

Korean Perspective on Nuclear Energy after Fukushima Accident

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Electricity is essential for our life in a modernized world, and the electricity demand in Korea is increasing rapidly due to its industrialization and higher standard of living. However, there are limited domestic energy resources and limited potential for renewable energy in the near future. In order to achieve energy security, Korea has to rely on nuclear energy which is a major source of electricity as a clean, economical and technology-driven energy with sustainability.

The first commercial nuclear power plant Kori Unit 1 started its operation in 1978, and currently there are 17 PWRs and 4 PHWRs in operation. 24% of the total installed capacity and 31% of the total electricity generation is from nuclear plants for the year 2010. The role of nuclear power plants in electricity generation in Korea is expected to become more important in the years to come due to the poor natural resources and emission control of green house gases. Currently three OPR1000s and four APR1400s are under construction as scheduled.

Korea took immediate actions to examine and improve safety of domestic nuclear power plants after the Fukushima accident. Experts group conducted a special safety inspection and emergency preparedness review on the 21 nuclear power plants in operation and found that there are no imminent risks to operating nuclear facilities. The special safety inspection also identified short- and long-term measures to minimize the impact of extreme natural disaster, to make emergency power and ultimate heat sink available during accidents, and to ensure containment building integrity and emergency response capability.

Korea hosted an IAEA Integrated Regulatory Review Service Mission in July 2011, and the Mission found that Korea has a technically capable and effective nuclear safety regulatory program.

In an effort to enhance regulatory independence, expertise and transparency, Korea established Nuclear Safety and Security Commission that reports directly to the President. The Commission is an independent regulatory body, and will further elevate our safety standards and upgrade nuclear safety regulations.

There are growing public concerns on the safety of nuclear power plants after the Fukushima accident. However, it needs to be noted that nuclear power is needed in order to meet increasing demand for energy in economical and environmentally friendly manner. For the promotion of nuclear energy, higher level safety has to be ensured and communications with the public has to be improved. With the efforts for enhanced safety of nuclear power plants, nuclear promotion policy remains the same after the Fukushima accident and the share of nuclear power in our national energy mix will be increased to 59% by 2030 according to the National Energy Basic Plan. Five basic elements of nuclear promotion policy include development of nuclear energy as driver for economic growth, development of advanced technologies, enhancement of safety, contribution to higher standard of living, and expansion of nuclear infra-structure.

In order to implement the nuclear promotion policy, comprehensive nuclear energy promotion plan has been established for the five year period of 2012-2016. There are various important research and development activities related to safety enhancement and development of advanced nuclear systems.

With reliable operation of nuclear power plants, the overall spent fuel storage capacity is foreseen to be saturated, and the current spent fuel storage pools at nuclear power plant sites will be full from 2016. In order to reduce the volume and radio toxicity of high level waste for final disposal, sodium-cooled fast reactor (SFR) technologies will be developed. Final goal of the SFR development effort is the construction of prototype by the year 2028 with intermediate goal of obtaining design approval from the regulatory authority by 2020.

For energy security under limited domestic energy resources, Korea needs nuclear plants in order to meet increasing demand for energy. Nuclear promotion policy of Korea remains the same after Fukushima accident, and higher level of safety should be ensured for expansion of nuclear energy utilization. Strong nuclear research and development activities provide a firm basis for the promotion of nuclear energy.