to reprocess spent fuel and use plutonium and uranium recovered in the process. Following this policy, Japan has accumulated relevant skills through the construction and operation of the Tokai reprocessing plant, while commissioning the reprocessing of most of spent fuel generated so far to foreign reprocessing firms. Subsequently, the private sectors has promoted the construction of the Rokkasho reprocessing plant, and the Government has developed a legal framework to designate the implementing bodies of geological disposal of vitrified high-level radioactive waste from the reprocessing, their financing system, and the process to determine the site for the disposal.

In the aforementioned Council, several members claimed that as we have experienced the delay in various activities including the use of plutonium in light-water reactors, the completion of the Rokkasho reprocessing plant, and the development of fast-breeder reactors, the strategy to close the fuel cycle is difficult to pursue and, even if it materialize, it is uneconomical compared with the strategy to dispose the spent fuel as wastes. It was farther claimed that to stick to the closed fuel cycle strategy by Japan, when things being what they were, might cause anxiety of nuclear proliferation in international community.

Responding to this claim, the Council reviewed the validity of current nuclear fuel cycle strategy by evaluating four scenarios of fuel cycle activities in future, a) continuation of the current strategy, b) switch-over to the direct disposal of spent fuel 40 years later, c) switch-over without delay, and d) interruption of the completion of Rokkasho plant pending policy deliberation for a few decades. The evaluation was done from the viewpoints of safety, technical viability, economic viability, energy security, environmental protection, nuclear nonproliferation, social acceptability, adaptability to future uncertainty, and manageability of the social issues possibly arisen from the change of strategy.

The results of this exercise indicated that the reprocessing scenario was superior in terms of energy security, environmental protection, adaptability to future uncertainty, and other aspects but inferior in economic viability as the cost of electricity was estimated to be 10 % higher in this scenario than in direct disposal scenario, though this did not change the economic competitiveness of nuclear power generation with other methods of power generation. Further to the claim of increase in proliferation risk and radioactivity releases in reprocessing scenario, it was concluded that as internationally agreed rigorous safety and security regulations as well as nuclear safeguard measures were to be applied to any activities involved in any scenario, the evaluation of these scenario from these viewpoints did not bring about the significant difference among scenarios.

As for social acceptability and adaptability to future uncertainty viewpoints, it was recognized through the debate that diverse societal assets accumulated over a period of many years such as technologies, relationships of trust with communities in which facilities were located, various international agreements relating to reprocessing in Japan and so on constituted items of great value that should be maintained if Japan would rank nuclear power generation as a main source of power and use this on a long-term basis by incorporating technical progress in a timely and appropriate manner and thus enjoy the benefits of energy security and environmental protection.

The probable effect of the change of strategy on the behavior of the general public was also discussed as it was essential for policy makers and private companies who operated facilities for the promotion of nuclear power generation and its fuel-cycle to maintain and secure mutual understanding with the general public. It was expected that if the policy was changed from the

reprocessing approach to the direct disposal approach, it would take 10 years or more to rebuild a relationship of trust with communities in which the facilities are located, changing the understanding from the continuation of the current strategy to the removal of spent fuel to disposal sites or to the interim storage facilities in the course of time.

Based on these discussions, the Framework expresses that it is appropriate to make it the basic policy of fuel cycle activities for Japan to utilize reprocessing technology from the viewpoint of utilizing nuclear power as a long-term and major method of power generation and that the entities should steadily promote the realization of activities planned through rigorous risk assessments and managements. It also expresses that the Government should start from 2010 the deliberation of the future fuel cycle strategy to be followed after the retirement of Rokkasho Reprocessing Plant, taking into consideration of the progress in the research and development of fast breeder reactor and its fuel cycle systems and that it is appropriate to promote basic research on the science and technology of direct disposal of spent fuel so as to be able to enjoy flexibility in the review of fuel cycle strategies in future.

Let me summarize at this point a set of performance objectives for promoting nuclear energy utilization expressed in the Framework across three different time frames; short term, mid-term and long-term.

The short term objectives are to enhance the operating efficiency of existing plants by improving plant availability and by pursuing power up-rating and life extension, to promote the utilization of the plutonium recovered from the spent fuel, and to construct interim spent fuel storage facilities in parallel with the completion of the commissioning test of the Rokkasho Reprocessing Plant.

One of the major mid-term objectives is to prepare advanced nuclear power plant designs with improved performance as candidates for the replacement of the retiring plants, taking into consideration the prediction that significant number of nuclear power plants in operation will start their retirement in 10 - 30 years. The Framework proposes that the government, based on comprehensive consideration of public interests, should establish an environment for inducing the private sector to make long-term investments for this objective, identify and characterize good elements of innovative technology platforms related to various improvements, and fund for the development of such technology in a timely fashion. It also proposes that manufacturers will strengthen the business structure and achieve the scale and competitiveness to be able to compete in international market by developing unique and innovative technologies and dramatically improving the efficiency of business execution by strengthened mutual cooperation.

The long-term objectives include to develop fast breeder reactor and its fuel cycle systems, of which objectives in coming ten years or so is to explore and clarify their concepts which should be commercially available in 2050s with enhanced safety, reliability, and economic performance consistent with the requirement of neighbor friendliness; with sufficient security in terms of proliferation resistance and physical protection; and by which the nation can enjoy the benefits of effective fuel utilization and more sophisticated nuclear waste management consistent with a national goal of pursuing sound material-recycle based society through reducing, reusing, and recycling.

In the research and development policy area, the Framework proposes to pursue a set of R&D activities across several different time frames in parallel; including a) exploratory research for innovative system concepts such as fusion, nuclear hydrogen, etc., b) technology development for

commercialization of innovative system such as FBR and its fuel cycle systems, and c) engineering development for commercialization of innovative system such as advanced LWRs in addition to generic research and nuclear safety research and those aiming at the improvement of design and operation of existing plants. It also expresses the recognition that it is important to maintain and enrich large scale research facilities and to promote technology transfer, knowledge management and knowledge dissemination among diverse sectors as well as generation involved in the research, development, and utilization of nuclear energy.

As for policies for international cooperation, the Framework tells that Japan should , a) maintain and strengthen international non-proliferation regime; b) support developing countries to utilize nuclear science and engineering for the promotion of public welfare and economy and prepare for the introduction of nuclear power; c) contribute to the activities of international organizations to provide needed services to the global communities; d) enhance R&D collaboration among nations for better utilization of resources and reduction of project risks; and e) endorse oversea business activities of Japanese nuclear industries.

In this connection, I would like to call your attention to the fact the Framework proposes to positively participate in the discussion about the Multilateral Approaches to the Nuclear Fuel Cycle initiated by Dr. ElBaradei as Japan can share with him the view that it is important to realize multilateral schemes to nuclear fuel cycle that can reduce unnecessary incentive for states to have national enrichment and reprocessing facilities. We believe it important for Japan not only to provide experiences and ideas in the discussion but also to provide proliferation-resistant technologies and capabilities of the activities involved if fitted, in order to devise and implement an equitable, adequate and achievable framework to assure the supply of nuclear energy services to international community.

I would like also to point out that energy technologies generally change only slowly and at considerable cost, and the social rate of return of the investment into nuclear energy R&D to the world as a whole is higher than to the individual countries. This is the reason why the framework states that co-ordination of research activities beyond national prestige to reduce the duplication of effort at the world level must be an absolute priority and Japan should pursue in the world nuclear community coordination of efforts in research and development needed to realize the required technological innovations in a timely manner for the benefit of global community.

In conclusion, Mr. Chairman, we have decided Framework for Nuclear Energy Policy. We expects the research, development and utilization of nuclear energy in Japan will follow the basic objectives, common principles and basic concepts for future approaches that are laid down in the framework in cooperation with the public and international society. We strongly hopes that in doing so, all the personnel concerned in nuclear energy carry the burden and expectations the public has placed on them by competing with other energy technologies in the pursuit of better performance, improving themselves by learning from their rivals, and reforming the nature of approaches without hesitation. This is the reason why the Framework expresses is as a performance objective in the area of policy review to strengthen periodic policy review activities as a part of Plan-Do-Check and Action cycle for continuous improvement of policy design and implementation, though I have no time to touch upon it. I do hope that these reviews will be executed with due consideration to uncertainties in their quality management and risk management, bearing always in mind that potential risks lurk in the nuclear facilities, and never overestimating the quality of the potential of nuclear technologies, overwhelmed by its phenomenal nature.