The Role of Nuclear Power in Global and Japanese Energy Policy[1]

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Thank you very much Ambassador Baker for all the good work you are doing for bridging knowledge among the people. And thank you Jerry for kind introduction.

Good morning distinguished guests, ladies and gentlemen, I would like to thank the Howard H. Baker Jr. Center for Public Policy for the opportunity to discuss the role of nuclear power in global and Japanese energy policy at this conference.

In May this year, former Prime Minister of Japan Shinzo Abe presented to the world an initiative to address global warming entitled "Invitation to Cool Earth 50." He proposed under this initiative a target of cutting global emission of greenhouse gases by 50% from the current level by the year 2050.

Obviously to realize the target would require an expanded use of nuclear energy, which is nearly carbon free and one of the cost-effective options available today for reducing carbon-dioxide gas emissions, as well as high-efficiency energy technologies, renewable energies, hydrogen, and carbon-sequestration technologies, much beyond any realistic scenarios proposed in the past in both developing and developed countries.

As you know, worldwide there were 435 nuclear power reactors in operation in 30 countries at the end of 2006, totaling 370 GWe of generating capacity. In 2006 nuclear power supplied about 15 % of the world's electricity.

Although the use of nuclear power has been concentrated in industrialized countries to date, current expansion, as well as near-term and long-term growth prospects, are centered in Asia, notably in China and India, though many others including the USA are working hard to add new reactors to their existing programs.

As for the future, the International Atomic Energy Agency and the International Energy Agency published last year projections of nuclear power expansion through 2030, which provides a high and a low projection.

The nuclear electricity generation in the IAEA's low projection grows at the rate of 1.1% per year and that in the high projection, which incorporates reasonable planned and proposed nuclear projects beyond those already firmly in the pipeline, grows at the rate of 2.6 % per year. The high end of the range for the IEA projection continues to grow to 2050 at essentially the same rate as in the IAEA high projection, and its share of global electricity generation reaches 22%.

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[1] Remarks made at Conference on the Role of Nuclear Power in Global and Domestic Energy Policy sponsored by Howard Baker Center for Public Policy and held at Woodrow Wilson International Center for Scholars; Washington, DC on October 3-4, 2007.

Taking together these and other projections and scenarios, it can be said that as the world seeks to increase its energy supplies to sustain its continued economic growth, while responsibly addressing greenhouse gas emission, nuclear power is expected to play a much greater and more significant role than ever, but still with substantial uncertainty.

In my view, the global nuclear community at this juncture has special responsibility to live up to the expectation and should energetically confront various challenges to obtain and maintain public confidence in nuclear energy, as the public is the key to the utilization of nuclear energy.

The challenge at the strategic level is to foster mutual understanding with the public about the characteristics of nuclear energy in the three dimensions of sustainable development; economy, environment and society, so that nuclear energy is appropriately chosen in the energy policy of each country.

Such characteristics important in the dimension of economy are competitive energy cost and stability of supply. Those in the dimension of environment are the assurance of low human health impact, small volume of waste production and rarity of severe accidents that might contaminate the land on a large scale, and those in the social dimension are the assurance in nuclear nonproliferation and long-term safety of radioactive waste disposal.

To foster such understanding, however, it is required for the global nuclear community to actually demonstrate that nuclear power plants and its fuel cycle facilities have, as a system, the aforementioned characteristics, and sustain their competitive position among various energy technologies over time by incessantly promoting research and development of the technology, in addition to developing and maintaining relevant infrastructure needed to have nuclear power programs in each country.

Last but not least, as the devil is in the details, it is important for each and every plant operator and organization of the nuclear community to continually improve systems and their businesses to meet societal needs through total quality management.

The Japan Atomic Energy Commission has decided, taking into account this three-tier structure of responsibility, a basic policy to promote the nuclear energy utilization in Japan, where currently 55 LWRs are operated by ten electric power companies, which supply about 30% of electricity in Japan and contribute to the increase in Japan's energy self-supply ratio from 4 % to 16 %.

The objective of the policy is to make the share of nuclear power in electricity generation after the year 2030 similar to or greater than the current level of 30 to 40 % and we have proposed actions across three different time frames; short-term, medium-term and long-term, to pursue this objective.

At the same time the AEC asks the Government and industry to incessantly pay attention to such cross-cutting issues as strict limitation of nuclear activities to peaceful purposes, promotion of effective and efficient safety regulation, assurance of opportunity for the public

to participate in policy making processes through openness and transparency, promotion of a policy of reusing, recycling and reducing waste, and promotion of international cooperation, in the planning and execution of these actions.

The short-term actions the Commission has asked the Government and industry to take are to;

- continue the construction of nuclear power plants; maintain the public trust in the operators and the regulators;
- improve the operation of existing plants aiming at longer life and higher availability; and
- promote the process to determine the site for a high-level radioactive waste disposal facility; and
- promote the MOX fuel utilization in LWRs, utilizing plutonium recovered and stored in Europe and that to be recovered at Rokkasho Reprocessing Plant that is currently in the final stage of commissioning test.

The mid-term actions the AEC is currently asking to start is to promote R&D of innovative technologies for the next generation LWRs, taking into account revolutionary changes in science and technology on the horizon.

As for long-term actions, the AEC has asked to promote a robust research and development program of fast breeder reactors and its fuel cycle technologies, aiming at its commercial introduction in around 2050.

I do not talk about each of them in detail here because of limitations of time, except on the current status of the actions to determine the site for a high-level radioactive waste disposal facility and the result of 16 July 2007 Earthquake at Kashiwazaki-Kariwa NPP of Tokyo Electric Power Company, TEPCO, as I believe that these put the Japanese nuclear community on a trial as to sustaining the public trust and confidence in nuclear energy utilization. I would like to close my talk by touching upon the Japan's activities for the promotion of nuclear energy use in international community in the context of the theme of this conference.

It is one of the most important issues in the near-term framework to decide the areas for preliminary suitability review for locating a facility for the disposal of the high level radioactive waste based on the application from municipalities. So far no mayor of municipalities has successfully applied to the invitation, since just the announcement of a mayor to study the merit and demerit of the application paralyzed the administrative affairs of the municipal office due to the intense media attention and rallies and demonstrations organized by activists to protest the announcement.

The AEC is now proposing that 1) the application system should be modified so that the role of mayors and governors be limited to an intermediate role at first: 2) the Government should strengthen public information activities as to the importance of the disposal facility at both national and municipal levels, including the promotion of citizen's working sessions to develop a plan for the sustainable development of the municipalities that host the facility, 3) the Government should promote not only relevant R&D activities but also the utilization of the facilities for them and their results for more effective public information.

As for July 16, 2007 Earthquake at Kashiwazaki-Kariwa NPP, the operating units were automatically shutdown and all plants behaved in a safe manner during and after earthquake although the earthquake significantly exceeded the level of the seismic input taken into account in the design of the plant and though the most of inspection of the plant is still to be done in detail, so far there has been no report of significant damage of safety-related structures, systems and components. On the other hand, non-safety related structures, systems and components were affected by anchorage failures due mainly to significant soil deformation around the reactor buildings.

To restart the operation of seven units at the site of which total capacity is 8.2 GWe and which generate more than 19 % of electricity the company sells in regular years, TEPCO will need the consent of local communities as well as the permission of the regulatory authority, submitting a re-evaluation of the seismic safety of the plant in accordance with new seismic design guidelines of the Nuclear Safety Commission issued in September 2006, taking into account lessons learned from the occurrence of the earthquake at a nearby fault which had not been identified in advance but caused a seismic input significantly exceeding the level of design basis seismic motion.

As a guardian of nuclear energy policy, the AEC has asked all nuclear power operators to hasten the planned review of the adequacy of seismic safety of their plants according to the new seismic safety design guideline and reiterated earlier recommendation to perform business risk assessment, seriously taking into account the risk arising from natural phenomena and earthquakes in particular, and preparing for the crisis from them as appropriate.

The Commission also asked the regulatory authority to review their system to swiftly identify safety issue in the operating experience and development in science and technology and seismology, in particular.

One more action area I would like to touch upon at this occasion is the international relations. Based on the recognition that international cooperation has played a vital role in the development of Japan's nuclear energy utilization activities, the AEC has asked the Government to continue to positively promote international cooperative activities in diverse areas.

In response, the Government has been making effort firstly for strengthening international nuclear nonproliferation regime. Examples are a) exerting its utmost diplomatic efforts for universalization of the additional protocol to the IAEA safeguards agreement, and b) contributing to the discussion about the establishment of multilateral frameworks for fuel supply assurance initiated by the IAEA director general Mohamed Elbaradei, by putting forward a proposal to ask the IAEA to act as an intermediary to mobilize pre-registered capability of diverse fuel supply services in member countries in the event of disruption of supply due to non-commercial reasons.

The other important activity in the area of international relations is the cooperation for the research and development of innovative technology. As innovation of nuclear technologies can occur only slowly and at considerable cost, Japan believes it quite reasonable for the

global nuclear community to coordinate such research and development activities beyond national prestige to reduce the duplication of efforts at the world level, and is positively participating in various bilateral and multilateral cooperative activities, such as Generation Four International Forum (GIF), International Project on Innovative Nuclear Reactors and Fuel Cycles (INPRO) of the IAEA and Global Nuclear Energy Partnership (GNEP) initiated by the US government.

In parallel with actions in these areas, the AEC is also concerned about the future viability of Japanese nuclear reactor vendors. The Commission has expressed therefore its expectation that they will strengthen the nature of enterprises and achieve the scale and competitiveness to be able to do business in the globalizing market.

Whether it is a response to the Commission's concern or not, three nuclear reactor vendors in Japan have recently strengthened their ties with overseas nuclear reactor vendors in their own ways to adapt themselves to globalizing business environment where a small group of major international enterprises are seeking to sell standardized nuclear power plants in numerous countries. We expect manufacturers in Japan to continue their business by manufacturing high quality and unique products by themselves, licensing their manufacturing technologies to other partners and/or establishing joint ventures with others.

The globalization of the nuclear business means that the supply of nuclear parts and components may come from many places on the world. A key factor for success in construction projects in such situation is the harmonization of the requirement each country's nuclear infrastructure imposes for assuring nuclear safety, security and nuclear nonproliferation, and, therefore, careful coordination by regulators around the world is recommended to ensure that there is consistency in the standards applied by different countries and that those standards are satisfied.

The Government of Japan is recently making effort for strengthening bilateral relations in nuclear energy area with various countries including the USA, Russia, China, Kazakhstan, Vietnam etc. as well as multilateral relations through frameworks of the IAEA, the NEA and the FNCA, and most recently the GNEP. One of the reasons for this initiative is to contribute to the development of mutually reliable infrastructure for nuclear energy utilization in emerging countries.

With that I finish my talk and I would be happy to answer any questions you may have.

Thank your for your attention.