Fast Reactor R&D Activities in Korea and Expectations from Monju

International Workshop on International Collaboration Research Using MONJU

Fukui, Japan April 24-25, 2013

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Status of Energy Supply in Korea

- Annual energy consumption of 261 Mtoe is ranked at number 8 in the world
- Import of energy resources accounts for 27% of total import



* IEA, Energy balance of OECD countries 2011

Energy Demand and Electricity Generation



Electricity demand increases with the growth of economy
Nuclear power plays a significant role for electricity generation

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Nuclear Power Plants in Korea



of Units and Generating Capacity (MWe) as of Mar. 2013

Source : www. Kepco.co.kr *※* 2012e : estimated the others

Electricity Market Price in Korea



※ Ref. www.epsis.kpx.or.kr, Electric Power Statistics Information System, Korea Power Exchange

National Energy Basic Plan



Nuclear Promotion Policy

- Development of Nuclear Energy as Driver for Economic Growth
 - ✓ Development of Small and Medium Reactors and Research Reactors
 - ✓ Non-electricity applications including hydrogen production

Development of Advanced Technologies

- ✓ Spent fuel recycle technologies
- ✓ Environmentally friendly decommissioning technologies

Enhancement of Safety

- ✓ Safety against extreme natural disasters
- ✓ Center of excellence for safety R&D

Higher Standard of Living

- ✓ Medical application of radiation
- ✓ Stable supply of medical isotopes

Expansion of Infra-structure

- ✓ High level human resources development
- ✓ International cooperation

Comprehensive Nuclear Energy Promotion Plan (CNEPP)

CNEPP has been formulated every 5 years since 1997, in compliance with the Atomic Energy Act



The 4th CNEPP ('12-'16) was Established in Nov. 2011

The national agenda for nuclear energy development under the principles of peaceful & safe use of nuclear energy.

"Role model as the world best nuclear country"



"World leadership of safe nuclear utilization"

Ensuring maximum nuclear safety, the Government reaffirmed its commitment to expand the utilization of nuclear energy

Vision

Fast Reactors for Spent Fuel Management



Reactor Transition Scenario - KAERI Study



Major Milestone of PGSFR

- 2012 : Conceptual design
- 2017 : Safety Analysis Report
- 2020 : Specific design approval (Licensing process has not been fixed)
- 2028 : Complete PGSFR construction



SFR R&D Activities at KAERI



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International Collaboration Utilizing Monju

- Monju design, construction and operation experiences can play an important role for international SFR technology development
 - \checkmark Demonstration of technical feasibilities and enhanced safety
 - ✓ Demonstration of environmentally-friendly spent fuel management



KAERI's interest in Collaboration under the framework of Gen IV International Forum

 \checkmark Validation of safety analysis tool using Monju experimental data

- ✓ Development of under sodium viewing requirements
- ✓ AtheNa experiment

JAEA's Sodium Handling Technology Training for KAERI

Objective

- To enhance KAERI's capability of sodium handling technology
- To share JAEA's experiences on FBR construction & operation

Training Courses

- 2012
 - 6 participants, Jan 16–20, 2012
 - INITC, Tsuruga Head Office, JAEA
- -2013
 - 7 participants, 2 weeks
 - Under discussion

Subjects of Training

- Dismantling and washing of sodium pipe
- Measurement of physical property
- Loop operation and instrumentation
- Sodium fire protection





Summary



Korean Sodium cooled Fast Reactor Program

- ✓ Enhanced safety needs to be ensured to promote nuclear energy
- ✓ SFR technologies are now being developed to provide technical basis for effective spent fuel management

International Collaboration Utilizing Monju

- Monju design, construction and operation experiences can play an important role for international SFR technology development
- ✓ KAERI would like to expand collaborative R&D activities, especially for safety enhancement, utilizing Monju