



EURADWASTE '19

9th European Commission Conference on EURATOM Research and Training in Radioactive Waste Management

4-7 June 2019
Pitesti, Romania

NEEDS OF COUNTRIES WITH LONGER TIMESCALE FOR DEEP GEOLOGICAL REPOSITORY IMPLEMENTATION

Bálint Nős

director of strategy and technology, PURAM

Nuclear Power Generation in CEE Countries

- Romania: 2 Candu 6
- Czech Republic
 - Dukovany: 4 WWER-440
 - Temelin: 2 WWER-1000
- Slovakia
 - Bohunice: 2 WWER-440 (+3 units shut down)
 - Mochovce: 2 WWER-440
- Bulgaria: 2 WWER-1000 (+4 units shut down)
- Slovenia/Croatia: 1 Westinghouse PWR
- Hungary: 4 WWER-440



Source: <http://www.world-nuclear.org>

Similar Boundary Conditions and Common Challenges

- Spent fuel is generated in each of these countries
 - ↳ The final solution for the management of SNF is the disposal in a GDF.
- There are only a few (0.5-6) operating units
 - ↳ The unit cost of GDF implementation is high, so providing the necessary resources (human, technical, financial, etc.) could be a challenge
- The implementation of the GDF is in an early stage





EURADWASTE '19

9th European Commission Conference on EURATOM Research and Training in Radioactive Waste Management

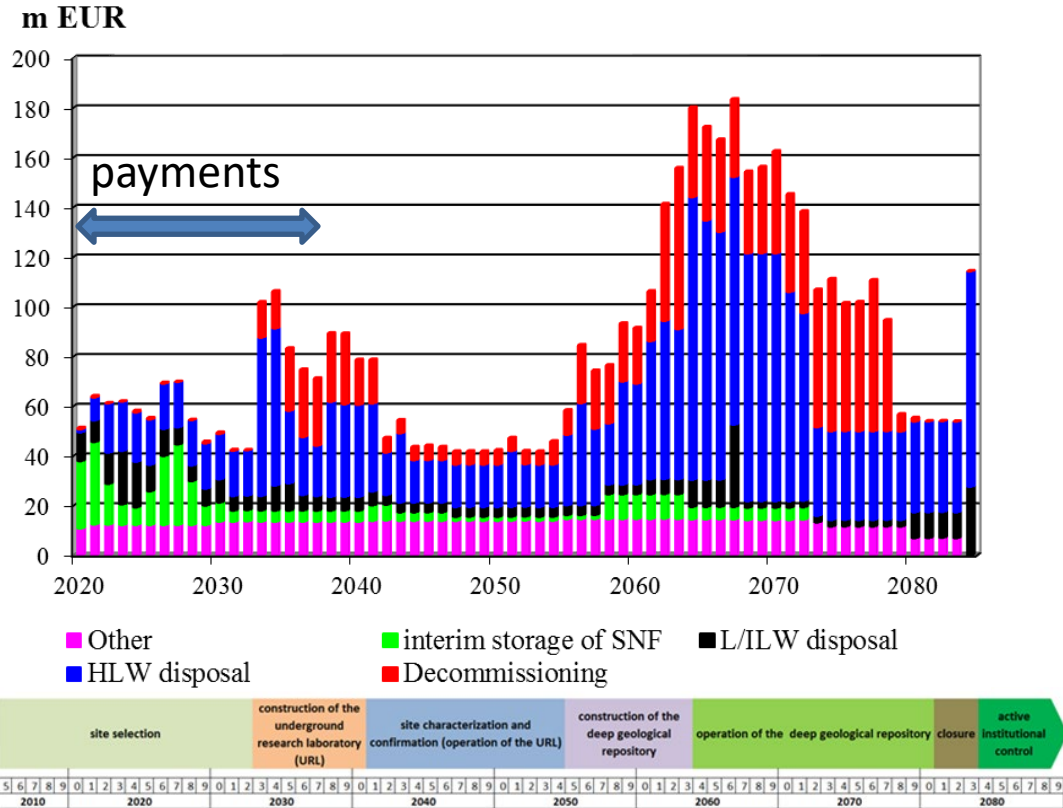
4-7 June 2019
Pitesti, Romania

Hungary

an example for a country with early stage programme for the development of geological disposal facility

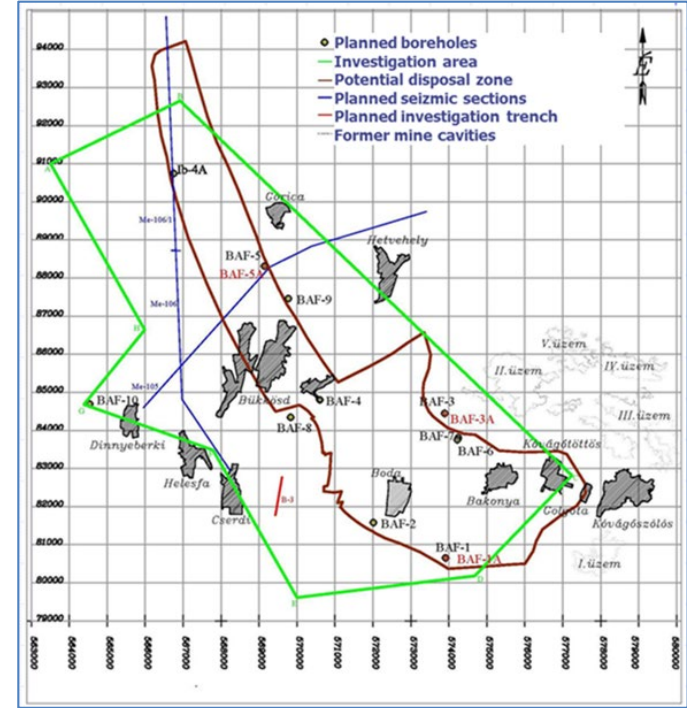
Programme Development

- It is important in an early stage as well,
 - to develop the conceptual plan for the disposal system
 - to define an implementation programme with milestones
 - to establish an R&D plan to support the implementation and
 - to carry out the cost calculation linked to the technical content



Current Status of Site Selection in Hungary

- Currently a surface based geological research program is ongoing
- A staged (stepwise) site investigation program has been developed



Boundary Conditions of R&D Planning

- The R&D framework programme was compiled within the national framework, taking into account the National Policy and National Programme
 - Reference scenario for the back-end is the open fuel cycle
 - The final solution for the HLW (SNF) management is the disposal in a domestic deep geological repository, implementing the multi-barrier system
 - Public hearing is an element of the licensing procedure for R&D plans



Assistance for Drafting the R&D Plan

- During the development of the R&D framework programme the PLANDIS guide was effectively used to structure the plan
- The methodological advice of ANDRA was really useful
 - to define the system boundary conditions,
 - to identify the safety functions and other requirements for the system elements and
 - to link the planned R&D activities to this functional breakdown system



R&D Framework programme - Topics

- An R&D Framework Programme was carried out for the surface based investigation structured into the following areas

Waste inventory

Waste package
(waste form and
package)

Engineered barrier
system (buffer,
backfill, seals and
plugs)

Geological (plus
natural and
societal)
environment of the
facility

Preliminary design
and layout of the
surface and
underground part
of the facility

Operation of the
facility, transport
and transfer of
waste packages,
retrievability,
reversibility

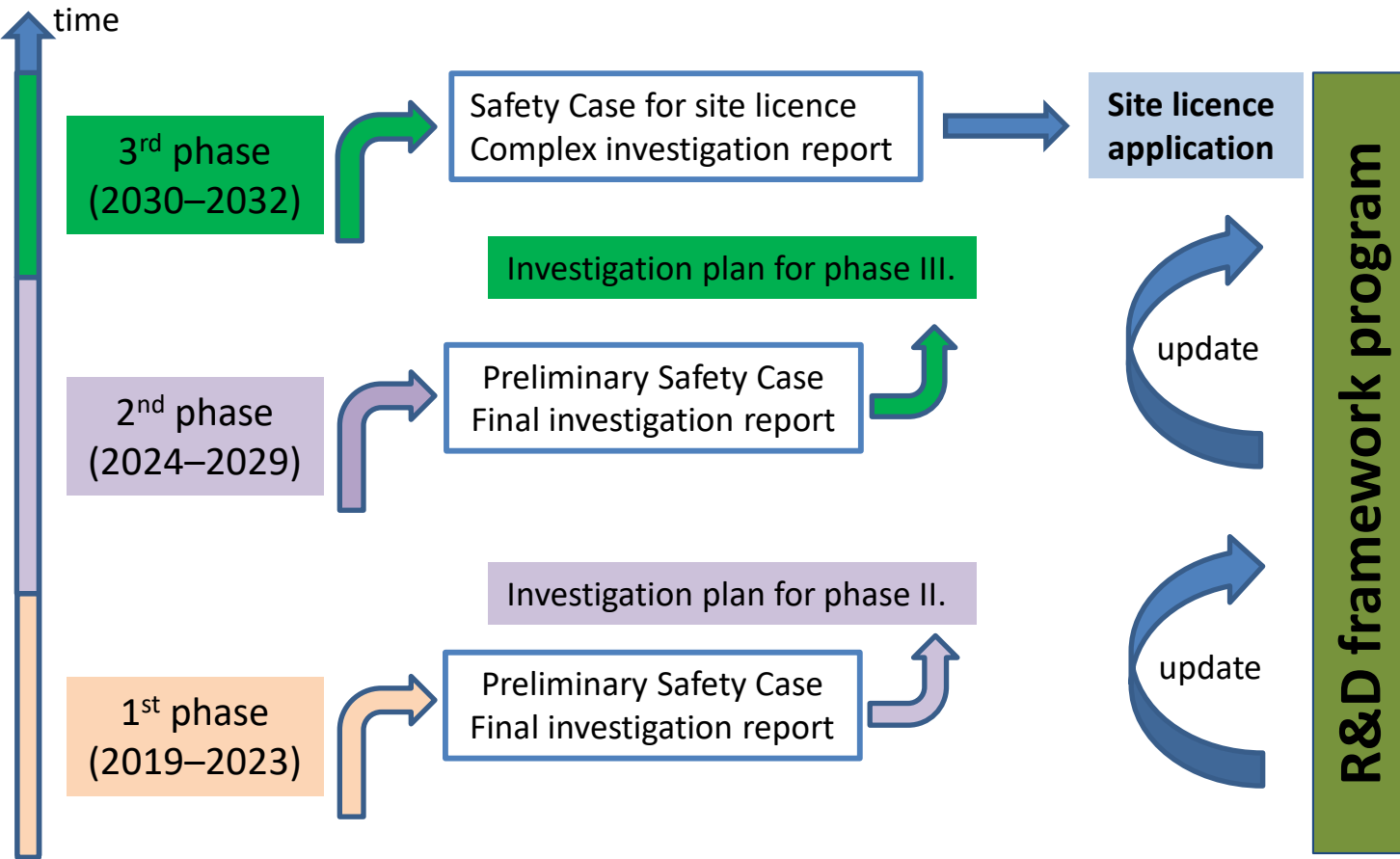
Methods for R&D
investigations,
models, evaluation

Data management,
and long-term
information
preservation

System of R&D Planning

General aims of the site investigation phases:

- **3rd phase:** preparation of the URL
- **2nd phase:** designation and characterization of the site
- **1st phase:** general data acquisition in order to rank candidate areas



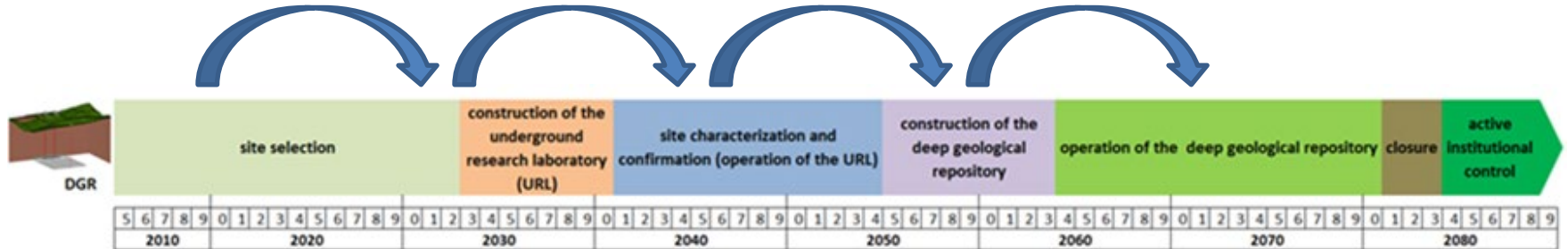
Needs of Countries in Early Stage of DGR Development

- **Strategical assistance**
 - Lessons learned by countries with advanced programmes (what is working and **WHAT ISN'T**)
 - Site selection and site characterization strategy (criteria, methodology, techniques)
 - Using the safety case (and safety functions) to develop the disposal system and to prioritize R&D
 - The implementation strategy for the URL (part or not part of the future DGR)
- **Adaptation instead of „copy and paste”: the way of reaching the decisions (rationale behind) could be more important than the decision itself**

Needs of Countries in Early Stage of DGR Development

- Competence and knowledge management
 - Core competences should be developed and maintained by the countries in early stage of DGR implementation
 - The collection of existing knowledge (state-of-knowledge) in different key topics could be a sound basis in knowledge management
 - Training modules and access to EU wide R&D infrastructure could help in attracting young professionals to join to the RadWaste arena

The educated, experienced workforce will be needed over generations!



Needs of Countries in Early Stage of DGR Development

- Competence and knowledge management
 - Core competences should be developed and maintained by the countries in early stage of DGR implementation
 - The collection of existing knowledge (state-of-knowledge) in different key topics could be a sound basis in knowledge management
 - Training modules and access to EU wide R&D infrastructure could help in attracting young professionals to join to the Radwaste arena
- **The EURAD Project could assist these countries to reach their goals in this respect!**



EURADWASTE '19

9th European Commission Conference on EURATOM Research and Training in Radioactive Waste Management

4-7 June 2019
Pitesti, Romania

Thank You for Your Attention!