

Japan's Nuclear Energy Policy and International Cooperation

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1. "Basic Plan for Energy Supply and Demand" and Nuclear Energy

In October 2003 the National Cabinet has endorsed the "Basic Plan for Energy Supply and Demand", which is formulated in accordance with "The Basic Law on Energy Policy Making" approved by the Diet in 2002.

These are three major policies of energy supply in the basic plan and the basic law, namely, security and stability, environmental compatibility, and economic competitiveness.

The "Basic Plan for Energy Supply and Demand" of Japan clearly states that nuclear energy provides stable and environmentally friendly power supply. Therefore, nuclear power should be promoted as the base power with the prerequisite of safety assurance.

2. Energy Supply Security

The self-sufficiency of primary energy in Japan is only 4% (hydro power), and it increases to 20% if nuclear power is recognized as domestic energy, while those of USA and France are 75% and 50%, respectively.

About half of primary energy of Japan is from oil, 85% of which was imported in 2002 from politically unstable Middle East. Therefore, energy supply infrastructure is quite fragile.

World energy demand will increase sharply by factor of 1.7 from 2000 to 2030, in particular, in Asian region which has large population and rapid economic growth. In fact, China has turned to the oil importing country since 1992 increasing rapidly the oil consumption which might cause oil price increase. For Japan keeping the smooth diplomatic relation with oil and gas producing nations is obviously important to maintain stable oil import.

For energy supply security, nuclear power has been recognized as the most important option in Japan. In the year of 2001 about 35% of power accounting for 15% of primary energy was provided by the nuclear power in Japan.

3. Climate Change Issue - Compliance to Kyoto Protocol

Japan has ratified the Kyoto Protocol and made best effort to comply it. The green house gases (GHG) emission should be reduced by 6% from 1990 level in the average between 2008 to 2012. In fact, however, the GHG emission in 2000 exceed 1990 level by 8.0%. In order to achieve the target (-6%), CO₂ emission due to energy production should be reduced to the level of 1990.

To achieve the goal, additional 10-13 units of nuclear power plants should be in operation before 2010. As a matter of fact, 4 NPPs are under construction and 6 are in preparation of starting construction in coming years. The 6 units are planned to be in operation before 2010.

In order to achieve the CO₂ reduction, wind and solar power has been rapidly introduced at the level of 460MW and 637 MW, respectively in 2002 as scattered small power supply. The target capacity in 2010 are 3,000MW for wind and 4,820MW for solar.

Saving energy in industry in the past 30 years has been successful while energy consumption for transportation and civilian life has increased more than 2 times. Japan is emitting about 5% global CO₂ producing the second largest GDP. The amount of CO₂ emission per GDP of Japan is in the lowest range.

4. Nuclear Fuel Cycle Policy of Japan

In Japan the economic growth of coming 30 years is foreseen at quite low level of 1-2%. However, as mentioned earlier, the nuclear power will continue to be the base energy in Japan in the future. The recycling of nuclear fuel is essential for sustainable nuclear power in the order of 50 to over 100 years. The estimated reserves of uranium ore will be spent in 61 years at the current rate of consumption.

The Japan's first commercial plant for reprocessing spent fuels will be in operation after July 2006 at Rokkasho-mura. Capacity is 800 tons spent fuels per year, while production rate of the spent fuel from existing 52 units of nuclear power plant is in the range of 1,000 tons /year. The intermediate spent fuel storage facilities outside of the plant site will be operational in 2010 in order to make the fuel cycle management more flexible.

The separated plutonium by the reprocessing plant will be used as MOX fuels for existing and planned 16-18 light water reactors (LWR) before 2010. Due to scandals of MOX fuel fabrication inspection by

the BNFL, and the falsification of inspection reports by the TEPCO, application of MOX fuels in LWR has unfortunately been largely delayed.

The proto-type Fast Breeder Reactor (FBR) "Monju" of the Japan Nuclear Cycle Development Institute (JNC) has not been operated for 8 years due to the sodium leakage accident. The modification of the plant hopefully should be started as early as possible subject to the final agreement of the local government, the Governor of the Fukui Prefecture. The operation experience and engineering data of "Monju" are essential to demonstrate reliability and to analyze economic competitiveness of the FBR in commercial use.

The FBR and related nuclear fuel-cycle technology have important potential to efficiently use uranium resource for more than a thousand years and to reduce long-lived radioactivity in high-level radioactive wastes. In this context the FBR is an important option which has the highest potential for providing mankind with energy for the future.

5. Strategy for International Cooperation of Japan

The Government of Japan has ratified the Additional Protocol to the IAEA Safeguards Agreement in 1999, and have been complying the full scope safe guards of IAEA pursuant to the NPT. This makes the Japanese nuclear programme to be fully transparent in terms of non-proliferation of nuclear weapons. The IAEA laboratory to verify nuclear material in the Rokkasho nuclear fuel reprocessing plant has been completed.

In the fields of promotion of nuclear energy, Japan is actively participating in the Generation IV International Forum (GIF). In particular, Japan is contributing as the leading country for the sodium cooled fast reactor project using extensive experience in "Joyo" and "Monju". Japan has bilateral cooperation with France for FBR development. Since the "Phoenix" will be closed in 2008, "Monju" will play more important roles for international cooperation.

Hydrogen production using high temperature nuclear heat is the important item to promote the new application of nuclear energy for transportation sector, which is also included in GIF where Japan is leading country. The Japan Atomic Energy Research Institute (JAERI) has been operating the HTTR (High Temperature Test Reactor) since 1998 to have produced nuclear heat at 850 and developing technology to produce hydrogen by the IS process. Japan is ready to contribute the international program.

The SCWR (Super Criticality Water Cooled Reactor) first proposed by the Univ. of Tokyo is also one of the projects of GIF which Japan will largely contribute.

The R&D on technology for geological disposal of high level radioactive wastes should be promoted by international cooperation through IAEA, NEA and bi-lateral mechanisms.

Japan has been playing active roles in Asian regional cooperation for the promotion of nuclear technology application. The Forum of Nuclear Cooperation in Asia (FNCA) is the successful regional cooperation led by Japanese Government with the participation of Australia, China, Indonesia, Japan, Korea, Malaysia, the Philippines, Thailand and Viet Nam. Major fields of Cooperation are radiation and isotope application for healthcare, agriculture and industry, application of research reactor, nuclear safety culture, wastes management, public information for nuclear acceptance and human resources development. Twelve projects with specific objects are being implemented to achieve tangible results leading socio-economic impacts.

The ITER is important issue for a large international fusion program sharing fund and expertise among 6 party countries. Japan strongly and firmly has committed to host the construction of experimental reactor seeking the agreement of all parties, in order to share extensive and excellent experiences by JT-60 for many years in Japan for the success of ITER.

6. Formulation of the Long-Term Program for Research, Development and Utilization of Nuclear Energy

Responding the change of environments in term of society, economy, industry, global climate change and the deregulation of power, the new Long-Term Program for Research, Development and Utilization of Nuclear Energy of Japan will be formulated. The preliminary work for the formulation of the Long-Term Program has started in listening a variety of different views from various sectors including the public.