



Overview of SAPIERR Projects

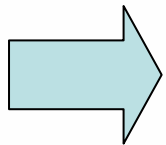
Ewoud Verhoef

SAPIERR II

Implementation of European Regional Repositories, Closing Seminar, Brussels, 27 January

International co-operation

- **Uranium mining**
- **Enrichment**
- **Fuel fabrication**
- **Electricity production**
- **Reprocessing**



why not for storage and disposal?

Geological disposal

In some countries it is difficult or impossible to develop national solutions for the radioactive waste:

- financial and technical resources,
- research capacity,
- suitable geological formations

Others are interested in economic optimisation:

- economies of scale
- more productive uses for public funds

CATT and SAPIERR



SIXTH FRAMEWORK PROGRAMME

- CATT:
 - Co-operation And Technology Transfer on long-term radioactive waste management for Member States with small nuclear programmes 2006-2007
- SAPIERR I:
 - Support Action on a Pilot Initiative for European Regional Repositories 2003-2005
- SAPIERR II:
 - Strategic Action Plan for Implementation of European Regional Repositories 2006-2008

Content

- Background
- **SAPIERR I**
- SAPIERR II
- Seminar Programme

SAPIERR I



SAPIERR I

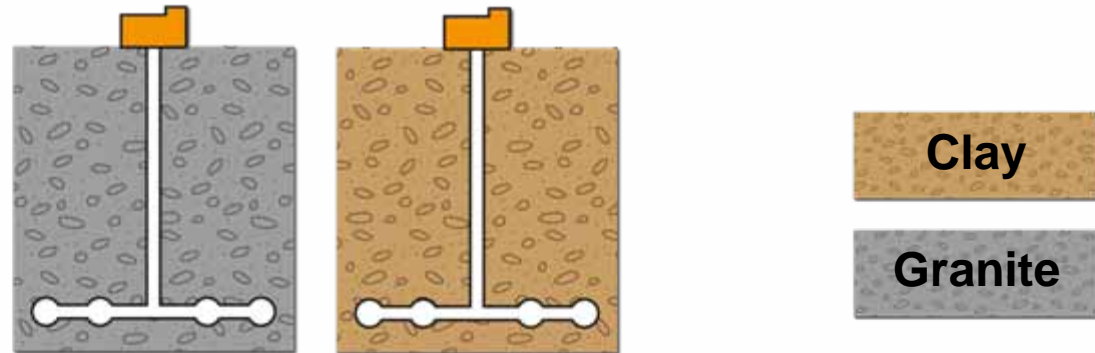
SAPIERR I/NPP

Overview of SAPIERR Projects

SAPIERR I Concepts

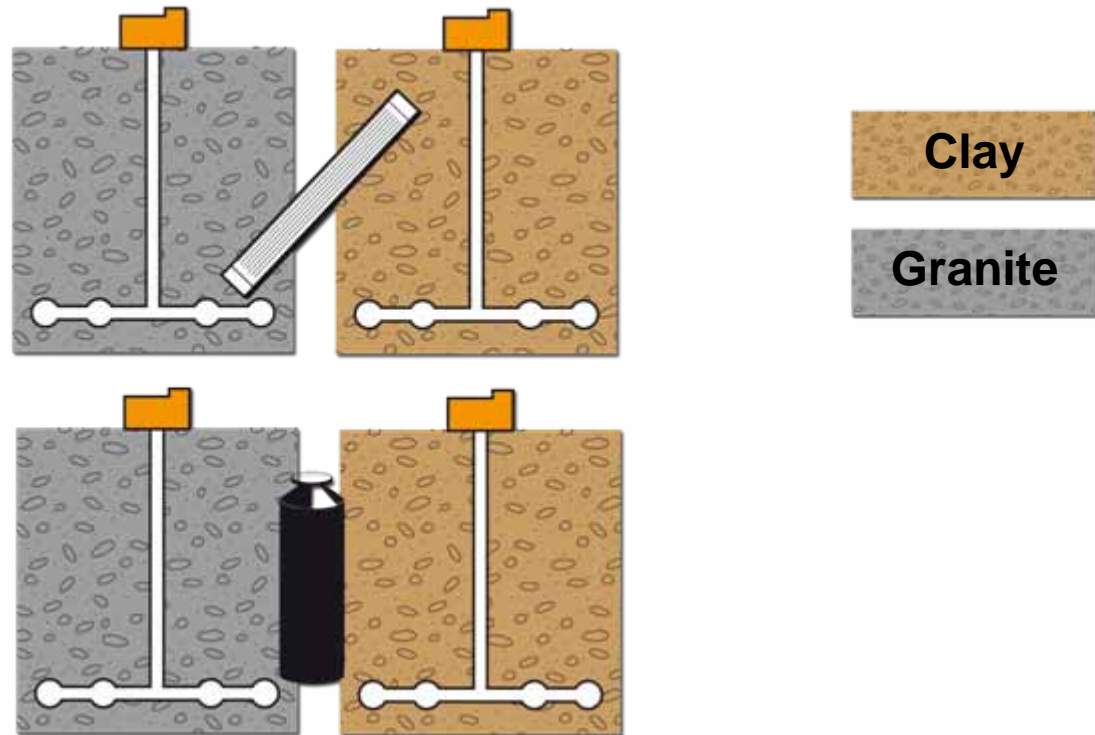
- Well developed concepts:
 - Granite (KBS-3H/NAGRA) & clay (NAGRA)
 - Most important directions in European geological disposal programmes
- Horizontal disposition
 - Chosen because of length of spent fuel elements (4.6 m)

SAPIERR I Scenarios



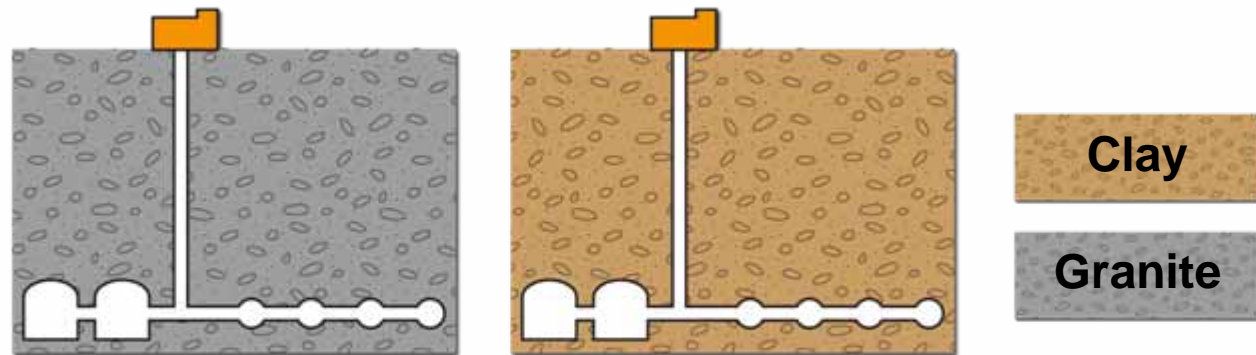
1 repository for all spent fuel and HLW

SAPIERR I Scenarios



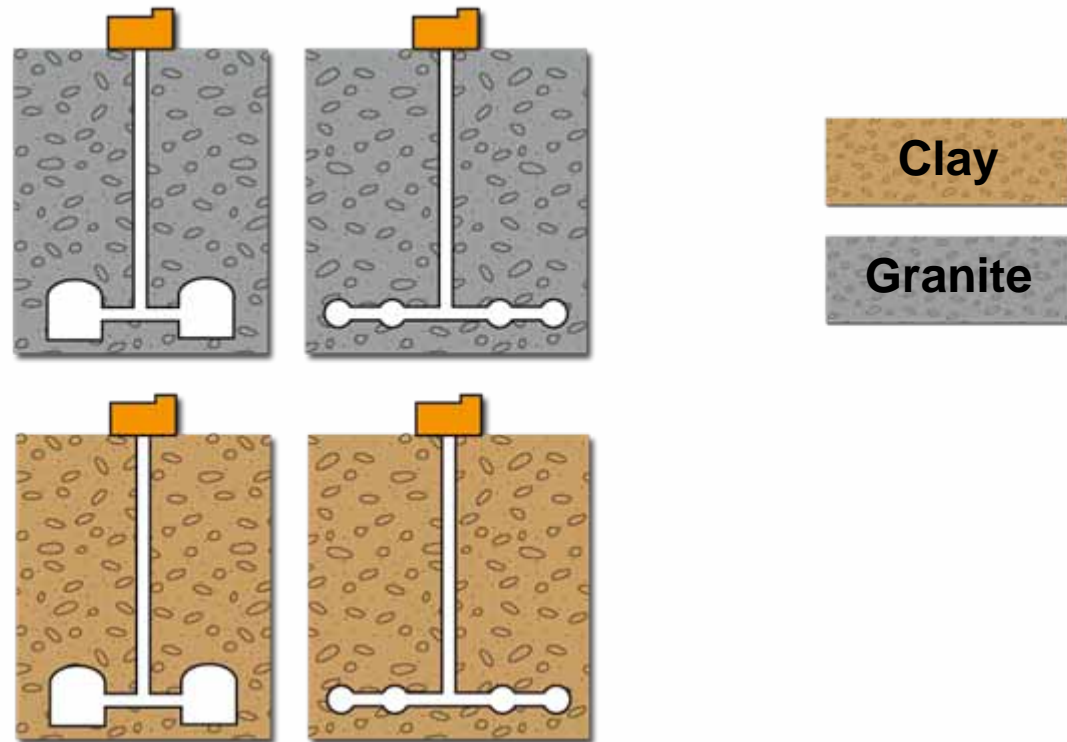
2 different repositories for spent fuel and for HLW

SAPIERR I Scenarios



1 repository for all spent fuel, HLW
and long-lived ILW

SAPIERR I Scenarios

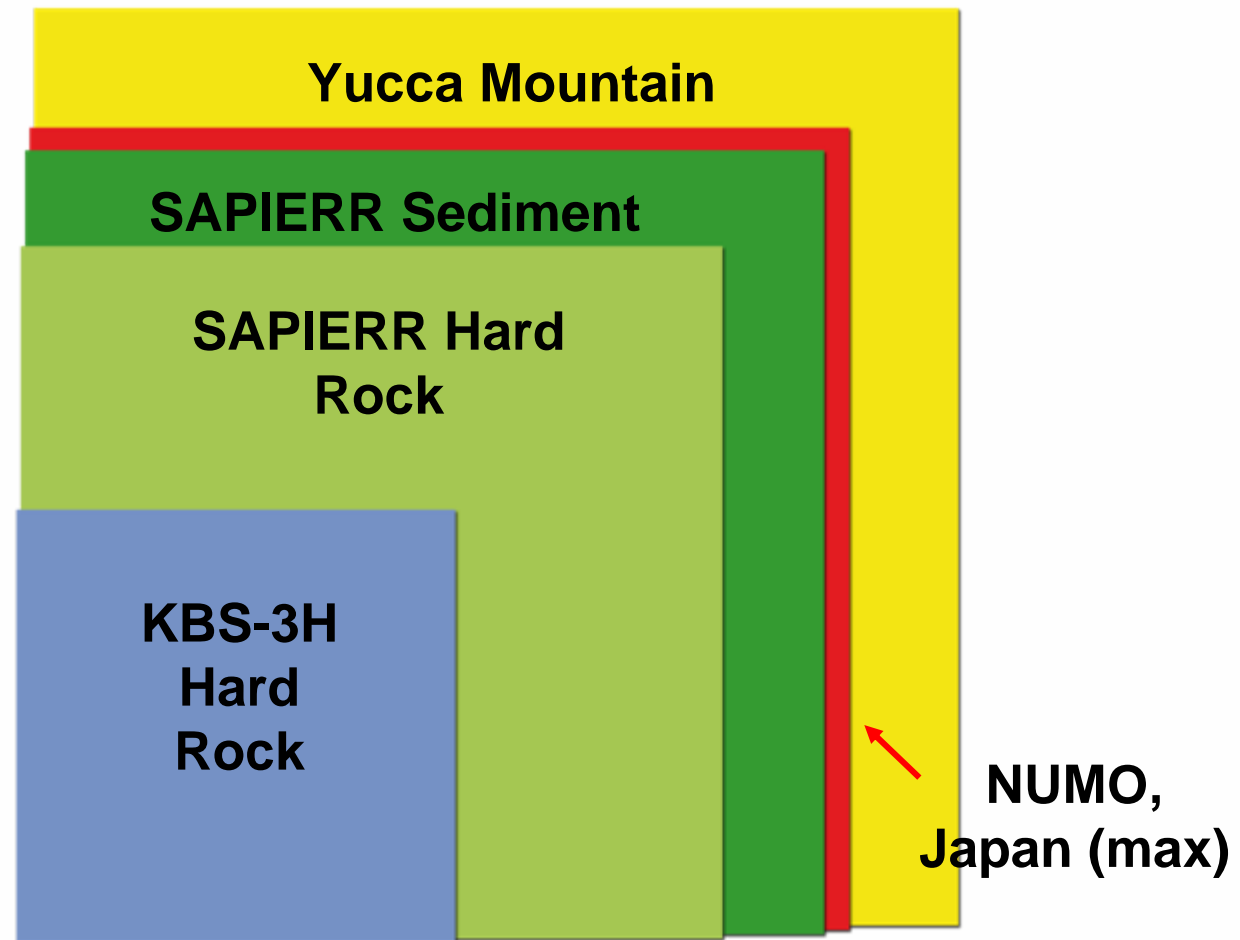


1 repository for all spent fuel and HLW and 1 repository for long-lived ILW

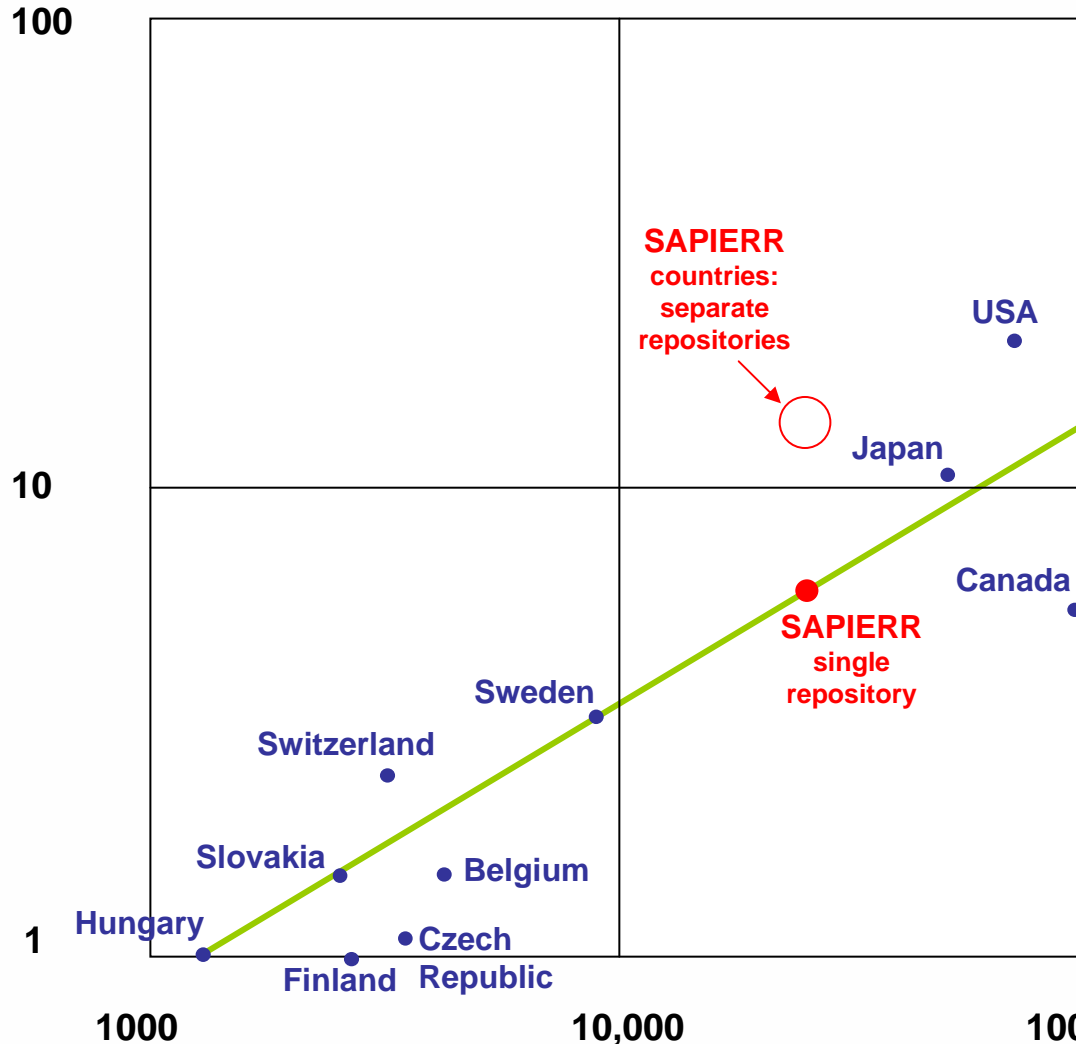
SAPIERR I Inventory

- 13.246 spent fuel containers
 - Swiss (Nagra) steal container (6061 of 5,0 m length, 2341 of 4,3 m length and 4844 of 3,7 m length)
- 2.021 HLW containers
 - With a length of 2,0 m (steal container ~COGEMA BNFL)
- 31,000 m³ LL-ILW
- NB: this is a relatively large repository
 - Compare Sweden: ~6000 containers;
 - Finland ~2500 containers

SAPIERR I Relative sizes



SAPIERR I Economy



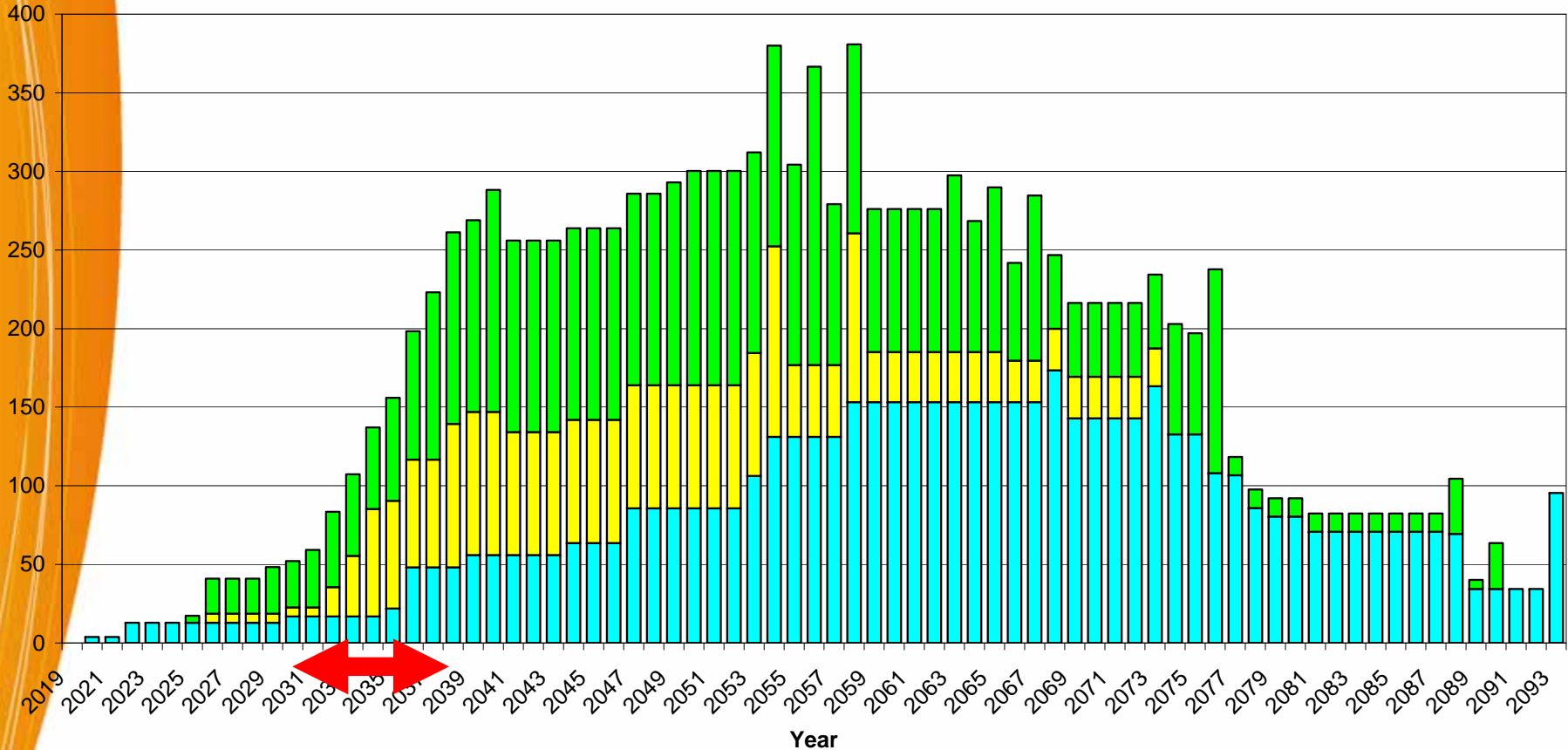
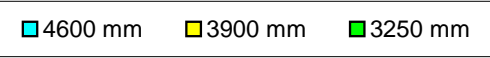
Apart
€14 10⁹
Together
€ 6 10⁹

Please note these are SAPIERR I data and don't reflect some of more recent cost estimates.

Overview of SAPIERR Projects

Operational Timescale

Number of disposal containers for spent fuel



Repository start date

Production Rate: max 250-350 pa (c.f. SKB 200 pa emplacement rate)

Overview of SAPIERR Projects

SAPIERR I Conclusions

- Potential advantages widely acknowledged in the EU
- Clearest advantages in the field of economy
- Most of the problems comparable with that of national programmes (in particular siting)
- Increased efforts needed now
- For further work a structured framework must be established

SAPIERR I Conclusions

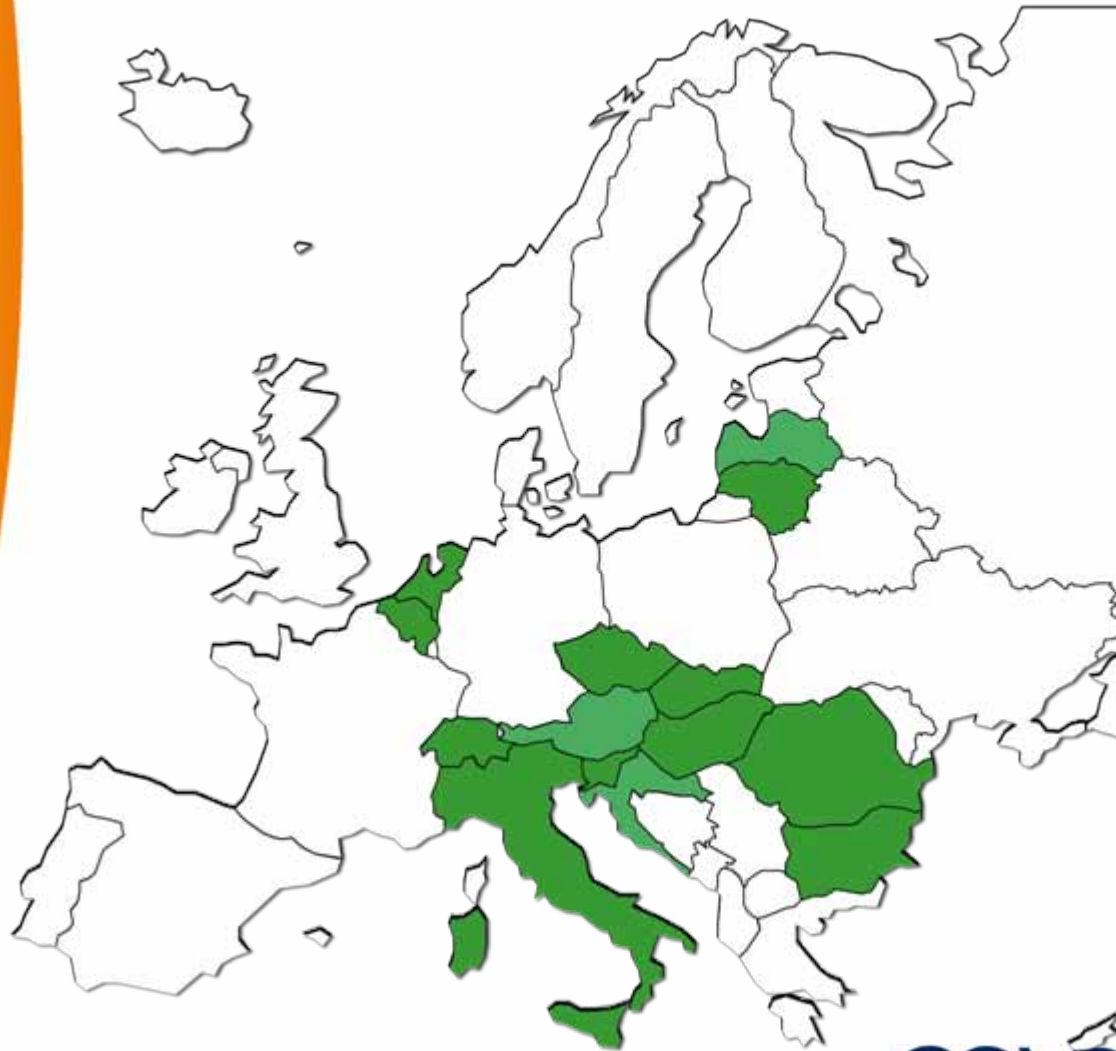
- 2035 target repository operational date (2030 for encapsulation plant)
- 20 – 25 years typical siting, SI work
- 2010 – 2015 start the process
- So, start **NOW** on assessing how to set legal and organisational structures in place:

SAPIERR II

Content

- Background
- SAPIERR I
- **SAPIERR II**
- Seminar Programme

SAPIERR I

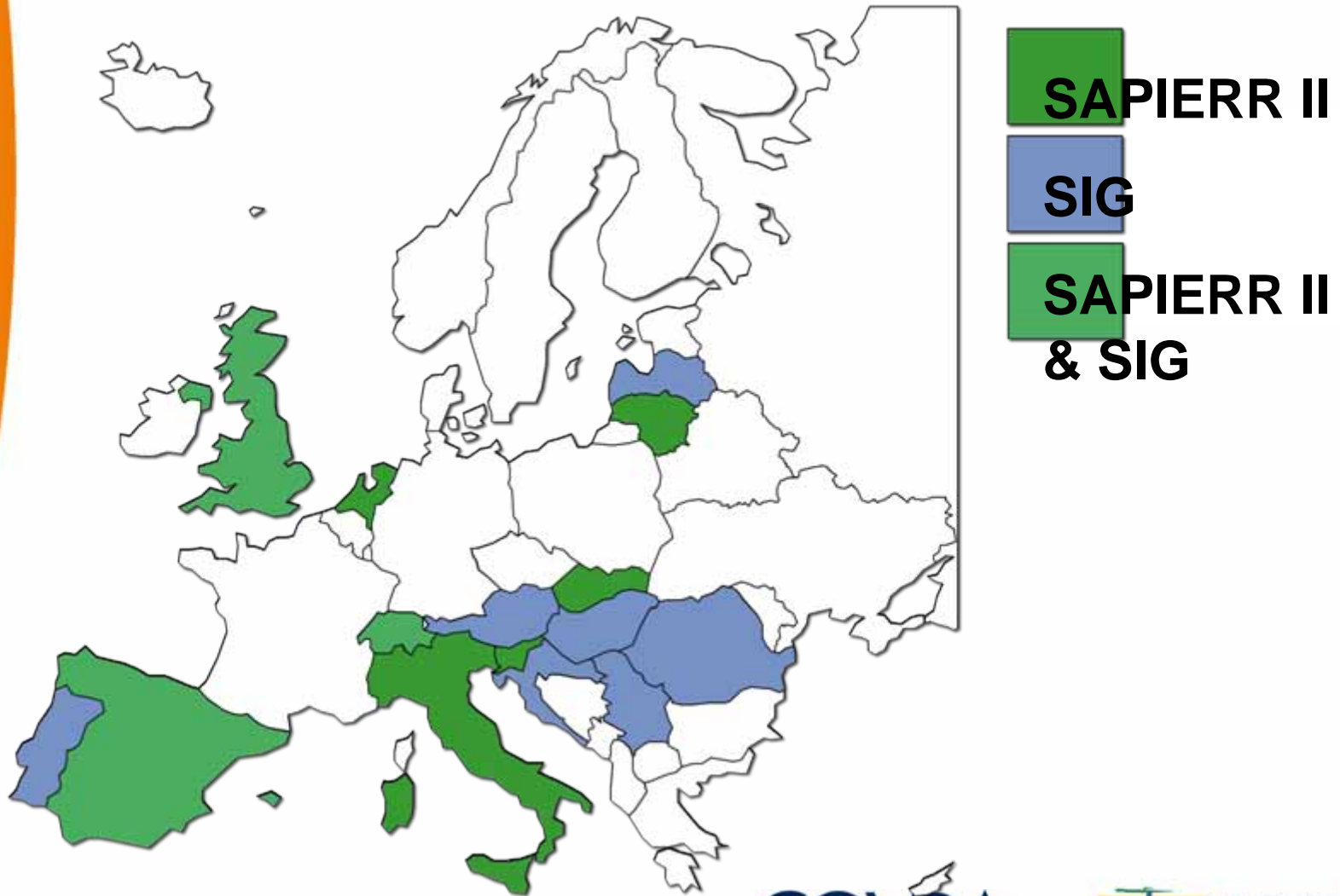


SAPIERR I

SAPIERR I/NPP

Overview of SAPIERR Projects

SAPIERR II

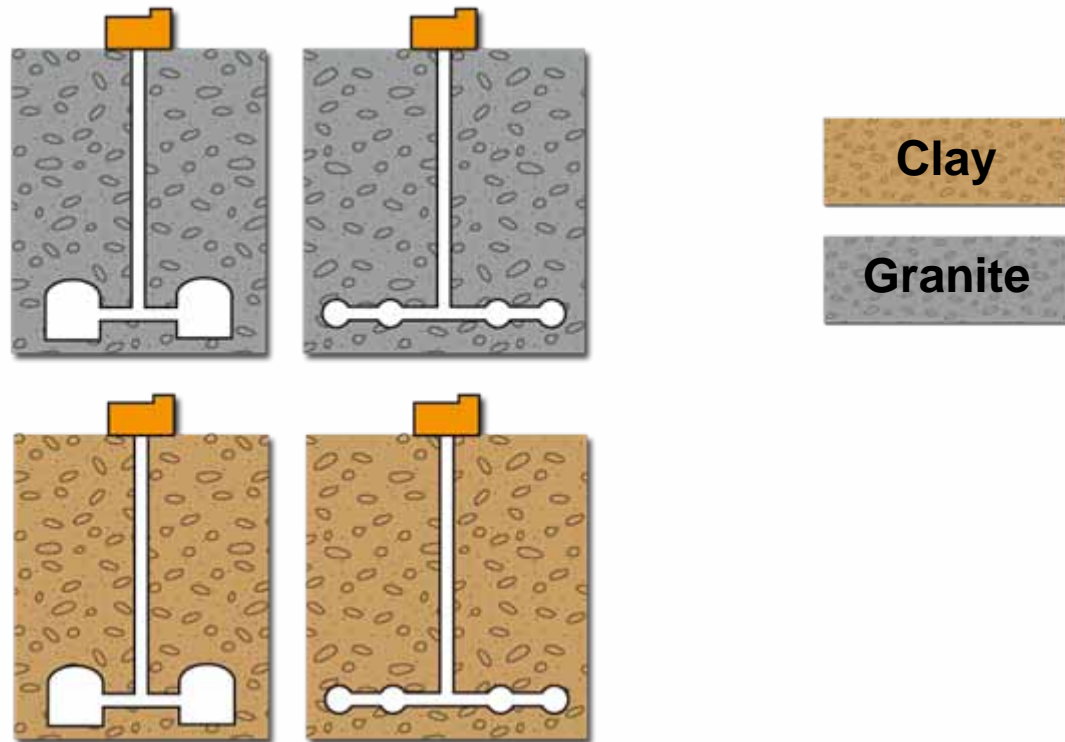


Overview of SAPIERR Projects

SAPIERR II Objectives

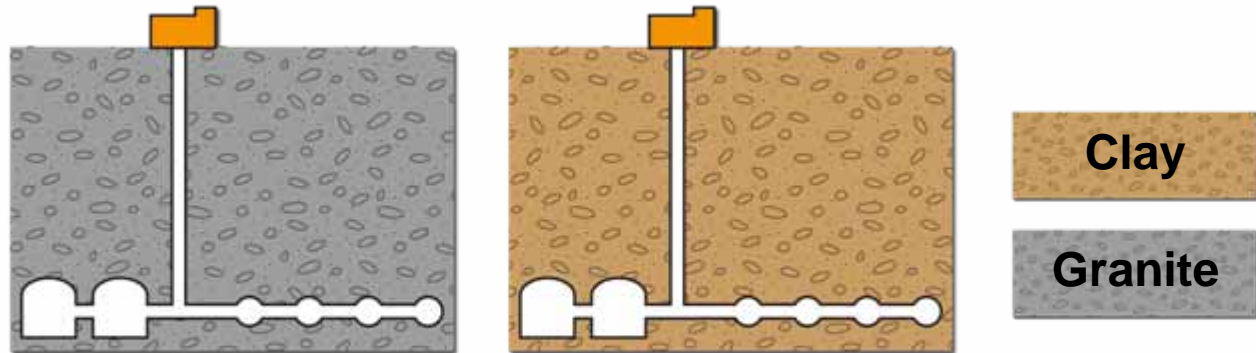
- Define options for organisational frameworks and project plans for a modestly sized, self-sufficient European Repository Development Organisation (ERDO)
- Clarify legal, economic, safety and security, and societal aspects of shared regional solutions
- Present the results and recommendations at a seminar for interested countries

SAPIERR II Scenarios



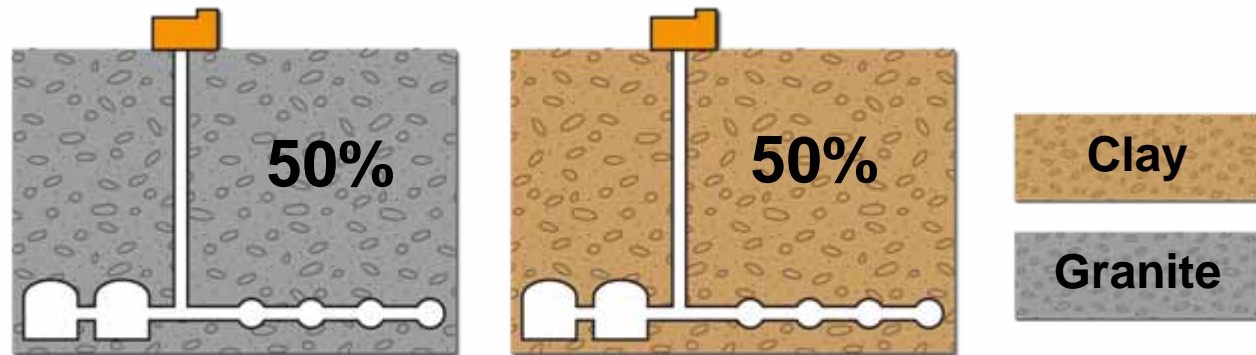
1 repository for all spent fuel and HLW and 1 repository for long-lived ILW

SAPIERR II Scenarios



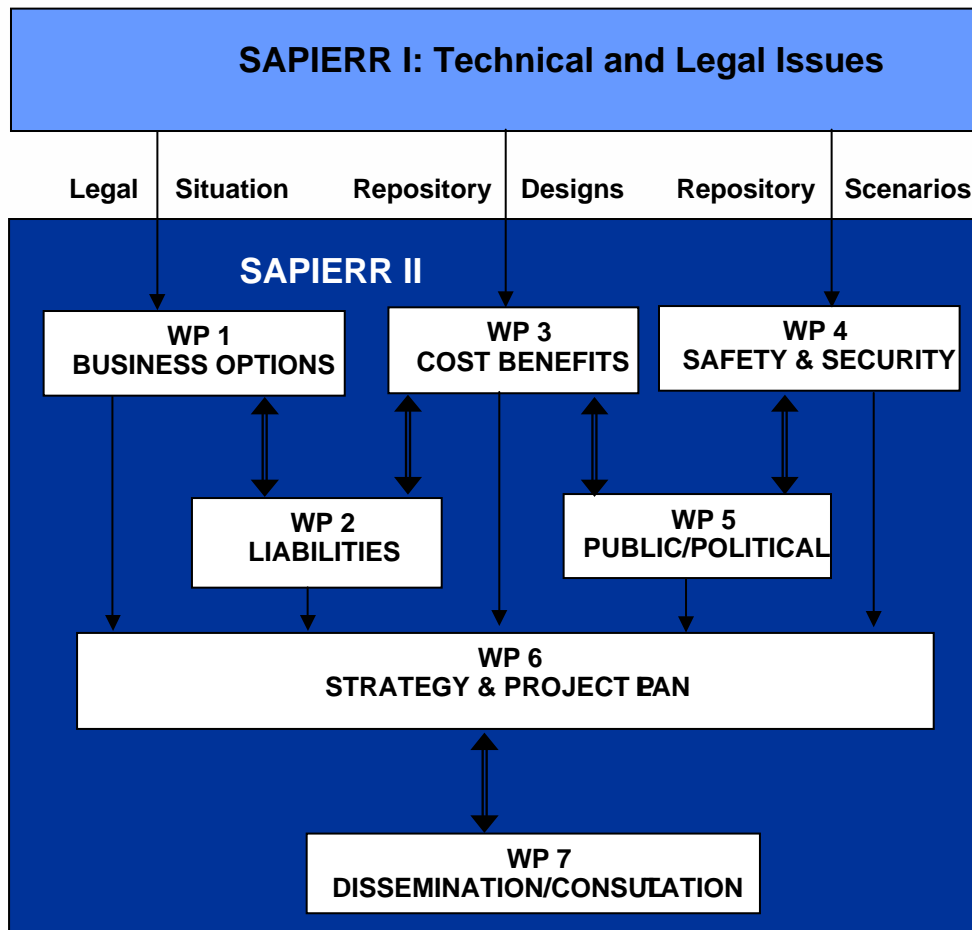
1 repository for all spent fuel, HLW
and long-lived ILW

SAPIERR II Scenarios



2 smaller repositories,
each containing 50% of all spent fuel,
HLW and long-lived ILW

SAPIERR II



↔ Strong interactions
 → Input Data

Who is doing what

WP1	Legal & Business Options for ERDO	ENEA
WP2	Legal Liability Issues	DECOM
WP3	Economic Issues	Arius
WP4	Safety & Security Implications	SAM
WP5	Public & Political Attitudes	Enviros
WP6	Strategy and Project Plan for the ERDO	Arius
WP7	Project Management & Info Dissemination	COVRA/Arius

Results

- Proposal: staged, adaptive implementation strategy
 - W.G. of interested countries (ERDO-WG)
 - W.G. task: preparing set up ERDO
- The seminar
 - overview current developments concerning multinational repository initiatives
 - results of the SAPIERR-II Project.
- ERDO WG: 12 countries and int. organisations

Content

- Background
- SAPIERR I
- SAPIERR II
- Seminar Programme

Seminar Programme

09:00–09:30	Overview of SAPIERR Projects
09:30–09:50	EC support for Member State collaboration (policy, CATT, etc.)
09:50–10:10	IAEA work on multilateral backend initiatives
10:10–10:30	Other relevant global developments
10.30–11:00	Coffee pause

Seminar Programme

- | | |
|---------------|---|
| 11:00 – 11:15 | Business Options for Developing a Multinational/Regional Repository |
| 11:15 – 11:30 | Responsibilities and Legal and Financial Liabilities |
| 11:30 – 12:00 | Q&A and Discussion |
| 12:00 – 13:30 | Lunch break |

Seminar Programme

13:30 – 14:10	Economic Aspects of Regional Repositories
14:10 – 14:50	Safety and Security Impacts of Regional Stores and Repositories
14:50 – 15:20	Public and political attitudes
15:20 – 15:50	Moving ahead: ERDO Working group
15:50 – 16:15	Discussion/Comments
16:30	End

SAPIERR II website

www.SAPIERR.net

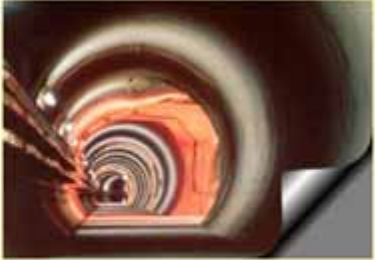
European Commission
The 6th Framework Programme

SAPIERR

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[Links](#)

The SAPIERR projects

Geological disposal is the only realistic solution for the long-term management of spent fuel and high-level radioactive waste. Implementation of a suitable deep repository may, however, be difficult or impossible in some (especially small) countries because of challenging geological conditions or restricted siting options, or because of the high costs involved. For these countries, shared regional or international storage and disposal facilities are a necessity. The objective of the EC-funded SAPIERR projects is to assist the development of shared regional or international storage and disposal facilities. The European Parliament and the EC have both expressed support for concepts that could lead to regional shared facilities being implemented in the EU.



In the period 2003 to 2005, the EC funded project SAPIERR I was devoted to pilot studies on the feasibility of shared regional storage facilities and geological repositories, for use by European countries. The studies showed that shared regional repositories are feasible, but also that if they are to be implemented, even some decades ahead, efforts must already be increased now. The first step would be to establish a structured framework for the work on regional repositories. The goal of SAPIERR II (2006-2008) is to develop possible practical implementation strategies and organisational structures. These will enable a formalised, structured European Development Organisation (EDO) to be established in 2008 or afterwards for working on shared EU radioactive waste storage and disposal activities. The EDO can work in parallel with national waste programmes. Participating EU Member States will be able to use the structures developed as, when and if needed for the furtherance of their individual national policies.

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