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SOGIN - The National Repository and Technology Park

NATIONAL REPOSITORY AND TECHNOLOGY PARK

The National Repository is a surface environmental infrastructure designed to host all Italian radioactive waste resulting from the decommissioning of nuclear power plants and the performance of nuclear medicine, industrial and research activities. This waste is currently stored in several temporary storage sites located across the Country.

The Repository features engineering and natural barriers specifically designed to contain radioactivity according to the best international practices, the latest IAEA (International Atomic Energy Agency) standards, and the ISIN (National Authority for Nuclear Safety and Radiological Protection).

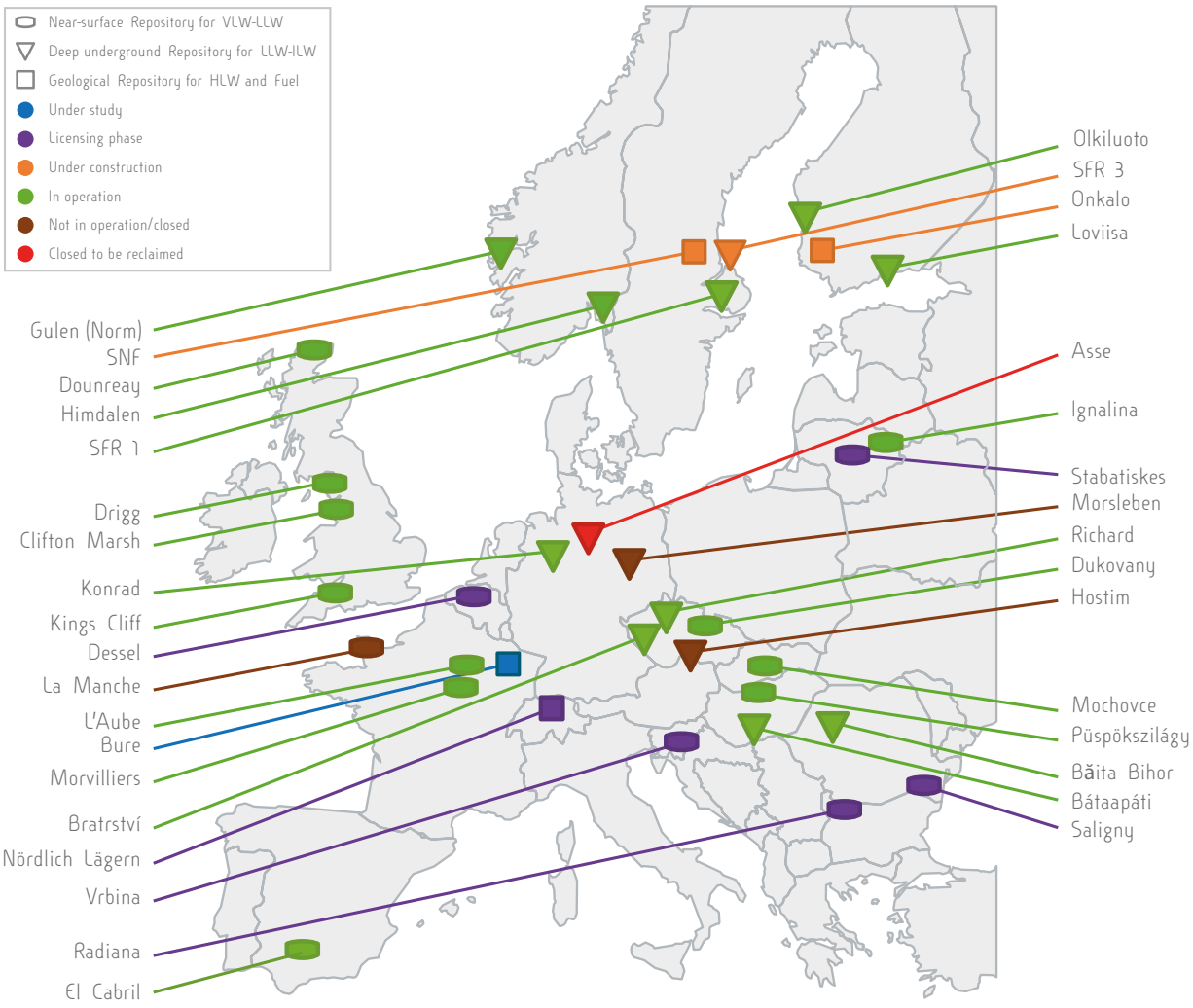
The Repository will allow the final disposal of about 78 thousand cubic metres of very low and low level radioactive waste. The infrastructure will also include a building complex with a capacity of about 17 thousand cubic metres for the long-term storage of intermediate and high level radioactive waste, pending their final shipment to a geological disposal facility.

The National Repository will collect about 95,000 cubic metres of radioactive waste over time, 60% of waste results from the operation and decommissioning of nuclear power plants, while 40% from non-energy activities such as scientific research, medical applications, and industry, including the waste produced to date and that which is estimated to be produced in the future. The relocation of radioactive waste to a single facility, in addition to ensuring its safer, more efficient, and rational management, will make it possible to complete the decommissioning of nuclear plants, clearing the current Italian nuclear sites from radiological constraints.

The National Repository will allow complying with EU regulations, thus including Italy among the States that have already realized such facilities. The National Repository project also includes the realization of a Technology Park, namely a research center in the fields of energy, waste management and sustainability, to foster international collaborations. It will be a pole of attraction for scientific and technological industrial innovation and a magnet for qualified employment.

Through Decree Law No 31 of 2010, Sogin, the state-owned company in charge of the decommissioning of Italian nuclear power plants and radioactive waste management, was assigned the task to site, design, build, and operate the National Repository and Technology Park.

PERMANENT STORAGE OF RADIOACTIVE WASTE IN EUROPE



Most of the EU Member States is currently operating final repositories for very low and low-level radioactive waste. Many countries have already found a suitable area or started designing final repositories (geological disposals) for intermediate and high level radioactive waste. The members states having lower amounts of high-level radioactive waste are, instead, negotiating the definition of a European Geological Disposal.

NATIONAL REPOSITORY AND TECHNOLOGY PARK, SITING PROCEDURES

The procedure to site the National Repository and Technology Park envisages technical and scientific aspects and the engagement of the citizens, as provided for under Decree Law No 31 of 2010. In technical terms, the siting procedure refers to the selection of an area following the performance of a set of evaluations. Said evaluations assess the suitability of the area according to its features, design solutions, and social and local context.

The siting process for a radioactive waste repository is fundamental to define the technical and design requirements ensuring the utmost protection of citizens and environment.

SITING CRITERIA

In accordance with the location criteria defined by the Regulatory Authority ISPRA (now ISIN) in Technical Guide No 29, Sogin drafted a proposal for a National Map of Potentially Suitable Areas (CNAPI). The CNAPI is the first step in a shared and participatory process to define the siting of the National Repository and Technology Park, a unique national infrastructure.

The siting criteria, in line with IAEA standards, represent a set of requirements and evaluation elements for the identification of areas where the integrity and safety of the National Repository is guaranteed over time. For example, these criteria exclude areas affected by high volcanic and seismic risk, fault lines, landslides, floods, or which insist on protected areas, identified under the applicable law, or civil, industrial and military settlements.

More specifically, the criteria are divided into:

- **15 exclusion criteria**, to exclude areas of the national territory whose characteristics do not allow, a priori, to guarantee full compliance with the safety requirements of the Repository. The application of the exclusion criteria, carried out by means of checks based on regulations, data and technical knowledge available for the entire national territory, leads to the identification of "potentially suitable areas";
- **13 in-depth criteria**, to assess the areas identified following the application of the previous criteria.

The application of the in-depth criteria, carried out by means of specific surveys and evaluations on the areas that have been found not to be excluded, may confirm the absence of any exclusionary elements, which could not be verified with the criteria used previously, or lead to the exclusion of further portions of territory within the potentially suitable areas.

As required by Decree Law No 31 of 2010, the CNAPI's proposal, together with the preliminary design of the National Repository and Technology Park and related documents, is subject to public consultation. The siting of the National Repository represents the first case in Italy of the siting of a major project on the basis of a systematic nationwide search for the most favourable territorial conditions for the protection of the environment and the territory.

MAPPING THE TERRITORY: VALUE FOR THE COMMUNITY

The data and elements resulting from the surveys constitute a wealth of geographical information available to the community. In fact, a database has been set up with information on the entire national territory and, in greater detail, on the areas identified in the CNAPI proposal with regard to issues such as: volcanic activity, seismic activity, geomorphology, hydrology, hydrogeology, soil and subsoil resources, human settlements, industrial activities, transport infrastructures, environmental and human assets.

The features of the site where the National Repository will be built will ensure, together with the engineering barriers of the repository, the confinement of radioactive waste for several centuries until the natural decay of radioactivity can achieve levels that are not damaging to human health and the environment.

PRELIMINARY DESIGN

The Preliminary Design of the National Repository and Technology Park defines, as provided for by Decree Law No 31 of 2010, the qualitative and functional characteristics that guarantee the optimal implementation of the infrastructure, in terms of operation, sizing and safety.

The repository will consist of facilities for the disposal of very low and low-level radioactive waste and for the long-term storage of medium and high-level radioactive waste.

The National Repository and Technology Park will cover an area of approximately 150 ha, 110 of which will be dedicated to the Repository and 40 to the Technology Park. Within the 110 ha of the National Repository, an area of about 10 ha will be devoted to the disposal of very low and low-level radioactive waste, while another area of 10 ha will feature the four interim storage facilities for medium and high-level radioactive waste. The remaining 90 hectares will be used for buffer zones, cell and module production facilities, module packaging plant, buildings for quality control, radiochemical analysis and support services.

Inspired by the experience of European countries that have already built or are building similar repositories, the Preliminary Design proposed by Sogin has a level of flexibility that allows it to be adapted both to the specific characteristics of the suitable site, chosen at the end of the localisation process, and to the needs of the host territory.

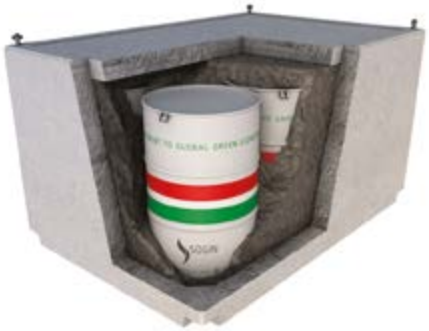
NATIONAL REPOSITORY: PROTECTION BARRIERS

The protection barriers will be made of special guaranteed materials designed to confine the radioactivity of the waste for the time necessary for its decay.

1

FIRST BARRIER (WASTE PACKAGE):

radioactive waste conditioned with a grouting matrix inside metallic containers, transported to the National Repository.



2

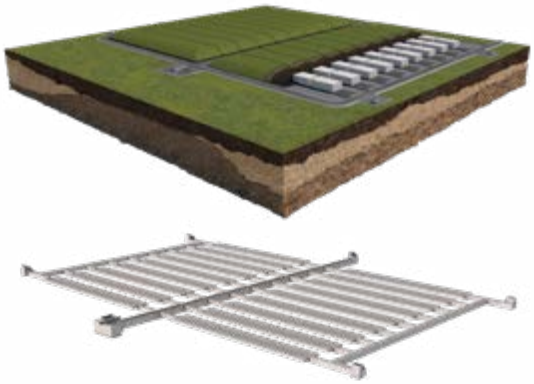
SECOND BARRIER (MODULE):

waste packages inserted and grouted inside reinforced concrete modules (3 m x 2 m x 1,7 m) qualified for 350 years duration.

3

THIRD BARRIER (VAULT):

240 modules placed in a reinforced concrete vault (27 m x 15,5 m x 10 m) qualified for 350 years duration.



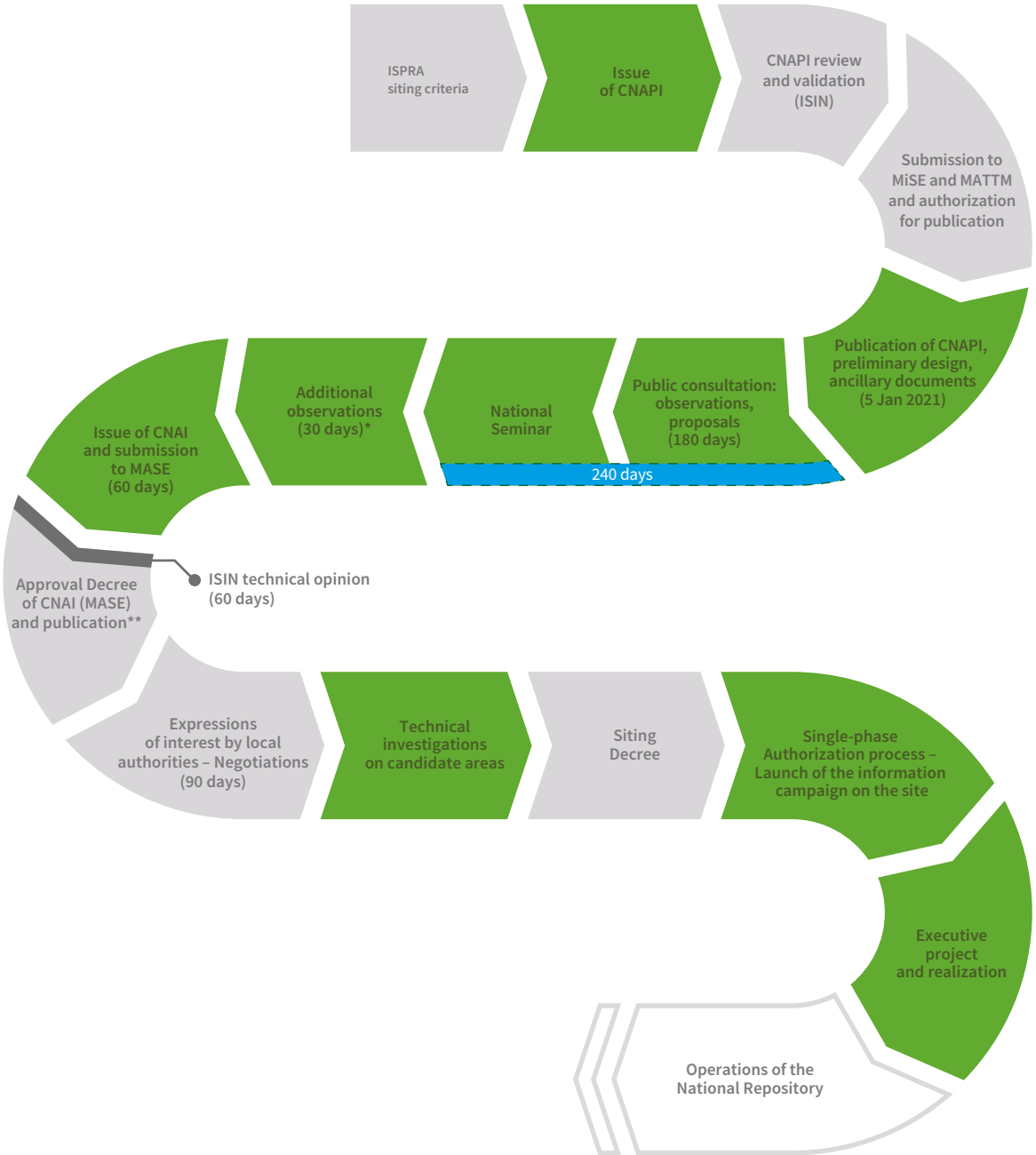
4

FOURTH BARRIER (MULTI-LAYERCOVER):

Once filled with modules and sealed, the vaults are capped with a final multi-layer cover for protection against rainfalls, isolation of waste from the environment and better visual impact.

LEGENDA :

CNAI National Map of Suitable Areas
CNAPI National Map of Potentially Suitable Areas
ISIN Italian Regulator (Nuclear Safety Authority)
MATTM Ministry of Environment
MiSE Ministry of Economic Development
MASE Ministry of Environment and Energy Security
Sogin activities
Activities of third parties



* Observations formally submitted to Sogin and MASE (former MiTE Ministry of Ecological Transition)
** CNAI will be published on the websites of Sogin, the competent Ministries and the ISIN

SITING PROCEDURE

Sogin, within the deadline set out in Decree Law No 31 of 2010, transmitted CNAPI's proposal to ISPRA (now ISIN), to verify the application of the siting criteria defined in Technical Guide No 29.

Once validated, ISIN sent the map proposal to the Ministry of Economic Development and the Ministry of the Environment, Land and Sea (now the Ministry of Environment and Energy Security) for clearance for publication. Having obtained the authorisation, on 5 January 2021 Sogin published the CNAPI, the preliminary design for the National Repository and Technology Park and related documents on its website depositonazionale.it.

As established by law, after CNAPI's publication, Sogin promoted a Public Consultation in several phases, first by receiving observations and technical proposals on both CNAPI and preliminary design, and subsequently by arranging a National Seminar with a wide range of stakeholders, including local communities concerned by the project. Due to the restrictions related to Covid-19, the National Seminar was held in hybrid mode, providing in any case the opportunity of participating to all those who requested it, and deepening all aspects related to the project. The prominent set of contributions provided by the Public Consultation was collected in a Report published on the website depositonazionale.it, which can be consulted together with all the documents provided with links and with the National Seminar sessions recorded on Youtube.

At the end of the Seminar, the stakeholders sent further comments and technical proposals to Sogin and the Ministry of Environment and Energy Security.

In the light of the comments made during the consultation, Sogin drafts the proposal of CNAI, the National Map of Suitable Areas, and sends it to the Ministry of Environment and Energy Security. Having obtained the technical opinion of ISIN regulatory authority, the Ministry of Environment and Energy Security approves it definitively, in agreement with the Ministry of Infrastructures and Transport.

The CNAI is then published on the websites of Sogin, the Ministries, and ISIN. This takes to the next step, thus the consultation phase aimed at gathering expressions of interest from the regions and local authorities in whose territories the eligible areas are included.

COMMUNICATION ASPECTS

The siting process of the National Repository, as other works relevant for the territory, requires extensive communication, and involvement of the public and stakeholders. These activities are provided for in Decree Law No 31 of 2010, which implements the provisions of international guidelines, as well as EU and national legislation governing access to information and participation in environmental matters.

The process of selecting the site to host the National Repository and Technology Park is based on three fundamental principles: information, transparency, and involvement.

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Shaping a safer future together

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