

**Site Selection Restart in Germany  
Results of the Site Selection Commission – 17017**

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**ABSTRACT**

Since 2011 Germany is pursuing a phase-out strategy concerning the use of nuclear power for electricity production. This decision was strongly influenced by the Fukushima event.

In 2013 the federal government announced that they also had achieved an agreement with the Federal States in Germany on a law to restart the site selection for a repository for spent fuel and high-level heat-generating waste from scratch. The new law was passed in July 2013.

At first a 34-member commission had been installed in April 2014 to evaluate the Site Selection Law [1] and to develop basic principles for site selection, including safety requirements and selection criteria for rock formations.

The commission included representatives from the parliament, civil society organizations, industry, environmental organizations, trade unions and scientists. The commission forwarded its recommendations in summer 2016. The evaluated law should come into force in 2017.

The stepwise approach for finding a suitable site for a repository for Germany's heat-generating waste might then start in 2017. As shown in publication [2], the site selection process will take several decades.

The preferred solution based on the present state of the art is the final disposal in deep geological formations in a mine with the option "Reversibility and Retrievability (R&R)".

The scientific challenges and the upcoming R&D program are complex. Therefore a "step-back option" (learning process) is foreseen in the program. The R&D program has to react flexibly to new findings, demands or modifications of criteria or requirements.

**FINAL DISPOSAL OF RADIOACTIVE WASTE IN GERMANY**

From 1979 until 2013 the salt dome of Gorleben was investigated for the disposal of high active heat generating waste. This site investigation was stopped in 2013 after a new site selection act came into force.

This site selection act had been evaluated by a commission between 2014 and 2016. It is intended to start a new site selection procedure from scratch including salt, clay and crystalline as host rocks.

Besides for negligible heat generating waste the iron ore mine Konrad had been licensed in 2002. Since then it is transformed into a repository. It is expected that Konrad will start in operation around 2022.

An overview over the German disposal situation is given in TABLE I.

TABLE I. Disposal Projects in Germany

Project	Geological Formation	Purpose	Actual Status	Waste
Gorleben 1979 -2013	Salt dome	Repository for all types of radioactive waste especially high-level and heat-generating waste	All investigations are stopped in 2013  But will take part in the new site selection	17,000 t HLW/spent fuel
New site selection 2017-≥ 2050	Salt  Clay  Crystalline	Repository for high-level and heat-generating waste	Evaluation of the site selection act finished.  Process of site selection might start in 2017	17,000 t HLW/spent fuel
Konrad since 1982	Iron ore	Repository for long lived waste with negligible heat generation	Licence issued 2002  Start of operation ≥ 2022  Operation: ≈ 35 years	300,000 m <sup>3</sup> LLW/ILW

## SITE SELECTION PROCESS

The criteria for the different site selection steps in general are shown in figure. 1.



Fig. 1.: Site Selection Process – Criteria [3]

The procedural steps/phases to determine a repository site are shown in table II.

TABLE II. Site Selection Process – Phases [3]

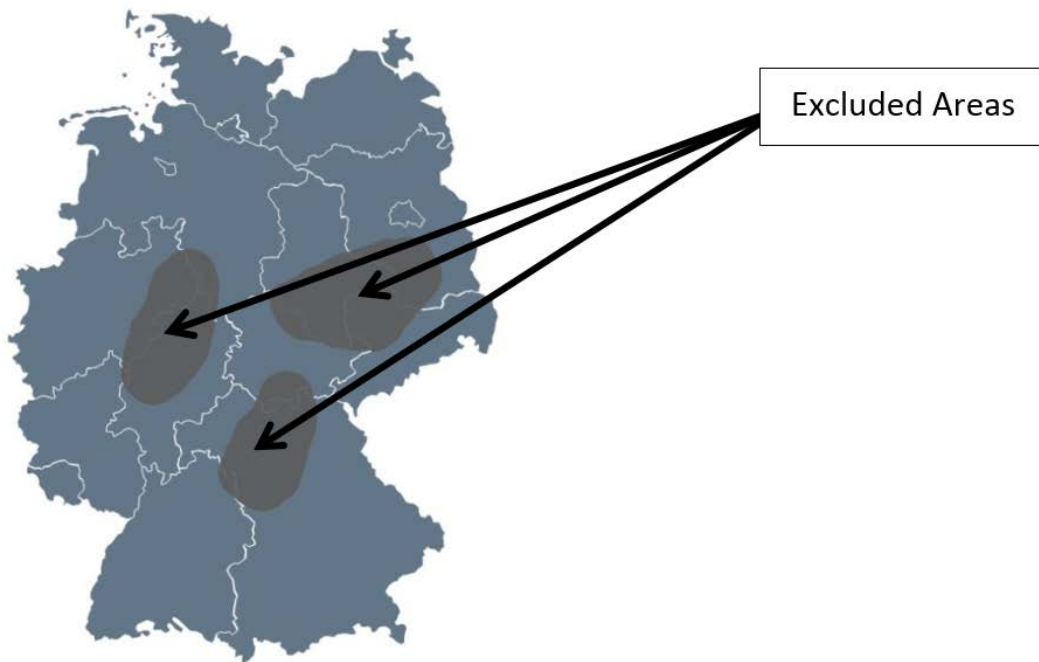
	Measures	Regions / Sites
<b>P1</b>	Start with a <b>blank map</b> , application of exclusion criteria and minimum criteria	> 20-30
<b>P2</b>	Selection of sites for investigation from above ground, application of exclusion criteria and minimum criteria  application of geoscientific weighting criteria  application of socio-economic weighting criteria	6-8
<b>P3</b>	Selection of sites for investigations from below ground	2-3
	<b>Selection of one site for licensing</b>	<b>1</b>

This stepwise approach - including the underground exploration - is based on the German final disposal concept from earlier times.

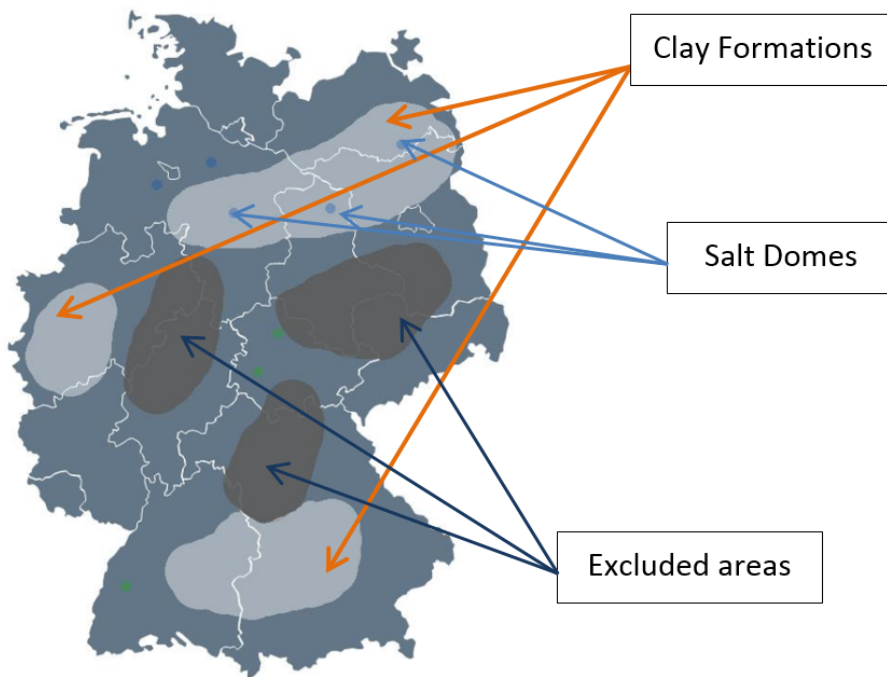
In the following pictures the application of the criteria in the different steps are

shown in principle:

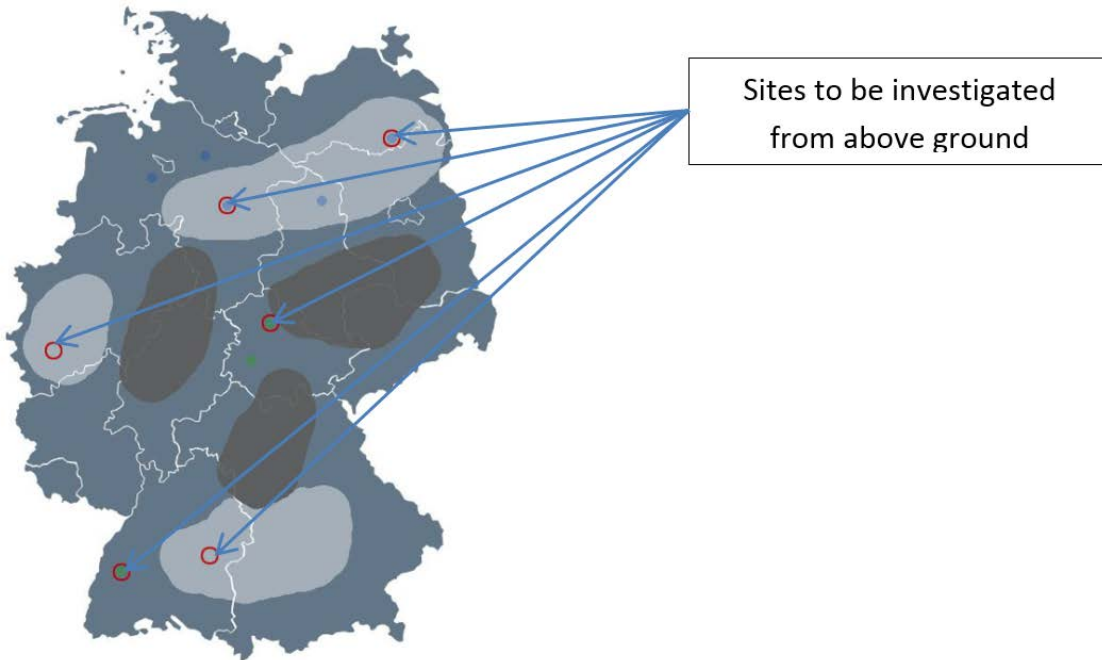
Step 1: Application the Exclusion Criteria



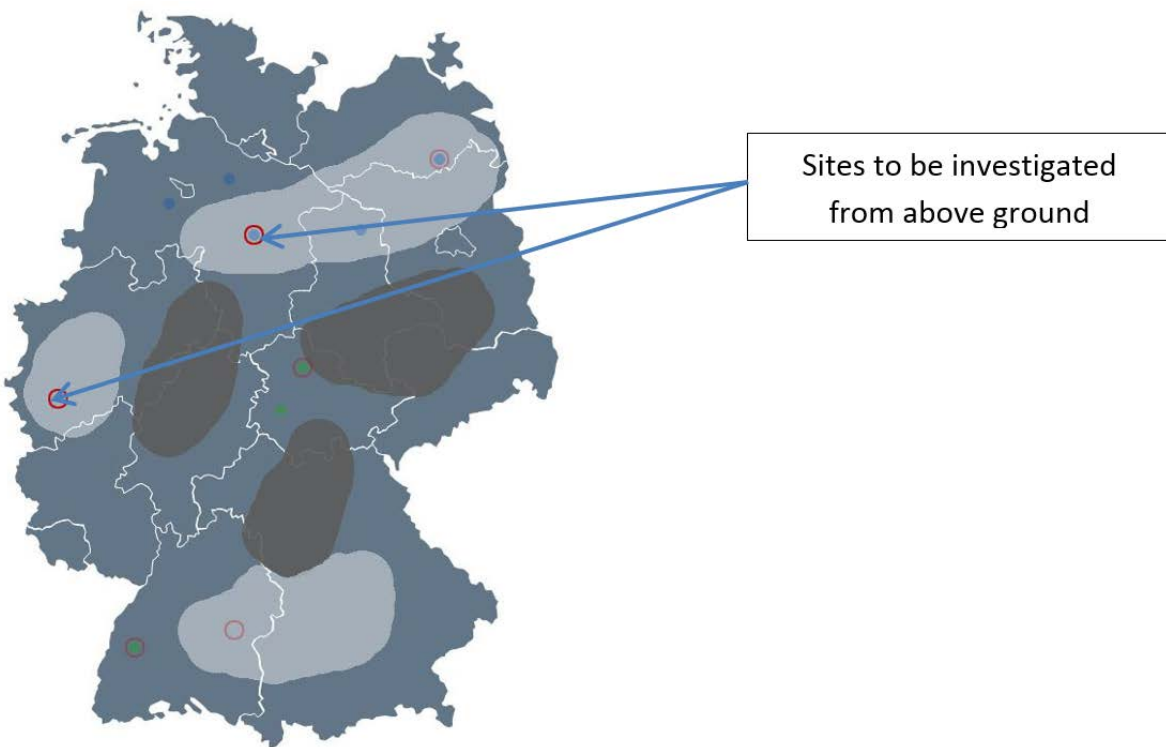
Steps 2 and 3: Application of the Minimum and Weighing Criteria



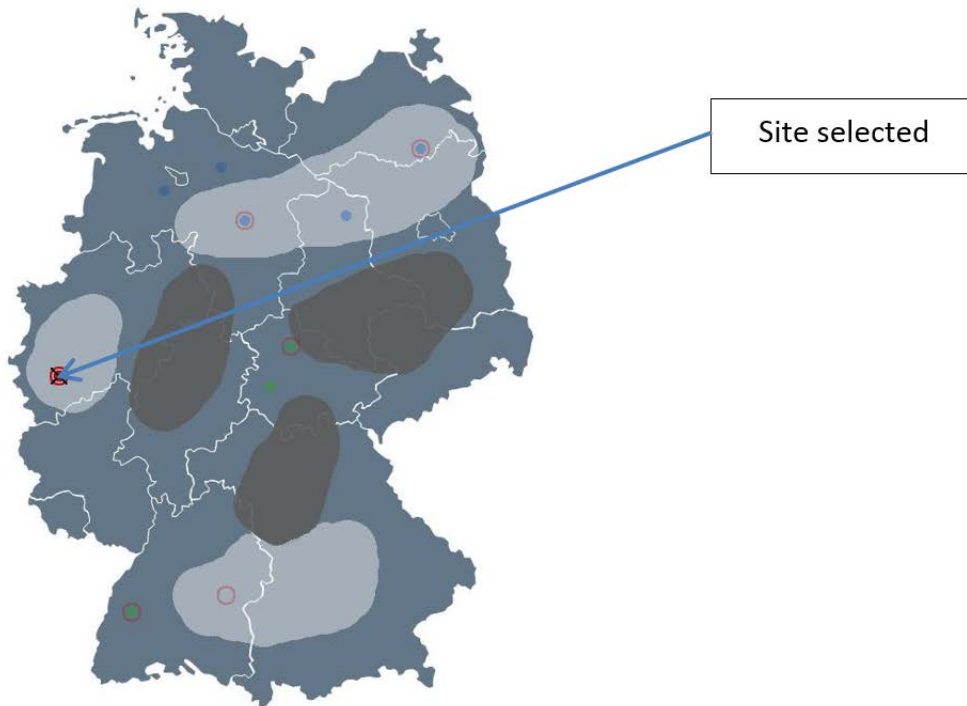
Step 4: Sites investigated from above ground



Step 5: Sites investigated from above ground; and



Step 6: site selected.



The site selection process leads to one site for which the licensing procedure will be initiated.

The target of the site selection process is to find in a transparent way criteria based one site which is expected to then be the best possible solution.

If it would turn out within the licensing process that the selected site cannot be licensed due to safety reasons based on new findings a setback has to be initiated and one has to go back one or two steps in the process depending on the new insights.

## **CHANGES IN RESPONSIBILITIES FOR RADIOACTIVE WASTE MANAGEMENT**

In the act on the search and selection of a site for a disposal facility for HLW in Germany a restructuring of the authorities and responsibilities was foreseen. These changes are shown in figure 2.

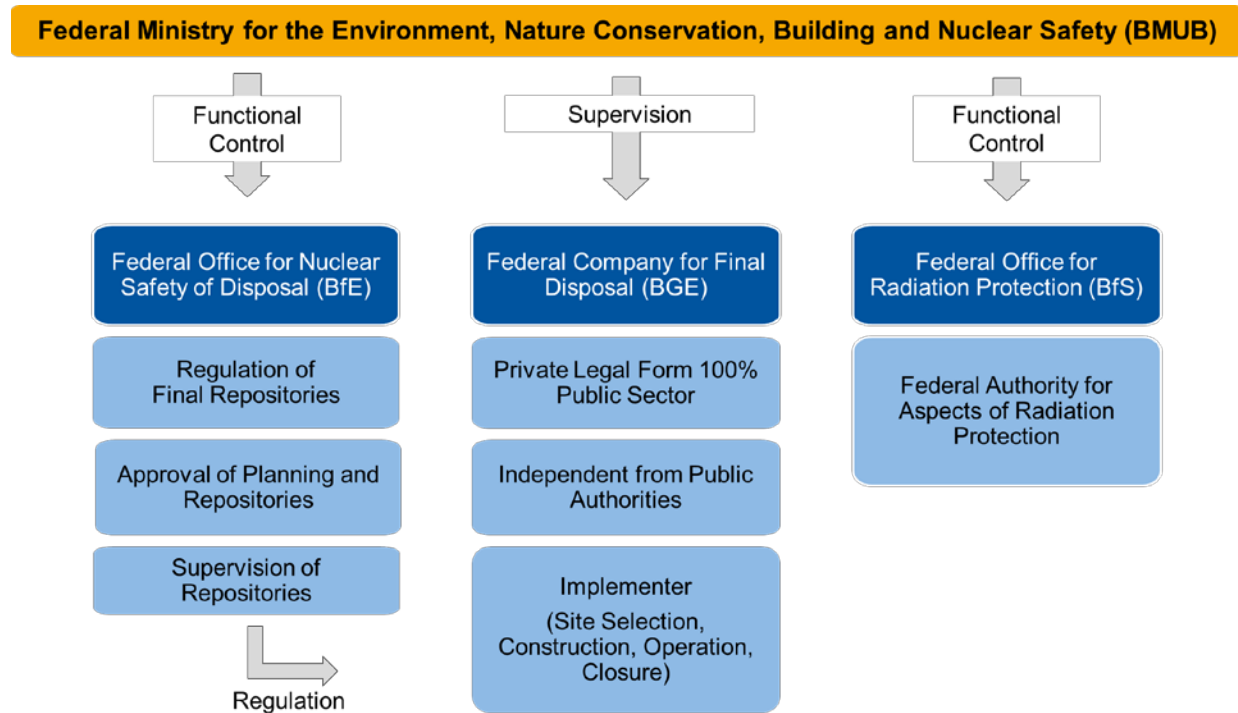


Fig. 2.: New organization structure [3]

In addition to these changes, another commission – so called “commission on the financing of nuclear face-out” – recommended to restructure the responsibilities for decommissioning and dismantling of NPPs, treatment and packaging of waste, storage and disposal as shown in figure 3.

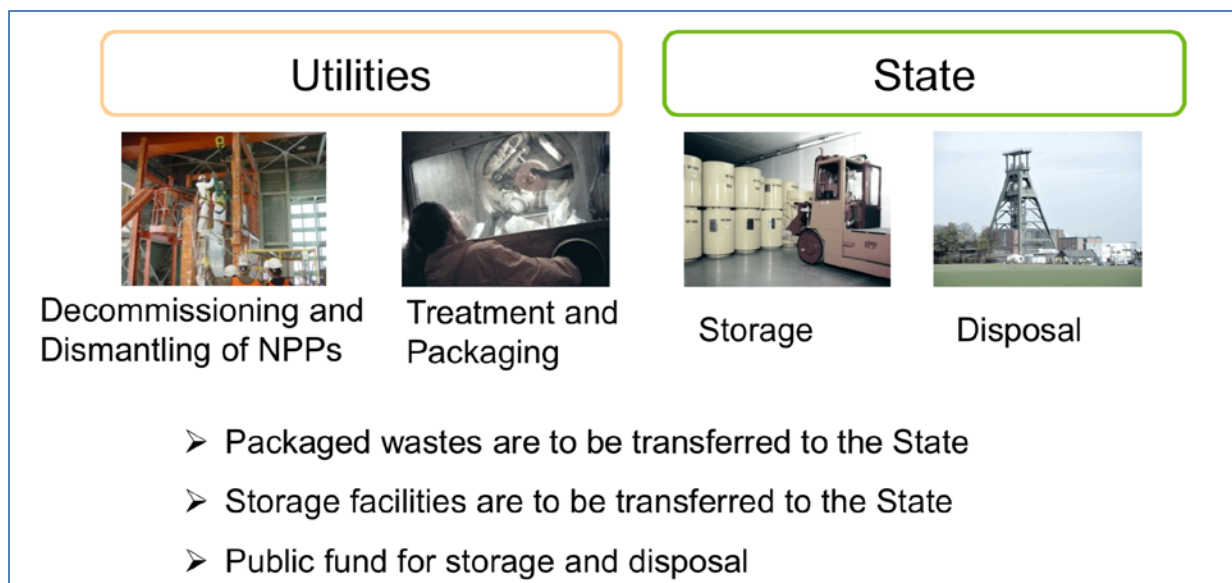


Fig. 3.: Recommended new responsibilities [4]

It is foreseen that the utilities transfer the estimated costs for storage and disposal

to a public fund (17.4 billion EUR). If the utilities pay an additional surcharge of 35,5 % (6.2 billion EUR), licensees are freed from further financial liabilities for storage and disposal.

The utilities are and will be still responsible for financing of decommissioning, dismantling, treatment and packaging of the waste.

The decision on these recommendations by the German parliament is expected in end 2016 / 2017.

## **CONCLUSIONS**

The stepwise approach for finding a suitable site for a repository for Germany's heat-generating waste might then start in 2017. The site selection process will take several decades.

The preferred solution based on the present state of the art is the final disposal in deep geological formations in a mine with the option "Reversibility and Retrievability (R&R)".

## **REFERENCES**

- [1] N.N.; Repository Site Selection Act (German Law); July 23rd 2013, BGBl. I, part I, Bonn. 2013.
- [2] Thomauske, B., Charlier, F.: Site Selection in Germany – Start of the Evaluation of the Site Selection Law; Proceedings of the WM 2015 Conference, Phoenix, USA, 2015.
- [3] Charlier, F., Thomauske, B.: Germany's new route towards a repository for HLW; Proceedings of IAEA International Conference on the Safety of Radioactive Waste Management, Vienna, Austria, 21-25 November 2016
- [4] Caspers, M., Schulte, L., Rüger, J.: Responsible and safe management of spent fuel and radioactive waste in Germany; Proceedings of IAEA International Conference on the Safety of Radioactive Waste Management, Vienna, Austria, 21-25 November 2016