

The background image is a composite. On the left, a white humanoid robot with glowing blue and green internal components is shown in profile. On the right, a woman with blonde hair in a ponytail, wearing a light blue athletic top and a black wristband, is captured in a dynamic running pose. The entire scene is set against a light, blurred background.

The German Way of Nuclear Waste Management

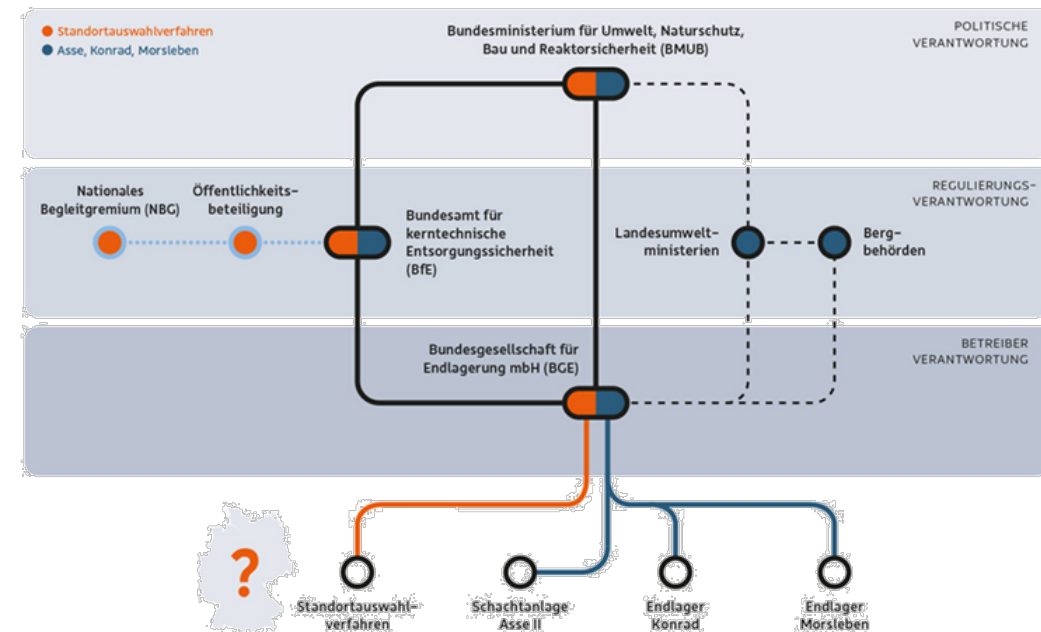
11.10.2021 IFNEC - Reliable Nuclear Fuel Services
Working Group Webinar

Project Management Agency KIT (PTKA) / p.p. BMWi

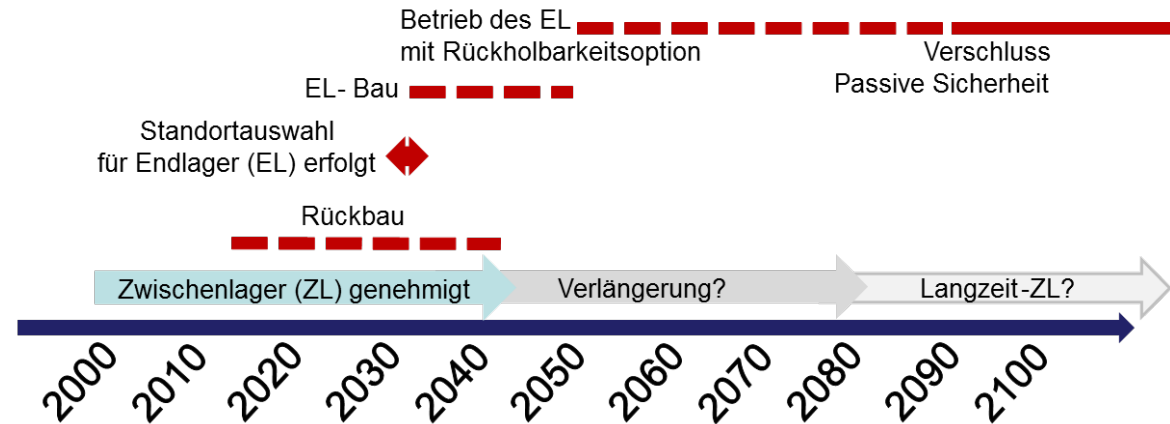
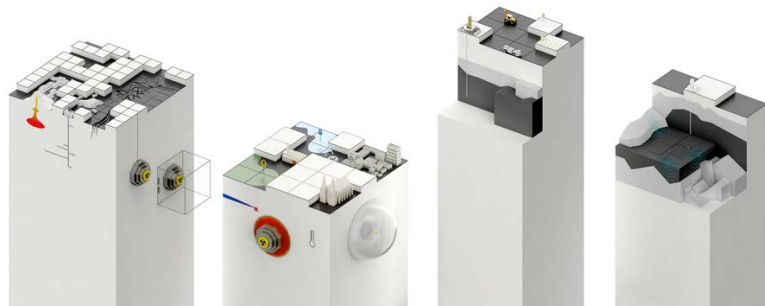
Situation of nuclear waste management in Germany



The **StandAG** (come into force 01.01.2014) now stipulates a multi-phase search for a **site** with the **best possible safety precautions** and the full **participation** of the public, especially in the regions where the sites will be located. **Scientific exclusion, minimum and assessment criteria** are defined and an **adaptive procedure** is developed to enable the revision of decisions and to establish the **retrievability** of the stored waste for a longer period of time.



Situation of nuclear waste management in Germany



STEP 1 Determination of Sub-Areas

- Collection of geological data
- Removal of unsuitable regions (earthquake, mining) from the white map
- Application of minimum requirements
- Weighting of dis-/advantages
- 1st interim report (proposed areas) by BGE (III.Q.2020)
- Symposium and Regional Conferences - discussion representatives/citizens – organized by BASE
- Bundestag decides on the regions to be explored

STEP 2 Surface Exploration

STEP 3 Underground Exploration

2031 Construction until 2050
Implementation as of 2050

Influence on Interim-Storage

Objectives of nuclear safety research

Protection of people and the environment



Nuclear Safety



Safe Storage and Disposal of Radioactive Waste

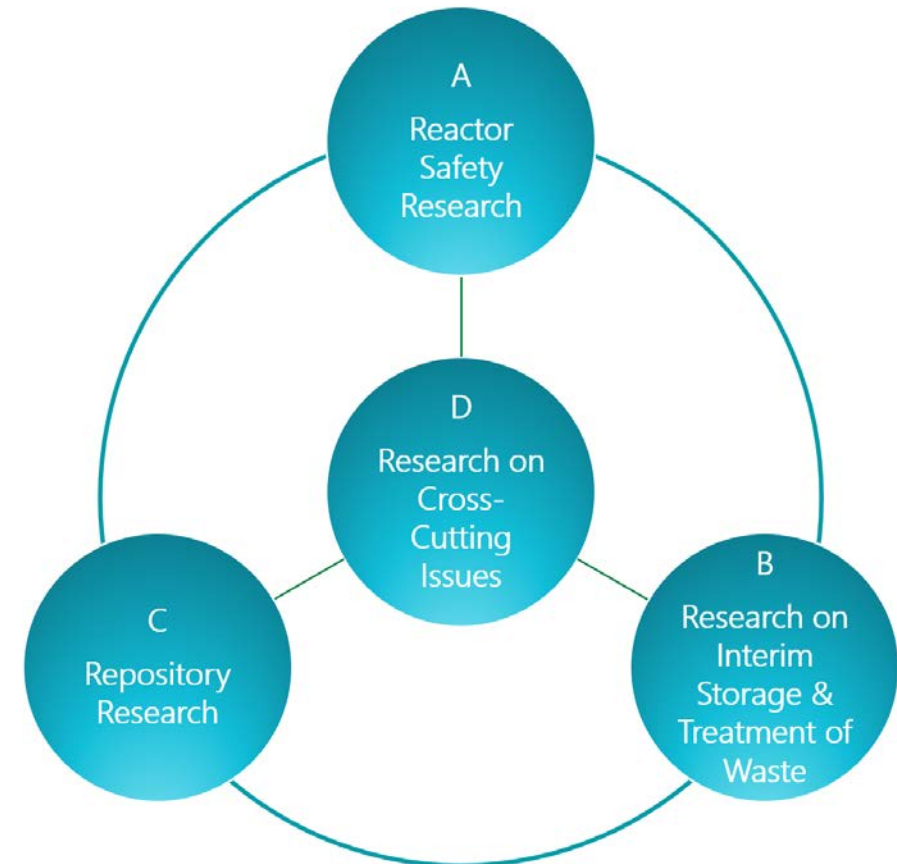


International Developments



State of Science and Technology

Nuclear safety research - Federal Ministry for Economic Affairs and Energy (BMWi)



Reactor Safety Research (A)



Reaktordruckbehälter mit Hauptkühlmittelleitungen der PKL (Primärkreislauf)-Versuchsanlage der Framatome GmbH

- The focus so far has been on research and power reactors in Germany
- Consideration of existing / developing plants and plant concepts abroad is increasing

Main objective: Further development of an independent, technically sound and based on own knowledge security-technical competence

Research on Interim Storage and Waste Treatment (B)



Blick auf die im Zwischenlager Gundremmingen eingelagerten Transport- und Lagerbehälter für hochradioaktive Abfälle (TLB)

- Creation of a scientific basis for extended interim storage
- Overlap with reactor safety and repository research

Special interest: condition of waste and containers, effect on transportability and handling, protective effect of buildings, derivation of waste treatment and conditioning options

Repository Research (C)



Blick in einen Experimentiertunnel im Felslabor Mt. Terri in der Schweiz

New challenge "site selection":
Equivalent, open-ended
considerations of all host rocks are
necessary

Focus on:

- Further development of the instruments and methodology for the safety case
- System behavior and development
- Technical feasibility and long-term behavior of repository components

Research on Cross-Cutting Issues (D)



Messung von Uranhexafluorid durch eine Safeguardsinspektorin – URENCO

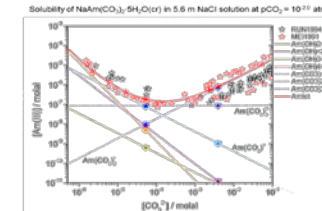
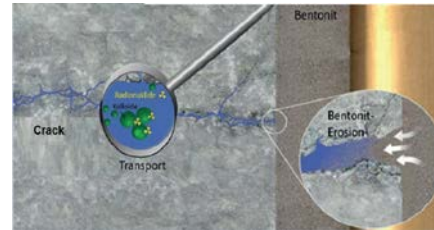
This includes:

- Knowledge and competence management
- Socio-technical issues
- Nuclear Material Monitoring Aspects

Specificity: The cross-sectional questions mentioned concern reactor safety research, research on interim storage and repository research

Research Approach

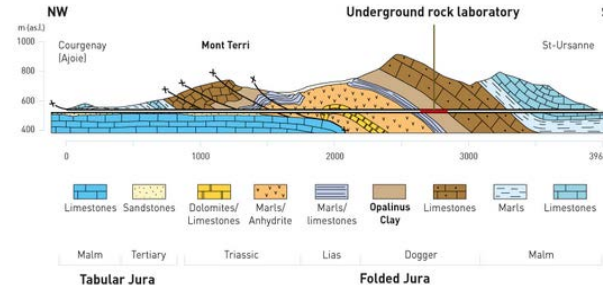
Applied Fundamental Research



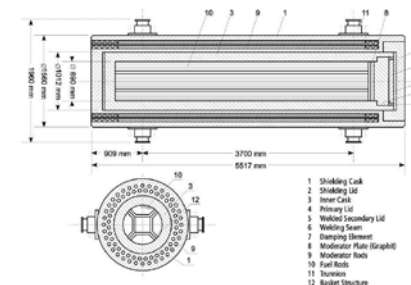
Experiment

Modelling

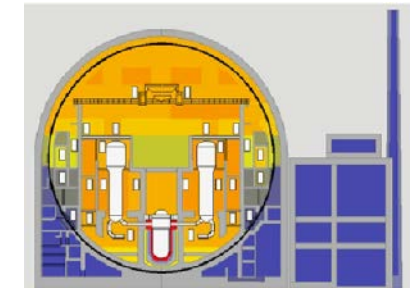
Practical Validation & Application
Safety Assessment, Technical Demonstration, Pilot Plants, Underground Research Labs (URL)



Mont Terri / Underground Lab



Container Concept



Safety Assessment

Education & Training
Building and Maintaining Technical and Scientific Expertise



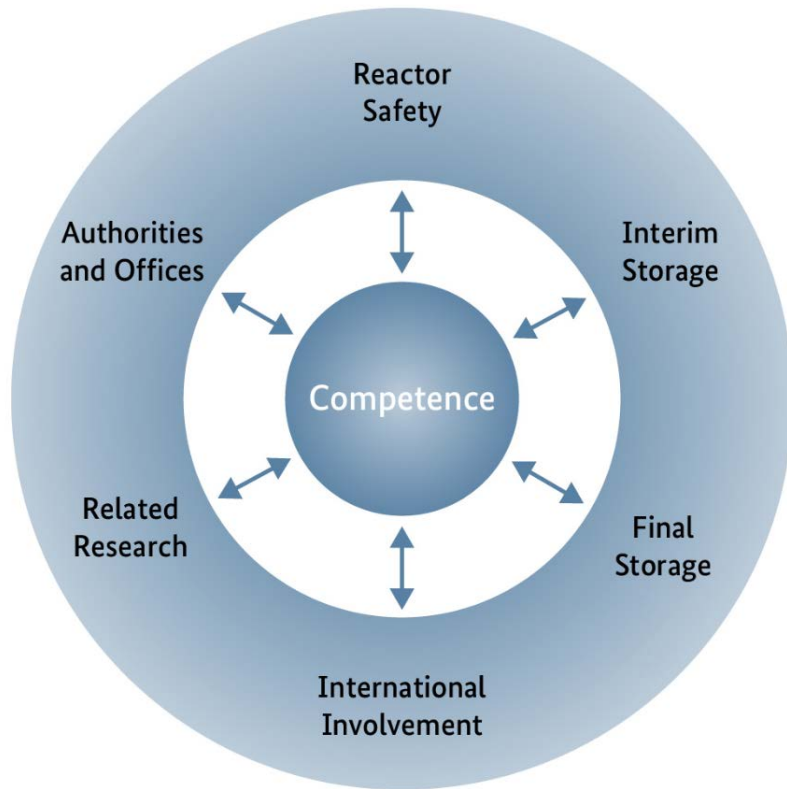
University Teaching



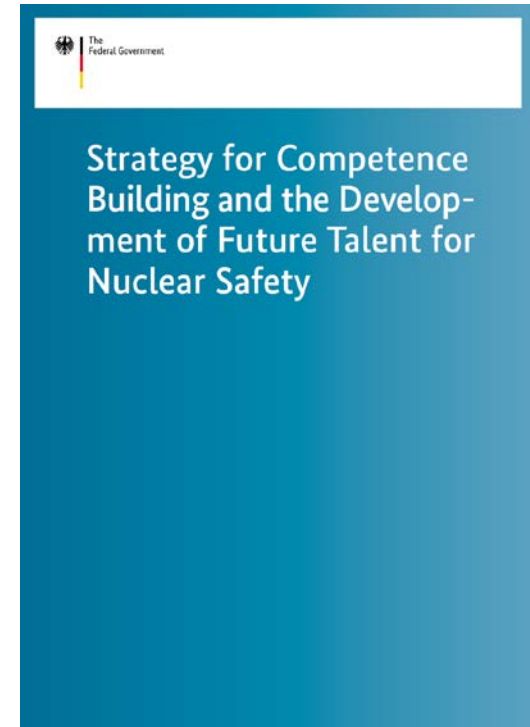
PhD / PostDoc



Development Competence & Young Academics



- Qualified staff
- *Preservation and expansion of specialist knowledge*
- Preservation and further development in teaching and research
- *Knowledge management*
- *Inter- / national networking*



<https://www.bmwi.de/Redaktion/EN/Publikationen/Energie/strategy-for-competence-building-and-the-development-of-future-talent-for-nuclear-safety.html>

International Networking and Cooperation



Bilateral Agreements



International Organisations



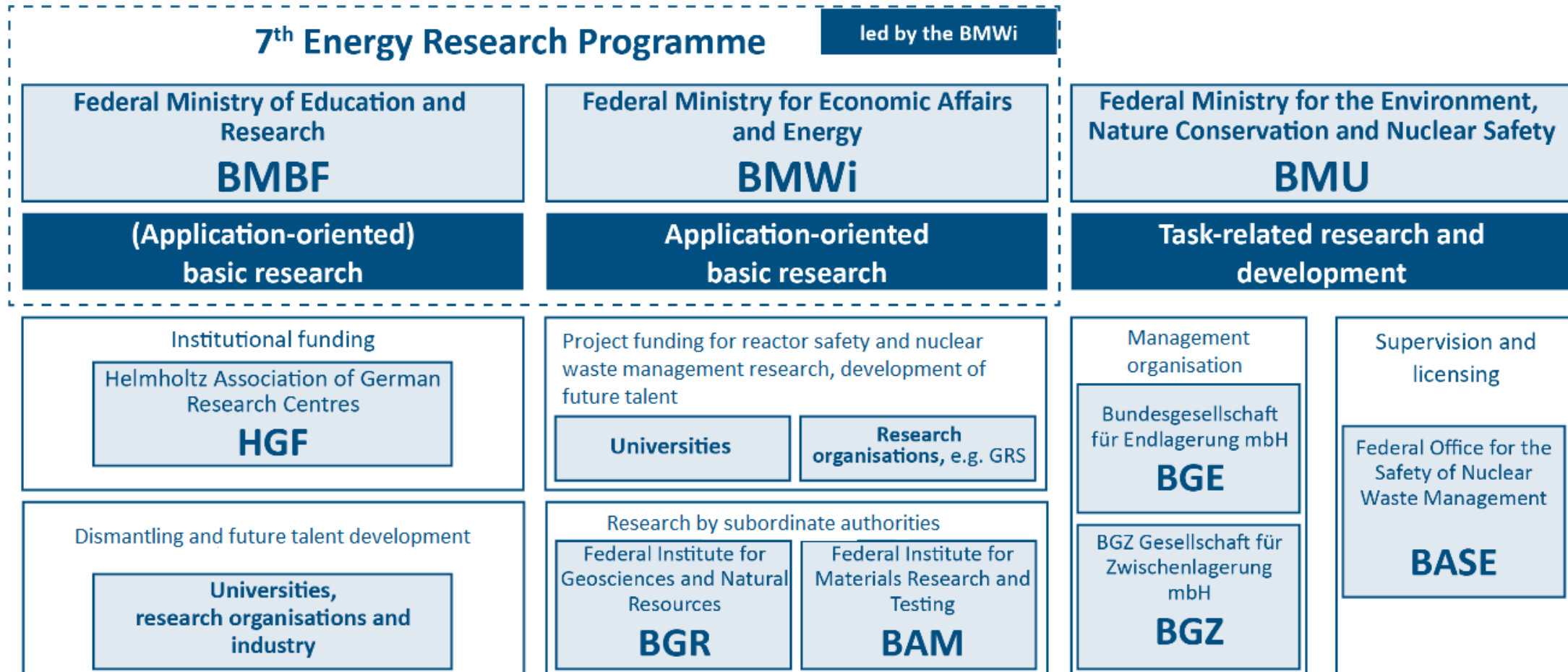
Research Infrastructure

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Underground Research Labs (URL),
Material Test Reactors (MTR),
Test Facilities, ...

Distribution of tasks and responsibilities in nuclear safety research



Research Areas

A Reactor Safety Research	B Research on Interim Storage & Treatment of Waste	C Repository Research	D Research on Cross-Cutting Issues
A1 Testing and evaluation of the safety of components and structures	B1 Extended interim storage	C1 Site selection	D1 Knowledge and competence management
A2 Evidence procedure for mastering transients, incidents and accidents	B2 Waste treatment and conditioning options for final disposal	C2 Safety and final storage concepts; Repository technology and (geo-)technical barriers	D2 Socio-technical issues
A3 Interaction between humans and technology and probabilistic safety analyzes	B3 Treatment and disposal methods	C3 Safety Case	D3 Safeguards