

The Framework for Nuclear Energy Policy in Japan

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Thank you, Mr. Chairman for your kind introduction. Distinguished delegates, Ladies and gentlemen, it is a great honor and pleasure for me to present you my reflection on the framework for nuclear energy policy in Japan.

Before going on to my main subjects, I would like to briefly review the role of nuclear power in the current Japanese energy supply scene. At present 53 nuclear power plants are in operation in Japan, including 23 PWRs and 30 BWRs. Their total capacity is about 47GWe. They are supplying about one-third of the country's electricity and becoming a safe, reliable and competitive energy source, indeed. 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 industrialized countries.

Nuclear power is also one of the most important means to cope with the request to reduce carbon dioxide emission 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 emission 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 surely a major reason why the electricity price is essentially stable in Japan in spite of the significant jump of oil price in these months.

The role of the Atomic Energy Commission is to decide policies for research, development and utilization of nuclear energy for relevant government agencies. In order to prepare ourselves for such decisions, the Atomic Energy Commission decided quite recently the "Framework for Nuclear Energy Policy", which was drafted by the New 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 representatives of various sectors of society, including academia, industries, legal professions, local governments, mass media and citizens groups who are critical of the utilization of nuclear energy. It is a pleasure for me to report you that the Cabinet decided last Friday to respect this framework as a basic policy for the promotion of research, development and utilization of nuclear energy.

The Framework sets several basic objectives in nuclear energy policy. Needless to say, one of the most important objectives is to increase the contribution of nuclear energy to the stable supply of energy and to the reduction in carbon dioxide emission by promoting efforts to further enhance its good characteristics and overcome issues and defects, while maintaining the function level of base activities to the people's expectations, which activities include those for assurance of safety, limiting them to strictly peaceful purposes, safe disposal of radioactive wastes and coexistence with communities.

In order to arrive at the actions necessary to attain this objective, we are required to clarify the position and the role of nuclear energy in energy policy. When deliberating energy policies in these days, it is especially important for Japan to note that Asian countries' dependence on the oil supply from the Middle East region will increase due to the continued growth in demand for oil in accordance with their rapid economic growth. We should also pay due attention to the claim of some oil experts that we may be reaching the peak of annual oil production and to the forecast that the developing countries will increase the share of natural gas in their energy supply due to the progress in the modernization of the society as in the case of the developed countries. These observations lead us to the consideration that Japan, as an isolated island country, should improve the degree of self-sufficiency in energy supply by increasing the use of non-fossil energy including renewable and nuclear energies, as the markets for fossil energy resources in the future will surely become tighter than ever.

Furthermore, it is also important for us to give serious consideration to the reality that though energy is an indispensable ingredient of economic development, energy supply is the source of most of the anthropogenic emissions of greenhouse gases that are altering the global climate. Needless to say, the climate change is one of the most dangerous environmental problems as it affects all environmental conditions and processes related with human well-being. 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 and recommendations into consideration, it can be judged important for Japan to reduce 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 important to consider the utilization of both renewable energy and nuclear energy rather than the utilization of either ones as it is clear that the former strategy has better chance of success than the latter especially for us Japan which is enjoying such

a large capacity of nuclear power generation already.

In addition to these considerations, we should also pay due attention in the formulation of future energy policy to the prediction that in Japan, the electricity demand will be at constant level all the time in this century after finishing the growth, though final energy consumption will soon start to decrease due to the progress in energy conservation and the population decrease. Therefore we have proposed in our policy framework that we should prepare ourselves so that we can make the share of nuclear power in electricity generation after the year 2030 similar to or greater than the current level of 30-40%, making good utilization of the occasion of the retirement of the existing plants.

Now, in order to make the contribution of nuclear energy over this century in this way, it is rational to pursue a set of actions across three different time frames; short term, mid-term and long-term in parallel, under the expectation that Japan will continue to utilize light water reactors for the time being by replacing the old ones with advanced ones and, starting at around 2050, gradually switch to fast breeder reactors towards the end of this century,

Now I will briefly touch upon these actions specified in the framework. The short term actions are those aiming at using existing assets as long as practicable: they include activities for maintaining the public confidence in the safety management of existing nuclear power plants and related facilities, improving the performance of existing plants incessantly, promoting the utilization of the plutonium recovered from the spent fuel in light water reactors, and making progress, as planned, in the search for the site for geological disposal of vitrified high-level radioactive wastes.

Mid-term actions are those to prepare advanced light water reactor 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 long-term actions are those related to the development of innovative nuclear energy supply systems which can be competitive with other technology in the future electric and non-electric energy market, in terms of social acceptability as well as safety, economy and environmental protection, in addition to such basic and/or generic nuclear science and technology research as fusion and ADS. One of the major projects for this purpose is that of developing fast breeder reactor and its fuel cycle systems, of which objectives in coming ten years or so is to explore and clarify the concepts of fast reactor systems which should be commercially available in 2050s by satisfying the requirements to enhance the economy, safety, and reliability, to achieve the efficient utilization of nuclear fuel resources, to realize sufficient security in terms

of proliferation resistance and physical protection, and to minimize the radio-toxicity of the wastes to be disposed of through minor actinide recycling.

One of the issues discussed most extensively as well as intensively before the Council attained to the stage of proposing this set of actions was the need for the recovery of the public confidence in both the plant operators' safety management and the effectiveness of regulators activities for the assurance of nuclear safety, as the Council identified the restoration as one of the most salient and urgent issues to be resolved.

In recent years, the public confidence in both the plant operator's safety management and the effectiveness of regulator's activities has deteriorated severely in Japan due to a series of operators' misconducts during the last several years. Because of this problem, the situation has gone so far as to the point that the average plant availability factor in Japan has dropped significantly and the credibility in nuclear energy as a secure supply source has been damaged significantly.

In the policy framework, we expressed our strong request that operators reconfirm safety first principle by top management, implement a mechanism to prevent misconducts and establish culture to deter them. We also requested them to facilitate risk communication with local communities, placing priority to the understanding of what the people want to know.

We also expressed our understanding of the situation that regulators also have their homework: they need to restore their credibility by improving and clarifying rules and regulation based on the best available knowledge from research and operational experience, by legalizing periodic safety review for enforcing the reflection of the most advanced knowledge related to the safe operation, and also by enhancing communication with the public, local governments, and the licensees on the regulatory activities on-site.

Another issue of such category was the nuclear fuel cycle strategy in Japan. Japan's basic policy in this area has been to reprocess spent fuel from light water reactors and use plutonium and uranium recovered in the process. Following this policy, Japan has acquired relevant skills through the construction and operation of the Tokai reprocessing plant, while commissioning the reprocessing 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 body of geological disposal of vitrified high-level radioactive waste, the financing system for these activities, and the selection process for its disposal sites. In recent years, however, we have experienced the delay in major activities related including the use of plutonium in light-water reactors, the

completion of the Rokkasho reprocessing plant and the development of fast-breeder reactors.

In the aforementioned Council, several members claimed that the strategy to close the fuel cycle is difficult to realize from the viewpoint of reducing their risk to an acceptable level and is uneconomical even if it realize as compared with the strategy to dispose the spent fuel as wastes, pointing out the cases of change of strategy in foreign countries and a concern that to stick to the closed fuel cycle strategy by Japan when things being what they are currently may cause anxiety of nuclear proliferation in international community.

Responding to this claim, the council discussed possible future nuclear fuel cycle strategy by evaluating four scenarios of future development of fuel cycle activities including those of switch over to the direct disposal of spent nuclear fuel, in addition to the continuation of the current strategy. The evaluation was done from the view points of safety, technical viability, economy, energy security, environmental compatibility, nuclear nonproliferation, social acceptability, adaptability to future uncertainty, and manageability of the social issues possibly caused by the change of strategy.

The results of this exercise indicate that the approach to utilize reprocessing technology is superior in terms of energy security, environmental protection, adaptability to future uncertainty, and other aspects, though this approach was inferior in economic viability under the condition that the current price level of uranium will continue, though there is a possibility that the uranium supply and demand situation may tighten in the future.

One of the issues intensively debated in the evaluation was the effect of the change of strategy on the behavior of the general public 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 is clear that if the policy should change from the reprocessing approach to the direct disposal approach, it would be necessary to rebuild a relationship of trust with the communities in which the facilities are located under the assumption that the current strategy be maintained.

The Council recognized through the debate that the national government and private sector companies had conducted various activities toward the achievement of the nuclear fuel cycle up to now and accumulated diverse societal assets 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. And it was claimed by the majority of the Council that the assets 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, environmental protection and adaptability to future uncertainty.

The Council has concluded based on these discussion 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, though we should allow flexible realization of activities planned from the viewpoint of business risk management and review the policy as the things being changed. It is proposed in this context that the Government should start from 2010 the deliberation of future fuel cycle strategy to be followed after the retirement of Rokkasho Reprocessing Plant expected at around 2050, taking into consideration of the progress in the R&D for fast reactor and its fuel cycle systems, among others.

I would like to add at this point that in finalizing the policy framework for nuclear fuel cycle activities, we have paid due attention to the discussion about the Multilateral Approaches to the Nuclear Fuel Cycle initiated by Dr. ElBaradei and proposed to be positive in the discussion on the way to realize such proposals.

I am sure that Japan will support and cooperate with the IAEA to realize multilateral schemes to nuclear fuel cycle that can reduce unnecessary incentive for states to have national enrichment and reprocessing facilities, by providing not only experiences and ideas but also proliferation-resistant technologies and capabilities of the activities involved if fitted, to devise and implement an equitable, adequate and achievable framework to assure the supply of nuclear energy services to international community.

As concluding remarks, Mr. Chairman, I would like to emphasize that economy, environment and security are the core of the energy problem and thus energy policy. However, there are dilemma in energy policy such as cost reduction versus environmental protection and nuclear energy production versus nuclear risk reduction. As we are definitely required to increase carbon-free energy supply to stabilize atmospheric carbon dioxide concentration, it is most appropriate to expand the use of nuclear energy by rectifying the defects and improving the competitiveness of the technologies incessantly.

The AEC strongly hopes that 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 whenever necessary over the many years to come, bearing always in mind that potential risks lurk in the nuclear facilities, and the quality of the potential of nuclear

technologies should not be overestimated, overwhelmed by its phenomenal nature.

At the same time we believe it important in this endeavor to recognize that 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. I believe it obvious to you 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 the world nuclear community should pursue coordination of efforts in research and development needed to realize the required technological innovations in a timely manner. Surely Japan is a member of countries who determined to continue to enjoy the benefit of nuclear energy while contributing to this kind of efforts as well as their coordination for the benefit of global community.