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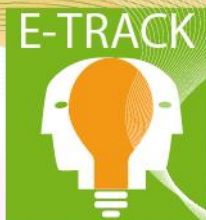
Radioactive Waste Management Stakeholders Map in the European Union

Report May 2014

Merixell Martell & Gianluca Ferraro

2014

Joint
Research
Centre



RADWASTE

European Commission
Joint Research Centre
Institute for Energy and Transport

Contact information

Ulrik von Estorff
Address: Joint Research Centre, P.O. Box 2, NL-1755 ZG Petten, The Netherlands
E-mail: Ulrik.von-estorff@ec.europa.eu
Tel.: +31 224 56 5325

<https://ec.europa.eu/jrc>

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Abstract

The report presents institutions and organisations involved in radioactive waste management (RWM) in several Members States (MSs) of the European Union (EU).

It also identifies the responsibilities of different actors and the relationships and lines of accountability existing between them.

The purpose is to provide a comprehensive overview of the RWM key stakeholders in the EU MSs.

The report also locates RWM facilities in each country through the use of geographical maps.

Detailed country profiles are provided for fifteen MSs: Belgium, Bulgaria, Czech Republic, Finland, France, Germany, Hungary, Lithuania, the Netherlands, Romania, Slovak Republic, Slovenia, Spain, Sweden and the United Kingdom.

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Editorial note

The information and views set out in this study are those of the authors and do not necessarily reflect the official opinion of the European Commission (EC). The EC does not guarantee the accuracy of the data included in this study. Neither the EC nor any person acting on the EC's behalf may be held responsible for the use which may be made of the information contained therein.

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Foreword

The Directorate General for Energy (DG ENER) and the Joint Research Centre (JRC) of the European Commission have jointly launched an initiative under the name of 'Energy – Transparency Centre of Knowledge' (E-TRACK) for the promotion of public participation in the implementation of energy policies. E-TRACK aims to offer a reliable source of information relating to energy policy implementation at European level by becoming a central point of reference for monitoring, disseminating and sharing information on good practices of public participation across the EU. The starting point for developing E-TRACK will be to focus on the experience gained on public dialogue in the field of radioactive waste management. One of the first tasks of E-TRACK is to provide an overview on the main actors in radioactive waste management (RWM) systems in the EU-28 countries as well as the available facilities for radioactive waste management in each country.

The present report shall be seen as a first step in the direction of systematizing available information regarding the wide range of stakeholder groups, with specific roles and responsibilities, involved in radioactive waste management at national level. This report was prepared on the basis of a review of a full range of publications, reports, databases and web pages to identify the key stakeholders in radioactive waste management in the Member States (MSs). The report seeks to gain an in-depth understanding of different radioactive waste management systems in the MSs, highlighting national RWM actors and the relationships existing among them, together with their responsibilities and lines of accountability. For this, a detailed mapping effort has been undertaken for each Member State. It is important to ensure that there are adequate interdependences among all parties for an effective and efficient RWM system. The report also shows, through geographical maps, the location of RWM facilities in each country. The report will thus form a basis on which further analyses to assess and review practices of public participation in RWM across Europe will be undertaken.

The report was developed by the JRC and reviewed by experts in the field.

February 2014

Introduction

In each Member State (MS) of the EU, radioactive waste management (RWM) systems include several actors with specific roles and responsibilities. The range of actors includes ministries, national RWM organisations, regulatory bodies and technical support organisations, research institutions, industry, associations representing civil society and local communities hosting nuclear facilities, among others. The different actors play a role in the policy debate around RWM decisions and their implementation.

The Council Directive 2011/70/EURATOM of 19 July 2011 establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste states that *"transparency should be provided by ensuring effective public information and opportunities for all stakeholders concerned, including local authorities and the public, to participate in the decision-making processes in accordance with national and international obligations"*. The implementation of the Directive addresses the challenge of involving all stakeholders concerned in the decision-making processes in the context of RWM. This is an incentive for the development of this report, which provides an overview of all stakeholder groups in the RWM field in the EU.

The Joint Research Centre conducted a study in order to map stakeholders involved in RWM in the EU's Member States (MSs) where a RWM system is present and relevant. This report lists institutions and organisations involved in radioactive waste management in the different MSs, highlights the relationships existing among them, their responsibilities and lines of accountability, and locates radioactive waste storage facilities in geographical maps in each country. The main purpose of this mapping exercise is to gain an in-depth understanding of the different RWM stakeholders existing in the EU MSs. This exercise is the basis for further comparing experiences and practices at national level as well as challenges and achievements regarding stakeholder involvement.

The report starts by briefly describing the method and scope of the work and how the country profiles have been developed. The following chapters present, for each country, the different RWM facilities for high-level waste (HLW) and spent fuel, vitrified waste (VW), low- and intermediate-level waste (LILW) and very low-level waste (VLLW) and where they are located through geographical maps. It then lists the main organisations involved in RWM in a given country, their responsibilities and the interactions between them. The detailed country profiles are prepared for fifteen countries: Belgium, Bulgaria, Czech Republic, Finland, France, Germany, Hungary, Lithuania, the Netherlands, Romania, Slovak Republic, Slovenia, Spain, Sweden and the United Kingdom. Additionally, the report considers the organisational responsibilities and the radioactive waste storage facilities in countries without current nuclear power programmes. These are: Austria, Cyprus, Denmark, Estonia, Greece, Ireland, Italy, Latvia, Luxembourg, Malta, Poland and Portugal. Additionally, Croatia has been included as part of this section, even though it is co-owner of the nuclear power plant located in Krško (Slovenia).

It is noted that categories of stakeholders and their roles and lines of responsibilities differ across countries. National authorities are responsible for finding solutions for the safe management of radioactive waste as well as for establishing transparent decision-

making processes. In this regard, identifying stakeholders and articulating a framework for establishing a dialogue is a key issue to ensure effective opportunities for promoting public participation. In some MSs, there is place for improvement for ensuring better organisational arrangements for raising transparency in radioactive waste management activities.

Development of country profiles

This report reviews radioactive waste management systems in the MSs of the European Union. Although radioactive waste is generated in all MSs, the greatest source of radioactive waste is the production of electricity in nuclear power plants and other associated activities, including decommissioning. For this reason, individual country profiles have been prepared for those MSs which currently operate nuclear power plants. These countries have in place an organised and comprehensive waste management system and most of them, have operational waste repositories for the wastes generated from nuclear power plants. Individual country profiles have been developed for the following fifteen countries: Belgium, Bulgaria, Czech Republic, France, Finland, Germany, Hungary, Lithuania, the Netherlands, Romania, Slovak Republic, Slovenia, Spain, Sweden and the United Kingdom.

The major topics addressed for each of the countries that have developed and implemented a radioactive waste management system are as follows:

1. the current, planned and closed radioactive waste storage and disposal facilities are listed and located in a geographical map of the country;
2. a table listing the main organisations involved in RWM classified per stakeholder category;
3. the role and responsibilities of the key actors in RWM are described;
4. an illustration of stakeholders' interactions is also shown. Some countries are in a stage of the RWM process where specific interactions with a new or different set of stakeholders are in place. In that case, an additional graph is included to show those interactions for a particular moment in time.

Following the country profiles, a specific section focuses on MSs without current nuclear power programmes, where radioactive waste is generated from non-power uses of radioactive materials, such as in medical and industrial applications or in research facilities like laboratories and research reactors. For those countries, the main organisational responsibilities involved in radioactive waste are briefly described and the storage and disposal facilities mentioned. These MSs are the following: Austria, Cyprus, Denmark, Estonia, Greece, Ireland, Latvia, Luxembourg, Malta, Poland and Portugal. Even though Croatia co-owns the Krsko nuclear power plant with Slovenia, the radioactive waste generated as part of the nuclear power plant activities is temporarily stored on site. For this reason, the responsibilities for radioactive waste management in Croatia are also described.

Radioactive waste management facilities

MSs define and classify radioactive waste differently. As a result, waste storage and/or disposal facilities shall be specified differently depending on the country. The IAEA (2009a) defines six classes of waste: exempt waste, very short-lived waste, very low-level waste, low-level waste, intermediate-level waste and high-level waste. Although not all Member States follow this classification¹, for the purpose of illustration of different types of storage facilities, the following categories of waste are reported:

¹ Some countries (with or without nuclear power plants) have small disposal sites for institutional waste, which have also been considered in the geographical maps as LILW repositories.

- LILW: low- and intermediate-level waste (including short-lived and long-lived);
- HLW: high-level waste, including spent fuel.

There are other types of wastes (e.g. spent fuel, wastes from mining and milling of uranium ores; industrial waste contaminated by naturally occurring radioactive materials (NORM), etc) that follow similar management approaches and thus, they are not specifically addressed in this report.

There are different solutions for managing radioactive wastes. The selection of a technical option may be influenced by several factors, both technical and social (e.g. nature and source of radioactive waste, RWM policy, regulatory requirements, reprocessing strategy, costs, reversibility requirements, public opinion, etc). Notwithstanding this, the storage of radioactive waste is an essential step in the overall RWM strategy. According to the IAEA (2006) "the storage of radioactive waste means the holding of radioactive waste in a facility that provides for its containment, with the intention of retrieval". The storage facility may be located at the facility generating the waste, such as a nuclear power plant, a hospital or a research centre, or it may comprise a separate entity such as a centralised facility or a national treatment and storage facility (IAEA, 2006).

In addition, the IAEA (2011b) states that "the term 'disposal'² refers to the emplacement of radioactive waste into a facility or a location with no intention of retrieving the waste... The term disposal implies that retrieval is not intended; it does not mean that retrieval is not possible". By contrast, "the term 'storage' refers to the retention of radioactive waste in a facility or a location with the intention of retrieving the waste" (*ibid*). It follows from this that "a disposal facility is designed to contain the waste and to isolate it from the accessible environment to the extent demanded by the hazard of the waste" (IAEA, 2014).

The common practice for low- and intermediate-level radioactive waste with a limited concentration of long-lived radioactivity is to be disposed of in facilities located at/or near the surface or subsurface (underground). Near surface disposal is the choice of disposal for "waste containing mainly short-lived radionuclides (radionuclides with half-lives of less than about thirty years are considered to be short-lived) and only low concentrations of long-lived radionuclides" (IAEA, 2014). Underground disposal in deep geological repositories is the suitable management option for radioactive waste with higher contents of long-lived radionuclides (i.e. that will not decay to safe levels over a period of a few hundred years). The depth of these repositories ranges from some hundred to more than a thousand meters, although certain categories of long-lived waste can be disposed of at intermediate depth (up to some 100 m) (IAEA, 2009c).

For short-lived low- and intermediate-level waste, repositories are in operation in many European countries. Surface or near surface disposal facilities are in operation in Czech Republic, France, Spain and the UK, whilst geological disposal in abandoned mines or specially constructed rock caverns in geological formations is carried out in Czech Republic, Finland and Sweden. For instance, Olkiluoto and Loviisa (Finland) and

² According to the IAEA (2009c) "a *disposal option*" means a "permanent emplacement of radioactive waste in specific surface, near surface or geological environment by means of an engineered facility. The boundary between a near surface environment and a geological environment is considered to lie at about 30 to 50 m below the surface or, in undulating terrain, 30 to 50 m below the local topographic low point".









SFR Forsmark (Sweden) were constructed several tens of metres below the bottom of the Baltic Sea whilst Richard II is located in an abandoned limestone mine in the Czech Republic. In Germany, Morsleben is an example of a deep geological repository for low- and intermediate-level waste (IAEA, 2007). The disposal facility proposed for construction at Dessel would be similar to the Centre de l'Aube in France and El Cabril in Spain. Some countries have the very low-level waste category (VLLW) within their national radioactive waste classification system. As such, they have constructed or will construct specific facilities for this type of waste (e.g. el Cabril in Spain, Morvilliers in France).

According to the IAEA (2009a), high-level waste (HLW) is defined as "waste with levels of activity concentration high enough to generate significant quantities of heat by the radioactive decay process or waste with large amounts of long-lived radionuclides that need to be considered in the design of a disposal facility for such waste. Disposal in deep, stable geological formations usually several hundred metres or more below the surface is the generally recognized option for disposal of HLW". There are not yet any disposal facilities for spent nuclear fuel and high-level waste in operation in Europe, although some countries have already selected a site (i.e. Finland and Sweden) or a zone (i.e. France). Spent fuel and long-lived radioactive wastes are currently stored in temporary surface and near surface storage facilities in those MSs with active or past nuclear power programmes before the intended disposal in deep geological repositories. These storage facilities for high-level waste and spent fuel are above ground or at very shallow depth. They might be centralised (e.g. Dessel in Belgium, Gorleben in Germany, CLAB in Sweden or Villar de Cañas in Spain) or interim storage facilities (e.g. onsite interim storage at the reactor sites in Germany or Trillo in Spain). Waste is stored either in dry conditions or underwater. In some countries (Belgium, France, Germany, the Netherlands and the UK), spent fuel is reprocessed and vitrified residues are also currently stored in interim storage facilities. Bulgaria also plans to construct an interim storage facility for vitrified high-level waste (EC, 2011).

Three deep geological disposal facilities are scheduled to start operation around 2025 in Europe in Finland, Sweden and France. In Finland, construction is underway on the ONKALO facility in the municipality of Eurajoki. This Underground Rock Characterisation Facility is being built for the final disposal of spent nuclear fuel. In Sweden, the final repository for spent fuel will be built in Forsmark, in the municipality of Östhammar. The site was selected in 2009 and the license application is currently being reviewed. In France, the Cigéo project will accept HLW and long-lived ILW and is located in the Meuse/Haute-Marne region in the east of France. Germany has also been investigating the Gorleben site for deep geological disposal for more than thirty years, but it is still unclear whether this would be the final site.









The country maps show facilities specifically designed to store or dispose of radioactive waste for the following types of waste: low-level and intermediate-level waste and high-level waste. Each country entry of this report includes a map with the approximate location of the radioactive waste storage/disposal facilities, indicating whether they are currently operational, closed or planned (including under construction). The country maps do not consider reactor storage sites, facilities for used research reactor fuel or Underground Research Laboratories. Mainly centralized waste management facilities are considered, i.e. facilities capable of processing, storage and, possibly, the disposal of all, or a large part, of the radioactive waste generated in a country (IAEA, 2009b).

The following table provides the description of the symbols used in the country geographical maps and what they stand for:

	CENTRALISED STORAGE		CENTRALISED DISPOSAL		
	EXISTING	PLANNED	EXISTING	PLANNED	CLOSED
High-level waste			N/A		N/A
Low- and intermediate-level waste					

N/A: not applicable

The centralised facilities shown in the country maps are summarised in the table below.

	CENTRALISED STORAGE		CENTRALISED DISPOSAL		
	EXISTING	PLANNED	EXISTING	PLANNED	CLOSED
High-level waste	 Dessel (BE) Hague (FR) Marcoule (FR) Gorleben (DE) Aahus (DE) Habog (NL) Clab (SE) Sellafield (UK)	 Villar de Cañas (ES)	N/A	 Olkiluoto (FI) Bure (FR) Forsmark (SE)	N/A
Low- and intermediate-level waste	 Dessel (BE) Habog (NL) Brinje (SI)		 Novi Han (BU) Dukovany (CZ) Aube (FR) Báatapati (HU) Baita Bihor (RO) Mochovce (SK) Cabril (ES) SFR (SE) Drigg (UK)	 Dessel (BE) Radiana (BU) Konrad (DE) Ignalina (LT) Saligny (RO) Krsko (SI)	 La Manche (FR) Hostím (CZ) Asse (DE) Morsleben (DE) Maišiagala (LT)

Stakeholders mapping

According to the OECD/NEA (2013) stakeholder is “any actor – institution, group or individual – with an interest or a role to play in the radioactive waste management process”. Stakeholders vary from country to country depending on the specific issue under consideration or the specific stage of a facility’s life cycle or the RWM programme in the country. As stated in OECD/NEA (2013), “the type of stakeholder involved depends on the stage in the process”. For instance, if the nuclear programme is under discussion, national stakeholders are more relevant whilst during the siting stage local stakeholders become vital actors in the decision-making process (IAEA, 2011a). The number and type of stakeholders included in this report aims to reflect a comprehensive list of recognised stakeholders regularly involved in decision-making of the particular country.

For the sake of simplicity and in order to systematise and compare information across countries, the individual country reports identify the following categories of stakeholders³:

- Policy/legislation actors: organisations responsible for policy-making, legislation and other decisions that require involvement of government officials at national level;
- Implementing organisations: organisations (governmental, private or others) responsible for implementing radioactive waste management tasks;
- Advisory and consultative bodies: organisations nominated to advise policy-makers, implementers or regulators;
- Regulator and technical support organisations: organisations (governmental agencies) responsible for the regulation of radioactive waste management;
- Scientific research: institutions or organisations providing scientific and technical expertise services to other stakeholder groups on nuclear and RWM topics. Universities are not included in this report, but only the main national research centres⁴;
- Non-governmental organisations (NGOs): interest groups or civil society organisations, including professional societies and academies. For this report, the NGOs considered are national umbrella organisations or confederations concerned with the protection of the environment and the impacts of nuclear energy and which are particularly involved in radioactive waste issues. Similarly, the professional societies considered are those which have a stake on nuclear energy issues⁵;
- Nuclear industry: companies across the nuclear supply chain, but mainly considering those involved in radioactive waste management;
- Local community: includes local governments (authorities) at any level of government lower than the federal or central government. Additionally, the establishment of formalised local partnerships or local committees is also considered under this category, as a way of the local politicians and officers to interact with the local community.

³ Peripheral actors that are not directly involved in radioactive waste management on a continuous basis, such as the general public, the media, professionals or business groups for instance, have not been specifically considered in the list.

⁴ For specific information on stakeholders involved in nuclear education and research, the JRC report (2012) ‘Mapping of Nuclear Education Possibilities and Nuclear Stakeholders in the EU-27’ by the authors Lacal, M.A. and von Estorff, U., provide a comprehensive map for each of the 27 MSs.

⁵ Greenpeace and Friends of the Earth are international NGOs with national branches in most of the countries and therefore, they are explicitly considered in each country profile.

Some variations on stakeholder categories might be found depending on the country. For instance, in some cases, like Belgium, international or European organisations have also been included as a separate stakeholder group. The intention is to provide an overview of the national situation. The country lists do not include individuals.

In most MS, the responsibilities concerning radioactive waste management are assigned to specific national waste management organisations. However, their role and status varies across the different MS. For instance, in some cases, like in France, ANDRA focuses on repository development and operation, whilst in others, like NDA in the UK, has also responsibilities for all historic liabilities including site operation (EC, 2011). The status of the waste management organisations also differs. In some countries, it is a public authority whilst in other it is a subsidiary of commercial nuclear power plant (NPP) operator, like in Sweden and Finland (EC, 2011).

The national regulatory authorities in the MSs are responsible for nuclear safety and the safe management of radioactive waste and spent fuel. In some countries, like in the UK and France, there are various regulatory organisations, including technical support organisations. A compilation of all organisations involved in the regulatory infrastructure and their specific role in the regulatory cycle (e.g. policy, legislation, licensing, R&D, cost estimation, public involvement, etc) is provided for each NEA Member Country in OECD/NEA (2010) and OECD/NEA (2005). These publications provide a useful snapshot of regulatory arrangement in some of the EU MS.

The Table below shows the name of the waste management organisation and the regulatory authorities for each MS.

Country	Waste management organisation	Regulatory body
Austria	Nuclear Engineering Seibersdorf (NES)	Federal Ministry of Agriculture, Forestry, Environment and Waste Management
Belgium	ONDRAF/NIRAS	FANC
Bulgaria	SERAW	BNRA
Croatia	Hazardous Waste Management Agency (APO)	Sanitary Inspection Section of the Ministry of Health
Cyprus	No distinct radioactive waste management organisation	Radiation Inspection and Control Safety, Ministry of Labour and Social Insurance
Czech Republic	SÚRAO	SÚJB
Denmark	Danish Decommissioning (DD)	National Institute of Radiation Protection under the National Board of Health and Danish Emergency management Agency
Estonia	A.L.A.R.A. AS	Ministry of the Environment within the limits of competence through the Environmental Board and the Environmental Inspectorate
Finland	POSIVA	STUK
France	ANDRA	ASN
Germany	BfS	BMU
Greece	NCSR Demokritos	GAEC (Greek Atomic Energy Commission)
Hungary	PURAM	HAEA
Ireland	No distinct radioactive waste management organisation	Radiological Protection Institute of Ireland (RPII)
Italy	SOGIN	ISPRA

The Netherlands	COVRA	VROM
Latvia	LVGMC	Radiation Safety Centre of the State Environmental Service
Lithuania	RATA	VATESI
Luxembourg	Radiation Protection Department (Ministry of Health)	Ministry of Health
Malta	WASTESERV	Radiation Protection Board/Malta Environment and Planning Authority
Poland	Radioactive Waste Management Plant (RWMP)	National Atomic Energy Agency (PAA)
Portugal	Instituto Superior Técnico (ITN), Universidade de Lisboa	Nuclear and Technological Institute, General Directorate for Health, General Directorate for Energy, Portuguese Environmental Agency and Independent Commission for Radiological Protection and Nuclear Safety (COMRSIN)
Romania	Nuclear Agency for Radioactive Waste	CNCAN
Slovak Republic	JAVYS	UJD
Slovenia	ARAO	URSJV
Spain	Enresa	Nuclear Safety Council (CSN)
Sweden	SKB	SSM
UK	Nuclear Decommissioning Authority (NDA)	ONR Environment Agency

Together with the name of the organisation or institution, the report also includes the link to the internet webpage, if available. A brief description of the division of responsibilities and lines of accountability follows.

Finally, a stakeholder map showing the main interactions between institutional stakeholders is illustrated. Stakeholders' maps differ depending on whether one considers the overall management strategy and policy programme or the siting of or review of the application of a repository facility (Bergmans, 2008). Whilst the former includes mainly governmental bodies, agencies and industry in a rather closed circle, the latter tends to be more open and includes representatives of the local level and NGOs. In most cases, the stakeholders' interactions regarding the overall management strategy are drawn up, but in the sake of completeness, some interactions showing the local relationships are also shown. It is worth bearing in mind that stakeholder maps may also differ depending on the specific issue being addressed or the type of decision to be made. For this reason, stakeholder maps should be contextualised to better identify responsibilities for particular issues and decisions. In a few cases, two maps have been included to show both, the organisational framework for RWM and the specific map for the repository project (or for a specific decision-making phase).

Sources of information

The research has reviewed available documents, reports and webpages in order to identify the institutional and organisational context of RWM in the different MSs. Public information sources have been used, such as OECD/NEA country profiles⁶, IAEA

⁶ <http://www.oecd-nea.org/rwm/profiles/>

databases with information on country nuclear power profiles⁷ and on radioactive waste management⁸, World Nuclear Association country profiles⁹, European Nuclear Safety Regulators Group (ENSREG)¹⁰, EC reports (EC, 2011) and websites from competent authorities of the Member States. The list of participants in some networks or platforms like the Implementing Geological Disposal Technology Platform (IGD-TP) and the Sustainable Nuclear Energy Technology Platform (SNE-TP) also provide information on key stakeholders in the field of geological disposal and nuclear energy at the national level. In addition, national country reports from research projects on radioactive waste management have also been reviewed. These research projects are mainly InSOTEC¹¹, IPPA¹² and COWAM In Practice (CIP)¹³. The information to locate storage and disposal facilities in the different countries has been gathered from and contrasted with the above mentioned sources as well as from the Vision Report of the IGD-TP (EC, 2009).

The majority of the information presented in this report has been collected during the months of December 2013 and January 2014. To the extent possible, this is the most updated information found through the different sources mentioned.

⁷ http://www-pub.iaea.org/MTCD/publications/PDF/CNPP2011_CD/pages/countryprofiles.htm

⁸ <http://newmdb.iaea.org/default.aspx>

⁹ <http://www.world-nuclear.org/info/Country-Profiles/>

¹⁰ www.ensreg.eu

¹¹ www.insotec.eu

¹² www.ippaproject.eu

¹³ www.cowam.com



Belgium



Radioactive waste management facilities

Current:

- Dessel: central facilities for storage of conditioned waste of all categories in Belgium (LILW and HLW).

Planned:

- cAt Project: this integrated disposal project offers a solution for disposal of short-lived low- and intermediate-level radioactive waste (category A waste) in a surface facility in the municipality of Dessel. The cAt project planning is aiming towards the installation being operational in 2016.



Main organisations involved in radioactive waste management

Policy/legislation actors	Federal Public Service Economy, SMEs, Self-Employed and Energy www.economie.fgov.be Federal Public Service Interior www.ibz.be
Implementing organisation	ONDRAF/NIRAS, National Organisation for Radioactive Waste and Enriched Fissile Materials www.nirond.be
Regulatory authorities	FANC, Federal agency for Nuclear Control www.fanc.fgov.be Bel V www.belv.be Vinçotte Nuclear Safety www.vnsafety.eu
Advisory and consultative bodies	Strategic Environmental Assessment (SEA Advisory Committee) Advisory and Audit Committee for the long-term Fund
Scientific research	SCK·CEN, National nuclear research centre www.sckcen.be
European organisations	European Underground Research Infrastructure for Disposal of Radioactive Waste in a clay Environment (EURIDICE) www.euridice.be Institute for Reference Materials and Measurements (IRMM) https://irmm.jrc.ec.europa.eu
Non-governmental organisations (NGOs)	Belgian Association for Radiological Protection (BVS) www.bvsabr.be Nuclear Forum www.nuclearforum.be
Nuclear industry	GDF Suez www.gdfsuez.com Electrabel www.electrabel.com Belgoprocess www.belgoprocess.be Synatom www.synatom.be TransNuBel www.transnubel.be Tecnubel www.tecnubel.be TRANSRAD www.transrad.be
Local community	Local partnership STORA ¹⁴ in Dessel www.stora.org Local partnership MONA in Mol Dessel local council www.dessel.be Mol local council www.gemeentemol.be

In Belgium, the Federal Public Service Economy, SMEs, Self-Employed and Energy is responsible for nuclear policy. The operators of nuclear facilities have to process and condition radioactive waste on-site. The long-term management of radioactive waste is under the competence of ONDRAF/NIRAS, a public institution with legal status. It also has the main responsibility for R&D on radioactive waste management and disposal in particular. Its subsidiary, Belgoprocess is responsible for the processing and storage of all Belgium's radioactive waste.

The federal law of 13th February 2006 on the assessment of environmental impact of plans and programmes and on the participation of the general public in the development of plans and programmes related to the environment required ONDRAF/NIRAS to provide for public participation in the development of a general programme for the long-term management of radioactive waste. Thus, the law obliged

¹⁴ Previously named STOLA

ONDRAF/NIRAS to develop a waste management plan and a supporting Strategic Environmental Assessment (SEA). It is worth mentioning that as part of this process, an ad hoc committee was set up with civil servants from related policy fields (e.g. energy, health, sustainable development, etc). Before the approval of the Waste Plan, ONDRAF/NIRAS submitted the draft Waste Plan and the SEA Advisory Committee set up by the Law of 13 February 2006, to the Federal Council for Sustainable development, to the Governments of the Regions and as provided by law, to FANC. Both documents were also submitted for public consultation (Schröder, 2012; ONDRAF/NIRAS, 2011).

Another advisory body is the Advisory and Audit Committee for the long-term fund. ONDRAF/NIRAS manages the long-term fund to ensure that the financial resources are available for the management of radioactive waste. This is comprised of representatives from ONDRAF/NIRAS, the Belgian State, Synatom and Electrabel, that follow up and verify its management (ONDRAF/NIRAS, 2011).

Research is performed, under the responsibility of ONDRAF/NIRAS, by the National Nuclear Research Centre (i.e. SCK·CEN, located in Mol), universities and other research institutes as well as engineering companies. The work at SCK·CEN is undertaken in cooperation with Tractebel Engineering, the nuclear engineering company of GDF Suez and with international organisations. EURIDICE is on the SCK·CEN site. The management and operation of the High activity disposal experimental site (Hades) is carried out by EURIDICE, which was set up by ONDRAF/NIRAS and SCK·CEN. The main objective of EURIDICE is to carry out the PRACLAY (Preliminary demonstration test for clay disposal of highly radioactive waste) project, which aims to demonstrate the feasibility of disposing of radioactive waste in deep clay layers. Apart from SCK·CEN, in the nuclear zone extending over Dessel, Mol and Geel, there are a number of nuclear companies. Belgoprocess in Dessel specialises in the processing and storage of Belgian radioactive waste and the dismantling of nuclear installations. The Belgonucléaire MOX plant closed in 2006 and is decommissioned. The Eurochemic reprocessing plant, which operated from 1966 to 1974, has been dismantled by Belgoprocess. On the Belgoprocess site, two other companies are established: Transnubel, specialised in transportation of radioactive materials and Tecnubel, specialised in nuclear decontamination.

Licensing, control and surveillance are the responsibility of FANC and is supervised by the Federal Minister of the Interior. The Council of Ministers commissioned FANC with the task of developing a licensing procedure for RW disposal facilities and conducting review of ONDRAF/NIRAS' activities in preparing the license application Safety Report.

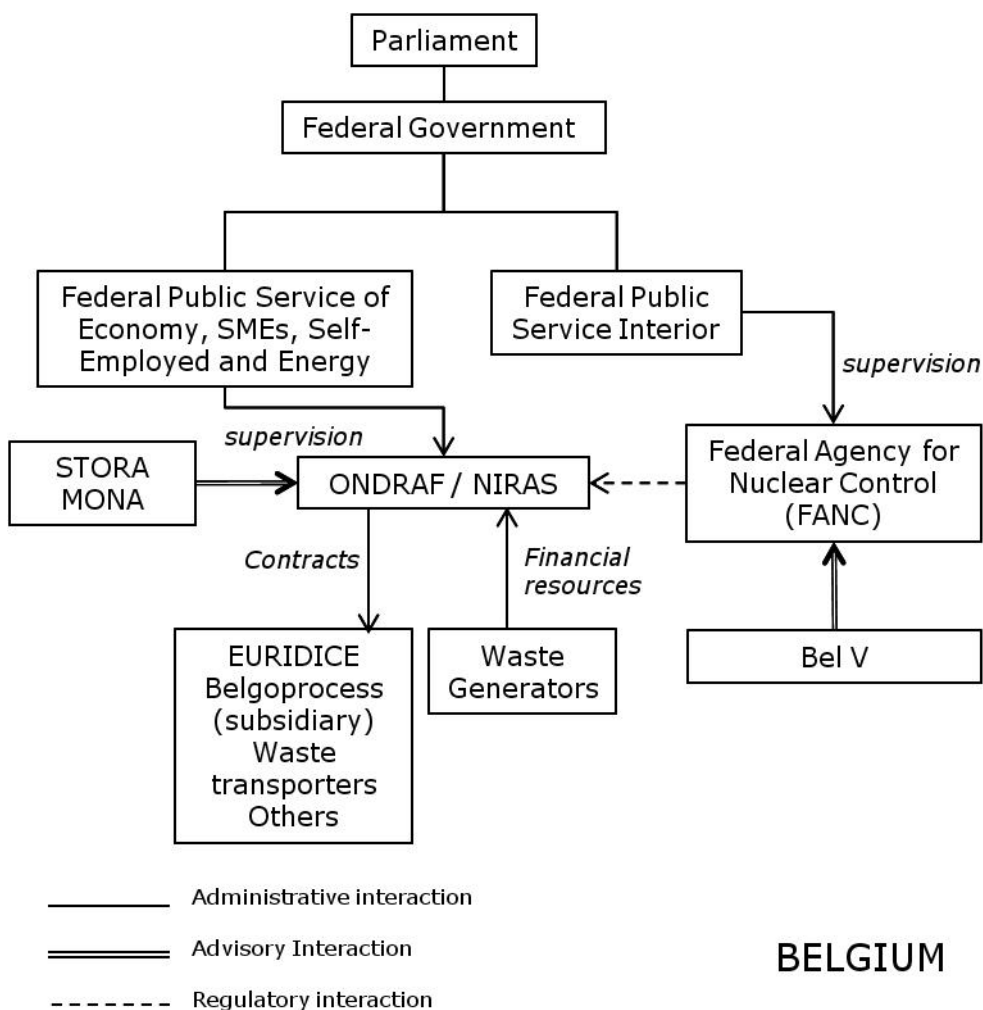
Bel V is a subsidiary of FANC and has taken over since 2008 the regulatory controls in nuclear installations formerly carried out by the Authorised Inspection Organisation AVN. Bel V is the technical support organisation of FANC.

Part of the inventory of radioactive wastes in Belgium is classed as "category A waste". These wastes have low- or intermediate-levels of radioactivity and contain mostly short-lived radionuclides. In 1998, the Belgian Council of Ministers endorsed the development of integrated disposal projects within a framework of societal participation between interested municipalities and ONDRAF/NIRAS. The municipalities of Mol, Dessel, Fleurus and Farciennes expressed interest. As a result, three partnerships were created: STOLA in Dessel, MONA in Mol and PaLoFF in the municipalities of Fleurus and Farciennes. In 2006, the Council of Ministers selected

STOLA-Dessel surface disposal project and ONDRAF/NIRAS was authorised to further develop the integrated disposal project. Since then, the two partnerships (STOLA, now STORA in Dessel and MONA in Mol) have been closely involved in the development of the integrated repository project (OECD/NEA, 2010).

The local partnerships are structured as not-for-profit organisations, with a sound legal basis. STORA stands for Study and Consultation Radioactive Waste Dessel and is the successor of STOLA, the Study and Consultation Group Low-Level Waste. It is a partnership between the Dessel municipality and ONDRAF/NIRAS that closely follows the cAt project and all nuclear affairs in the municipality. MONA stands for Mol Consultation Nuclear Waste and is a partnership between Mol municipality and ONDRAF/NIRAS. MONA monitors the cAt project and also other nuclear activities in the region. Hence, the cAt project is followed by a steering committee from ONDRAF/NIRAS, STORA and MONA, in which the mayors of Dessel and Mol have an advisory role (ONDRAF/NIRAS, 2010).

Stakeholders interactions





Bulgaria



Radioactive waste management facilities

Current:

- Novi Han: repository for LILW resulting from nuclear applications in medicine, industry and research. It is situated 35 km southeast of Sofia, near the village of Novi Han in the municipality of Elin Pelin.

Planned:

- Radiana site: near surface disposal facility for long-term storage of short-lived low- and intermediate-level waste at Radiana site, located within the 3 km controlled zone of Kozloduy nuclear power plant, in the municipality of Kozloduy.



Main organisations involved in radioactive waste management

Policy/legislation actors	Ministry of Economy and Energy www.mi.government.bg Ministry of Health www.mh.government.bg Ministry of Environment and Water www.moew.government.bg Ministry of Interior www.mvr.bg
Implementing organisation	SE RAW, State Enterprise Radioactive Waste www.dprao.bg/en
Regulatory authorities	Bulgarian Nuclear Regulatory Agency, BNRA www.bnsa.bas.bg
Scientific research	Institute for Nuclear Research and Nuclear Energy (INRNE) of the Bulgarian Academy of Sciences www.inrne.bas.bg National centre of Radiobiology and Radiation Protection (NCRRP) www.ncrrp.org
Non-governmental organisations (NGOs)	Za Zemiata (For the Earth) www.old.zazemiata.org Zelenite www.izbori.zelenite.bg Bulgarian Nuclear Society www.bgns.bg Bulgarian Atomic Forum (BULATOM) www.bulatom-bg.org
Nuclear industry	Kozloduy NPP plc www.kznpp.org Bulgarian National Electric Company (NEK EAD) www.nek.bg Bulgarian Energy Holding EAD www.bgenh.com
Local community	Kozloduy local council www.kozloduy.bg Belene local council

The Ministry of Economy and Energy elaborates and implements the national energy policy, prior to the decisions made by the Council of Ministers. The Ministry of Health performs assessment of the doses and consequences for the population of emergency situations. The Ministry of Environment manages the national system for control of the environment and performs radioecological monitoring. General Directorate Fire safety and protection of the population, of the Ministry of Interior, manages the activities related to emergency planning and emergency. The Radioactive Waste Management Fund and the Nuclear Facilities Decommissioning Fund were established properly in 1999 and are managed by the government.¹⁵

State Enterprise Radioactive Waste (SE RAW) was established in 2004 and is responsible for the safe management of radioactive waste outside the site of their generation. Thus, the radioactive waste becomes state property from the time it is accepted by SE RAW. SE RAW depends on the Ministry of Economy and Energy and is responsible of undertaking all activities during the life cycle of radioactive waste management facilities - site selection, design, construction, commissioning, operation, rehabilitation and reconstruction, decommissioning and closure/postclosure. It can also transport radioactive waste. SE RW is organised in four specialised divisions, namely:

- Specialized Division (SD) of Novi Han storage facility site, responsible for reprocessing and storage of low- and intermediate-level waste generated in industry, medicine and science.

¹⁵ <http://www.world-nuclear.org/info/Country-Profiles/Countries-A-F/Bulgaria/>

- Specialized Division (SD) responsible for the implementation of the project for the national disposal facility for LILW from nuclear facilities and nuclear applications.
- Specialized Division (SD) on Kozloduy NPP site responsible for conditioning and storage of LILW generated as a result of the operation of the Kozloduy NPP.
- Specialized Division (SD) on Kozloduy NPP site established responsible for decommissioning of Kozloduy nuclear power plants units 1 and 2.

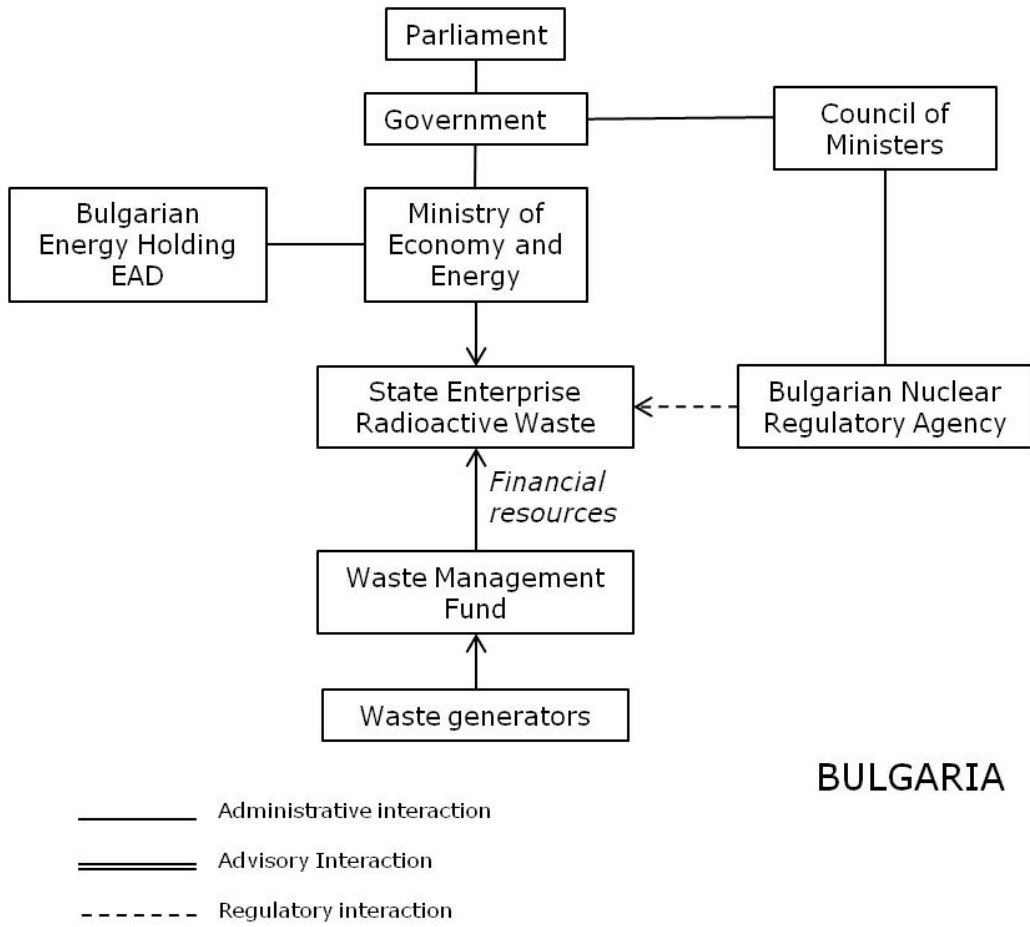
The Bulgarian Nuclear Regulatory Agency (BNRA) at the Bulgarian Council of Ministers is in charge to ensure nuclear safety and radiation protection. They also define the conditions and procedures for transferring radioactive waste to the SE RAW. They grant the license of storage facilities. In addition, the National Centre of Radiobiology and Radiation Protection (NCRRP) is a specialized body of the Ministry of Health and is the main authority of the national system for control of ionizing radiation and health monitoring.

The Institute for Nuclear Research and Nuclear Energy (INRNE) of the Bulgarian Academy of Sciences was the operator of the Novi Han Repository for more than thirty years, before SE RAW took over responsibility for this repository. At present, the INRNE undertakes research on nuclear physics, nuclear energy, environmental monitoring, etc.

Kozloduy NPP plc is the main electricity generating plant in Bulgaria. It is a public limited company with 100% public ownership. It is a subsidiary company of the Bulgarian Energy Holding EAD.

In 2005, the Government in Bulgaria made a decision to construct a new nuclear power plant in the municipality of Belene. However, in 2012, the Council of Ministers adopted a decision which revoked all previous decisions related to the construction of the Belene NPP. In January 2013, a referendum was held to vote on the construction of a new nuclear power plant in the country. After the low voter turnout, the Parliament decided to abandon the Belene nuclear power plant project in favour of building a new unit at Kozloduy.

Stakeholders interactions





Czech Republic



Radioactive waste management facilities

Current:

- Dukovany: largest low- and intermediate-level short-lived waste repository adjacent to the nuclear power plant. It is used for disposal of waste during the operation of Dukovany and Temelín nuclear power plant. At the Dukovany nuclear power plant site there is also a storage facility for spent fuel in operation since 1997.

Closed:

- Hostim: low- and intermediate-level short-lived radioactive waste repository in operation between 1959 and 1965 situated near Beroun. It was sealed in 1997 and is currently being monitored.



Main organisations involved in radioactive waste management

Policy/legislation actors	Ministry of Industry and Trade www.mpo.cz Ministry of Finance www.mfcr.cz Ministry of Environment www.mcp.cz
Implementing organisation	SÚRAO Radioactive Waste Repository Authority www.surao.cz
Regulatory authorities	State Office for Nuclear Safety, SÚJB www.sujb.cz Czech Mining Office http://www.cbusbs.cz
Scientific research	Ústav Jaderného Vyzkumu Rez A.S, Nuclear Research Institute (NRI) www.ujv.cz Academy of Sciences of the Czech Republic www.cas.cz
Non-governmental organisations (NGOs)	The Green Circle (national association of NGOs) Czech Nuclear Society www.csvts.cz Czech Radiological Society www.crs.cz
Nuclear industry	CEZ www.cez.cz
Local community	Dukovany local council www.obecdukovany.cz Temelín local council

The Czech Government defines the radioactive waste management policy and strategy and guarantees safety of radioactive waste disposal. The state organisation SÚRAO was established by the Ministry of Trade and Industry in 1997 as a fully state controlled organisation. SÚRAO operates the existing low- and intermediate-level waste repositories and is responsible for the development of deep geological repository for disposal of HLW and spent fuel. Activities of SÚRAO are financed from the Nuclear Account, a fund which is created from levies of waste generators for the waste disposal and is managed by the Ministry of Finance. Additionally, SÚRAO has submitted to the Ministry of Environment applications for non-invasive investigation in potentially suitable areas for the deep geological repository in seven municipalities (SÚRAO, 2014).

CEZ is the main company that operates the nuclear power plants of Dukovany and Temelín. CEZ is fully responsible for storage and management of its radioactive waste at its premises, until it is handed over to SÚRAO.

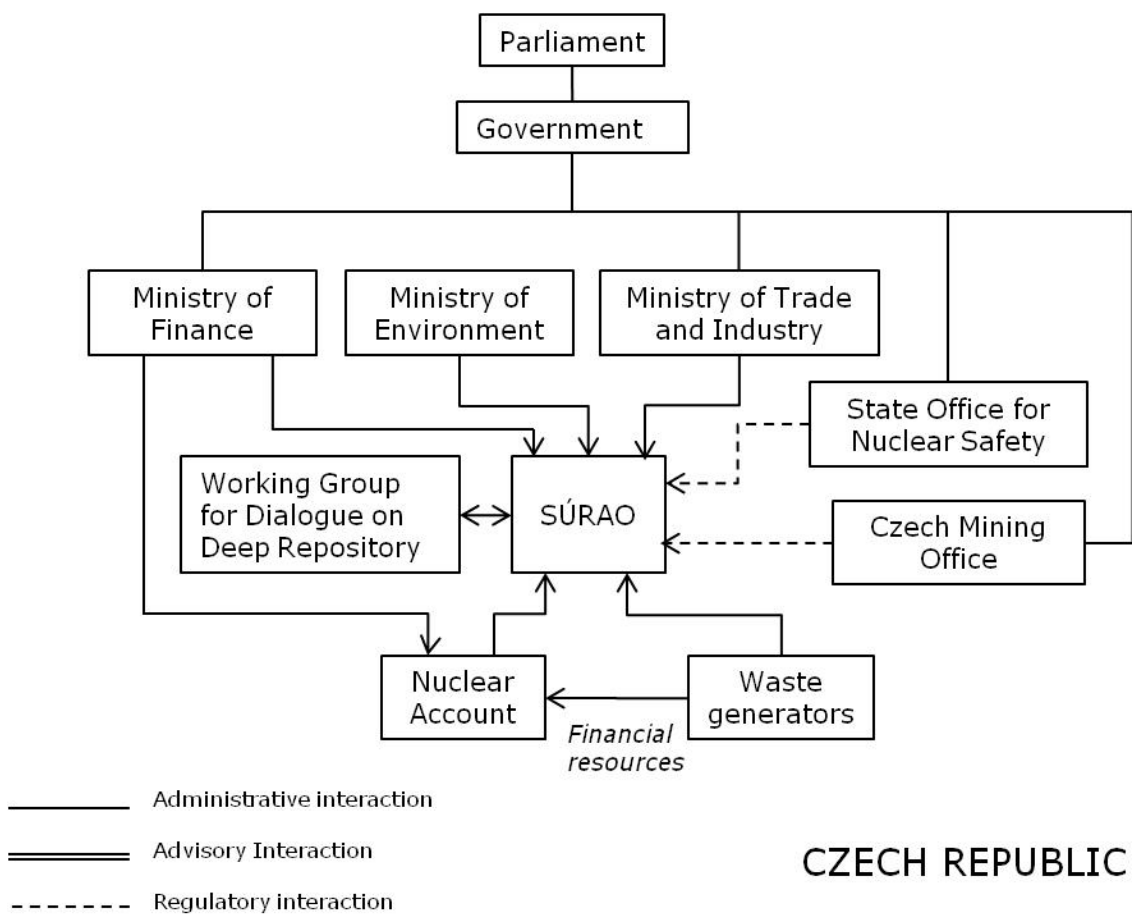
The State Office for Nuclear Safety (SÚJB) is responsible for nuclear safety and radiation protection supervision as well as for the development of legal regulations in the field of nuclear energy use and radioactive waste management. SÚJB reports directly to cabinet.

The Czech Mining Office approves the construction and operation of repositories and supervises activities connected with radioactive waste management in these repositories, from the point of view of mining regulations.

An interesting initiative in Czech Republic is the Working Group for Dialogue on Deep Repository established after the ARGONA EC funded project in June 2010, to bring together all stakeholders in the field of radioactive management to discuss in a "safe space" (Sumerova and Vojtechova, 2011). SÚRAO initiated this Working Group to "strengthen the transparent process of site selection for geological disposal" (Svacina and Konopásek, 2012). The Working Group was established with the support of the

Ministry of Industry and Trade and in cooperation with the Ministry of Environment. The working group brings together representatives of municipalities in the areas proposed as suitable for further research, representatives of the government (Ministry of Industry and Trade and Ministry of Environment) and parliament, SÚRAO, SÚJB, local and national NGOs (like Calla and the Environmental Law Service). A sociologist from the Czech Academy of Sciences chairs the group. The working group has organised a number of events, like round table discussions, seminars and public debates.

Stakeholders interactions





Finland



Radioactive waste management facilities

Planned:

- Olkiluoto: site selected for the construction of the final repository for spent fuel based on the 2000 decision-in-principle (DiP). This facility referred to as Onkalo (the underground cave) is located close to the Olkiluoto site. Construction of the access tunnel for the facility started in 2004.



Main organisations involved in radioactive waste management

Policy/legislation actors	Ministry of Employment and the Economy (MEE) www.tem.fi Ministry of Social Affairs and Health www.stm.fi
Implementing organisation	POSIVA Oy www.posiva.fi
Regulatory authorities	STUK, Radiation and Nuclear Safety Authority www.stuk.fi
Scientific research	Geological Survey of Finland www.gtk.fi
Non-governmental organisations	Greenpeace www.greenpeace.org/finland Finnish Association for Nature Conservation www.sll.fi Finnish Nuclear Society (ATS) www.ats-fns.fi
Nuclear industry	Fortum Power and Heat Oy (FPH) www.fortum.com Teollisuuden Voima Oy (TVO) www.tvo.fi Fennovoima Oy (FV) www.fennovoima.fi
Local community	Eurajoki local council www.eurajoki.fi Loviisa local council www.loviisa.fi

In Finland, the Government grants licenses for nuclear facilities and issues general safety regulations. For major nuclear facilities, like the repository for spent fuel, the legislation defines that the Government has to issue a Decision in Principle (DiP), whereby the Government takes the licensing decision, prior approval by the host municipality and the Parliament ratifies the DiP. The Government issues the construction and operation licenses.

The Ministry of Employment and Economy (MEE) directs the planning and oversees implementation of radioactive waste management. It also oversees implementation of related R&D. There is a public sector R&D programme (currently the KYT 2014) to support and maintain expertise in the field of radioactive waste management. A State Nuclear Waste Management Fund, under the administration of MEE, ensures that the financial provisions for future waste management are adequate.

The utilities are responsible for the storage of spent fuel, conditioning and disposal of operating LILW and planning of decommissioning nuclear power plants (NPPs).

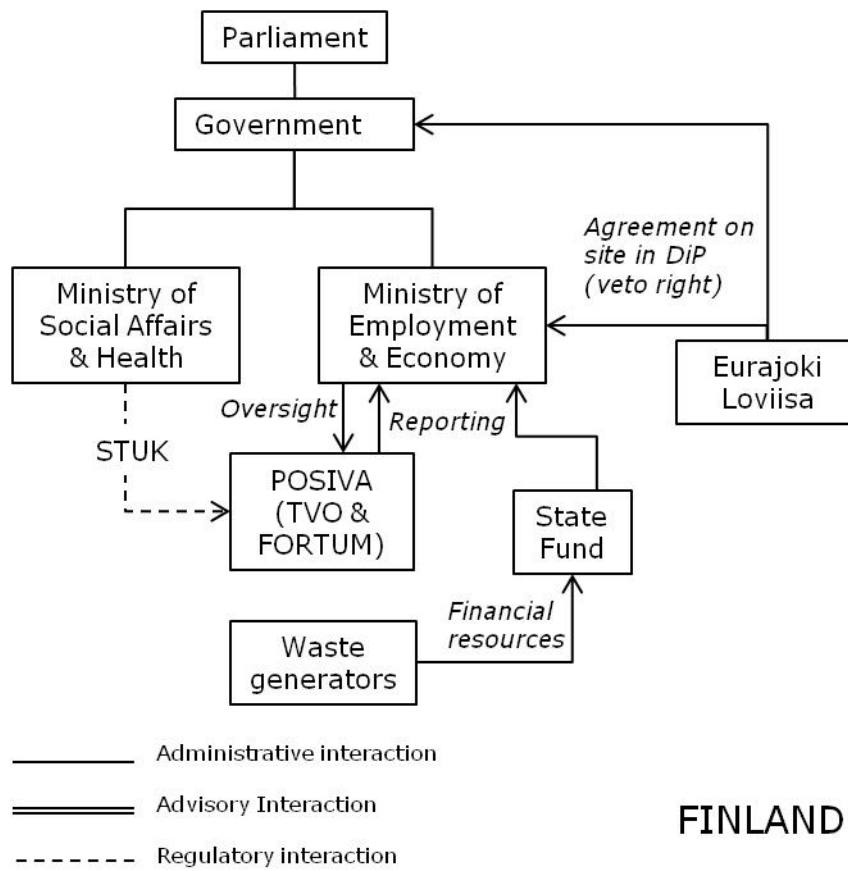
The radioactive waste management agency in Finland is POSIVA, a company jointly owned by TVO and FPH and is responsible for spent fuel disposal. Fennovoima is a new utility, was granted permission to build a nuclear unit in the municipality of Pyhäjoki, is not yet a licensee under the nuclear waste management obligation (Nurmi et al., 2012).

STUK, operating under the Ministry of Social Affairs and Health, is responsible for the regulatory oversight of radiation and nuclear safety, for issuing detailed safety regulations and for the technical and safety related review of license applications.

The Technical Research Centre of Finland (VTT) operates a small research reactor in Otaniemi, Espoo.

The municipalities of Eurajoki and Loviisa host nuclear power plants and storage facilities for spent fuel and for LILW. In addition, the Olkiluoto site in Eurajoki is the selected site for geological disposal of spent fuel. In Finland, host municipalities play a decisive role in the Decision-in-Principle procedure in relation to siting. They have a veto right which cannot be overruled by the Government.

Stakeholders interactions





France



Radioactive waste management facilities

Current:

- The Centre de Stockage de l'Aube (CSA) for the disposal of low- and intermediate-level short-lived radioactive waste is located 250 km east of Paris, near Soulaines, in the Aube district. A few kilometres from the existing Centre de Stockage de l'Aube disposal facility, there is the Centre Industriel de Regroupement, d'Entreposage et de Stockage (CIRES 1), a surface disposal facility for grouping, storing and disposing of very low-level radioactive waste located at Morvilliers.
- Vitrified high-level waste from reprocessing spent fuel is stored in dedicated facilities at the production sites, at La Hague and Marcoule sites. They will remain there for a few decades until their disposal. Until Cigeo is commissioned, existing HLW and ILW-LL have been temporarily placed in dry storage in buildings at the facilities where they are generated, primarily La Hague and Marcoule (Andra, 2013).

Closed:

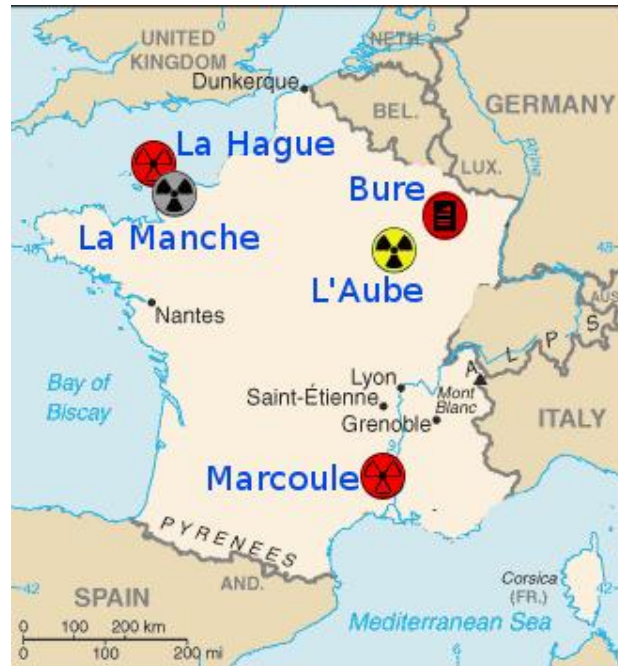
- Manche disposal facility (Centre de Stockage de la Manche, CSM): this facility for low- and intermediate-level short-lived waste is now in the post-closure monitoring phase since 2003. It is located in the Manche district near the AREVA La Hague reprocessing facility.

Planned:

- Cigeo¹⁶ is the planned geological disposal facility of high-level waste and long-lived intermediate-level waste which may be sited near the current Meuse/Haute-Marne Underground Research Laboratory in Bure (Meuse district).

¹⁶ Cigeo stands for industrial centre for geological disposal.

Geographical map with RWM facilities for vitrified waste, HLW, ILW and VLLW



Main organisations involved in radioactive waste management

Policy/legislation actors	Ministère de l'Écologie, du Développement durable et de l'Énergie, http://www.developpement-durable.gouv.fr Ministère de l'Enseignement supérieur et de la Recherche http://www.enseignementsup-recherche.gouv.fr OPECST, Parliamentary Office for the evaluation of Scientific and Technological Choices http://www.senat.fr/opecest/eng
Implementing organisation	ANDRA, Agence Nationale pour la Gestion de Déchets Radioactifs, National Radioactive waste management agency www.andra.fr
Advisory bodies to the implementing organisation	ANDRA Scientific Council Comité d'expertise et suivi de la démarche d'information et de consultation, Advisory Committee for the implementation of the Information and Consultation Plan in Eastern France (COESDIC) Comité d'orientation et suivi du laboratoire souterrain, Scientific Orientation Committee of the URL (COS)
Regulator and Technical Support Organisations	ASN, Autorité de Sûreté Nucléaire (Nuclear Safety Authority) www.asn.fr IRSN, Institut de Radioprotection et de Sûreté Nucléaire, Institute for Radiological Protection and Nuclear Safety www.irsn.org CNE2 ¹⁷ , Commission Nationale d'Évaluation (National Assessment Board), http://cne2.fr
Advisory and consultative bodies to the ASN (Groupes Permanents; Standing Groups of Experts) ¹⁸	GPD, Groupe Permanent d'experts pour les déchets, Advisory Committee for radioactive waste http://www.asn.fr/index.php/Les-actions-de-l-ASN/Les-appuis-techniques/Les-groupes-permanents-d-experts/Groupe-permanent-d-experts-pour-les-dechets-GPD
Other national level organisations	HCTISN, High Committee for Transparency and Information in Nuclear Safety www.hctisn.fr CNDP, Commission Nationale du Débat Public (Public Debate National Commission) http://www.debatpublic.fr
Scientific research	CEA, Commissariat à l'Énergie Atomique et aux Énergies Alternatives, Alternative Energies and Atomic Energy Commission www.cea.fr BRGM, Bureau de Recherches Géologiques et Minières (BRGM) www.brgm.fr

¹⁷ According to OECD/NEA (2013), CNE's role cannot be considered formally as a regulator but its role has been essential to the progress of geological disposal in France.

¹⁸ Other advisory bodies to the ASN are: Advisory Committee for nuclear reactors; Advisory Committee for transport; Advisory Committee for radiation protection in medicine applications; Advisory Committee for radiation protection in industrial activities; Advisory Committee for nuclear pressurized vessel.

	CNRS, Centre National de la Recherche Scientifique (French National Centre for Scientific Research) www.cnrs.fr INERIS, Institut National de l'Environnement Industriel et de Risques, www.ineris.fr
Non-governmental organisations (NGOs)	ACRO Association pour le Contrôle de la Radioactivité de l'Ouest http://www.acro.eu.org CRIIRAD, Commission de Recherche et d'Information Indépendantes sur la Radioactivité http://www.criirad.org/english/presentation.html SFEN, Société Française d'Énergie Nucléaire http://www.sfen.org SFRP, Société Française de Radioprotection http://www.sfrp.asso.fr
Nuclear industry	EdF www.edf.com AREVA www.areva.com
Regional level Public Interest Groups	GIP Objective Meuse, Groupement d'Interêt Public (Public Interest Group) www.objectifmeuse.org GIP Haute-Marne, Groupement d'Interêt Public http://www.gip-haute-marne.fr
Local community	ANCCLI, National Association of Local Information Commission www.anccli.fr CLIS, Comité Local d'Information et de Suivi (Local Information and Oversight Committee) specific to the underground laboratory at Bure www.clis-bure.com EODRA, Association des Elus de Lorraine et Champagne-Ardenne Opposés à l'enfouissement des Déchets radioactifs et favorables à un développement durable www.stopbure.com

The main producers of radioactive materials and waste in France are Areva, CEA and EDF. The French Parliament defines the national policy on the management of radioactive waste in France. ANDRA¹⁹ is the specific public agency with the responsibility for the long-term management of radioactive waste. ANDRA operates waste repositories and is in charge of designing, siting and constructing new disposal facilities. Its basic three missions are: a) R&D mission: to propose safe long-term solution for radioactive waste; b) industrial mission concerning waste acceptance criteria and control and siting, construction, operation, closure and monitoring of repositories and c) regular information of the national inventory of radioactive materials and waste as well as active policy of dialogue with stakeholders at national and local levels. ANDRA is under the supervision of the Ministry of Ecology, Energy, Sustainable Development and the Sea (MEEDDM) and the Ministry of Research. Andra reports to government, so that Parliament can decide on waste policy. The General Directorate for Energy and Climate of MEEDDM elaborates the policy and implements the Government's decisions related to the civil nuclear sector, except for those dealing with nuclear safety and radiological protection.

¹⁹ ANDRA had been part of the CEA previous to the Law 91-1381.

ANDRA's research activities are regularly evaluated by different national organisations, like CNE, ASN and the Scientific Committee. The National Assessment Board (CNE2), created by Parliament, is an expert assessment committee to evaluate and review the various programmes carried out for the management of HL and long-lived ILRW. The CNE2 reviews all radioactive waste management R&D programmes. Its annual report shall be transmitted by the Government to Parliament, which in turn forwards it to the Parliamentary Office for the evaluation of Scientific and Technological Choices (OPECTS) before being made public. The OPECTS's task is to keep parliament informed by assessing the consequences of emerging scientific progress, review controversial subjects and monitor the implementation of new technologies. The Scientific Committee, was created by decree, and reviews Andra scientific policy and results. In addition, ANDRA itself set up two advisory committees: COS, composed of experts in geosciences to provide advice on the experimental programme carried out at the Centre Meuse/Haute Marne with the URL and COESDIC. COESDIC is composed of experts in social sciences and public information to give advice on the implementation of the information and consultation plan for the geological repository but also for the siting of LLW repository. Andra was also evaluated in 2012 by the French Agency for the Evaluation of Research and Higher Education (AERES).

The ASN is tasked on behalf of the State to regulate nuclear safety and radiation protection, in order to protect workers, patients, the public and the environment from the risks involved in nuclear activities. It also contributes to inform the citizens in the field of nuclear safety. The IRSN is the main support organisation to the ASN. IRSN is a public body in charge of the scientific assessment of nuclear and radiation hazards.

With regards to R&D in the field of radioactive waste management, the main research institutions other than ANDRA are CEA and CNRS. CEA carries out R&D for the implementation of civilian nuclear activities and supports Andra R&D programme for some specific topics (based on bilateral agreements). In addition, ANDRA subcontracts and organises research with research groups based at CNRS, INERIS, BRGM and universities (Université de Technologie de Troyes, Université de Lorraine, etc), among others.

The High Committee for Transparency and Information in Nuclear Safety (HCTISN) is an independent institution to inform and debate in the field of hazards and impact of nuclear activities on health, environment and nuclear safety. The HCTISN can issue opinions on any nuclear issue and on access to information in nuclear safety or to guarantee or improve transparency. Ministers in charge of nuclear safety, the OPECTS, CLI and nuclear operators can refer to the HCTISN. For instance, the MEEDDM asked the HCTISN to prepare a report providing an inventory of radioactive waste considered by the Cigeo project and describing the decision-making process behind the project's definition (Andra, 2013).

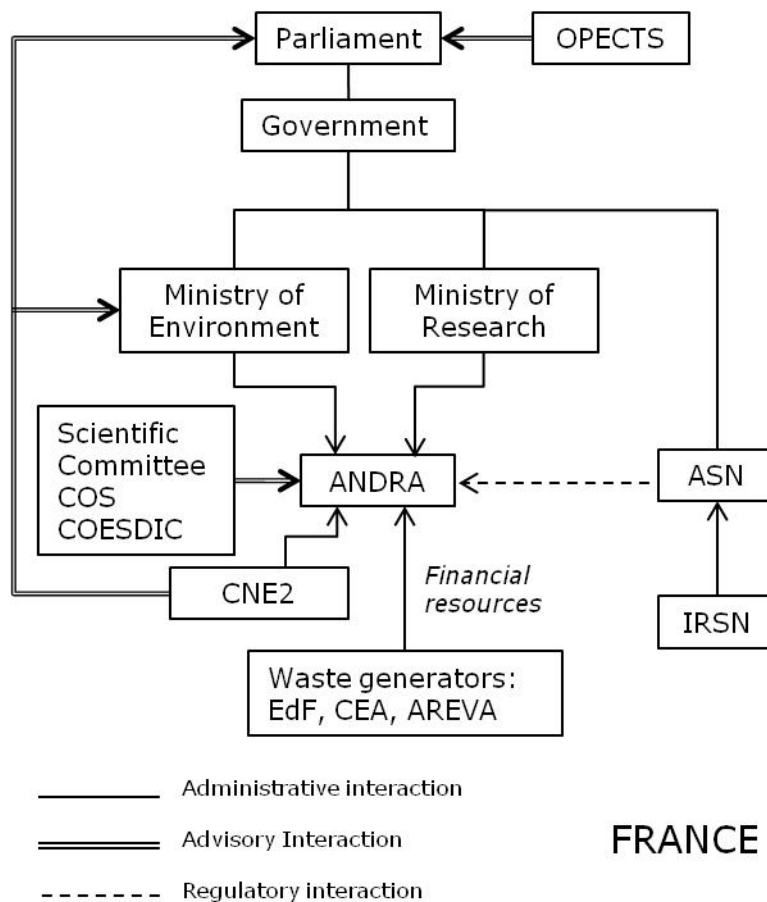
The Public Debate National Commission (CNDP) is an independent authority whose remit is to organise debates on planning and infrastructure projects of national interest with major socio-economic and environmental impacts. In 2005-2006, the CNDP organised a public debate on general management options concerning high-level and intermediate-level long-lived radioactive waste. In 2006, the Parliament adopted reversible deep geological disposal as the solution for the long-term management of HLW and ILW-LL. Later in 2013, the CNDP organised the public debate on the Cigéo

project, the deep disposal centre for high-level and long-lived intermediate-level radioactive waste.

At the local level, before constructing a storage or disposal facility, ANDRA has to consult with local government officials and with the local public. Local information Committees (CLIs) are formed nearby the basic nuclear facilities. The CLIs involve local experts, NGOs, elected representatives and other representatives of civil society, with the main purpose of monitoring operations of nuclear power plants. CLIs are united in a national association under the name of ANCCLI. In addition, the 2006 Radioactive Materials and Waste Planning Law, required the establishment of a local information and oversight committee, CLIS, comprised of national and local elected officials and various stakeholders. CLIS should be established in each community hosting an underground laboratory and consulted on issues related to the community or the environment. The CLIS of Bure order regular expert surveys regarding ANDRA's dossiers or more specific topics.

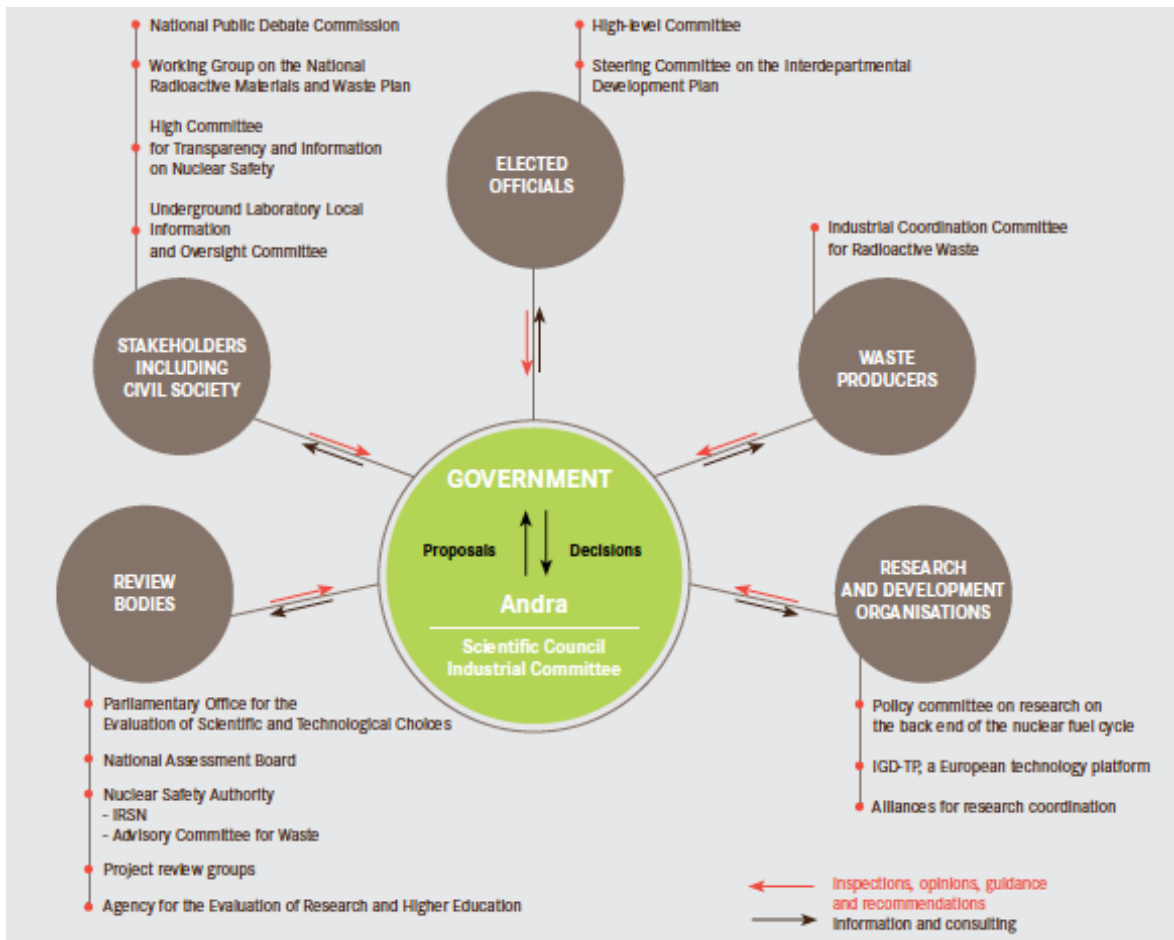
Other than CLIs, the 2006 Planning Act prescribed to fund economic development schemes of municipalities and districts concerned by the project of geological repository of HLW and long-lived ILW through Public Interest Groups (GIP). There were two GIPs set up for the two districts of Meuse and Haute-Marne.

The interactions between the main institutions involved in radioactive waste management in France are shown in the Figure below. It is worth briefly describing the interactions between organisations for approving a 30km² underground zone of interest for detailed survey to site the underground facility (named ZIRA) in 2009. Following a position issued by CNE, ASN, consultation with elected officials and the CLIS, the Government approved the zone proposed by Andra.

Stakeholders interactions²⁰

It is interesting to highlight the specific stakeholder map associated with the governance of the Cigeo Project (Andra, 2013). The review procedure for the licence application of the Cigeo facility is set out in the 2006 Planning Act. Andra will submit the license application in 2015, which will be reviewed by CNE, ASN, local authorities and OPECST before an act of legislation laying down the reversibility conditions is passed. Once this act is passed, Andra will have to supplement its application to demonstrate that it is in compliance with the act. The assessment by the ASN will continue and a public inquiry will be held before the licensing decree may be signed.

²⁰ Information extracted from and available at http://www.oecd-nea.org/rwm/profiles/france_report.pdf



Source: Andra (2013)



Germany



Radioactive waste management facilities

Current²¹:

- Ahaus: Transport Cask Storage Facility for the storage of fuel assemblies and transport and storage casks.
- Gorleben: storage facility for vitrified high-level waste glass canisters.

Closed:

- Asse II: repository for low- and intermediate-level waste operational from 1967 to 1978. Waste retrieval is being considered due to stability problems.
- Morsleben: repository for low- and intermediate-level waste operational from 1971 until 1998.

Planned²²:

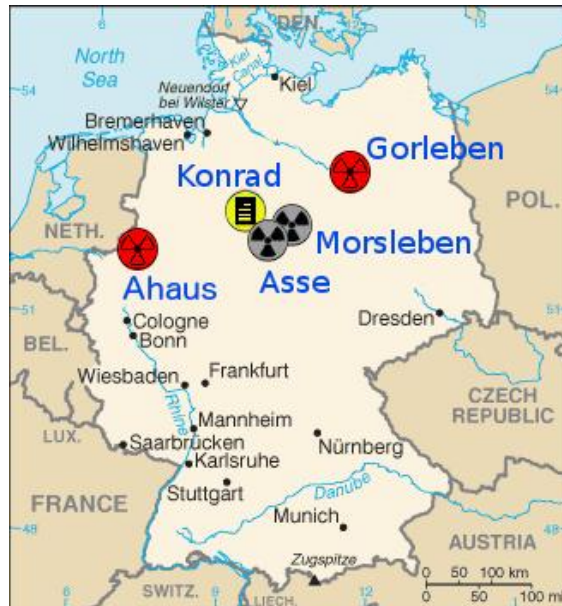
- Konrad: final disposal facility for non-heat generating radioactive waste. It is a former iron ore mine and has been under development as a repository since 1975. It was licensed in 2002 for LILW disposal and is expected to be operational around 2014.
- Gorleben: The Gorleben site has been considered (and still is) for deep disposal of long-lived high-level waste for many years despite the controversies regarding its potential suitability. However, it is not included in the map because there is not a clear decision to keep Gorleben as a deep geological repository for the time being.

In Germany spent fuel will be stored in dry decentralised storage facilities at the twelve nuclear power plant sites where it is generated (OECD/Nea, 2013). These sites are the following: Biblis, Philippsburg, Neckarwestheim, Gundremmingen, Isar, Grafenrheinfeld, Grohnde, Emsland, Unterweser, Brunsbüttel, Brokdorf and Krümmel.

²¹ There is also the Greifswald (ZNL) storage facility "Zwischenlager Nord" (ZNL) at Greifswald which stores spent fuel from the reactors at Rheinsberg and Greifswald, but is not a central facility and is not shown in the map. ZNL is also licensed to store vitrified waste from the Karlsruhe vitrification plant (OECD/NEA, 2013).

²² According to German energy policy, storage facilities for spent fuel are to be built in each of the NPP sites.

Geographical map with RWM facilities for spent fuel, vitrified HLW and LILW.



Main organisations involved in radioactive waste management

Policy/legislation actors	Federal Ministry of the Environment (BMU) www.bmu.de Federal Ministry of Economics and Technology (BMW) www.bmw.de Federal Ministry of Education and Research www.bmbf.de
Advisory bodies to the BMU	Nuclear Waste Management Commission (ESK) www.enstorgunskommission.de Commission on Radiological Protection (SSK) www.ssk.de Reactor Safety Commission (RSK) www.rskonline.de
Implementing organisation	Federal Office for Radiation Protection (BfS) www.bfs.de
Regulatory authorities and TSOs	Technical Inspection Agencies (TÜV) www.de.tuv.com Gesellschaft für Anlagen und Reaktorsicherheit mbH (GRS) www.grs.de
Scientific research	Federal Institute for Geosciences and Natural Resources (BGR) of the BMW www.bgr.bund.de GSF National Research Centre for Environment and Health Karlsruhe Institute of Technology (KIT) www.kit.edu
Non-governmental organisations	Bürgerinitiative Kein Atommüll in Ahaus e.V. www.bi-ahaus.de German Nuclear Society www.ktg.org German Atomic Forum www.kernenergie.de Naturschutzbund Deutschland (NABU) www.nabu.de
Industry	Gesellschaft für Nucleare-Service mbH (GNS) www.gns.de
Regional level	Länder – Government of Lower Saxony (e.g. Ministry of Environment of Lower Saxony, NMU) www.niedersachsen.de

Local government	Asse community Schöppenstedt community Wolfenbüttel county council Gorleben community Gartow community
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Due to the federal political and administrative organisation, the distribution of responsibilities in the field of radioactive waste management is rather complex. According to the German Atomic Energy Act, the Federal Government is responsible for the final disposal of radioactive waste in Germany. Within the Federal Government itself, the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) and the Federal Office of Radiation Protection (BfS), a subordinate authority, are responsible for the siting, planning, plant-related research and development, exploration, construction, operation and decommissioning of repositories for radioactive waste. The Reactor Safety Commission, the Commission on Radiological Protection and the Nuclear Waste Management Commission advise the BMU on all major issues concerning nuclear reactors, the nuclear cycle and radiation protection.

The producers of radioactive waste are responsible for the conditioning and storing spent fuel and radioactive waste. When delivering radioactive waste to a state storage facility, ownership is transferred to this facility. Thus, the responsibility for conditioning is assumed by the operator of the state storage facility.

GNS is responsible for all operations regarding the transport and disposal of waste in Germany. DBE constructs and operates repositories and is in charge of the decommissioning of Morsleben.

The Federal Ministry for Economic Affairs and Energy (BMWi) is responsible for the nuclear energy industry and repository-related basic research. The Federal Institute for Geosciences and Natural Resources (BGR), a subordinate authority of the BMWi, deals with geoscientific issues regarding the final disposal of radioactive waste.

The Länder (State) are responsible for licensing the radioactive waste management facilities. For instance, the Environmental Ministry of Lower-Saxony is responsible for licensing the closure of the Asse Mine or exploration activities at Gorleben (Minhans and Kallenbach-Herbert, 2012) and Konrad. The Ministry of the Environment in Saxony-Anhalt is the licensing authority on behalf of the federal government for the Morsleben repository (NEA, 2006).

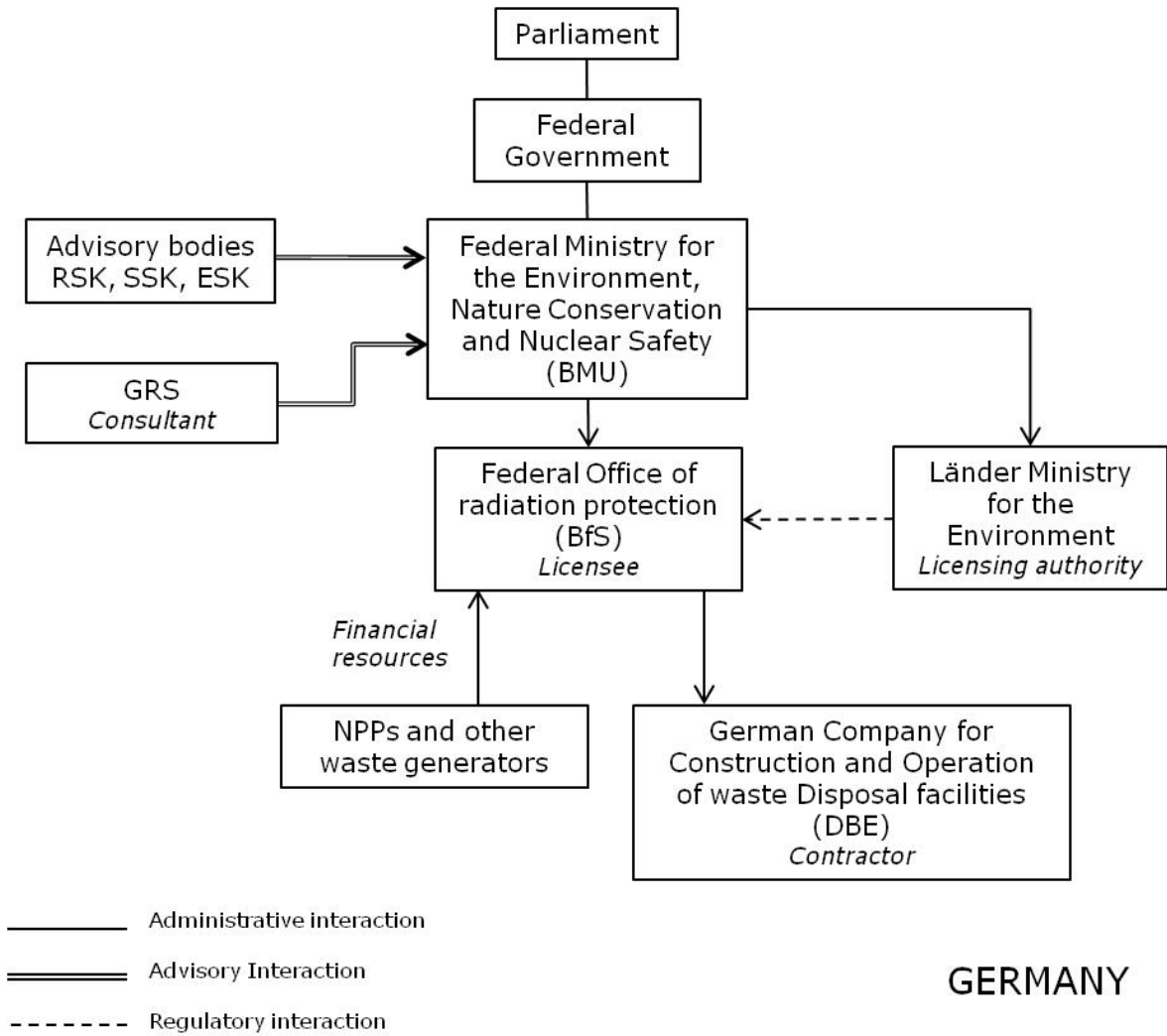
An advisory body to the government, the AkEnd committee, was set up in 1999 to develop a new siting procedure. It was an interdisciplinary expert group tasked to develop repository site selection criteria and a selection procedure on a scientifically sound basis. The recommendations of AkEnd were handed over to BMU in December 2002. The AkEnd process ended in 2003 as a result of the failure to establish a negotiation group with representatives from Federal and Länder governments, industry and stakeholder groups (Minhand and Kallenbach-Herbert, 2012)²³.

At present, and as it will be shown below, the Asse-2-Advisory Group was created in 2008 to discuss options for the closure of the Asse repository. Representatives of the

²³ Minhans and Kallenbach-Herbert (2012) summarise other participatory initiatives, like the Disposal Dialogue Forum or Gorleben dialogue launched by BMU.

operator, the BfS, the Lower Saxony Ministry of the Environment and BMU are represented in this advisory group.

Stakeholders interactions



The licensing procedure for the closure of the Asse repository for low- and intermediate-level waste has enabled a new set of interactions among key stakeholders. The Asse 2 Advisory Group has been set up and it is composed of a group of regional representatives, representatives of BfS, BMU and nominated experts (Minhans and Kallenbach-Herbert, 2012). The Citizens' Advisory Group (A2B)

assembles the interests of the region²⁴ and complements the decisions of the responsible ministries. The AGO expert group assesses the options for closure of the Asse mine based on the safety analysis provided by the operator. The figure representing the interactions for this specific case is shown below.



Source: Minhans, A. (2013)

²⁴ The participants are members of the county administration and council, neighbouring communities, environmental associations and citizens.



Hungary



Radioactive waste management facilities

Current:

- Bataapati: central repository for disposal of low- and intermediate-level radioactive waste.



Main organisations involved in radioactive waste management

Policy/legislation actors	National Public Health and Medical Officer Service (NPHMOS) www.antsz.hu
Implementing organisation	Public Agency for Radioactive Waste Management (PURAM) www.rhk.hu
Regulatory authorities and TSOs	Hungarian Atomic Energy Authority (HAEA) www.haea.gov.uk
Scientific research	Atomic Energy Research Institute (AEKI) of the Hungarian Academy of Sciences http://www.aeki.kfki.hu Institute for Nuclear Research of the Hungarian Academy of Sciences www.atomki.hu
Non-governmental organisations	Energiaklub http://energiaklub.hu/ Regional Environment Centre Hungary www.rec.hu
Nuclear Industry	Paks Nuclear Power Plant www.paksnuclearpowerplant.com

Local community	West-Mecsek Public Information Association (NyMTIT, Boda) Isotope Information Association (Püspökszilágy) Public association for Information and Oversight (TETT, Páks) Public Oversight and Information Association (Bátaapáti)
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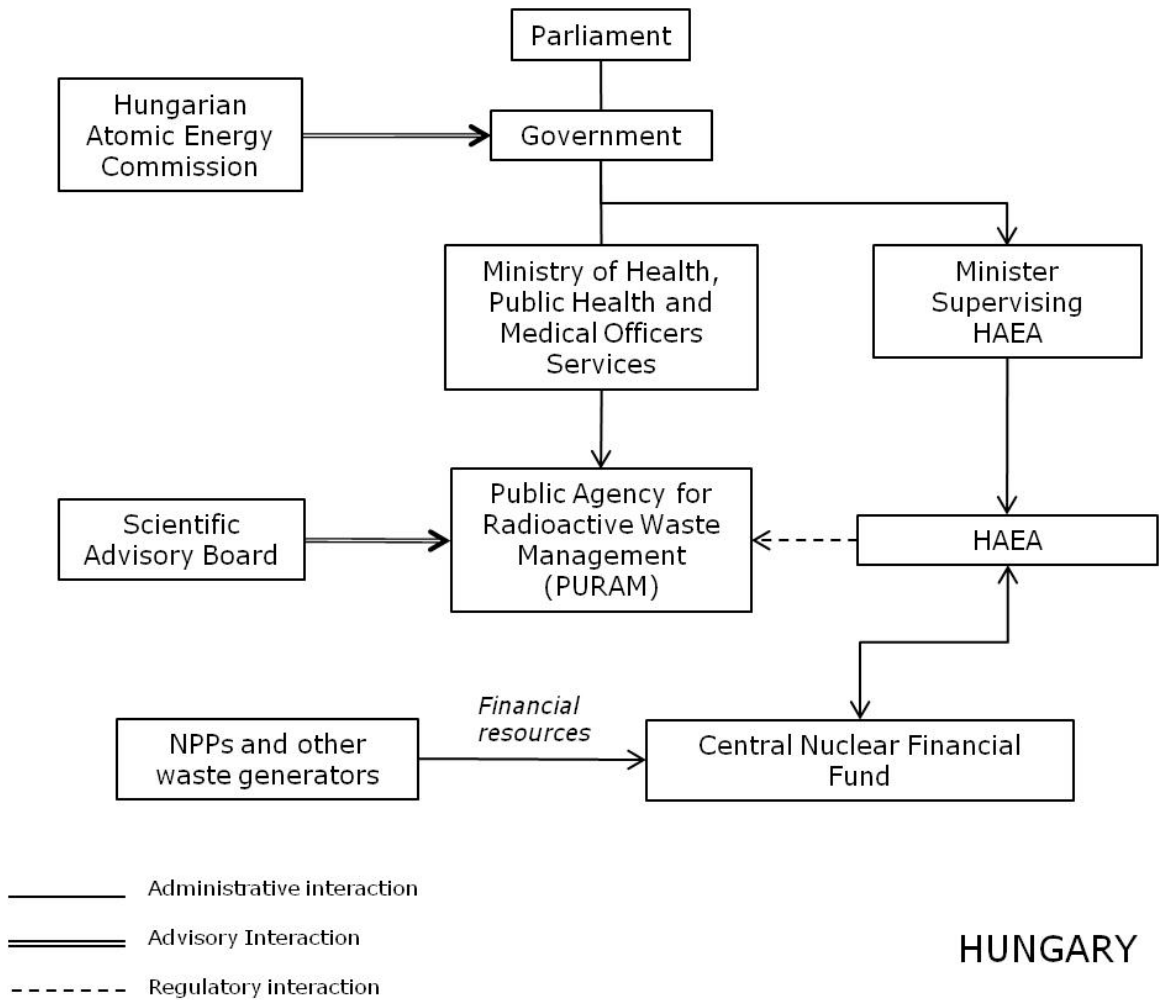
Most of the radioactive waste in Hungary is generated by the operation of Paks nuclear power plant. The National Public Health and Medical Officer Service (NPHMOS) of the Ministry of Health is responsible for licensing and supervision of the siting, construction, commissioning, operation and closure of radioactive waste disposal facilities.

The Hungarian Atomic Energy Authority (HAEA) is responsible for regulation of nuclear facilities and supervises nuclear industry. It is a central public administrative organisation under Government supervision, by a minister appointed by the Prime Minister, independently of his/her portfolio. The work of HAEA is supported by the Scientific Council. This Council is composed of a maximum of twelve nation-wide acknowledged experts.

PURAM is the Public Limited Company for Radioactive Waste Management and is responsible for the management of all types of radioactive waste, decommissioning of nuclear facilities as well as related R&D. The Central Nuclear Financial Fund is covering the costs of radioactive waste management, including the operation of PURAM. The Central Nuclear Financial Fund was set up in January 1998 for financing radioactive waste disposal, storage and decommissioning of nuclear facilities. The Minister supervising HAEA has jurisdiction over the Fund, while HAEA is responsible for its administration.

Public information and oversight associations are independent legal entities composed of local mayors from the municipalities in the vicinity of operational or planned nuclear facilities. They participate in overseeing the safety of nuclear facility and provide information of the facility to the public. There are four of these associations in the vicinity of nuclear facilities in Hungary. Some local NGOs can be part of the association but without a voting right.

Stakeholders interactions





Lithuania



Radioactive waste management facilities

Closed:

- **Maišiagala:** radon-type facility for institutional radioactive waste of different types (e.g. short-lived low-level and long-lived), which was in operation from 1964 to 1989. Surveillance and monitoring is currently undertaken by RATA. It is situated 30 km northwest from Vilnius, the capital of Lithuania.

Planned:

- **Ignalina:** very low-, low- and intermediate-level radioactive waste repository.



Main organisations involved in radioactive waste management

Policy/legislation actors	Ministry of Energy www.enmin.lt Ministry of Health www.sam.lt Ministry of the Environment www.am.lt
Implementing organisation	RATA, Radioactive Waste Management Agency www.rata.lt
Regulatory authorities	VATESI, State Nuclear Power Safety Inspectorate www.vatesi.lt Radiation Protection Centre (RPC) www.rsc.lt
Scientific research	Lithuanian Energy Institute www.lei.lt
Non-governmental organisations (NGOs)	Baltic Environmental Forum (BEF) Lithuania www.sena.be.lt The Lithuanian Environmental NGOs Coalition www.aplinkosauga.lt
Nuclear industry	State Enterprise Ignalina Nuclear Power Plant www.iae.lt Lietuvos Energija www.le.lt
Local community	Ignalina district municipality www.ignalina.lt

The Ministry of Energy is responsible for the implementation of state policy and is the owner of the Ignalina nuclear power plant. The Ministry supervises the nuclear energy sector and is responsible for the preparation of regulatory acts governing nuclear energy and nuclear safety. The Ministry of Energy is also the owner of the Ignalina nuclear power plant.

The Ministry of Economy is responsible for issuing licenses for the export, import and transit of radioactive materials used in nuclear technology.

The Ministry of Environment establishes procedures and issues authorisations for the import, export, transit and transportation of radioactive waste within the country. The Ministry of Environment coordinates environmental impact assessment and establishes levels for radioactive releases in the environment.

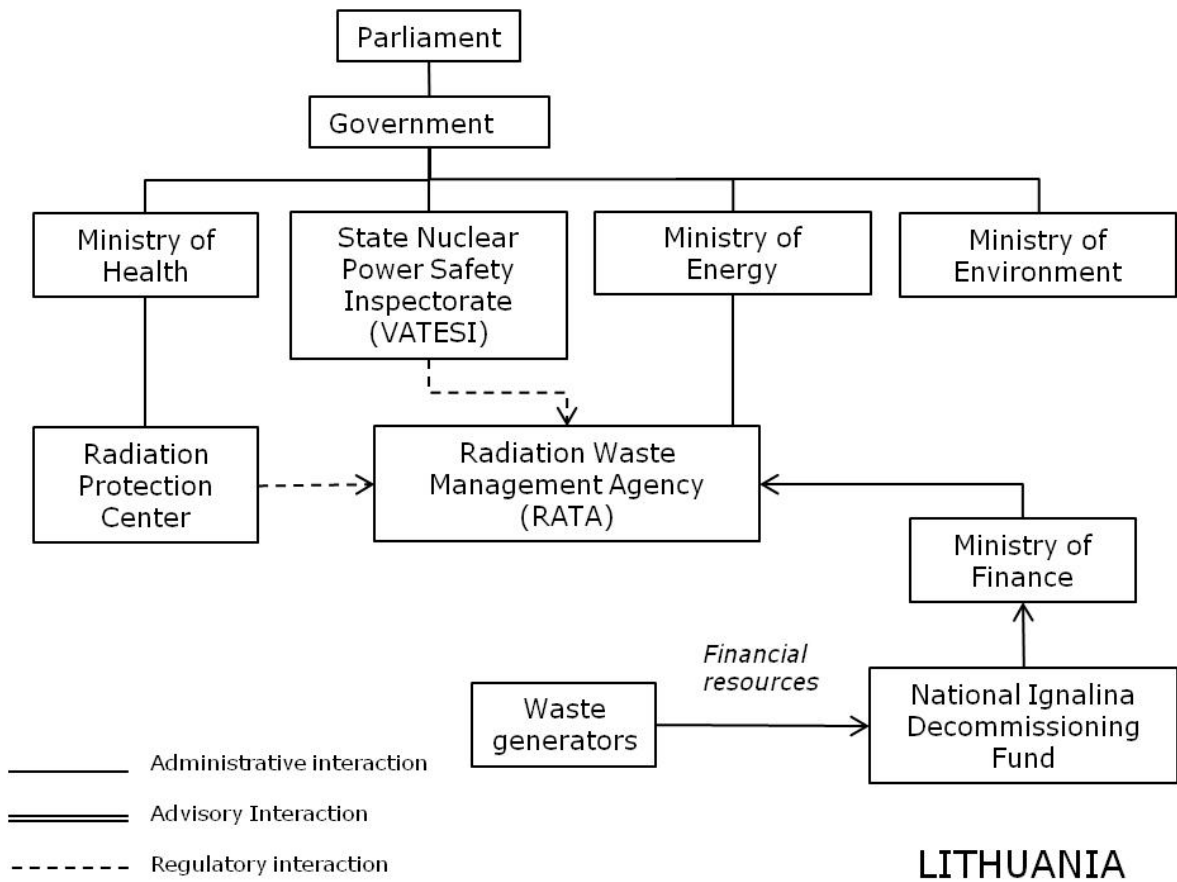
The Radioactive Waste Management Agency (RATA) was established in 2001 by the Ministry of Economy for management and disposal of radioactive waste generated by the Ignalina nuclear power plant. The task of RATA is to construct and operate the repositories for radioactive waste. In 2013, RATA is under supervision of the Ministry of Energy.

The Radiation Protection Centre (RPC), under the Ministry of Health, is the regulatory body coordinating the activities on radiation protection of the different bodies of public administration and local government.

VATESI is the independent state institution exercising state regulation and supervision of nuclear safety at nuclear power plants and waste management facilities, nuclear installations and transportation of safety of nuclear materials. VATESI reports to the Prime Minister and the Government. Until 2011, VATESI was accountable to the Government only²⁵.

²⁵ http://www-pub.iaea.org/MTCD/publications/PDF/CNPP2013_CD/countryprofiles/Lithuania/Lithuania.htm

Stakeholders interactions





Netherlands



Radioactive waste management facilities

Current:

- Habog: centralised storage facility for high-level waste and low- and intermediate-level waste situated in the municipality of Borsele.



Main organisations involved in radioactive waste management

Policy/legislation actors	Ministry of Social Affairs and Employment http://www.government.nl/ministries/szw Ministry of Economic Affairs http://www.government.nl/ministries/ez Ministry of Infrastructure and the Environment http://www.government.nl/ministries/ienm
Implementing organisation	COVRA www.covra.nl
Regulatory authorities	Nuclear Installations and Safety Department (NIV) Department of Nuclear Safety, Security and Safeguards (KFD)
Scientific research	Nuclear Research and Consultancy Group (NRG) www.nrg.eu Energy Research Centre of the Netherlands www.ecn.nl Netherlands Organisation for Applied Scientific Research (TNO) www.tno.nl
Non-governmental organisations (NGOs)	Netherlands Nuclear Society (NNS) www.ecn.nl/society/nns
Nuclear industry	N.V. EPZ www.epz.nl B.V. GKN
Local community	Borsele local council www.borsele.nl

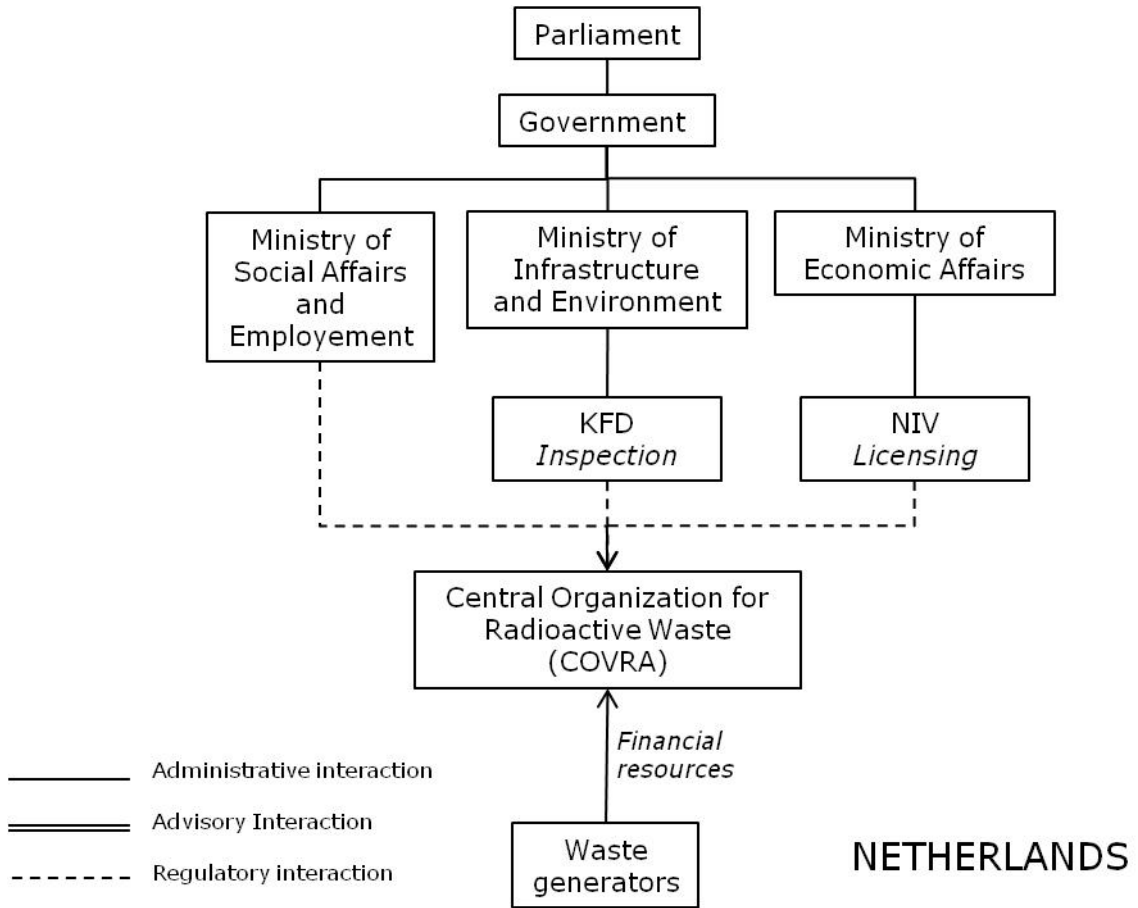
In the Netherlands, nuclear issues are not centralised within one authority. The responsibility in the field of nuclear activities is shared by several ministries who consult each other and issue regulations jointly. The Minister of Infrastructure and the Environment is primarily responsible for the Nuclear Energy Act and is the single licensing authority. The regulatory body, the Nuclear Safety Department (KFD) is also part of the organisation of the Ministry of Infrastructure and Environment and is responsible for independent supervision (safety assessment, inspection and enforcement) of the safety and security of nuclear activities. KFD is embedded in an organisational division of the Inspectorate of the Environment and Transport, which is the inspection branch of the Ministry of Infrastructure and Environment.

Within the Ministry of Economic Affairs, the nuclear installations and safety department (NIV), is involved in the preparation of legislation, formulation of policies and licensing.

The Central Organisation for Radioactive Waste (COVRA) is in charge of implementing the Dutch policy with regard to radioactive waste in the Netherlands. It is a non-profit organisation founded in 1982. It is authorised by the government to treat and store all kinds of radioactive waste (LLW, ILW, HLW, spent fuel).

The NRG is the national nuclear research centre of the Netherlands. It undertakes, coordinates and sponsors R&D in the energy supply field. It is also the largest producer of radioisotopes in Europe. It offers a wide range of services to energy utilities, government, industry, etc.

Stakeholders interactions





Romania



Radioactive waste management facilities

Current:

- Baita Bihor repository: national repository for low and intermediate institutional radioactive waste. It became operational in 1985.

Planned:

- Saligny: planned near surface repository for low- and intermediate-level waste in Saligny municipality.



Main organisations involved in radioactive waste management

Policy/legislation actors	Ministry of Economy www.minind.ro Ministry of the Environment www.mmediu.ro Ministry of Public Health www.ms.ro
Implementing organisation	Nuclear Agency & Radioactive Waste (ANDR) www.agentianucleara.ro
Regulatory authorities	State Office for Nuclear Safety, CNCAN www.cncan.ro

Scientific research	Institute for Nuclear Research (SCN Pitesti) www.nuclear.ro Centre of Technology and Engineering for Nuclear Projects (CITON) www.citon.ro
Non governmental organisations (NGOs)	ARIN Braila www.arin.ro Terra Milenium Bucharest III www.terraiii.ngo.ro ROMATOM www.romatom.ro AREN Nuclear Society www.aren.ro
Nuclear industry	Nuclear Electrica www.nuclearelectrica.ro Romanian Authority for Nuclear Activities (RAAN) www.raan.ro Cernavoda Nuclear Power Plant www.cne.ro S.C. Energonuclear S.A. www.energonuclear.ro
Local level	Cernavoda local council www.primaria-cernavoda.ro Saligny local council www.primariasaligny.ro

The Nuclear Agency & Radioactive Waste (AN&DR) is a specialised authority of the central administration responsible for the coordination of the safe management of radioactive waste and spent nuclear fuel, including final disposal, at national level. It is co-ordinated by the Ministry of Economy. It is also the competent national authority in the field of promotion, development and monitoring of nuclear peaceful activities. The Ministry of Health is responsible for monitoring radioactivity and for epidemiological surveillance system. The Ministry of Interior is responsible for supervision of physical protection of nuclear facilities and nuclear material, whilst the Ministry of Environment is responsible for environmental protection legislation and regulations and for the licensing process from an environmental protection point of view. The Ministry of Public Finance is in charge of providing and controlling financial support from governmental budgetary funds.

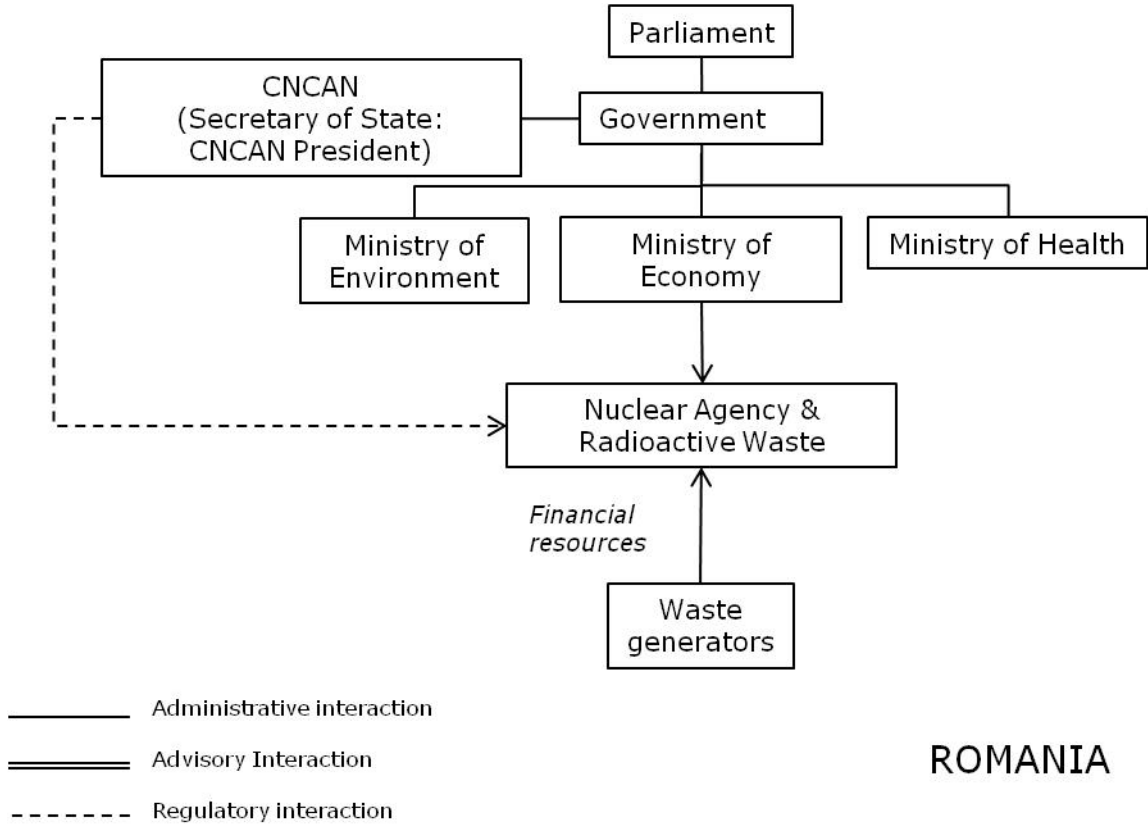
CNCAN is the national competent authority in the nuclear field, exercising the functions of regulation, authorisation and control of nuclear activities. It is an independent governmental body and the president of CNCAN is the Secretary of State.

The owner and operator of Cernavoda nuclear power plant is Nuclearelectrica S.A. The shareholders of Nuclearelectrica are the State of Romania (around 90%) and Fondul Proprietatea (less than 10%). Nuclearelectrica is a shareholder of Energonuclear, together with Enel investment Holding B.V. and ArcelorMittal Galati S.A.

The Romanian Authority for Nuclear Activities (RAAN), through its subsidiaries, the Nuclear Research Institute (SCN) Pitesti, which is the operator of the TRIGA type research reactor and SITON, are involved in the scientific and technical work associated with radioactive waste management.

The nuclear power plant of Cernavoda is located right at the border between Cernavoda and Saligny on the territory of Cernavoda municipality. A part of the nuclear power plant exclusion zone is on the territory of Saligny where the site for the low- and intermediate-level waste repository is proposed.

Stakeholders interactions





Slovakia



Radioactive waste management facilities

Current:

- Mochovce: near surface repository for low- and intermediate-level short-lived radioactive waste.



Main organisations involved in radioactive waste management

Policy/legislation actors	Ministry of Economy www.economy.gov.sk Ministry of the Environment www.minzp.sk Ministry of Health www.uvzsr.sk
Implementing organisation	Nuclear and Decommissioning Company JAVYS www.javys.sk
Regulatory authorities	Nuclear Regulatory Authority www.ujd.gov.sk State Health Institution
Scientific research	VUEZ Levice www.vuez.sk VUJE Trnava www.vuje.sk
Non-governmental organisations (NGOs)	Edofórum (umbrella organisation for environmental NGOs) Slovak Nuclear Society SNUS www.snus.sk Regional Environmental Centre (REC) www.rec.sk
Nuclear industry	Slovenske Elektrarne a.s. www.seas.sk Energoprojekt Slovakia a.s. www.netax.sk/energoprojekt Nuclear Energetic Slovak Company (JESS a.s.)

Local level	Jaslovské Bohunice local council ZMO, Association of towns and communities in Jaslovské Bohunice region, composed of around 185 municipalities located up to 30 km from Bohunice NPP www.zmo.sk
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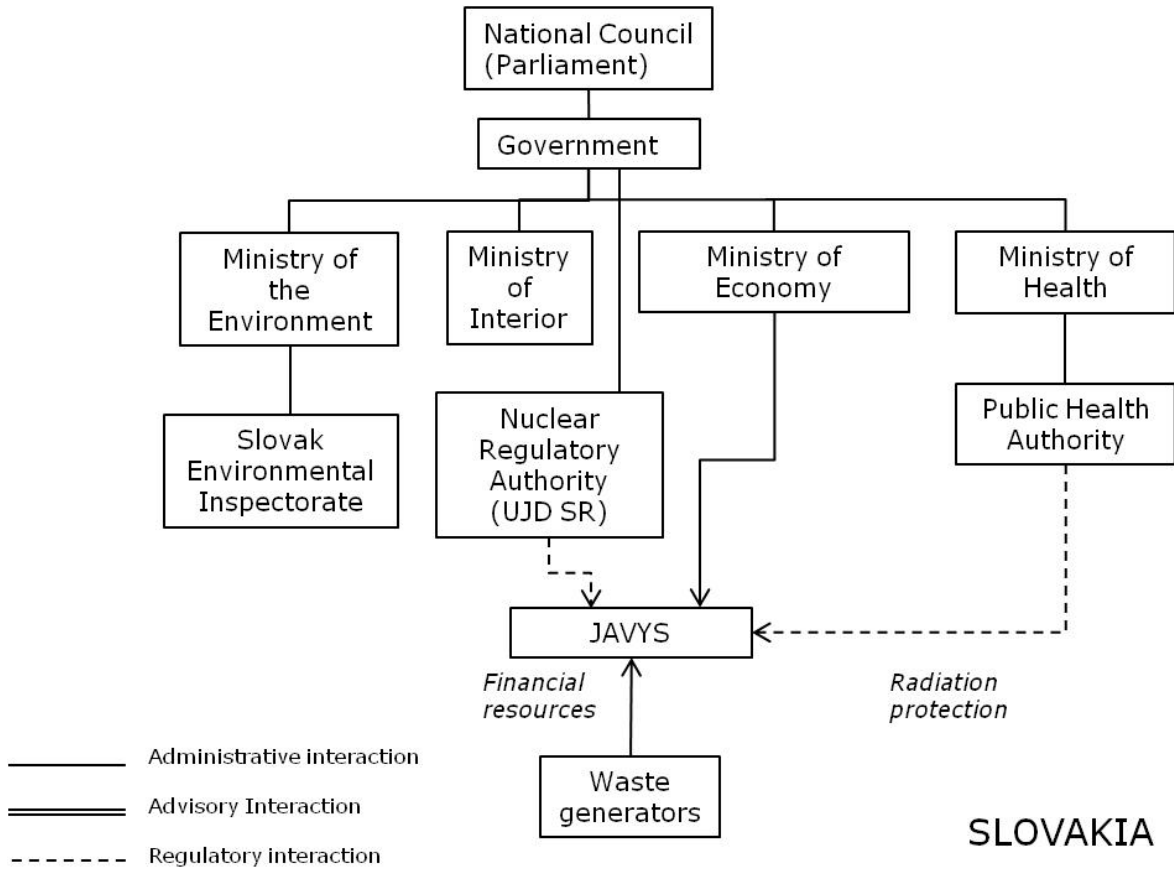
The State authorities with specific responsibilities in the area of radioactive waste management in Slovakia are the National Council, the Government and the Ministries of Economy, Health and the Environment. The Ministry of Health is responsible for health care and health protection. In addition, the Public Health Authority carries out state health supervision in the field of protection against ionization radiation. The Ministry of Environment is responsible for development and protection of the environment. The Slovak Environmental Inspectorate fulfils the function of state supervision in matters of environment and reports to the Ministry of Environment. The Ministry of Interior, among other organisations, is responsible for the security of persons and property, civil protection, civil emergency planning , etc.

The Ministry of Economy is responsible for the energy sector, including management of nuclear fuel and storage of radioactive waste. The Ministry of Economy administers the State Fund for Decommissioning of Nuclear Power Installations and Radioactive Waste and Spent Fuel Management.

There are two organisations in Slovakia operating nuclear installations – SE, a.s. and JAVYS, a.s. JAVYS is the State owned company established in 2005 responsible for the management of spent nuclear fuel and radioactive waste in Slovakia as well as decommissioning of the nuclear power plants.

The Nuclear Regulatory Authority of Slovakia (UJD SR) is responsible for supervision of nuclear safety, including all aspects of radioactive waste management and spent fuel management and other phases of fuel cycle, as well as physical protection of nuclear installations.

Stakeholders interactions





Slovenia



Radioactive waste management facilities

Current:

- Brinje: central storage facility for low- and intermediate-level long-lived radioactive waste arising from medical, industrial and research applications.

Planned:

- Krško: repository for low- and intermediate-level long-lived radioactive waste situated in Vrbine site in Krško.



Main organisations involved in radioactive waste management

Policy/legislation actors	Ministry of the Environment and Spatial Planning www.arhiv.mop.gov.si Ministry of the Economic Development and Technology www.mgrt.gov.si Ministry of Health www.mz.gov.si
Implementing organisation	ARAO Radioactive Waste Management Agency www.arao.si
	Fund for Financing Decommissioning of the Krsko Nuclear Power Plant and Disposal of Radioactive Waste from the Krsko Nuclear Power Plant www.sklad-nel.si
Regulatory authorities	Slovenian Nuclear Safety Authority (SNSA) www.ursjv.gov.si Slovenian Radiation Safety Administration www.uvps.gov.si
Scientific research	Jozef Stefan Institute www.ijs.si
Non-governmental organisations (NGOs)	ZEG Association of ecological movements in Slovenia www.zveza-zeg.si Slovenian Nuclear Society www.nss.si Regional Environmental Center (REC Slovenia) www.rec.org
Nuclear industry	Nuclearna Elektrarna Krsko www.nek.si GEN energija d.o.o www.gen-energija.si
Local level	Krsko local council www.krsko.si Brezice local council www.brezice.si Sevnica local council

ARAO is a non-profit organisation of the Slovenian Government, established in 2011, which provides a state-owned public service for radioactive waste management. ARAO has the responsibility of collecting, transporting, treating, storing and disposing of LILW and for the disposal of HLW. It executes the policy of the Ministry of the Environment and Spatial Planning.

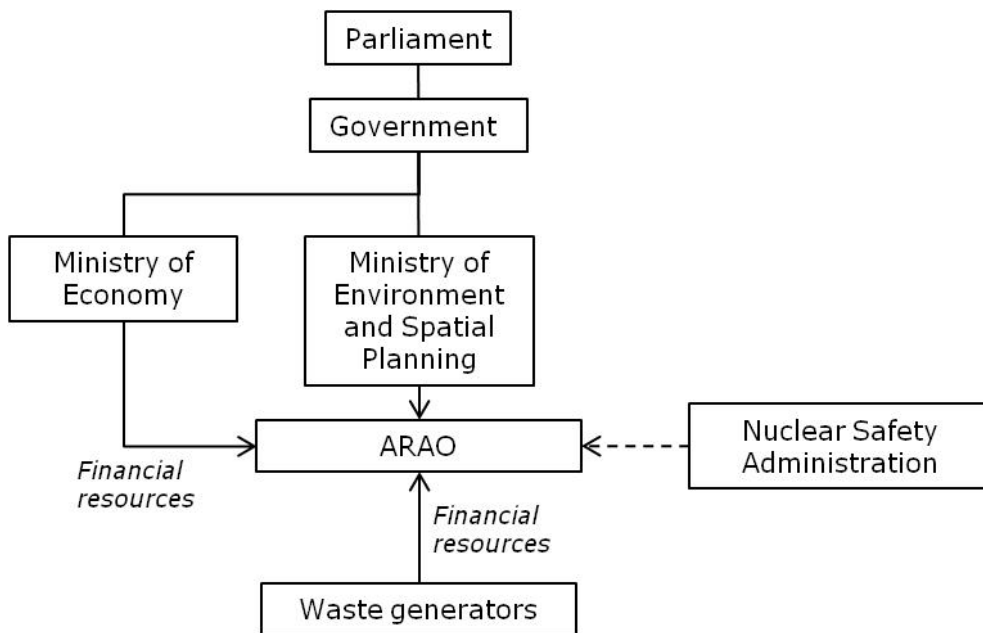
In 2006, local partnerships, based on the Belgium partnerships, were established as a joint venture between ARAO and three candidate municipalities to host a radioactive waste repository, Krsko, Brezice and Svenica. The partnerships were set up to support the mixed mode siting approach and address local needs. However, they ended in 2009 after the siting process reached its final stage with the confirmation of one potential location for hosting the low- and intermediate-level waste.

The storage of the radioactive waste from the nuclear power plant is responsibility of the operator NEK.

The SNSA is the regulatory body within the Ministry of Agriculture and the Environment, which is responsible for nuclear and radiation safety. The Slovenian Radiation Protection Administration within the Ministry of Health is the competent authority for radiation safety in medicine. The Ministry of Interior is responsible for control of the transport of radioactive material and has major responsibilities in the area of physical protection of nuclear material.

The Fund for Financing Decommissioning of the Krsko Nuclear Power Plant and Disposal of Radioactive Waste from the Krsko Nuclear Power Plant has been tasked by the Slovene state to collect the funds needed for the decommissioning of the nuclear power plant and safe disposal of radioactive waste. The Fund was founded by the Slovenian National Assembly and its activities are affected by the Slovenian Government.

Stakeholders interactions



- Administrative interaction
- ==== Advisory Interaction
- - - - - Regulatory interaction

SLOVENIA



Spain



Radioactive waste management facilities

Current:

- El Cabril: surface disposal facility for low- and intermediate-level waste short-lived. Very low-level waste generated in nuclear and other facilities is also disposed of in the near surface repository at El Cabril centre.

Planned:

- Villar de Cañas: centralised storage facility for high-level waste and spent fuel in the province of Cuenca. This facility will also accommodate vitrified high-level waste from the reprocessing of spent fuel from Vandellòs I nuclear power plant currently stored in France.



Main organisations involved in radioactive waste management

Policy/legislation actors	Ministry of Industry, Energy and Tourism (MINETUR) www.minetur.gob.es
Implementing organisation	ENRESA www.enresa.es
Regulatory authorities	CSN, Nuclear Safety Council www.csn.es
Scientific research	CIEMAT Centre for Energy-related, Environmental and Technical Research www.ciemat.es CSIC, National Research Council www.csic.es CEIDEN, Technology Platform for Fission Nuclear Energy www.ceiden.com
Non-governmental organisations (NGOs)	Ecologistas en Acción www.ecologistasenaccion.org SNE, Spanish Nuclear Society www.sne.es SEPR, Spanish Society of Radiological Protection www.sepr.es Official Association of Physicists www.cofis.es
Nuclear industry	Foro de la Industria Nuclear www.foronuclear.org UNESA www.unesa.es Endesa www.endesa.es Nuclenor www.nuclenor.org Iberdrola www.iberdrola.es
Local community	Municipality of Hornachuelos hosting El Cabril www.hornachuelos.es Villar de Cañas www.villardecanas.es AMAC Spanish Association of Municipalities in Nuclear Zones www.amac.es COMUN Coordinator of Nuclear Municipalities in Spain www.lacomun.es

ENRESA, the state-owned company responsible for managing radioactive waste and decommissioning nuclear plants, was created in 1984. The shareholders of ENRESA are CIEMAT (80%) and SEPI (20%), both governmental institutions, which provide continuous support and assistance in relation to the company's proposals and needs. The role of ENRESA is to develop radioactive waste management activities according to the policy and strategy approved by the Spanish Government. Thus, ENRESA is committed by Law to prepare and submit a draft of the general radioactive waste plan to the Ministry of Industry, every four years or when necessary. The draft plan is then assessed by the Government which approves it, if considered appropriate. The Plan is then submitted to Parliament for information. The first general radioactive waste plan was approved in 1987 whilst the latest in 2006. ENRESA is assigned to undertake the management of this public service, under the auspices of the Ministry of Industry and carries out the tasks assigned to it by the Government. ENRESA reports to the Ministry of Industry via the Secretariat of State for Energy, which is responsible for strategic management and monitoring and control of its economic and technical activities. ENRESA also reports on its activities and projects, communicates legislative needs and informs on technological innovations in its field of activity to the Parliament.

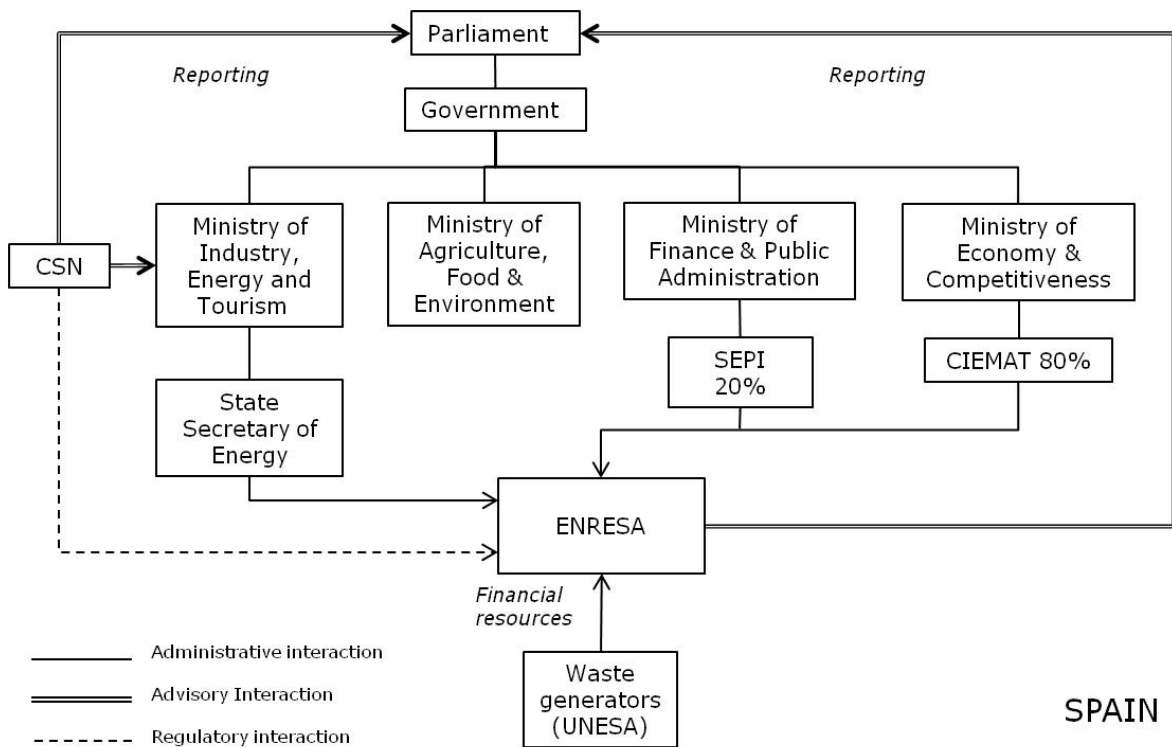
The Nuclear Safety Council, CSN, is the only competent body in matters of nuclear safety and radiological protection and is independent of the state administration. It

reports directly to the Parliament. The CSN issues reports to the MINETUR on nuclear safety, radiological protection, and physical protection, prior to the adoption of resolutions.

The MARM participates in the licensing process, in collaboration with the CSN, by providing an environmental impact statement. This procedure takes into account regional and local governments in the areas under their competence.

AMAC is the Spanish Association of Municipalities in Nuclear Areas. It is composed of 66 municipalities situated in the 10km area around nuclear power plants. AMAC interacts institutionally with the relevant institutions with responsibilities in radioactive waste management (i.e. Ministry of Industry, ENRESA, CSN) and is the link between them and local actors. There is also an association (COMUN) representing the interests of the municipalities with nuclear reactors.

Stakeholders interactions





Sweden



Radioactive waste management facilities

Current:

- Clab is the central storage facility for spent nuclear fuel, located north of the municipality of Oskarshamn.
- SFR is the disposal facility for short-lived low- and intermediate-level waste in Forsmark, outside the municipality of Östhammar. The SFR facility plans to undergo an expansion to receive waste from dismantling nuclear power plants.
- It is worth mentioning also the M/S Sigrid, a specially built vessel to transport radioactive waste from nuclear power plants to the waste storage facilities.

Planned:

- A final repository for spent fuel is planned in Östhammar municipality, close to the Forsmark nuclear power plant. At present, SSM and the Land and Environmental Court are reviewing the applications submitted by SKB in spring 2011. The review will take several years. The operation of the repository is foreseen around 2025.



Main organisations involved in radioactive waste management

Policy/legislation actors	Ministry of the Environment www.sweden.gov.se
Implementing organisation	SKB, Swedish Nuclear Fuel and Waste Management Company www.skb.se
Regulatory authorities	Swedish Radiation Safety Authority (SSM) http://www.stralsakerhetsmyndigheten.se Land and Environmental Court www.domstol.se
Advisory and consultative bodies	Swedish National Council for Nuclear Waste, Kärnavfallsrådet http://www.karnavfallsradet.se
Scientific research ²⁶	Studsvik AB www.studsvik.com
Non-governmental organisations (NGOs)	Swedish Environmental Movement's Nuclear Waste Secretariat (Milkas) http://nonuclear.se/milkas Swedish NGO office for Nuclear Waste Review (MKG) www.mkg.se National Organisation of Energy Associations (SERO) www.sero.se
Nuclear industry	Vattenfall AB www.vattenfall.com EON Sweden AB www.eon.se
Regional level	Uppsala Regional Council www.region uppsala.se Kalmar County Council www.rfkl.se
Local community	Östhammar local council www.osthammar.se Oskarshamn local council www.oskarshamn.se

The Government grants licenses for nuclear facilities and decides on fees to be paid to the nuclear waste fund as well as on financial guarantees to be provided by the licensees. The Ministry of the Environment is responsible for legislating matters related to management of spent fuel and radioactive waste as well as from use of radioactive substances from medical, research and industrial applications.

The Swedish nuclear operators jointly established a company to assist them in safely handling, transporting and storing spent fuel and radioactive waste outside the nuclear power plants. Thus, SKB was established in the 1970s and is also responsible for the planning and construction of all facilities required for the management of spent nuclear fuel and radioactive wastes as well as for R&D programmes necessary for the provision of such facilities. SKB submitted the application for a final disposal of spent fuel in Östhammar community and an encapsulation plant in Oskarshamn to the Environmental Court and to SSM in 2011. Both administrations will provide recommendations to the government. Apart from the approval from the regulatory

²⁶ It is interesting to mention here Nova FoU, the joint research and development platform at Nova Centre for University Studies, Research and Development supported by SKB and the Municipality of Oskarshamn. Further information can be found at: <http://www.novaoskarshamn.se>.

authorities, SKB needs also approval from the municipalities of Östhammar and Oskarshamn as well as from the Parliament and the Swedish Council for Nuclear Waste (OECD/NEA, 2012). The Swedish process is currently in the licensing phase and a final decision is not expected before 2016 (SKB, 2013).

Studsvik Nuclear AB offers treatment of low- and intermediate-level waste from nuclear power plants and other industries at its own facilities outside Nyköping. When the waste is treated at Studsvik, it is returned to the customer.

SSM²⁷ is the regulatory authority for protection of people and the environment against harmful effects of ionising and non-ionising radiation, for issues on nuclear safety, as well as other activities involving radiation. SSM has a mandate from the Swedish Government within the areas of nuclear safety, radiation protection and nuclear non-proliferation. SSM reports to the Ministry of the Environment. The Government has tasked SSM to review SKB's application to construct a repository for spent nuclear fuel under the Act on Nuclear Activities. When the application has been reviewed, a report is presented to the Government. The Environmental Court also reviews environmental related matters of the application according to the Environmental Code and reports its findings to the Government. The Östhammar municipality must also approve SKB's applications before the Government grants SKB a license to construct the repository.

The Swedish National Council for Nuclear Waste²⁸ is an independent scientific committee whose mission is to advise the Government on nuclear waste and decommissioning of nuclear facilities. It is attached to the Ministry of the Environment.

The Swedish Nuclear Waste Fund is a governmental authority with the primary task of administrating the fees that have been collected from nuclear power reactor owners and that are used for paying the costs of the repository project.

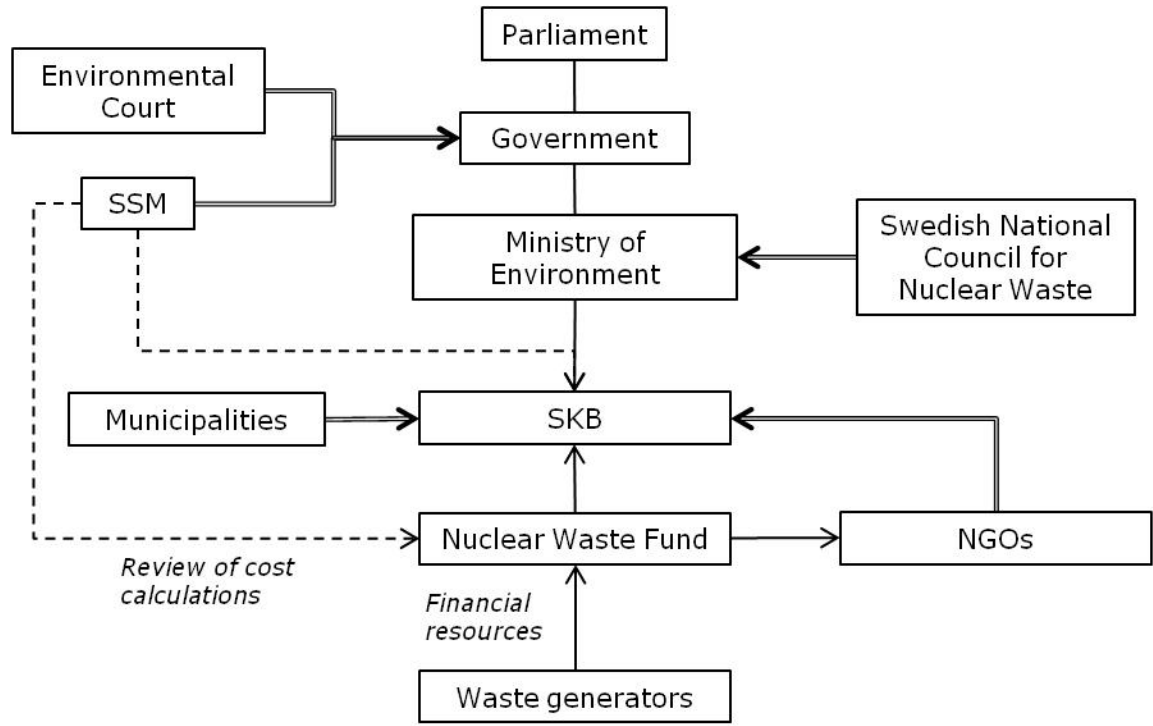
Östhammar and Oskarshamn are the two municipalities, both hosting reactors, that agreed to become candidates in the process of siting the spent fuel repository. Swedish municipalities have veto right over the siting of projects which may involve environmental impacts. On 16 March 2011, SKB applied for permits to build the final repository for spent fuel in Forsmark, in the northern part of the municipality of Östhammar.

One of the main environmental groups in Sweden is the Swedish NGO Office for Nuclear Waste Review (MKG) which was created in 2004 by the largest Swedish environmental NGO. MKG is an umbrella organisation including the Swedish Society for Nature Conservation and two of their regional branches, an independent youth movement associated with the society and the local association of Östhammar Oss. MKG was specifically created as a result of the Nuclear Financial Act to work with nuclear waste issue. Another environmental NGO, which is active in the field of radioactive waste management, is the Swedish Environmental Movement's Nuclear Secretariat (Milkas) founded by the Swedish Anti-nuclear Movement and Friends of the Earth Sweden. The association is also partly financed by the Swedish Nuclear Waste Fund.

²⁷ On 1 July 2008, SSM took over the responsibilities of the two regulatory bodies, the Swedish Nuclear Power Inspectorate SKI and the Swedish Radiation Protection Authority, SSI.

²⁸ Previously named KASAM.

Stakeholders interactions

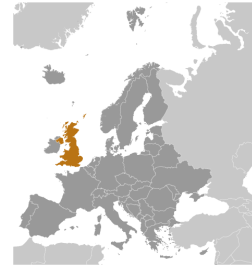


- Administrative interaction
- == Advisory Interaction
- - - Regulatory interaction

SWEDEN



United Kingdom



Radioactive waste management facilities

Current:

- Drigg: repository for low-level radioactive waste operating since 1959 near Drigg in Cumbria.
- Sellafield: high-level waste arising from reprocessing is vitrified and stored at Sellafield.



Main organisations involved in radioactive waste management

Policy/legislation actors	Department of Energy and Climate Change (DECC) www.decc.gov.uk Department for Environment, Food and Rural Affairs (DEFRA) www.defra.gov.uk
Advisory bodies	CoRWM https://www.gov.uk/government/organisations/committee-on-radioactive-waste-management
Implementing organisation	NDA, Nuclear Decommissioning Authority, www.nda.gov.uk
Regulatory authorities	ONR, Office for Nuclear Regulation (ONR) as an agency within the Health and Safety Executive www.hse.gov.uk/nuclear Environment Agency www.environment-agency.gov.uk Scottish Environment Protection Agency (SEPA) www.sepa.org.uk
Scientific research	British Geological Survey (BGS) www.bgs.ac.uk UK Atomic Energy Authority Ltd (UKAEA) www.ukaea.co.uk
Non-governmental organisations (NGOs)	Cumbrians opposed to a radioactive environment (CORE) www.corecumbria.co.uk
Industry	Nuclear Industry Association NIA www.niauk.org Sellafield Limited www.sellafieldsites.com British Energy plc www.british-energy.com Magnox Ltd www.magnoxsites.co.uk
Local community	Copeland Borough Council www.allerdale.gov.uk Allerdale Borough Council www.copeland.gov.uk Cumbria County Council www.cumbria.gov.uk Nuclear Legacy Advisory Forum (NuLeAF) www.nuleaf.org.uk West Cumbria Sites Stakeholder Group (WCSSG)

DECC is the lead department in the UK for the management and disposal of radioactive waste. DECC works closely with DEFRA and the Environment Agency to plan and regulate radioactive waste management.

The Nuclear Decommissioning Authority (NDA) is a non-departmental public body created in 2005, responsible for implementing Government policy on the long-term management of nuclear waste, including the decommissioning and clean up of the civil public sector nuclear sites. The NDA reports to the DECC and for some aspects, NDA is responsible to the Scottish Ministers.

The Environment Agency and the ONR will regulate any future geological disposal facility for radioactive waste in England. The Environment Agency provides advice and regulatory comment to government, the NDA, local authorities and the public. The Environment Agency is the leading public body for protecting and improving the environment in England and Wales, carrying out Government policy. The Scottish environment Protection Agency (SEPA) is Scotland's environmental regulator, and their main role is to protect and improve the environment.

The Office for Nuclear Regulation (ONR), an agency of the Health and Safety Executive (HSE), was formed in April 2011 as a specific regulator of the nuclear industry. ONR must consult the Environment Agency, for England and Wales, and the Scottish Environment Protection Agency (SEPA) for Scotland, before granting a license.

CoRWM is an advisory non-departmental public body of the DECC which was set up by the UK government in November 2003. CoRWM provides independent scrutiny and advice to the UK government on the long-term management of high-level radioactive waste. CoRWM is formed of 12 members who are experts in different aspects of radioactive waste management. They are appointed and report to ministers from: DECC, Scottish Government, Welsh government, Department of the Environment of Northern Ireland.

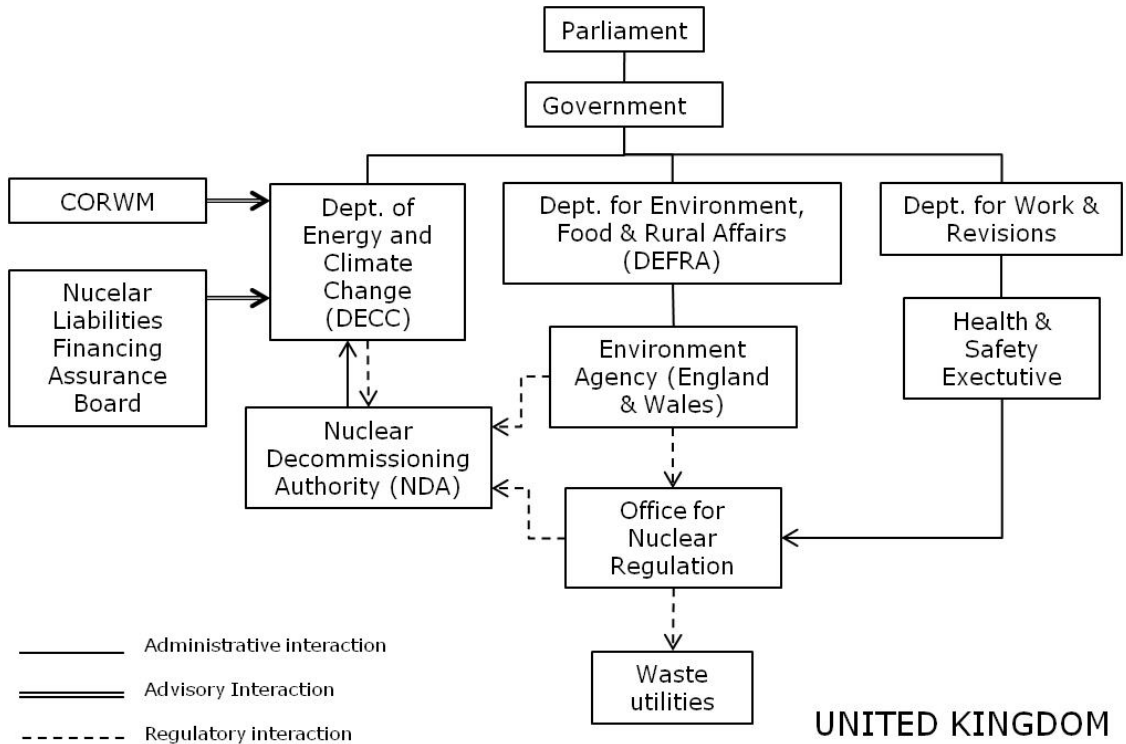
NuLeAF is a special interest group of the Local Government Association that represents local government on nuclear legacy management and takes an active part in consultations and debates on radioactive waste issues.

At the regional level, it is interesting to mention Allerdale Borough Council, Copeland Borough Council and Cumbria County Council as they set up the West Cumbria Managing Radioactive Waste Safely (MRWM) Partnership²⁹. The role of this partnership was to involve a wide range of interests over three years "to consider the issues that would be involved in taking part in a search to see if there is anywhere in the Allerdale and/or Copeland areas suitable for a repository for higher activity radioactive waste" (West Cumbria MRWS Partnership, 2012). In addition, the West Cumbria Sites Stakeholder Group independently monitors Sellafield and provides a forum for representing local community interests. It is also the interface between the community, the site operator and the NDA.

At the industrial level, Magnox South Ltd is the management and operations contractor responsible for decommissioning five nuclear sites on behalf of the NDA. Sellafield Ltd is the company responsible for safely delivering decommissioning, reprocessing, nuclear waste management and fuel manufacturing on behalf of the NDA.

²⁹ www.westcumbriamrws.org.uk

Stakeholders interactions



Countries without nuclear power programmes

This Section presents the organisational responsibilities and storage facilities in countries without nuclear power programmes. These countries include: Austria, Cyprus, Denmark, Estonia, Greece, Ireland, Italy, Latvia, Luxembourg, Malta, Poland and Portugal. Radioactive waste in countries without nuclear power programmes is generated mainly in medical and industrial applications or in research facilities like laboratories and research reactors. The responsibility for radioactive waste management can rest on a national research centre or institute (e.g. Austria, Greece, Portugal), a Ministerial department (e.g. Luxembourg) or other bodies. In Cyprus and Ireland there is no distinct radioactive waste management organisation.

The Table below lists the waste management organisations and regulatory bodies for the MSs without nuclear power programmes. Croatia is also included in the table below, although it is worth mentioning that it should be addressed as a specific case due to the co-ownership of the Krsko nuclear power plant with Slovenia. Radioactive waste from Krsko nuclear power plant is temporarily stored on site, whilst radioactive waste from medical, industrial and research activities is stored in temporary storages at two national research institutes. The Hazardous Waste Management Agency³⁰ (APO) is responsible for the management of LILW and spent fuel from Krsko nuclear power plant and its decommissioning. The Ministry of Health, Sanitary Inspection Section is the competent authority for radiation protection issues.

Country	WMO	Regulatory body
Austria	Nuclear Engineering Seibersdorf (NES) www.nes.at	Federal Ministry of Agriculture, Forestry, Environment and Water Management http://www.lebensministerium.at
Croatia	Hazardous Waste Management Agency (APO) www.apo.hr	Ministry of Health, Sanitary Inspection Section www.zdravlje.hr
Cyprus	No distinct radioactive waste management organisation	Radiation Inspection and Control Safety, Ministry of Labour and Social Insurance www.mlsi.gov.cy
Denmark	Danish Decommissioning (DD) www.ddcom.dk	National Institute of Radiation Protection http://sundhedsstyrelsen.dk/sis and Danish Emergency Management Agency (DEMA) www.brs.dk
Estonia	A.L.A.R.A. AS www.alara.ee	Environmental Board www.keskkonnaamet.ee
Greece	NCSR Demokritos www.demokritos.gr	Greek Atomic Energy Commission (GAEC) www.gaec.gr
Ireland	No distinct radioactive waste management organisation	Radiological Protection Institute of Ireland (RPII) www.rpii.ie
Italy	SOGIN www.sogin.it	ISPRA www.isprambiente.gov.it

³⁰ www.apo.hr

Latvia	LVGMC www.lvgmc.lv	Radiation Safety Centre of the State Environmental Service www.vvd.gov.lv
Luxembourg	Ministry of Health www.ms.public.lu	Department of Radiation Protection, Ministry of Health www.ms.public.lu
Malta	WASTESERV	Radiation Protection Board www.ohsa.org.mt
Poland	RWMP www.zuop.pl	National Atomic Energy Agency www.paa.pov.pl
Portugal	ITN www.itn.pt	Regulatory Commission for the Safety of Nuclear Installations (COMRSIN) www.comrsin.pt

In most of these countries, low- and intermediate-level radioactive waste produced is stored on site by users, like in Greece or Ireland. In Luxembourg, small quantities of radioactive waste are exported to Belgium for treatment and final storage according to a bilateral agreement (EC, 2011).

Some of these countries have storage facilities for radioactive waste, like Italy, Poland and Portugal. In Italy, spent fuel is stored at the storage facilities of Trino, Caorso³¹ and Avogadro. The Avogadro site is a spent fuel storage facility away from reactors placed at Saluggia, near the town of Vercelli.

Poland disposes of institutional low- and intermediate-level waste at the Rózan facility, together with storage of long-lived waste. However, the repository will be closed in 2020 and a new one has to be built, taking into account the plans for new nuclear build in Poland. For spent fuel coming from research reactors, most of it is shipped to the Russian Federation. The Radioactive Waste management plant state-owned company (RWMP), in operation since 2002, takes full responsibility for waste management since the time of collection from the producer.

In Portugal, low- and intermediate-level waste is stored at ITN, which is the only legal organisation responsible for collection, conditioning and storage of radioactive waste in Portugal. On the other hand, spent fuel from the research reactor RPI is returned back to the USA according to an agreement between the two countries.

³¹ The nuclear power plants of Trino and Caorso were shut down in 1987, based on a governmental decision after the Chernobyl accident.

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