

Improving existing arrangements on information and public participation in the field of RWM in Europe: the way forward



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The research and results presented here are those of the participants in the ACN Energy Community's (ACN) round table work programme (2017-2019) on the management of radioactive waste (RWM).

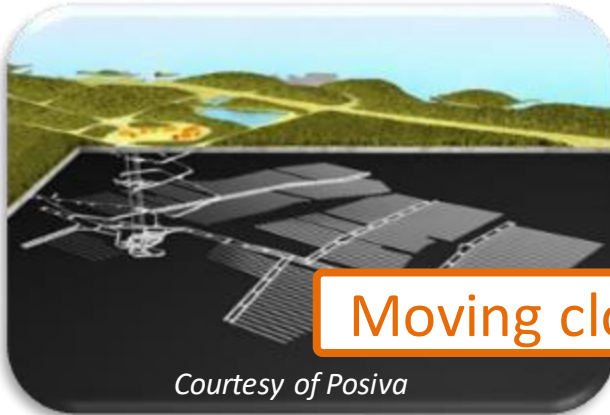
The IGD-TP

- ▶ Dedicated to initiating and carrying out European strategic initiatives to facilitate the stepwise implementation of safe, deep geological disposal of SF, HLW and other long-lived radioactive waste
- ▶ Launched on 12 November 2009 by the European Commission and Waste Management Organisations (WMOs)
- ▶ Now solely funded by the 12 WMOs and organisations responsible for implementation-related RD&D who form the Executive Group (EG)
- ▶ The IGD-TP welcomes membership from all interested parties endorsing the IGD-TP Vision and willing to contribute positively and constructively to the group's goals
 - Currently 142 member organisations across 29 countries



Implementer Progress

- ▶ Our first vision:
'to have the first geological disposal facilities (GDF) for spent fuel, high-level waste and other long-lived radioactive waste in operation by 2025' (Vision 2025)
- ▶ Major progress has been made towards achieving our Vision 2025:
 - Posiva has a construction licence and plans to submit its operation licence application in 2020/21
 - SKB submitted its construction licence application in 2011
 - Andra expects to follow in 2021



Moving closer to realising our Vision 2025!

Vision 2040

- ▶ In order to meet the challenges of the next phase we have updated the group's vision
 - Announced at our 10 year anniversary in November 2019
 - Vision has a slightly broader remit, reflecting the needs of small inventory member states who may be considering shared repositories and/or mined borehole disposal

2040 – Towards industrialisation of radioactive waste disposal in Europe

Safely operate

the first geological disposal facilities in Europe

Optimise & industrialise

planning, construction and disposal operations

Tailor solutions

for disposal of the diverse waste inventories in Europe

IGD-TP objectives and how to meet them

▶ What:

- A forum for discussion of RD&D issues and priorities
- A means for sharing RD&D information and results, including information and experience on RD&D planning and management
- A mechanism for co-ordinating RD&D on topics of shared interest between programmes and groups of organisations

▶ How:

- Pooling of critical European resources and preparing co-ordination of future projects
- Secure finances for implementation of the agreed strategic initiatives
- Foster knowledge management / development and transfer
- Contribute to the availability and maintenance of critical masses of resources for RD&D of technology as well as networks for knowledge management, education and training
- Identify areas in strategic knowledge or know-how that can be covered by concerted actions
- Create synergies with other international organisations and European initiatives

Benefits

- ▶ Competence building
- ▶ Joint work and use of resources
- ▶ Joint work on strategies
- ▶ Knowledge transfer

2020 Strategic Research Agenda

- ▶ 2020 SRA highlights main RD&D needs common to multiple WMOs
- ▶ Identifies main RD&D issues that needed a co-ordinated effort in order to realise our ‘Vision 2040’
- ▶ Also provides valuable input to identifying topics for future EURATOM calls
- ▶ Comprises 9 key topics and various cross-cutting activities

Stages of repository development

	Generic studies and concept development	Selection of host rock and site	Technology development and repository design	Technology development and repository construction	Industrial-scale manufacturing and repository operation
Safety strategy and methodology	Development of safety assessment methodology	Application of methodology in safety case and improvement of methods	Application of methodology in safety case and improvement of methods	Application of methodology in safety case	Application of methodology in safety case
Long-term safety: Scientific and technical basis	Broad-based research	Research narrowed to deal with host rock-specific aspects and specific aspects associated with the selected EBS	In situ experiments and improvement of data bases and understanding	Scientific work sharply focused on small number of residual issues, large-scale in situ experiments and component tests	Confirmation studies on components under site conditions incl. monitoring
Facility and component design	Concept variant studies	Repository design concepts adapted to specific rock type	Component design and layout design Operational safety studies	Full-scale prototypes constructed Industrial scheme developed	Full-scale production and operation
Site-related characteristics	Surveys of potential host rocks and their characteristics based on available information	Host rock characterization and site-specific studies	Detailed site characterization Excavation	Construction of main underground facilities Confirmation of rock properties for final design	Construction, confirmation, monitoring

Generic stages of repository development as derived from international experience. The stated RD&D activities reflect today’s state-of-the-art in geological disposal

SRA 2020 – the way forward

- ▶ The indicated topics are good candidates for future research effort and funds, due to the commonalities and shared priorities with the WMOs
- ▶ This is not an exhaustive list of RD&D topics, as each WMO will have additional research topics of national importance
- ▶ Prioritisation is based on consensus between WMOs assessing importance and urgency of each research topic to their national waste disposal programme

The priorities of RD&D depend upon the national radioactive waste inventory, host rock geology, national context and/or legislation, and the stage of the programme's lifecycle - and these priorities change as the programme progresses.

Overview of European DGR Maturity and Associated RD&D

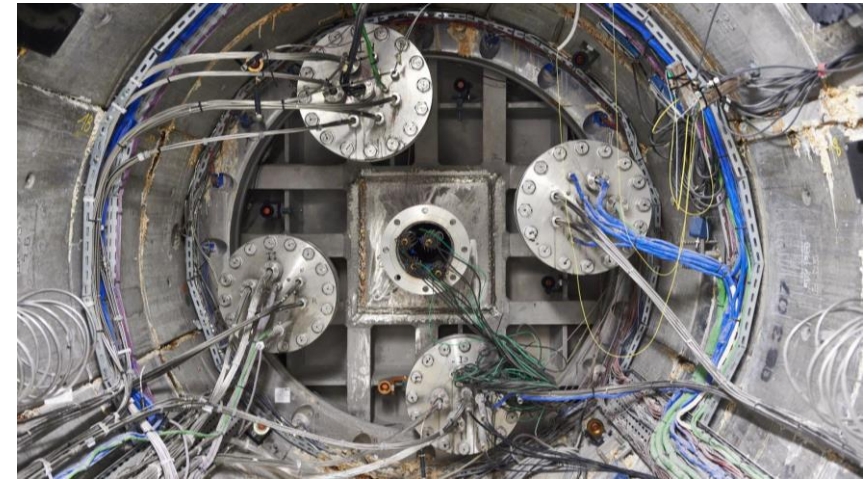
	Generic	Site selection	Site specific	Construction	Operations	Closure
 ANDRA Agence nationale pour la gestion des déchets radioactifs				2028 / 2029	2038	2145 - 2150
 arao						
 BGE BUNDESGESELLSCHAFT FÜR ENKLÄGERUNG Bundesministerium für Wirtschaft und Energie			2031		2050	
 COVRA		2120			2130	
 enresa	2025	2035	2055	2073	2088	2093
 nagra			2024	2050	2060	
 ONDRAF/NIRAS						
 POSIVA					2024	
 PURAM			2055	2064	2079	
 Radioactive Waste Management						
 SKB				2023	2031	2065
 SÚRAO			2025			
	Generic safety case	Site specific safety case(s)	Pre-construction safety case	Pre-operational safety case	Operational safety case	Final safety case
	RD&D Focus: General science & technology development Lots of options available	RD&D Focus: Validation of understanding and adaptation of concept Options within programme reducing	RD&D Focus: Disposal concept(s) selected and mature Validation of understanding continues	RD&D Focus: Optimisation and industrialisation of facility and disposal concept(s)	RD&D Focus: Reassurance and competence maintenance	
			Construction licence		Operational licence	Closure licence

Looking forward...

- ▶ The IGD-TP aims at inclusivity of all WMOs to promote collaboration and knowledge transfer within the geological disposal community
- ▶ Has a strong focus on Europe, but the IGD-TP supports international collaboration with many other platforms to avoid duplication and identify synergies
- ▶ Acts as a key instrument in ensuring continuity throughout the long timescales over which development, operation and closure of a GDF take place, in terms of scientific and technological advancements and knowledge transfer of good practice and lessons learned within the community
- ▶ Provides a strong implementer voice and collaborative action to ensure necessary expertise and facilities are maintained and are state-of-the-art
- ▶ Vision 2040 and the SRA are intended to guide the focus of activities and resource allocation over the next decade by highlighting the research areas that are of common interest to multiple (European) WMOs

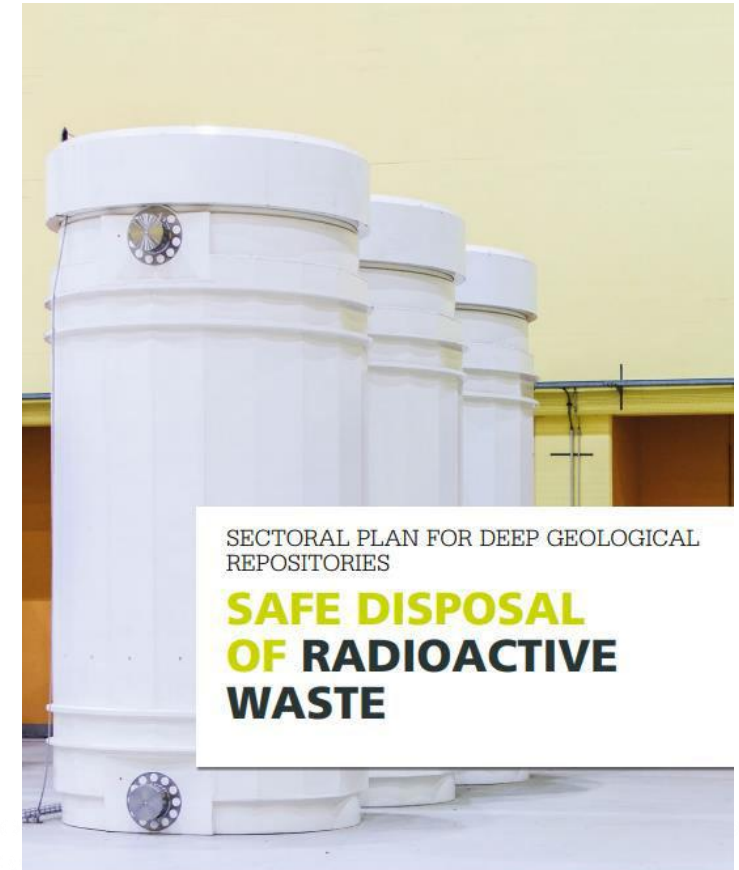
Key messages to ensure and execute an adequate RD&D programme in particular at an early stage (1/2)

- Successful repository implementation needs the legal framework with the roles of each party clearly described (implementer, regulator, society)
- How to implement the repository programme and conduct the site selection needs to be set out and accepted by all parties
- A long-term political commitment is required - without this it has proven extremely difficult to develop and maintain a needs-driven and focussed, well-funded RD&D programme
- Where the above conditions have not been fulfilled, several programmes have gone to a “hold” or even “restart” phase
→ This challenges the RD&D programme and setting priorities
- International collaboration is an instrument to bridge this, but loss of knowledge is almost inevitable



Key messages to ensure and execute an adequate RD&D programme in particular at an early stage (2/2)

- While RD&D is an important part of the repository programme, it is widely felt that the challenges for repository implementation do not lie in the technical aspects (although optimisation will always remain a driver), but rather in implementing an agreed approach collaboratively with wider society
- The role of the implementer is to bring focus to the RD&D programme, in the generic stage based on generic safety cases
 - Focus is needed as RD&D topics mature and going in more detail might no longer be the best way to support the programme budget





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Thank you for your attention