Status of SFR Development in Korea

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SFR Technology Development Plan



Status of Energy Supply in Korea

96.6 % of energy was imported in 2010

Year 2010

Korea's Energy Consumption

8th World Ranking

- Energy Consumption : 261 Mtoe
- * Ref: BP (2011), Statistical Review of World Energy

Korea's Energy & Oil Import

- Energy Import : 252 Mtoe
 (USD 118 Billion, 27 % in total import)
- Oil Import : 147 Mtoe = 872 Million bbl (USD 69 Billion)
- * Ref: Korea Energy Economics Institute (2011)



* 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

Nuclear Power Plants in Korea

Units [MWe]



Electricity Generation Cost in Korea

※ *Ref*: www.kosis.kr(2010. 02)



National Nuclear Safety Management System



MKE : Ministry of Knowledge Economy MEST : Ministry of Education, Science and Technology

National Energy Basic Plan





Development of Advanced Nuclear Systems



Why Fast Reactor?



Sustainability of Nuclear Energy

Fast Reactors

Update of SFR Program Plan



- Prototype reactor will be developed in order to establish local infrastructure for SFR
- Advanced technologies, which cannot be applied to the prototype reactor due to long development time, will also be developed for improved economics and enhanced safety of commercial SFR
- Regulatory body will establish new licensing system for reactors with technology development purposes
 - Currently there are two reactor categories : research and commercial reactors

Long-term Plan for SFR Technology Development

- ◆ 2012: Conceptual design for prototype reactor
- ◆ 2017: Safety Analysis Report (SAR)
- 2020: Design approval
- 2028: Construction



Key Design Features of Prototype SFR (Draft)

Objectives

- Irradiation test of TRU fuels
- Acquisition of design, construction, and operation technologies
 - 100~200 MWe
 - Pool-type Reactor
 - Fuel : U-Zr -> U-TRU-Zr
 - Clad : HT9
 - Core I/O Temp. : 365/510 °C
 - DHR System : PDRC/ADRC
 - 2-loop IHTS/SGS
 - Rankine Cycle



Sodium Fast Reactor development Agency (SFRA)



Summary



Korea needs nuclear power plants in order to meet increasing demand for energy

✓ Energy security under poor energy resource situations

Korea is developing SFR technologies for spent fuel management and uranium utilization

✓ Design approval of a prototype SFR by 2020

✓ Construction of a prototype SFR by 2028