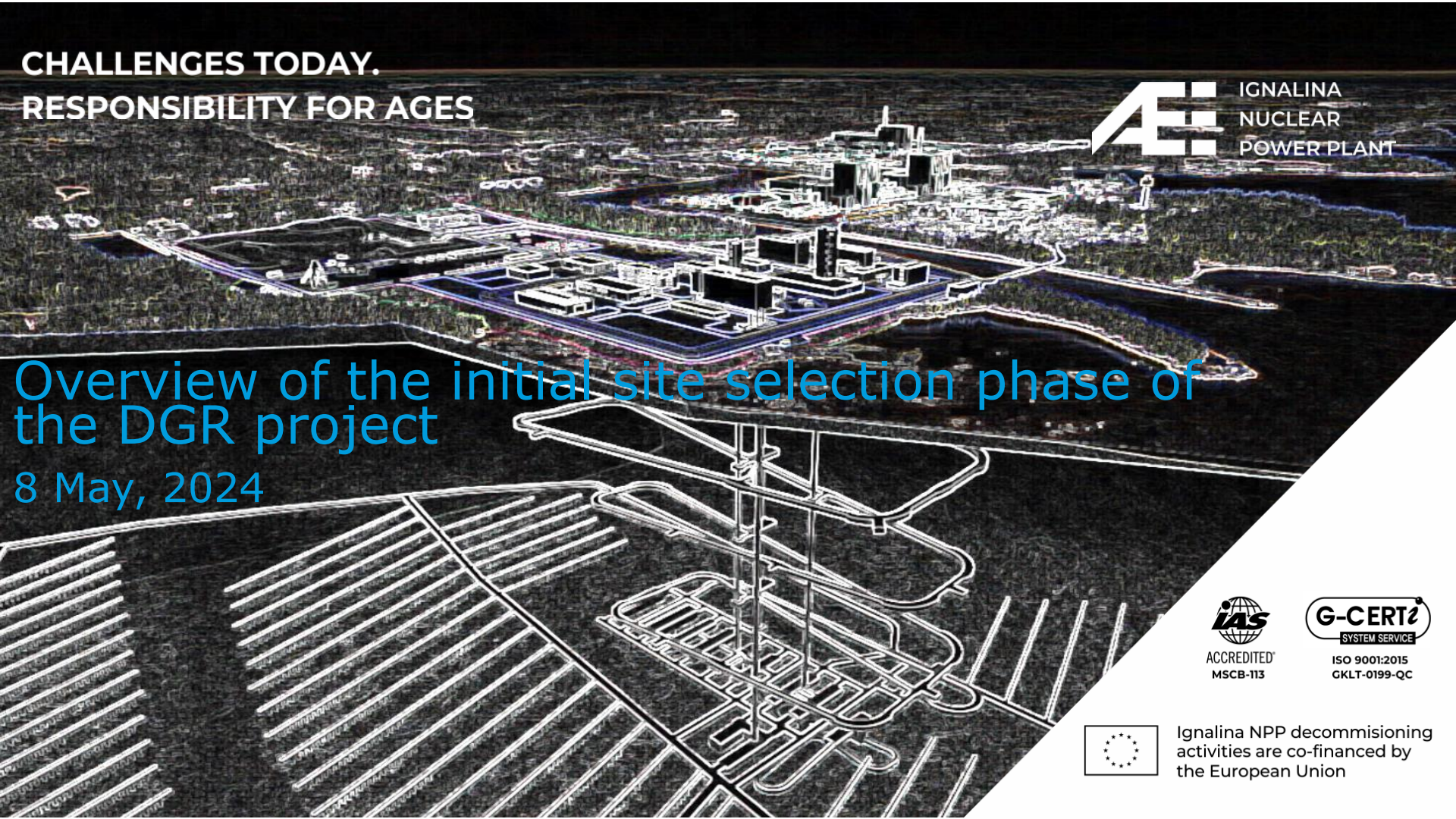


Overview of the initial site selection phase of the DGR project

8 May, 2024

ACCREDITED
MSCB-113

ISO 9001:2015
GKLT-0199-QC

Ignalina NPP decommisioning activities are co-financed by the European Union

Why Deep Geological Repository?

IGNALINA NUCLEAR POWER PLANT

DEEP GEOLOGICAL REPOSITORY (DGR), BECAUSE:

- Spent nuclear fuel classified as high-level RW was transferred to special storage facilities at Ignalina NPP by 2022 and other long-lived RW will be transported in special containers to the relevant INPP storage facilities by 2038.
- At the end of the safe operational term of the containers and storage facilities for highly RW (2050 and 2067 respectively), preparations must be made for the final management of highly RW and long-lived RW.
- In accordance with the Joint Convention on the Safety of Spent Fuel Management and on the Safety of RW Management as of 5 September 1997, the Law on RW Management of the Republic of Lithuania (hereinafter - the Law) was adopted in 1999 in Lithuania, which was amended in 2014 considering the provisions of the Council Directive 2011/70/Euratom as of 19 July 2011. The Law establishes the principles of radioactive waste management in Lithuania.
- According to the Law, high-level radioactive waste and long-lived radioactive waste generated in Lithuania must be disposed of in a repository built in the territory of Lithuania.
- On 31 December 2010, the State Atomic Energy Safety Inspectorate, which established nuclear safety requirements in Lithuania and carried out state regulation and supervision of RW management safety, approved the nuclear safety requirements BSR-3.1.2-2017 “Pre-disposal Management of RW at the Nuclear Facilities”, which established that high-level RW and long-lived RW must be disposed of in a deep geological repository.

DGR Project: basic characteristics

IGNALINA NUCLEAR POWER PLANT

DGR IMPLEMENTATION STAGES (SCOPES)

Repository construction process includes (I) site selection, (II) design, (III) construction, (IV) operation, (V) closure and, in exceptional cases, (VI) post-closure institutional control and monitoring.

DGR PRELIMINARY SCHEDULE

In 2019 INPP prepared a preliminary schedule for the implementation of the DGR project.
The schedule provides the following stages/deadlines:

- Surveys until DGR site approval: 2020-2047;
- DGR design (approved DGR sites): 2048–2057;
- DGR construction: 2058–2067;
- DGR operation: 2068–2074;
- DGR closure: 2075–2079;
- Period after DGR closure: from 2080.

DGR PRICE

According to preliminary estimates and DGR programs of more experienced countries, the construction of a DGR in Lithuania (incl. planning, design and construction) would take about 50 years and cost about 2521 million euros (prices of 2004).

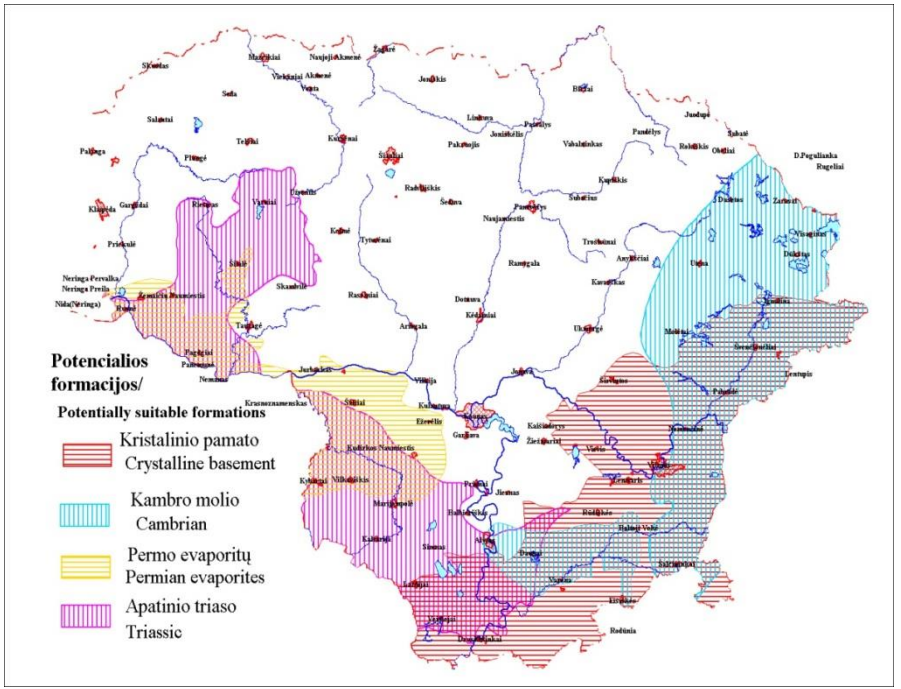
DGR potential formations

IGNALINA NUCLEAR POWER PLANT

The only sustainable solution is to built DGR in stable, sufficiently deep geological formations.

There are 4 geological formations in Lithuania, which are potentially suitable for DGR construction:

- Crystalline basement,
- Cambrian clay,
- Permian evaporites*,
- Lower Triassic.



Geological formations potentially suitable for DGR construction in the territory of Lithuania (layout scheme)

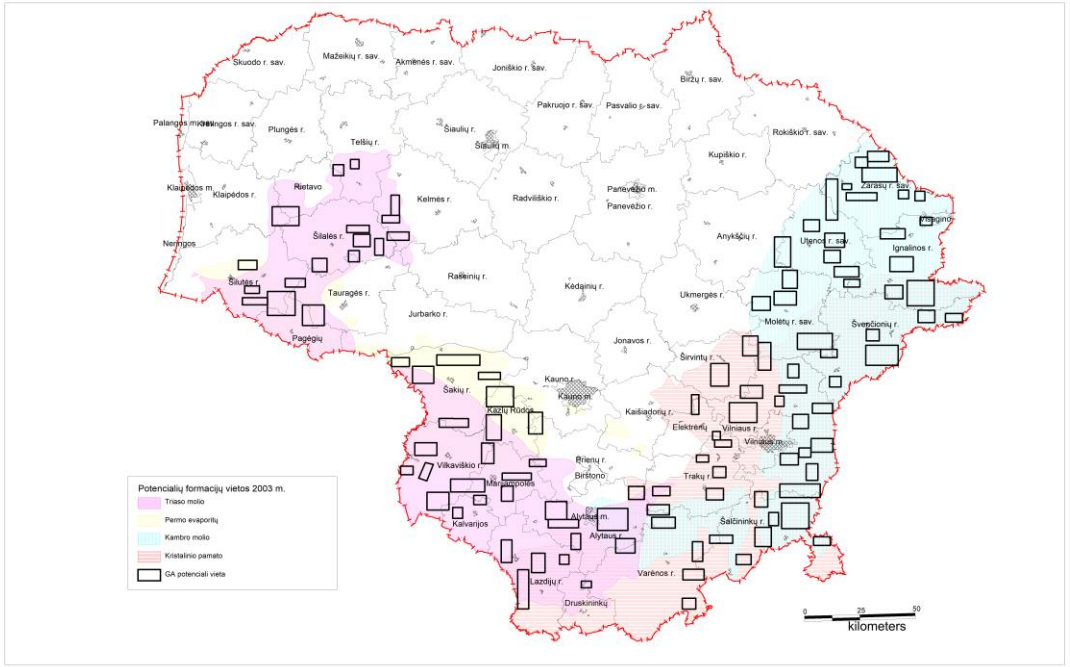
DGR potential sites

IGNALINA NUCLEAR POWER PLANT

Negative screening was performed to identify potential sites for DGR, i.e. preliminary unsuitable sites were identified under the following established boundary conditions (ineligibility criteria).

After eliminating the areas according to the ineligibility criteria 110 potential sites were identified in all geological formations.

Their total territory is 5 632 km^2 .



Potential sites for DGR construction

Evaluation of potential sites for DGR

IGNALINA NUCLEAR POWER PLANT

110 potential sites were identified

After the assessment of socio-economic criteria, 2 potential sites were eliminated, 108 remained

According to geological selection criteria and geological (suitability) criteria, 31* potential sites were eliminated, 78 remained

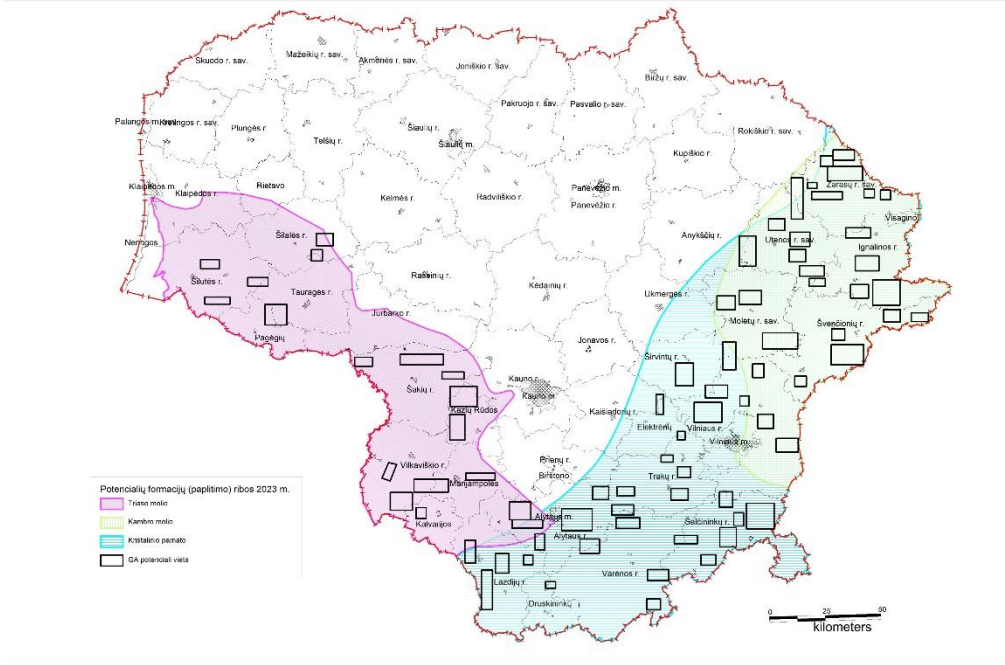
After the decision was made at the meeting of the SWG to reject Permian evaporites as suitable formations for DGR construction, 1 site was eliminated, 77 remained

ASSESSING AND REDUCING THE NUMBER OF POTENTIAL SITES

Potential territories suitable for DGR construction shall be assessed under the following selection criteria:

- Geological suitability criteria;
- Socio-economic criteria;
- General safety criteria.

POTENTIAL SITES / MUNICIPALITIES



Potential sites for DGR construction

77

77 potential DGR sites have been identified for further study

29

There are 29 municipalities in whose territory there are potential DGR sites

IGNALINA NUCLEAR POWER PLANT

MAIN WORKS (2019–2030)
OF THE STAGE PRIOR DGR SITE APPROVAL

2019-2024

Project planning and primary data analysis

- Identification of potentially suitable sites
- Eligibility criteria for DGR construction site
- Expert assessment of sites potentially suitable for DGR construction
- IAEA independent international expert assessment
- Public consultation on the selection process for DGR site

2025-2030

Geological Surveys, concept development

- General program of geological research
- Assessment of the risks/significance of environmental impact of DGR
- Geological research of formations (drilling of deep borehole)
- Social-economic assessment of the impact of DGR on potential sites
- Development of DGR concepts in clay and crystalline basement
- Safety analysis for DGR construction in clay and crystalline basement
- Public consultation on the selection process for DGR site

IGNALINA NUCLEAR POWER PLANT

MAIN WORKS (2031–2047)
OF THE STAGE PRIOR DGR SITE APPROVAL

2031-2047
Research

- Comprehensive research
- Summarization of research results and expert assessments
- IAEA independent international expert assessment
- Priority of potential DGR sites identification
- Drilling of deep boreholes, research in selected sites
- Performing environmental impact assessment procedures
- Public Consultations

2047
DGR site selection

- Final DGR site selection

IGNALINA
NUCLEAR
POWER PLANT

Elektrinės str. 12/1
Drūkšinių vil. 31152
Visagino mun. Lietuva

State Enterprise
Ignalina Nuclear Power Plant
www.iae.lt

Phone +370 386 28985
Fax +370 386 24396
E-mail iae@iae.lt

ACCREDITED
MSCB-113

ISO 9001:2015
GKLT-0199-QC

Ignalina NPP decommisioning activities are co-financed by the European Union