

# Post Fukushima Nuclear Safety Actions in Korea to Enhance the Safety of Nuclear Installations

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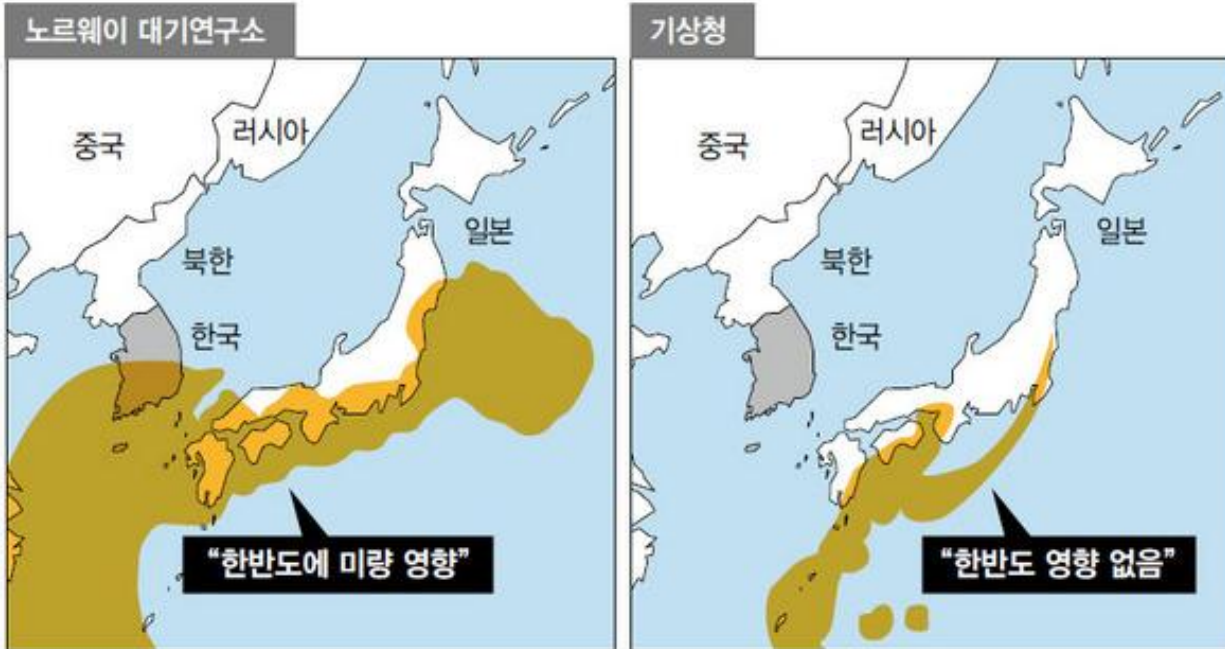
- Special Safety Inspection after the Fukushima Accidents
- Changes of Regulatory Framework
- Mid-&-Long Term Research after the Fukushima

# Fukushima Accident (11 Mar. 2011)

## 방사성 물질 확산 예측 비교

자료: 노르웨이 대기연구소, 기상청

\*2011년 4월3일에 실시한 일본 후쿠시마 원전 방사성물질 확산 예측 결과임.  
다만 노르웨이 대기연구소는 6일 오후 6시, 기상청은 5일 오후 3시의 상황을 예측한 것임.



[from [www.hani.co.kr](http://www.hani.co.kr) & TEPCO]

# Present Status of Korean NPP Program



In operation

**21 units**  
(18.5 GW)



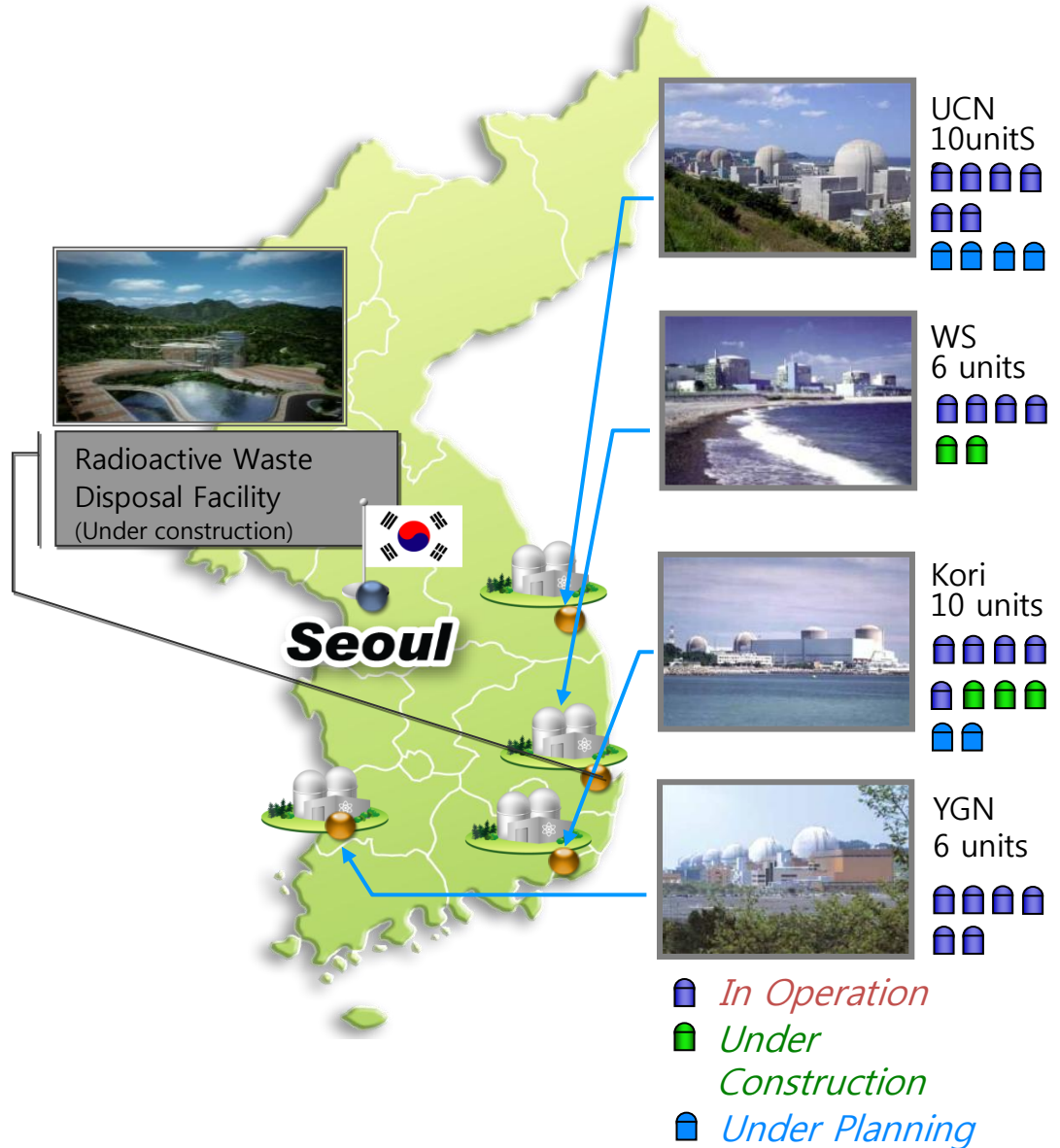
Under construction

**5 units**



Under planning

**6 units**



- Capacity: 18.5GW, 29.5%  
(Plan to increase 41% by 2030)
- Generation: 1,487GWh, 36%  
(Plan to increase 59% by 2030)

# Special Safety Inspection (1/5)

- **Activities of Regulatory Body**
  - MEST, KINS organized the special safety inspection team
    - From 28 Mar. to 3 May, 2011
    - For 21 operating NPPs and 1 research reactor
  - **Considered Scenario in Inspection**
    - Extreme natural hazard (earthquake + tsunami)
    - SBO
    - Severe Accident
  - **Conclusions of Regulatory Body**
    - No NPP is exposed to imminent risk
    - But safety measures are need against potential risk

# Special Safety Inspection (2/5)

## – Action Items based on DID

- **1<sup>st</sup> Barrier against extreme natural disaster**
  - Improve seismic resistance
  - Minimize potential risk of flooding
- **2<sup>nd</sup> Barrier to ensure core cooling capability**
  - Make available A/C power at any anticipated events
  - Make available cooling water and path at any unlikely event
- **3<sup>rd</sup> Barrier to ensure C/B integrity and to improve emergency response capability**
  - To eliminate the likelihood of severe accident and avoid hydrogen explosion
  - To address multi-unit disasters

# Special Safety Inspection (3/5)

- **Activities of Industry Side**
  - Additional Special Inspection for **Kori-1 Units (Long-term operation related)**
  - Special Inspection of **NPPs under construction** (5 units)
  - Design Review of **New NPPs** (APR+) against Fukushima accident
  - Establish integrated plan to enhance the safety of NPP (July 2011)
  - KHNP announced that they will invest ~600M euro for next 10 years to improve the safety of NPPs

# Special Safety Inspection (4/5)

- **50 Action Items for 6 Areas**

- Structure, Component Integrity against Seismic, Tsunami
- Safety of Electrical/Cooling/Fire Protection System against Flooding
- Mitigation of Severe Accidents
- Emergency Responses
- Long Term Operation & New NPPs
- Research Reactors, Fuel Cycle Facilities & Medical Institute for Radiation Emergency

Group	Application Stage	# of Items
Design	Apply at the detailed design stage	12
Construction	Apply at the construction/test operation stage	13
Operation	Apply at the operation stage	7
Etc.s	For specific unit and/or NPP type	18
<b>Sum</b>		<b>50</b>



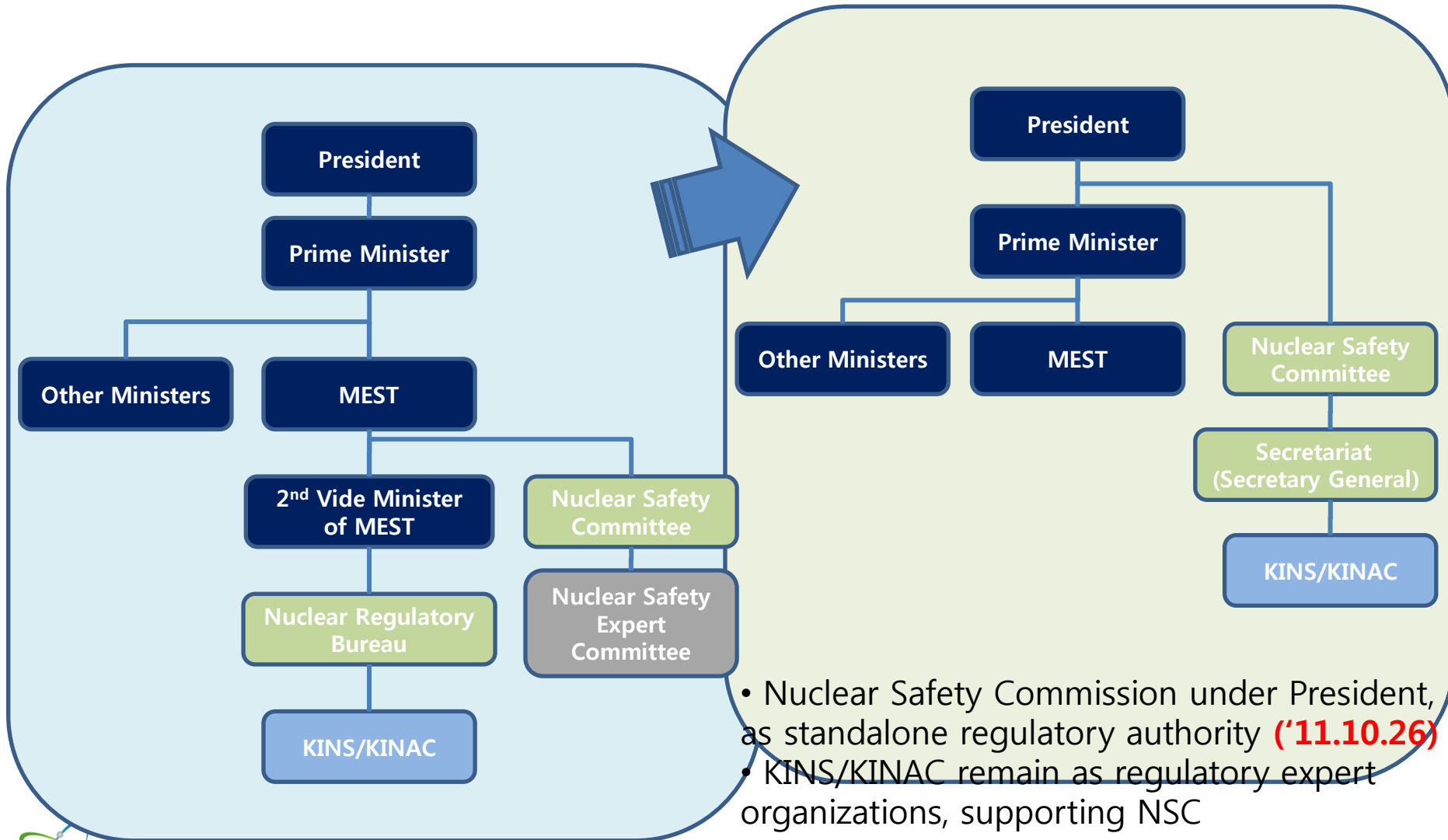
# Special Safety Inspection (5/5)

- **Some Example Items**
  - Structure, Component Integrity for Seismic, Tsunami
    - Automatic Seismic Trip System
    - Seismic Design Criteria: 0.2g → 0.3g
    - Water-proof door for Aux. & EDG Building
  - Safety of Electrical/Cooling/Fire Protection System against the flooding
    - Movable EDG Vehicle, Battery Connection Point to External Electric Source
    - Water Injection Line to SFP from External Fire Car
    - Dedicated Battery for Important Safety Systems
    - Design Change of AAC DG
  - Mitigation of Severe Accidents
    - PAR for Hydrogen Removal
    - Reactor Building Venting System
  - Emergency Responses
    - Critical Information Acquisition for Long Term SBO
- **All action items will be accomplished by 2015**
  - Some action items are already accomplished by 2011

# Changes of Regulatory Framework (1/2)

- **IRRS of IAEA to Korea (10 ~ 22 July, 2011)**
  - First IRRS Mission after Fukushima
    - Fukushima aspects are included in each module review
  - Summary of Mission
    - The Korean government, through the activities of MEST and KINS has implemented a technically capable and effective nuclear safety regulation program
    - Korea's response to the accident at Fukushima has been prompt & effective. Communications with the public, development of actions for improvement and coordination with international stakeholders was of high quality.

# Changes of Regulatory Framework (2/2)



# Mid-&-Long Term Research after the Fukushima

- **Two Government Funded Research Programs**
  - Being planned by MEST & MKE
  - Some research items are focused on the ways to overcome the Fukushima accident
    - **Extreme Hazard**
    - **Multi-unit Risk**
    - **Severe Accidents**
    - **SFP Safety, Nuclear Chemistry during accident**
  - The research for New NPP is focusing on the **Passive Safety System**

# Continued Efforts...

- NSSC plans to review & revise action items continuously
  - Evaluate the effects of action items by using PSA methodology
  - Review the action items of other countries and international organizations such as IAEA, NEA and **some additional action items** will be derived
- Korean Nuclear Society consists of a **special committee** to analyze the Fukushima accidents and to derive countermeasures by the end of 2012

# 감사합니다



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