Geological Disposal Option and Institutional Issues

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Contents

Difficulties in Radioactive Waste Disposal Site Acquisition

(Korean Example)

Radioactive Waste Management
Korean National Policy

- Radioactive Waste Management Policy (1998,9)
  - Fundamental Principles
    - Direct control by the government
    - Top priority on safety
    - Minimization of waste generation
    - “Polluters pay” principle
    - Transparency of site selection process

- National Radioactive Waste Management Program
  - An LILW repository by 2008
  - A centralized interim storage for spent fuel by 2016 in the same site

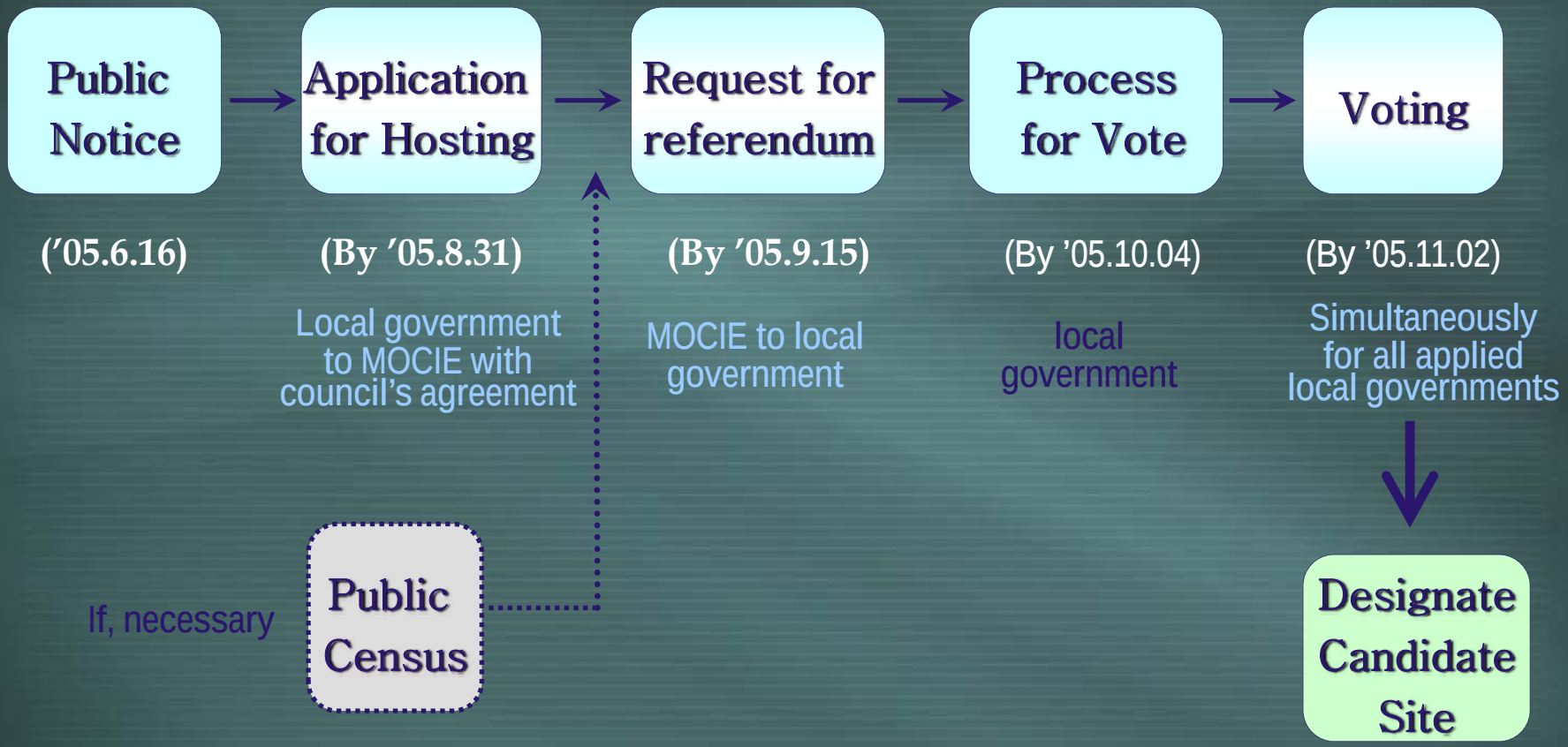
Korean Disposal Site Selection Activities

- The first round of site selection :1986 –1996
  - 1st attempt : 1986 – 1989
    - Three sites identified through literature survey
  - 2nd attempt : 1990 – 1991
    - Ahn-myun island selected for site investigation
  - 3rd attempt : 1991 - 1993
    - Six sites identified by a third party (SNU)
  - 4th attempt : 1993 - 1994
    - A financial support package for three sites were suggested.
  - 5th attempt : 1994 - 1995
    - The Gul-up island chosen by the Government

Korean Disposal Site Selection Activities

- The second round (1997-2004)
  - 6th attempt : 2000 - 2001
    - Solicitation offered to 46 local governments
  - 7th attempt : 2002 - 2003
    - Solicitation to four possible cities around NPP's
  - 8th attempt : 2003
    - Wido at Buan county was a potential candidate.
  - 9th attempt : 2004.2 – 2004.9
    - A financial support package was offered to 7 cities.

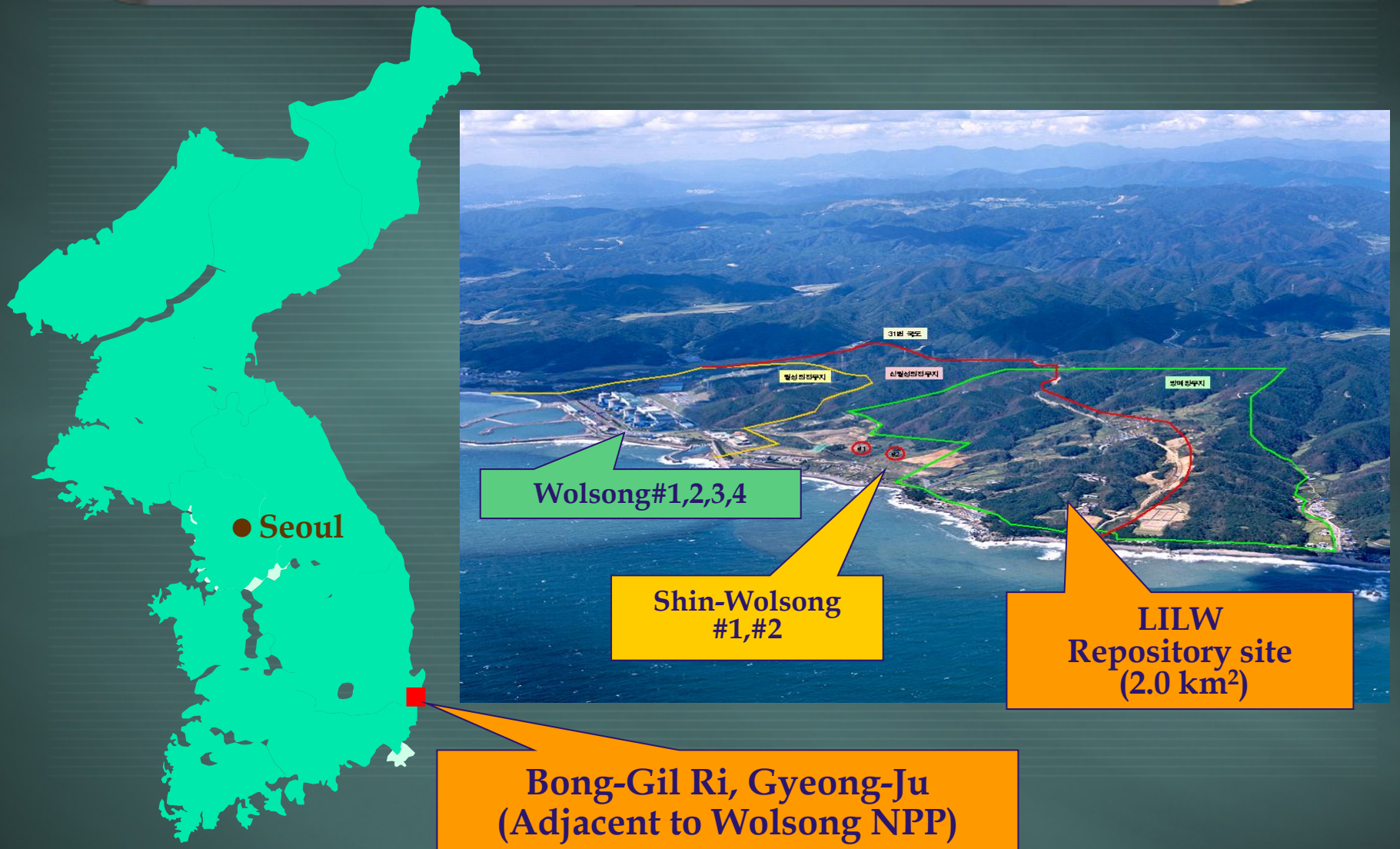
New approach proposed in 2005 and new Site Selection Process & Schedule



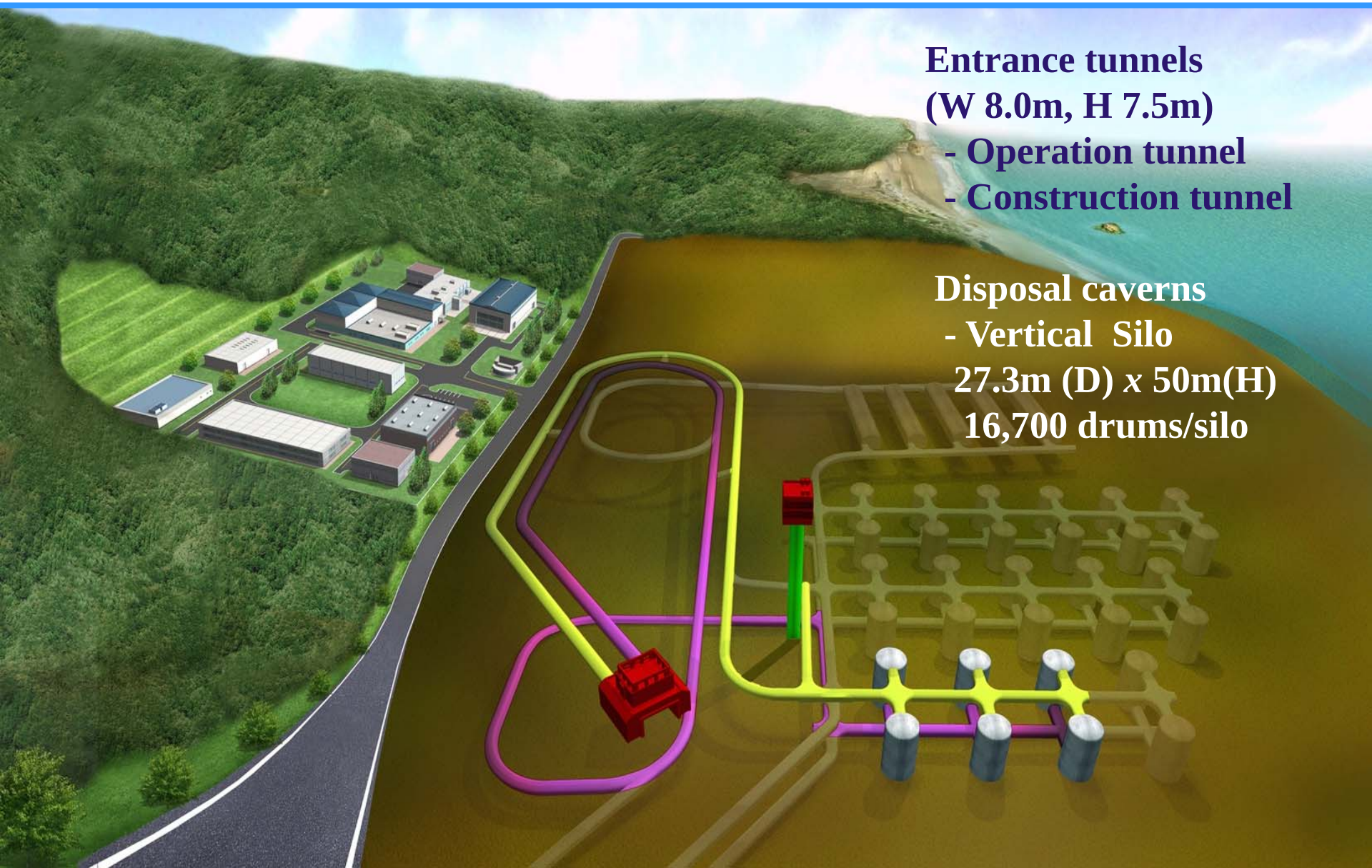
Result of the Local Referendum

	Rate of vote (%)	Approval rate (%)
Gyeong-Ju city	70.8	89.5
Po-Hang city	47.7	67.5
Yeong-Deok city	80.2	79.3
Gun-San city	70.2	84.4

LILW Repository Site



Disposal Facility Profile



HLW Repository More Difficult (?)

U. S. A

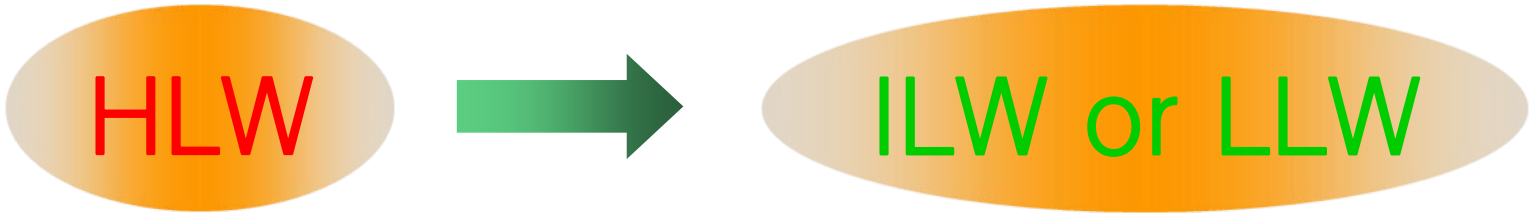
Finland

Sweden

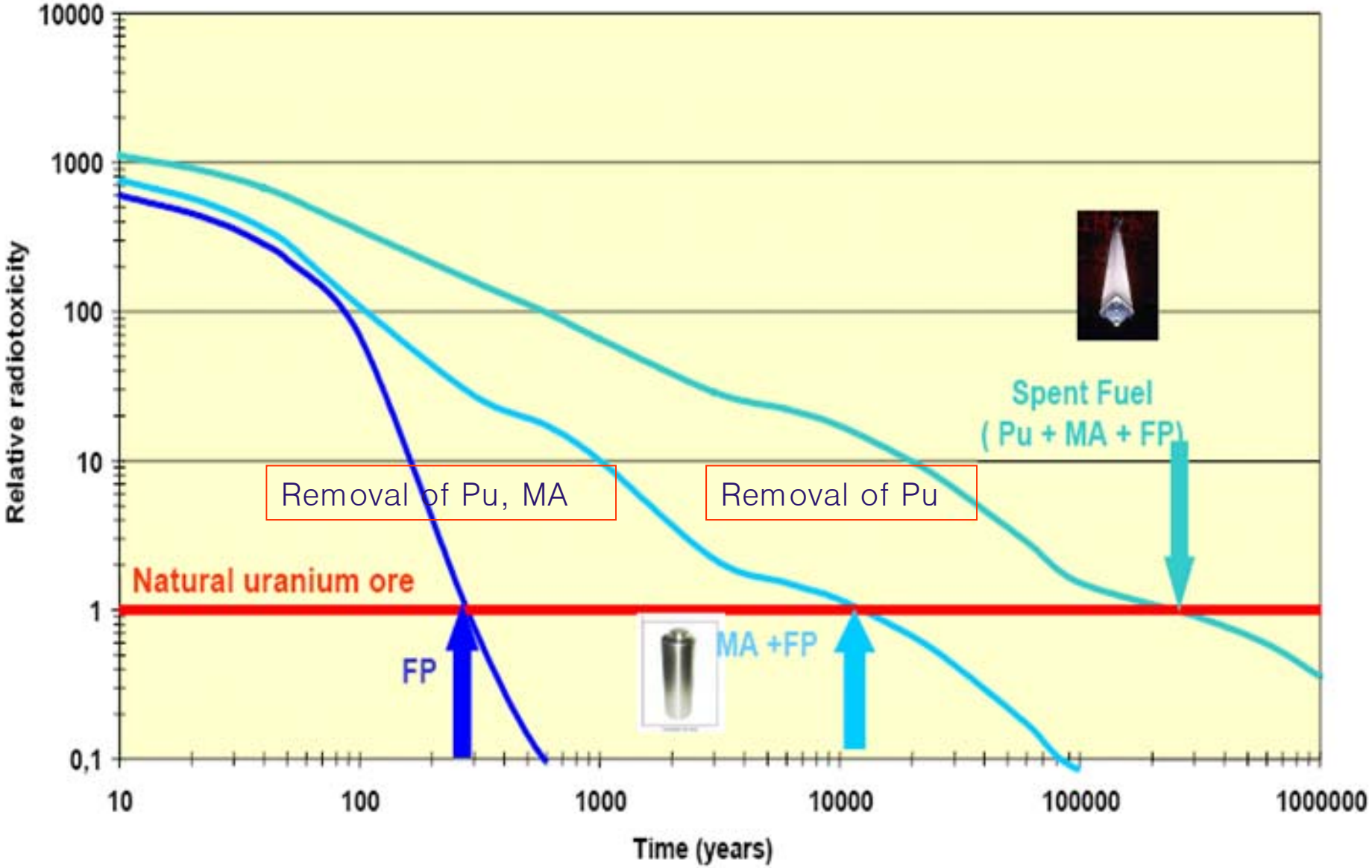
France

Japan

Concept change



Radioactive Decay



Feasibility (?)

* Technical considerations
  - Decontamination Factor
  - Suitability for Disposal
* Regulatory Aspects
* Economical Considerations
* Public Acceptance

Technical Progress

* Progress on Aqueous and Pyrochemical Partitioning Technologies

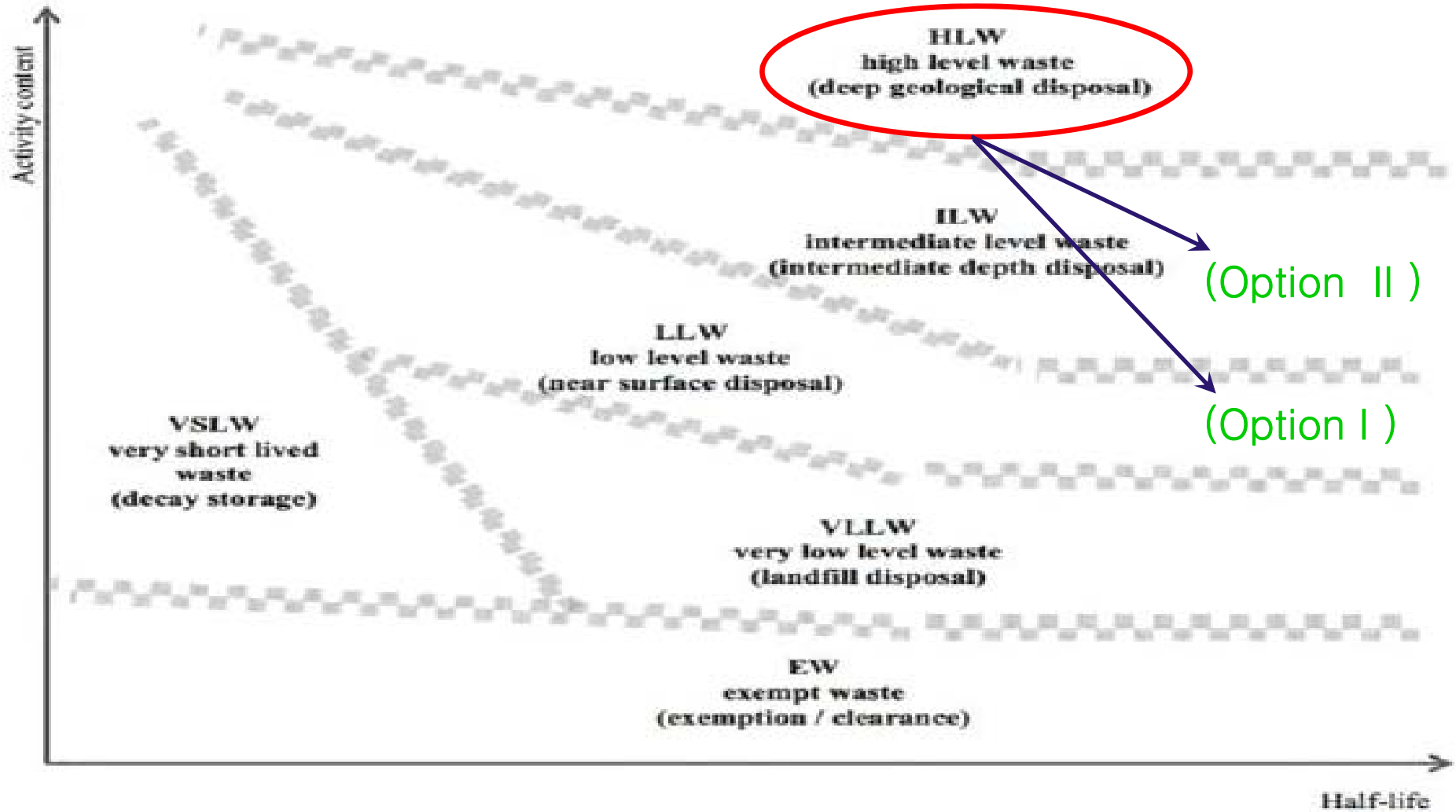
* Progress on Transmutation Technology

* Decontamination Factor for Radionuclides

* Deep Geological Disposal Studies

New Classification of Radioactive Waste

(proposed by IAEA)



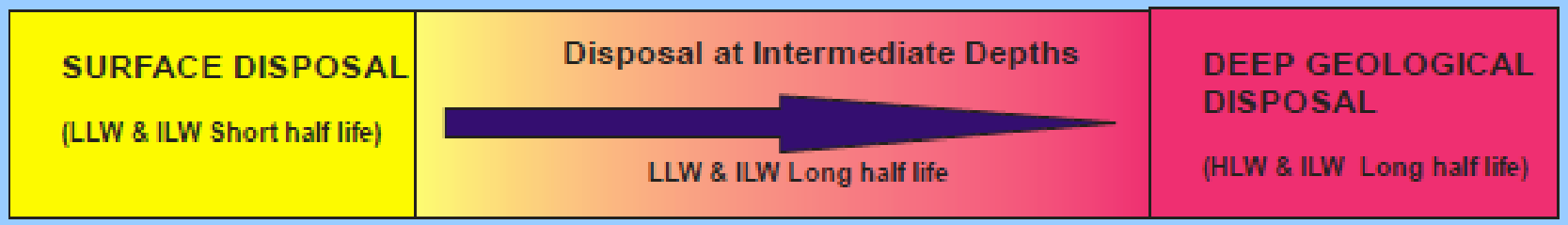
THE GOAL OF DISPOSAL

The disposal of radioactive waste includes all activities focussed on the emplacement of radioactive waste in a facility with no intention of retrieving it in the future.

The GOAL of disposal is the limitation of radiological impacts of radioactive waste to acceptable levels that ensure the protection of man and the environment, to be achieved through the effective and efficient use of resources

In seeking to achieve this goal an objective of disposal is to minimize the integrated detriment from the handling of radioactive waste during disposal operations and the post-closure phase.

RADIOACTIVE WASTE DISPOSAL OPTIONS



HIGH RELIANCE ON ENGINEERED BARRIERS supported by natural site characteristics

Characterisation & post-closure safety assessment relatively straightforward - limited time scale and near-surface characterisation

Long-term institutional control may continue after emplacement and closure to ensure managed safety

?

HIGH RELIANCE ON NATURAL BARRIERS supported by engineered and chemical barriers

Characterisation & post-closure safety assessment relatively complex - very long time scales and detailed understanding of the sub-surface necessary

Possible post-closure monitoring but concept relies on passive safety

FACTORS AFFECTING CHOICE OF DISPOSAL OPTION

- Ensuring the Safety and Basic Principles and Objectives are met through the choice of an appropriate disposal concept will depend on:
  - Nature of the waste
  - Quantity of waste
  - Site Characteristics
  - Other Factors (e.g. socio-political)
- Disposal is intended to be permanent, but a programme can be designed to include the option of retrievability (reversing the action of waste emplacement before or after closure) and/or reversibility (reverse one or more steps in a repository development at any stage) – but if these are built into the overall concept they must not detract from the basic safety function

Regulatory Aspects

* Surface Disposal for LLW
  - Fairly well established and in force

* Deep Geological Disposal for HLW
  - Established and in further development

* Disposal for ILW
  - Disposal at intermediate(?) depth
  - Unclear position

Institutional control

Under DOE P 454.1

"Institutional controls" may include administrative or legal controls, physical barriers or markers, and methods to preserve information and data
and inform current and future generations of hazards and risks, effectively on a site-wide basis.

Institutional control requirements

* Surface disposal for LLW
  - Fairly well established and in force

* Deep geological disposal for HLW
  - Needs to be in further development

* Intermediate depth disposal for ILW
  - Needs to be developed

Public Acceptance

* Public Acceptance and Perception for the disposal of ILW – Option II
* Public Acceptance and Perception for the disposal of LLW – Option I

HOME WORK

* Target
- Option I (HLW → LLW) or Option II (HLW → ILW)
  depends on Technical Achievement
* Performance Test
- Source term, Waste form, Reference engineered barrier, Reference site, Risk assessment, etc.

* PA Enhancement Program Development

PROPOSAL

* A Multinational Research Project
- Objective to verify the feasibility of the Option I
- Evaluate the input data for the Option I, reference source term, waste form, engineered barrier, reference site characteristics, etc.
- Develop tools to assess the performance objectives for Option I
* KOREA willing to launch a research project.


Thank You