Deliverable 9.17: Implementation of ROUTES action plan second phase

Report of Task 7 on Interaction with Civil Society (ICS)

Transparency in establishment of national radioactive waste facilities: Criteria for good transparency, national case studies and recommendations

The project leading to this application has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 847593.

Document information

Project Acronym	**EURAD**
Project Title	**European Joint Programme on Radioactive Waste Management**
Project Type	**European Joint Programme (EJP)**
EC grant agreement No.	**847593**
Project starting / end date	**1st June 2019 – 30 May 2024**
Work Package No.	**9**
Work Package Title	**Waste management routes in Europe from cradle to grave**
Work Package Acronym	**ROUTES**
Deliverable No.	**9.17**
Deliverable Title	**Implementation of ROUTES action plan second phase**
Lead Beneficiary	**IRSN [NTW]**
Contractual Delivery Date	**April 2022**
Actual Delivery Date	**October 2023**
Type	**Report**
Dissemination level	**Public**
Authors	**Nadja Zeleznik (EIMV), Johan Swahn (NTW), Michal Daniška (NTW), Jan Haverkamp (NTW), Niels Henrik Hooge (NTW), Malcolm de Butler (NTW), Colin Wales (NTW)**

To be cited as:

Zeleznik N., Swahn J., Daniška M., Haverkamp J., Hooge N.H., de Butler M, Wales C., (2022): Implementation of ROUTES action plan second phase. Final version as of 22/08/2023 of deliverable D9.17 of the HORIZON 2020 project EURAD. EC Grant agreement no: 847593.

Disclaimer

All information in this document is provided "as is" and no guarantee or warranty is given that the information is fit for any particular purpose. The user, therefore, uses the information at its sole risk and liability. For the avoidance of all doubts, the European Commission or the individual Colleges of EURAD (and their participating members) has no liability in respect of this document, which is merely representing the authors' view.

Acknowledgement

This document is a deliverable of the European Joint Programme on Radioactive Waste Management (EURAD). EURAD has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 847593.

Status of deliverable		
	By	Date
Delivered (Lead Beneficiary)	Nadja Zeleznik, JSI [EIMV]	18.11.2022
Verified (WP Leader)	François Marsal, IRSN	07.03.2023
Delivered (Lead Beneficiary)	Nadja Zeleznik, JSI [EIMV]	10.03.2023
Reviewed (Reviewers)	Wilfried Pfingsten, PSI Frederic Bernier, FANC	27.03.2023 03.05.2023
Approved (PMO)	Elisabeth Salat, IRSN	17.08.2023
Submitted to EC (Coordinator)	Andra	10.10.2023

Executive Summary

The focus of the work of ROUTES Task 7 on Interaction with Civil Society (ICS) during year 3 has been investigations on how the pillars of Aarhus convention and a broader understanding of transparency by Civil Society (CS) can be transposed into Radioactive Waste Management (RWM), in particular in establishment of Radioactive Waste (RW) facilities in different national contexts. Therefore, the deliverable D9.17 is entitled “Implementation of ROUTES action plan second phase: Transparency in establishment of national radioactive waste facilities: Criteria for good transparency, national case studies and recommendations”. In this deliverable the results of the investigations are provided, including comments, suggestions, questions, and other observations collected in interaction with EURAD participants and the CS larger group.

The report starts with an overview of the ICS action plan with the main issues for investigation of Task 7 in the following years and the focus of the present deliverable. In addition, the detailed structure of the report is given. In section 2, some criteria for transparency in the development of national RW facilities are proposed based on the Radioactive Waste Directive, the Aarhus Convention and the BEPPER report. Section 3 deals with the questionnaire submitted to the ROUTES members and to the CS larger group members and received responds. It was devoted to the transparency in the establishment of national radioactive waste facilities and included five topics of effective access to information, public participation, justice (Aarhus Convention), resources (BEPPER report) and T&PP in the development of the national programmes on RWM submitted to the EC (Waste Directive). Section 4 presents recommendations for the transparency and public participation derived from the analyses of the national case studies on transparency in establishment of national radioactive waste facilities for different European countries: Czech Republic, Denmark, Germany, Greenland, France, Netherland, Slovakia, Sweden and United-Kingdom (the national cases are accessible in the appendix of the deliverable). Based on the descriptions and analyses, conclusions with general recommendations from the case studies and ICS that could more generally apply for the establishment of national RW facilities are provided in section 4.

The ongoing interactions and progress of activities in relation to Tasks 2-8 in ROUTES that have taken place during year 3 are reported in section 5. Finally, some ideas of what the next investigations will be the focus of Task 7 work during year 4 are reported in section 6.

Table of contents

List of figures

List of Tables

Glossary

"The Act" – Public Participation Act – or so called "Act on the Involvement of Municipalities", Czech Republic

BEPPER – Broad framework for Effective Public Participation in Environmental decision-making in Radioactive waste management

ADC – Allerdale District Council, United Kingdom

AGR – Advanced Gas cooled Reactor

AONB – Area of Outstanding Natural Beauty, United Kingdom

BAN – Break Atomic Chain, Netherlands

BEIS – Business, Energy and Industrial Strategy (UK Government Department)

BMD – Brede Maatschappelijke Discuss Broad Societal Discussion on nuclear energy, Netherlands

CBC – Copeland Borough Council, United Kingdom

CCC – Cumbria County Council, United Kingdom

CoRWM – Committee on Radioactive Waste Management (2003- Current), United Kingdom

CP – Community Partnership (As defined in the WWCL), United Kingdom

COG – ContainerOpslagGebouw – container storage building, the Netherlands

COVRA - Centrale Organisatie voor Radioactief Afval (Central Organisation for Radioactive Waste), Netherlands

CS – Civil Society

CSO – Civil Society Organisation

CT – The Cumbria Trust Ltd, United Kingdom

CZ – The Czech Republic

D9.16 – Deliverable 9.16

D9.17 – Deliverable 9.17

DAD – Decide, Announce, Defend

DD – Danish Decommissioning

DG ENER - Directorate-General for Energy (DG Ener) of the European Commission

DGR – Deep Geological Repository

DtP – Decision to Participate

EC – European Commission

ECN – Energy Centre Netherlands

EIA – Environmental Impact Assessment

EJP – European Joint Programme

EoI – Expression of Interest

ERMA – European Raw Materials Alliance

EU – European Union

EURAD – European Joint Programme on Radioactive Waste Management

FNV – Federarieve Nederlandse Vakvereniging, Federative Dutch Trade Union, Netherlands

FOIA – Freedom of Information Act

GD – Geological Disposal

GDF – Geological Disposal Facility

GEUS – Geological Survey of Denmark and Greenland

GKN – Gemeenschappelijke Kerncentrale Nederland, owner Dodewaard nuclear power plant, Netherlands

GML – Greenland Minerals Ltd.

HABOG – Hoogradioactief Afval Behandelings- en OpslagGebouw, high radioactive waste treatment and storage building, Netherlands

HAW – Higher Activity Waste

HLW – High Level Waste

IAEA – International Atomic Energy Agency

ICS – Interaction with Civil Society

IGD – Implementing Geological Disposal

IPSOS MORI – UK Market Research Company

JAVYS – Jadrová a vyraďovacia spoločnosť = Nuclear and decommissioning company

LAKA – Landelijk Anti-Kernenergie Archief, national anti-nuclear archive, the Netherlands

LDNP – Lake District National Park, United Kingdom

LILW – Low and Intermediate Level Waste

LIMS – Large Inventory Member States

LLW – Low Level Waste

LLWR – Low Level Waste Repository (Location: - Drigg in Cumbria)

LOFRA – Commissie Locatiekeuze Faciliteit Radioactief Afval (Commission site location choice radioactive waste), Netherlands

LOG – Laagradioactiefaval OpslagGebouw – low-level radioactive waste storage building, Netherlands

MKG – The Swedish NGO Office for Nuclear Waste Review

MOG – Middelradioactiefaval OpslagGebouw – mid-level radioactive waste storage building

MPO – Ministry of Industry, Czech Republic

MRWS – Managing Radioactive Waste Safely (Policy and Community Engagement Process 2010-2013)

MS – Member State(s)

NDA – Nuclear Decommissioning Authority (2006 – Current), United Kingdom

NGO – Non-Governmental Organisation

NIREX – Nuclear Industries Radioactive Waste Executive (1982-1985), United Kingdom

NIREX Ltd – (1985-2005 UK incorporated public body with shareholders), United Kingdom

NOEND – No Ennerdale Nuclear Disposal (Citizens Group), United Kingdom

NPP – Nuclear Power Plant

NRA – Nuclear Regulatory Authority

NSIP – Nationally Significant Infrastructure Project

NTW – Nuclear Transparency Watch

NWS – Nuclear Waste Services (2022 – Current, Formally Radioactive Waste Management)

OECD – Organisation for Economic Co-operation and Development

OPERA - Onderzoeksprogramma Eindberging Radioactief Afval, research programme final disposal radioactive waste, the Netherlands

PLA – Principle Local Authority

PMO – Programme Management Office (EURAD Work Package)

PRW – Pressurised Water Reactor

PZEM - Provinciale Zeeuwse Electriciteitsmaatschappij, Provincial and municipal utility, Zeeland, Netherlands

Q/A – Questions & Answers

R&D – Research & Development

RW – Radioactive Waste

RC – Republic of Croatia

RCF – Rock Characterisation Facility

REE – Rare Earth Element

REs – Nationally funded Research Entities

ROUTES – Waste management routes in Europe from cradle to grave (EURAD Work Package)

RS – Republic of Slovenia

RW – Radioactive Waste

RWM – Radioactive Waste Management

RWM Ltd – Radioactive Waste Management Ltd (2014 -2022 Now NWS incorporating LLWR), United Kingdom

SEA – Strategic Environmental Assessment

SIA – Social Impact Assessment

SIMS – Small Inventory Member States

SMR – Small Modular Reactor

SNF – Spent Nuclear Fuel

SPAND – Solway Plain against a Nuclear Dump (Citizens Group), United Kingdom

SURAO – Sprava ulozist radioaktivnich odpadu_ WMO, Czech Republic

SUJB – Statni urad pro jadernou bezpecnost _ State Office for Nuclear Safety, Czech Republic

T&PP – Transparency and Public Participation

TCT – Treatment and Conditioning Technology

THORP – Thermal Oxide Reprocessing Plant

TPEVM – Third Party Expert View Mechanism

TSO(s) – Technical Support Organisations

UK NIREX Ltd – (1985 -2005), United Kingdom

UMAN – Uncertainty Management multi-Actor Network

USGS – United States Geological Survey

VLLW – Very Low-Level Waste

VOG – Verarmd uranium Opslag Gebouw – depleted uranium storage building, the Netherlands

VVER – Water Water Energy Reactor

WAC – Waste Acceptance Criteria

WG – Working Group (As defined in the WWCL)

WHS – World Heritage Site

WISE – World Information Service on Energy

WMO(s) - Waste Management Organisation(s)

WP – Work Package

WWC – Working with Communities Policy

1. Introduction

Deliverable 9.17 “Implementation of ROUTES action plan second phase” is the second report based on the approach, described in the Deliverable 9.15 “Scoping of ROUTES, Initial ICS Input and ICS Action Plan” [1], developed by the CS experts of Task 7 in the ROUTES WP. This approach foresees continuous follow up of the activities in ROUTES technical tasks (2-6 and 8) and further orientation on the specific topic identified as most interesting in the perspective of developing interactions between CS and EURAD partners along the course of the WP. The first deliverable 9.16 “Implementation of ROUTES action plan first phase” [2] therefore focused on ethical and legal issues, good transparency and public concerns related to shared Radioactive Waste Management (RWM) solutions coming from several presented cases. It also identified the topic of EURAD year 3 investigation within Task 7. Therefore, the focus of this deliverable 9.17 is the transparency and public participation in regard to national RWM developments based on the provisions of existing international legal frameworks (like Aarhus and ESPOO conventions) and related EU legislation, in particular the Waste Directive [3], but also the SEA Directive [4], the EIA Directive [5], transposition of Aarhus convention into EU legal system [6, 7, 8] and evaluations by CS members from several national examples.

As the activities within ROUTES continue, this will also be an opportunity to review existing action plans and to address the ongoing development in other tasks. The first version of the ICS action plan is part of D9.15 but has been further reassessed and adopted by Task 7 members as a base for this report (presented in 1.1). The introduction is concluded by a description of the structure of the report (1.2).

1.1 Updated ROUTES Task 7 action plan for year 2-4 for interaction with civil society (ICS)

Based on the outcomes of the Task 7, investigation of tasks 2-6 and the new task 8, starting in EURAD year 3 as result of second wave, in the ROUTES WP, additional feedback from EURAD participants and interaction with the EURAD CS larger group, an action plan for Task 7 work with interaction with civil society for the years 2-4 of the project was developed after the first year. It was amended after year 2 to adapt the work for year 3 and is now amended after year 3 to adapt for the work during year 4. The action plan is a dynamic proposal and with the original intention for revision each year to include the developments of the work done, the results produced in tasks 2-6 and 8 in the ROUTES WP and the interaction activities with the CS larger group. There may also be inputs from other EURAD participants, influence from developments in different international arenas (for instance the European Commission and international organisations engaged in the field), or developments at the national level in participating countries. The proposed topics in frame of Task 7 for the overall work for years 2-4 are:

1. In the frame of Task 2, “Identifying challenging wastes to be collaboratively tackled within EURAD”, the group of CS experts has identified the work as interesting, among others because there will be a description of inventories of challenging wastes for many countries. It may certainly be of interest to CS in those countries to be informed about this and about the on-going plans to manage and dispose of such wastes.
    - Task 7 will therefore work on understanding and communicating information about the inventories to the CS larger group and where applicable, also beyond into general civil society.
    - The CS experts’ group have studied and considered deliverable D9.4 "Overview of existing work on categorisation/classification of Radioactive Wastes (RWs) in participating states to assist communication on the categorisation and classification schemes provided by the participating countries**...**”
    - During EURAD year 3, the focus has been given on following the production of the deliverable D9.5 “Overview of issues related to challenging wastes”.

- During year 4 Task 7 will study the final deliverable from Task 2, i.e., D9.6 “Common understanding of the practical issues on waste management routes”.
- Method:
  - To follow the deliverable production, with a focus on the inventory descriptions,
  - To develop a summary that can be understandable by civil society,
  - To discuss it and bring feedback to ROUTES participants,
  - To report the findings in deliverable D9.18.

2. In the frame of Task 3 on “Description and comparison of radwaste characterisation approaches” and Task 4 on “Identification of Waste Acceptance Criteria (WAC) used in EU Member States for different disposal alternatives in order to inform development of WAC in countries without WAC/facilities”, the group of CS experts will primarily follow the work of the tasks to be able to assist in communicating the work to the larger CS group.
   - Method:
     - To follow the deliverable production in a general way,
     - To develop short summaries that can be understandable by civil society,
     - To discuss the deliverables and bring feedback to ROUTES participants,
     - To report key findings in Task 7 deliverables.

3. In the frame of Task 5, “RWM Solutions for small amounts of waste”, the examination of how the conditions for CS involvement in Small Inventory Member States (SIMS) differ from CS involvement in Large Inventory Member States (LIMS) is an issue of interest under Task 7. The work has been commenced in smaller scale in year 2, but larger efforts are planned for years 3-4.
   - To look at CS involvement in SIMS and in LIMS, search for commonalities and differences, factors with impact, like transparency levels (according to discussions in the BEPPER report produced by Nuclear Transparency Watch (NTW)[1]: information availability, quality and access, participation in decision-making, access to legal recourse, including CS resourcing).
   - Method:
     - Selection of a few cases based on still to establish criteria – up to 4 typical cases – 2 from each group,
     - Descriptive approach – establish potential structures,
     - Add a Q/A with representatives from different groups,
     - Discuss draft findings in the CS larger group and with EURAD participants.
   - Important topics with ethical implications are the consideration of deep borehole repository technology in the CS larger group, as well as long-term interim storage.
   - Method:
     - Link with the work in the SITEX Network, where NTW is also involved, with analysis of deep borehole repository (DBR).
     - Developing an understanding of positive and negative aspects on current challenges in long term interim storage.

4. In the frame of Task 6, “Shared solutions in European countries”, the work of Task 7 will concentrate on the issue of understanding what “shared solutions” can mean as well as the public perception of transnational or shared nuclear facilities, particularly storage and repositories for nuclear waste, as a key issue with respect to CS involvement. This topic was a focus in year 2, as

[1] http://www.nuclear-transparency-watch.eu/a-la-une/new-publication-bepper-report.html

reported in the deliverable D9.16 [2]. The CS experts investigated how the understanding of the public perception of shared nuclear facilities between two or more MS differs from public perception of nuclear facilities within one Member State, if at all, and how a process of localisation of a shared nuclear facility, involving all the relevant stakeholders could be structured. The basic elements for considerations were discussed. Several examples of shared solutions were investigated, such as:

- the shared responsibility for RW from the Slovenian / Croatian Krško NPP,
- the export of depleted uranium for uncertain management in Russia,
- the Bohunice centre in Slovakia, established to treat the waste from the A1 NPP accident, but now rebuilt for treatment of larger quantities of RW including RW from foreign countries.

Based on investigation, an understanding of the concept of "shared solutions" and the public perception of such developments with a reference to the Aarhus convention have been drawn out with recommendations coming from the performed analysis.

5. In the frame of Task 8, "Evaluation of possible waste management solutions for Member States without WAC and with small inventories (SIMS)", the work of Task 7 will concentrate on the issues with regards to CS aspects for related countries (SIMS). This might include the issues of inclusion of CS in the RW pathways selection in the countries with small inventories, many times without nuclear power plant inventory and therefore with less attention to the waste management solutions for existing waste. Also, different aspects of predisposal RW management will be discussed from a CS perspective. The activities are still at the beginning, therefore further consideration will be given in year 4.

A focus of the work of Task 7 during year 3, is on point 3 above, i.e., on Task 5 "RWM Solutions for small amounts of waste", and assessment of transparency and participation in the development of national RWM facilities. The investigation also addresses point 5 above, that is the new Task 8 with WM solutions for states with small inventory and without WAC, which is a new task in ROUTES. The approach used, although in line, is slightly modified from that presented. Firstly, the overview of criteria for transparency in the development of national radioactive waste facilities is discussed, followed by results from the applied questionnaire on transparency in the establishment of national RW facilities among ROUTES members and larger CS group. In total, nine national case studies are presented addressing LIMS and SIMS using a harmonised format. Such an approach allows for assessment of transparency in different countries with lessons learnt but also enables a search for commonalities and differences between the cases and potential recommendations with more general validity.

In this deliverable D9.17 "Implementation of ROUTES action plan second phase", the results of the investigation are provided, including comments, suggestions, questions, other observations collected in interaction with EURAD participants and the CS larger group. Additionally, the ongoing interactions and progress of activities during year 3 in relation to tasks 2-6 and the new task 8 are reported in this deliverable, which, furthermore, includes indications of changes in priorities on content for further work that will be reported later in D9.18 "Implementation of ROUTES action plan third phase" (planned for May 2023).

The CS experts in Task 7 will during the whole project actively follow the development of deliverables by all the Tasks 2-6 and 8 and give inputs suggested by both the CS experts group and the CS larger group. The suggestions from the CS experts are meant to be discussed with ROUTES participants to also define R&D activities in the different tasks.

1.2 Structure of the report

Deliverable 9.17 has the following structure:

- In section 1, the ICS action plan development is presented with main issues for the investigation of Task 7 in the following years and the focus of the present deliverable.
- In section 2, criteria for transparency in the establishment of national radioactive waste facilities based on the Aarhus convention, other legal frameworks and CS interpretation are presented.
- Section 3 provides the information on the results from the questionnaire applied for the purpose of this study among the participants of ROUTES and CS larger group. The questionnaire used for survey, described in Section 3 is given in the Appendix, including the raw data received by participants from different countries.
- Section 4 delivers the recommendation on transparency and public participation which are derived based on the analyses of national case related to development of national RW solutions in 9 countries (presented in the Appendix) and also bring general recommendations from the case studies and interaction with CS that could be generally used and applied for the development of national RWM solutions. This is the core of the deliverable and should be taken into account in development of future activities in RWM.
- In Section 5, the outcomes from other ROUTES tasks are also evaluated, with potential for examination by the Task 7 team in year 4.
- Section 6 provides concluding remarks for further work.

2. Criteria for transparency in the development of national radioactive waste facilities

In its most fundamental meaning “transparency” is a property of a material that means that it can be seen through, e.g., like glass in a window. But the meaning of the word transparency has been developed in several different fields leading to a wide range of definitions and uses[2].

In the nuclear field, and thus also in the field of Radioactive Waste Management (RWM), transparency is widely understood as pertaining to public information and communication. But even within the nuclear field there are different approaches to the understanding of what transparency means. These are discussed in this chapter.

There is consensus at all levels that Transparency and Public Participation in decision making processes is essential for effective governance in RWM. A review of evaluations on transparency governance in RWM carried out in different EU research projects as well within the OECD/NEA and the EU Commission project E-TRACK is presented in Appendix A. A review of evaluations on Transparency and Public Participation governance is used as an input, together with the experience of the authors, into the development of the transparency concept in relation to RWM in the rest of this chapter.

It is also important to keep in mind the specific international and European legislation on transparency in addition to more specific international and European legislation on transparency, with specific relevance to RWM when discussing transparency governance. An overview of such legislation, including the Aarhus and Espoo Conventions, EU directives and the IAEA Joint Convention and other IAEA work is given in Appendix B. The EU Radioactive Waste Directive and the Aarhus Convention are specifically referred to in this chapter.

2.1 Transparency as defined in the Radioactive Waste Directive

In its simplest form, transparency in RWM means that:

1. the general public is given some elementary information about RWM and projects that relate to RWM;
2. the general public has the possibility to give its view on RWM and projects that relate to RWM in some sort of elementary consultation process.

However, in order to be effective, transparency needs to be developed beyond its elementary forms[3]. This was recognised when the European Union developed and adopted the Radioactive Waste Directive (2011/70/Euratom).

Recital 31 in the preamble of the Radioactive Waste Directive states:

“Transparency should be provided by ensuring effective public information and opportunities for all stakeholders, including local authorities and the public, to participate in the decision-making processes in accordance with national and international obligations”.

According to the directive, European member states are required to include a description of their transparency governance in RWM in their national programmes and reports as required by the directive. The

[2] https://en.wikipedia.org/wiki/Transparency

[3] Transparency in its elementary forms is unfortunately still applied in many countries. The “need” to inform the public about RWM projects has just been seen as part of a process which can be labelled “Decide, Announce, Defend (DAD)”. Such processes invariably tend to fail, which caused in some processes the use of the acronym “DEAD”. Not much better is the process of having public participation processes with consultation meetings without having any intent of changing the project. This just leads to what has been labelled “Unlimited Nuclear Consultations Leading to Exhaustion (UNCLE)” where the likelihood of failure of the project is very high.

directive includes a special article, Article 10, in a section of the directive that covers “Transparency”. The article states the following:

Transparency

1. Member States shall ensure that necessary information on the management of spent fuel and RW be made available to workers and the general public. This obligation includes ensuring that the competent regulatory authority informs the public in the fields of its competence. Information shall be made available to the public in accordance with national legislation and international obligations, provided that this does not jeopardise other interests such as, inter alia, security, recognised in national legislation or international obligations.

2. Member States shall ensure that the public be given the necessary opportunities to participate effectively in the decision-making process regarding spent fuel and radioactive waste management in accordance with national legislation and international obligations.

A principal focus of this report is to undertake a critical explanation or interpretation of Article 10 with a view to establishing shared understanding of the key terms therein.

It is noteworthy that in relation to both making information available and effective public participation in decision-making, adherence to international obligations is required. Clearly this refers to the various relevant EU directives and the multilateral environmental agreements on which they are based including the Aarhus and Espoo Conventions, amongst other such instruments. As the Aarhus and Espoo conventions have been adopted by all member states of the European Union the Aarhus convention should also be implemented in national legislation.

It is also noteworthy that the public participation shall give the public the opportunity to participate “effectively” in the decision-making process.
In the following is described how the “international obligation” requirement can be interpreted and then what can be seen as “effective” transparency is discussed.

2.2 Transparency using the Aarhus Convention as a basis.

For European countries, which include the EU member states, the most important international obligation for transparency is the adherence to the Aarhus Convention. The “Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters”, was adopted in Aarhus in 1998 and entered into force in 2001. Currently the convention has 47 parties from across the UNECE[4] region. All EU member states, and the European Union are parties[5][6].

The three fundamental rights contained in the Convention are:

- The right of access to information on the environment,
- The right to participate in decision-making affecting health or the environment and,
- The right to have access to justice when these rights are denied or when acts and omissions by private individuals and public authorities contravene provisions of national law relating to the environment.

These are often called the three pillars of the convention.

[4] United Nations Economic Commission for Europe
[5] See http://ec.europa.eu/environment/aarhus/legislation.htm
[6] There is a small complication in the nuclear field in that in the EU the Euratom Treaty is not part of the Aarhus Convention as a result of the failure to integrate the treaty into the process leading to the adoption of the Treaty of Lisbon. This issue is analyzed a little further in the national case addressing the Netherlands in appendix 2.

The countries that are parties to the Aarhus Convention are obliged to implement the convention in their national legislation. In reality the level of implementation varies considerably and there are a range of constraints and challenges to be addressed. The parties' implementation of the convention is under continual review in a consultative and non-confrontational way. Central to this is the innovative Compliance Committee who examine communications of alleged non-compliance by parties brought by individuals, NGOs, and other parties to the convention.

Regarding public participation it is noteworthy the convention stresses the importance of early public participation when all options are open and the obligation to take due account of the outcome of the public participation.

As a party to the Aarhus Convention the European Union also has to implement the convention into European legislation. In 2003 the EU adopted two Directives concerning the first and second pillars of the Aarhus Convention. They were to be implemented in the national law of the EU Member States by 14 February and 25 June 2005 respectively; they are:

- Directive 2003/4/EC of the European Parliament and of the Council of 28 January 2003 on public access to environmental information. Member States were obliged to transpose the 2003 directive into national law by 2005[7].
- Directive 2003/35/EC of the European Parliament and of the Council of 26 May 2003 providing for public participation in respect of the drawing up of certain plans and programmes relating to the environment[8].

The third pillar of the convention, the right to access to justice, has still not been implemented in EU legislation. There has been a draft directive for many years but there appears to be little progress to have it adopted.

2.3 Key elements for good transparency (based on the BEPPER report)

Nuclear Transparency Watch (NTW) is a European wide network and a non-profit organisation, founded in 2013 in order to promote transparency and public participation in the nuclear field in the perspective of the Aarhus Convention. Just before its creation, in July 2011, the Radioactive Waste Directive (2011/70/Euratom) was adopted, including Article 10 on transparency. The first RWM programmes and reports were to be delivered in August 2015. NTW had early discussions with the European Commission (DG ENER) concerning how it would be possible to evaluate the implementation of Article 10 on transparency in the Member States. In 2014-2015, NTW worked on a project to study how effective transparency (i.e., public information and participation) in RWM could be described. The result was the BEPPER report[9] (BEPPER stands for "Broad framework for Effective Public Participation in Environmental decision-making in Radioactive waste management"), published in December 2015.

The BEPPER report includes a wide range of provisions on what constitutes good transparency. As a summary, the following elements can be retained:

- First, the paper contains elements on the definition of transparency in the Radioactive Waste Directive, which take the form of broadly formulated requirements for public information and participation during RWM decision-making.
- It also holds some content on transparency based on the Aarhus Convention and its three pillars: access to public information, access to public participation, and access to justice.

[7] http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1448347440395&uri=CELEX:32003L0004
[8] http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1435384826335&uri=CELEX:32003L0035
[9] The BEPPER report, December 2015 http://www.nuclear-transparency-watch.eu/wp-content/uploads/2016/04/NTW_Transparency_in_RWM_BEPPER_report_December_2015.pdf

- The report sets out four pillars for effective transparency (and public transparency) which are mainly based on the Aarhus Convention: effective access to information and communication, effective access to public participation and consultation, effective access to justice and decision-making, and effective access to resources. It goes further in establishing a level system for evaluation of effective transparency in RWM with regards to those 4 pillars.
- The report also settles some Key Components of Effective Transparency in RWM: some principles (e.g., building societal confidence, adopting a multi-generational perspective, considering public perceptions of safety and risk, taking into account energy policy), good practices (e.g., enhancing dialogue in pluralistic spaces, demystifying and democratising, adopting new decision-making processes, setting horizontal as well as vertical information exchanges, implementing and facilitating access to justice), plus components on innovation in resources and transparency assessment (e.g., make sure that CS has the resources to participate; create the conditions for civil society access to expertise; engage experienced and widely trusted facilitators; develop libraries, compendia, websites of good practices, etc; elaborate standards for transparency assessment).
- It ends with a general reflection regarding transparency in RWM. e.g., all applicable international regimes should be implemented and continuously strengthened at the national level; effective transparency regimes for RWM will result in better quality decision-making processes leading to higher safety and possibilities for higher trust; as part of CS, environmental NGOs have a special role to play in transparency processes - if properly resourced, they can provide organised and qualified input that improves decision-making leading to more robust and acceptable outcomes.
- In the appendix of the BEPPER report, one can find relevant research and experience from other processes on transparency in RWM, as well as international and European governance on transparency in RWM that helped NTW members in producing the report.

Beyond the BEPPER report, the BEPPER project had some broader objectives, e.g., to establish enduring governance models providing resources to NGOs on the international, national and local level; to improve the technical and legal capacities of NGO representatives participating in research projects; to promote the inclusion of CS and NGOs as part of the RWM arena; to enable the development of a legal framework for effective public participation in RWM that takes into due account the input of NGOs; to involve CS and NGOs as respected partners in international and European networks.

These objectives are being reached in the frame of EURAD to the extent possible. Indeed, this is the first European research programme where CS experts and CS members are involved, following a double wing model of interaction. On the one hand, the CS experts are engaged in the management WP (PMO), plus in the two strategic studies (UMAN and ROUTES) where they directly interact with participants from the three other colleges of the programme (WMOs, TSOs and REs). They are paid for their work and their travel expenses are reimbursed. On the other hand, CS members with various affiliations (from municipalities, NGOs, etc.) and composing a larger group and are invited to provide comments and to give their views on the work performed in the EJP, through interactions they have with the CS experts (in meetings, or by email). These participate on a voluntary basis, but their travel expenses are also covered.

In the investigation of transparency in transparency in the establishment of national radioactive waste facilities the following criteria has been used:

- Effective access to information,
- Effective access to public participation,
- Effective access to justice,
- Effective access to resources.

3. Questionnaire for ROUTES members and CS larger group on transparency in the establishment of national RW facilities

3.1 Presentation of questionnaire and participants

In the frame of EURAD, the Civil Society (CS) experts involved in ROUTES Task 7 dedicated to the Interaction with Civil Society (ICS) elaborated a questionnaire to collect the opinions of ROUTES participants from the 3 colleges (Technical Support Organisations (TSOs), Waste Management Organisations (WMOs) and Research Entities (REs)), plus the views of the CS larger group involved in EURAD.

The subject of the questionnaire is transparency in the establishment of national radioactive waste facilities. The results of the questionnaire are gathered and analysed here in this section, in addition all received data are presented in Appendix 1, still anonymized, together with some statistics and questionnaire.

The methodology associated to this questionnaire is qualitative and not quantitative, therefore it has no statistical value but provide more perceived understanding of the situation in individual country by different actors. The options for answers were closed and open ended: closed-ended questions had a limited set of possible answers, open-ended questions allowed for a free-form answer. The participants in the research are nor a representative sample and therefore results have limited value The analysis of the results was done trying to embrace every point of views in a harmonized and fair way. When some opinions were not similar – which was quite rare – the choice was to prioritize the opinion of the most developed answer. The intention of questionnaire was to obtain the opinion regarding T&PP in different countries assessed by different actors.

The questionnaire is based on the provisions in the Aarhus Convention[10] which has been transposed into the legislation of EU member states. Furthermore, NTW work on transparency has been taken into consideration (BEPPER report).

The questions are divided into five topics:

1. **Effective access to information**
2. **Effective access to public participation**
3. **Effective access to justice**
4. **Effective access to resources**
5. **Transparency and Public Participation in the context of reporting to the EC**

The questionnaire itself is published in the Appendix 1.

All answers are anonymised and used only for the purpose of the ROUTES Task 7 deliverable.

The questionnaire includes some socio-demographic data (name, sex, type of actor (WMO, TSO, RE, CS), organisation, country) and several questions related to national RW facilities and provisions in the Aarhus convention.

In total, 100 participants of ROUTES and/or members of CS involved in EURAD (i.e., CS experts and members of the CS larger group) were invited to fill in Task 7's questionnaire in the frame of the development of deliverable D9.17. Those were members from NGOs, WMOs, TSOs and REs with some independent experts related to different colleges.

Out of the 100 persons to whom the questionnaire was sent, 31 gave an answer with 13 of CS members from NGOs, 8 of WMOs members, 5 of TSOs members and 5 of REs members.

[10] https://environment.ec.europa.eu/law-and-governance/aarhus_en

In terms of geographic representation, 61% of the respondents come from Western European countries (Austria, Belgium, Denmark, France, Norway, Portugal, Sweden, the United Kingdom) and 39% come from Eastern European countries (Bulgaria, Cyprus, Czech Republic, Slovakia, Slovenia, Ukraine). Participants from all the ROUTES tasks answered the questionnaire, with a majority of respondents belonging to Task 6. See more details in the table in appendix 1.

Representatives of different types of institutions participated, but the summaries from the responses do not provide an agreed opinion or position to the answers. The collection outlines the basic ideas and suggestions from those involved in the questionnaire and the (dis-)agreements on the reactions are not traced.

3.2 Analysis of the results

The results are summarized for each of the topics investigated and presented in a way, that provide all different received positions and views. In the Appendix 1 the real (raw) result from the investigation is provided by the countries. It has to be stressed that the responds are not having any statistical value and are more indication of assessments of transparency in the establishment of national radioactive waste facilities.

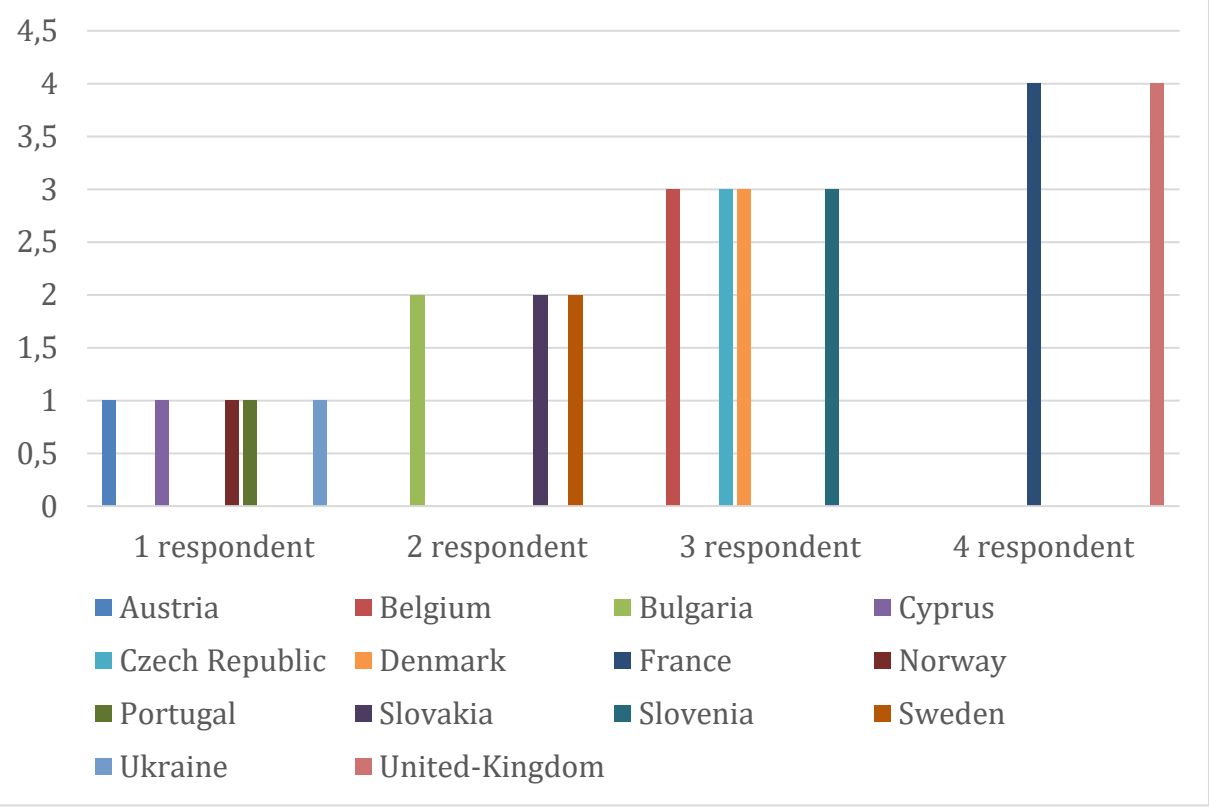


Figure 1- Number of respondents to the questionnaire per country

3.2.1 Effective access to information

Most of the participants considered that access to information on RWM, including information regarding disposal of RW, was allowed under freedom of information legislation with a registration system of documents, and allowing free digital or printed copies of documents.

The main challenges to access to information are associated with the denial of information due to confidentiality of commercial information, the status of the holder of the information (e.g., WMOs) and more generally the complexity of information available, which can be difficult to use for the CS members for

whom simplified summaries should be provided. Where those challenges were reported by most of the participants, a minority of them considered the information being generally “good”, and one participant even considered that there was no challenge at all in his country towards access to information.

Generally, the rights to access to information have improved in the last decade according to 61% of the participants, whereas for 29% nothing has really changed, and for 10% the situation is worse. What has been positively added in the last decade was, for instance, an institutionalised model for transparency and public participation in the decision-making on RWM.

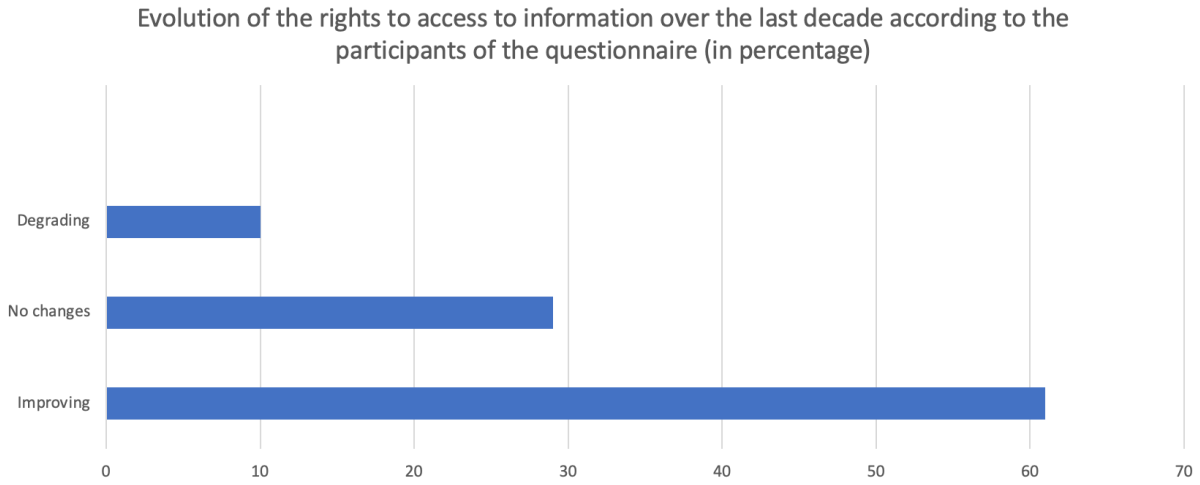


Figure 2 - Evolution of the access to information according to the respondents of the questionnaire

In general, easier, with more natural access to information and more public debates on issues related to RWM are observed. The information also appears to be better documented and more digitalised today, as well as more understandable. Some governments have been positively involved in this shift towards transparency (Bulgaria, United Kingdom, Czech Republic, Ukraine, Austria, Portugal or France). However, if more public debates are taking place, there is little activity in those processes and some ups and downs have been reported, especially because of individuals in charge who can be more, or less keen, to open up and provide information to the public. In fact, some participants aren’t considering any improvements in the last decade and are calling for changes in the legal framework as well as in relations between experts and society (Cyprus, Norway or Denmark). More worryingly, some even consider a regression in the rights to access to information for instance (Slovakia, Belgium or Sweden) because of a law allowing denial of access to files due to telecommunication, bank, and postal secrecy. Intellectual property has also been brought up recently and some documents are not accessible any longer.

According to the respondents as much information as possible should be provided, especially regarding environmental and health issues but also on the decision-making process. A difference of opinion arose concerning safety, security (e.g., devices, functionality, transport) or even customer/producer data related to certain types of a particular waste. According to some respondents, there should not be any restrictions at all, for others the same issues could justify restrictions. In fact, the most used reason for imposing restrictions was concerns for security. The proportion of respondents requiring no restrictions at all was more or less equal to the proportion of respondents envisaging some restrictions. The call for maximum availability of information was supported by the idea; that it benefits every stakeholder if the information is made available to everyone in an understandable and timely manner, enabling the public to make informed decisions. In the case of denial of access to information, it was mentioned this had to be justified by a FOIA Commissioner. Finally, it was also reported that to address this question, time is needed as well as engagement from experts and public representatives based on clear and easy access to information and that any answer to this question inevitably must be based on political factors.

3.2.2 Effective access to public participation

Most of the respondents answered that the level of public participation in RWM was at level 5 (1)[11] in their country, including participation regarding final disposal of RW, which means, they recognise the existence of a (legal) system ensuring that due consideration is taken of questions/issues/comments (e.g., properly dealt with in an environmental impact statement).

According to the outcomes of the questionnaire it seems that some of the main obstacles to participation in RWM are due to lack of proper organisation, lack of pluralistic participation with only official parties involved in the decision-making process resulting in lack of inclusion of "ordinary" members of the public in the institutional mechanisms for transparency and public participation. Also, in many instances consultation seems to be limited to very local acquiescent populations surrounding nuclear licenced sites, while other communities, who perceive themselves to be clearly affected are excluded. Those excluded view such processes as cynical at best.

Additionally, it was stated that when it is organised at all, participation can be hard to obtain because the wider public and the youth are difficult to reach. Also, it appears that, sometimes, neither feedback nor follow up, or the viewpoints obtained are not duly considered. Groups have been created at both local and national levels all of which could make a contribution to consultation and engagement in the siting process. However, the questionnaire reports that even if some tools are in place like website information with some structured public participation foreseen in some countries, the evaluation of the challenges are not identified similarly by WMOs or NGOs. Low participation, lack of structure and organisation, lack of meetings, difficulty to set a pluralistic and intergenerational dialogue that is not only driven by WMOs, are all challenges that have been reported. Furthermore, and as mentioned above, in some cases, it seems to be difficult for "ordinary" members of the public to get access to the institutional mechanisms for transparency and public participation. This is apparently due to different factors such as short deadlines, administrative barriers or limited expertise and financial resources. Thus, the lack of independent nuclear experts[12] creates a great dependency for the public on the information provided by the project proposer and the public often has a perception of its involvement as not influential on the decision-making process. This is especially true when public participation is not taken seriously, when its preconditions are not met and when the participants are feeling "there is nothing left to decide", even from the beginning of the process.

Some countries are only starting the process of "opening up" to public participation (Czech Republic or Slovakia for instance) others have it legally consolidated and already organised with information being regularly provided online by WMOs and regulators (France for instance). It has been underlined; how important it is to ensure the participation of all elements of a community in a collaborative process because of its dynamic nature will take some time.

Looking at public participation over time and especially over the last decade (see Table 5 in Appendix 1 for details), 56% of the respondents reported some improvements (institutionalised models of transparency and public participation in decision-making, systematic consultation, expansion of public participation to plans and programmes, and not only on project level; strengthening of the public participation rights; independence within public participation through the use of institutional bodies; participatory dialogues; interdisciplinary conferences; the viewpoints and influence of public participation better taken

[11] See appendix 1.

[12] A recognized expert who might be self-employed, or in an NGO, RE, TSO, WMO or wherever, and has the capability to provide an expert opinion on an issue related to RWM that would typically function as a credible "second opinion". In regard to independence, the most important characteristic of this expert being, that he or she is independent from the RWM decision-makers and formally or informally is not perceived as being close to them.

into account; some research projects are including local stakeholders and the public such as the PREPARE or CONFIDENCE programs; finally, digitalisation and internet also helped improving public participation), 27% of the participants have reported no significant changes in their countries for the last decade especially towards environmental issues and finally 17% of the participants even noticed some regression (bypass of the 2nd pillar of the Aarhus Convention, going back to a "wait-and-see" position until a government's decision is taken; amendment of an atomic act in autumn 2021 that effectively deprived the public of the possibility to participate in a new EIA process for a new nuclear power plant project; lack of government action; no support given from the Environmental Agency in case of life time extension of a nuclear power plant; mistrust by the affected public and reluctance to participate in dialogue and bureaucratic implementation). Nothing has changed in general even if some improvements or regressions occurred. Among other things, it was considered relevant to enlarge public participation with the publication of a governmental process such as a National Plan on Radwaste Management based on voluntarism, openness, and community-led decision-making.

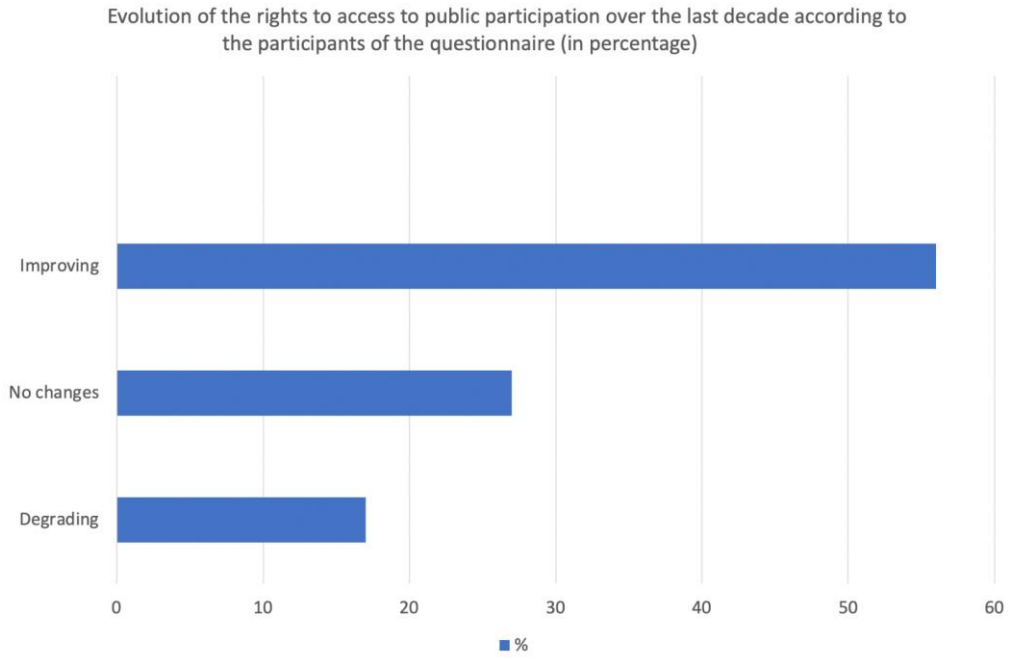


Figure 3 - Evolution of the access to public participation according to the respondents of the questionnaire

3.2.3 Effective access to justice

Around two thirds of respondents considered that access to justice[13] in RWM in their countries, including in regard to final disposal of RW, is at a level 3 on the 5 levels listed in the questionnaire, meaning there is access to justice in RWM decision-making processes (taking due account of questions/issues/comments during consultation). For more details see the Table 6 and 7 in the Appendix 1.

The level 3 of access to justice was considered more appropriate by most of the respondents, who in some cases selected various levels of access to justice as relevant.

[13] There are many reports on access to justice in other areas than RWM developed by Task Force on Access to Justice https://unece.org/env/pp/analytical-studies-and%20surveys-on-access-to-justice . *(Task Force on Access to Justice was mandated to systematically collect information relating to the implementation of article 9 of the Aarhus Convention and prepare, studies, where appropriate, with the objective of identifying gaps and promoting good practices in access to justice in environmental matters).*

30% of the participants picked level 5, which is the highest level of access to justice offered to the participants' choice. This means, they recognise a full right to veto in their country. 20% of the participants considered that the access to justice was limited to access to information while a slightly less considered a level 4, meaning a limited right of veto given. None of the participants indicated there was no access to justice at all in their country.

Regarding the main challenges to access to justice in RWM, one participant reported that it hadn't been used yet. Only 3 participants considered there were no challenges at all, where 4 participants considered they were not able to answer this question. The 20 remaining participants, on the contrary, noted some important challenges, mainly towards the ability to participate due to cost, time available and the legal competencies demanded. In fact, the practice of access to justice is generally not felt established even if some legal framework is in place, because the public is not using it where it does exist because of a lack of knowledge for the reasons already given (time-consuming, costly, no independent institution, no legal support such as developed and clarified legal practices or representation).

Additionally, it was reported by the CS actors in different manner though the questionnaire that the nuclear industry has, in general, practically unlimited financial resources compared to NGOs and Civil Society representatives willing to participate, as well as a fleet of specialised lawyers with a tendency not to disclose vital information and not to perform an Environmental Impact Assessment (EIA). Finally, it has also been mentioned the legal framework is sometimes only partially available or, not even yet in place concerning the disposal of RW.

Concerning the evolution of the rights to justice in the last decade, these have (according to participants), largely remained unchanged with 57% of respondents noticing no significant change. However, when some changes were observed, twice the number of respondents concluded these were enlarging access to justice rights rather than reducing them. 26% of the participants noted some positive changes occurring in the last decade (even when they may not have been very significant or still forthcoming) while 17% of the participants noted some negative changes in the same period (see the table 7 in Appendix 1); 17% of the participants couldn't answer this question. As examples for the right to access to justice, an increase of rights through legal improvements (already implemented or on the way) were mentioned, like the IAEA Joint Convention, Directive 2013/70/EURATOM and Directive 2013/59/EURATOM; ongoing implementation by a new regulator; new policies for geological disposal; new laws on public involvement). Some institutional improvements were also reported, including a new supreme administrative court dealing with all final appeals to court judgements related to administrative procedures. Another case mentions an improvement of the right to appeal and appeals of NGOs that have been supported by court decisions. It was further mentioned that information is more secured and more demanded. As examples of reduction in rights to access to justice, some limitations in financial support of the justice itself was noted, the increasing complexity for NGOs that must prove their legal interest, or that must go through longer and more complicated procedures with no legal practice support. This is often considered discouraging.

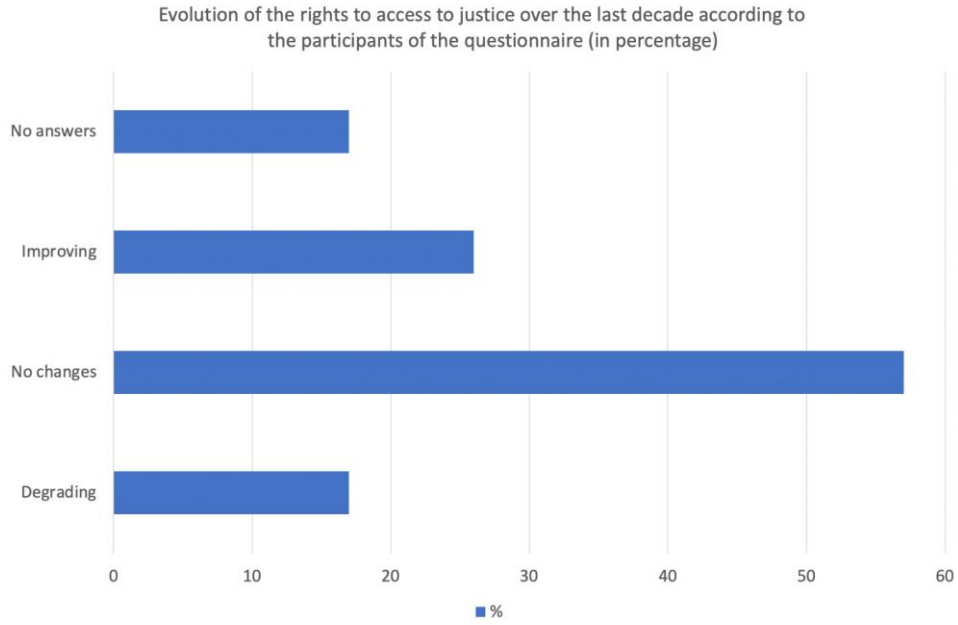


Figure 4 – Evolution of the access to justice according to the respondents of the questionnaire

3.2.4 Effective access to resources

Regarding access to financial resources, for NGOs, the respondents answered quite evenly among the three different levels proposed. Similarly large groups of respondents reported on the availability of access to independent resources, access to non-independent resources, or no access to resources at all.

A quarter of respondents considered they couldn't answer this question while a third of those stated, there were some problems accessing resources to start with (no access at all, access limited to a selection period). However, when some access to resources did exist, only one in seven participants concluded there were no restrictions.

Generally speaking, for most respondents (more than 50%), some resources are available, but often subject to restrictions: limited use (only for "pro-government organisations" or for national NGOs directly co-operating with the Waste Management Organisation), limited time (site selection process), limited amount (no more than 10 000 euros per NGO per year for instance), limited availability to particular organisations only (for e.g., municipalities or "Community Partnerships" agreeing with a geological survey). Those conditions can also sometimes be dependent on management organisations and/or of the government. In some cases, conditions can be legally regulated (e.g., in the Atomic Act), but not always. In some cases, it can be made difficult to access resources for independent expertise. Over time, some positive evolution in the form of removal of limitations has been observed.

The resources are in most cases coming from the government, even though 4 participants couldn't answer this question. One in six participants reported resources were coming from RW organisations, and one in seven, that resources were coming from the producers. In the case where resources are organised concerning RWM financing, they are often organised by governments (e.g., Ministry of Finance, Ministry of Energy), via the waste management organisations or directly by the waste management organisations themselves.

3.2.5 Transparency and public participation (consultation processes) in development of the National Program on RWM submitted to the European Commission

Only a third of respondents mentioned a National Program on RWM being reported to the European Commission with concerns regarding transparency and public participation in the process. Remarks made included “there was good transparency and public participation in the plan”, “there was consultation and public discussion, but no feedback”, “there was limited participation in local forum meetings”, “only public participation/consultation”. Two respondents mentioned they could not answer the question. The last two-thirds mentioned that National Programmes were not submitted to the European Commission yet. However, they also reported various steps towards transparency and public participation in the description / development of their National Programmes on RWM (e.g., a one-month public consultation procedure, no public participation / consultation process; a limited or good process; summary of the environmental assessment; presentation / publication of the National Program; only one meeting but no process; no transparency or good transparency).

4. Recommendations for transparency

This section provides some recommendations for transparency to be used in the establishment of the RWM facilities derived from the experience of the transparency in RWM.

In order to illustrate the application of the transparency in development of national radioactive management solutions, several national case studies are described and analysed by representatives of CS experts. These cases, presented in Appendix 2, include the examples from advanced RWM programmes or from early stage RWM programmes, with large or small inventories across Europe. They provide information on context (on nuclear activities, RW situation, current development, judicial situation), description of how the transparency is implemented (in terms of access to information, access to public participation/consultation, access to justice and access to resourcing), assessment of the transparency of the decision process. The main conclusions from these case studies are reported in section 4.1. Then, the main generalized findings from the analyses of these case studies are given in section 4.2.

4.1 Conclusions from national cases

The following are short recommendations based on the position of CS members solicited to describe the national cases in Appendix B. These include examples from advanced RWM programmes, as well as from early stage RWM programmes, with large and small inventories across Europe. The key elements of the case studies are among others, their specific national contexts and descriptions of the public's access to information, participation, justice and resources, and lessons learned.

4.1.1 Conclusions from the Czech Republic with regard to RWM

The situation is considered to have improved these last years as the WMO provides much more information than before. When in the past, the NGOs asked for a document (based on the Act on the free access to information), they often received redacted (blacked out) pages with only a date, a few conjunctions, and a signature. The TSO also disclosed environmental impact studies and some other data, which are now available on their web page.[14]

Improvements in access to information and opportunities for public participation have occurred mainly due to persistent public and NGOs pressure and change of the government. However, the public has limited funding opportunities and the systematic activities of the NGOs are supported mainly by foreign grants. Therefore, it is recommended to share international experiences how the Aarhus convention pillars can be implemented in effective and productive way and to follow the results also in the frame of national reports according to waste directive.

4.1.2 Conclusions from the Denmark with regard to RWM

The following lessons can be learned from the Danish case:

- The Danish government has been open to criticism from CS and international experts and delayed the final disposal of Denmark's RW in order to find a safer technical solution and involve CS in the decision-making process.
- A national contact forum for RW was established under the auspices of the Danish Ministry of Higher Education and Science with participation of the organisations and authorities responsible for the management and disposal of RW, and regional authorities, green NGOs and citizens groups. The national contact forum is supplemented by a regional contact forum in the municipality, where an interim storage facility is built, with potentially more contact fora to follow, when possible, host sites for the final repository are designated.

[14] www.surao.cz/en

- Affiliated with the contact fora is a panel of scholars from Danish universities, which provides second opinions in the RWM process and replies to questions from the general public. The panel members have been selected by The Danish Council for Independent Research, which provides independent scientific counselling to the Danish Government.

4.1.3 Conclusions from the Germany with regard to RWM

Many lessons have been learned about how to develop and implement a public participation and engagement process that ensures community support for the selection of a waste disposal site. This includes removing any preconceived opinions in the process, involving a wide range of stakeholders early on, providing high levels of access to information from the waste management organisation and the regulatory authority, and ensuring oversight by an independent public body with representation from multiple stakeholders. By acknowledging and providing resources for community education, there is an implicit recognition that informed decision-making in the field of RWM, including final disposal, is essential. The German case provides a practical example of how other member states could implement the BEPPER Report to build public trust, particularly in the siting process, by emphasizing transparency, public engagement, access to resources and access to justice for all stakeholders.

4.1.4 Conclusions from the Greenland with regard to RWM[15]

Since 2013, where the so-called uranium ban in Greenland was lifted, the Greenlandic government has successfully resisted attempts by parts of the mining industry to erode the EIA and SIA processes as an integral part of the licensing procedure for large-scale mining projects. However, T&PP in Greenland would benefit significantly by ratification of the Aarhus Convention as well as other international conventions protecting CS, and a more comprehensive interpretation of the Espoo Convention, not least considering that this would help integrate the public in the decision-making on which parts of Greenland that should be designated as potential mining license areas.

4.1.5 Conclusions from the France with regard to RWM

In the French case, it is worth emphasizing the importance of permanent working groups, at both local and national levels, bringing together all stakeholders, similar to the CLIS (local) and PNGMDR "Orientations" commission (national). With adequate resources and a mandate to discuss all aspects of the project, both technical and non-technical, these groups can play a critical role in providing proposals and opinions throughout the process, similar to the "clarification of controversies" promised by the CPDP of the PNGMDR.

Furthermore, it is crucial to maintain long-term financial resources, to engage non-institutional experts and to monitor specific issues that may not be a priority for the project leader, or that may be overlooked entirely, such as geothermal energy from a technical perspective and health from a non-technical perspective.

4.1.6 Conclusions from the Netherlands with regard to RWM

RWM policy in the Netherlands, and especially management of high-level and long-lived RWs, is oriented on a concept of temporary storage with an open-ended view on final disposal. This choice is considered as providing a window of opportunity for the development of appropriate final management options and promotes an acceptable level of transparency. However, in practice, the open-ended final disposal concept has resulted in what this report characterises as “kicking the can down the road”. In other words, the opportunity to find a suitable final disposal process and establish proper transparency processes has not been fully used, and instead, the final decision has been postponed to 2100, three generations into the future. Even the issue of transparency is pushed forward in the form of consecutive

[15] Greenland is part of the Danish kingdom participating in EURAD.

research projects rather than more openness, public participation, access to resources and access to justice. Both the Dutch government and the WMO also do not take any serious steps to reduce the necessary time to find a final solution for disposal. Best practice in temporary storage in this way unfortunately causes a breach with the Euratom Radioactive Waste Directory's principle of the producer generation taking responsibility for final disposal. The ongoing research from the *Rathenau Instituut* gives, depending on its outcome, the opportunity to correct this situation and speed up serious research into final disposal options, locations and a final decision that is taken nearer to the lifetime of those benefiting from the production of the RW.

The Netherlands, furthermore, have a deeply rooted tradition of what is called "poldering". This word refers to the use of elaboration and governance processes from the times when water management governance was developed, needing more or less consensus solutions with the participation of all key stakeholders. The Dutch government tries to build on that tradition in RWM. However, it appears to face similar problems as we see in other countries, with a gap between involvement of the public, civil society and independent academia on one hand, and the wish for fast political solutions on the other (including the decision to "wait and see", because there is time to 2100), often under pressure of debates related to the use of nuclear power. Seeing through more inclusive deliberative processes to the end, with participation of all relevant stakeholders, would most certainly lead to better quality policy.

4.1.7 Conclusions from the Slovakia with regard to RWM

Public participation in Slovakia is allowed in administrative procedures related to nuclear installations under the EIA Act, which guarantees that a public participant of an EIA process automatically becomes a participant of all the follow-up administrative procedures. Implementation of similar legislative regulations is worth recommending also for other countries.

However, the effectiveness of public participation is limited due to problems in access to information and its verification, information asymmetry, short procedural deadlines, insufficient financial resources and personal capacities of the public and NGOs. Also, the new construction and spatial planning legislation and the planned EIA Act amendment can have a significantly negative impact on the right of public participation and its effectivity. Providing easy access to electronic documentation from administrative procedures held by regulatory authorities could significantly improve public participation effectiveness.[16].

To improve the effectiveness of public participation, legally binding resourcing for local communities and NGOs should be implemented, procedural deadlines extended, and independent experts made available. The responsible authorities should actively seek public participants and improve access to information. The state-owned company responsible for SNF and RW management, claims not to be liable under the Slovak Freedom of Information Act, limiting transparency and access to information. An amendment to explicitly define the WMO as liable may improve transparency. Minimal progress has been made on the Slovak DGR project since 2001, and there is not sufficient time left for high-quality public participation in the site selection procedure. A separate institution responsible only for RW and SNF repositories could prioritize the DGR project and reduce the risk of conflict of interests.

4.1.8 Conclusions from the Sweden with regard to RWM

There is much to learn from the Swedish experience of a long civil and military nuclear history with the resulting legacy of facilities and RW, from the Swedish governance system and facilities for RWM and from the decision-making process for the spent fuel repository. Some of the most important are:

[16] It is de facto impossible for the public to get familiar with the entire documentation consisting of hundreds or even thousands of pages in detail if it can be accessed only via physical inspection of printed files.

- It is a problem to have all the responsibility for research and development and for operation of RWM facilities with a private entity that is not part of the national public access to information system.
- The quality of the decision-making process is improved considerably by the implementation of good consultation and access to justice systems.
- The quality of the decision-making process is further improved by resourcing local communities and environmental NGOs to be able to participate fully in the process.
- It is of vital importance that all problems that come up in the decision-making process are fully examined as far as possible.
- The robustness of the safety case for a repository can appear high but is dependent on a number of assumptions that should perhaps not be ignored with the argument that a holistic view allows this."

4.1.9 Conclusions from the United-Kingdom with regard to RWM

Transparency, public participation, and access to justice in the context of RWM and geological disposal are key ingredients to achieving social justice both for this and future generations.

All stakeholders must have an understanding they are engaging in and with a process which is seen to be fair and equitable. How a WMO engages with a community whether by a community volunteering or by a WMO choosing a "preferred site" is key to achieving environmental and social justice both in a local community and wider context.

The study of the UK case outlines how three previous attempts since the mid 1980's failed, the last two being in Cumbria near to the Sellafield site where 80% of the UK RW is stored. The current community engagement process is enshrined in law as described by the link to the legislation in the UK case study. The process requires that one person can volunteer a whole community but crucially the process cannot commence without the consent and engagement of at least one tier of local government. In the last failed attempt (MRWS Process) the higher tier local Authority Cumbria County Council halted the process. – the new process prescribes that a lower tier municipality can be the "Principle Local Authority".

However, political events concerning the reorganisation of Local Government now mean from April 2023 there will only be one "Principle" local Authority called Cumberland comprising both Copeland and Allerdale, so all three current search areas and community partnerships will fall within one principal municipality called Cumberland.

In all three Cumberland CP's there is perceived to be a lack of representative balance and meaningful public engagement manifested by the emergence of local opposition groups against a GDF where membership is gaining momentum. Demonstrably there is a perceived and apparent lack of public participation.

The legislation prescribes that from time to time a CP will need to take tests of public support as the process moves forward. It is currently unclear as to how this will be done. Moreover, the legislation prescribes that if after what could be a time frame of 10-15 years a community does not want to proceed with the construction of a GDF then it won't happen. The legislation does not provide for access to justice under the Aarhus Convention as currently drafted but does provide for the government to seek "other means" of implementation should a community say no. The worry here is that a WMO may have expended £100's millions in investigative research only for a community to reject the proposal and have it foisted upon them against their will. – Much more work on public engagement and public participation needs to be done for the process to be demonstrably fair.

While there are no issues concerning scientific and technical transparency from the WMO, a request by Cumbria Trust to the Allerdale community partnership as to how they select members to be reflective of

the community they are supposed to be accountable to has been made in response to the appointment of three local businessmen to the Allerdale CP who all have connections to the local RWM supply chain.

4.2 General findings for recommendations

4.2.1 Access to information from WMOs

During the assessments of the case studies, it was noticed that there in some countries were problems with access to information from Waste Management Organisations (WMOs). This chapter investigates these cases, the international legal situation, especially the obligations under the Euratom Radioactive Waste Directive (2011/70/Euratom), the Nuclear Safety Directive (2009/71/Euratom as amended in 2014/87/Euratom), the EU Access to Environmental Information Directive (2003/4/EC) and the Aarhus Convention. It comes to the conclusion that there is a legal obligation for all WMOs to provide access to information as if they were a public authority, no matter what their status as a state or private entity. The main arguments for this are that all environmental information produced and held by WMOs is an important ingredient for government decision procedures concerning RW, that full access to this information – with the exemptions stated under art. 4 (4) of the Aarhus Convention – supports better quality decision making, and that WMOs implement government policies under oversight of a state authority and deliver a public service.

4.2.1.1 Cases of access to WMO information

Three clear cases: the Czech Republic, Denmark, Germany

The Czech WMO, is a state organisation and therefore fully falls under the access to information legislation implementing the relevant EU Directives and the Aarhus Convention.

In the past, there have been problems of access to information, mainly complaints from municipalities that were on the lists for potential sites for a deep geological disposal. They complained about lack of access to documentation on the basis of confidentiality. However, no cases were found that would show that lack of access to information, as defined under the EU Directives and the Aarhus Convention, could not be successfully challenged in the courts.

Also in Denmark, all involved institutions are state organisations and therefore fall under the access to information and access to environmental legislation.

The new set-up in Germany consists of state organisations (TSO, WMO) and a stakeholder oversight group, which all fall under access to information legislation.

Historically information requested has been redacted in the United Kingdom. Currently, information is provided in the format requested which represents a transparency culture change.

The Netherlands[17]

The WMO is since 2002 100% owned by the state. It concerns itself not falling under the Act for Open Government (*woo*), nor under the obligation for access to environmental information as formulated in the EU Directives and Aarhus Convention. This was confirmed by the Court of Amsterdam in the 2021 case LAKA vs COVRA.[18] The court considered the WMO *"not an institution, service or company that works under the responsibility of an authority, as meant in art. 3 of the Act on Access to Information (WOB) and the Aarhus Convention"*. The Court therefore did not allow access to the WMO's research planning for final disposal of RW under the (former) Act on Access to Information (*WOB*). With the new

[17] See chapter Institutional mechanisms in the Netherlands in the Appendix 2 to facilitate transparency and public participation in RWM.

[18] https://www.laka.org/nieuws/2021/rechter-kernafvalbeheerder-covra-valt-niet-onder-de-wob-15098

law, the situation has not changed. LAKA appealed this conclusion, which is still pending at the highest administrative appeal body, the Council of State. With the new law, the situation has not changed.

The Dutch WMO is a public entity, which is 100% owned by the Dutch state. It holds a monopoly on managing RW from nuclear reactors, hospitals and industry. It defines its responsibility towards the state as: the Dutch WMO "is a state company, implements policies of the Netherlands and is responsible for the waste strategy from collection to final disposal."
Its activities are overseen by the Dutch nuclear regulator, an independent state authority. Hence, under Aarhus, it should fall under the obligations of a "public authority" concerning access to information, public participation and access to justice, as defined in the Convention.

Slovakia[19]

Slovakia has a chequered past concerning access to information in the nuclear sector. The Slovak nuclear regulator has been found in non-compliance with the Aarhus Convention after a complaint that it had declared virtually all nuclear information confidential on the basis of security under the nuclear law (ACCC/C/2013/89[20]). In the following attempts to rectify the situation, it appeared to be very difficult to convince Slovakia of the fact that it could not withhold this type of information, but in the last years, the situation seems to improve, though, for instance, documentation concerning dry interim storage casks was still withheld.
The WMO is a 100% state company claiming not to be a liable entity according to the Slovak Freedom of Information Act and therefore not obliged to reply to public requests for information. As a result, the public cannot obtain any information from the WMO via requests of information, which negatively affects the transparency of RW and SNF management in Slovakia and the effectiveness of public participation in related decision-making processes. Members of civil society expect this situation to worsen when future RW related activities will be carried out by other (private) contractors than the Slovak WMO.

Sweden[21]

The Swedish WMO is a private entity, owned by the nuclear utilities. It is therefore not considered to fall under the legislation organising access to information and hence not obliged to disclose any information. This has led in many instances to situations in which the public could not access key information in procedures it was involved in, e.g., the case of copper-corrosion in the licensing procedure for a deep geological disposal.

4.2.1.2 The problem of access to information from WMOs

There are two areas where WMOs try to avoid their obligation to access to information under the Aarhus Convention, the EU Directives, and often national law. The first one is their status, the second concerns the content of information.

In Sweden there is a private entity, owned by the nuclear utilities. This private entity for that reason does not consider itself falling under the access to information obligations of the Aarhus Convention, the EU Directives or national laws. In the Netherlands and Slovakia, 100% state owned companies are coming to the same conclusion. They consider themselves separate entities, not part of the state structure.

In the case of Slovakia, the issue of content was shown playing a role: Slovakia at some point had excluded all information that could in any way be related to nuclear security as an exemption to art. 4 of

[19] See chapter Institutional mechanisms in Slovakia in the Appendix 2 to facilitate transparency and public participation in RWM.
[20] https://unece.org/fileadmin/DAM/env/pp/compliance/CC-58/ece.mp.pp.c.1.2017.13.e.pdf
[21] See chapter Institutional mechanisms in Sweden in the Appendix 2 to facilitate transparency and public participation in RWM.

the Aarhus Convention. Next to that, it is possible to see that the Dutch WMO uses the argument of corporate confidentiality in the case of tariff-information (although it has no competitors but holds a monopoly on the market). In Sweden it is possible to see that the argument of intellectual property is used by the WMO to refuse access to information.

List of recommendations proposed:

- Information on governance of WMOs in member states should be provided and harmonised under the minimum standards set by, among others, the Aarhus Convention for public services (WMOs provide a public service, whether they are state owned or private entities, and as such, access to information, rules of the Aarhus Convention are applicable).
- Research and development should follow normal access to information standards with results publicly available whether it's favourable or not to either interest.
- Qualitative summaries should be available to Civil Society in an intelligible format and not only extensive reports.

4.2.2 The Aarhus Convention

The Aarhus Convention stipulates in art. 4(1), that "***public authorities, in response to a request for environmental information, make such information available to the public.***"
"*Public authorities*" are in art. 2(2) defined to be "*(a) Government at national, regional and other level; (b) Natural or legal persons performing public administrative functions under national law, including specific duties, activities or services in relation to the environment; (c) Any other natural or legal persons having public responsibilities or functions, or providing public services, in relation to the environment, under the control of a body or person falling within subparagraphs (a) or (b) above;".*

From the second edition of the Implementation Guide of the Aarhus Convention from 2014[22], one may conclude that WMOs as mentioned in the cases in paragraph 5.2.1 fall under the category "public authority". The Implementation Guide refers to the very first case dealt with by the Aarhus Convention Compliance Committee (ACCC), ACCC/C/2004/1 Kazahstan[23], where the Kazah nuclear state company Kazatomprom in its function as a WMO had refused access to information to an environmental NGO. The ACCC concluded: *"17. The National Atomic Company Kazatomprom is a legal person performing administrative functions under national law, including activities in relation to the environment, and performing public functions under the control of a public authority. The company is also fully owned by the State. Due to these characteristics, it falls under the definition of a "public authority", as set out in article 2, paragraphs 2 (b) and 2 (c)."* and "*19. It is, therefore, the opinion of the Committee that, as a public authority in the meaning of article 2, paragraphs 2 (b) and 2 (c), Kazatomprom was under an obligation to provide the environmental information requested by the communicant pursuant to article 4 and that failure to do so was not in conformity with that article."*
This basically settles the cases of the Netherlands and Slovakia, where the WMO is state owned, under control of a ministry, overseen by the nuclear regulatory authority, and carrying out activities, including administrative functions in relation to the environment.

The case of Sweden is slightly more complex, because the WMO is not state owned. Art. 2(2c), however, also counts other legal persons with public responsibilities or functions, or providing public services, in relation to the environment, under the control of a body or person, falling within subparagraphs (a) and (b) of Art. 2. The 2014 second edition of the Guide to Implementation states "*Such persons might be service providers or other companies that fall under the control of either public authorities or other bodies*

[22] UNECE, *The Aarhus Convention – An Implementation Guide – second edition*, Geneva (2014); https://unece.org/info/Environment-Policy/Public-participation/pub/2289
[23] https://unece.org/fileadmin/DAM/env/documents/2005/pp/c.1/ece.mp.pp.c1.2005.2.Add.1.e.pdf

to whom public functions have been delegated by law. For example, water management functions might be performed by either a government institution or a private entity. In the latter case, the provisions of the Convention would be applicable to the private entity insofar as it performs public water management functions under the control of the governmental authority." The Guide then notices that this clearly includes publicly owned legal persons like the above mentioned Kazatomprom, or indeed the Dutch WMO or the Slovak WMO. But "*Furthermore, subparagraph (c) covers* ***entities performing environment-related public services that are subject to regulatory control****. The provision reflects certain trends towards the privatization of public functions that exist in the ECE region."* [emphasis added, JH]

The key-question for the Swedish case is therefore whether the WMO is an entity performing an environment-related public service, subject to regulatory control. The fact that the Swedish WMO's work falls under the regulatory control of the Swedish nuclear regulator decides the latter part. The question of whether the WMO performs a public service remains. It could be argued that the tasks of a WMO are indeed a public service: it is a task primarily focused on safe management of wastes that otherwise could harm the environment and public; the WMO holds a monopoly on carrying out this task, and the State has delegated its ultimate responsibility for management of spent fuel and RW to the WMO.

This can be concluded from the Euratom Radioactive Waste Directive 2011/70/Euratom. In Preamble 25, it is stated that "***The ultimate responsibility of Member States for the safety of spent fuel and RWM is a fundamental principle*** *reaffirmed by the Joint Convention. That principle of national responsibility, as well as the principle of prime responsibility of the licence holder for the safety of spent fuel and RWM* ***under the supervision of its competent regulatory authority****, should be enhanced and the role and independence of the competent regulatory authority should be reinforced by this Directive.*"

Art. 4(1) of 2011/71/Euratom states: "*Member States shall establish and maintain national policies on spent fuel and RWM. Without prejudice to Article 2(3),* ***each Member State shall have ultimate responsibility for management of the spent fuel and RW generated in it***". And Art. 5(1): "*Member States shall establish and maintain a national legislative, regulatory and organisational framework ('national framework') for spent fuel and RWM* ***that allocates responsibility*** *and provides for coordination between relevant competent bodies. The national framework shall provide for all of the following: […] (f) the allocation of responsibility to the bodies involved in the different steps of spent fuel and RWM; in particular,* ***the national framework shall give primary responsibility for the spent fuel and RW to their generators or, under specific circumstances, to a licence holder to whom this responsibility has been entrusted by competent bodies****;*" [Emphasis added, JH].

From this, it has to be concluded that WMOs fall under art. 2(2b,c) of the Aarhus Convention, also if they are not state entities, because they perform responsibilities that ultimately fall to the state and have been allocated to the WMO, under supervision of a regulatory authority.

Our conclusion is that WMOs, as providers of a public service, falling under the oversight of a regulatory body, fall under art. 2(2b,c) of the Aarhus Convention, and are obliged to fulfil the obligations to access to environmental information as formulated under art. 4 of the Aarhus Convention.

4.2.3 Euratom Directives on Radioactive Waste, Nuclear Safety, and EU Access to Environmental Information Directive

Transparency is a key feature in the Euratom Directives governing RW and nuclear safety. In the Radioactive Waste Directive 2011/70/Euratom, art. 10 is dedicated to transparency and states in paragraph 1: "*Member States shall ensure that necessary information on the management of spent fuel and RW be made available to workers and the general public. This obligation includes ensuring that the competent regulatory authority informs the public in the fields of its competence.* ***Information shall be made***

***available to the public in accordance with national legislation and international obligations**, provided that this does not jeopardise other interests such as, inter alia, security, recognised in national legislation or international obligations.*"

Access to information is also regulated in the Nuclear Safety Directive (2009/71/Euratom as amended by 2014/87/Euratom), art. 8(1-2):

"*1. Member States shall ensure that necessary information in relation to the nuclear safety of nuclear installations and its regulation is made available to workers and the general public, with specific consideration to local authorities, population and stakeholders in the vicinity of a nuclear installation. That obligation includes ensuring that the competent regulatory authority and the licence holders, within their fields of responsibility, provide in the framework of their communication policy: (a) information on normal operating conditions of nuclear installations to workers and the general public; and (b) prompt information in case of incidents and accidents to workers and the general public and to the competent regulatory authorities of other Member States in the vicinity of a nuclear installation.*
2. ***Information shall be made available to the public in accordance with relevant legislation and international instruments**, provided that this does not jeopardise other overriding interests, such as security, which are recognised in relevant legislation or international instruments.*"

This includes the international obligations under the Treaties of the EU and under the Aarhus Convention.

In this case relevant EU Access to Environmental Information Directive 2003/4/EC follows in its definition of "public authority" in art. 2(2) closely the Aarhus Convention and states in art. 3(1) that "*Member States shall ensure that public authorities are required, in accordance with the provisions of this Directive, to make available environmental information held by or for them to any applicant at his request and without his having to state an interest.*"

4.2.4 Conclusions

From the above, it may be clear that all WMOs, irrespective of their organisational structure or status as public, private-public, or private entities, are obliged to provide environmental information to the public as defined in art. 4 of the Aarhus Convention and art. 3 of the EU Access to Environmental Information Directive. The fact that this is currently not happening in all Aarhus signatory countries and all EU Member States is undermining the quality of decision making around nuclear waste in those countries (see for instance the situation in the Netherlands, Slovakia and Sweden here described), and infringes the rights of citizens to be involved in decision making in this important field. Certainly, in an area, where intra- and intergenerational justice is an important issue, full transparency should be guaranteed.

The authors recommend encouraging citizens, in cases where their rights to access to environmental information are infringed upon, to seek national legal remedy, and when that is refused, communicate violations to the European Commission and the Aarhus Convention Compliance Committee.

5. Interactions with other ROUTES tasks

During EURAD Year 3, ROUTES Task 7 CS experts have followed the work of the other ROUTES Tasks as was presented in the deliverable D9.15 [1] and they kept interacting (with the Tasks leaders especially) in different ways: through email exchanges, through questions and presentations during meetings, via deliverable reviews and participating in all other activities organised by the tasks' coordinators. Below is a short summary of the interactions between ROUTES Task 7 CS experts and the other ROUTES participants in relation to the Tasks 2, 3, 4, 5, 6 and 8.

Task 2: 'Identify challenging waste to be collaboratively tackled within EURAD'.

The objectives of Task 2 on "Identify challenging wastes to be collaboratively tackled within EURAD" (Task 5 is coordinated by ANDRA from France and SSTC NRS from Ukraine) as mentioned in the ROUTES project work package description of work are as follows:

- Identify challenging wastes and related difficult issues to be collaboratively tackled within the Joint Programme, such as: Sludge; Organic waste; Ion exchange resin; Bituminised waste; Graphite waste; Uranium/radium/thorium bearing waste; Decommissioning waste (soil, rubble etc.); Particular spent fuel such as metal uranium and aluminium cladding; Disused radioactive sealed sources (from category 1 to 5, including neutron sources and radium sources); Waste containing reactive metals such as aluminium, magnesium, zirconium, sodium; Waste containing chemotoxic material such as beryllium, mercury, asbestos, lead; Legacy waste.

- Map and share understanding at EU level of the practical issues on waste management routes, taking into account specific issues relating to challenging wastes and small inventory programmes.

During months 25 to 36, Task 2 organised 7 work meetings dedicated to challenging wastes during the spring of 2021. Each meeting was dedicated to 1 or 2 challenging wastes. For each waste, each step of the RW categorisation scheme-approach, discussion on technical details of what is at stake in the different MS in terms of feedback experiences, good practices, difficulties, solutions already existing and interdependency between each step. This was followed by identification of R&D needs and possible common research programs that could be launched.

Deliverable D9.4 "Overview of existing work on categorisation/classification of RWs in participating states" was published in March 2021. Deliverable 9.5 "Overview of issues related to challenging wastes" is expected was published in August 2022. The activities in Task 2 were followed by the CS experts in Task 7, with relatively few exchanges.

Task 3: "Description and comparison of radwaste characterisation approaches"

The objectives of Task 3 on "Description and comparison of radwaste characterisation approaches" has the following objectives:

- Identification of characterisation techniques for RW.
- Comparison of the characterisation methods applied for the same RW in different countries;
- Analysis of the existing approaches and identification of the knowledge gaps;
- Recommendations for the future R&D to eliminate knowledge gaps;
- Recommendations for characterisation approaches for countries with non-developed waste management concept.

Task 3 organised 3 workshops on Radioanalytical Characterisation from 2019 to 2022 and 2 workshops on Legacy Waste from 2021 to 2022 leading to 2 deliverables on those topics, the first one D9.7 released in May 2021 and the second one D9.8 released in February 2022. The 3rd workshop in May 2022 gathered 14 participants from 10 organisations and focused on the D9.7 (the deliverables are still ongoing).

Task 4: "Identification of WAC used in EU Member-States for different disposal alternatives in order to inform development of WAC in countries without WAC/facilities".

The subtask 4.2 on "sharing experience on waste management with/without WAC available" is still in progress. Its workshop was held on June 14th and 15th 2021 online with participants from outside of ROUTES (notably PREDIS, NEA, ERDO and the IAEA) as milestone MS132.The internal summary report of subtask 4.2 was finalised in mid-December 2021 as milestone MS144. Task 7 members were present and were following the developments.

The subtask 4.3 on "R&D needs and opportunities of collaboration" started with a kick-off meeting in January 2022. National inputs on R&D needs and opportunities for collaboration were prepared and discussed at the subtask workshop in May 2022. Task 7 members were present and contributed to the workshop.

Task 5 "RWM solutions for small amounts of wastes

The objectives of Task 5 on "RWM solutions for small amounts of wastes"[24] as mentioned in the ROUTES project work package description of work are as follows:

- Collection, analysis and comparison of the actual existing knowledge about disposal options for small amounts of waste.
- Description of the necessary predisposal routes for the disposal options.
- Evaluation of the possible small-scale disposal solutions and description of their positive and negative aspects. In this regard, knowledge and experience will be reviewed in order to identify knowledge gaps.
- Dissemination of the results to other SIMS and description of the spin off for countries with large amounts of RW..
- Identification of R&D gaps.

During months 25 to 36, Task 5 organised a preparation meeting in December 2021 with 20 participants from 18 organisations for a 3-day workshop, which was held in January 2022. The workshop, which had 25 participants from 18 organisations from 16 countries focused on predisposal steps, predisposal routes per waste type and predisposal routes for the different disposal options in the SIMS. The workshop was concluded by a plenum discussion addressing the interdependencies of predisposal steps and disposal option. A Deliverable - *D9.10, Report about the knowledge for existing and potential disposal options for SIMS* – has been under review since October 2021, and the content of another Deliverable - *D9.11, Report presenting the results of the workshop dealing with possible conditioning routes for SIMS* – is almost available. The activities in Task 5 were followed by the CS experts in Task 7, with relatively few exchanges.

[24] Task 5 is coordinated by NCRS from Germany and SURO from the Czech Republic.

Task 6: "Shared solutions in European countries"

The members of Task 7 contributed to the discussion on the D9.12 Studies and plans for developing shared solutions for RWM in Europe and provided some comments for the deliverable as part of the subtask 6.1. For the sub-tusk 6.2 on Case studies on shared development and use of technologies and facilities the members were involved in the meetings and workshop, organised by the task coordinator. The focus of the collaboration was the experience of interactions with civil society in the case of shared solutions and lessons learned from past activities. The Task 7 members also participated to subtask 6.3 activities and agree to organise a special session during the workshop on shared solution and views of different actors.

In year 2, and also most of year 3, Task 7 members developed D9.16 Implementation of ROUTES action plan first phase [2], devoted to the shared solution and views on transparency from CS and other ROUTES participants. The core part of this deliverable is devoted to the shared solutions of RWM and discusses some key ethical and legal principles for RW, which are relevant to different solutions and public concerns related to the shared solutions in general, where the ideas and comments were collected from participants of ROUTES and also from CS larger group. These are then illustrated with three cases of different shared solutions which exist:

- Shared responsibility between the Republic of Slovenia and the Republic of Croatia for RW and SF from the Krško NPP (Slovenia),
- Foreign RW treatment in Jaslovské Bohunice, Slovakia – transformation from a national to international treatment centre,
- Exports of TENORM to Russia - A case of lack of transparency and research.

Based on lessons learned the more general recommendations are derived which are of value also for other shared situations. From all cases it is revealed that the international requirements regarding the transparency (either access to information or to public participation) should be fully implemented. Any restriction of these rights influences the broader acceptance, and in the longer term, has negative impacts on the shared practice. Limitation of public participation in decision making to the legal time schedules of 30 days as it is prescribed by for example EIA directives, is not a wise approach as it is impossible to really study very complex material in case of new RW facility establishment. The main aim of public participation is to collect the views of different stakeholders and to address them in a positive way. This is even more relevant in case of shared solutions where a deliberative process should be established for a longer period, if possible, from the beginning, to provide sufficient possibilities for exchanges and debates. In such deliberative processes, the roles for wider participation and information exchanges should be provided. For such activities, it is also vital to assure proper resources, which guarantee similar conditions for all stakeholders (not just official ones for which involvement is part of their job). For cases of disputes, the access to the justice must be available to provide legal means, if the decisions would be challenged.

Another important lesson learned is that all different RWM activities should include proper research on the EU level. As example, research into the depleted uranium waste streams, including those to Russia, could be a template for the assessment of other TENORM streams that are currently evading investigation because of claims of partial reuse. Within EU co-funding, there should be an assessment of the handling pathways of all forms of TENORM, whether or not they include partial reuse within or outside the EU. This includes clarity about long-term management of untreated or treated TENORM; safety of transport; assessment of RW as by-product in processing of TENORM; immobilisation and storage of TENORM and by-products from reuse; risks of temporary storage and final deposition of these wastes.

Task 8: "Extension on the evaluation of the possible waste management solutions for MS without WAC and with small inventories (SIMS)"

The objectives of Task 8 on ""Extension on the evaluation of the possible waste management solutions for MS without WAC and with small inventories (SIMS)" as mentioned in the ROUTES project work package description of work are as follows:

- Qualitative analysis and assessment of the predisposal routes of challenging waste for SIMS
- Qualitative analysis and assessment of existing disposal options for SIMS
- Analysis of the applicability of the disposal options for SIMS (e.g., inventory, costs, retrievability)
- Preparation of two case studies showing typical waste pathways (predisposal routes and disposal option)
- Interaction with KM WPs

The Task 8 was launched in the year 3 of EURAD with a Kick-off meeting in November with 27 participants from 19 organisations (17 countries). The topics were the following:

- Introductions into Task 8 objectives and subtasks
- Discussion of proposed case studies
- Interaction with other ROUTES tasks

In March 2022 took place the first workshop for the Task 8 on disposal options for SIMS and on predisposal routes for SIMS with 25 participants from 19 organisations (16 countries). The topics were the following:

- Presentation of the Task 8.1 objectives
- Presentation of working approach / methodology for Task 8.1 and Task 8.2
- Analysis of predisposal routes using the methodology "NDA Value Framework" for selected waste types
    - SIERs
    - DSRS (Lightning rods)
    - Metals (from decommissioning)
    - Concrete (from decommissioning)

The Task 8 is working on a MS 281 internal memorandum on the predisposal routes analysis according to the NDA Value Framework and on a MS 284 analysis of the March 2022 workshop and on the preparation for a hybrid meeting in Prague.

Some of the Task 7 CS experts took part in the Kick-off meeting as well as in the workshop of the Task 8 but there weren't many exchanges other than that.

6. Conclusion and the focus of Task 7 in year 4

The D9.17 report is the result of the implementation of an action plan developed after the first year of Task 7 ICS [1] and further precisions of activities in the D9.16 report on ethical and legal issues, good transparency, public concerns on shared solutions and case studies [2] in particular based on the evolution of ROUTES with the results and also its extension. The core part of the deliverable is devoted to the implementation of a broader understanding of transparency in RWM, in particular with establishment of RW disposals. Starting with the description of what broader transparency means for CS, the report presents the results of a short survey among the ROUTES participants and the larger CS group on transparency issues in RWM. The aim of this small survey is to obtain position on transparency in the countries from different types of actors. Several national cases are given with a largely common structure for description and address the current situations regarding RWM transparency in different European countries, with advanced and early-stage programmes for large and small RW inventories. They are described in detail in the appendix 2. Based on lessons learned and findings from presented cases, more general recommendations are derived from national examples which are relevant also for other RWM situations. One section of the report also deals with the interactions with other ROUTES tasks in year 3.

During the assessments of the case studies in performed analyses, it was noticed that there were in some countries problems with access to information from WMOs although there is a legal obligation for all WMOs to provide access to information as if they were a public authority, no matter what their status as state or private entity. The main arguments for this are that all environmental information produced and held by WMOs is an important ingredient for government decision procedures concerning RW, that full access to this information supports better quality decision making, and that WMOs implement government policies under oversight of a state authority and deliver a public service.
The fact that this is currently not happening in all Aarhus signatory countries and all EU Member States. The lack of information is undermining the quality of decision making around nuclear waste in those countries and infringes the rights of citizens to be involved in decision making in this important field. Certainly, in an area, where intra- and intergenerational justice is an important issue, full transparency should be guaranteed.

For EURAD year 4, the focus of the investigation of Task 7 members will be to address public participation for technical topics like development of WAC, management of challenging wastes and safety case development. The leading question will be how to organise and engage the public in these technical topics, which might not be so interesting for CS but will still be subject of research and development because of their various uncertainties. The Task 7 team will develop the CS understanding of concrete, short term engagement with different actors, in particular with CS, (including impacted citizens, and also NGOs), and also look at the longer engagement, taking into account long timescales of repository lifetime, as a basic agreed condition to be fulfilled for any RWM activity.

7. References

[1.] Zeleznik N., Swahn J., Haverkamp J., Hooge N.H., Rey H. (2020): **Scoping of ROUTES, initial ICS input and ICS action plan**. April 2021. https://www.ejp-eurad.eu/publications/eurad-deliverable-915-scoping-routes-initial-cs-input-and-ics-action-plan-task-71.

[2.] Zeleznik N., Swahn J., Haverkamp J., Hooge N.H., Rey H., Daniska M. (2021): **Implementation of ROUTES action plan first phase**. May 2022. https://www.ejp-eurad.eu/publications/eurad-d916-implementation-routes-ics-action-plan-first-phase.

[3.] 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: EUR-Lex -32011L0070 - EN - EUR-Lex: https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32011L0070&from=EN.

[4.] Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment, Official Journal L 197, 21/07/2001 P. 0030 – 0037. https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32001L0042&from=EN.

[5.] Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment and Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment. https://ec.europa.eu/environment/eia/eia-legalcontext.htm.

[6.] Directive 2003/4/ECof the European Parliament and of the Council of 28 January 2003 on public access to environmental information and repealing Council Directive 90/313/EEC. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32003L0004.

[7.] Directive 2003/35/ECof the European Parliament and of the Council of 26 May 2003 providing for public participation in respect of the drawing up of certain plans and programmes relating to the environment and amending with regard to public participation and access to justice Council Directives 85/337/EEC and 96/61/EC. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32003L0035.

[8.] Regulation (EC) No 1367/2006 of the European Parliament and of the Council of 6 September 2006 on the application of the provisions of the Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters to Community institutions and bodies. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32006R1367.

[9.] References for the Slovak case in section 4:

a. Vojtěchová, H.: Aktuální stav přípravy HÚ na Slovensku, SÚ RAO & ÚJV Řež 2019. Available online at https://www.surao.cz/wp-content/uploads/2020/09/TZ409_2019-Aktualni-stav-pripravy-HU-na-Slovensku_final.pdf (last accessed on 22 May 2022)

b. Mršková, A.: Vývoj hlbinného úložiska v Slovenskej republike. In Jaderná energie, 3/2020. Available online at https://jadernaenergie.online/wp-content/uploads/2020/07/CVR_casopis_jaderna_energie_3_20_web.pdf (last accessed on 9 June 2022)

c. https://www.njf.sk/sprava-prostriedkov/poskytovanie-financnych-prostriedkov/nakladanie-s-vjp/hlbinne-ulozisko-rao-a-vjp

Appendix A – Questionnaire

In the frame of EURAD, the Civil Society (CS) experts involved in ROUTES Task 7 dedicated to the Interaction with Civil Society (ICS) in ROUTES have elaborated a questionnaire to collect the opinions of ROUTES participants from the 3 colleges (Technical Support Organisations, Waste Management Organisations, Research Entities), plus the views of the CS members involved in EURAD.

Structure of the questionnaire

General information

*Name/Surname
*Type of actor: WMO, TSO, RE, Civil Society
*Name of your organisation
*In which ROUTES Task are you involved?
*Email address

Questions

1. Effective access to information

According to the Aarhus Convention, access to information is the right of everyone to receive environmental information that is held by public authorities. This can include information on the state of the environment, but also on policies or measures taken, or on the state of human health and safety where this can be affected by the state of the environment. Applicants are entitled to obtain this information within one month of the request and without having to say why they require it. In addition, public authorities are obliged, under the Convention, to actively disseminate environmental information in their possession.

Q1.1 Effective access to information: what is the level of access to information in the case of radioactive waste management (RWM) in your country, including information regarding the repository?

- **Level 1** –
  - (1) No access - no Freedom of Information act (FoI Act) in country
  - (2) Partly no access to information due to structural organisation of RWM system (e.g. the implementer is private company with no access to information)
- **Level 2** –
  - (1) FoI Act but poor or non-existent registration of documents
  - (2) Existence of independent and competent legal system for appeals
- **Level 3** –
  - (1) FoI Act with registration of documents, but limited access to registry (personal visit or correspondence necessary)
  - (2) Unaffordable cost for printed copies of documents
  - (3) Reasonable/ cost for printed copies of documents
  - (4) Free digital copies of documents
  - (5) Free digital or printed copies of documents
- **Level 4** - FoI Act with registration of documents, registry searchable on Internet
- **Level 5** - FoI Act with registration of documents/correspondence, registry searchable on Internet and searchable documents directly downloadable from Internet

Q1.2 What are the main challenges in case you want to access the information on RWM (e.g., denial of information due to different administrative complications, no information from industry (private companies), denial of information due to confidentiality of commercial information, documents provided, but information redacted, ….)?

Q1.3 Are the rights to access to information changing over time? Have you noticed any difference during the last decade?

Q1.4 In your opinion, what information should be available to the public and if any restrictions should be applied, why?

2. Effective access to public participation

According to the Aarhus Convention, access to public participation constitutes the right to participate in environmental decision-making. Arrangements are to be made by public authorities to enable the public affected and environmental NGOs to comment on, for example, proposals for projects affecting the environment, or plans and programs related to the environment. These comments are to be taken into due account in the decision-making, and information to be provided on the final decisions and the reasons for it.

Q2.1 Effective access to public participation: what is the level of public participation in the case of radioactive waste management (RWM) in your country, including public participation regarding final disposal of the radioactive waste?

- **Level 1** - No public participation (PP)
- **Level 2** - PP in the form of information-only meetings
- **Level 3** - PP in the form of requests for written questions/issues/comments only
- **Level 4** –
    - (1) PP in the form of consultation meetings with documentation of questions/issues and answers and the possibility to submit questions/issues/comments that are documented and answered
    - (2) Mostly local consultation meetings
    - (3) Mostly national consultation meetings
    - (4) Local and national consultation meetings
    - (5) National consultations using internet forms
- **Level 5** –
    - (1) Existence of a (legal) system ensuring due account is taken of questions/issues/comments, (e.g., properly dealt with in an environmental impact statement)
    - (2) PP is widespread within the whole RWM governance system, (e.g., also from regulator, government on legislation, etc, not only on projects)
    - (3) Existence of an independent entity to organise consultation and development of environmental impact statements

Q2.2 What are the main challenges in case you want to participate in RWM (e.g., no problems at all, participation is not organised systematically, only official parties participate, no due account of the remarks obtained, no follow up, ….)?

Q2.3 Are the rights to public participation changing with time (enlarged, reduced)? Have you noticed any difference during the last decade? For which projects?

3. Effective access to justice

In the Aarhus Convention, access to justice is defined as the right for members of the public to review procedures to challenge public decisions, including substantive legality of the decisions, that have been made without respecting the right to access to information and public participation, or environmental law in general. The remedies that they are provided must be adequate and effective, including injunctive relief when appropriate, and be fair, equitable, timely and not prohibitively expensive. Decisions resulting from access to justice must be given or recorded in writing and court decisions, and whenever possible of other bodies, be publicly accessible. Also, members of the public must be informed about their right to justice.

Q3.1 Effective access to justice: what is the level of access to justice in the case of radioactive waste management (RWM) in your country, including final disposal of the radioactive waste?

- **Level 1** - No access to justice
- **Level 2** - Access to justice for access to information
- **Level 3** - Also access to justice in decision-making processes (taking due account of questions/issues/comments during consultation)
- **Level 4** - Limited right to veto, e.g., by local communities.
- **Level 5** - Full right to veto, e.g., by local communities.

Q3.2 What are the main challenges in the case of access to justice in RWM (e.g., no instruction on how to act, legal representation needed, no legal practices, no legal framework, ….)?

Q3.3 Are the rights to justice changing with time (enlarged, reduced)? Have you noticed any difference during the last decade? Are you aware of any relevant examples?

4. Effective access to resources

Resources could be financial means, but also knowledge and capacity building, access to independent expertise, experience, available time, etc. Particularly the financial resources can be provided for decision-making bodies, local communities, local NGOs through local communities, local and national NGOs through national authorities or from an independent source (e.g., a nuclear waste fund).

Q4.1 Effective access to resources: what is the level of access to financial resources for NGO in the case of radioactive waste management (RWM) in your country?

- **Level 1** - No access to resources
- **Level 2** - Access to resources, but not from an independent source
- **Level 3** - Access to resources from an independent source

Q4.2 Are there any conditions for use of resources (e.g., restrictions on how resources can be used and for how long they can be received, available only for particular organisations (local, national...))?

Q4.3 Who gives the resources? How is the financing system for RWM organised?

5. Transparency and Public Participation in the context of reporting to the EC

Each EU Member State must submit a National Program for radioactive waste management to the EU Commission. Have you been involved in any way in the development of the national program? How is the transparency in this work? What possibilities have there been for public participation? Have there been consultation processes and have these been formal?

Q5. Has there been transparency and public participation (consultation processes) for the description/development of the National Programme on RWM submitted to the European Commission?

Answers

Out of the 100 persons to whom the questionnaire was sent, 31 gave an answer with 13 of CS members from NGOs, 8 WMOs members, 5 of TSOs members and 5 of REs members.

The geographic distribution of the respondents goes as follows:

- 1 respondent from: Austria, Cyprus, Norway, Portugal, and Ukraine.
- 2 respondents from: Bulgaria, Slovakia, and Sweden.
- 3 respondents from: Belgium, Czech Republic, Denmark, and Slovenia.
- 4 respondents from: France and the United-Kingdom.

Q1.1 Effective access to information: what is the level[25] of access to information in the case of radioactive waste management (RWM) in your country, including information regarding the repository?

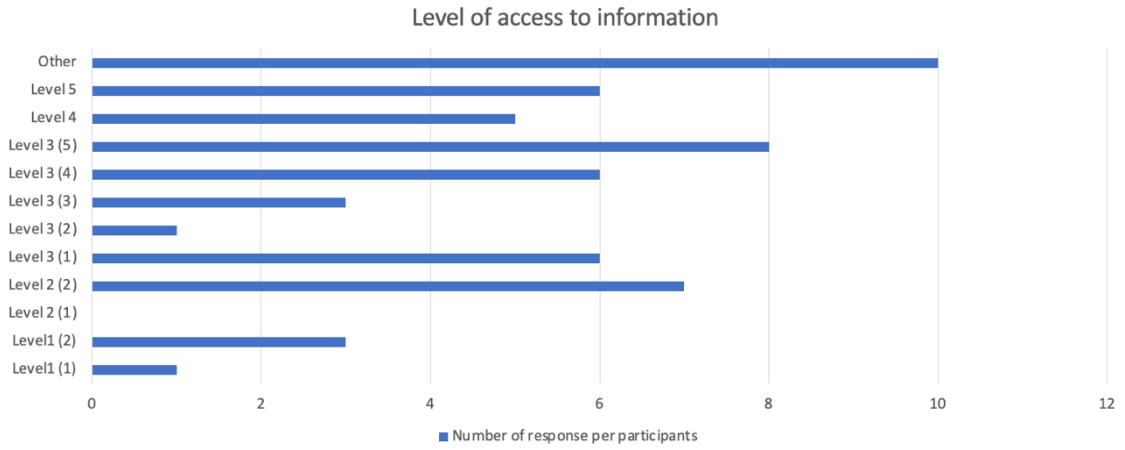


Figure 5– Responses to the Q1.1 of the questionnaire on the level of access to information

In the graph above (Figure 5) there are also 10 comments from various actors of different countries:

- from Austria: "*The Austrian Freedom of Information Act is under review. Information about radioactive waste management in Austria is available as free digital documents (see answer to Question 1.2).*"
- from Belgium: *"The proposals to this question are strange. Effective access to information can be measured in many different ways. For example, holding a public consultation during covid is holding a consultation but doing it at an inappropriate time. Having information available on the internet that is smooth and a form of communication exercise is effectively having online access to information but not precise enough for what the reader is looking for. Having the possibility to appeal yes, but can a citizen afford it (time, hiring a lawyer, forming a collective)? To be able to obtain documents (printed or not): ok but only for those that are final and not those that are under negotiation (for example a draft royal decree). So, getting stabilized information when*

[25] For more details on the levels of access to information see the structure of the questionnaire in the beginning of the appendix 1.

there is nothing left to decide: yes, it is important, but does it promote interaction, transparency? I honestly don't know. There are things that are done at the Belgian level, and they all respect the legal requirements. But is it sufficient to respect the legal requirements in the case of radioactive waste management? I note that in all the cases presented, it is up to the citizens to inform themselves, to obtain, to request information. They must be proactive. But what about the pro-activity (beyond the legal aspects) of the organizations in charge of these issues? Information, participation, awareness raising remains a side-line activity of these organizations which, it is true, already have a lot to do in terms of technical, financial, security control etc."

- from Cyprus: *"RWM does not exist."*
- from Denmark: *"All technical reports, policy papers, env. information etc. in relation to repository are published on the internet. Special conditions apply to conversation among public entities; however, the Aarhus Convention is followed in relation to access to environmental information."*
- from Portugal: *"In the first version of the National plan for Radwaste Management that was for public consultation, there was a briefly mention to a future repository. This National Plan was lately revised but not yet published in Decree-Law. No further info is known. In PT, there is only an interim storage facility that has been licensed by the Regulator and has received visits from both IAEA and EC."*
- from Slovakia: *"Rather unique situation, see for ex. https://unece.org/env/pp/cc/decision-vi8i-concerning-slovakia"*
- from Slovakia: *"Partly no access to information due to structural organisation of RWM system (the implementer - 100% state-owned stock company JAVYS claims not to be a liable entity according to the Slovak Freedom of Information Act and does not reply to requests of information)."*
- from Slovenia: *"Generic info free & digital, the details in the development: licensing of LILW repository on-going, info is not public during this stage."*
- from Sweden: *"All documents that is delivered to authorities are subject to Foi Act and are accessible relatively easy. All documents created by the RWM company that is NOT delivered to authorities are not accessible by law. It is up to RWM company to share those. If they don't want to share, they don't have to share."*
- from Ukraine: *"Depending on the document types, there is a different type of access. It is possible to submit an electronic application on the website of State Nuclear Regulatory Inspectorate of Ukraine (All information that states in questionnaire as of 23.02.2022)."*
- from United-Kingdom: *"Level 4 – The UK FoI Act 2000 and the Environmental Information Regulations 2004 (EIR) provide access to information on request. Documents, research and statistics are proactively published on the NWS website and are searchable and downloadable for free."*
- from United-Kingdom: *"This depends on the type of information. From my perspective I can say:*
    - *Much of the work conducted by government institutions is published, which nowadays means it is freely available online.*
    - *Not all work is published; some work is unpublished for commercial, security or other reasons that restrict the release of information into the public domain. Access to protectively marked information is determined on a need-to-know basis.*
    - *Publication is sometimes quite slow.*
    - *There have been examples of documents being removed from the internet, reducing their accessibility. An example is the Waste Acceptance Criteria for the UK Low Level Waste Repository (LLWR), which were removed from LLWR's website in ~2020, although these would likely be provided in response to an FOI request.*

Q1.2 What are the main challenges in case you want to access the information on RWM (e.g. denial of information due to different administrative complications, no information from industry (private

companies), denial of information due to confidentiality of commercial information, documents provided, but information redacted….)?

Country	Answer
Austria	*Austria has a centralized waste management organization (WMO) which is Nuclear Engineering Seibersdorf GmbH (http://www.nes.at). Information about the waste management program in Austria is available there (in German and English) as well as on the website of the respective ministry at (https://www.bmk.gv.at/themen/klima_umwelt/strahlenschutz/radioaktiv.html) which is available in German only. The national program (in German) is available there to download as PDF as well https://www.bmk.gv.at/themen/klima_umwelt/strahlenschutz/radioaktiv.html and it contains information regarding the inventory of the interim storage in Austria. (Austria doesn't have a final disposal facility yet but is in the process of starting the planning in a transparent way that includes civil society (https://www.entsorgungsbeirat.gv.at/ in German and English). In specific: If the information wanted is not on the websites available to the public, questions about the Austrian inventory are possible via the ministry. Information about specific waste producers cannot be given due to data-protection laws.*
Belgium	*Hard to figure out which information exists (no public databases as far as I'm aware)*
Belgium	*I started to answer it above. In my opinion, the levels proposed here are not always automatic. They are legally foreseen but in their application they can be variable. For example, it can become difficult to find some public consultation documents from 2009-2010. The final document is available but not what made it possible to compose it. There is therefore a loss of information: what remains are documents (appraisals) that are stabilized. They are also the ones that circulate the most with time. Another example: the "Belgian monitor - consolidated version" (a platform that allow access to every legal document) gives access to the whole Belgian legislation, but it is difficult for a citizen to understand how it works online. This difficulty is an additional difficulty in accessing information. However, in this case, we can say that access to information is allowed and organized. The question to be asked here is: is the way in which information is made available easily accessible to those who wish to be informed? Are people who do not want to be informed effectively informed in other ways? This implies regular assessments of how information (format, delivery platform), what kind of information (data being discussed, stabilized documents) is delivered. The context of enunciation must be taken into account to know what to do and provide. For example, the covid period (phase 1 of containment) is inappropriate. At this point, it is still the same kind of information, the same way of operating regardless of the context, the audience and their expectations (or lack thereof).*
Belgium	*The main challenges are: o denial of information due to confidentiality of commercial information, o documents provided, but information redacted.*
Bulgaria	*Lack of real action by the government and non-implementation of the RAW management strategy*
Bulgaria	*Documents provided, but limited information*
Cyprus	*the main challenges the information available is limited*
Czech Republic	*Access to information of private companies*
Czech Republic	*confidentiality of commercial information, documents often provided but the main info blackened*
Czech Republic	*It depends on type of requested information, its owner, source of funding for its acquisition, degree of confidentiality, etc. d graduated approach.*
Denmark	*Must be a specific request on information and some information is confidential*
Denmark	*The main challenge, which is not prohibitive, could be to identify the relevant documents, especially for "ordinary" members of the public.*

Denmark	*As WMO, in general I have access to all relevant information.*
France	*In practice, civil society cannot access information protected for commercial, industrial or defence purposes*
France	*High amount of technical information*
France	*denial of information due to confidentiality of commercial information*
France	*Lack of information due to confidentiality of commercial information*
Norway	*Challenges mainly arise from denial of information due to confidentiality of commercial information, e.g. information about foreign companies offering services to Waste Management Organization, and withholding of information that could jeopardize security of nuclear facilities, or transport.*
Portugal	*Some information mainly from past activities (legacy wastes) have been lost (35-45 years old). The confidentiality in terms of the industry can also be a setback. The sources annual declaration sent to the Regulator is confidential. Also, activities inside the interim storage facility are somewhere confidential for the public (exception for the Joint Convention report). This facility is not for public visits as well.*
Slovakia	*Due to many nuances, I would prefer to answer/explain this in person in Paris on 28-30 March or in the week 13-17 June*
Slovakia	*the implementer - 100% state-owned stock company JAVYS claims not to be a liable entity according to the Slovak Freedom of Information Act and does not reply to requests of information the set of files/documents in the administrative procedures held by the Nuclear Regulatory Authority of the Slovak republic - NRA SR (based on which the decisions/rulings in those procedures are made) can be accessed only through physical inspection of the files at the NRA SR premises - if one is a participant in the administrative procedure, of course. Photos cannot be taken during the inspection. Paper copies of the inspected files can be requested - one has to specify the files or parts of the files, he is interested in. The redacted versions (after removal of e.g. personal information, building codes, ...) of the files are then provided. One is not charged for the copies if the total price is below a specified limit (10€ ?). The unit price of a paper copy is relatively low (a few cents per page), but the files often contain hundreds or even thousands of pages. One therefore ends up requesting copies of only a small portion of the files, in order to reduce the cost of copying the files and the time needed to copy the files (in order to obtain the copies faster) and in order to not put too much workload on the NRA SR employees. Information obtained through FOIA request need not be received fast enough, e.g. before deadlines of other administrative procedures where the information is needed (Slovak FOIA sets 8-16 working days deadline for providing a reply to a FOIA request) There is not an online database of documents (e.g. of NRA SR) that are available to be requested through FOIA, it often takes a lot of time to find out there is a relevant document that can be requested*
Slovenia	*There is no denial or access restrictions for the majority of documents, sometimes NDA should be signed to protect the usage and sharing of information. Restricted access is only valid for documentation that has been declared as safety and security relevant according to national legislation.*
Slovenia	*No clear information what documents are developed, many times decisions of authorities not to disclosed information and therefore use of formal process at Information Ombdusman required, information redacted, even too much information with detail technical reports (like 2000 pages) with no clear summary for public.*
Slovenia	*I do not expect any challenges once the licensing process is closed*
Sweden	*Because it is a private company it is not mandatory to share information, only the information they decide to share. It is in their right to decline any inquiry of information.*
Sweden	*No free access of information from implementer that is a private company*
Ukraine	*No main challenges (All information that states in questionnaire as of 23.02.2022).*
United-Kingdom	*Information provided but redacted due to commercial confidentiality*
United-Kingdom	*No current challenges on access to information*

United-Kingdom	*NA*
United-Kingdom	*Again, this depends on the information being requested, but common challenges are commercial restrictions and difficulties identifying who holds desired information.*

Table 1 – *Results by countries to the Q1.2 of the questionnaire*

Q1.3 Are the rights to access to information changing over time? Have you noticed any difference during the last decade?

Country	Answer
Austria	*Also, according to the radiation protection act Austria had to elaborate a national program that must include how transparency and public participation in questions of RAW management is being ensured. Yes, there has been a change in the last decade. Questions regarding RAW management are discussed in public and we therefore are providing more and more information on our (NES.at) website as we see this increase of interest which is also due to the start of discussions regarding final disposal. This is also true for our regulator.*
Belgium	*No*
Belgium	*Not particularly and this is precisely something that needs to be improved. For instance: NWMO doesn't need an expert in communication who provides smooth information, but it should rather train and allow their safety, R&D, financial experts to express and vulgarize information to citizens. It will a huge difference also to ensure this double wing interaction among experts and society. For the moment and with the exception of a few, these two spheres remain too often closed to each other on the organizational level and meetings remain very punctual.*
Belgium	*The past decade has seen a shift from working with documents on paper to documents in electronic format. This shift was accelerated by the covid pandemic. The availability of documents in electronic format has made these documents more publicly accessible.*
Bulgaria	*Yes, there is more access to information, but there is no real activity.*
Bulgaria	*More accessible*
Cyprus	*no*
Czech Republic	*Access to information is gradually getting better*
Czech Republic	*Yes, due to the constant NGO push and changes in political representation the situation is getting better.*
Czech Republic	*Act No. 106/1999 Coll., On Free Access to Information, stipulates that e.g. ministries and other institutions, in particular those in the state ownership are obliged to provide information to natural and legal persons upon request. Based on degree of this Act implementation, it seems to be easier than time before. The clerk is better educated in the processes and specificity of public interest in this field.*
Denmark	*No changes - access to public information is regulated by law*
Denmark	*De facto access to information for stakeholders has improved considerably since 2016, when an institutionalized model for transparency and public participation in the decision-making on RWM in Denmark was established.*
Denmark	*There has been a change in the legislation on public access to information in general, to some extent limiting access to conversations between authorities. However, access to information on environmental issues is unchanged.*
France	*Interactions with the public have strongly been improved in France during the last decade, facilitating in return the access of information, notably in terms of understanding of technical documentation and of appropriation of technical concepts by the public.*
France	*An increasingly transparent approach*
France	*Easier and more natural access to information - More public debates to discuss issues related to RWM*

France	*Evolution is positive as giving access to information seems now more normal and that there are more debates going on about RWM*
Norway	*No change in the right to information access, but new information does present itself from time to time, because individuals or groups reveal information that is not publicly available due to above restrictions. Nuclear facilities in Norway have been the responsibility of a private institution for decades. Currently a process is ongoing to transfer those facilities to a state entity, which might mean better access to information because of the law on public access to information. https://lovdata.no/dokument/NLE/lov/2006-05-19-16 Still, some restrictions will apply.*
Portugal	*Yes. Registries are also in digital support which helps to send the info. Past reports from the EC, the fact the info about radwaste has to be sent to the IAEA Joint Convention and the obligations related to implementation of Directive2013/70/EURATOM were the main reasons to improve the registry of radwaste. The WMO has sometimes difficulties in providing info to the REs mainly because it also does not have it.*
Slovakia	*Yes, see for ex. the same link that I copied pasted into answer to the Q1.1*
Slovakia	*Until autumn 2021 the Slovak Atomic law allowed for denial of access to files due to telecommunication, bank or postal secrecy. In autumn 2021 - a new legal reason for denial of access to files was introduced - intellectual property. Since autumn 2021 older (but still in effect) NRA SR rulings and related documents are not accessible online on the NRA SR webpage any longer*
Slovenia	*Yes, they are. The tendency is to open or to provide access to most of the documentation.*
Slovenia	*There was a shift in some periods to more open provision of information, but in general there are ups and downs. Mostly to openness depends on individual personalities of heads (CEOs).*
Slovenia	*No*
Sweden	*No*
Sweden	*Less openness of the regulator, does not register all the necessary information*
Ukraine	*Improvements in the context of improving the interface electronic system (All information that states in questionnaire as of 23.02.2022).*
United-Kingdom	*We have had a FoI Act and can appeal to a FoI Commissioner. This system has existed for over a decade. There are slightly different systems in England and Wales and In Scotland*
United-Kingdom	*Information more freely available*
United-Kingdom	*The UK Government supports the UK FoI Act and the EIR to provide access to information to help the public understand decision making and how public money is spent. The UK Government reviewed the FoI Act in 2016.*
United-Kingdom	*See answer to 1.1 above.*

Table 2 - Results by countries to the Q1.3 of the questionnaire

Q1.4 In your opinion, what information should be available to the public and if any restrictions should be applied, why?

Country	***Answer***
Austria	*General information regarding radioactive waste management should be available (and this information is already available). The public should be informed in any case in very sensitive issues like site selection and disposal. Also, information about the decision making process in RAW management especially disposal should be available. Frequently asked questions by the public should be addressed in all information sources (online or otherwise). Restrictions should be there for waste producer specific information to protect customer/producer data – especially in the highly sensitive subject of radioactive waste.*
Belgium	*Everything except for nuclear classified information (e.g., linked to security of nuclear sites, fissile material stocks, etc.)*

Belgium	*This means organizing constant meetings and discussions on these aspects in order to propose a co-constructed project. It takes time for sure, and it implies a strong engagement from the experts and the publics (or their representatives). For example, not having access to the draft royal decree is a democratic problem. It is not even submitted to the Parliament for discussion (...)*
Belgium	*All final documents generated by public institutions should be publicly available, with the exception of security-related information (aspects related to non-proliferation, protection against terrorism, military …). Draft versions of documents should always remain internal.*
Bulgaria	*The public has a right to all information.*
Bulgaria	*General and enough representative, but not strong technical and detailed*
Cyprus	*all information except that which should be kept confidential for safety reasons*
Czech Republic	*Restricting access to security related information (device, functionality, transport)*
Czech Republic	*Most of the information re DGR, technical studies, socio-economical studies, financial calculations as well as info about the existing NPP should be available, restrictions are acceptable on issues regarding safety protection of the nuclear facilities, limitedly on highly confidential commercial info*
Czech Republic	*Not all information should be available for public, same of them are of strategic interest of the state, could be misused or even abused and/or not well understood. There should be graduated approach to them, the level of details of the available information should comply with security and safety issues.*
Denmark	*All information except on special waste that requires certain precautions*
Denmark	*A few restrictions as possible should be applied, particularly in regard to access to environmental information.*
Denmark	*As much information as possible to enable the public to make informed decisions.*
France	*No official opinion from IRSN*
France	*Not sure that restriction should be applied in terms of information access to the public. However, it should be kept in mind that sometimes, high level of technical information can be disseminated, and it should be accompanied to be understandable by all.*
France	*Access to all information with no restrictions*
France	*All information should be accessible to the public at some point, it shouldn't take years to communicate on problems, there should be less / no restrictions to accessing it.*
Norway	*Civil society, the nuclear industry, and government benefits from maximum transparency on matters related to RWM. Thus, great care should be taken to make available as much information as possible. In cases where security might be jeopardized by sharing information, documents should be published with a minimum of information "blacked out", and only that which is directly related to security. E.g. transport times for radioactive waste, details about placement of security measures at nuclear sites, etc. Details like amount of security employees and other, more general statistics, should not be withheld, as these provide the public with an understanding of the resources put into actually securing sites and RAW. In this way, it should be obvious what information is withheld. Withholding whole documents because of small pieces of sensitive information does not give context to the public, and that makes it harder to build trust, which is essential for RWM-projects in a democratic society to run smoothly. Another alternative, albeit not ideal, is that one writes two versions of documents that concern sensitive information - one for the public, and one for "internal use". Still, this does not have as positive an impact on perceived transparency and trust, as publishing documents with small segments "blacked out" would.*
Portugal	*In our case, no nuclear Country, all information is public providing the reports are public as well. The first National Program was for public consultation before being published in the legislation. It is expected to have the second report public soon. It is more difficult to get info about specific waste streams for the REs maybe because the WMO does not have the info or does not have the means (human resources) to get it.*

Slovakia	*In Slovakia, there are disagreements with regard to this Q since at least 2007. This Q would fit more like a roundtable discussion which could in my opinion last several days, and no conclusions would most probably be able to be made (as different actors/stakeholders would hold naturally different positions/answers to this Q). In the end, I am afraid that the answer to this Q must inevitably be largely based on political factors.*
Slovakia	*one can understand some restrictions justified by security reasons, but I am afraid that this justification is greatly overused at the moment*
Slovenia	*All should be available to the public; exemption is only valid for documentation that has been declared as safety and security.*
Slovenia	*All information should be available, only information restricted by law can be confidential (like Physical protection plan with technical details about protection).*
Slovenia	*basic info on the waste and related facilities including the full safety case and decisions of the regulator*
Sweden	*All information should be available to the public.*
Sweden	*Only restrictions for physical security reasons. All financial information should be available (no commercial secrecy)*
Ukraine	*Information on the impact of the object on the environment, on the state of the environment, on the impact on human health should be provided without restriction (All information that states in questionnaire as of 23.02.2022).*
United-Kingdom	*As much information as possible should be available. Some restrictions may be justified but is it important that the FoI Commissioner is able to look at cases where information has been denied.*
United-Kingdom	*The only exception to available information should be in with regard to implications concerning defence and national security*
United-Kingdom	*The UK Government policy on geological disposal provides that "It is vital that communities have confidence in the information provided to them about the siting process, including on all relevant scientific and technical issues. NWS will be the first port of call for information on geological disposal and the siting process. The Community Partnership will also be able to call on the Government's independent advisory body, CoRWM and regulators." [para 6.60] The policy also acknowledges "the importance of providing upfront information, on issues such as geology, socio-economic impacts and community investment has been highlighted. The availability of clear, evidence-based information on both technical issues, and the process of working with communities, will enable communities to engage in the process with more confidence." [para 5.1]*
United-Kingdom	*Supportive of maximising transparency, except where there is a clear basis for not releasing information (e.g., security or commercial restrictions).*

Table 3 - Results by countries to the Q1.4 of the questionnaire

Q2.1 Effective access to public participation: what is the level[26] of public participation in the case of radioactive waste management (RWM) in your country, including public participation regarding final disposal of the radioactive waste?

[26] For more details on the levels of access to public participation see the structure of the questionnaire in the beginning of the appendix 1.

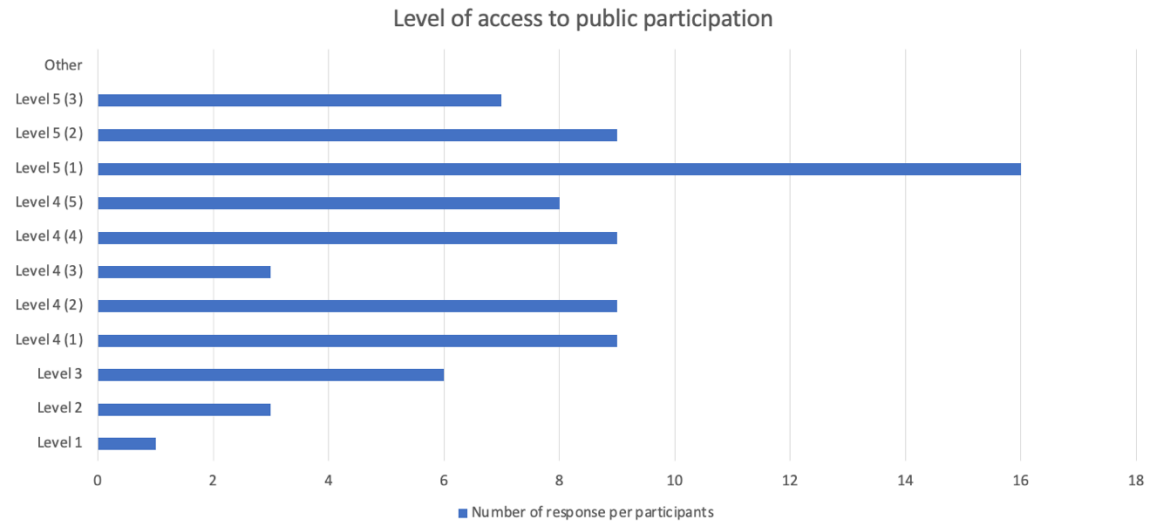


Figure 6 – Responses to the Q2.1 of the questionnaire on the level of access to public participation

In the graph above (Figure 6) there are also 2 comments from various actors from the United-Kingdom:

- *"LEVEL 5 (2) but it is possible that LEVEL 5(3) may be involved later in the process."*
- *"Level 5: Formal public consultations are used extensively in the UK to aid policy development and in many cases are legally required (e.g. local planning authorities are required to undertake a formal period of public consultation, prior to deciding a planning application): https://www.gov.uk/government/publications/consultation-principles-guidance. Development of a geological disposal facility in the UK is designated as a nationally significant infrastructure project. Details of this process, including how to participate are available here: https://infrastructure.planninginspectorate.gov.uk/application-process/the-process/ A community-led approach is fundamental to the current UK siting process for a geological disposal facility (GDF), with openness and widespread participation being cornerstones of this approach. See for example: https://southcopeland.workinginpartnership.org.uk/"*

Q2.2 What are the main challenges in case you want to participate in RWM (e.g. no problems at all, participation is not organized systematically, only official parties participate, no due account of the remarks obtained, no follow up, ….)?

Country	Answer
Austria	*Formal public participation is not yet organized systematically. There are some tools in place for public participation and information (e.g. website information, questions can be asked to the WMO or the regulator, public participation is also insured in frame of strategic environmental assessments and environmental impact assessments). Currently the Austrian advisory board on radioactive waste management (https://www.entsorgungsbeirat.gv.at/en/themen/about-us/tasks) is working on a structured public participation concept.*
Belgium	*For DGRs, Belgium is only starting the process, so it's difficult to say at this point…*
Belgium	*several elements: 1. when participation is not taken seriously by those who organize it. For example, considering that it is a waste of time, that nothing new is learned, that those who participate are not educated enough to understand, etc. In this first case, it is a waste of time for everyone (participants and organizers). I've often wondered if the last public consultation was really taken seriously by the NWMO or if they considered it an unnecessary*

	bis repetita of the 2011 legal public consultation. They need to be asked. 2. when participation is carried out at an inappropriate time. For example, during a period of crisis that does not allow for gatherings, face-to-face discussions, or the organization of events in calm conditions where people are mentally and physically available to participate. 3. When participants feel that they are being presented with a fait accompli and that there is nothing left to decide and/or that a decision already made elsewhere must be endorsed. For example, when you entered the online platform of the Belgian public consultation of 2021, the first question asked was a closed question: do you think that geological disposal is the best way to manage radioactive waste? I imagine there is more that those three elements are key ones.
Belgium	*The main challenge is that the participation is not organized systematically.*
Bulgaria	*There is no feedback and no follow-up*
Bulgaria	*Official parties participate, and PP representatives in some cases*
Cyprus	*not applicable*
Czech Republic	*The question is not relevant to WMO*
Czech Republic	*NGO and civil society has limited access to participation, mainly official parties participate (mayors of the municipalities, district politicians...), no due account of the remarks*
Czech Republic	*National WMO SURAO provides information on the status of RWM, mainly disposal, to the public on SURAO website, regularly uses newsletters "Zprávy ze Správy"(4x per year), activities etc. The information is accessible also on regulatory authority, SUJB, website or via direct questions, and also in TSO, SURO. National reports and RWM policy are publicly available.*
Denmark	*No problems with meetings on local and national level but the dialogue regarding final disposal is difficult to get started*
Denmark	*The main challenge, which is not prohibitive, is for "ordinary" members of the public to gain access to the institutional mechanisms for transparency and public participation (i.e. the national and so far one local contact fora for RW) that are currently in place.*
Denmark	*No challenges for me as part of WMO.*
France	*- Lack of fundings and human resources to help public participation. - Public perception of its involvement is that its opinion does not really influence decisions.*
France	*no particular problems except the fact that it involves large participation to numerous meetings that take time*
France	*Participation is not organized systematically - No or not enough follow up, not enough - The comments obtained are not sufficiently taken into account*
France	*Participation is not organized systematically and there is no or not enough follow up, also the results from participations are not sufficiently taken into account.*
Norway	*Norway currently employs a system where the WMO has an open reference group for national NGOs, which meets a minimum of 4 times a year. Local groups of the same kind are in the works, and local and national consultation meetings are being held. The biggest challenge currently is that participation outside the established group of national NGOs is not systematically organized. In part, this is due to a perceived lack of interest outside those regions where nuclear facilities currently are located, meaning participation is most likely in these regions on a local level. The first RWM-project in Norway is just starting up, which means attention around the project is not high. Attempts have been made to hold public meetings in these regions, with low participation. The main contact is between the WMO and local authorities, the WMO and national NGOs, and the WMO and the ministry and regulator.*
Portugal	*As RE, the main problems are related with info from subjects that have not yet been discussed among the WMO and/or the Regulator. The lack of people with knowledge to understand the radwaste issues is also a problem.*
Slovakia	*Not competent.*

Slovakia	*short deadlines; administrative procedure files are not available online or at least in the electronic form, physical inspection of the files during office hours is necessary (as a result one has to take a day off the regular job); older (but still in effect) NRA SR rulings are not accessible online; Information obtained through FOIA request need not be received before deadlines of the administrative procedures (Slovak FOIA sets 8-16 working days deadline for providing a reply to a FOIA request). Information asymmetry - Due to limited time, expertise and financial resources the public and municipalities are reliant mostly on information provided by the project proposer, either in the EIA documentation or in reactions to additional questions (raised e.g., during the public hearing). Information verification is difficult and time and financially demanding. Consultations with independent experts appear to be a theoretical option only, not only because of short procedural deadlines and financial constraints, but also due to a lack of suitable independent nuclear experts and/or insufficient free capacities of these experts.*
Slovenia	*No problems at all.*
Slovenia	*Participation is legally assured and organised for local citizens and NGOs with legal stands, but for others it is difficult to participate. Remarks are rarely taken into account.*
Slovenia	*not sure about that*
Sweden	*After the environmental impact statement was created there are very few, if at all, meetings held by the company. The municipality has meetings open to the public a couple of times a year with information sharing. At the moment it is not easy to participate unless you are involved in an NGO that receives invites to participate.*
Sweden	*Due account is not adequately taken, and this is accepted in the access to justice system as the project is very big and important.*
Ukraine	*No main challenges (All information that states in questionnaire as of 23.02.2022).*
United-Kingdom	*In terms of participation by members of the public, there is participation in local site groups and also requirements for consultation and engagement as part of the GDF siting process, including a public vote as to whether to accept the GDF. One challenge is that local engagement tends to be through local meetings which are not well attended, and which don't tend to involve younger people or hard to reach groups. Local authorities are of course the democratically elected bodies within nuclear communities and through Nuleaf they engage on behalf of local people.*
United-Kingdom	*Scope of participation in limited to "narrow geography" wider public interests not given appropriate weighting.*
United-Kingdom	*• To ensure that all elements of a community can participate in the process. Typically, it is older and/or retired people who engage with us from the general public or it is those with a special interest (e.g. from an environment perspective) that engage with us.* *• A key aspect of the UK process is that we, as the Waste Management Organisation, must work collaboratively with Community Partnerships.* *o It has taken some time for individuals and organisations to work out how they perform their roles in a collaborative way and understand what authority they have, in order to make decisions.* *o The slow start to the Community Partnerships has meant that some people think that they have not had enough engagement with us as the WMO.* *o The way the Community Partnerships are constituted is defined by UK Government policy and some people find it challenging that they do not have an automatic right to be part of some of the committees. For example, the membership of a Community Partnership must reflect the local area. Some people outside the area think that they should be involved, even if the policy doesn't allow it. Also, they often fail to appreciate where they can engage.*
United-Kingdom	*N/A*

Table 4 - Results by countries to the Q2.2 of the questionnaire

Q2.3 Are the rights to public participation changing with time (enlarged, reduced)? Have you noticed any difference during the last decade? For which projects?

Country	Answer
Austria	*Yes, they are changing with time. Radioactive waste management and especially disposal are topics where the public has a strong opinion. This is leading to more questions asked regarding these topics as well as a strengthening of public participation and public participation rights.*
Belgium	*There were different SEA's on DGR in the past, and now a public consultation will be organised through an independent institutional body*
Belgium	*In Belgium, the answer is clear: the NWMO was proactive in the 2010s (participatory dialogues, interdisciplinary conference) and even delegated the organization of a citizens' conference to the King Baudouin Foundation. Since the agency is waiting for the government's decision, it is back to a wait-and-see position. in practice, nothing is organized and when it is organized, it is at least legal. It is, in my opinion, a step backwards. Participation (expert or citizen) is not only intended to make people participate, but it also makes the problem visible, and puts it on the agenda in an indirect way. Regularly organized participation reminds political decision-makers of the role they too have to play. Ten years of silence until the organization of the legal public consultation in 2021 (in the covid period) sends the wrong message to the whole population (including the policy makers): that this project doesn't deserve a full and constant attention and that RW can be sidelined compared to other more urgent issues.*
Belgium	*These rights have not changed noticeably.*
Bulgaria	*There is more transparency, but there is still a lack of government action.*
Bulgaria	*The opinion and influence of the public participation is taken account for the decisions, and it increase positive during the last decade*
Cyprus	*not applicable*
Czech Republic	*There are rights to public participation. The problem is mistrust of affected public and reluctance to participate in dialog.*
Czech Republic	*Due to constant push of the NGO and the change in the political representation on the national and district level the participation has improved. Although the Czech Atomic law anticipates special Participation Act for the DGR sitting process since 2016 and the Act still doesn't exist. TSO and WMO go ahead with the DGR development and sitting process happily without the Act.*
Czech Republic	*Official public participation is done by national legal framework, mainly in the repository construction phase. New act on public engagement in the process is under development.*
Denmark	*No significant change over time*
Denmark	*They have improved considerably since 2016, when an institutionalized model for transparency and public participation in the decision-making on RWM in Denmark was established.*
Denmark	*Not when it comes to environmental issues, re. also, above answers.*
France	*Public participation in the development of the national plan for RWM and in the governance of this plan has strongly increased in the last decade*
France	*public participation process is increasing in the RWM field, not only regarding the disposal projects themselves, but also regarding the strategic decisions to be made in terms of future RWM.*
France	*PP enlarged to plan and not only project. Systematic consultation on regulatory changes and new projects*
France	*The Public Participation has been enlarged to the plan and not only narrowed to the project. Now there are systematic consultations on regulatory changes and new projects.*
Norway	*The right to public participation in and of itself has not changed, but the practical implementation has. Norway's RWM facilities have been the responsibility of a private entity. In*

	2018, a new directorate was established under the Norwegian Ministry of Trade, Industry and Fisheries, called Norwegian Nuclear Decommissioning. This entity will take the responsibility and ownership of nuclear facilities, and facilitate decommissioning, handling and storage of RAW and SNF in Norway, becoming Norway's WMO. It will assume responsibility for all facilities by 2024. When this entity was established, it initiated a national reference group for NGOs to facilitate direct contact with the civil society. This group meets regularly and are proactively updated on developments.
Portugal	*Public participation started to change with the involvement in research projects where the local stakeholders and the general public were involved (ex.: PREPARE and CONFIDENCE). This gave very important inputs and conclusions. Also, with the publication of the first National Plan on Radwaste Management that was for public consultation. It is quite striking the fact that the press is only interested in radwaste when something happens (Ex.: Chernobyl, Fukushima) but does not keep the same level of interest and the questions are sometimes, useless and showing a low level of knowledge. Maybe this is due to the fact the PT is not a nuclear Country.*
Slovakia	*In fact, the bypassing of the 2nd pillar of the Aarhus Convention particularly and only in a field of "commercial nuclear" started in Slovakia in 2007, in a direct relation to the EIA procedure for the finalisation of the Units 3 & 4 of the Mochovce NPP. See for ex. section 3.3.2 in my article available at https://doi.org/10.1016/j.pnucene.2019.103192 (or by email request to me).*
Slovakia	*I had not been observing the situation before 2019. What I think greatly affected the rights to public participation was the amendment of the atomic act in autumn 2021 that effectively deprived the public of the possibility to participate in a new EIA process for the new NPP project in J. Bohunice. Originally, the EIA statement would expire after 7 years - in 2023. Now no new EIA process is expected, although the start of construction of the new NPP is not expected within 10-20 years from now.*
Slovenia	*The public participation rules and transparency was already defined decades ago, the changes are small and toward more participation and being more open to public.*
Slovenia	*There were no serious changes in the possibilities for PP. Lately the process of EIA and construction licence were joined in one integral process, which really did not support more PP. PP is legally prescribed, but it is implemented very bureaucratically. Also, it has been seen for some cases that even Environmental Agency decided not to support public hearing in case of NPP lifetime extension, and only appeal to the court by NGOs change the decision.*
Slovenia	*no*
Sweden	*No. The rights haven't changed. The ability to participate have changed due to where we are in the process of creating the depository.*
Sweden	*The consultations done by the regulator are getting fewer and of less quality.*
Ukraine	*Improved in the context of the use of Internet forms, for example, on the website of State Nuclear Regulatory Inspectorate of Ukraine (All information that states in questionnaire as of 23.02.2022).*
United-Kingdom	*There is general participation in the work of the NDA but there is now also participation on the GDF process in those communities which have chosen to enter the siting process.*
United-Kingdom	*None observed.*
United-Kingdom	*Government policy has changed in the last 10 years. In 2013 the previous siting for geological disposal ended: only two of the three engaged local councils voted to proceed, but a unanimous decision was required for the process to continue. In December 2018 a new policy was published for England in respect of geological disposal of higher activity radioactive waste. https://www.gov.uk/government/publications/implementing-geological-disposal-working-with-communities-long-term-management-of-higher-activity-radioactive-waste A very similar policy was published into January 2019 for Wales. Scotland and Northern Ireland are excluded from geological disposal. This policy is very different and*

	much more inclusive of local communities: It specifically requires there to be both a willing community and a suitable site.
United-Kingdom	*Considerably greater degree of public involvement and opportunity to influence the decision-making process since establishment of Managing Radioactive Waste Safely (MRWS) policy by UK Government in 2001. Since then, GDF siting processes have been based on voluntarism, openness and community-led decision-making.*

Table 5 - Results by countries to the Q2.3 of the questionnaire

Q3.1 Effective access to justice: what is the level[27] of access to justice in the case of radioactive waste management (RWM) in your country, including final disposal of the radioactive waste?

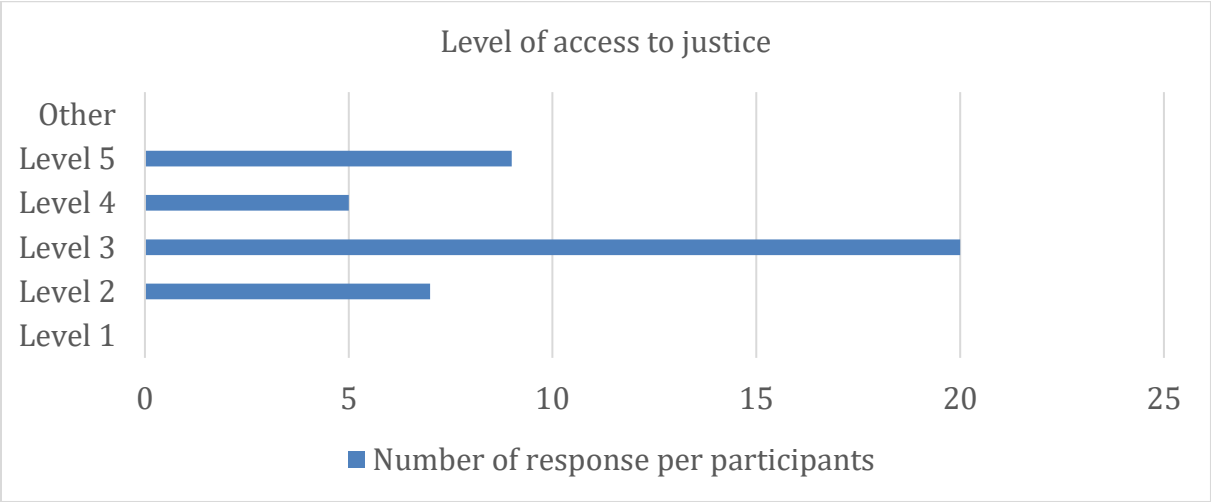


Figure 7 - Responses to the Q3.1 of the questionnaire on the level of access to justice

In the graph above (Figure 7) there are also 1 comment from the United-Kingdom:

- *"Level 5: The residents of the area around any proposed site for a GDF would have the final say on whether they are willing to host such a facility, in what is known as a Test of Public Support, and the Community Partnership will oversee this. The elected local authorities on the Partnership can also withdraw the area at any point in this process, right up until the Test of Public Support."*

Q3.2 What are the main challenges in the case of access to justice in RWM (e.g. no instruction how to act, legal representative needed, no legal practices, no legal framework, ….)?

Country	Answer
Austria	*Legal framework available only in fragments. The freedom of information act is under review. The environmental information law is applicable for the WMO and there are the laws regarding strategic environmental assessments and environmental impact assessments. Laws regarding the site selection process for the future final repository will be worked on based on results from the previously mentioned advisory board.*
Belgium	*None*
Belgium	*Time and money for citizens who are concerned yes, but who also have a job, a life and other constraints.*
Belgium	*The main challenge is the absence of legislation specific to the access to justice in RWM. The absence of legal practices, instructions, legal representation, is only a result of this.*

[27] For more details on the levels of access to justice see the structure of the questionnaire in the beginning of the appendix 1.

Bulgaria	*The requirement for NGOs to prove a legal interest must be removed*
Bulgaria	*There are not fully developed and clarified legal practices*
Cyprus	*not applicable*
Czech Republic	*Pass a special law of DGR and related public rights.*
Czech Republic	*no legal framework, remarks often not taken in due account, financing of litigations*
Czech Republic	*The larger involvement of public and its experts with support in the legislative framework, incl. the accessibility to the independent financial resources for public involvement in the process.*
Denmark	*No challenges*
Denmark	*To start legal proceedings is complicated and expensive and one has to have legal standing.*
Denmark	*No practical experience.*
France	*Non competent*
France	*not very familiar with this concept*
France	*Legal frame probably exists but not appeal it. Not enough instructions about how to use it and when*
France	*If a legal frame does probably exist there are no appeal to it, as a matter of fact there are not enough instructions about how to use it and when.*
Norway	*The main challenge is that the practice is not established. The principle currently followed is that local communities should volunteer to house RWM-facilities. It will take some years to establish whether this strategy will bear fruit. If that does not work, it may be that an alternative path, with limited ability to veto, might be chosen.*
Portugal	*The new Regulator is still issuing legislative framework and what is related to disposal is not yet done.*
Slovakia	*This has not been tested yet - my answer to the previous Q 3.1 is based only on the empiric experience with the "3rd pillar of the Aarhus Convention" which I summarised in my article linked above in the section 3.3.1 based on the content of the Slovakia's Supreme Court ruling from 2013 that is quoted/referred in this article.*
Slovakia	*The cost-free appeals of the NRA SR rulings/decisions are assessed by the head of the NRA SR, not by an independent institution. If the case is taken to the court, it is time consuming (1-2+ years at least), financially demanding (the lawyers cost 100€+ per hour) and it is a very specialized part of the legislation, it is almost impossible to find an independent lawyer who has experience in this field and is willing to help an NGO. On the other hand, the nuclear industry has practically unlimited financial resources and a fleet of specialized lawyers.*
Slovenia	*Legal framework in place.*
Slovenia	*It can be noticed that some decisions of authorities (like Nuclear Regulatory Authority, even Environmental Agency) are supporting the tendency of nuclear institutions not to disclose the information and not to perform the EIA (as the only phase where PP is legally prescribed). Also, nuclear industry has a strong inclination not to really inform about the activities (technical data on their websites are poor) and not to perform EIA.*
Slovenia	*not sure*
Sweden	*The main challenge is to be able to participate. Not that it is difficult to participate, but the court hearings are long, during daytime and only take place at a few locations in the country. For those working other jobs have to take vacations to participate. Loss of income, travel expenses make it difficult to participate.*
Sweden	*The regulator has no interest in access to justice for other actors in the system.*
Ukraine	*There is no legal practice (All information that states in questionnaire as of 23.02.2022).*
United-Kingdom	*As explained general RWM engagement is different from that around GDF siting.*

United-Kingdom	*3.1 (Above) needs further elaboration e.g. What constitutes a "local community" could be and in the case of the UK is too narrow. 3.2 Yet to be explored and tested.*
United-Kingdom	*The basis of the siting process is the Government's Working with Communities policy.*
United-Kingdom	*N/A*

Table 6 - Results by countries to the Q3.2 of the questionnaire

Q3.3 Are the rights to justice changing with time (enlarged, reduced)? Have you noticed any difference during the last decade? Are you aware of any relevant examples?

Country	Answer
Austria	*Yes, they are getting enlarged. From a WMO perspective we are getting information requests based on the environmental information act. And we also see the strengthening of data protection rules (also regarding producer information for waste).*
Belgium	*No*
Belgium	*I don't think so. However, in recent years we can see a reduction in financial support for justice (the state budget dedicated to justice is lower than expected). The justice infrastructure needs important investment (that do not come), the functioning of the institution is understaffed. Lawyers and judges regularly challenge politicians on this subject. A strong democratic state also means a strong justice institution. This is an element that NWMO, NGOS and CS should be very concerned on.*
Belgium	*These rights have not changed noticeably.*
Bulgaria	*The Bulgarian court wants NGOs to prove their legal interest*
Bulgaria	*The rights to justice changing with time and these are enlarged*
Cyprus	*not applicable*
Czech Republic	*The law (see Q3.2) will be probably pass this year.*
Czech Republic	*again, the situation has slightly improved, ex. the WMO expert panel, which evaluated the selection criteria for the DGR, invited one representative of the NGOs (Platform against DGR), WMO published studies and some other information regarding the DGR development and sitting process on their web page*
Czech Republic	*New act on public involvement in a process is under preparation.*
Denmark	*No change*
Denmark	*The rights to justice have remained the same.*
Denmark	*No difference experienced.*
France	*Non competent*
France	*again, not very familiar with this concept*
France	*Access to justice is often long and tedious and therefore discouraging*
France	*Access to justice is often long and complicated and therefore discouraging.*
Norway	*As Norway has not had a strategy for RWM-handling, the practices in this field have not been established. Society is creating such a strategy now, which makes it hard to comment on whether the rights have changed or not. One could argue that rights have been enlarged, because current facilities have been in need of upgrade, and now there is room for improvement, and for a discussion on alternatives, meaning the right to appeal decisions also is increased. In practice, local communities have a limited right to veto. Construction of facilities, e.g. a repository, is dependent first on local authorities approval of the proper regulatory category for the land area in question. Then, national authorities need to approve a license for a set number of emissions from the facility. If the local authorities do not agree to approve a regulation change for the land area, the state could in theory approve such a regulation change without the consent of the local authorities. This, however, is unlikely, and a political compromise has to be sought.*

Portugal	*The IAEA Joint Convention, Directive 2013/70/EURATOM and Directive 2013/59/EURATOM with the implementation (still ongoing) of the new Regulator are a way of improving the rights to justice. However, a long way is still ahead of PT in this area.*
Slovakia	*I am unaware of any more recent "testing" of this than the case which I refer to in my previous answer.*
Slovakia	*Since 2019 I have noticed only one minor change - recently a new supreme administrative court was established that will deal with all final appeals to court judgements related to administrative procedures.*
Slovenia	*No significant changes.*
Slovenia	*Now they are legalised and started to be used by NGOs. The court decision usually supported the appeals of NGOs. The authorities are following the court decisions. So, in general the trend is slightly positive.*
Slovenia	*no*
Sweden	*No*
Sweden	*No major change.*
Ukraine	*There is no legal practice (All information that states in questionnaire as of 23.02.2022).*
United-Kingdom	*No changes noticed.*
United-Kingdom	*No perceptible changes*
United-Kingdom	*It might be considered that the new policy for geological disposal in 2018/2019 provides better access to justice than in the past. For examples - It is a policy that is published by the relevant government's - It gives the power to local councils to withdraw their communities from the siting process at any point up to the Test of Public Support. - It defines how communities can gain access to scientific and technical information, including o Stating that "It is vital that communities have confidence in the information provided to them about the siting process, including on all relevant scientific and technical issues" o Stating that "The availability of clear, evidence-based information on both technical issues, and the process of working with communities, will enable communities to engage in the process with more confidence" o specifying that a Community Partnership "will also be able to call on the Government's independent advisory body, CoRWM and regulators" and - The UK Government has signed a Memorandum of Understanding with a number of Learned Societies, who have agreed a mechanism under which the Community Partnership may approach [Learned Society] members for a view on any scientific or technical questions it may have remaining after discussing them with NWS, the regulators and any research and reports that they may have had commissioned.*
United-Kingdom	*N/A*

Table 7 - Results by countries to the Q3.3 of the questionnaire

Q4.1 Effective access to resources: what is the level[28] of access to financial resources for NGO in the case of radioactive waste management (RWM) in your country?

[28] For more details on the levels of access to financial resources see the structure of the questionnaire in the beginning of the appendix 1.

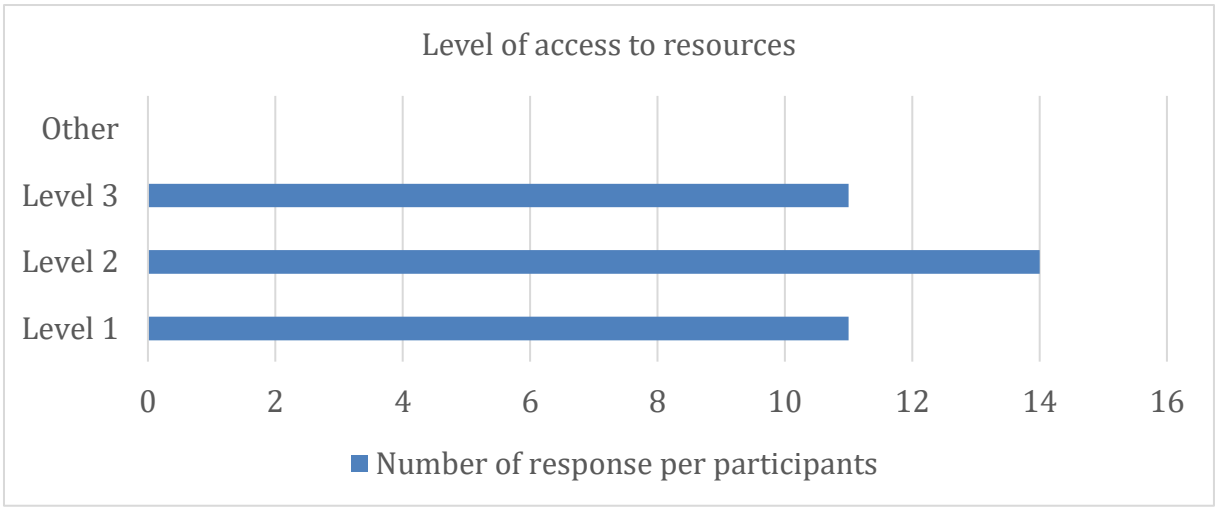


Figure 8 - Responses to the Q4.1 of the questionnaire on the level of access to financial resources

In the graph above (Figure 8) there are also 2 comments from various actors from the United-Kingdom:

- *"LEVEL 3. The Government policy specifies that The Community Partnership may also commission reports and research on specific topics from independent experts, as part of the agreed programme of activities. Given the range of advice and information available it may be that the Community Partnership receives conflicting statements from different parties. If that is the case the Government is making available a mechanism through which the Community Partnership can access independent experts for views on contested and unresolved scientific or technical issues."*
- *"N/A - The Nuclear Non-Governmental Organisation Forum organises stakeholder meetings with NGOs, government and nuclear regulatory stakeholders to address issues of NGOs regarding new build nuclear reactors and nuclear waste management. They meet three times a year. See: https://www.gov.uk/government/groups/non-governmental- organisation-forum"*

Q4.2 Are there any conditions for use of resources (e.g. restrictions on how resources can be used and for how long they can be received, available only for particular organisations (local, national,…)?

Country	Answer
Austria	*No*
Belgium	*There are some restrictions to the use of resources by local community NGO's.*
Belgium	*To be honest, I really don't know. Local organisation (MONA, STORA) is financed by NWMO (and then indirectly by waste producers).*
Belgium	*There is no access to resources.*
Bulgaria	*they are only available to certain pro-government organizations*
Bulgaria	*Available mainly for particular organisations*
Cyprus	*not applicable*
Czech Republic	*The conditions are regulated by Atonic Act*
Czech Republic	*NGOs apply mostly for international funding and grants provided by private funds - spending is then regulated by their specific contract conditions*
Czech Republic	*E.g. a financial compensation for municipalities which agree with a geological survey within siting has been approved by the Czech government.*

Denmark	*RW management is state funded and therefor new projects must be applied for by the management organisation in order to obtain further funding. Relevant funding has always been granted.*
Denmark	*They are made available within the institutionalized model for transparency and public participation in the decision-making on RWM that was established in 2016 and some of them – particularly access to a "second opinion" from the independent expert affiliated with the national and local for a for RW – are open to everybody.*
Denmark	*It differs among different organisations. As a stated owned enterprise, we are bound by decisions made by Parliament and our ministry + budgets.*
France	*Non competent*
France	*some websites offer resources all along the year without any restrictions*
France	*Access to resources for independent expertise is not easy... no legal frame for this access.*
France	*Access to resources for independent expertise are not easy to get as there are no legal frame facilitating an access for it.*
Norway	*Financial resources for NGOs are currently limited to those national NGOs that participate in the national reference group on RWM together with the newly established governmental WMO. It depends on a signed agreement with the WMO, where the NGO states that it shares the goal of addressing the issue of RWM-handling in Norway and agrees that we need to find a final solution now, not leaving the burden to future generations. The agreement is usually signed for a three-year period. The stated goal of the WMO is to involve NGOs over time, making sure competence and experience is strengthened among the NGOs. ensuring a better ability to participate in public debate on these issues. All NGOs in the group may apply for support on the basis of this agreement. The support can constitute a maximum of 100 000 NOK (ca 10 000 EUR) per year and should cover travel expenses for meetings and some salary costs for NGOs, facilitating participation and allowing time to be spent on the work in the reference group and related activities. There are signals saying that a similar support system will be available for local NGOs if/when local reference groups are established.*
Portugal	*No info. Also regarding Q4.1, no info indeed, so, I would be careful with the analysis of the reply to this question*
Slovakia	*It is very difficult to answer this Q as well as the previous Q. In fact, I am not aware of any national-level independent/public source of finance, i.e. as for ex. in Sweden. However, any NGO in Slovakia can in principle attempt to accede financial resources from for ex. public or private foundations, or maybe even some official sources linked to the EU, and it is more likely that none of the Slovak environmental NGOs have attempted to do so since about 2010 (which was the last year I noted that Slovak NGOs got grants for their work in RWM related issues).*
Slovakia	*since we are not provided by any resources, there are no restrictions.*
Slovenia	*I am not in the position to comment that-it should be commented by NGOs.*
Slovenia	*NGOs are not receiving the resources in the context of RWM. For LILW disposal site selection, local partnerships were established, and local municipalities received resources. After site was selected, all activities stopped.*
Slovenia	*depends on the phases of the licensing*
Sweden	*Yes. Restrictions on how they can be used. Also, only available for particular organisations.*
Sweden	*Originally limited possibilities to use funding for all types of waste (only spent nuclear fuel) and how it could be used for information purposes. By lobbying the time there have been less limitations.*
Ukraine	*Depends on the specific situation, such as the terms of the grant (All information that states in questionnaire as of 23.02.2022).*
United-Kingdom	*The UK Government supports NGO fora that help NGOs engage. As noted before NGOs are only one part of teh local community and so I think this work needs to also support engagement with local government and directly with the public at a local and national level,*

United-Kingdom	*N/A see 4.1*
United-Kingdom	*Any conditions would be agreed when the resources were commissioned (e.g. cost, time etc.) but the availability of access to the required resources exists for the duration of the Community Partnership (i.e up to the point when a community takes a Test of Public Support).*
United-Kingdom	*N/A*

Table 8 - Results by countries to the Q4.2 of the questionnaire

Q4.3 Who give the resources? How is the financing system for RWM organized?

Country	Answer
Austria	-
Belgium	*through the waste management organisation implementing the repository*
Belgium	*see RWM website; "All of ONDRAF/NIRAS' costs are supported by the beneficiaries of its services, in other words by the producers of radioactive waste and by the Belgian State, the latter in its capacity as owner of part of the waste belonging to the nuclear liabilities." https://www.ondraf.be/financement*
Belgium	*There is no access to resources.*
Bulgaria	*Ministry of Energy*
Bulgaria	*Government*
Cyprus	*not applicable*
Czech Republic	*SÚRAO, according to Atomic Act*
Czech Republic	*RWM is financed by state, producers have to pay to a special fund according to their production, the funding needed for DGR construction hasn't been gathered (there is just a small percentage of the final sum budgeted many years ago*
Czech Republic	*Main source for RWM is a Nuclear Account operated by WMO, SURAO, managed by the Ministry of Finance and placed at Czech National Bank. The contributors to this account are waste producers /Polluter pays principle/, in particular Czech power company, CEZ.*
Denmark	*The waste management organization is state funded*
Denmark	*The resources are provided by the Danish government.*
Denmark	*Parliament.*
France	*Non competent*
France	*independent organisation can publish the resources, RWM agency is also provided particular resources*
France	*Government*
France	*Government*
Norway	*Norway's RWM-strategy is currently being established by a governmental WMO. The work to decommission nuclear facilities (research reactors and old storages), building a new national repository and handling nuclear and radioactive waste will be covered by the state, through the budget of the Norwegian Ministry of Trade, Industry and Fisheries. The private entity that has operated Norway's research reactor has failed to set aside any significant funds for a clean-up.*
Portugal	*The State finances the RMO organization plus the fees producers pay to RWM for receiving and treating their radwastes.*
Slovakia	*As I mentioned above, since about 2010, I am not aware of any financial grant, or a similar financial resource being referred by any NGO in relation to any RWM related project/activity.*

Slovakia	*there are proposals to establish a legal framework for financing of the municipalities in the region near the SNF interim storage and the planned geological disposal sites. The National nuclear fund is considered to be a source of the money. I have not noticed any plans for financing the NGOs though.*
Slovenia	*For RW and SF management financing is secured by the state budget, polluter of holder payments for provisions of public service of RW and SF management and mainly from decommissioning a disposal fund.*
Slovenia	*The resources for local partnerships were based on the contract between WMO and municipality, taken from funds for NPP waste management (special devoted fund).*
Slovenia	*waste management organisation*
Sweden	*The government and through the nuclear waste fund. Most of the resources are from the fund.*
Sweden	*2005-2016: Nuclear Waste Fund, 2017- budgetary money from government. At all-time the regulator has been responsible for distribution.*
Ukraine	*Independent sources of resources can be: organizations that provide grants, charitable foundations, etc. (All information that states in questionnaire as of 23.02.2022)*
United-Kingdom	*NDA, RWM and UK Government all fund an NGO forum. The ONR (safety Regulator) and EA (environmental regulator) also do so.*
United-Kingdom	*N/A See 4.1*
United-Kingdom	*The resources are available from the UK Government via the WMO. The Community Partnerships do not have the ability to enter into contracts, but the WMO does. The commissioning of the resources will be done in collaboration with the Community Partnership. The policy states - that a role of the Community Partnership is to agree a programme of activities to develop the community's understanding of the siting process and the potential implications of hosting a GDF - All [other] decisions, such as priorities for the Community Investment Funding, or agreeing the programme of activities, should be taken by the Community Partnership - It would give members of the community the opportunity to raise questions and issues that they want addressed, which could then be fed into the programme of activities. - It will be important that all interactions between the Community Partnership and people in the community are made public.*
United-Kingdom	*N/A*

Table 9 - Results by countries to the Q4.3 of the questionnaire

Q5. Has there been transparency and public participation (consultation processes) for the description/development of the National Programme on RWM submitted to the European Commission?

Country	***Answer***
Austria	*For the development of the Austrian National Programme a summarizing statement for the strategic environmental assessment was carried out (as per 2001/42/EG). The WMO in Austria did also participate in the development.*
Belgium	*Belgium is infringed by the EC wrt its national programme - we are only starting up public participation on DGR*
Belgium	*To what I recall, NWMO organized public consultations from 2009 - 2011, suggested a waste plan in 2011. and the NWMO worked (a.o. with the minister competent) to provide a first national program on RWM in 2015. No consultation of it on an early draft I'm aware of.*
Belgium	*There has been transparency in the sense that the National Programme on RWM is legislation. However, the level of public participation in the development of the National Programme has been very low. The first Belgian National Programme was promulgated in 2016 in the form of a Ministerial Decree. The National Programme was established under*

	the coordination of ONDRAF/NIRAS, in cooperation with the main relevant institutional actors, i.e. the nuclear safety authority (AFCN/FANC), the Federal Public Service responsible for Energy and the Commission for Nuclear Provisions (composed of top level representatives of the Treasury, the regulator of the Belgian market for electricity and natural gas, the Federal Public Service for Budget and Management Control, the Belgian National Bank and the Federal Public Service responsible for Energy). Other actors were consulted on an ad hoc basis.
Bulgaria	*There was a process of consultation, public discussion. We participated but did not receive feedback*
Bulgaria	*Yes, there is good transparency and public participation (consultation processes) for the description / development of the National ATM Program presented to the European Commission*
Cyprus	*not applicable*
Czech Republic	*SÚRAO prepares the materials for the national program.*
Czech Republic	*As far as I know there was no formal consultation process, however the NGOs and municipalities concerned with the sitting process of DGR have submitted their written remarks, these were not taken in due account*
Czech Republic	*I don't have a sufficient information on this process.*
Denmark	*To a limited degree. The programme has been discussed at local contact forum meetings.*
Denmark	*There has not been a consultation process. However, the latest report on the national programme has been presented in the national contact forum for RW, where all the stakeholders in the Danish RWM have had an opportunity to comment on the report after its publication.*
Denmark	*The National Programme is published and publicly available.*
France	*Yes, see answers above*
France	*the new national programme on RWM has been subject to national concertation where representatives of NGOs have been involved.*
France	*We are well involved in the French national programme on RWM but I never heard that this programme will be at a time sending to EU*
France	*It is not known that the French submitted a National Programme for RWM to the EU Commission. Not yet at least.*
Norway	*Each EU Member State has to submit a National Programme for radioactive waste management to the EU Commission. Have you been involved in any way in the development of the national programme? How is the transparency in this work? What possibilities have there been for public participation? Have there been consultation processes and have these been formal? Not to my knowledge, but Norway is not a member of the EU.*
Portugal	*The first National Programme on Radwaste was carried out by the Competent Authorities and was accessible for public consultation but the public was not involved in the drafting of it. It was also approved by the EC. The second Plan is not yet published in the site of the Regulator (APA) and no info about the reasons is known.*
Slovakia	*x*
Slovakia	*The process of developing the National Programme on RWM in Slovakia for the next 7 years is in its final phase. The public was not openly/actively invited to participate. After my explicit request I was allowed to submit a statement with comments on the draft of the National Programme on RWM. However, I do not know how they will be dealt with. In my opinion, the effective public participation was quite limited in this case. The workload, time schedule and meeting times of the workgroups effectively did not allow a person with a regular job to participate (the public participation in the workgroups was not explicitly denied).*
Slovenia	*Most definitely, 1-month public consultation procedure is required, and willing citizens/public can provide comments and suggestion to amend the programme.*

Slovenia	*No for the first two, for the last one there was a period for remarks, but obviously it was performed only on internet and no comments obtained (no visibility, no proactive discussion).*
Slovenia	*yes*
Sweden	*I don't remember participating, and I don't remember any public participation for the national programme.*
Sweden	*Very weekly. Only one meeting, no process.*
Ukraine	*YES (All information that states in questionnaire as of 23.02.2022)*
United-Kingdom	*UK isn't a member state, but I assume that the information was submitted before Brexit.*
United-Kingdom	*UK is not currently a member State*
United-Kingdom	*In 2001, the UK Government and devolved administrations initiated the Managing Radioactive Waste Safely programme (Managing Radioactive Waste Safely: Proposals for Developing a Policy for Managing Solid Radioactive Waste in the UK, September 2001: http://bit.ly/15Rum8m), with the aim of finding a practical long-term management solution for the UK's higher activity radioactive waste that: • achieved long-term protection of people and the environment; • was open and transparent and inspired public confidence; • was based on sound science; •ensured the effective use of public monies. Between 2003 and 2006, a wide range of options on how to deal with the UK's higher activity radioactive waste were considered by the independent Committee on Radioactive Waste Management (CoRWM), from indefinite storage on or below the surface through to propelling waste into space. In July 2006, CoRWM recommended that geological disposal, coupled with safe and secure interim storage, was the best available approach for the long-term management of the UK's higher activity radioactive waste (Managing our Radioactive Waste Safely – CoRWM's Recommendation to Government, July 2006 https://www.gov.uk/government/publications/managing-our-radioactive-waste-safely-corwm-doc-700). CoRWM reissued a statement reiterating its commitment to geological disposal and has restated its support in its most recent work programme. In October 2006, the UK Government and devolved administrations published a response to CoRWM, accepting its recommendations. In 2008, the UK Government and the devolved administrations for Wales and Northern Ireland published the White Paper: Managing Radioactive Waste Safely – A Framework for Implementing Geological Disposal (BERR, 'Managing Radioactive Waste Safely – A Framework for Implementing Geological Disposal', January 2008: https://www.gov.uk/government/publications/managing-radioactive-waste-safely-a-framework-for- implementing-geological-disposal) and launched a siting process based on the approach it set out. This included identifying a location for a GDF, based on local communities' willingness to participate in a voluntary siting process. The siting process set out in the 2008 White Paper operated for five years, with a number of communities participating in its early stages, but by February 2013, there were no longer any communities involved in the siting process and the process ended. Following a further consultation and evidence gathering a new White Paper, based on lessons learned, was published in 2014 (Implementing Geological Disposal, 2014: https://www.gov.uk/government/publications/implementing- geological-disposal). The 2014 White Paper established commitments to early community investment funding, a Right of Withdrawal and the need for a Test of Public Support prior to the construction of a GDF. The 2014 White Paper also committed the Government to further development of a process for working with communities to identify a suitable location for a GDF, including access to independent expert views. In order to develop the final Working with Communities policy, Government undertook the following actions: • sought advice from people with experience in local government and community engagement in the delivery of large infrastructure projects, through a Community Representation Working Group (CRWG) to help develop practical processes for community representation; • issued a call for evidence on community representation, community investment and a Test of Public Support; • conducted a literature review on community engagement, drawing on a wide body of literature, including peer-reviewed academic journals, books, as well as Government, NGO and industry reports; • carried out public dialogue events in 2016 to explore the views of the*

	public, on the key policy issues relating to the siting of a GDF; and • consulted on the Working with Communities policy proposals. The Government response to the consultation is published alongside resulted in the 2018 (for England) and 2019 (for Wales) policy papers. Government considered that this marked the completion of the initial action on working with communities. The 2018 Working with Communities policy requires both a suitable site and the policy explains how the developer and the Community Partnerships must engage their communities.
United-Kingdom	*See RWM response to Question 5. The Nuclear Decommissioning Authority (NDA) updates its strategy every five years and consults on its draft strategy each time. See: https://www.gov.uk/government/publications/nuclear-decommissioning-authority-strategy-effective-from-march-2021*

Table 10 - Results by countries to the Q5 of the questionnaire

Appendix B - Cases of transparency in some European countries

In order to characterise transparency in different countries, several national case studies are described in the following. These include the examples from advanced RWM programmes, as well as from early stage RWM programmes, with large and small inventories across Europe. As much as possible, we have tried to implement a similar format for the content of each case study, but due to the very different nature of many of the cases, a rigid uniform structure for all the studies would be counter-productive[29]. The key elements of the case studies are as follows:

- Description of the case context (ongoing nuclear, radioactive waste situation, current development, judicial situation)
- Description of access to information, access to public participation/consultation, access to justice and access to resourcing in particular national RW facility case
- Assessment of the quality/bad and good examples (from perspective of key elements)
- Lessons learned

Institutional mechanisms in the Czech Republic to facilitate transparency and public participation in RWM

Mgr. Hana Veronika Konvalinková, member of CS larger group EURAD

DGR siting process in CZ – case context

The Czech Republic has two operational NPP´s and is considering building a DGR for the final amount of about 10 000 t of spent fuel and HLW. The program for development of a deep geological repository started in 1993 and was coordinated by several state authorities. In 1997 the waste management organisation SURAO was established. SURAO is an organisational unit of the state, reporting to the Ministry of Industry.

In 2001 the first list of sites considered for the DGR was disclosed by a politician who was present at the Council of SURAO negotiations. None of the municipalities concerned had been contacted or informed that they were on the list of these sites considered for building the DGR. It resulted in public discontent and the first referenda against the siting of a DGR took place in the municipalities mentioned in the plan.[30][31]

The proposals for a DGR were clearly rejected by all the local referenda that have taken place so far. The number of sites kept changing over the years. In June 2016, two localities near the existing NPPs were added, raising the final number of considered sites to 9. It was clear that geological criteria were not the key factor for adding those sites but an expectation of a higher public acceptance of the DGR.[32]

[29] The case studies have been prepared by members of the CS larger group involved in EURAD as well as some of the CS experts of ROUTES task 7. They consider the institutional mechanisms available in each country that are supposed to facilitate transparency and public participation in RWM. The evaluation aim to be as objective as possible but has never been subject to a discussion that involves other national organisations. The personal opinions will therefore be separated and clearly reported as such in order to differentiate them from the rest of the presentation of each case.

[30] referendums_in_selected_sites_until2018

[31] Ref.https://ekolist.cz/cz/zpravodajstvi/zpravy/seitlova-rozhodnuti-o-budoucich-ulozistich-jaderneho-odpadu-je-v-rukou

[32]Ref.https://www.idnes.cz/ceske-budejovice/zpravy/uloziste-radioaktivni-odpad-temelin-olesnik-hluboka-driten.A180614_110808_budejovice-zpravy_khr

However, the plan had not been discussed nor were the municipalities informed about it, leading to public uproar and it can be concluded that the assumption of higher acceptance of a site near an existing NPP is false.

In 2020 four sites were shortlisted from the original list of nine. The process lacked transparency, participation of the local municipalities, NGOs and public, was insufficient and their rights to appeal during the process limited. The shortlisting process was not only delayed but several mayor problems occurred and as a result the director, Mr Slovak, of SURAO was dismissed by the Ministry of Industry in 2019.[33] Platform against DGR which at the time united 31 municipalities and 14 NGO´s had earlier sent an open letter to the ministry of industry requesting the dismissal of director Slovak which the ministry in few weeks did.[34][35]

The mayors of the municipalities concerned by the sitting process could participate, but only as observers in the SURAO´s so-called working group.[36]

There was also an expert panel, where geological selection criteria were discussed. Municipalities could only be represented by one representative in this panel. As a professional geologist, this municipality representative criticised the entire procedure, mainly the lack of shortlisting criteria specifications, time pressure and not reviewing the shortlisting process in its complexity. This shortlisting process was not reviewed by independent or international experts.[37]

SURAO is trying to proceed with obtaining more geological data from the pre- selected sites. However, it encounters resistance from municipalities, which call for the adoption of the "Participation Act" without "The Act" being in force; municipalities do not want to give consent to setting the exploration areas and deep geological research. At the beginning of the process in 2012 the Ministry of Industry declared that geological research for the siting process will be conducted only with the consent of the concerned municipalities. Different ministries kept changing this declaration until it was decided that research will be conducted at all (initial) 7 sites even without consents. However, to conduct geological research an official application is required for establishing an exploration area. Municipalities appealed against this process, and they were successful.[38]

This led SURAO to rename geological research to "geological surveys", which in terms of legislation means that SURAO circumvented the need for more procedurally complex process of defining an exploration area (which, in legal terms, is needed for the geological research) in which the public has legal rights and opportunities to participate. By this "little legal trick" SURAO bypassed the need for public participation and was able to continue its geological work on the sites without public consent.[39]

[33] https://ct24.ceskatelevize.cz/ekonomika/2735534-ministryne-novakova-odvolala-sefa-spravy-ulozist-radioaktivnich-odpadu-slovaka

[34] https://www.nechcemeuloziste.cz/cs/aktuality/platforma-proti-ulozisti-pozaduje-odvolani-reditele-slovaka.html

[35] http://www.platformaprotiulozisti.cz/cs/aktuality/prvni-etapa-hledani-uloziste-se-chyli-ke-konci-byla-plna-podvadeni-zastupcu-statu-a-vzbudila-neduveru.html

[36] https://www.nechcemeuloziste.cz/cs/aktuality/stat-pri-vyberu-uloziste-slibuje-dialog-realne-mu-ale-brani-tvrdi-starostove.html

[37] https://platformaprotiulozisti.cz/cs/aktuality/vyber-lokalit-pro-uloziste-je-cas-na-oponenturu-pane-ministre

[38] https://www.nechcemeuloziste.cz/cs/aktuality/uz-seste-pruzkumne-uzemi-pro-uloziste-zrusil-soud-obce-a-spolky-opet-vyhraly-nad-nekvalitni-praci-statnich-uredniku.html

[39] https://www.nechcemeuloziste.cz/cs/aktuality/sprava-ulozist-nase-spolecna-nepredvidatelna-budoucnost.html

This enabled SURAO to obtain at least some data necessary to support the shortlisting process. Nevertheless, work was delayed and not carried out properly.[40]

The announcement of the shortlisting process was postponed several times and during the period a new director of SURAO was appointed. The former director was criticised for problems with obtaining geological data and delayed shortlisting process. He was also identified as the cause of failed communication with municipalities and the public.[41]

Access to information, access to public participation and justice

After implementing the Euratom Directive 2011/70/Euratom, the Czech Republic responded to the requirement for effective public participation in decision-making processes in the Atomic Act of 2016: *Atomic Act 263/2016, §108: (2) Radioactive waste and spent fuel shall be handled so that no disproportionate technical, economic or social burden is caused nor to current nor to future generations. (4) and the procedure for ensuring respect for the interests of municipalities, which are entitled to a contribution from the nuclear account pursuant to Section 117 (1), and their citizens in these processes, is determined by a special law.*

As stipulated by this Act, effective public participation is supposed to be defined by a special Act on Public Participation. However, this Act has not been passed yet. Many ministries have promised to push it, the public and NGOs have made several proposals, the previous government in 2020 prepared a draft intention of the Act, which the recent government have promised to finalise. However, the recent Draft of the "Act on the involvement of municipalities" does not strengthen the rights of the public and municipalities in the desired way, it is rather formal fulfilment of the Atomic Act. It is also striking, that the act proposal is not called a Public Participation Act, but an "Act on involvement of municipalities" which suggests that participation provisions will focus on the official representatives of municipalities concerned with the DGR siting plan, neglecting the wider public and NGOs.[42]

Municipalities, through their legal representative, commented on the substantive draft of the Act. The comments were also supported by the Union of Towns and Municipalities and the Association of Local Governments (joining more than 4,700 municipalities in the Czech Republic) together with the Platform against DGR (representing 35 municipalities and 16 NGOs of the selected sites areas). All comments were rejected. The Ministry of Industry responded to these comments, but arguments were factually incompatible with the essence of the comments.[43]

Example March 2022 – the new government promises to continue with preparation of "the Act".

The main objections to the *"Act on the involvement"* are that the proposed level of public participation is not sufficient. It can only be effective if municipalities and the public can influence whether, and how the process will continue in the respective site.

[40] https://www.nechcemeuloziste.cz/cs/aktuality/ve-hre-o-uloziste-zustanou-ctyri-lokality-karty-jsou-zatim-neodkryte.html

[41] https://zpravy.aktualne.cz/ekonomika/novakova-odvolala-sefa-surao-slovaka-nahradi-ho-jan-prachar

[42] https://www.nechcemeuloziste.cz/cs/aktuality/ministerstvo-prumyslu-se-vysmalo-obcim-u-kterych-chce-nechat-vyhorele-palivo-slibovany-navrh-zakona-vlade-nepredlozilo.html

[43] https://advokatnidenik.cz/2020/08/08/zakon-posilujici-roli-obci-pri-volbe-uloziste-radioaktivniho-odpadu-ma-skluz/

The submitted draft proposal of "the Act" almost completely neglects the involvement of the public and makes them mere onlookers in the permitting procedures as there is almost no possibility to appeal against a decision made during the approval process.[44]

Also, the draft does not prevent the possibility of purposeful confusions of "survey" and "research" that have been used by SURAO to circumvent public participation.[45]

No compensation provisions – the municipalities don´t get any money for DGR related activities on their territory - for the different steps of the siting process, such as permitting, building, operation and closing phase have been stipulated in "the Act".

There is a clear intention to continue geological research and even locate the repository without the consent by the concerned municipalities because the work on "the Act" has been interrupted and it is very unlikely that it can be completed and come to force before 2023. *"Larger-scale geological research work will commence following the introduction of the Act on the Involvement of Municipalities or after 2023 (whichever comes first). SÚRAO will focus primarily on research that will be aimed particularly at obtaining data for the compilation of safety reports and models and will be conducted over an area of up to 25 kilometres from the candidate DGR site".*[46]

Also, a municipality veto in the final DGR site selection process has never been considered.
The official authorities keep repeating that municipalities must sacrifice their interests for higher interest of building DGR.[47]

The implementation of the Aarhus Convention in the field of RWM management in the Czech Republic is not sufficient. Responsible institutions, such as SURAO, SUJB (State Office for Nuclear Safety), MPO (Ministry of Industry) act as proponents of nuclear energy and often trivialise the risks.[48]
The situation with access to information has improved, but a clear trend to restrict the communication with the public and public participation to a minimum remains.[49]

It appears that SURAO prefers to communicate with the official municipal representatives and invests in PR and promoting the concept of DGR through press, advertisements, leaflets, and seemingly independent interviews. Trivialisation of the risks and negative impacts continues as the concept of DGR is presented as a safe and easy-to-implement technical solution.[50]

---

[44] https://www.platformaprotiulozisti.cz/cs/aktuality/dalsi-vlada-konci-a-zakon-o-zapojeni-obci-do-vyberu-uloziste-nikde.html

[45] https://www.nechcemeuloziste.cz/cs/aktuality/zpravodaj-jaderny-odpad-2-2019.html

[46] www.surao.cz/en/life-stages-of-the-dgr

[47] https://www.nechcemeuloziste.cz/cs/dokumenty/musi-se-obce-obetovat-pro-vyssi-verejny-zajem-pravni-stanovisko.html

[48] https://www.idnes.cz/zpravy/domaci/nku-na-pripravu-uloziste-dal-stat-1-8-miliardy-o-miste-jasno-nema-bukov-sprava-ulozist-radioaktivnic.A201109_085318_domaci_lre & https://www.euro.cz/clanky/neekonomicke-ukvapene-drabova-kritizuje-stavbu-laboratore-za-1-7-miliardy-1401837/

[49] https://chytraenergie.info/index.php/chytra-energie-novinky/atom/249-statsulozistemjdeprotiobcim

[50] *Example: in the article for the magazine Respect in February 2022, the chairwoman of SUJB said that dealing with HLW and spent fuel has been technically solved and DGR placed 500 meters underground represents no risk and cannot do any harm to the environment or people neither now nor in the future. The SUJB chairwoman quite popular in CZ and has a good access to media where she keeps repeating that the public concerned with the DGR siting process is overwhelmed with emotion and uses only the right cerebral hemisphere when dealing with the issue of DGR and therefore not capable to understand the technical solution (*https://www.respekt.cz/tydenik/2022/8/energetika-je-potvora and https://echo24.cz/a/iQN9Q/uloziste-jaderneho-odpadu-se-prosadi-obce-musi-nepohodli-strpet-rika-drabova).

The chairwoman represents an example of the narrative that the official institutions in the Czech Republic have kept repeating over the years. Criticism of her professional practices has been well summarized in the series of articles by Jan Beranek, an energy expert form Greenpeace International.[51]
Negative impacts and risks of the HLW and DGR development have never been admitted, on the contrary only positive impacts on the region are highlighted and new employment, prosperity and financial compensations are stressed as benefits for the communities. This is always repeated during public hearings, meetings with SURAO and state representatives, in the SURAO magazine distributed for free in the localities "Zpravy ze Spravy" and on the official SURAO web page.[52]

Following a reprimand from the European Commission[53], the Czech Republic proceeded to update The Concept of RWM in 2019. The EC criticised that the Czech WM program did not contain key performance indicators for monitoring progress in implementation and complete cost assessment of the RWM national program. This information was added however, the change was regarded so minor that the Ministry of Environment did not request a formal procedure within the SEA process.[54] [55]

Transparency and access to information
Transparency and access to information is regulated by the Act on the free access to information 1999/106 which gives the public rights to access official documents. Civil and local government officials are also entitled to disclose information to a third party provided that the information is not confidential. Public participation in issues related to RWM can be also obtained through the Act on the right to environmental information 123/1998. Citizens have the right to submit comments in public consultations on environmental issues, EIA and SEA processes which are published on the websites of the responsible authorities, take part in public hearings, etc.[56,57]

Assessment and Public Participation
The Act on Public Involvement (participation act) needs to be reworked, considering the comments of municipalities, associations, and NGOs. It should aim to create a truly effective tool that will not be a fake and imperfect implementation of the EU legislation, but an effective tool defining the processes and conditions under which municipality representatives and public can participate in order to increase the quality of involved decisions.

By adopting the "the Act", the Czech Republic would meet the requirements of the 2011 Euratom Directive and its own Atomic Act, and the siting process would be given clear rules for public participation.

Implementation of the Aarhus Convention, access to information and effective participation in the process of dealing with HLW, spend spent fuel and DGR siting has been weak. With the new government and due to long and effective public pressure, the situation is improving. Activities of the municipalities, public and NGOs coordinated through the Platform against DGR have been effective and contributed to the current positive shift. (Platform against DGR officially operates since 2016).

[51] https://denikreferendum.cz/clanek/32542-jak-dana-drabova-poslala-policii-na-obcanskou-spolecnost
[52] www.surao.cz/en/dgr-benefits/
[53] https://www.mpo.cz/cz/energetika/nakladani-s-radioaktivnimi-odpady/aktualizace-koncepce-nakladani-s-radioaktivnimi-odpady-a-vyhorelym-jadernym-palivem-v-cr--251133/,
[54] https://www.euro.cz/clanky/ulozeni-jaderneho-odpadu-muze-cesko-stat-az-225-miliard-dosud-stat-uvadel-polovinu-1454364/#topic-3046
[55] http://www.platformaprotiulozisti.cz/cs/aktuality/koncepce-nakladani-s-radioaktivnimi-odpady-stat-promarnil-prilezitost-pro-verejnou-debatu.html
[56] Act on the free access to information 106/1999
[57] Act on the right to environmental information

Since 2019, under the new director, SURAO has improved communication, it is more open, it has published environmental studies and disclosed some other data. During the preparation of "the Act", it set up an expert panel on geological assessment and allowed participation of one representative of municipalities with a voting right – although this was still disproportional and insufficient - it represented a positive change in the attitude of the Czech authorities.

Access to resources

Currently, there exists no access to financial resources for NGO's or groups of concerned citizens such as a community to call upon, with the purpose of obtaining independent scientific, technical and socio-technical expertise. Mechanisms could exist at some future point to enable communities to make and take informed decisions concerning the siting process. The industry and or government could provide such resources.

Access to Justice

While it is currently possible for an NGO or concerned group of citizens to bring a "cause of action" in both the National and the European Court, the process would require significant financial resources, Environmental lawyers might wish to take on a case with merit "pro bono" but there is no guarantee this would be the case. Affected communities should have the right to access law and justice at a national level.

Conclusion and lessons learned

Both the Aarhus convention and the Espoo are implemented in Czech legislation, but in practice these procedures are often used purely formally. Courts and executive bodies do not settle factual notes and objections, their settlements are only formal, which makes public participation and involvement in procedural acts insufficient.

In the site selection process and RWM process as such, there are many "grey zones", many negotiations take place within these grey zones without the public being able to participate in them in any way or to learn about them. For example, it is not known on which basis the criteria for site selection were chosen, what is the weight of the individual criterion in the process of site shortlisting, etc.

The state legislation is generally very unstable in this respect, the state nor its organisations such as SURAO do not keep their own schedules and public pledges.

There is certainly room for corruption in the process, e.g., many public tenders in connection with DGR are won by the state-owned company Diamo. If Diamo fails, the tender is sometimes cancelled completely.[58]

The public is calling for more information and participation. The importance of the geological criteria must not outweigh possible non-consent of the municipalities and public concerned. The "Participation Act with proper participation provisions for the public should be passed before any geological research is done. The national concept for RWM should be updated and alternatives for dealing with HLW and spent fuel properly elaborated.

The situation has improved and SURAO provides much more information than before. When in the past, the NGOs asked for a document (based on the Act on the free access to information) they often received

[58] http://www.nechcemeuloziste.cz/cs/aktuality/stat-zrusil-soutez-za-200-milionu-korun-nevyhral-jeho-vlastni-podnik.html

redacted (blacked out) pages with only a date, a few conjunctions, and a signature. SURAO also disclosed environmental impact studies and some other data, which are now available on their web page.[59,60]

Improvements in access to information and opportunities for public participation have occurred mainly due to persistent public and NGOs pressure and change of the government. However, the public has limited funding opportunities and the systematic activities of the NGOs are supported mainly by foreign grants.

[59] www.surao.cz/en
[60] https://www.surao.cz/en/about-us/annual-reports/

Institutional mechanisms in Denmark to facilitate transparency and public participation in RWM.

Niels Henrik Hooge, member of Nuclear Transparency Watch and NOAH Friends of the Earth Denmark

Since 2016, there has been an institutionalised model for Transparency and Public Participation (T&PP) in the decision-making on RWM in Denmark. This was deemed a political necessity due to opposition from the five municipalities that were initially designated as potential host sites for the Danish final repository for RW. A national contact forum for RW was subsequently established, which is now under the auspices of the Danish Ministry of Higher Education and Science, consisting of all the relevant stakeholders.

A brief history of the final disposal of the Danish radioactive waste so far

Preparations for a final repository started in 2003, when the Danish Parliament gave its consent[61] for the government to start preparing a basis for decision for a final repository for Denmark's appr. 5-10,000 m3 LILW[62]. The same year, *Danish Decommissioning (DD)* was established as an WMO under the Ministry of Science, Technology, and Innovation. DD is responsible for decommissioning the nuclear facilities formerly attached to *Risø National Laboratory* (currently named Risø DTU - National Laboratory for Sustainable Energy) on the island of Zeeland, where the LILW was mainly produced. No nuclear power plants were ever built in Denmark. The original nuclear power program was abandoned in 1985 and most of the RW originates from Risø's 3 decommissioned research reactors of 2 kW, 5 MW and 10 MW after their approximately 40 years of operation.

In 2009, the basis for decision[63] on the final disposal of the RW was presented to the Danish Parliament[64]. It described the principles on safety and environmental concerns which set the frame for the establishment of the final repository and outlined three parallel studies which were to be carried out prior to its establishment: An investigation of repository concepts in relation to geology and safety analyses, a study on safe transportation of radioactive waste and a geological study describing areas in Denmark suitable as sites for a final repository. Together, these would constitute the basis on which the final decisions on geological environment, repository concept, and repository location would be taken. The *Danish Ministry of Health* would have the overall responsibility for the establishment of the repository and DD would be responsible for the repository concepts in relation to geology and safety analyses. The *National Institute of Radiation Protection* (SIS) would be responsible for the study of transportation, and the *Geological Survey of Denmark and Greenland* (GEUS) for the geological studies of suitable areas for the repository.

The preparations reached a more definite state in 2011, when a working group under the Danish Ministry of Health designated six locations – selected from 22 sites - in five municipalities as the most suitable areas for the final repository. More comprehensive field studies were then supposed to lead to a further reduction of the number of sites to two or three, if the Parliament decided to continue with this solution.

At that time, the RW was projected to be disposed of in a near-surface final repository (0-30 m depth), possibly in combination with borehole and medium-deep disposal (30-100 m depth). The repository was

[61] Parliamentary Resolution B 48 of 13 March 2003: Proposal for parliamentary resolution concerning the decommissioning of the nuclear facilities at the Risoe Research Facility site (ufm.dk)
[62] In addition to the LILW, the repository would dispose of 233 kg of high level RW (spent fuel).

to be completed by 2023 and the planned administratively controllable period was set to be 300-500 years to below clearance levels (figure 9).[65]

However, the municipalities refused to host a repository and citizens' groups against RW were founded in all the municipalities in question[66]. The municipalities were dissatisfied that they had not been consulted in advance and had to hear of the recommendations through the press. The joint efforts of the municipalities and the citizens groups culminated in 2012, when a public hearing was held at the former Danish stock exchange in Copenhagen. It was attended by among others the Minister of Health, Members of Parliament, Mayors from the five municipalities, NGOs, experts and representatives of the citizens' groups. At the event, 54,214 signatures against a final RW repository were handed over to the minister.

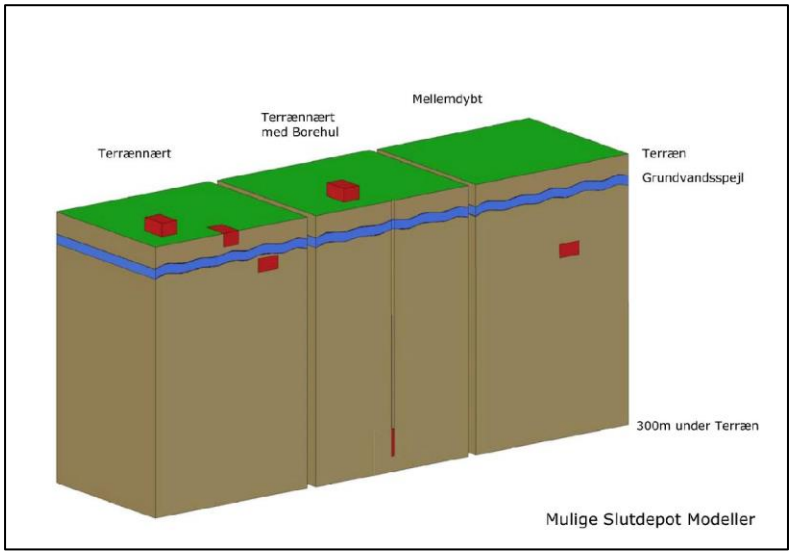


Figure 9 - The initial Danish RW final repository concept

Gradually, the criticism acquired a more scientific dimension, when Swedish, Norwegian and German experts drew attention to the fact that the planned final repository did not live up to the safety and environmental standards in Denmark's neighbouring countries. E.g., the expert organisation, *The Swedish NGO Office for Nuclear Waste Review, MKG* estimated that the Danish authorities did not seek to implement the best available technologies and that their plans were founded on a safety culture, which was not in compliance with Swedish law. Furthermore, according to MKG, the site selection process did not meet international standards (figure 10).[67]

[65] Dansk Dekommissionering: Kort fortalt: Forstudier til dansk slutdepot for radioaktivt affald, 2011: Fakta om slutdepot (dekom.dk)

[66] For more on this subject, see: NOAH FoE Denmark and SustainableEnergy, Short chronology of the Danish decision-making process for the future management of nuclear waste (from March 2003 to July 2014): Microsoft Word - Short chronology of the Danish decision-making process for the future management of nuclear waste (noah.dk)

[67] Eksperter dumper Danmarks plan for deponering af atomaffald, Information, 28 november 2012: Eksperter dumper Danmarks plan for deponering af atomaffald | Information For more information on MKG's points of view, see: Dr. Johan Swahn, Nuclear waste management in Sweden compared to nuclear waste management in Denmark, The Swedish NGO Office for Nuclear Waste Review, MKG, Presentation at Christiansborg, 24 March 2015: Johan Swahn MKG presentation Copenhagen 150324 extra.pptx (noah.dk)

One of the highlights of the criticism came in 2014, when the German Öko-Institut[68] published a working paper[69], analysing the Danish final repository project. The Institute concluded that none of the Danish RW from Risø National Laboratory decayed within this administratively controllable period, so none of it would be suitable for the planned near-surface disposal[70]. The Danish method to evaluate the feasibility of disposal was unsound from a safety standpoint because it ignored the basic principles of safe geological disposal. Instead, the criteria should be to identify impermeable geologic layers in a suitable depth (e.g., 300 to 800 m) with a geologically predictable long-term integrity. Thus, the results of the performed site-selection process were useless and the ongoing process to locate the final repository should not be continued before clear and appropriate safety criteria for the repository were established.[71]

During the strategic environmental assessment of the repository project from October to December 2014, this criticism was repeated in a long series of position papers from among others nuclear authorities in Sweden, Germany, and Poland, confirming the doubts that had already been raised among the political decision-makers[72]. As a result, instead of opting for a supposedly flawed final repository concept, the political parties in the Danish Parliament began contemplating the possibility of interim storage of waste for up to a hundred years.

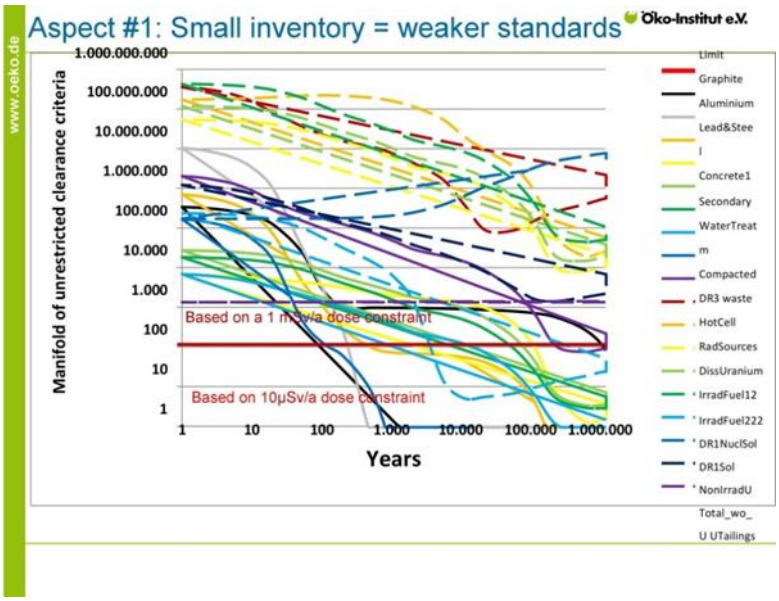


Figure 10 - Öko-Instute's take on the Danish inventory.

[68] The Institute is known as one the world's leading expert organisations in the field of research on RWM. Among those who have commissioned opinions from Öko-Institut's Division for Nuclear Engineering and Facility Safety are The European Commission, The European Parliament, EURATOM, OECD, and in Germany a long series of federal and state ministries, agencies, municipalities and energy companies.

[69] Gerhard Schmidt: The Danish Inventory of RW and the required repository type, Öko-Institut Working Paper, Division on Nuclear Engineering and Facility Safety, November 2014: Workingpaper (oeko.de)

[70] Only two of the Danish waste types decayed enough within the time period to the next predicted ice-age to below clearance levels. One was slightly above that criterion, whereas all the other 18 waste types required confinement times of 100,000 years or more.

[71] Gerhard Schmidt: Öko-Institut's take on the Danish concept for a final repository for low- and intermediate-level radioactive waste, Powerpoint presentation, March 2015: 2015-021-en.pdf (oeko.de)

[72] Ministeriet for Sundhed og Forebyggelse, Plan og miljøvurdering for etablering af slutdepot for dansk lav- og mellemaktivt affald, Sammenfattende redegørelse, februar 2015: SUU Alm.del Bilag 237: Sammenfattende-redegoerelse.pdf (ft.dk)

The turning points

The first significant step towards a new course was made in 2016, when a national contact forum for RW was established under the auspices of the Ministry of Higher Education and Science, which after a general election and a shift of government had taken over political responsibility for the Danish RWM. The contact forum was established after lobbying from the NGO-community for a broadly composed contact forum with participation of the organisations and authorities responsible for the management and disposal of the radioactive waste from Risø, representatives of CS, including green NGOs and citizens' groups, affected local and regional authorities, independent international expert organisations, and relevant nuclear authorities from neighbouring countries[73]. The forum, which should be integrated into the decision-making process on all the potential RW infrastructure projects, should meet up regularly. A somewhat similar, but more limited concept had been floated around by the authorities without being implemented. In May 2016, the contact forum had its first meeting, followed by three the same year, two in 2017, two in 2018, one in 2019, one in 2020, one in 2021, and so far, one in 2022 (figure 11).[74]

In March 2018, the Minister for Higher Education and Science put forward a proposal for a parliamentary decision on a new long-term solution for Denmark's radioactive waste. The proposal, which was supported by all the political parties, indicated that the LILW would be temporarily stored until 2073 at the latest in an upgraded interim storage facility at Risø National Laboratory and then permanently disposed of in a deep geological repository. This meant that the previous final repository localisation process had to be repeated from scratch. Furthermore, the option of transnational cooperation was kept open, and involvement of stakeholders would continue in a contact forum for the RW. In May later that year, the proposal was adopted unanimously by members of the Danish Parliament[75].

Recent developments

Preparations are now underway for the commissioning of an upgraded intermediary storage facility for the RW to be completed at Risø by august 2024. Construction is expected to start in 2022 or later after the initial phase of the EIA[76], municipal planning, local planning and design, construction approval by the regulatory authorities, as well as construction budget approval by the Parliament. A public hearing and an ESPOO hearing are supposed to take place in 2022. The safety assessment for the storage facility is in preparation and will form the basis for application for both the construction license application and the operating license application for the storage facility[77]. Additionally, for the mid to long term, the following priorities have been established: Completion of a fully operational upgraded storage facility, including RWM facilities, further characterisation, and verification of the RW inventory, identification of

[73] Anbefalinger fra seks miljøorganisationer i forbindelse med den videre proces for et slutdepot eller et mellemlager for lav- og mellemradioaktivt affald i Danmark, 29 maj 2015: Microsoft Word - Anbefalinger atomaffaldsproces (noah.dk)

[74] The photo was taken by Ingeborg Marie Ellern Nielsen and is from the homepage of Ministry of Higher Education and Science: Kontaktforum (nationalt) — Uddannelses- og Forskningsministeriet (ufm.dk)

[75] Parliamentary Resolution B 90 of 15 May 2018: english_translation_of_danish_parliament_resolution_b90.pdf (ufm.dk)

[76] For more information on the EIA, see the homepage of the Danish Environmental Protection Agency: Ny opgraderet lagerfacilitet på Risø (mst.dk)

[77] Danish Health Authority: National Programme for the Responsible and Safe Management of Radioactive Waste, 2020, p. 43-47: Microsoft Word - National Programme Denmark 2020, Council Directive 2011 70 EURATOM (sst.dk)

technical solutions needed to carry out waste management options, identification of research and development required to achieve the necessary technical solutions[78] and implementation of research and development.

In January 2022, GEUS published nine reports on the geology of Denmark at 500 metres' depth, facilitating a new phase in the siting selection for a final repository for the RW, which is expected to end up with two possible host sites before the designation of the final location. GEUS' characterisation and evaluation of the entire Danish subsurface are based on a number of criteria for the properties of the subsoil in regard to deep geological deposition based on the requirements of the Danish Parliament, international guidelines from the IAEA, OECD's Nuclear Agency and EU directives as well as experiences and recommendations from similar projects in Switzerland, Sweden, Finland, England, France and Belgium. International experts have also been involved in defining the criteria and the concept for the evaluation of the Danish areas. The results demonstrate that there are large areas in Denmark where further investigations are expected to identify sites with favourable geological characteristics that meet the established requirements[79].

Figure 11 - The participants in the first meeting of the national contact forum for radioactive waste

The Danish contact fora for radioactive waste

Currently, the national contact forum, which meets regularly, has more than twenty members, including initially representatives from concerned local citizens' groups, who are now reorganised into a national organisation, NGO representatives, Local Government Denmark, Danish Regions, representatives of the regulating agencies – i.e., Danish Health Authority (Radiation Protection) and Danish Emergency Management Agency - DD, GEUS, and the Danish Agency for Institutions and Educational Grants[80]. A local contact forum in Roskilde, where an intermediary storage facility is to be built, was established in

[78] It should be noted that DD participates in the EURAD programme, the Strategic Studies Work Package on waste management ROUTES. One of the tasks under the ROUTES WP, which DD considers relevant, is investigating the potential of shared solutions, both regarding pre-disposal and disposal. This is of particular interest for small inventory member states with only limited amounts of long-lived waste. DD also closely follows the work conducted in several work packages under the EURAD programme, including "Research, Development and Demonstration", "Strategic Studies" and "Knowledge Management", as a source of input to the design of national Research, Development and Demonstration programs. Finally, DD participates in the ERDO-WG, following projects on characterisation of legacy/historic waste and on borehole disposal solutions, ibid. p. 47.

[79] See GEUS homepage: Danmarks undergrund evalueret til deponering af radioaktivt affald (geus.dk)

[80] Stakeholders in the process to find a long-term solution for radioactive waste in Denmark: Stakeholders in the process to find a long-term solution for radioactive waste in Denmark — Uddannelses- og Forskningsministeriet (ufm.dk)

2018. More fora are underway, when new possible host sites for a deep geological final repository are designated.

Affiliated with the contact fora is a panel of scholars from Danish universities to give replies to questions from the general public on RWM. The panel members have been selected by The Danish Council for Independent Research, which provides independent scientific counselling to the Danish Government. In the context of RWM, the expert panel submits written answers to questions on nuclear physics and nuclear energy, health physics and radiation protection, environmental impact assessment and environmental law, public governance, and general ethics[81].

Assessment of the implementation of the Aarhus Convention in Denmark

In various degrees, the United Nations Economic Commission for Europe Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (The Aarhus Convention)[82] has been transposed into the legislation of all the EU MS. It could be argued that the Danish level of implementation of the Convention is high[83]. Transparency and access to information is regulated by the Public Access to Information Act[84] and the Public Access to Environmental Information Act[85]. The latter gives the public the right to access official documents, provided the documents are not subject to secrecy. Civil and local government servants are also entitled to disclose information to a third party provided that the information is not confidential. Public participation in issues related to RWM is embedded in Danish environmental legislation by the *Environmental Assessment of Plans, Programmes and Projects Act (EIA)*[86]. Citizens have the right to submit responses in public consultations on environmental assessment of plans, programmes and projects, which are published on the website of the Danish Environmental Protection Agency.

Public participation in decision-making concerning national policy on RWM is addressed in Parliamentary Resolution B48/2003[87], Parliamentary Statement R4/2009, and Parliamentary Resolution B90/2018[88]. It is supported by information dissemination on relevant websites, first and foremost of The Ministry of Higher Education and Science, DD and The Danish Health Authority, public hearings and facilitation of stakeholder dialogue through the afore-mentioned contact fora. It would be fair to conclude that effective access for CS to T&PP in regard to the Aarhus Convention have been established in

[81] See the previous note.

[82] The Aarhus Convention: cep43e.pdf (unece.org)

[83] For a general description of the implementation of the Aarhus Convention in Denmark, see: Miljøministeriet: Danmarks 6. rapport om Århuskonventionen, april 2021: rapport-om-aarhuskonventionen-dansk-version.pdf (mim.dk) In addition, the National Programme for the Responsible and Safe Management of Radioactive Waste (see note 19) has been used as a source for this section.

[84] Bekendtgørelse af lov om offentlighed i forvaltningen: Offentlighedsloven (retsinformation.dk)

[85] Bekendtgørelse af lov om aktindsigt i miljøoplysninger: Miljøoplysningsloven (retsinformation.dk) The Act transposes Directive 2003/4/EC of the European Parliament and of the Council of 28 January 2003 on public access to environmental information into Danish legislation.

[86] Bekendtgørelse af lov om miljøvurdering af planer og programmer og af konkrete projekter (VVM): Miljøvurderingsloven (retsinformation.dk) The act transposes Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment and subsequent EU legislation into Danish legislation.

[87] To a large degree, the description of the lessons is based on Johan Swahn, Gerhard Schmidt, Palle Bendsen and Hans Pedersen: The Danish nuclear waste management process must be improved, Feature article in Ingeniøren, 30 October 2015 (English unabbreviated version), which here in some instances is quoted verbatim: Microsoft Word - Feature article contact forum (noah.dk)

[88] Niels Henrik Hooge, NOAH Friends of the Earth Denmark's Urangruppe: Etiske overvejelser om byrdefordelingen mellem nutidige og fremtidige generationer ved oprettelsen af et mellemlager for lav- og mellemradioaktivt affald, Oplæg ved møde i kontaktforum for radioaktivt affald, d. 14. december 2016: kortlink.dk/ufm/rmpz

Denmark. Access to justice is further supported by a de facto municipality veto in the final RW repository selection process, considering that there so far has been no intention by the authorities to locate a repository without a consent by the designated municipality. These assertions are further elaborated on below.

Lessons learned.

It could be argued that at least five important lessons could be drawn from the above-mentioned[89]. Although they are influenced by Danish conditions, some if not most of them might be seen as archetypical of problems related to RWM programs in general as well as for the debate that currently plays out at the European level on T&PP in decision-making processes in this field.

The *first lesson* is that in order to manage and dispose of RW with the proper speed, the necessary time has to be invested – even if at first glance it looks like the decision-making process is delayed. The slowness of the process is mainly due to the fact that planning of RWM was not a mandatory part of the basis for the decision to build the research reactors at Risø National Laboratory. Nonetheless, reservations and objections from stakeholders must be addressed, until all problems are solved. The inclusion of CS must be so thorough and credible that it ensures that all future decisions fully meet the public's need for information and participation and guarantees that the political choices not only are socially, culturally, politically, and economically acceptable, but also technologically viable and sound.

The *second lesson* is that the criticism of the decision-making process and the final repository concept introduced by the government undoubtedly worked. This could not have happened without a strong implementation of the Aarhus and Espoo Conventions, manifesting itself in a comprehensive strategic environmental impact assessment: Although almost nothing of what had been planned by the Danish authorities turned out as expected, the result appeared to make all the interested parties content. The reason for this is manifold: A "time out" was applied as a result of the pressure from the affected local communities and criticism from the NGOs, international experts and authorities in the neighbouring countries. During this time out, the regulators and political decision-makers took the necessary time to reflect on the matters at hand and had the courage to fundamentally change the course that initially was plotted.

The *third lesson* is that the criticism should be if not institutionalised, then at least integrated in the decision-making process and have better conditions to evolve. For decades, RWM has been perceived as a technical issue, only to be administered by the authorities and a few technical experts. However, this is no longer the case. Today, it is recognised all over Europe that T&PP – particularly in local communities near potential repository sites – is crucial to the decision-making process. The best possible standards relate not only to goals, but also to means, including the best and most inclusive and democratic practices. The improvements in the decision-making process were not least due to the fact that the Danish Ministry of Higher Education and Science established a national contact forum for RW with participation of the organisations and authorities responsible for the management and disposal of RW from Risø, and regional authorities, green NGOs and citizens groups. The national contact forum was followed by a regional contact forum in Roskilde Municipality, where Risø is located, with potentially more contact fora to follow, when possible, host sites for the final repository are designated. Since the establishment of the fora, the dialogue with CS has been much more constructive.

[89] The border between the (Western) German Federal Republic and the (Eastern) German Democratic Republic was until reunification more or less seen as a hard outside border of the Federal Republic and hence an easy spot to choose for a final repository site.

The *fourth lesson* is that criticism should be supported by sufficient resources. These are not only financial means, but also knowledge and capacity building, experience, available time, etc. Although government funding has not been allocated to NGOs (as opposed to e.g., in Sweden), sufficient resources have been allocated to the preservation and development of the institutional mechanisms that ensure stakeholder involvement, including engagement of CS, in the RWM decision-making process, and access for the public to a second opinion on any RWM decision from the independent expert panel affiliated with the contact fora. However, regarding the broader issue of the financing of the RWM and the final disposal of the RW, it could also be argued that the planned solution violates the polluter-pays principle. The research activities at Risø were state-sponsored, and there has been no source of tax revenue from waste producers to contribute to the cost coverage of the national programme for RWM. Consequently, the Danish state will continuously cover its financial costs. On this basis, the burden of costs for decommissioning of the nuclear facilities, construction of an upgraded storage facility and an operational period of up to 50 years, followed by development of a final disposal and subsequent institutional control will be carried not by the generations who have produced the RW, but by subsequent generations. In order for the waste-producing generations to pay, sufficient money, earmarked for the construction and the operation of the final repository, would have to be transferred to a fund to guarantee that the financing of the repository is in place at the time it was originally planned to be in operation[90]. However, there is no plan for such a measure.

The *fifth and final lesson* is that the RWM decision-making process is not over, before the RW is permanently disposed of. In Denmark, that is far from the case. It must be expected that the new and presumably safer repository concept potentially could be met with some of the same local opposition as the former repository concept sometime in the future. However, the lessons that in the meantime have been learned might make these final steps easier and, not least, make for a better outcome.

[90] Niels Henrik Hooge, NOAH Friends of the Earth Denmark's Urangruppe: Etiske overvejelser om byrdefordelingen mellem nutidige og fremtidige generationer ved oprettelsen af et mellemlager for lav- og mellemradioaktivt affald, Oplæg ved møde i kontaktforum for radioaktivt affald, d. 14. december 2016: kortlink.dk/ufm/rmpz

Institutional mechanisms in Germany to facilitate transparency and public participation in RWM.
Rebecca Harms, former MEP, member of NTW

Nuclear waste: no final storage without citizen participation
For decades of protests in the Wendland region in Germany, critics argued and demonstrated against the purely political decision taken in 1977 to use the Gorleben salt dome as a final repository for highly radioactive nuclear waste. More than a year ago, it was officially acknowledged that the Gorleben salt dome, whose location on the pre-reunification German-German border[91] was more important than its geological quality, is unsuitable for the final disposal of highly RW. It has been left out of the newly launched search for the most suitable geology and the site at which a repository can be established.

The fact that this decision was made is a positive surprise, because in the history of the anti-nuclear protests in Gorleben, scientific expertise and criticism of the procedure so far counted for little for the political decision-makers. As an example, it was known that the overburden does not meet the requirements for the safest possible final repository.

Changing federal governments held on to Gorleben as final repository site for more than forty years. Now, however, the scientists of the newly responsible Federal Company for Final Disposal (BGE) excluded the Gorleben-Rambow salt dome, as well as 79 other salt domes, from the further procedure with the presentation of the "Interim Report on Partial Areas", after applying legally anchored criteria. The decisive factors for the decision were geological. However, in spite of a clear and transparent procedure, illustrating the long-standing emotions around the subject, some claims of this being a political decision remain, for instance from the Bavarian state government.

Where to put the most dangerous waste ever produced?
After the Bundestag (German Parliament) had repeatedly decided to phase out nuclear energy with a broad majority, the last time in 2011 as a result of the Fukushima nuclear power plant catastrophe, the scientific "no" for Gorleben marks the seriousness of that decision. It also marked the launch of a new search for a final repository. The citizens' initiative in the Wendland and with it all those who had once formed the nationwide anti-nuclear movement have thus achieved a double and unique success. However, this success also poses new challenges for society. For decades it was popular in the anti-nuclear movement to declare that “Gorleben is everywhere”. In fact, the Gorleben site was indeed almost everywhere: The interim report of the BGE has even turned the situation for Gorleben around in the sense of the citizens' initiative, as it now demands a great deal from society as a whole. The question "Where to put the nuclear waste?" has turned from a regional to a national question. Where Gorleben and several other salt domes will henceforth be excluded from the search for a final repository, deposits of salt, clay or granite throughout the country are considered for further investigation.

With this open-ended approach and its transparent selection procedure, in which all suitable geologies across almost all federal states are considered, Germany differs positively from virtually all other countries that are pursuing a repository strategy.

The accumulated nuclear waste must be disposed of as safely as possible for hundreds of thousands of years. How this is to be achieved, especially for highly RW, is one of the most difficult and still unsolved tasks worldwide. Beyond the dispute over the continued existence of nuclear power for supposedly ecological reasons, most experts who deal with nuclear waste are in favour of deep geological

[91] The border between the (Western) German Federal Republic and the (Eastern) German Democratic Republic was until reunification more or less seen as a hard outside border of the Federal Republic and hence an easy spot to choose for a final repository site.

storage. Nevertheless, there are also differences among them, for example with regard to safety criteria in the selection, and retrieval options, or public participation in the preparatory procedures.

Despite criticism on procedures, and lack of binding criteria in preparation of final disposal sites worldwide, some procedure has to be installed to compare and determine possible repository sites. In Germany, since the conclusion of the Final Repository Commission in 2016, the conditions for this have been improved: with the Site Selection Act, Germany has a binding basis for the search. Requirements for safety and criteria for the preliminary safety investigations are regulated in a decree. In addition, the state has taken responsibility for final disposal away from industry and has reorganised the financing of disposal. Despite all the criticism of the financial burden on industry, it is of no small significance that the interests of the nuclear industry are no longer in the foreground, but those of the general public - first and foremost safety.

Thus, the implementation of the selection procedure and the construction of the repository, for which the BGE is responsible, will henceforth be supervised by external parties: The Federal Office for the Safety of Waste Disposal (BASE) will supervise the activities of the BGE and check whether its procedures comply with the Site Selection Act. In addition, those affected by the site selection can have BASE's decisions reviewed in court.

Furthermore, the legislator has provided for citizen participation in different formats, nationally and regionally, which are to take place in self-organisation and with organisational assistance from the BASE. In addition, a National Monitoring Body (NBG) has been created, consisting of scientists and students, former MPs and representatives of social organisations. They can inspect files, consult experts, and commission expert reports. The NBG, supported by its participation officer, is supposed to mediate between all parties involved in the proceedings as an independent and citizen-oriented actor.

These new framework conditions have nothing, but nothing at all, to do with the procedure that, in addition to the fundamental dispute over nuclear power, fuelled the social conflicts over Gorleben from 1977 onwards.

The important and ambitious promise of the legislature to society today is that the process should be open-ended, science-based, participatory, and learning. There is no guarantee that all this will succeed.

Not an easy, but a worthwhile undertaking

The site selection alone will take at least a decade and must finally be decided by the Bundestag. Another thirty years will certainly pass before a possible operating licence is granted. Just how difficult and complicated this process will be already became apparent when, in the course of 2021, the interim report of the BGE was discussed in a total of three expert conferences organised nationwide and a public kick-off event.

One of the main criticisms from civil society was that the conferences were largely held online because of the Corona pandemic - and a postponement on the part of BASE and the BGE was out of the question. The latter did not want to overturn the timetable decided before Corona already in the first phase of the lengthy process. Therefore, only a few actors actually came together in one place to discuss the interim results directly with each other. Technical problems, but also inept moderation in some places, and the very different knowledge levels of participants often led to a noticeable irritability and persistent criticism of what was perceived as an inadequate discussion format. There was also early criticism that after the first conference held in an area of the proposed site, and no further public participation on the report was planned until the regional conferences that were to be held much later. After an application by BUND on this issue remained unanswered for a long time, this participation gap is now to be closed by an "expert forum on sub-areas", which is to meet at least once a year. This should ensure that interested

citizens and their organisations as well as municipal representatives can critically accompany the further selection. With the explicit support of the BGE, so-called stopping points in the process are to ensure that the state of work of the BGE and the steps for the selection of regions and sites are comprehensible to the general public.

In addition, the first advisory and planning group was elected in November, which is to continuously accompany the work of the BGE during the narrowing down of areas and be able to question it at an early stage.

It can obtain scientific expertise, should accompany the evaluation of the expert conferences, and prepared the first expert forum in February 2022. The group is composed of citizens, representatives of involved municipalities, associations, regional authorities, and academia according to the same proportional representation as the predecessor group at the expert conference. Furthermore, there was an addition of two members from the special Youth Council. This council was newly created because only very few young people took part in the conferences, even though they constitute the generation to which nuclear waste will be handed over.

One thing is certain: the actors involved have learned a lot in the last weeks and months.

The lamented "participation gap" has not only been closed, but the responsible institutions and representatives of the self-organised expert conference have learned lessons from the first year of participation. Admittedly, it took longer than critics would have liked. But in all of this, it must be remembered: An authority is an authority and cannot make decisions on its own. It is completely understandable that the lengthy coordination between BASE and the Federal Environment Ministry leads to frustration.

However, it is equally clear that a delay of a few months in a procedure that is designed to last at least a decade cannot be regarded as an unreasonable clarification period.

In the resolution of the conflicts over the next participation phase that has been reached in the meantime, the participation officer and the NBG have proven their value and it is encouraging that all the institutions and citizen representatives involved were able to come to an agreement. A process is currently developing on one of the most socially difficult issues that could become exemplary for citizen participation in Germany.

This process needs not only learning authorities and institutions, but also a learning civil society. Thus, the environmental association BUND, disappointed and annoyed by the lack of comprehensive and swift adoption of a motion initiated by it and adopted by the first expert conference, withdrew its participation in the third expert conference. The groups of the Nuclear Waste Conference, a long-standing association of citizens' initiatives at nuclear waste repository sites, also voiced much criticism of the technical conferences. Many of the topics that they want to see dealt with more intensively, such as the safety of the interim storage facilities or final non-heat-generating waste, actually deserve more attention. However, the process of finding a final repository for highly RW should neither be interrupted nor boycotted. The course of the conferences so far, the results of public participation and their now decided continuation do not justify such demands.

The heated discussions about a process that has just begun, and the distortions of representation of the process among some civil society actors involved are so counterproductive, above all because the procedure is still far removed from the actual conflicts: The major confrontations are only imminent the further the process progresses and the closer the decision on the location comes. The fact that the dispute over the participation gap has already become a sticking point for parts of civil society seems

unwise when measured against the conflicts that still lie ahead and fails to recognise that much has already been learned.

Therefore, it is only to be welcomed that a large part of civil society continues to participate and that there were enough candidates for the planning and advisory group. The process of finding a final repository for high-level RW has only just begun. The state has taken on the responsibility anew and with great awareness of the nuclear risks. State authorities, together with their scientists, are trying to prepare a final disposal not against but with the citizens. This attempt is a great, hard-won advance that must not be squandered. There would be simpler and cheaper solutions than deep geological storage - but they would probably not be any safer. The movement should therefore do everything it can to close the chapter on nuclear power in Germany as best it can, and not put itself at a disadvantage in the process.

Transparency and access to information
Since the establishment of the Federal Republic of Germany access to information has increased to the extent that currently there are no material issues concerning a citizen's right to information and access. The Federal Act governing access to information came into force in 2006. Fees to access information are modest, can be discounted and in some cases are free. Requested information is provided in a timely way and usually within 1 month.

Public participation
With only geologically suitable regions being prospected for the siting of a deep geological disposal, communities can have a scientific and technical understanding that suitable geology may exist in their region and sub regions. This scientific approach gives communities confidence going forward. The participation gap has been closed with various fora identifying the need for, and importance of, pluralistic dialogue and the establishment of agreed and trusted multi-party stakeholder engagement processes at national, regional and local levels which are enshrined in law.

Access to resources
Provisions in law have been promised by the legislature that resources will be provided to civil society groups to enable access to independent scientific and technical expertise.

In 2019, an IAEA ARTEMIS mission noted that Germany has a mature legal and regulatory framework for the safety of spent fuel and RWM[92]. The team highlighted the professionalism and commitment to safety of all organisations involved in the implementation and oversight of the National Programme.

The ARTEMIS team identified the involvement in the site selection process of an independent mediating body composed of prominent people and other citizens (Nationales Begleitgremium) as an example of good practice.

"Germany has an important programme of RWM and decommissioning. Many lessons have been learnt that will help the international community," said ARTEMIS team leader Patrick Majerus, head of Luxembourg's Department of Radiation Protection at the Ministry of Health.

Access to justice
The process written into national law provides for independent arbitration, should that become necessary. Additionally, Germany is a signatory to the Aarhus and Espoo Conventions.

Conclusion

[92] https://www.iaea.org/node/41872

Many lessons have been learned concerning how a public participation and engagement process can be developed and deployed, with the goal of ensuring the process of site selection should have the support of a community. There is also an implicit recognition through the acknowledgement and provision of resources for communities to be educated, enabling them to make “informed” decisions in the field of RWM including final disposal. The German case concerning transparency, public engagement, access to resources and justice with all stakeholders feeling engaged with the process is, in practice, an example as to how the BEPPER Report could be implemented by other Nation States to ensure public trust.

Institutional mechanisms in Greenland to facilitate transparency and public participation in RWM.

Niels Henrik Hooge, member of Nuclear Transparency Watch and NOAH Friends of the Earth Denmark

Transparency and public participation regarding uranium mining in Greenland

Few Northern countries have drawn more international attention because of its increasing geopolitical importance than Greenland. First and foremost, the focus is on Greenland's vast mineral and oil and gas resources. Greenland is rich in mineral deposits, mainly in rare earth elements (REEs), uranium and thorium, but also zinc, copper, nickel, gold, diamonds and platinum group metals. In addition to possessing one of the single biggest uranium deposits and by far the biggest thorium deposit in the world at Kvanefjeld and the Ilimaussaq-complex[93], the country is estimated to hold 38.5 million tons of rare earth oxides, while total reserves for the rest of the world stand at 120 million tons[94]. Most of the mineral resources are located in Southern Greenland, particularly in Greenland's smallest municipality, Kommune Kujalleq. Furthermore. Greenland has some of the world's largest undiscovered oil and gas deposits. In 2008, the United States Geological Survey (USGS) estimated that North Eastern Greenland has an undiscovered potential of 31,4 BBOE (billion barrels of oil-equivalents)[95]. Estimates of Greenland's total oil and gas resources are even bigger. According to USGS, the total amount of oil left to be discovered around the world is 565 billion barrels (in 2012)[96].

Two themes have dominated Greenlandic politics in recent years: Independence from Denmark and uranium mining. In 2013, Greenland's parliament, Inatsisartut, abolished its zero-tolerance policy for uranium mining, which until that time had lasted a quarter of a century. During all this time, acceptance of the uranium ban was unanimous both in Inatsisartut and the Danish parliament, Folketinget. The rationale behind this decision was that exploitation of Greenland's mineral resources and particularly uranium mining was the quickest way to economic self-sufficiency and full independence from Denmark.

As a result, no issue related to the environment and transparency and public participation (T&PP) has played a bigger role in Greenlandic politics than the big, rare-earth element (REE) and uranium mine project at Kvanefjeld (in Greenlandic: Kuannersuit), owned by the Australian company *Greenland Minerals Ltd., GML*. The project is potentially the biggest industrial project in the history of the Danish Kingdom. Although it started more than half a century ago, under GML's ownership the controversial project has been at the forefront of the public eye for more than a decade, how politically important Kvanefjeld is, can be seen from the fact that positions on the mining project and uranium mining in general have been a determining factor in the formation of five government coalitions since 2013[97]. Considering the

[93] However, Kvanefjeld and the Ilimaussaq-complex are not the only uranium deposits in Greenland: According to the Geological Survey of Denmark and Greenland, deposits are situated at Illorsuit, Puissattaq, Ivittuut and Motzfeldt Lake in Southern Greenland, Sarfartoq, Nassuttooq, Qaqqaarsuk and Attu in Western Greenland and Randbøldal and Milne Land in Eastern Greenland. In addition, there might be uranium deposits that have not yet been discovered. See: Per Kalvig, Karsten Secher og Gert Asmund: Information og fakta om udvinding af uran i Grønland 2015, Udgivet af De Nationale Geologiske Undersøgelser for Danmark og Grønland – GEUS, september 2015: http://mima.geus.dk/wp-content/uploads/URAN_DK_2015.pdf

[94] REEs can be mined southwest of Kangerlussuaq, in Godthåbsfjorden, at Kangerdluarssuq between Narsaq and Qaqortoq and near Narsarsuaq.

[95] The figures are: East Greenland Rift Basins: 31,4 BBOE; West Greenland-East Canada: 17 BBOE; North Greenland Sheared Margin: 3,3 BBOE. Most of the undiscovered oil and gas occurs offshore. See: Kenneth J. Bird, et al. (2008). Circum-Arctic Resource Appraisal: Estimates of Undiscovered Oil and Gas North of the Arctic Circle, U.S. Geological Survey Fact Sheet, 2008, p. 4: https://pubs.usgs.gov/fs/2008/3049/fs2008-3049.pdf

[96] National Geographic: New Survey of Undiscovered Oil Shows Shift Away from Middle East, Russia, 2 May 2012: https://www.nationalgeographic.com/environment/great-energy-challenge/2012/new-survey-of-undiscovered-oil-shows-shift-away-from-middle-east-russia/

[97] New government coalitions were established in 2013, 2014, 2016, 2018, 2021 and 2022. In the most recent government's coalition agreement from April 2022, it was decided to postpone any new decision on uranium

size and importance of the Kvanefjeld project, it could be argued that a description of the twists and turns of the project constitutes a generic description of the development of Greenland's mineral sector. In many respects, it can be considered a textbook case on almost all aspects of the mining industry's relationship with the public and a demonstration of the necessity of a strong legal framework in order to involve the public in the approval and development of large-scale mining projects (figure 12).[98]

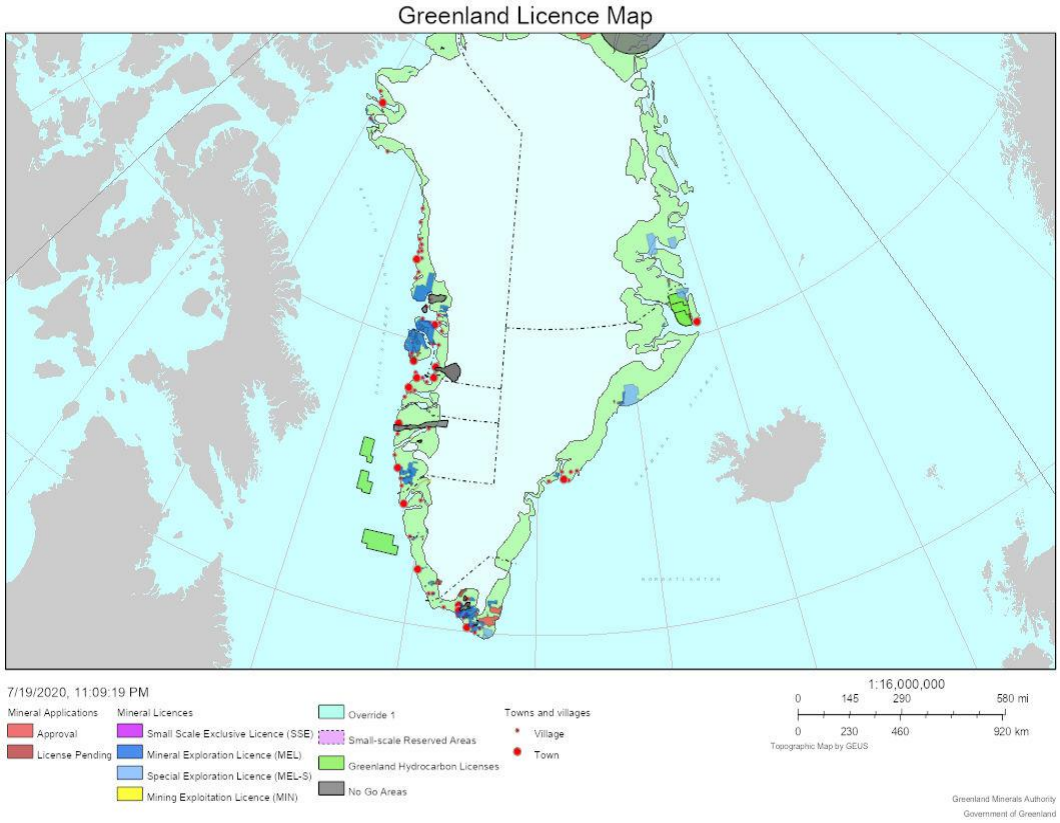


Figure 12 - Greenland Licence Map

Greenland's relationship with the EU

In a European perspective, Greenland's mineral sector is mainly relevant for two reasons: First, Greenland might be a candidate for EU membership in a not-so-distant future. In fact, Greenland has already been an EU Member State (MS). In 1973, Greenland joined the then European Community (EC) as a country together with Denmark, but after gaining autonomy in 1979 with the introduction of home rule within the Danish realm, Greenland voted to leave in 1982 and left in 1985 to become a so-called EU overseas country. The main reason for leaving was disagreements about the Common Fisheries Policy and to regain control of Greenlandic fish resources[99]. Even though Greenland is not a MS, Greenlandic citizens are still EU citizens within the meaning of EU treaties and Danish national law. Legally, Greenlanders are Danish citizens and therefore also EU citizens[100]. In recent years, scepticism towards the

mining and the Kvanefjeld project. Government coalition agreement: Koalitionsaftalen mellem IA og Siumut – Siumut

[98] Source: Greenland Mineral Resources Authority, July 2020.

[99] A Treaty on Greenland's withdrawal from the Community was made – *the Greenland Treaty* – declaring Greenland as a "special case", for which a fisheries agreement is provided between the parties. Here, the EU keeps its fishing rights and Greenland its financial contribution as before the withdrawal. It also gives Greenland tariff free access of fisheries products to the EU as long as there exists a satisfactory fisheries agreement.

[100] Greenland is a mostly self-governing part of the Danish Kingdom, which also includes Denmark and the Faroe Islands. Through the Home Rule and Self-Government Acts (adopted in 1979 and 2009 respectively) Greenland has the right to elect its own parliament and government, the latter having sovereignty and administration over the

EU has diminished considerably and a return to the EU in the future cannot be ruled out. Greenland already meets most if not all of the criteria for accession and currently the EU is by far Greenland´s most important trading partner[101].

Second, in 2021, Greenland joined the European Raw Materials Alliance (ERMA)[102], a network launched by the European Commission in 2020. ERMA comprises hundreds of industrial actors, EU MS and regions, trade unions, civil society, research and technology organisations, investors and NGOs, which among others aim to make Europe economically more resilient by diversifying its supply chains. Most of the raw materials identified by the EU as critical can be extracted in Greenland - primarily Greenland's REEs, but also other minerals used in new technologies, including batteries for energy storage. According to some projections, Europe's demand for REEs will increase as much as tenfold by 2050, which is the year in which the EU plans to become carbon neutral. Thus, Europe's focus on Greenland will intensify in the coming years, a fact clearly manifested in EU's new Arctic Strategy from 2021[103]. Here, the EU for the first time defines itself as an important Arctic stakeholder. Among others, the strategy foresees establishment of a European Commission Office in Greenland's capital Nuuk in order to strengthen cooperation between EU and Greenland and to enhance EU's involvement in all the relevant Arctic working groups.

The legal framework

Several laws regulate Greenland's mining industry, among which some of the most important are *the Mineral Resource Act*[104] and the *Large-Scale Projects Act*. The first one lays down the basis and framework for the regulation of mineral resources as well as activities of importance in this field. It is further supplemented by provisions in executive orders and standard license terms which among others aim to ensure that the activities are adequately carried out in regard to safety, health and the environment. The administrator of the mineral resources is Greenland's *Mineral Resources Authority* under the Greenland Self-Government authorities. When necessary, the Authority cooperates with the Danish Energy Agency and the Danish Environmental Protection Agency[105]. The second law - the Large-Scale Projects Act - gives permission to a company to invite tenders for construction projects on special terms, provided that the company has been granted the required approval[106].

areas such as education, health, fisheries, minerals and oil extraction, environment and climate. The Self-Government Act ensures recognition of Greenlanders as people in international law, the opportunity for Greenland to become an independent state, as well as the opportunity to take on the jurisdiction of more areas. In regard to the EU, Greenland has status as one of the EU countries' overseas countries and territories (OCT). Thus, Greenland receives funding from the EU for sustainable development and has signed agreements increasing cooperation.

[101] E.g. in 2018, Greenland's exports to the EU amounted to a 93 per cent of Greenland's total exports and Greenland's imports from the EU were valued at 91 percent of all Greenland's imports, cf. Statistics Greenland: Greenland in Figures 2019 and European Commission: European Union, Trade in goods with Greenland, 3/ 2019: https://webgate.ec.europa.eu/isdb_results/factsheets/country/details_greenland_en.pdf

[102] ERMA homepage: European Raw Materials Alliance (ERMA) - Homepage

[103] European Commission, Joint Communication on a stronger EU engagement for a peaceful, sustainable and prosperous Arctic: Joint Communication on a stronger EU engagement for a peaceful, sustainable and prosperous Arctic | EEAS Website (europa.eu)

[104] Mineral Resource Act of 7 December 2009 (unofficial consolidation): Unofficial-translation-of-unofficial-consolidation-of-the-Mineral-Resources-Act.pdf (govmin.gl)

[105] Explanatory Notes to the Mineral Resources Act: Explanatory Notes to the Bill (govmin.gl) See also: Homepage Plesner Advokatpartnerselskab: Extraction in Greenland (plesner.com)

[106] The aim of the Large-Scale Projects Act is to increase foreign investments and prevent and limit their possible negative consequences to Greenlandic society. It stipulates a minimum hourly wage for foreign workers, but at the same time, the access for companies to employ such workers in large-scale projects is expanded during the construction phase of the projects. See Forslag til Lov for Grønland om udlændinges adgang til opholds- og arbejdstilladelse i anlægsfasen af et storskalaprojekt,

Not less significant is the recently adopted *Uranium Act*, which bans prospecting, exploration and exploitation of uranium and of other minerals, if the resource in question contains more than 100 ppm of uranium (100 gr. uranium per tonne of ore)[107]. The act, which entered into force in December 2021, is expected to prevent the big REE and uranium mining project at Kvanefjeld from proceeding as well as large-scale mining projects at Motzfeldt Sø and Milne Land in Southern Greenland and Safartoq and Tikiussaq in Western Greenland, all in all licence areas covering several thousands of km2.

Furthermore, exploration licences for hydrocarbons and minerals in Greenland are regulated by the laws of both Greenland and Denmark. In some cases, disputes between the Greenlandic authorities and the licensee are settled by the Danish courts and in other by an arbitration tribunal seated in Denmark, applying Danish law[108].

Only limited transparency and public participation

Greenland is not party to the Aarhus Convention[109] and although environmental impact assessments (EIAs) are mandatory for large-scale mining projects[110], this does not pertain to strategic environmental impact assessments for mineral exploration areas. This means that few areas in principle are excluded from being licensed and also that the public is not informed in advance on what areas could be designated[111]. Consequently, in addition to more than forty small-scales licences, there are now more than 90 active large-scale mining projects (prospecting, exploration and exploitation) in Greenland[112], covering thousands of square kilometres, and almost all related to surface mining projects, often at high altitude[113]. Most of these licence areas are located in Southern Greenland, which has the country's richest

[107] The Uranium Act came into force in December 2021. It is intended to ensure that no uranium is extracted in Greenland. Furthermore, the law authorises the government to introduce similar bans on other radioactive elements and restrict or revoke licences if exploitation in accordance with the ban is not possible. See: Greenland Parliament Act No. 20 of 1 December 2021 to ban uranium prospecting, exploration and exploitation, etc. (unofficial translation): Uranlov-ENG.pdf (govmin.gl) and also the Explanatory Notes to the Bill: Bemaerkninger-uranlov-ENG.pdf (govmin.gl)

[108] However, Greenland has not ratified the Energy Charter Treaty or other investment protection treaties. By ratifying them, disputes between the government and licensees would be settled in arbitration courts through civil action behind closed doors, on a legal basis that does not necessarily include Greenlandic legislation, and which cannot be appealed.

[109] The rights guaranteed by the Aarhus Convention relate to three areas: (a) The public's right of access to environmental information vis-à-vis administrative authorities and private parties with public responsibilities for environmental protection. (b) The public's right to participate in certain environmental decision-making processes. (c) The public's right of access to courts or tribunals in environmental matters. Transparency includes informing all persons and stakeholders in a way that they can assess the risk of a certain activity. Information has to be provided complete and early enough for this to happen. Link to the convention website: Introduction | UNECE

[110] The Mineral Resources Act requires that mining companies prepare an EIA in connection with the development of any proposed mineral project. The Act also stipulates that an exploitation licence for a proposed project will only be granted if the project's EIA is accepted by the authorities. The purpose of the EIA is to identify, predict and communicate the potential environmental impacts of the planned mining project in all of its phases - construction, operations, closure and post-closure. The assessment should also identify mitigation measures designed to eliminate or minimise negative environmental effects, such measures, as far as possible, being incorporated into the project design.

[111] For more information on Greenland's legislation in this field, see Ellen Margrethe Basse, Juridisk responsum om den gældende grønlandske lovgivning vurderet i lyset af Århuskonventionen, Juridisk Institut, Business and Social Sciences, Aarhus Universitet (June 2014): http://kortlink.dk/naalakkersuisut/pk6q

[112] Government of Greenland, Ministry of Mineral Resources and Justice, Minex No. 54, Mineral Exploration Newsletter, 2022: https://govmin.gl/wp-content/uploads/2022/01/Minex-54.pdf

[113] Among others, the lack of transparency enabled one of the former governments to open up for oil exploitation in the world's biggest national park in North Eastern Greenland. And since January 2021 a mining project in

biodiversity and all of Greenland's farmland and therefore often is described as "Greenland's breadbasket". Southern Greenland's suitability to host a large-scale mining industry has long been a concern. Mining and particularly uranium are considered incompatible with development of most of the sectors, which are key growth sectors for the economy, namely fishing and catching, tourism and food production. All of Greenland's sheep stock – more than twenty thousand overwintering sheep – are found in Southern Greenland and there is an ambition to introduce beef and dairy cattle, when global warming makes the climate milder. Furthermore, Southern Greenland has some of the best catch areas: Just the small Kujalleq municipality had almost ninety thousand catches in 2009 and 2010 of among others, birds, land mammals and seals[114].

Health and environmental concerns

According to GML, in addition to containing the second biggest uranium[115] and by far the largest thorium deposits, the Ilimaussaq-complex in Kommune Kujalleq, of which Kvanefjeld is a part, possesses the second largest deposits of REEs in the world. The mine, which would be the world's second largest open pit uranium mine, is located on top of a mountain, six hundred metres above sea-level, only six kilometres from Narsaq, a town of approximately 1,500 inhabitants in Southern Greenland. The licence area is also situated near the Kujataa UNESCO World Heritage Site, one of Greenland's three world heritage sites (figure 13)[116].

Kvanefjeld's close proximity to inhabited areas have caused strong regional opposition to the mining project because of its predictable negative health and environmental impacts. In case of a dam break, the huge tailings facility located in a lake high above Narsaq, could flood the area. The enormous amount of RW from the mine is also in itself a cause of concern. According to one estimate, if all its presently known uranium resources are mined, Kvanefjeld would produce more than double as much RW as the total mass of uranium mill tailings in Canada and the U.S. put together[117].

Eastern Greenland, where a Canadian company plans to exploit 12.8 million tons ore annually, has been under development. The entire exploration area is located in Greenland's National Park.

[114] Naalakkersuisut, Departementet for Fiskeri, Fangst og Landbrug: Fangstrapport 2012. Since then, there has not been easily accessible statistics on the subject.

[115] GMEL Company Presentation, Symposium Investor Roadshow, Slide 5, April 2014: https://www.slideshare.net/SymposiumEvents/greenland-minerals-and-energy-company-presentation-symposium-investor-roadshow-april-2014

[116] MEL 2010-02 (blue area) marks the Kvanefjeld exploration licence area. The grey areas represent the Kujataa UNESCO World Heritage Sites and buffer zones. Source: Greenland Minerals Authority, May 2021.

[117] Mining of the full resources would generate a tailings volume about ten times larger than in the current design. From the EIA draft report follows that GMEL during a lifespan of 37 years of the mine intends to process a total of 111 million tonnes of ore, slightly more than one tenth of the recoverable amount of 1.01 billion tonnes reported to be present in the three deposits at the Ilimmaasaq complex and 16.5% of the Kvanefjeld deposit of 673 million tonnes. However, in the section of the white book that describes the social sustainability of the mining project, which was written at the same time as earlier draft EIA reports, GMEL mentions an operating lifespan of the mine of more than 100 years, which indicates a significantly bigger output. See: NGO press release: The Kvanefjeld project does not meet Greenland's Mineral Resources Act's environmental and climate requirements, 10 March 2017: 2017-03-10 Press release concerning EIA draft report Kvanefjeld_0.pdf (noah.dk)

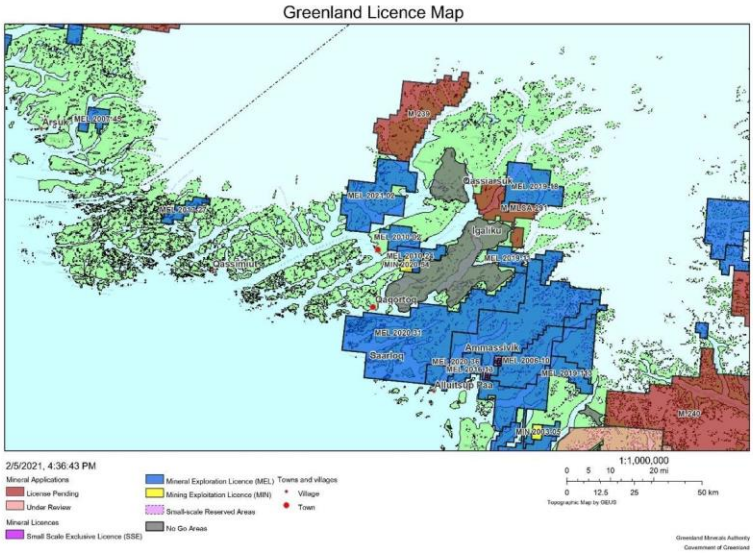


Figure 13 - Kvanefjeld and mineral licenses in Kommune Kujalleq

Furthermore, the Danish Risø National Laboratory has estimated that up to a thousand tons of toxic and radioactive dust might be released annually from the open pit mine[118]. A lot of the dust will be carried by the heavy Arctic Sea winds across the region, where it will affect among others agricultural activities. People living in the contaminated areas would be chronically exposed to radioactive and other toxic species via drinking water, food, and air. Seafood would become contaminated as well, due to the substantial discharges of wastes into the coastal sea[119].

A flawed process

The general public's view on uranium mining might have been formed by the experience that it already had with radioactive contamination and the lack of transparency in this field: In January 1968, a B-52 bomber from the United States Air Force carrying four thermonuclear bombs crashed onto the sea ice in North Star Bay in Greenland. The crash caused the conventional explosives aboard the aircraft to detonate and the nuclear payload to rupture and disperse, resulting in radioactive contamination of the surrounding area. Later, reports emerged in the Danish press that one of the four bombs had not been recovered, although the American authorities stated that all four bombs were destroyed. This in spite of the fact that 700 specialised personnel from both Denmark and the U.S. and more than 70 U.S. government agencies had worked for nine months to clean up the site. Also, Danish workers involved in the clean-up operation claimed long-term health problems due to their exposure to radiation.
A survey from 1995 found 410 deaths by cancers out of a sample of 1,500 workers[120]. Scientific studies have demonstrated that contamination from the accident mainly occurs in the marine environment[121].

Furthermore, the Kvanefjeld project's history started half a century ago, not in Greenland, but in Denmark. Kvanefjeld's uranium deposit was discovered in 1956 and further explored by the Danish Nuclear Energy Commission, which needed a stable fuel supply for Denmark's planned nuclear power program. In 1978, after preliminary studies, the Risø National Laboratory initiated a comprehensive research project to determine the most efficient way to extract the uranium. The project was financed primarily by

[118] Kim Pilegaard, Preliminary environmental impact statement for the Kvanefjeld uranium mine, Risø National Laboratory, September 1990, p. 44: https://backend.orbit.dtu.dk/ws/portalfiles/portal/56472284/ris_m_2875.pdf
[119] NGO press release, The Kvanefjeld project does not meet Greenland's Mineral Resources Act's environmental and climate requirements, 10 March, 2017: https://noah.dk/sites/default/files/2017-03/2017-03-10%20Press%20release%20concerning%20EIA%20draft%20report%20Kvanefjeld_0.pdf
[120] Knud Juel, Gerda Engholm and Hans Storm, Register study of mortality and cancer incidence among Thule workers, Danish National Institute of Public Health & Cancer Society, 2005.
[121] For general information on the accident, e.g. see: Wikipedia homepage: 1968 Thule Air Base B-52 crash.

the Danish government, but some of the money came from the EC. It was estimated that the Kvanefjeld deposit, then set at 43,000 tonnes of uranium, comprised 28 per cent of the EC's uranium resources[122].

Both the leading rival government parties in Greenland, Siumut and Inuit Ataqatigiit, were against the project. After the Danish rejection of nuclear power and the decision in 1988 by the Joint Committee on Mineral Resources in Greenland not to issue permits for uranium exploration and extraction, the Kvanefjeld project was off the political agenda for many years. However, this changed in 2008, when GML decided that the company wanted to mine not only REE, but also uranium. If it did not get permission, it would abandon the project.

Where uranium so far had been considered the main deposit, it was now mentioned as a by-product of the REEs. In 2013, the first pro-uranium government in Greenland came into power, headed by Aleqa Hammond of Siumut, and shortly thereafter the uranium ban was repealed[123]. In her inaugural address, Aleqa Hammond promised a consultative referendum in Southern Greenland on the Kvanefjeld project, a promise that was repeated in the last speech she held in Inatsisartut in 2014, the day before a new general election was called. The promise was never fulfilled, although Siumut stayed in power for the next eight years.

During her tenure, the government proposed amendments to the Mineral Resources Act aiming at not only lowering procedural environmental standards for uranium mining, but for all mining[124]. The amendments would have abolished the right of public access to documents that constitute the basis for decisions on issuance of mining permits, before they were given, and repealed the public's access to justice. Only the (unrelated) call for a general election at the time prevented the passing of the bill. The retraction of the referendum promises and the attempt to lower the environmental standards of the mining industry were some of the peaks in a pro-uranium campaign that lasted several years. Among others, the campaign involved four information tours in Southern Greenland by lecturers from Danish research institutions. The lecturers were supposed to be neutral but played down or ignored the health and environmental impacts of uranium mining and the Kvanefjeld project[125]. As a result, public confidence in the decision-making process quickly diminished. In 2014, an opinion poll showed that only one

[122] For more on Kvanefjeld's history, see: Ajaa Chemnitz Larsen and others, Uranium in Greenland: Risky business, Feature article in Arctic Journal, 12 February 2016. Originally published in Danish in an abbreviated version by the daily Politiken, 11 February, 2016, https://noah.dk/sites/default/files/inline-files/160212_Feature%20article%20Arctic%20Journal.pdf

[123] Forslag til Inatsisartutbeslutning om at Inatsisartut med virkning fra EM13 tiltræder at "Nul-tolerancen" overfor brydning af uran og andre radioaktive stoffer ophører, 8. august, 2013: http://www.inatsisartut.gl/dvd/EM2013/pdf/media/998286/pkt106_em2013_nultolerance_uran_bf_dk.pdf

[124] Forslag til ændring af Inatsisartut-lov nr. 7 af 7. december 2009 om mineralske råstoffer og aktiviteter af betydning herfor (råstofloven), 12. juni 2014. The proposal to limit the public's access to environmental information and justice in environmental matters was tabled at the same time as an expert workshop was held in Greenland's capital, Nuuk, to lay down the groundwork for future legislation on extraction, production and exportation of uranium in Greenland. The identity of the participants was kept a secret, but documentation provided under the Danish Freedom of Information Act revealed that among other representatives of GML (became GME), participated. The workshop, which was hermetically closed to the public, was organised by the Danish Institute for International Studies, DIIS, a Danish government funded research organisation with close ties to the Danish Foreign Ministry. For further information, see: Falke Thue Mikailsen, Palle Bendsen, Varste M. Berndtsson and Niels Henrik Hooge, Phasing Out Democracy, The Arctic Journal, 9 September 2014: Uranium in Greenland - Phasing out democracy | Aarhus Clearinghouse (unece.org)

[125] Much of the tours were dedicated to a rebuttal of the findings of an independent Dutch expert report on the environmental impacts of the Kvanefjeld project, which was commissioned by Avataq, The Danish Ecological Council, NOAH Friend of the Earth Denmark and Sustainable Energy. Among others, the report concluded that the project was not environmentally sustainable and threatened the health of the local population. See: NGO press release: New report confirms that the Kvanefjeld mining project is not sustainable, 28 April 2014: Microsoft

out of ten Greenlanders thought that public participation in this process was satisfactory[126] and continuously, there has been a majority of the population in favour of a referendum on uranium mining[127].

Lack of boundaries between the public and the private sector

Greenland has not ratified the United Nations' Convention Against Corruption[128] or adopted standards, measures and rules, which assure that licensing procedures are not manipulated or interfered with. One of the results is that there have not been firm boundaries between the licensing authority and the mining companies or proper vetting procedures in place for licence applicants that take into consideration possible prior criminal convictions and ties to criminal organisations by key people in the companies in question, or patterns of behaviour concerning other mining projects inside and outside of Greenland.

A long-standing example of the consequences of this deficiency is GML: In November 2013, Member of the Danish Parliament for Inuit Ataqatigiit, Johan Lund Olsen, raised the question of GML's ties to organised crime and its alleged owner's financing of terrorist activities in Somalia in a closed session in the Danish Parliament's Foreign Policy Committee[129]. Rumours to that effect had been circulating in the Australian mainstream press for years. The objective was to get GML's ownership thoroughly investigated. The then Chairwoman of Inuit Ataqatigiit, Sara Olsvig, asked the same questions in Inatsisartut shortly after, but neither the Danish, nor the Greenlandic government wanted to investigate GML[130].
In the following years, GML compromised itself on several occasions, which in September 2019 led to a rebuttal from Greenland's then Prime Minister, Kim Kielsen, and The Department of Nature and Environment's Permanent Secretary, Mette Skarregaard Pedersen. According to them, GML had systematically undermined Greenland's environmental standards and in addition to misinforming the authorities, failed to comply with requests and instructions to correct and supplement its EIA draft reports for the mining project. In a letter sent to GML's Managing Director, they complained that GML frequently had contacted high-ranking civil servants and ministers who had no competence within the EIA review process, seeking to undermine the authority of Greenland's Environmental Agency for Mineral Resources Activities[131].

Even though the rebuttal is extraordinary by any standard, it did not address the fact that GML had established close ties to parts of the political community and the civil service, which was considered inappropriate by most of the Greenlandic public. In addition of hiring Greenland's former Prime Minister

---

Word - Press release van Leeuwen report (noah.dk) Link to the report: J. W. Storm van Leeuwen Kuannersuit-Kvanefjeld report April 2014.pdf (noah.dk)

[126] Sermitsiaq: Måling: Selvstyret overhører befolkningen, 3. oktober 2014: Måling: Selvstyret overhører befolkningen | Sermitsiaq.AG

[127] E.g. see: Sermitsiaq: Flertal af borgere ønsker folkeafstemning om uran, 24. juni 2016: Flertal af borgere ønsker folkeafstemning om uran | Sermitsiaq.AG

[128] United Nation, United Nations Convention Against Corruption, New York, 2004:UNITED NATIONS CONVENTION AGAINST CORRUPTION (unodc.org)

[129] Johan Lund Olsen, Finn Sørensen, Mikkel Myrup, Niels Henrik Hooge, Palle Bendsen og Hans Pedersen, Ingen kontrol med grønlandsk uran, kronik i Information, 11. november 2013): http://www.information.dk/480186

[130] Svar fra Naalakkersuisoq for Erhverv og Råstoffer, Jens-Erik Kirkegaard, til medlem af Inatsisartut, Sara Olsvig, 20. december 2013: 250_GMEL_og_kriminalitet_saol_svar.pdf See also: Antony Loewenstein: Australian uranium mining in Greenland is tearing the country in half, The Guardian, 15 May, 2014: http://www.theguardian.com/commentisfree/2014/may/15/australian-uranium-mining-in-greenland-is-tearing-the-country-in-half

[131] Niels Henrik Hooge, New setback for the Kvanefjeld mining project in Greenland, Nuclear Monitor, Issue #879, 4 November, 2019): https://wiseinternational.org/nuclear-monitor/879/new-setback-kvanefjeld-mining-project-greenland

as Chairman of its board[132], GML also hired two former Deputy Ministers for Mineral Resources, one as Chairman of the Board, the other as Executive General Manager[133]. According to some sources, GML may even have been involved in the process that led to the Trump administration's offer to buy Greenland[134].

Last but not least, questions were asked in the Danish mainstream press, whether GML had been involved in the attempt to subvert Greenland's 2021 general election (see the next section). Four days before the election, Denmark's biggest television station, TV2, ran a story alleging that Inuit Ataqaigiit's leader and later Greenland's Prime Minister — Múte Bourup Egede - was criminally corrupt and had abused his power when he served as a cabinet member some years before. The story was repeated by other Danish news media. After the election, TV2 admitted that the story was false and apologised to Egede but did not disclose the source of the story. A couple of months later, Danish newspaper Berlingske revealed that the story was based on an 11-page press briefing[135], whose origin is still unknown. TV2's news director, who used to work as a political spin doctor for an earlier Danish government administration, resigned following the incident. GML has denied any involvement.

The Kvanefjeld elections

In December 2020, the Greenlandic government started public hearings on the Kvanefjeld mining project as part of the EIA and Social Impact Assessment (SIA) process, after which the government planned to decide whether to grant GML an exploitation permit. However, questions were raised, why the government had not notified its neighbours considering that Greenland has been party to the Espoo Convention on Environmental Impact Assessment in a Transboundary Context since 1997[136]. As a consequence, the government allowed everybody outside of Greenland to partake in the public hearings, although none of the neighbouring states were notified. Because of increasing public opposition to the mining project, particularly in Southern Greenland, the public consultation period was extended until September 2021. However, disagreements over the consultation process caused the government coalition to split up, which led to elections being called. After a general election and municipality elections on April 6th – widely known as "the Kvanefjeld elections" and for the first time ever attracting media interest from all over the world – a new government was installed, consisting of Inuit Ataqatigiit and the nationalist Partii Naleraq. The new government made good on its promise to reinstate the uranium ban, which entered into force in December 2021. It also joined the Paris Agreement and suspended all new oil and gas exploration in order to address climate change concerns.

[132] Erik Jensen m.fl., Miljøforkæmpere: Et langt spor af problemer følger med australsk minegigants entre i Grønland, Altinget, 3. november 2020: Miljøforkæmpere: Et langt spor af problemer følger med australsk minegigants entre i Grønland - Altinget - Alt om politik: altinget.dk

[133] According the Greenlandic newspaper Sermitsiaq, one of these former Deputy Ministers was provided with stock options potentially worth 3 billion DKK (400 million EUR) by GML, corresponding to 3 percent of the company's share value, cf. Trine Juncher Jørgensen, En guldrandet forretning, Sermitsiaq No. 14, s. 42-44, 9. april 2021: Sermitsiaq Uge 14 2021 - Sermitsiaq.AG eAviser

[134] Tim Treadgold, Trump Might Want to Buy Greenland But His Nemesis, China, Is There Before Him, Forbes, 19 August, 2019: http://kortlink.dk/forbes/22rfp

[135] Berlingske: Afsløring: Her er det sprængfarlige dokument, der lokkede TV 2 på afveje, 24. juni 2021: Afsløring: Her er det sprængfarlige dokument, der lokkede TV 2 på afveje (berlingske.dk)

[136] The projected activities at Kvanefjeld are listed several places in the Convention's Appendices 1 and 3 and in addition to be the by far biggest and potentially most polluting industrial project in the history of the Danish Kingdom, it will according to the EIA report increase Greenland's current total CO^2 emissions by 45 per cent. Link to the Espoo Convention: More on the Convention | UNECE

However, even before the uranium ban was reinstated, GML made it clear that it did not expect the ban to have any substantial impact on the continuation of the Kvanefjeld project[137]. The company portends that it intends to seek compensation and damages for expropriation, if the project is stopped[138].

Lessons learned.
It seems evident from the above-mentioned, that if the political and administrative decision-making in the mining sector, in this case primarily in regard to uranium mining, does not include involvement of civil society, opposition from the public is not likely to go away. Instead, it could – like in the case described here – develop into a major and even dominating political issue at the national level and transform elections into referendums on uranium mining. It is equally clear that T&PP in Greenland would benefit by ratification of the Aarhus Convention and a stricter interpretation of the Espoo Convention[139]. T&PP in Greenland's mineral sector would also improve by adoption of the United Nations' Convention Against Corruption. This could help establish firm boundaries between the licensing authority and the mining companies and prevent conflicts of interest by imposing appropriate restrictions on the professional activities of former public officials and on their employment by the private sector after their resignation or retirement.

Also, it should be possible to annul prospecting, exploration and exploitation licences if a licence holder violates Greenland's penal code, tries to manipulate the licensing process, unduly influence the decision-making, or undermine local and general elections in order to facilitate mining projects. Vetting of licence applicants should be mandatory and whistle-blower protection should be introduced as a tool for fighting corruption as well as for transparency and access to relevant information by the public. Finally, in regard to large-scale mining projects, it could be argued that local communities should have the right to free prior and informed consent, including a right to say no to mining projects[140].

[137] NGO-press release: Green NGOs Publish Transcript from Kvanefjeld Owner's Annual General Meeting, 4 June 2021: Green NGOs Publish Transcript from Kvanefjeld Owner's Annual General Meeting | NOAH
[138] GML Company Announcement March 23rd, 2022: IMUMR Flotation Success (weblink.com.au)
[139] If Greenland joined the EU, the Aarhus Convention would automatically be considered "hard law" not least qua the implementation of Directive 2003/4/EC on public access to environmental information and Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment and subsequent EU legislation into Greenlandic law.
[140] For further information, see: Position Paper by NOAH Friends of the Earth Denmark, SustainableEnergy and Grup de Cientifics i Tècnics per un Futur No Nuclear / Group of Scientists and Engineers for a Non-Nuclear Future on a Proposal for a Greenland Parliament Act to Ban Uranium Prospecting, Exploration and Exploitation, 31 July 2021: Position paper on uranium bill 2021-07-31.pdf (noah.dk)

Institutional mechanisms in France to facilitate transparency and public participation in RWM.
Benoît Jaquet, general secretary of the CLIS of Bure

The management of HLW and ILW in France since 1991: context
Since 1991, there have been 3 steps: 1991-2005, 2006-2013 and 2016-2021 with each time a law, a public enquiry and a public debate related to RWM in France.

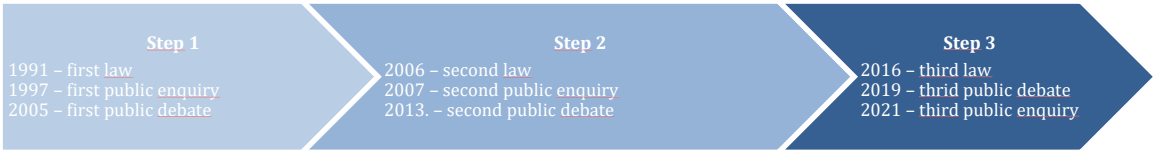


Figure 14 - Different historical steps of the French sitting process for GDR

Step 1 (1991-2005)

- *In 1991, the first law*

The 1991 Long-Lived Radioactive Waste Management Law constitutes the first law debated by the French National Assembly regarding the nuclear program. It:

- provides for 15 years of research in three areas: separation-transmutation, geological disposal, conditioning, and long-term surface storage;
- creates ANDRA[141] as a public agency detached from the CEA[142], in charge of waste management, the National Evaluation Commission in charge of evaluating each year the progress of research on the three tracks;
- provides for preliminary research in underground laboratories for geological disposal, where monitoring and information bodies (CLIS[143]) and bodies to manage the accompanying funds (GIP, public interest grouping) must be created;
- is looking forward to the adoption of a new law in 2006 based on the results of the research.

A decision of the Conseil d'Etat[144], referred to by citizens of the Meuse department in 1998, validated the process of siting for an underground laboratory despite the conclusions of the "Commissaire du Gouvernement" proposing the cancellation of the entire procedure for insufficient consultation.[145]

In the end, only one site was selected (Bure), although the law did refer to laboratories in the plural. It should be noted that all candidate departments (Vienne, Gard, Meuse, and Haute-Marne, the latter two being combined into a single site from 1995 onwards) have benefited since 1994 from accompanying funds.

- *In 1997, first public enquiry*

This first public enquiry was for the request of authorisation to install and operate a laboratory.

[141] *Agence Nationale pour la gestion des Déchets Radioactifs (ANDRA*) – National Agency for Radioactive Waste Management.
[142] *Commissariat à l'énergie atomique et aux énergies alternatives (CEA)* – French Alternative Energies and Atomic Energy Commission.
[143] 34 CLIS are forming the ANCCLI – National Association of Local Information Committees and Commissions.
[144] The *Conseil d'Etat* is the supreme administrative court of the whole system of administrative justice in France. The *Rapporteur public* (formerly *Commissaire du Gouvernement*) provides the hearing with an independent opinion on the questions raised by the case.
[145] Archive publicly available at the CLIs of Bure

This request (DAIE) was submitted by ANDRA at the three candidate sites, which also gave rise to consultation of the local authorities concerned (regions, departments, and communes).

Back in 1999, with two decrees, one creating the CLIS, the other authorising ANDRA to build and operate the lab. The advantage of the CLIS is that it has substantial financial resources (allowing it to call on non-institutional experts, for example), and that it includes among its members associations opposed to the project, which provides a pluralistic space to enhance dialogue and debate on the project (and if it does not participate directly in the decision-making process, it can have an influence).

- *In 2005, first (national) public debate*

This first debate was not on the project, but on the management of radioactive materials and waste. This national debate was preceding the discussion in the Parliament (2006 date given by the 1991 law). The conclusions of this debate recommend the implementation of a National Plan for the Management of Radioactive Materials and Waste (PNGMDR), and the continuation of research on long-term surface or subsurface storage as an alternative to geological disposal.

Step 2 (2006-2013)

- *In 2006, second law*

This law confirms the implementation of the PNGMDR, but makes geological disposal the reference solution, the idea of an alternative solution seeming to be definitively ruled out. On the other hand, if the principle of geological disposal is confirmed, and if it is clearly stated that such a disposal could only be authorised in the vicinity of an underground research laboratory, the law gives additional time for this research (it should be noted that the construction of the laboratory was only completed in 2005).

- *In 2007, second public enquiry*

This new enquiry aimed to extend the authorisation to operate the Bure laboratory until 2030.

- *In 2013, second public debate*

This time the debate was local and solely on the geological disposal project. It was supposed to take place before ANDRA submits the license application, initially planned in 2015. The opponents' associations decided to boycott it, believing that, in view of the scant regard in which the Parliament held the conclusions of the 2005 debate, it served no purpose other than to endorse the project by suggesting that the public had been involved.

Step 3 (2013-2021)

- *In 2016, third law*

The main purpose of this law is to define reversibility, to restore a timetable from 2006 that had become obsolete, and to introduce a pilot industrial phase (mentioned in the 2013 debate) before any industrial exploitation of the geological disposal.

- *In 2019, third national public debate on the PNGMDR*

Finally, the third national public debate on the PNGMDR held in 2019 resulted in proposals from the Ministry of Ecological Transition in terms of governance (in particular, the creation of a pluralistic instance for the PNGMDR, called "*Commission Orientations*"). It also acted that PNGMDR would take into account the geological disposal project, which had been proceeding in a parallel and autonomous manner until then.

- *In 2021, third public enquiry*

This final public enquiry to date has just been completed in 2021 and was dedicated to a request from ANDRA of a declaration of public utility (DUP) of the geological disposal project. This procedure included a review of the Environmental Authority and a consultation of the local communities.
Finally, the decree recognising the public utility of the geological disposal project was issued on 8th of July 2022.

A fourth public enquiry is planned in four or five years, as part of the process of the license application expected from ANDRA in 2022. This will open a review process by the Nuclear Safety Authority (ASN), assisted by IRSN, which should last at least three years. The license application process will include, as already indicated, a new public enquiry, consultation of the concerned communities, a review from the CNE[146], and a report from the OPECST[147]. Beyond that, if the license is granted (by decree), a new law is planned at the end of the pilot phase to decide whether to continue with the repository or to stop it. As far as the support funds are concerned, they currently amount to approximately €30 million per year per department (managed by a GIP).

Very recently, in the National Commission for Public Debate's concluded from its own analyses of public debates regarding the nuclear activities in France during the last decades that "there is a constant feeling that decisions concerning nuclear power are taken without taking into account the voice of the people".[148]

Access to information, access to public participation/consultation, access to justice and access to resourcing in France

- **Access to information**

Overall, access to information has been made easier over the last twenty years (role of the ASN, opening up of the IRSN, and also, to a lesser extent, of ANDRA). For example, the last time a document was refused (list of ANDRA's land acquisitions in Meuse and Haute-Marne) was several years ago. Since then, after intervention by the CADA (Commission for access to administrative documents) and pressing requests from the CLIS, information on this point has been regularly communicated to the CLIS.

Concerning the technical information provided by ANDRA they are comprehensive but can be made of very dense and complex files (up to 3000 pages).

- **Access to participation**

Three public debates took place (2005, 2013 and 2019) but the participants from the second one started to boycott it being unhappy about how their participation had been taken into account after the first public debate. It was pointed that this participation was biased serving as a public caution in a narrowing process with one goal finding a place for a geological disposal while the discussion was broader on RWM at the beginning. The 2013 debate has been called "fake debate"[149] by some participants, the president of the CNDP[150] wrote in 2014 that this debate had illustrated the loss of trust among the population regarding those in charge.

It was also considered impossible to speak about RW without talking about nuclear energy and energy policy in general. Indeed, nuclear energy is not only considered as an industrial choice but as societal choice. Unfortunately, it was never possible to have this debate neither in 2013 nor in 2019. The public was divided by two main directions for RW one based on the faith on the actual technical possibilities

[146] *Commission nationale d'évaluation* (CNE) – national commission of evaluation
[147] *Office Parlementaire d'Evaluation des Choix Scientifiques et Techniques* - Parliamentary office for the assessment of scientific and technological options
[148] https://www.debatpublic.fr/sites/default/files/2022-02/CNDP-Eclairage-Nucleaire-16022022_3.pdf
[149] https://www.debatpublic.fr/sites/default/files/2022-02/CNDP-Eclairage-Nucleaire-16022022_3.pdf
[150] Commission National du Débat Public (CNDP) – National Commission of Public Debate

with a geological disposal solution and one based on the faith on society and its capability to find better new solutions in the future with a sub-surface disposal solution in the meantime.[151]

- **Access to justice**

The European Court of Human Right (ECHR) has condemned France for "disproportionately" restricting access to justice for Mirabel-LNE, an association opposed to the nuclear waste burial project in Bure (Meuse), the 1st of July 2021). However, for the five other associations appealing to the court, their claim wasn't considered consistent : "the Court notes that five of the six applicant associations were able to bring an action before the domestic courts which, in the context of a fully adversarial procedure, made it possible to carry out an effective review of ANDRA's compliance with its legal obligation to make available to the public information relating to the management of RW and the content and quality of the information disseminated by the agency concerning the geothermal potential of the Bure site".

- **Access to resources**

The CLIS has access to substantial financial resources (allowing it to call on non-institutional experts, for example), provided by the State (150 000 € per year) and waste producers (EDF, ORANO, CEA, each one 50 000 € per year). The support funds given to the departments are entirely dedicated to economic development.

Assessment of the transparency of the decision process for the development of a geological disposal for HLW and ILW in France

The decision process in France allowed several public and parliamentary debates and involves pluralistic organisations or instances (e.g., CLIS de Bure and *Commission orientations* for the PNGDMR). The capacity of the CLIS de Bure (linked to the financial means at its disposal) to deal with subjects that are not imposed by ANDRA, as illustrated by the 2 following examples, can notably be seen as a good practice:

- the questioning of the evaluation of the geothermal potential in the Bure region,
- the process underway for the implementation of a health reference report on the population living near the site envisaged for the geological disposal and the follow-up over time in the event of authorisation.

However, some negative aspects in the decision process in France should also be emphasised.

First, the Long-Lived Radioactive Waste Management Law in 1991 was promising, but its implementation was very disappointing as the three axes of research very quickly came down to one main axis (geological disposal), both the others (transmutation and long-term storage) being only considered as complementary to geological disposal. The method chosen for the search for candidate sites for a laboratory is also open to criticism from the point of view of consultation as the decision of the *Conseil d'Etat* did not follow the conclusions of the *Commissaire du Gouvernement* (see above). It should finally be noted that the other candidate departments (Vienne and Gard) have only benefited of a rather derisory amount (5 million francs per year per department) while waiting for something better to come along, and which are, for Meuse and Haute-Marne in any case, the only reason for applying.

Then, considering the adoption of laws in 2006 and 2016 by the French Parliament, it is worth noting that these texts have been voted without any real debate as they were adopted at the end of the evening, with almost empty assemblies.

Finally, regarding the public inquiry completed in 2021 in the frame of declaration of public utility (DUP) of the geological disposal project, even if the procedure met the requirements of a public consultation,

[151] https://www.debatpublic.fr/sites/default/files/2022-02/CNDP-Eclairage-Nucleaire-16022022_3.pdf

provision of information, and even the possibility of appeal to a court (with the opinion of the Environmental Authority), it resulted in practice with very dense and complex files and a very limited public participation. The opinion of local authorities is only consultative (several local authorities, particularly those close to the pro-posed storage sites, have issued unfavourable or favourable opinions with reservations), and the conclusions of the inquiry commission seems to be always favourable to the project, even if they are sometimes accompanied by reservations.

In conclusion, the examples pointed out above seem to show the very low impact of these procedures on the decisions taken, and the conclusion of the National Commission for Public Debate that “there is a constant feeling that decisions concerning nuclear power are taken without taking into account the voice of the people” is hard to contradict.

Lessons learnt & recommendations.

- Avoid any refusal to communicate documents, which can be seen as doubly negative: on the one hand, it leaves room for all kinds of interpretations concerning the reasons for this refusal or the information contained in these documents, and on the other hand, it creates mistrust, even distrust, towards the organisation in question (knowing that more and more often, the documents will finally be communicated)
- A clearly defined legal framework (even if it can evolve) and procedures ensuring that it is respected by all actors are necessary to enhance transparency.
- Participation of the public (or its representatives, or stakeholders) and access to pluralist information require financial means that must be guaranteed in the long term.
- Participation in the decision-making process must be useful and acknowledged: a decision taken after consultation must indicate how it has taken account of this consultation, or why it has not taken it into account, in whole or in part.

It would be good to have permanent working groups, at both local and national levels, bringing together all the players, of the CLIS type (local) and the PNGMDR "Orientations" commission (national) with the means, and with the missions to discuss all aspects of the project (technical or not), a bit like the "clarification of controversies" promised by the CPDP of the PNGMDR, and to make proposals or give opinions throughout the process.

Figure 15 - View of the CIGEO laboratory

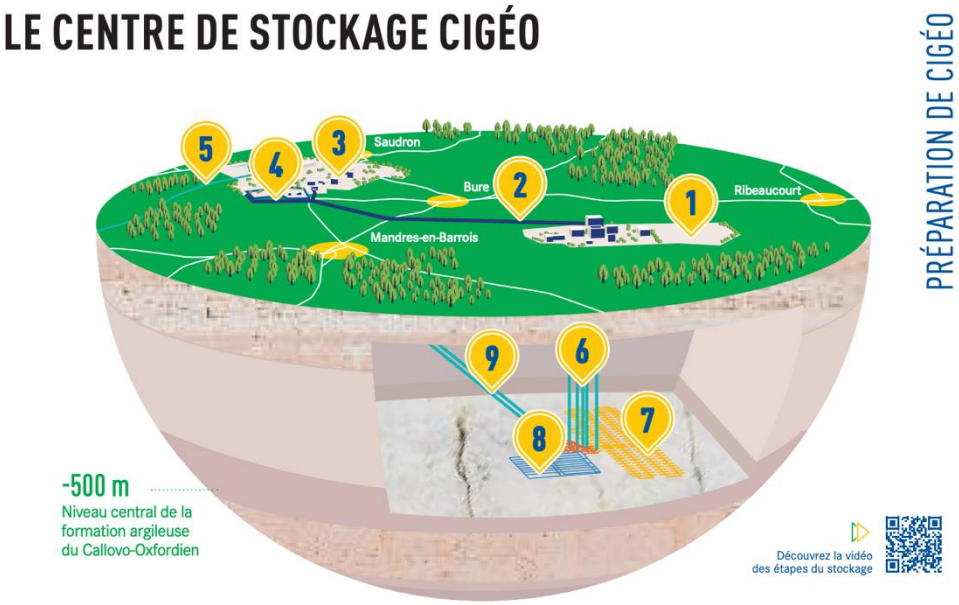


Figure 16 - Sketch of the CIGEO laboratory

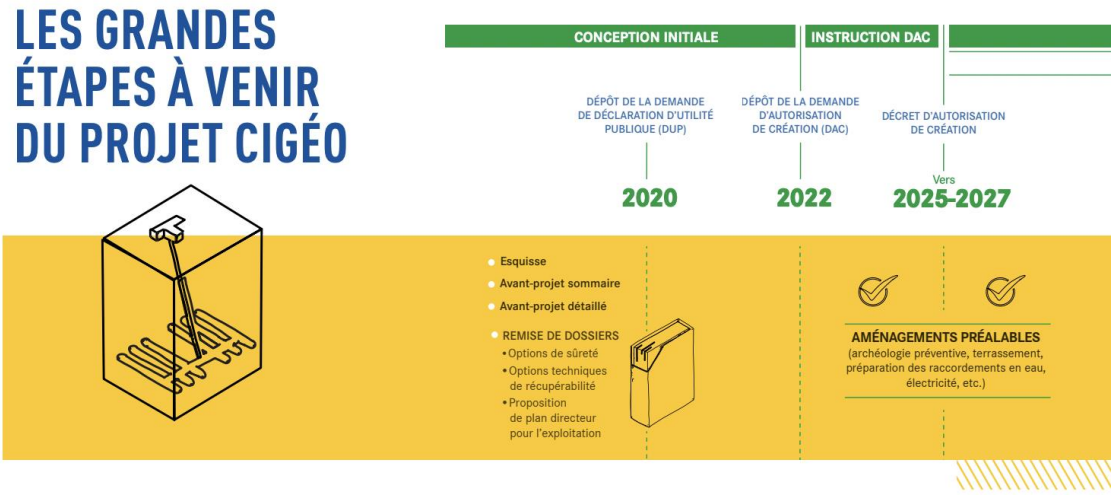


Figure 17 - Next steps foreseen by ANDRA until 2030

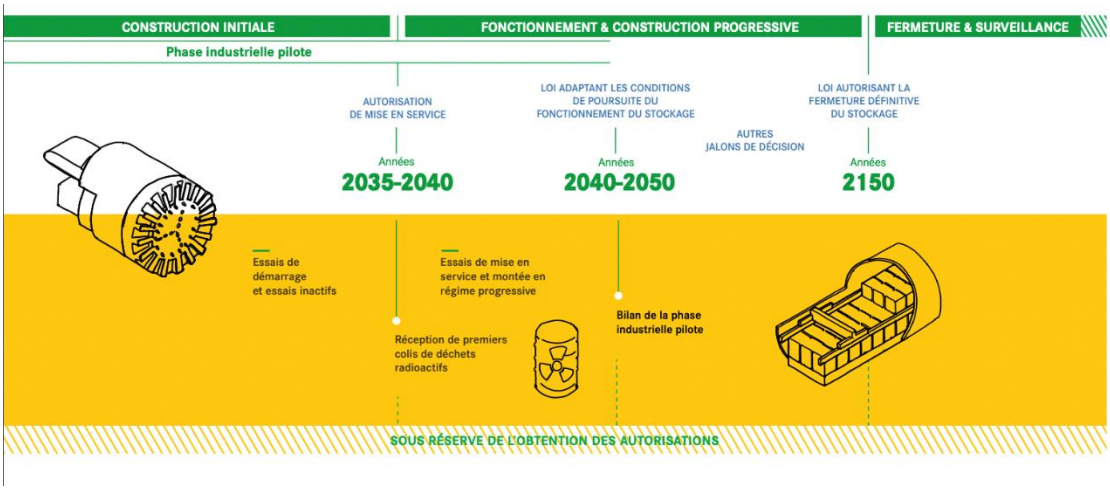


Figure 18 - Next steps foreseen by ANDRA after 2030

Institutional mechanisms in the Netherlands to facilitate transparency and public participation in RWM152

Jan Haverkamp, senior expert nuclear energy, and energy policy at WISE Netherlands and Greenpeace Netherlands

Nuclear waste management in the Netherlands

The Netherlands started nuclear research in the mid-1950s. In 1955, the Reactor Center Netherlands in the dunes near the village of Petten, 50 km North of Amsterdam, was opened. In 1960, the High Flux Reactor started operations on that site, and a year later, a research reactor was started at the Technical University of Delft. Three more research reactors operated (in Wageningen, Arnhem and Petten) that have since closed. In 1968, the Dodewaard nuclear power station was connected to the grid, followed in 1973 by the nuclear power station Borssele. Dodewaard closed in 1997, fuel was removed, and the reactor mothballed for a cooling period of 45 years.

RW was initially from 1958 centrally stored at the Reactor Centre Netherlands, the location of the HFR in Petten.

In 1966 some spent fuel was sent to Eurochemic in Belgium (Dessel/Mol) for reprocessing. From 1978 to 1997, there were contracts with the United Kingdom for reprocessing of spent fuel in Windscale / Sellafield, from 1979 with France for reprocessing in La Hague. These latter two contracts included a returning clause for residual waste or a radiation equivalent in vitrified high-level waste.

In 1976, it was announced that the Netherlands would build a deep geological disposal in salt layers in the North-East of the country. This led to enormous protests, both locally and nationally. Parallel, the government carried out a so-called Broad Social Debate (*Brede Maatschappelijke Discussie or BMD*) in which the position of nuclear energy in the Netherland was to be discussed. After receiving a highly critical end-report, the Government decided to ignore the BMD and decided for an expansion of nuclear power. This did not happen because of Chernobyl (1986) and a second attempt ended with Fukushima (2011).

[152] This overview is based on two recent reports:
Berkers, Eric, Dhoya Snijders, Rinie van Est, Aanvang van het radioactief-afvaltijdperk - Besluitvorming in Nederland van 1939 tot 2011 – concept versie, Den Haag (2019) Rathenau Instituut – this has not been published on the internet, but may be obtained from info@rathenau.nl or the author (jan@wisenederland.nl)
Damveld, Herman, Plannen Opslag Kernafval in Zoutkoepels of Kleilagen, een Overzicht van 1960 tot 2021, Groningen (2021), WISE Nederland; https://wisenederland.nl/wp-content/uploads/2020/04/PLANNEN-OPSLAG-KERNAFVAL-IN-ZOUTKOEPELS-OF-KLEILAGEN-EEN-OVERZICHT-VAN-1960-TOT-2021-2.pdf

Figure 19 - Sea dumping of radioactive waste was halted in 1982 after strong protests.

In 1960, the Netherlands started dumping low- and mid-level RW in the ocean. Under heavy protests from among others the trade union FNV, the anti-nuclear group BAN (Break Atomic Chain Netherlands) and Greenpeace, this practice was halted in 1982.

In order to take the heat out of the nuclear waste debate, Government set up the commission Location Choice Storage Radioactive Waste (Dutch acronym LOFRA) in 1982, which, in 1986, chose the location Borssele, next to the nuclear power station, for a central RW storage. The location was chosen on the basis of lowest public resistance.[153] The Central Organisation for Radioactive Waste (Dutch acronym COVRA) in the end of 1982 took over the task of management of RW and opened the COVRA waste storage in 1991. COVRA was initially owned by the GKN (owner of the Dodewaard nuclear power station) 30%, PZEM (owner of the Borssele nuclear power station) 30%, ECN 30% and the Dutch state 10%. Since 2002, it is 100% state owned and falls under the Ministry of Finance.

In 2003, a specialised storage for high-level waste, the HABOG (High radioactive Waste Management and Storage Building) became operational. Here the vitrified waste returning from the UK and France is stored. HABOG has a foreseen operational time until 2130. It currently stores around 110 m^3 high-level waste.[154] 19 May 2022, the HABOG was expanded to create 50 m^3 extra capacity that had become needed because of the prolonged lifetime of the Borssele nuclear power station from 2013 to 2033.[155] COVRA furthermore operates a storage for low-level and intermediate-level waste (LOG), for containers (COG) and two storage buildings for depleted uranium (VOG and VOG-2). A multifunctional storage facility for low- and mid-level waste (MOG) is under preparation.

[153] Berkers, Eric, Dhoya Snijders, Rinie van Est (2019), page 112
[154] https://www.covra.nl/en/project/habog/
[155] https://www.covra.nl/nl/organisatie/nieuws/uitbreiding-opslaggebouw-hoogradioactief-afval-geopend/

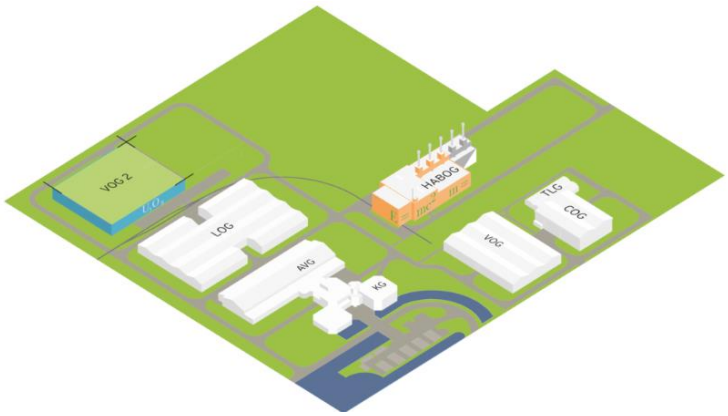


Figure 20 - The lay-out of the COVRA storage facility

In management governance terms, it is possible to see that the Dutch political establishment considers since 1982 the RW problem solved. There is interim storage of high quality for at least 100 years. The issue receives less attention.[156]

After the adoption of the radioactive waste directive 2011/70/Euratom by the European Council and the European Commission, the European Commission pointed out that the Dutch strategy to shift the problem of final disposal to the end of the century did not comply with the principle of responsibility for the beneficiary generation.[157] At the same time in a first reaction, COVRA worked out the OPERA programme with financing from Borssele operator EPZ and the Dutch Ministry of Economy, producing a report with an inventory of knowledge about the potential of clay for deep geological disposal. This report, however, was explicitly not meant to speed up the search for a final solution but falls within the schedule set by the government. This is confirmed in the 2016 national programme that was produced for the European Commission under 2011/70/Euratom. The Commission EIA, an advisory body, remarks that the plan is based on an optimistic future scenario, in which the money is secured, and a certain harmony exists in which location search and implementation can be carried out. The Commission EIA does not share that optimism and makes recommendations for steps to be taken in short term to get more hold on uncertainties.[158]

The Government decided on the basis of the national plan of 2016 to set up a so-called reflection group to include the public in the discussions around RW. After yet another advisory report from a so-called preparer (*kwartiermaker*),[159] this reflection group was not installed. Instead, the Government asked the *Rathenau Instituut* (a think-tank) in 2019 to carry out a broad discussion about nuclear waste storage and disposal and come with another report in 2024.[160]

---

[156] This is a summary of opinions that re-appear in Government letters to the Parliament throughout the period 1982 to 2022. This is also in the referred literature repeated as reason for the lesser political and public attention received since the large protests in Groningen and Drenthe around potential deep geological disposal in salt layers in the 1980s.

[157] https://www.laka.org/nieuws/2021/europese-commissie-escaleert-conflict-met-nederland-over-gebrekkige-omgang-met-kernafval-15526

[158] Commissie m.e.r., *Nationaal uitvoeringsprogramma voor langetermijnbeheer van radioactief afval en verbruikte splijtstoffen - Toetsingsadvies over het ontwerpprogramma, 26 november 2014, projectnummer 2842*, the Hague (2015); page 1-2; https://www.commissiemer.nl/docs/mer/p28/p2842/a2842ts.pdf

[159] https://www.autoriteitnvs.nl/actueel/nieuws/2018/05/14/rapport-klankbordgroep-eindberging-radioactief-afval-naar-de-kamer

[160] https://www.rathenau.nl/nl/dossier-advies-besluitvormingsproces-toekomst-radioactief-afval#:~:text=De%20staatssecretaris%20van%20Infrastructuur%20en,Nederland%20eruit%20zou%20kunnen%20zien.

In the meantime, the discussion about new nuclear capacity in the Netherlands has burst out. After a popular comical TV news programme on "the taboo on nuclear energy" in October 2018, several political parties and pro-nuclear organisations knew to spur a hot social debate, demanding new nuclear power stations – generation III+ and/or SMRs, especially thorium molten salt reactors. This discussion started to overshadow many other climate debates in the country.

After the parliamentary elections of March 2021, there is a majority in parliament in favour of new nuclear and the new government took up in its government declaration to want to extend the lifetime of the Borssele nuclear power plant, facilitate the construction of two new nuclear power stations and *"We will also take care for safe, permanent storage of nuclear waste".*[161] The nuclear waste discussion, however, continues on a low level around the process that the *Rathenau Instituut* is implementing with a five-year time frame. The debate received some pressure from the discussions around the Delegated Act from the European Commission to include nuclear and gas into the Taxonomy on Sustainable Financing, where the Commission introduces a criterium into the Act in which Member States have to have solid plans that can lead to a deep geological disposal for high-level waste before 2050. Minister Jetten of Climate Policy remarks, however, that this is unfair, because the problem in the Netherlands is already solved with its temporary storage for 100 years, and that the Netherlands will try to change the criteria in the Taxonomy in the coming years.[162]

Access to information, public participation, access to resources and justice

- **Access to information**

Access to information was in the Netherlands organised under the Law on Public Governance (*wet openbaarheid bestuur – wob*), recently changed into the Law on Open Government (*wet open overheid - woo*).[163] This, in principle, implements the rights on access to information as formulated in the Aarhus Convention and the EU Aarhus Directive. COVRA was owned by the GKN (owner of the Dodewaard nuclear power station) 30%, ECN 30% and the Dutch state 10%. Since 2002, it is 100% state owned and falls under the Ministry of Finance.

There are not many civil society organisations in the Netherlands active on RW issues at the moment. The main actors are the Dutch NGOs LAKA, WISE Nederland and Greenpeace Nederland. Sometimes there is also interest from the provincial Nature and Environment Federations (e.g., in the provinces of Zeeland, Brabant, Groningen en Drenthe) and some individual civil society experts (e.g., Herman Damveld,[164] Peter Löhnberg[165]). Besides that, there are some groups that are directly related with nuclear institutes (like NRG in Petten, COVRA) that follow the issue actively.

Over the last years, there has been an ongoing controversy about the position of the waste management organisation COVRA. The Dutch NGO LAKA (National Anti-Nuclear Archive), filed in 2019 an access to information request under the *wob* into the research programme of COVRA, after it had obtained information from the state technical support organisation RIVM about some of this research. From this documentation, it appeared that COVRA had no intention to involve civil society or the public in its research programme. LAKA therefore wanted to have access to the full documentation to see how important questions still could find their way into the programme.

[161] https://open.overheid.nl/repository/ronl-f3cb0d9c-878b-4608-9f6a-8a2f6e24a410/1/pdf/coalitieakkoord-2021-2025.pdf

[162] https://archief28.sitearchief.nl/archives/sitearchief/19961231235959/https://www.rijksoverheid.nl/binaries/rijksoverheid/documenten/kamerstukken/2022/04/20/kamerbrief-appreciatie-eu-taxonomie-ten-aanzien-van-kernenergie-en-aardgas/kamerbrief-appreciatie-eu-taxonomie-ten-aanzien-van-kernenergie-en-aardgas.pdf

[163] https://www.rijksoverheid.nl/actueel/nieuws/2022/05/01/woo-regelt-recht-op-overheidsinformatie

[164] https://wisenederland.nl/wp-content/uploads/2020/04/PLANNEN-OPSLAG-KERNAFVAL-IN-ZOUTKOEPELS-OF-KLEILAGEN-EEN-OVERZICHT-VAN-1960-TOT-2021-2.pdf

[165] http://kernafvalstraling.nl/

However, although COVRA is a 100% state entity, it claims that it does not fall under the rules for access to information. In 2021, LAKA lost its access to information request in the Court of Amsterdam, which argued that COVRA is *"not an institution, service or company that works under the responsibility of an authority, as meant in art. 3 of the Act on Access to Information (WOB) and the Aarhus Convention".* The Court argues that it is therefore not possible to do a request for information on COVRA's research plans for final deposition of RW under the Act on Access to Information.[166] This is a strange judgement, because COVRA is a fully state-owned entity, under full oversight of a state authority, with a monopoly position on a market (radioactive waste management) that should be considered a public service. It defines its responsibility towards the state as a state company, implementing policies of the Netherlands and responsible for the waste strategy from collection to final disposal. Its activities are overseen by the Dutch nuclear regulator ANVS, an independent state authority. Hence, COVRA falls under the Aarhus definition of a "public authority".[167] The positioning of COVRA as not falling under the obligations of the Aarhus Convention severely hampers access for citizens to a lot of RW information. LAKA has appealed the court decision and has asked the final administrative appeal body, the Council of State (*Raad van State – RvS*), to ask prejudicial questions on the matter to the European Court of Justice. This is still pending.

Parallel to this case, LAKA requested insight into the transparency of the tariffs of COVRA[168], because it is not clear whether the "polluter pays'' principle indeed is fully implemented in the case of RW from nuclear power stations, or whether there are structures in place (state investments and/or cross-financing mechanisms over other waste categories) that reduce the costs for the owner of the Borssele nuclear power station, EPZ. This, in LAKA's opinion, would constitute illegal state aid. COVRA, however, hides again behind its status as an independent company, even though it holds a monopoly position on this public service. LAKA has submitted a complaint to the European Commission, which started an investigation into illegal state aid, but this was without further explanation dropped in September 2020.

In both cases, COVRA and the Dutch state worked closely together. In the access to information case, COVRA was supported by the official law office from the state, and there was close cooperation between the Ministry of Infrastructure and Water, the nuclear regulator ANVS and COVRA in responding to the questions from the European Commission on state aid.

- **Public participation**

Public participation is incorporated in different laws. For RW, the most relevant laws are the Environmental Protection Law (*wet milieubescherming – wmb*), and the Regulation EIA (*besluit mer – bmer*). Large infrastructural projects have to be submitted to public participation under the uniform public preparation procedure (*uniforme openbare voorbereidingsprocedure – uov*). There is currently some confusion about the implementation of the Aarhus Convention concerning changes to activities. Changes to nuclear activities, different from wind farms or thermal power plants, under the Dutch EIA regulation do not automatically require public participation on the environment or an EIA, but only if the relevant ministry concludes that there will be significant negative impact on the environment. This goes against the obligations under the Aarhus Convention, that only knows such an assessment of potential impacts for

[166] https://www.laka.org/nieuws/2021/rechter-kernafvalbeheerder-covra-valt-niet-onder-de-wob-15098

[167] According to findings from the Aarhus Convention Compliance Committee in case ACCC/C/2004/1 Kazakhstan, par. 17, "*a legal person performing administrative functions under national law, including activities in relation to the environment, and performing public functions under the control of a public authority [, which] is also fully owned by the State [...] falls under the definition of a "public authority", as set out in article 2, paragraphs 2 (b) and 2 (c).*" https://unece.org/fileadmin/DAM/env/documents/2005/pp/c.1/ece.mp.pp.c1.2005.2.Add.1.e.pdf

[168] https://www.laka.org/nieuws/2021/europese-commissie-onderzocht-financiering-covra-na-staatssteunklacht-laka-14914

activities that do not fall under its Annex[169], and even for such cases it does not matter whether these impacts are positive or negative, as long as they are potentially significant.[170] Even more, under art. 6(10) of the Convention, all extensions or updates of activities under the Annex need to be submitted to public participation "when appropriate". That means that only in cases where it is highly unlikely that significant impacts will take place – very short extensions of operation, marginal updates – public participation is not deemed appropriate.[171]

In response to findings of the Aarhus Convention Compliance Committee in a case concerning the lifetime extension of the Borssele nuclear power plant (ACCC/C/2014/104[172]), the Dutch government is currently working on a plan of action to come into compliance with these obligations. It is not clear whether the proposed changes in legislation will also cover similar issues around RWM, though they appear to be applicable to changes in the duration of operation of all nuclear installations. On the basis of another communication, currently under assessment by the ACCC, ACCC/C/2021/187, it is likely that those proposals from the Netherlands will have to be adapted to a broader interpretation of art. 6(10) of the Aarhus Convention and will have to encompass all extensions and updates to nuclear installations, and not only those concerning duration of operation.[173]

In general, there is a lack of system in how Dutch authorities deal with public participation around RW issues. COVRA's research plans are not subject to any public participation, although programmes and plans normally should be submitted to a strategic environmental assessment (SEA) under the Kiev Protocol to the Espoo Convention and the EU SEA Directive (Directive 2001/42/EC) and art. 7 of the Aarhus Convention, but COVRA does not consider itself falling under the definition of an authority. Of course, projects, like the recent extension of the HABOG, are submitted to an EIA, but this does not address the wider framework of RW policy.

After the initial proposal for a stakeholder-wide reflection group on the issue of RWM, the Ministry has now fallen back to a five-year study by the think-tank *Rathenau Instituut* into the decision procedures around RW issues.[174] This study does have some limited interaction with stakeholders, but it is not public participation as prescribed under the Aarhus Convention.

- **Access to resources**

One of the central issues that was added in NTW's BEPPER report on the basis for good practice in transparency and civil society involvement around RW, is that of access to resources.[175] This is based on Aarhus Convention art. 3(4), which obliges Parties to *"provide for appropriate recognition of and support to associations, organisations or groups promoting environmental protection and ensure that its national legal system is consistent with this obligation."*[176] The BEPPER report argues, with concrete

[169] Aarhus Convention, art. 6(1a,b); https://unece.org/DAM/env/pp/documents/cep43e.pdf
[170] Aarhus Convention Compliance Committe, *Report of the Compliance Committee on general issues of compliance*, Geneva (2021), adopted by UNECE 7th MoP of the Aarhus Convention, paragraph 56: *"it is immaterial that, if the operating conditions are updated, the updated conditions could in some respects have a beneficial effect on the environment, human health and safety. The crucial point is whether the reconsideration or update is "capable of" changing the activity's basic parameters or will "address" significant environmental aspects of the activity."*; https://unece.org/sites/default/files/2021-10/ECE.MP_.PP_.2021.45_ac.pdf
[171] Ibidem, paragraphs 53 to 56.
[172] https://unece.org/env/pp/cc/accc.c.2014.104_netherlands
[173] https://unece.org/env/pp/cc/accc.c.2021.187_netherlands
[174] https://www.rathenau.nl/nl/dossier-advies-besluitvormingsproces-toekomst-radioactief-afval
[175] Swahn, Johan, e.a., *Transparency in Radioactive Waste Management*, Brussels (2015) Nuclear Transparency Watch, page 9 "Effective access to resources"; http://www.nuclear-transparency-watch.eu/wp-content/uploads/2016/04/NTW_Transparency_in_RWM_BEPPER_report_December_2015.pdf
[176] UNECE Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention): https://unece.org/DAM/env/pp/documents/cep43e.pdf

examples of best practice, that in order to create a level playing field for civil society in decision procedures around RW, resources, including financial resources, should be considered a basic right for civil society to be able to properly participate.

As already mentioned above, the basis in civil society that is currently involved in RW issues is extremely narrow in the Netherlands: LAKA, WISE and Greenpeace only have a few people dealing with nuclear issues in general, there are only a few more individual former nuclear waste activists still following the portfolio. LAKA is keeping a rather comprehensive archive of all reports and studies that are produced on the issue in the Netherlands, available for active citizens.[177] This is all funded with scant private donations. Also, involvement in dialogue discussions, like those from the *Rathenau Instituut*, is done on own cost. Next to some industry-related pro-nuclear groups that also are active here and there in issues around RW, over the last five years a few vocal pro-nuclear initiatives were established - e.g. the eco-modernist RePlanet foundation and several satellite initiatives. However, these latter have not played a significant role in the debate around RW so far.

WISE, Greenpeace and LAKA plead in the *Rathenau Instituut* discussions[178] for similar structures as can be found in Sweden, France or Germany, where active citizen initiatives receive funds from the RW fund or otherwise independent financial structures to enable them to deliver quality citizen expertise or, when appropriate, can hire independent expertise.

- **Access to justice**

As described above, there are problems with access to justice considering access to information from COVRA. There is little experience with access to justice in cases of public participation, because policy development on RWM has basically been put on hold since the decisions on COVRA and the temporary storage for at least 100 years.

Experiences with access to justice show, however, that there exists a barrier for environmental organisations, because they tend to be small and even the very modest court fees can be problematic. Organisations with very low budgets can receive *pro-deo* legal support, but even a small and relatively poor organisation such as WISE is not eligible for that. The result is that access to court on RW issues is still rather rare.

Lessons learned.
RWM policy in the Netherlands, and especially management of high-level and long-lived RWs, can basically be characterised as “kicking the can down the road”. In order to squelch high-running debates in broader society on deep geological disposal plans in salt-layers in the North of the country in the early 1980s, the government decided for long term interim storage until 2130 and taking decisions only in 2100. This remains unsatisfactory – both in relation to the issue of responsibility of those benefiting, as

[177] https://www.laka.org/docu/

[178] No author, Langdurig beheer van radioactief afval - Een verkenning van governancekwesties - Versie ter consultatie. Den Haag (2020) Rathenau Instituut.
Berkers, Eric, Dhoya Snijders, Rinie van Est, *Aanvang van het radioactief-afvaltijdperk - Besluitvorming in Nederland van 1939 tot 2011 – concept versie*, Den Haag (2019) Rathenau Instituut.
Haverkamp, Jan, *Zienswijze op Rathenau Instituut Langdurig beheer van radioactief afval - Versie ter consultatie - Een verkenning van governancekwesties*, Amsterdam (2020) WISE Nederland and Greenpeace Nederland.
These documents can be obtained from jan@wisenederland.nl
It has to be noted that the *Rathenau Instituut* until now has not published its own materials, nor the input from consulted stakeholders, including that from civil society. This is illustrative of the level of transparency in which the Dutch tradition of poldering – finding compromise solutions with a wide but limited group of stakeholders – functions.

in relation to European developments on the issue. Furthermore, in spite of the many reports and discussions, policy development is still characterised by a low level of transparency, concerning access to information (the refusal of COVRA to adhere to the basic rules of the Aarhus Convention, not publishing reports and viewpoints by the *Rathenau Instituut*), the involvement of the wider public (an ongoing chain for over 4 decades of new reports and limited meta-processes on how the public debate should be given form, but no implementation of a participative process itself), enabling the public to participate (complete lack of support mechanisms for local communities and NGOs to develop their own expertise) and access to justice (high costs).
In order to improve the situation, the following steps would be recommendable:

- Creating a governance structure of RWM that includes all stakeholders, including civil society, coordinated by an independent governance body, which ensures the necessary transparency, including access to information, public participation, access to resources and access to justice;
- Submitting COVRA to the obligations under the Law on Open Government (woo) and the Aarhus Convention in giving access to information;
- Implementing active access to information in ongoing procedures of policy discussions and development, including the work of the preparer (*kwartiermaker*) and the *Rathenau Instituut*, including also input from stakeholders;
- Enabling and facilitating local citizens and NGOs to participate in procedures by organising a support structure financed from RW funds (polluter pays), following the Swedish and French models;
- Enforcing obligations for public participation procedures (SEAs for plans and programmes, EIAs for concrete projects) for all RW policy development and implementation steps in line with the Aarhus Convention, the Espoo Convention, the EU SEA and EIA Directives and Dutch law;
- Creation of a comprehensive RW plan, as obliged under 2011/70/Euratom, with participation of all stakeholders and submitted to a SEA;
- Enabling access to justice for involved local citizens and NGOs via the above-mentioned support structures.

Institutional mechanisms in Slovakia to facilitate transparency and public participation in RWM.

Michal Daniška, civil society expert and director of the civic association Chceme zdravú krajinu

Historical context

In Slovakia there are 4 nuclear reactors in operation, 3 reactors are being decommissioned, 2 reactors are being constructed/commissioned and an additional one is planned. All these reactors are or were used for commercial production of electricity. There is no experimental nuclear reactor in Slovakia. Except for the HWGC type reactor of the oldest NPP A1, all other reactors are PWRs (VVER). There are two main nuclear localities in Slovakia – Jaslovské Bohunice and Mochovce, both in the western part of the country. There are operated nuclear reactors and RW or SNF storage and treatment facilities in both Jaslovské Bohunice and Mochovce.

The nuclear site near Jaslovské Bohunice includes the NPP A1 and V1 (both being decommissioned), NPP V2 (in operation), RW Treatment and Conditioning Technologies (RW TCT), Interim SNF storage (IS SNF), Integral RW storage (IS RW) and other nuclear installations. In addition, a new nuclear reactor is planned in this locality (EIA process completed in 2016)[179]. NPP A1, commissioned in 1972, was the first NPP in the former Czechoslovakia. Being operated only for 5 years, NPP A1 was permanently shut down after two serious accidents in 1976 and 1977[180]. Shortly after the process of decommissioning had slowly begun, continuing to these days. The core of the RW TCT was designed to ensure the process of treatment of RW produced during the decommissioning of NPP A1[181]. The NPP V1 with two VVER 440 V-230 reactors (put in continued commercial operation mode in 1980 and 1981, respectively) is being decommissioned since its shut-down in 2006 (1st reactor block) and 2008 (2nd reactor block) as a condition of accession of Slovakia into the European Union in 2004[182,183]. The operating NPP V2 includes two VVER 440 reactors of the newer type V-213 which were commissioned in 1985.

The interim SNF storage[184] is the only facility of its kind in Slovakia. After an initial period when the SNF is kept in the pools adjacent to the reactors, all SNF from NPPs both in Jaslovské Bohunice and Mochovce is collected in the IS SNF. The IS SNF consists of two parts – the "wet" section and the "dry" section. In the wet storage the SNF assemblies are stored in water pools. The water serves both as residual heat transfer medium and as a radiation shield. The wet section was commissioned in 1988 and represents the original part of the facility. After a change in geometry of storage of the SNF assemblies in 1997-2000 the capacity of the wet storage increased from 5040 to 14112 SNF assemblies. The dry section is currently under construction and once fully completed should provide storage capacity for additional 18600 fuel assemblies. The residual heat transfer is ensured by natural airflow and radiation shielding shall be provided by construction of the storage casks.

The integral RW storage[185,186] was commissioned in 2018 and serves exclusively for storage of solid or solidified RW (incl. MLW and HLW) originating from the Jaslovské Bohunice locality, i.e., from NPP A1, V1 and V2. Liquid RW or SNF or RW from other sites cannot be stored in the IS RW. IS RW has three basic functions: decay - RW contaminated with short-lived radionuclides, which can be released into the

[179] https://www.enviroportal.sk/sk_SK/eia/detail/novy-jadrovy-zdroj-v-lokalite-jaslovske-bohunice
[180] https://www.njf.sk/sprava-prostriedkov/poskytovanie-financnych-prostriedkov/vyradovanie-je/vyradovanie-je-a1/
[181] see e.g. the section "II.2. Purpose" of the EIA report of the proposed activity "RW processing and treatment technology by JAVYS, a.s. at Jaslovské Bohunice location". Available online at https://www.enviroportal.sk/sk/eia/detail/optimalizacia-spracovatelskych-kapacit-technologii-pre-spracovanie-upr
[182] https://www.javys.sk/sk/jadrove-zariadenia/jadrova-elektraren-v1/historia
[183] https://www.enviroportal.sk/sk/eia/detail/2-etapa-vyradovania-jadrovej-elektrarne-v1-jaslovske-bohunice
[184] https://www.enviroportal.sk/clanky/eia/detail/dobudovanie-skladovacej-kapacity-medziskladu-vyhoreteho-jadroveho-pali
[185] https://www.enviroportal.sk/sk/eia/detail/integralny-sklad-rao
[186] https://www.ujd.gov.sk/wp-content/uploads/2021/08/Narodna-sprava_VJP_RAO_2020.pdf, p. 35

environment after the activity decreases below the value set by legislation; balancing – short-term storage of RW (e.g. from decommissioning of nuclear installations) waiting for available treatment capacity at RW TCT and subsequent final disposal at the National RW repository in Mochovce, storage - long-term storage of RW that cannot be disposed at National RW repository in Mochovce before its final disposal in the DGR (once it is commissioned). The capacity of IS RW is limited by the total activity of its RW inventory which cannot exceed 1 x 10^{18} Bq.

The nuclear site near Mochovce includes the reactor blocks EMO 1, 2 (in operation), EMO 3 (in test operation) and EMO 4 (under construction), the installation called "*Final treatment of liquid RW*" and the National repository for VLLW and LLW (NR RW). All the reactors in Mochovce (EMO 1-4) are VVER 440 of the newer type V-213. The units EMO 1 and EMO 2 were commissioned in 1998 and 2000, respectively. The NR RW[187,188] is a surface type repository intended for storage of solid and solidified LLW and VLLW originating from operation and decommissioning of nuclear facilities in the Slovak Republic. The LLW and VLLW are disposed in separate sections. The LLW is disposed in fibre concrete containers (FCC), each with internal volume 3.1m^3, that are arranged into the so-called "double-rows". The capacity of a double rows is 3600 FCCs. Currently, 3 double rows are in operation and the fourth one is planned. Gradually, 7.5 double-rows can be constructed in total. The total capacity of the VLLW section is currently 29 000 m^3. The first double-row of the LLW section was commissioned in 2001, the first stage of the VLLW was commissioned in 2016. Both sections are being gradually expanded.

The NPPs in Slovakia, which are in operation or under construction, belong to the Slovenské elektrárne (i.e., "Slovak power plants") company. All the remaining nuclear facilities (e.g., the NPP A1, NPP V1, RW TCT, IS SNF, IS RW, NR RW, …) are owned and operated (except the NPP A1 and V1 which are being decommissioned) by JAVYS (Jadrová a vyraďovacia spoločnosť = Nuclear and decommissioning company), a state-owned stock company (the Ministry of Economy of the Slovak republic holds 100% of the company stocks). Originally, before JAVYS was founded in 2005, these nuclear installations belonged to the Slovenské elektrárne company. Prior to its privatisation in 2006 Slovenské elektrárne had been a state-owned company which operated all the power plants in Slovakia including the nuclear ones and the related infrastructure (e.g., RW and SNF management facilities). JAVYS was founded on 6th July 2005 by separating it from the Slovenské elektrárne, as one of the crucial steps before privatisation of the Slovenské elektrárne[189]. JAVYS was not a subject of privatisation and, as a result, has remained completely state-owned[190]. At the time of its founding JAVYS consisted of selected nuclear assets in which the Italian ENEL company, the winner of the business competition for privatisation of the Slovenské elektrárne, was not interested. These assets included the NPP V1 and the detached plant SE-VYZ which focused on decommissioning of the NPP A-1 and management of Slovak RW and SNF at RW TCT, IS SNF (both in J.Bohunice) and the National repository for LLW and VLLW in Mochovce. The portfolio of activities of JAVYS expanded during the following years. At the moment, JAVYS is also responsible for the project of the deep geological repository (DGR), holds the de facto monopoly position in interim storage of Slovak SNF, decommissioning and management of RW from decommissioning (§3 sec. 10 of the Atomic Act[191]) and owns 51% share of the JESS company (Jadrová energetická spoločnosť Slovenska = Nuclear energetic company of Slovakia) the objective of which is the construction of a new nuclear power plant in Jaslovské Bohunice. The installation called "Final treatment of liquid RW" in Mochovce is also operated by JAVYS. Although JAVYS is state-owned, carries out a public service and receives millions of euros from the public budget (through the National nuclear fund) each

[187] https://www.enviroportal.sk/sk/eia/detail/rozsirenie-ru-rao-v-mochovciach-pre-ukladanie-nsao-vybudovanie-ulozisk
[188] https://www.ujd.gov.sk/wp-content/uploads/2021/08/Narodna-sprava_VJP_RAO_2020.pdf, p. 39
[189] https://www.javys.sk/en/about-the-company/company-profile/history
[190] https://www.orsr.sk/vypis.asp?ID=568960&SID=7&P=1
[191] https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/2004/541/#paragraf-3.odsek-11

year, it claims not to be a liable entity according to the Slovak Freedom of Information Act and therefore not obliged to reply to public requests of information.

During the communist era the commercial nuclear programme of the Czechoslovak socialist republic (CSSR) was conducted in close cooperation with the Union of the soviet socialist republics (USSR). The corresponding bilateral agreements included supply of fresh fuel by the USSR, but only the oldest agreement for construction of the first NPP A1 from 1956 included a commitment of the USSR to accept the SNF back permanently. In the later agreements related to construction of the NPP V1 and V2 in Jaslovské Bohunice and the NPP in Mochovce from 1970 and 1980, respectively, the USSR commited only to collection of the SNF for reprocessing after an initial 3-year storage period on the territory of Czechoslovakia[192]. During the 3 years before exporting to the USSR the SNF was kept in storage pools adjacent to the reactors. However, at the beginning of the 1980s the USSR announced that it demanded an extension of the period of SNF storage on the Czechoslovak territory before its transportation to the USSR from 3 to 10 years. Therefore, a wet interim SNF storage in Jaslovské Bohunice was constructed. By February 1987, when the wet interim storage was commissioned, 697 SNF assemblies of the VVER 440 type from the V1 NPP (after 3 years of storage in Czechoslovakia) had been transported to the USSR. Until 1987 the USSR had been accepting the SNF free of charge, only the shipping costs had been paid by the CSSR. Since February 1987 all SNF produced by the Slovak VVER NPPs has been stored in the IS SNF[193]. Political changes at the turn of the 1980s and 1990s in combination with increasing prices and technical requirements led to a significant change of the view on the nuclear fuel cycle back-end stage, focusing on realisation of a deep geological repository on the territory of the former Czechoslovakia. Despite this, the entire SNF inventory of the A1 NPP (HWGC reactor; damaged and shut down after two serious accidents in 1976 and 1977) was sent to the USSR and later the Russian federation. This process was concluded in 1999[194].

History of the project of the Slovak geological disposal repository

The idea of disposal of SNF and RW in a deep geological repository began to be addressed in the former Czechoslovakia in more detail in the early 1990s. The work focused almost exclusively on geological survey and research. The dissolution of the Czechoslovak federative republic into two independent successor states, the Czech Republic and the Slovak republic in 1993 led to a corresponding split in the DGR project. Each of the new states continued on its own, with its own institutions searching for two DGR sites in each of the republics instead of a common site within the federation.

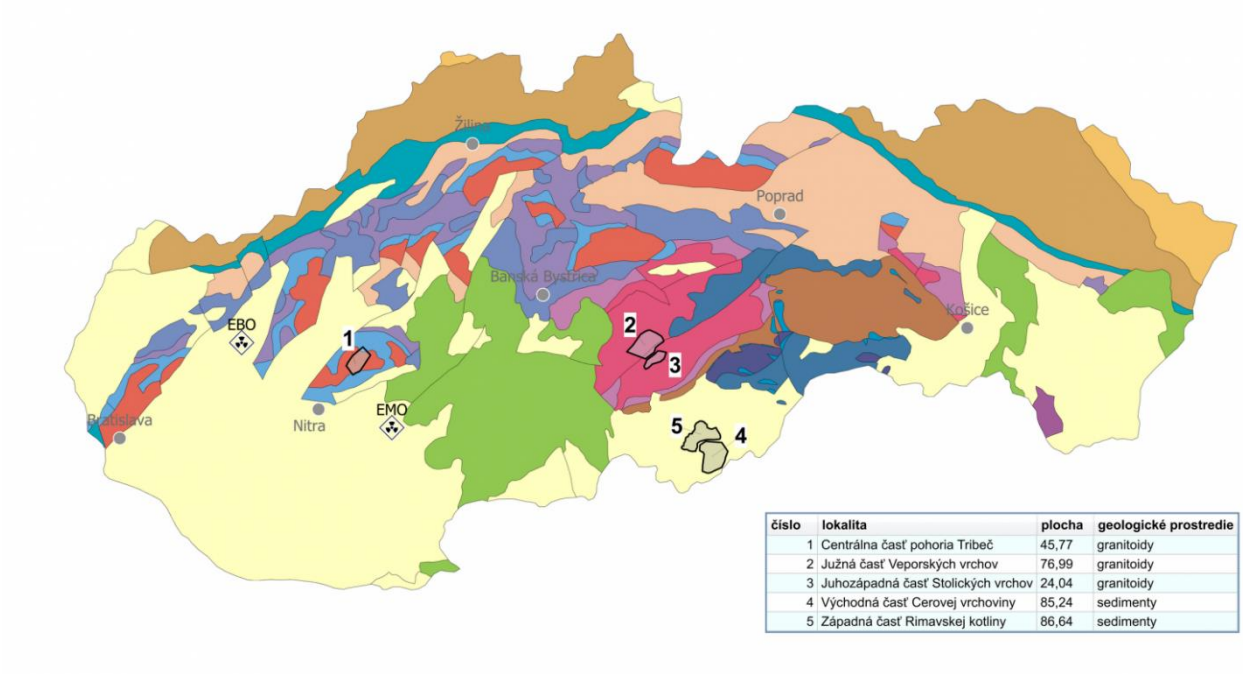
During 1996-2001 more than 60 studies and reports were developed, e.g., feasibility studies, documents for safety analyses, analyses for involvement of the public and initial geological mapping and surveys were elaborated. This work was requested and financed by the Slovenské elektrárne company, at that time still a state-owned enterprise. Based on international recommendations, characteristics of a suitable DGR locality in Slovakia were set (e.g., long-term development of the area, geological risks, geological structure, hydrogeological conditions, geochemical aspects, engineering-geological properties, raw materials deposits, legislative protection of the area - a total of 58 characteristics). Based on a multicriterial analysis of the geological environment of Slovakia, 5 “perspective sites” were proposed for further

[192] see “Strategy for the back end of peaceful uses of nuclear energy in Slovakia” from 15.01.2014, p. 50. Available online at https://www.enviroportal.sk/sk/eia/detail/strategia-zaverecnej-casti-mieroveho-vyuzivania-jadrovej-energie-v-sr

[193] see “Strategy for the back end of peaceful uses of nuclear energy in Slovakia” from 15.01.2014, p. 51. Available online at https://www.enviroportal.sk/sk/eia/detail/strategia-zaverecnej-casti-mieroveho-vyuzivania-jadrovej-energie-v-sr

[194] see “Strategy for the back end of peaceful uses of nuclear energy in Slovakia” from 15.01.2014, p. 14. Available online at https://www.enviroportal.sk/sk/eia/detail/strategia-zaverecnej-casti-mieroveho-vyuzivania-jadrovej-energie-v-sr

geological survey (figure 21)[195]. In 2001 the work on the Slovak DGR project was suspended (until 2012) and in 2004 the Slovenské elektrárne company was privatised. Approximately 2.6 mil. € in total were spent on the Slovak DGR project between 1996 and 2001[196].



číslo	lokalita	plocha	geologické prostredie
1	Centrálna časť pohoria Tribeč	45,77	granitoidy
2	Južná časť Veporských vrchov	76,99	granitoidy
3	Juhozápadná časť Stolických vrchov	24,04	granitoidy
4	Východná časť Cerovej vrchoviny	85,24	sedimenty
5	Západná časť Rimavskej kotliny	86,64	sedimenty

Figure 21 - The map of 5 "perspective sites" of the Slovak DGR

In 2010 the company JAVYS became the authorised implementer of the Slovak DGR project. Between 2013-2018 the site selection criteria were reassessed, the feasibility study was updated, recommendations for the public involvement and plans for the next stages of the Slovak DGR project were developed, proposals for" economic stimulation" of participating localities were prepared. Two of the 5 perspective sites -" Tríbeč" and" western part of the Rimava basin" - were proposed by JAVYS as sites with the best geological properties and a plan of further geological and technical activities in the two siteswas prepared. Approximately 0.4 mil. € in total was spent on the Slovak DGR project between 2013 and 2018. In this context, it can be considered important to emphasise that only a small fraction (in 2019-2021 nothing or de facto nothing) of the resources allocated to the Slovak DGR project was spent[197].

Management of RW and SNF follows, among others, the National policy for management of SNF and RW in the Slovak republic and the National programme for the implementation of the National policy and objectives set therein. The in-effect version of the national policy and programme, adopted in 2015, sets two important objectives related to the DGR project - final selection of the DGR site with a deadline in 2030 and commissioning the DGR in 2065. Currently, after a 7-year period, the national policy and

[195] Source : https://www.njf.sk/sprava-prostriedkov/poskytovanie-financnych-prostriedkov/nakladanie-s-vjp/hlbinne-ulozisko-rao-a-vjp/

[196] https://www.njf.sk/sprava-prostriedkov/poskytovanie-financnych-prostriedkov/nakladanie-s-vjp/hlbinne-ulozisko-rao-a-vjp/

[197] According to the annual reports of the NNF (available online at https://www.njf.sk/dokumenty/dokumenty-jadroveho-fondu/), 3 106 491 € was originally approved in 2018 for "*Development of the DGR in the Slovak Republic*", but only 232 651 € was actually drawn (see the NNF Annual Report 2018, Table 1.3.2); in 2019, 2 331 034 € was originally approved, but 0 € was actually drawn (see the NNF Annual Report 2019, Table 1.3.2); in 2020, 2 558 976 € was originally approved, but only 11 008.69 € was actually drawn (see the NNF Annual Report 2020, Table A.3.9)); in 2021, 503 216 € was originally approved, but 0 € was actually drawn (see the NNF Annual Report 2021, Table A.3.10);

programme is being updated. In the draft version of the updated national policy and programme (to be assessed in a SEA process) "*commissioning the DGR*" was removed from the list of objectives. The deadline for the final selection of the DGR site remained set to 2030 (although the original draft from December 2021, before the commenting procedure, significantly postponed the deadline from 2030 to 2045). The author considers it disturbing that the current draft of the national policy and programme does not include any objectives in the area of transparency. Especially because in the original version from December 2021 there was the following objective:

"*Ensure transparency in the field of environmental, social and economic impacts on public finances in all activities related to operation and decommissioning of NPPs and disposal of RW and SNF*".

Access to information, public participation, access to resources and justice

- **Access to information**

One of the most relevant issues is that JAVYS (a state-owned company which de facto holds a monopoly position in SNF and RW management in Slovakia, receives millions of euros from the public budget and is also responsible for the project of the Slovak DGR) claims not to be a liable entity with respect to the Slovak Freedom of Information Act. As a result, the public cannot obtain information from JAVYS via requests of information, which negatively affects the transparency of RW and SNF management in Slovakia and effectiveness of public participation in related decision-making processes. There is no alternative liable entity which could provide the information (in general). For example, when requested[198], the Nuclear regulatory authority of the Slovak republic (NRA) could not provide (did not have the data) volumes of RW incinerated by JAVYS in 2020 and 2021, which is an elementary piece of information. One can hardly expect a high level of transparency in the Slovak DGR project, if the implementer refuses to reply to public requests of information. Additional obstacles in access to information may arise if a major part of the Slovak DGR project is not realised by JAVYS, but another (private) company in the position of a general contractor.

Moreover, there is only a very limited amount of information related to the DGR project on the webpage of JAVYS and its most recent annual reports from the years 2019-2021[199] do not mention the DGR at all. As a result, instead of information channels of the DGR project implementer, the webpage of the National nuclear fund[200] and the National policy and programme for management of SNF and RW[201] serve as the primary online source of information about the Slovak DGR for the general public.

Documentation from administrative procedures held by NRA is typically not available to the public in the electronic form, can be accessed usually only via physical inspection of printed files and sometimes is even declared confidential (e.g., information related to the dry interim storage casks). If, alternatively, a request of information is used to obtain a part of the documentation, the deadline for providing a reply is 8 to 16 workdays. This is usually too long for effective participation in decision-making processes. An easy access to the electronic version of the documentation would significantly increase the effectiveness of public participation.

In practice, the main source of information for the general public about announced investment projects is the EIA documentation (note that the EIA process and public participation for the DGR siting procedure has not started yet), since it is published online, and it is easier-to-read for non-experts as well. However, there is an information asymmetry between the public, NGOs, and municipalities on one hand,

[198] Requests of information according to the Freedom of Information Act sent by the author.
[199] https://www.javys.sk/sk/informacny-servis/vyrocne-spravy
[200] https://www.njf.sk/sprava-prostriedkov/poskytovanie-financnych-prostriedkov/nakladanie-s-vjp/hlbinne-ulozisko-rao-a-vjp/
[201] https://www.enviroportal.sk/sk/eia/detail/navrh-vnutrostatnej-politiky-vnutrostatneho-programu-nakladania-s-vyho

and the project proposer on the other. In case of nuclear installations, this asymmetry is further enhanced because of higher complexity of the problem. Due to limited time, expertise, and financial resources the public and municipalities are reliant mostly on information provided by the project proposer, either in the EIA documentation or in reactions to additional questions (raised e.g., during the public hearing). Extensive and time-consuming investigation and information verification based on independent sources may be necessary to obtain objective and complete information. Consultations with independent experts appear to be a theoretical option only, not only because of short procedural deadlines and financial constraints, but also due to a lack of suitable independent nuclear experts.

- **Public participation**

In general, the public, NGOs and municipalities can, upon request, participate in administrative procedures related to nuclear installations. For example, the author participated in the procedures related to the dry interim storage, the integral RW storage or the second incineration plant in Jaslovské Bohunice. However, the effectivity of the participation is limited due to problems in access to information and its verification (including restricted access to documentation, e.g., the SNF casks of the dry interim storage), information asymmetry, short procedural deadlines, insufficient financial resources, and personal capacities of the public and NGOs.

If a person or an NGO participates in an EIA process, the Slovak EIA Act guarantees that the person/NGO can participate in the follow-up administrative procedures. However, even if municipalities, public or NGOs actively participate in an EIA process related to the nuclear industry, they rarely participate in the follow-up procedures, most likely due to obstacles mentioned above.

Public participation in adoption procedures of strategic documents represents a specific category. The active National policy for management of SNF and RW in the Slovak republic and the National programme for the implementation of the National policy from 2015 was adopted without active public participation and a SEA process. The author actively requested participation in the ongoing process of updating the national policy and programme which was approved by the National nuclear fund (the institution supervising the process). The author was given the opportunity to send his comments and remarks on the draft of the updated national policy and programme.

- **Access to justice**

According to the Slovak legislation a participant of an administrative procedure (including the public and NGOs) can challenge the ruling adopted as a result of the procedure at the court within 2 months. Nevertheless, in environmental issues this seldom happens due to insufficient financial resources and personal capacities of the public, NGOs and municipalities, information and financial asymmetry and a long time before even the first instance verdict is issued (usually 1-2 years).

Lessons learned.
There is a lack of transparency and ineffectivity of public participation in RW management, since the public cannot obtain information from JAVYS, a state-owned company which de facto holds a monopoly position in SNF and RW management in Slovakia, via requests of information. An amendment of the Slovak Freedom of Information Act explicitly defining JAVYS as a liable entity might improve the position of the public.

An easy access to the electronic version of the documentation from administrative procedures held by NRA might increase the effectivity of public participation as well. The documentation, often consisting of hundreds or even thousands of pages, can be accessed usually only via physical inspection of printed files, which de facto makes it impossible for the public to get familiar with the entire documentation in detail, even if it is not declared confidential. At the same time, the project proposer has the electronic

form of the documentation and also indicates which information in it is "confidential". Providing an electronic version of the documentation to the public would therefore be linked with no or negligible additional costs.

The minimal progress in the Slovak DGR project in recent years can be considered as non-compliant with the principle of "avoidance of any undue burden on future generations". Also, taking into account the deadline for the final selection of the DGR site in 2030, one might expect that there is not sufficient time left for high quality participation of the public in the site selection procedure in which the affected communities have not been involved yet. If a separate institution responsible only for the RW and SNF repositories had been established in Slovakia, the situation might have been improved. This way the DGR project would become one of the top priorities of the suggested institution. Such division of responsibilities would also reduce the risk of possible conflict of interests, since JAVYS is also a producer of RW (and, in the future, also of SNF - through the project of the new NPP in Jaslovské Bohunice).

There is strong information and financial asymmetry between the project proposer on one side and the public, NGOs and municipalities on the other side. The quality of the decision-making process and the effectivity of public participation would certainly improve if there was legally binding resourcing of local communities and NGOs, e.g. from the National nuclear fund, the short procedural deadlines were extended, and there were independent experts available for consultations. The legal scheme for financial support of the local communities might reduce the risk of strong correlation between (dis)approval of a project by the official representatives of the municipalities and the amount of the (future) donation of the project proposer to the municipalities as experienced e.g. in 2019[202].

However, instead of improving the situation in accordance with the proposals made above, it looks like the Slovak government decided to proceed in the opposite direction. The new construction and spatial planning legislation[203] and the proposed EIA Act amendment[204] can have a significantly negative impact on the right of public participation and its effectivity.

[202] See https://www.rtvs.sk/novinky/zaujimavosti/227377/budeme-na-slovensku-spalovat-este-viac-odpadu at 11:22-12:50

[203] Act no. 200/2022 Coll. and act no. 201/2022 Coll. which will come in force on 1st April 2024.

[204] https://www.nrsr.sk/web/Default.aspx?sid=zakony/zakon&MasterID=8755

Institutional mechanisms in Sweden to facilitate transparency and public participation in RWM.

Johan Swahn, Swedish NGO Office for Nuclear Waste Review (MKG), member of NTW

Sweden is an advanced nuclear country with a long nuclear history. As an integrated military and civil nuclear programme based on domestic heavy-water reactor technology was phased out in the late 1960s, a large-scale light-water reactor construction program resulted by 1985 in the operation of 12 reactors at four nuclear power plants (NPPs).

Through the years and more rapidly in recent years, Sweden has reduced its nuclear capacity. The two reactors at the Barsebäck NPP near the Danish border were shut down in 1999 and 2005. Two out of three reactors at the Oskarshamn plant were shut down in 2015 and 2017. At the Ringhals NPP, two of its four reactors were shut down in 2019 and 2020 and two remain. There are three operating reactors at the Forsmark NPP.

In 2021, Sweden's remaining six operating nuclear reactors supplied 50,5 TWh, about 30% of the total Swedish electricity production of 166.6 TWh. Total electricity use in Sweden was 140,2 TWh and the net export for the year was 25,3 TWh[205]. The nuclear industry wants to operate the remaining 6 nuclear reactors for 60 years into the 2040s.

After a political turmoil on nuclear energy and nuclear waste policy in the second half of the 1970s, a governance and legal framework for nuclear waste management and financing was developed in the first half of the 1980s. By this time Sweden had abandoned reprocessing and there were plans for facilities for storage and disposal of most waste forms, some of them becoming operational in that decade.

Although there was a rudimentary system existing for public participation in environmental decision-making before 1998, the full implementation of the Aarhus convention in the new Environmental code gave environmental organisations access not only to public participation but also access to justice.

By the time the consultation process for a Swedish repository for spent nuclear fuel was started around 2002, the decision-making on nuclear activities was quite complicated involving both the nuclear and environmental legislation. In 2005 environmental organisations were resourced to be able to participate fully in the process.

This section includes a case study of the decision-making process for the spent fuel repository starting with the consultation process and ending in the continued process after the decision of the Swedish government to approve the repository in January 2022. But before that, a background is given on the early history of Swedish nuclear power and radioactive waste management (RWM), as well as on the Swedish governance system and existing facilities for RWM.

Short early history of Swedish nuclear power end early nuclear waste management

Sweden became a nuclear country very early. After the Second World War the military interest in nuclear weapons started a process where a combined military and civil nuclear programme developed in the fifties. The civil program was originally a cover for the military effort. Apart from research reactors, a small heavy water moderated reactor producing heat for district heating and electricity was built underground in Ågesta, a suburb South of Stockholm. The military project was abandoned by the late 1960s and Sweden joined the Nuclear Non-Proliferation Treaty that entered into force in 1970. Sweden later used the weapons expertise in nuclear disarmament work.

[205] See: https://www.energiforetagen.se/pressrum/pressmeddelanden/2021/elaret-2021.-fran-rekordlagt-till-rekordhogt-elpris/ .

The pressurized heavy-water reactor programme was converted into a major light-water reactor programme and 12 nuclear power reactors became operational between 1972 and 1985. In the middle of this very large expansion of nuclear power a nuclear debate started after the Harrisburg accident and led to a national referendum on nuclear power in 1980. The result of the referendum was politically interpreted to mean that nuclear power was to be phased out by 2010.

An important part of the national nuclear debate during the 1970s was the issue of RW. The debate forced the industry to speed-up the development of a method for long-term disposal of the high-level waste. In 1977 a method for disposal of high-level reprocessing waste was presented, the KBS-1 method for vitrified high-level waste in a titanium canister.

At this time Sweden, for non-proliferation and economic reasons, opted out of reprocessing that had for a short previous period been seen as a RWM "solution". In 1978 the KBS-2 method was presented for direct disposal of spent nuclear fuel with a 20 cm thick copper canister and disassembled fuel elements. The system was further developed and optimised and in 1983 the KBS-3 method was presented with a 10 cm copper canister containing complete fuel elements. In the first half of the 1990s the copper thickness was reduced to 5 cm and the fuel elements were to be positioned inside a cast iron insert.

Both the early military and civil research programmes have left complicated and badly documented legacy waste and the reprocessing period has also left trails in the Swedish inventory for RW. The facilities that have been built and are being planned are described in a later section. In the final section the specific case of the Swedish venture to build and operate a repository for spent nuclear fuel using the KBS method with copper canisters is presented.

The Swedish governance and legal framework for radioactive waste management, transparency and financing

After the national referendum on nuclear power in 1980 there was a calmer political period on the issues of nuclear power and nuclear waste. In the first part of the following decade legislation was developed for the management of RW and waste facilities. Additionally, a financing system was developed, based on the "polluter pays principle.

The Nuclear Activities Act of 1983 put all the responsibility for management and disposal of waste on the nuclear industry[206]. All that had to be done to keep the operational licences for the nuclear reactors was to present a research and development and demonstration (R&DD) programme every three years. In Swedish these are called the "Fud reports". The nuclear industry had already in the 1970s created a jointly owned private company called the Swedish Nuclear Fuel and Waste Management Company (SKB) to manage their responsibility for the waste that was continuously produced. The company produced the first Fud report in 1984 that was part of the process to get the latest nuclear reactors licensed. Since 1986 the Fud-reports have come every three years and the latest report is the Fud-2019 report[207]. The programme is reviewed by the radiation safety regulator that, after asking widely for comments in a consultation process, makes a report to the government. A separate report is provided by an independent scientific advisory board to the government, the Swedish Council for Nuclear Waste. The government then takes a decision on the report and can give conditions for further R&D work.
Historically the Swedish regulator for radiation safety was very positive concerning industry work and therefore very little has changed from what SKB wanted to do. The regulator refers any problems they discover back to the industry as the industry has the responsibility for resolving them by further research.

[206] Available at: https://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/lag-19843-om-karnteknisk-verksamhet_sfs-1984-3 . An older translation into English is available here: https://www.stralsakerhetsmyndigheten.se/en/enactments/acts-and-ordinances/ .
The Nuclear Activities Act is under review and a modernised version will likely be introduced during 2023.
[207] See: https://www.skb.se/wp-content/uploads/2020/01/RDD-Programme-2019.pdf

But this means that there is a risk that problems just "disappear", as it is not in the industry's interest to find or examine problems that can hinder its work or plans.

Historically the Swedish regulator for radiation safety (historically the Swedish Nuclear Power Inspectorate, SKI, and since 2008 SSM) has been relatively positive concerning the SKB work plans as presented in the Fud reports and has in its review to the government recommended support of the plans. There has been a tendency to refer any perceived problems back to the industry, which has the legal responsibility for resolving them. This however means that there has been a risk that problems just "disappear", as it might not be in the industry's interest to find or examine problems that can hinder its work or plans.

As an example, the government has been interested in examining alternatives to the KBS method for a spent fuel repository, i.e., the use of very deep boreholes. This forced SKB to carry out some studies of very deep boreholes in the early 1990s[208], but the combination of an evident lack of interest from SKB that was supported by SKI meant that nothing came of the effort. Even though the government returned to the issue of alternative methods in several Fud report decisions, by the time the licensing process for a spent fuel repository started in the 2010s it was of course too late. Even though by this time there were ongoing plans to make a pilot project in very deep boreholes[209].

The government has also shown an interest in sitting issues, especially in the second half of the 1990s as described in section 4. In the government decision on the Fud-1998 report it forced SKB as a condition to provide a clearer plan for the future siting process. The government also again wanted more information on the alternative very deep boreholes. In 2000 SKB published the report Fud-K[210]. The report was used by the government to support using the KBS method as a "reference method", and as a result SKB felt the company could start the consultation process for the repository for spent fuel.

In summary, however, the legal Fud program process has been a relatively weak steering process for industry plans or future R&D work. With a political disinterest in RWM issues and a generally industry-supporting regulator (whether SKI or SSM) most government decisions on the Fud reports have had no effect on the work of SKB.

At times the government has been concerned that alternatives to the KBS method for a spent fuel repository, for example the use of very deep boreholes, have not been examined enough. And sometimes the government has taken a larger interest in sitting issues. But generally, the legal R&D process has been a very weak official steering process for industry plans or work. SKB has made very few changes to the company's plans for RWM or R&D as a result of comments received in the process.

There is a very open access to official documents in Sweden going back hundreds of years. With some exceptions for commercial or security secrecy, and secrecy regarding interaction with foreign governments, all documents and even emails and messages that concern official business must be registered and made available upon request. Also, the contents of important phone calls have to be noted and registered. This means that the activities of the government, of the nuclear safety regulator and local communities can be followed together with documents and other information.

The big problem in Sweden regarding access to information is that the nuclear waste company SKB is a private company who are outside the remit of the legislation and are therefore not obligated to disclose any information. This means that SKB, which has the legal responsibility for research and development on RWM and repository technology, can keep all its work secret. SKB can hide any problems because

[208] *Project on Alternative Systems Study (PASS). Final report*, SKB TR 93-04, Swedish Nuclear Fuel And Waste Management Co., October 1992 (https://skb.se/publikation/9206/TR93-04webb.pdf).
[209] *Deep Borehole Field Test: Characterization Borehole Science Objectives*, Kuhlman et al., SAND2015-4424R, U.S. Department of Energy 2015 (https://www.osti.gov/servlets/purl/1184360).
[210] *Samlad redovisning av metod, platsval och program inför platsundersökningsskedet*, Swedish Nuclear Fuel And Waste Management Co., December 2000 (https://skb.se/publikation/17886/Fud-k-www.pdf).

the documentation or research results never have to be disclosed. In practice this means that the company publishes only results that support its safety case.

The availability of public information but lack of access of information from the implementer of RWM means that the Aarhus convention's first pillar of access to information is weakly implemented on nuclear waste issues[211].

The Swedish legal framework for decision-making on issues that have an environmental impact was greatly improved at the end of the 1990s when the Environmental Code became part of the Swedish judicial system[212]. Parts of the Environmental Code implements the Aarhus convention pillar of access to public participation and access to justice. The legislation mandates that the implementer of activities that have an environmental impact, including nuclear activities, carry out and document a process of public consultation while developing the environmental impact statement for a new or changed activity or facility. Permits according to the Environmental Code are given by a special Land and Environment Court. Part of the decision-making process is that the court must approve the consultation process and that issues raised have been properly taken into due account. Environmental organisations are given special importance in the legislation and have the right to appeal all decisions taken.

All nuclear activities in Sweden are thus licensed in two parallel decision-making processes. The nuclear regulator, the Swedish Radiation Safety Authority (SSM), carries out a review according to the Nuclear Activities Act with the associated government ordinance and regulatory regulations. The Land and Environment Court carries out a review according to the Environmental Code. To make the process easier the Nuclear Activities Act has passages stating that decisions are to use the decision-making criteria from the Environmental Code as well as the public participation procedures.

The final decision to allow and licence facilities involving RW are not taken by the regulator or the court but by the Swedish government. SSM and the environmental court only give recommendations to the government that must take a final decision. Government decisions can be appealed to the constitutional Supreme Administrative Court, which only checks if the law has been followed, i.e., restricts its decisions to issues that have a clear legal connotation.

After a government decision to give a licence according to the Nuclear Activities Act, the regulator continues a stepwise decision-making process of examining revised safety cases to allow construction, pilot operation and full operation. After a government permissibility decision according to the Environmental Code, the environment court gives the final licence with conditions. The court decisions can be appealed to two higher court levels, for example on details in the conditions, but the government decision lies as a basis for a licence and binds the back of the courts that must give the licence.

Sweden was early in financing RWM compared to other nations, as defined in the original 1981 Financial Act. The nuclear financial legislation, that was updated with a new version of the act in 2006, defines the responsibility of the nuclear operator, or anyone producing RW, for decommissioning and guaranteeing that the full costs will be borne by the producer[213]. A fee on electricity from nuclear power and

[211] For more information on the Aarhus Convention or the "UNECE Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters" see: https://unece.org/environment-policy/public-participation/aarhus-convention/introduction .

[212] Available at: https://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/miljobalk-1998808_sfs-1998-808 . More information can be found here: https://www.naturvardsverket.se/en/laws-and-regulations/the-swedish-environmental-code/ . An English translation can be found here: https://www.government.se/legal-documents/2000/08/ds-200061/ .

[213] Available at https://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/lag-2006647-om-finansiering-av-karntekniska_sfs-2006-647 .

guaranteed securities by the power plant owners are the two main pillars of financing waste management and decommissioning of reactors. After the global finance crisis of 2008, it became clear that there were large risks that the state via the taxpayers would have to pay for future RWM costs and the Financial was extensively revised in 2017[214].

According to the legislation the nuclear industry must produce a report called the PLAN report every three years with projections of future costs based on different scenarios. The report provides data for the calculation of RW fees and securities. It is scrutinised by the Swedish National Debt Office, which also publishes the report for public review[215]. The debt office gives recommendations to the government, which takes the final decision. The latest government decision was taken in January 2022 and set the fee per kWh of nuclear electricity produced to between EUR-cent 0,30 to 0,56. There are also two types of securities set[216].

The fees on nuclear electricity production are placed in a Nuclear Waste Fund, managed by a government authority with rules from the financial legislation[217]. Both the nuclear industry work on RWM and the regulatory work are financed from the fund. In addition, the nuclear waste communities receive support from the fund for their work. Of interest is that from 2005 onwards environmental NGOs were able to receive funding from the nuclear waste fund, although such funding has since 2017 instead come from the state budget.

The Swedish facilities for and inventories of radioactive waste

The spent nuclear fuel from the Swedish NPPs is primarily stored in a centralised intermediate storage facility Clab at the Oskarshamn NPP. Clab is a facility 50 m underground and was commissioned in 1985 and has a capacity of 8 000 tonnes spent fuel[218]. In August 2021 the Swedish government approved a capacity increase to 11 000 tonnes fuel and the increase is being accomplished by re-racking the fuel elements in compact storage cassettes. It is likely that the increase will be enough to hold the remaining spent fuel to be produced by the remaining Swedish nuclear reactors during their lifetime, even if a repository for spent nuclear fuel does not become operational before the 2040s. By the end of 2019 there was a total of 6 805 tonnes of spent fuel in the facility[219]. In addition, there were 486 tonnes of spent nuclear fuel in the cooling pools at the Swedish NPPs. Since all the Swedish NPPs are situated on the coast there is a special ship that transports waste to the existing and planned waste management and disposal facilities[220].

[214] The main changes were improvements to the securities system as well as controlling the expected future rate of return on the funds in the Nuclear Waste Fund.
[215] fore 2018 the responsibility for the review of the industry's financial plans was with the nuclear regulator SSM, that for many years did not put much effort into this issue.
[216] See: https://www.riksgalden.se/en/our-operations/financing-of-nuclear-waste-management/how-is-nuclear-waste-management-to-be-financed/
[217] For more information on the nuclear waste fund see: http://www.karnavfallsfonden.se/informationinenglish .
[218] More information about Clab on the SKB web site: https://www.skb.com/our-operations/clab/ .
[219] The inventory data from this section comes from "Sweden's seventh national report under the Joint Convention on the safety of spent fuel management and on the safety of radioactive waste management", Ds 2020:21, 26 October 2020 (https://www.regeringen.se/rattsliga-dokument/departementsserien-och-promemorior/2020/10/ds-202021/) and "Sweden's third National Report on Implementation of Council Directive 2011/70/Euratom", June 24, 2021 (https://www.mkg.se/uploads/Arende_Externa/SSM_Swedens_third_National_Report_on_Implementation_of_Council_Directive_2011-70-Euratom_210624.pdf).
[220] More information about the transportation system on the SKB web site: https://www.skb.com/our-operations/transport-by-sea/

Since 1988 there has an operational repository for short-lived low- and intermediate-level RW from nuclear reactors, SFR[221]. It is situated 75 m under the seabed outside the Forsmark NPP. Most of the waste comes from the operation of the Swedish nuclear power reactor, but in the early 1990s 75 containers containing nearly 3 000 barrels of legacy waste were also deposited. In recent years it has been discovered these barrels may also contain long-lived RW, so the containers must be retrieved. At the end of 2019 SFR contained 39,915 m^3 of short-lived low- and intermediate-level RW.

In December 2021 the Swedish government approved a new repository to be built in direct connection to SFR. This SFR 2 repository will be at a depth of 120 m and will be for short-lived low- and intermediate-level RW from the decommissioning of the Swedish nuclear facilities. Sometime in the future there is planned a repository for long-lived intermediate level waste called SFL that will mostly contain decommissioning waste and legacy waste.

Finally, at the Ringhals, Forsmark, Oskarshamn NPPs, and at the Studsvik nuclear facility, there are shallow land-burial facilities for very low-level RW. By December 31, 2019, the total volume of waste in these landfill "repositories" was 27 904 m^3.

A case study of the decision-making process for a Swedish repository for spent nuclear fuel
If put in a repository, spent nuclear fuel for environmental reasons must be isolated from mankind and nature for hundreds of thousands of years. In addition, there is a security issue for tens of thousands of years as the plutonium in the spent fuel could be used as a material for nuclear explosives. Thirdly, the content of the repository contains chemically toxic material that will be an environmental threat forever.

The KBS concept for disposal of spent fuel was developed in Sweden in the mid 1970s. There were three KBS reports in 1977, 1978 and 1983. With the last KBS-3 report the concept was almost finalised with copper canisters containing the spent nuclear fuel to be deposited in holes in the floor of tunnels about 500 m underground in granite bedrock (figure 22)[222]. By the early 1990s the cylindrical canisters were finalised to be 5 m high and 1 m in diameter and made from 5 cm thick copper. Inside the copper canister is a cast iron insert to hold the spent fuel elements in place and to provide higher strength to the encapsulation.

As there is flowing groundwater in the granite bedrock and even though the copper canister is supposed to be relatively immune to corrosion the canister is surrounded by a clay called "bentonite" that will swell when subjected to water The clay buffer is to provide a tight protection of the copper canister from the groundwater. The deposition tunnels and other parts of the repository system will also be filled with bentonite clay so the whole bedrock system is as tight as the bedrock itself to the flow of water.

The long-term safety case for the KBS-3 concept thus relies on two artificial engineered barriers – a copper canister and a bentonite clay buffer – and a semi-natural barrier of the bedrock with tunnels filled with clay. In practice the tunnels in the bedrock are disregarded as it is assumed no water can flow through them. In the safety analyses a rock that has few cracks and fissures becomes a very good barrier.

Whether copper is a good choice for a canister material was debated in the 1980s and the issue surfaced again in 2007. This issue will be further developed below as it later became a very important part of the licensing process for the Swedish spent fuel repository.

[221] More information about SFR on the SKB web site: https://www.skb.com/our-operations/sfr/ .
[222] The man in the figure is there only to illustrate the size of the copper canister. In reality, a person so close to a canister would receive a lethal dose of radiation in a matter of minutes. All operations for depositing canisters in boreholes have to be done by remotely controlled vehicles.

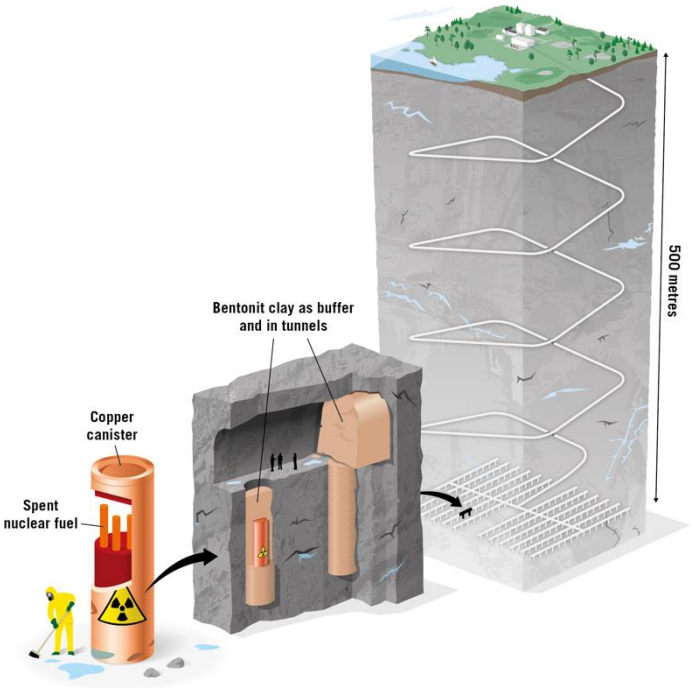


Figure 22 – the KBS method (Source: MKG)

Siting of the spent fuel repository – A long road to acceptance

Originally the bedrock was seen as the most important barrier in the KBS concept. The siting process for a repository for spent nuclear fuel was started in the mid-1970s by the nuclear waste company SKB and the exploratory drilling in the bedrock all over Sweden to find the best bedrock. The drilling often met with local resistance. The opposition became better and better organised in a network of local opposition groups. In 1986 the resistance led to a stop of the siting process.

There had to be a restart of the siting work and a voluntary process was started with all the communities in Sweden contacted to see if they were interested. Two communities in the north of Sweden saw that a repository could give jobs and volunteered, but when local referendums were held the inhabitants of the communities said no.

The search then moved to communities that already had nuclear facilities or were neighbouring communities. By the late 1990s the siting process was focused on two nuclear communities, Oskarshamn and Östhammar where the Oskarshamn and Forsmark NPPs are situated. At the Oskarshamn NPP there is also the central intermediate storage site for spent nuclear fuel, Clab, and at the Forsmark NPP the repository for short-lived RW, SFR. Detailed site investigations were done in areas just adjacent to the nuclear power plants.

The emphasis in the safety case was at this time moved from the importance of a tight bedrock to the ability of the artificial barriers of the copper canister and the bentonite buffer to contain the radioactivity in the long term. This meant that the nuclear waste company could suggest that almost any bedrock could be used for a KBS repository as the artificial barriers of the copper canister and the clay buffer would work for the hundreds of thousands of years needed. In 2009 the Forsmark nuclear power plant site was chosen for a repository before the Oskarshamn site. Interestingly enough the reason was that the Forsmark bedrock had less cracks than in Oskarshamn, so the safety analysis showed that Forsmark was a little safer. The site for an encapsulation plant Clink was to be co-localised with the existing

spent fuel storage facility, Clab, at the Oskarshamn NPP site. The copper canisters are to be transported by ship from Oskarshamn to Forsmark.

The change in focus with time on the importance of the rock barrier in relation to the artificial copper and clay buffer barriers is very important. The KBS system is supposed to rely on three independent barriers for long-term safety. In reality, however, the barriers are not independent of each other, and each may have its problems. The question of to what extent the robustness of the whole system, in holistic approach, allows weaknesses of individual barriers to be ignored finally became the central issue in the licensing review for a Swedish KBS repository.

Consultation, licence application and review

From around 2002 and onwards the nuclear waste company SKB carried out a lengthy and thorough consultation process for developing the environmental impact statement for the spent fuel repository and the encapsulation plant. In March 2011 the nuclear waste company SKB submitted a licence application package according to the Nuclear Activities Act and the Environmental Code for a spent fuel repository system using the KBS method at the Forsmark NPP and an encapsulation plant at the Oskarshamn NPP.

The application review was started by the regulator, the Swedish Radiation Safety Authority (SSM) according to the nuclear legislation and the Land and Environmental Court according to the environmental legislation. The initial review for completeness of the application was completed in 2015. During 2016 and 2017 the application was reviewed on issues. Many issues were covered including problems with the site chosen, better alternatives for site and method (deep boreholes), issues concerning the safety case (canister integrity, clay erosion, hydrogeology, and seismology), as well as problems with intentional intrusion scenarios and problems of transferring information about the repository into to the future.

But perhaps most importantly during the review process, the issue of problems with the copper canister were raised by some actors including researchers at the Royal Institute of Technology (KTH) in Stockholm and by environmental NGOs (Swedish Society for Nature Conservation (SSNC) and MKG)[223]. The copper corrosion controversy goes back to the 1980s and became very lively from 2007 with the publication of new studies by researchers at KTH. It is described more in detail below.

In the autumn of 2017, the main meeting of the Environmental Court was held as the final part of the review process. The regulator SSM told the court that some issues, i.e., the copper corrosion issue, could be dealt with after a government decision. The court questioned this in the meeting. According to both the Environmental Code and the Nuclear Activities Act the repository had to be shown safe before a government decision.

At the main court hearing eminent scientists from the Royal Institute of Technology (KTH) in Stockholm strongly questioned the SKB position on copper corrosion. In addition, during the court proceedings leaks to media showed that the regulator SSM had big internal problems (an SSM corrosion expert was against a yes decision in the spring of 2016 when the regulator for the first time told the court that the repository would likely be safe, and that there were SSM scenarios on copper corrosion processes that showed that regulatory limits could be exceeded).

On January 23, 2018, the Environmental Court made its recommendation to the government. The court recommended that the government say no to the application, primarily because of the uncertainties regarding the long-term safety of the planned repository due to possible copper canister problems. These issues would have to be resolved before a government decision could be taken.

[223] The Swedish Society for Nature Conservation (Naturskyddsföreningen), SSNC, is the largest Swedish environmental NGO with over 200 000 members (https://www.naturskyddsforeningen.se/in-english). SSNC is the largest member organisation of the Swedish NGO Office for Nuclear Waste Review (Miljöorganisationernas kärnavfallsgranskning), MKG, that works with nuclear waste issues since 2005 (https://www.mkg.se/en).

On the same date the regulator SSM told the government that it could say yes to the repository, as some issues, i.e., possible problems with the long-term integrity of the copper canister, could be dealt with later, after a government decision. The regulator also believes that the repository can be safe enough even if the copper canister does not work exactly as postulated as there are other barriers (clay/rock). This regulatory focus on a holistic approach on the robustness of the safety case is important for the understanding of what happens hereafter.

The problems with copper

But before continuing with the government review of the licence application it must be understandood what the copper corrosion controversy is about. The basis for using copper as a canister material is that theoretically it is as immune as gold to corrosion in a repository environment. The reason for this is that there is no dissolved oxygen in the water that can corrode copper. As a comparison oxygen in the air corrodes copper roofing turning it green, but without oxygen in the repository or in the water in the repository the copper surface would not be affected. In addition, any oxygen in the repository during deposition of the copper canisters but after the sealing of the holes will be consumed by bacteria and chemical reactions very fast, the process taking only a few months.

The problem is that the scientific hypothesis that water without dissolved oxygen (anoxic water) does not corrode copper is likely false. This was discovered experimentally by a researcher at the Royal Institute of Technology (KTH) already in the mid-1980s[224], but the results were ignored by SKB and the Swedish regulator at that time. But as the repository consultation process started the researcher came back and together with colleagues published new results in 2007 and then onwards with new studies[225]. SKB has strongly contested the research, but the results have been repeated by other researchers[226]. It is now also theoretically understood that water molecules can corrode a copper surface[227].

As a result of the controversy, there is now an ongoing scientific paradigm shift to the fact that water can directly corrode copper even when there is no oxygen. The question is more of how fast the reaction can take place at the temperatures and in the complicated water chemistry of the repository. The researchers from KTH claim that some copper canisters can start to collapse after only a few hundred years. The nuclear waste company strongly questions this and points to its own research maintaining that of the approximately 6,000 copper canisters to be put in the Swedish repository less than one will start to leak in a million years.

Of interest here is that at the end of 2017, after the main meeting of the environmental court, the results of 18 years of copper corrosion in an oxygen-free repository environment were published from the FEBEX experiment showing considerable and unexpected copper corrosion, also so-called pitting corrosion that is very serious as it means that there is a larger risk of a hole being created through a copper surface [228]. SKB in the report claimed that the corrosion must have been due to oxygen leaking into the

[224] Hultquist, G., "Hydrogen Evolution in Corrosion of Copper in Pure Water", *Corrosion Science*, 26(2), 173-177 1986.

[225] See for example Szakálos, P., Hultquist, G., & Wikmark, G., Corrosion of Copper by Water. Electrochemical and Solid-State Letters, 10(11) 2007", "Water Corrodes Copper", Hultquist et al., *Catalysis Letters* (132), pp 311–316, 2009 and Hultquist, G., et.al., Corrosion of copper in distilled water without O2 and the detection of produced hydrogen. Corrosion Science, (95), 162-167. 2015.

[226] For example, Becker, R., & Hermansson, H. P., Evolution of hydrogen by copper in ultrapure water without dissolved oxygen, SSM report 2011:34. Swedish Radiation Safety Authority 2011 and Cleveland, C., Moghaddam, S., & Orazem, C., Nanometer-Scale Corrosion of Copper in De-Aerated Deionized Water. *Journal of The Electrochemical Society*, 161(3), C107-C114 2014.

[227] Macdonald, D. D., & Sharifi-Asl, S., Copper Immune to Corrosion When in Contact with Water and Aqueous Solutions? SSM report 2011:09. Swedish Radiation Safety Authority 2011.

[228] "FEBEX-DP Metal Corrosion and Iron-Bentonite Interaction Studies", P. Wersin & F. Kober (eds.), Arbeitsbericht NAB 16-16, Nagra, October 2017.

repository but in a similar experiment called FE experiment it was shown that the whole experiment with long tunnels was oxygen-free in only some months[229].

The government review of copper corrosion issues

After the January 2018 statements of the court and SSM, the government review started and the nuclear waste company SKB made a submission of complementary information on copper corrosion in April 2019 basically stating that the court had not understood the copper corrosion issues. Very little new information was provided compared to the information the court had access to during its review.

The government sent out the complementary information for consultation and comments from other parties were provided to the government in the autumn of 2019. The regulator SSM's conviction that the repository would be safe enough was said to have been "strengthened" by the new information provided. However, the Swedish Council for Nuclear Waste, the government's scientific advisory body, now entered the discussion and said that there may be problems with the copper, and also with the cast iron insert, that may show that the concept does not work.

The researchers at KTH persevered in their criticism of using copper as a canister material, joined by the SSM corrosion expert that was opposed to the regulator saying yes to the court in 2016, who had now left SSM. The SSNC, the Swedish Friends of the Earth, SFOE (who had joined MKG) and MKG stated that it would be wrong to use copper as a canister material.

An unexpected development in 2019: New experimental packages from the LOT project retrieved with 20 years of copper corrosion.

In the middle of the government review an unexpected possibility turned up that had the potential to once and for all decide the issue of whether copper was a good canister material for the Swedish spent nuclear fuel repository or not.

The so-called LOT experiment operated by the nuclear waste company SKB has been ongoing at 400 m depth in the Äspö Hard Rock Laboratory near the Oskarshamn NPP since around the year 2000. In total there were seven experimental packages with copper and clay in a very good simulation of real repository conditions. Three 1-year packages were retrieved early, but when SKB retrieved one 5-year package in 2006 an unexpected amount of copper corrosion had occurred. However, the reporting on the corrosion was very limited.

As results about copper corrosion from the LOT experiment could be important, MKG has for long demanded that the next package be retrieved and analysed. Then, in the autumn of 2019 SKB secretly retrieved two now 20-year-old experimental packages. This was disclosed by SKB at a meeting organised by the regulator SSM in the beginning of October.

For many months MKG worked to get SKB to disclose all relevant corrosion results as soon as possible, and that SSM checked the results with a quality reviewer. The efforts were successful. SKB published a report with the copper corrosion results in October 2020[230] and SSM has carried out a quality assurance project with support of the U.K. consultancy company Galson Sciences[231].

[229] Müller H. et al., Implementation of the full-scale emplacement (FE) experiment at the Mont Terri rock laboratory, *Swiss J Geosci*, 110 287–306 2017.

[230] "Corrosion of copper after 20 years exposure in the bentonite field tests LOT S2 and A3", Johansson et al., SKB TR-20-14, September 2020.

[231] "Quality Assurance Review of the Swedish Nuclear Fuel and Waste Management Company's LOT Experiment (Phase S2 and A3) at the Äspö Facility in Sweden", Hicks et al., SSM report 2021:06, March 2021.

The SSNC, the SFOE and MKG also told the Government that it should wait for the LOT results as if the corrosion is as bad as in the FEBEX experiment something is very wrong with using copper as a canister material.

There is a lot of information on copper corrosion in the SKB report. The problem being missing detailed analysis of the surfaces that had been corroded the most, making the conclusions less scientifically relevant. In the report there is a picture of the bottom plate that shows very severe corrosion. But the corrosion is not analysed and in detail reported. Bust, even more problematic is the fact that even more corrosion is likely to have taken place on the hottest part of the central copper tube and it is not analysed in detail.

The regulator SSM made a statement on the LOT results to the government in March 2020. Unfortunately, SSM accepted the SKB reporting of results, without much analysis of its own. The researchers at KTH pointed out that if the reporting of the LOT results were completely scientific, they would likely show that copper could not be used as a canister material.

The government decision

During 2021 the discussion about nuclear power and nuclear waste management became increasingly politicised. The government had since 2018 been a Social Democrat and Green Party minority coalition with a Minister of the Environment from the Green Party who was reluctant to approve any repository. But the pressure from pro-nuclear political parties increased throughout the year.

The copper corrosion controversy also became more intense in the autumn of 2021. SSNC, the SFOE and MKG told the government that the LOT experiment should be used to provide vital information necessary before a decision. The Swedish Council for Nuclear Waste stated that more research is needed to understand how the copper canister behaves in a repository environment, but that this could be done after a government decision. But the council also wanted the government only to give a construction license according to the Environmental Code and an operational licence was to be given later. Such a legal construction would have been new.

It became more and more clear that not only the nuclear waste company SKB, but also the regulator SSM, were convinced that there are no copper problems which are important enough to question the long term-safety of the repository. The safety case in a holistic view where there are also the other barriers (of the clay buffer and the rock/clay in tunnels) mean that the repository will be robust. There are scenarios in the SKB safety analysis that show that even if there are small holes in many of the canisters already from the beginning, the regulatory limits will only be exceeded in the long term if the clay buffer and the rock are very tight[232].

In November-December 2021 there was political turmoil in the budget process for 2022, with the result being that the Green Party left the government. The new Social Democrat minister of the environment almost immediately promised a decision on the spent fuel repository in January 2022.

On January 27, 2022, the government took the decision to approve the repository. The decision relied almost exclusively on statements from SSM. The SSNC, the SFOE and MKG have appealed the government decision to the Swedish Highest Administrative Court (constitutional court) for judicial review. The organisations primarily want the court to review whether the government has followed the preconditions for a decision according to the Environmental Code (that the repository has been shown to

[232] See figure 13-67 on p. 720 in Long-term safety for the final repository for spent nuclear fuel at Forsmark, Main report of the SR-Site project, Volume III, TR 11-01, Svensk Kärnbränslehantering AB, March 2011.

be safe at the time of the licence and that the precautionary principle has been followed) when the government decision so strongly relies only on the support from the regulator.

The appeal questions – again[233] – the holistic regulatory approach that the robustness of the whole KBS barrier system means that individual barriers need not function as intended. The case is made that there is strong evidence that the copper canister will not work as foreseen due to corrosion and other processes. If this is the case the clay buffer will likely be destroyed by the copper corrosion products and will not be tight to water as the swelling capacity of the bentonite clay in the buffer is affected when the clay physical and chemical characteristics changes.

The clay buffer barrier is not independent of copper canister problems. If the final barrier of the rock does not work, there is then a big problem. In reality it is not the rock itself that is the weakest part of this final barrier, but rather the clay in the tunnels. If the clay does not completely stop the flow of water as intended, and there is relatively little research showing it will, the "rock barrier" is not as strong as envisioned in the safety case. It is simple to give each of the three barriers a high protective function in the safety case and claim that as long as one barrier is intact everything is fine. The ultimate safety question is how big individual barrier problems can be compared to the "robustness" of the total barrier system.

If the appeal is unsuccessful, which is perhaps likely considering the national importance of the repository project, the next step in the decision-making process is the return of the case to the Land and Environment Court for a final licence decision and conditions. This process will not start until mid-2023 and will take several years with the possibility to appeal decisions taken.

What can still be foreseen is there will be a construction start in perhaps five years and that the first copper canister with spent fuel is emplaced in a repository in fifteen years. Unless the science of copper corrosion – and/or a better understanding of the weaknesses of clay barriers – comes back to haunt the decisions so far taken.

Concluding remarks

There is much to learn from the Swedish experience of a long civil and military nuclear history with the resulting legacy of facilities and RW, from the Swedish governance system and facilities for RWM and from the decision-making process for the spent fuel repository. Some of the most important are:

- It is a problem to have all the responsibility for research and development and for operation of RWM facilities with a private entity that is not part of the national public access to information system.
- The quality of the decision-making process is improved considerably by the implementation of good consultation and access to justice systems.
- The quality of the decision-making process is further improved by resourcing local communities and environmental NGOs to be able to participate fully in the process.
- It is of vital importance that all problems that come up in the decision-making process are fully examined as far as possible.

[233] The criticism of the regulatory holistic approach was clearly communicated to the government by SSNC, SFOE and MKG during the government review. In order to give the Swedish Highest Administrative Court, the complete picture of the issues involved the appeal was accompanied by 48 appendices with documentation from issues raised from the consultation process onwards. See, https://www.mkg.se/nyheter/naturskyddsforeningen-mfl-begar-rattsprovning-av-karnbransleforvarsbeslutet .

- The robustness of the safety case for a repository can appear high but is dependent on a number of assumptions that should perhaps not be ignored with the argument that a holistic view allows this.

Institutional mechanisms in United Kingdom to facilitate transparency and public participation in RWM.

Colin Wales, Director of Cumbria Trust, NTW member

National Context

The UK's Nuclear industry has been operational since the late 1940's, initially to acquire nuclear weapons through plutonium extraction at Windscale in West Cumbria[234]. The first UK civil nuclear reactor for electricity generation (Calder Hall)[235] was commissioned in 1956 and situated on the same site as the Windscale facility. The site is currently known as Sellafield where from 1997-2018, 9331 tonnes of

[234] Windscale Plutonium extraction piles. – Design, construction and siting https://en.wikipedia.org/wiki/Windscale_Piles

[235] Calder Hall – UK's first civil nuclear power plant. https://www.ice.org.uk/what-is-civil-engineering/what-do-civil-engineers-do/calder-hall-nuclear-power-station

spent nuclear fuel were reprocessed at THORP plant[236], primarily for overseas customers. The UK currently has a fleet of 15 operational nuclear reactors which comprise of 14 AGR's and 1 PWR[237] seven of which are due to be decommissioned before 2030. As a result of operations, the UK has an inventory of RW (source, current location, waste streams, volumes and activity), currently managed by the Nuclear Waste Services[238] (NWS) which is a wholly owned subsidiary of the NDA[239] (a corporate body under the direction of BEIS[240] (A UK Government department). Nuclear waste is stored at various locations around the UK (Fig 1) Several of these sites are currently licenced to dispose of LLW at the LLWR[241] facility at Drigg in Cumbria near Sellafield and VLLW at other sites in the UK as detailed in figure 15.

RW was first identified as an environmental pollution problem in the mid 1950's but was not recognised officially in the UK in 1976 with the publication of "Flowers Report"[242]. One of the conclusions being: - "There should be no commitment to a large programme of nuclear fission power until it has been demonstrated beyond reasonable doubt that a method exists to ensure the safe containment of long lived, highly RW for the indefinite future" (Para 338). In 1982 the UK Government set up the Nuclear Industry Radioactive Waste Executive NIREX[243], (subsequently to become UK NIREX Ltd in 1985) with specific responsibilities:

- to advise organisations and companies that produce RW on how they should package RW.
- to set standards for RW packaging. It monitored the processes of organisations and companies to check, for example, that they had procedures for keeping adequate records
- to produce on behalf of the UK Department for the Environment, Food and Rural Affairs an updated public record of the quantities and types of RW in the UK;
- to continue to develop understanding of the scientific, technological and environmental options for dealing with RW, including developing an understanding of the requirements for public acceptability.

[236] Thermal Oxide Reprocessing Plant THORPE
https://en.wikipedia.org/wiki/Thermal_Oxide_Reprocessing_Plant
[237] UK's current fleet of operational nuclear power plants
[238] NWS Nuclear Waste Services
[239] NDA Nuclear Decommissioning Authority
[240] BEIS
[241] Low Level Waste Repository (LLWR)
[242] Royal Commission on Environmental Pollution 6th Report Nuclear Power and the Environment
https://www.davidsmythe.org/nuclear/flowers%20commission%201976.pdf
[243] UK NIREX Ltd https://en.wikipedia.org/wiki/Nirex

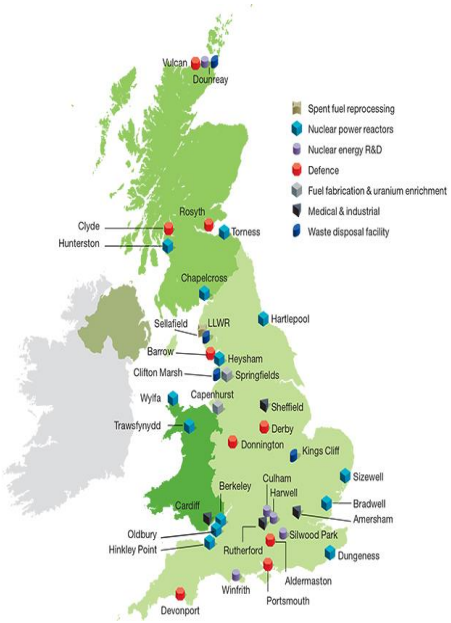


Figure 23 – UK Nuclear Licensed Sites. The UK's nuclear waste inventory is updated tri annually by the NDA in the form of the Radioactive Waste inventory report.[244] – Please refer to p.34 of the report for current and future wastes arising up and until 2135.

In the mid 1980's UK NIREX Ltd identified 4 potential sites for a LLWR as identified (figure 23).
UK NIREX Ltd implementation strategy was one of Decide, Announce and Defend. (DAD) The lack of public engagement, high-profile exposure on national television of sometimes violent public protests caused the abandonment by NIREX of all 4 prospective sites.

A retreat to the Nuclear Oasis

In 1989 UK NIREX Ltd identified two sites where it wished to build a Rock Characterisation Facility (RCF) Sellafield was eventually chosen over Caithness in Scotland. In 1992 NIREX acquired a parcel of land known as Longlands Farm where it began geological investigations for 4 years at a total cost of over £400M. This investigation resulted in a refusal of planning permission and a Public Inquiry, (1996) the result of which culminated in advice to the Secretary of State for the Environment to refuse planning to construct the GDF on grounds that NIREX had a poor understanding of the geology.[245, 246] The closing remarks of the Public Inquiry Inspector were "It would be better to look elsewhere" It is worth mentioning NIREX was mistrusted by local people and the County Council who rightly or wrongly thought an RCF was a precursor to a GDF. Nevertheless, it worth noting that NRIEX thereafter changed its policy to

include transparency in 1999 and elements of T&PP[247,248] although the notion of stakeholder engagement was recognised the notion of community volunteerism had not yet emerged as policy.

[244] 2019 UK Nuclear Waste Inventory Report https://ukinventory.nda.gov.uk/wp-content/uploads/2020/01/2019-Waste-Report-Final.pdf Contains public sector information licensed under the Open Government Licence v3.0
[245] NIREX Inquiry Inspectors report http://www.davidsmythe.org/nuclear/inspector's_report_complete.pdf
[246] NIREX Technical Assessors Report http://www.davidsmythe.org/nuclear/Assessor_report.pdf
[247] Inside NIREX, a lawyers view towards transparency https://www.lawgazette.co.uk/news/transparent-waste-the-in-house-team-at-radioactive-waste-disposers-nirex-has-to handle-cases-which-are-politically-sensitive-as-well-as-legally-complex-nirexs-head-of-legal-has-adapted-by-adoptin/20972.article
[248] Technocratic failures and the Participatory Turn https://www.osti.gov/etdeweb/servlets/purl/20789770

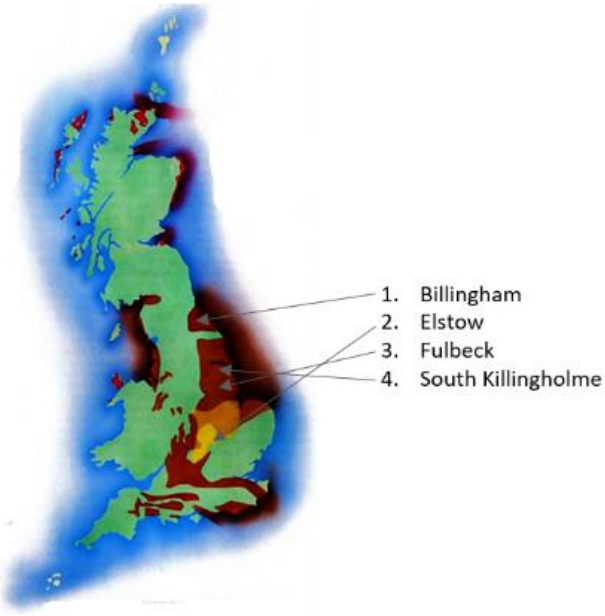


Figure 24 – 1980's proposed sites for potential GDF siting

CoRWM – Towards Volunteerism (Managing Radioactive Waste Safely – MRWS)

In 2003 the Government set up CoRWM[249] to consider how to manage the UK's higher activity radioactive waste (HAW) in the long term, protecting people and the environment. In July 2006 CoRWM reported to Government recommending :

- Geological disposal via a GDF is the best available long-term solution.
- Safe and secure interim storage is needed in the meantime.
- Further research & development is needed.

The government accepted these recommendations which led to the publication of a "White Paper"[250] "Managing Radioactive Waste Safely" (MRWS)[251] which set out a process of community engagement, defined what constituted a "host community", a "local decision-making body" and "Wider Local Interests" (p 48, 6.8). The MRWS process required an Expression of Interest (EoI) and following consultation by way of public engagement to determine support or otherwise, a Decision to Participate. (DtP). In 2010 three local authorities expressed an interest in participation, these were, Copeland Borough Council, (CBC) Allerdale District Council (ADC) and the Higher Tier Local Authority Cumbria County Council. (CCC). In 2011 as a part of the West Cumbria MRWS process it was agreed that for the process to move to desk based studies all three councils would have to agree. An understanding between the Councils and Government is set out in a series of letters between the parties.[252] After a period of extensive information gathering, identification of potential local areas for desk-based studies, public consultations, local public events and an IPSOS MORI telephone poll, the West Cumbria MRWS partnership published its final report and it was then up to each of the three Councils to decide whether to decide or not to proceed to the next decision point in the MRWS process of "desk-based studies" A vote by each

[249] CoRWM Responsibilities, Members, objectives and scope of work https://www.gov.uk/government/organisations/committee-on-radioactive-waste-management/about

[250] Policy documents produced by Government that set out their proposals for future legislation.

[251] MRWS 2006 publication https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/68927/7386.pdf

[252] Series of letters clarifying the engagement between Allerdale, Copeland and Cumbria County Council in the MRWS process https://cumbria.gov.uk/elibrary/Content/Internet/538/415439746.PDF

council took place on January 30th 2013 as to whether to proceed. Both Copeland and Allerdale agreed but the higher tier (CCC) declined to participate[253] giving 13 reasons as why it did not wish to participate further in the process. Allerdale District Council withdrew its DtP after it learned of CCC's decision.

Of note was the comment picked up by CCC and made by the previously employed MRWS consultant Geologist, who in a very well attended public meeting at Keswick stated "There was a low probability of finding a site in West Cumbria" – The MRWS process was subsequently terminated with the government recognising the process had finished in Cumbria.

Following the ending of MRWS process in 2013 the UK government issued a white paper in July 2014 "Implementing Geological Disposal".[254] (IGD) The white paper set out the process by which HAW would be managed in the long term through geological disposal, how potential sites will be identified, in addition to a geological National Screening exercise[255], through a new process of volunteerism and community engagement. In 2018 RWM Ltd actioned the national geological screening exercise which comprised of 13 regions, each divided into sub regions to take account of their known broadly similar geological characteristics. Although data was gathered for Northern Ireland there are no plans to site a GDF there as that is a devolved matter for consideration by the Northern Ireland Executive. Scotland has its own plan for RW and so no data was gathered for Scotland. The outcome of the National Screening exercise was an assessment of the geology in each region relevant to the safety of a Geological Disposal Facility (GDF).

In 2015 changes were made to UK planning law to recognise the development of a GDF as a Nationally Significant Infrastructure Project. (NSIP)[256] However, under the new "Working with Communities policy[257] (WWC) there must be at least one relevant Principle Local Authority as a member of a community must be a member of a Community Partnership (CP). Currently CCC have refused to join the Cumbrian CP's. However, the WWC defines a lower tier Local Authority such as CBC and ABC currently a 2nd tier local authority as a relevant principle local authority. These two authorities have agreed to be members of the relevant Community Partnership.

Overview of transparency process and the roles of stakeholders

During the MRWS process many communities felt very concerned their views were not being listened to. This was manifest by local opposition organising in areas where it was thought they were being targeted for geological investigations and at the time gave very well attended public presentations by Professors of Geology and Social Scientists. One group was formed in Allerdale; Solway Plain Against a Nuclear Dump (SPAND)[258] and one in Copeland, "No Ennerdale Nuclear Disposal" (NOEND)[259]. It should be noted that Ennerdale is located in the Lake District National Park which is a World Heritage

[253] Decision by CCC to withdraw from the MRWS process https://cumbria.gov.uk/elibrary/Content/Internet/538/41543992.PDF
[254] 2014 White Paper Implementing Geological Disposal https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/332890/GDF_White_Paper_FINAL.pdf
[255] Geological National Screening Exercise https://www.gov.uk/guidance/about-national-geological-screening-ngs
[256] 2015 Inclusion of a GDF as a NSIP https://www.legislation.gov.uk/uksi/2015/949/introduction/made
[257] Working with Communities policy https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/766643/Implementing_Geological_Disposal_-_Working_with_Communities.pdf
[258] Solway Plain against Nuclear Dump Campaign https://cumbriatrust.wordpress.com/the-2012-13-spand-solway-plain-against-nuclear-dump-campaign/
[259] NOEND No Ennerdale Nuclear Dump http://www.noend.org.uk/

Site[260] (WHS) and the Solway Coast is an Area of Outstanding Natural Beauty[261] (AONB), both are conferred with the highest levels of environmental protection. Requests for information by individuals and NGO's from the MRWS committee were sometimes denied, referred or answered by way of an FOI response with redactions. – A good example of this was a request for information about a MRWS meeting in 2011 to which 19 of 20 pages were redacted with the only discernible information being that the local MP was a vegetarian.

The formation of Cumbria Trust

The Cumbria Trust Ltd (CT)[262] was formed in the weeks after CCC gave its decision to terminate the MRWS process in 2013. One of its directors Eddie Martin was at the time the retiring leader of CCC who was responsible for ending the MRWS process. Cumbria Trust is not opposed to a GDF but contends it must be located in an area of "suitable geology" and have the support of both the local and wider communities.

Currently, Local Government reorganisation is taking place in Cumbria to form two Unitary Authorities in 2023 roughly splitting the administrative boundaries of Cumbria along a North - South axis and abolishing all the existing 2nd tier administrative authorities. *CCC is Currently the Higher Tier Local Authority encompassing all 6 (figure 25) 2nd Tier Local Authorities.*

Local Government reorganisation will see the abolition of both CCC and all 6 2nd tier administrative councils. In their place will be two higher tier Local Authorities ***Cumberland*** *to the West encompassing Copeland (where Sellafield is situated), Allerdale and Carlisle and* ***Westmorland and Furness*** *to the East encompassing Eden, South Lakeland and Barrow. These changes will come into effect in 2023.*

Figure 25 - Six 2nd Tier Local Authorities to be abolished with 2 new Principle Local Authorities from 2023 Copeland, Allerdale and Carlisle to merge creating a new single "Cumberland" PLA. South Lakeland, Eden and Barrow to be merged creating a new single "Westmorland and Fumess" PLA

The MRWS process did not rule out siting a GDF in either the LDNP (WHS) or the Solway Coast (AONB). This is something to which CT is against. It should also be noted that CT's position on nuclear power is neutral and, further, if the right containment geology can be found and a safety case made, CT is not opposed to a GDF. Cumbria Trust welcomes the new search area has been expanded to include the inshore coastal waters up to a distance of 22km from the Cumbrian coastline where there could be

[260] Lake District National (WHS) https://whc.unesco.org/en/list/422
[261] Solway Coast https://www.solwaycoastaonb.org.uk/2019/ Contains public sector information licensed under the Open Government Licence v3.0
[262] The Cumbria Trust Ltd https://cumbriatrust.wordpress.com/

the prospect of finding suitable containment geology.[263] CT's position of the prospect of finding suitable terrestrial containment geology is; that enough is known about the geology of West Cumbria to rule out the prospect of finding a safe suitable site on shore.

Working Groups, Community Partnerships, Composition and Process

The WWC policy allows any individual or group of people with an interest in the siting process to propose an area for consideration by NWS to site a GDF. If NWS indicates the area may have potential for a GDF, they must inform the PLA. If an LA agrees, a Working Group (WG) can be established with the view to forming a "Community Partnership" (CP). Currently, three Cumbrian WG's have progressed to CP status[264,265,266], each having identified search areas. (Figure 28,29,30) Further, all three Cumbrian CP's have agreed to exclude the LDNP from their search areas, with Allerdale also excluding the Solway Coast AONB. This is viewed as a positive step by many local environmental groups. Currently, the East Lincolnshire WG[267] has identified a search area (Figure 31) and has formed a CP. It should be noted that NWS can withdraw from the process at any time for technical reasons or other reasons which demonstrated there were no longer prospects of finding a suitable site within either the Search Area or Potential Host Community. Before NWS seeks regulatory approval and development consent to begin construction of a GDF in a particular community, there must be a Test of PUBLIC Support of residents in the Potential Host Community to determine whether the community is willing to host a GDF. Should a community decide via this test that it does not wish to host a GDF then the process will conclude and a GDF will not be built. The WWC policy (6.100) expects that a community decision as to whether to proceed to the construction phase; "would only be taken after extensive community engagement when the community has had time to ask questions, raise any concerns and learn about a GDF. There will be only one opportunity for a Test of Public Support in each Potential Host Community. However, the Government expects the Community Partnership to monitor public opinion throughout the process".[268]

The WWC (6.98) directs that a "Test of Public Support" by the CP could be: - A local referendum, a formal consultation or statistically representative polling. If new methods to test public opinion emerge in the future, the Community Partnership may wish to consider a different approach.

Conclusions on Transparency – A UK perspective

Up and until the end of the MRWS requests for information from CSO's to the WMO were sometimes ignored, in some cases not provided or if they were, many contained redactions by the WMO, even where there were no national security implications. The issue of transparency concerning Nuclear Waste in the UK is now resolved with requests for information by members of the public and CSO's to NWS, the ONR and CoRWM always met and in a timely way.

Public Participation in decision making processes and access to Justice - Why it matters.

The current process as to whether or not to site a GDF in West Cumbria will ultimately rest with the community were NWS want to site it. The CP will take the decision as to when to hold a test of public support. There will only be one test of public support. Current guidelines as outlined in the WWCL suggest a timeframe of between 10-15 years. However, it is expected that CP's will monitor community opinion throughout the process.

[263] Comparing the prospectivity of hydrogeological settings for deep radioactive waste disposal https://link.springer.com/article/10.1007/s10040-020-02182-2

[264] Mid Copeland GDF Community Partnership https://midcopeland.workinginpartnership.org.uk/

[265] South Copeland GDF Community Partnership https://southcopeland.workinginpartnership.org.uk/

[266] Allerdale GDF Community Partnership https://allerdale.workinginpartnership.org.uk/

[267] Theddlethorpe (Lincolnshire) Working Group https://theddlethorpe.workinginpartnership.org.uk/

[268] Office of Nuclear Regulation guidance for Geological disposal https://www.onr.org.uk/pars/2018/non-site-specific-16-032.pdf

The 2009-2013 MRWS process demonstrated there were diverging views on the geological suitability for siting a GDF anywhere within the terrestrial geology of West Cumbria. The MRWS committee concluded that not enough was known about the geology to say with any certainty the geology was unsuitable while independent geological experts concluded that more than enough was known concerning the unsuitability of the geology. The contested professional opinion on the geological suitability was highlighted as one reason given by CCC to for its decision to terminate the MRWS process in 2013. The WWCL prescribes that expert opinion can be sought from a variety of sources, such as RWM itself, CoRWM, and experts elsewhere but, where scientific and technical issues remain contested the WWCL provides for a TPEVM[269] though UK "Learned Societies" such as the Geological Society[270].

Currently the issue as to what defines/constitutes a community when considering siting a GDF is addressed in the WWC by limiting the definition to a small number geographically contiguous political ward boundaries with local representation on CP's limited to those that exist within the search area. The notion of defining a community is a nebulous concept for many reasons but failing to address the concerns of wider community interests, particularly when your immediate neighbour is a WHS may well lead to vocal opposition of the process.

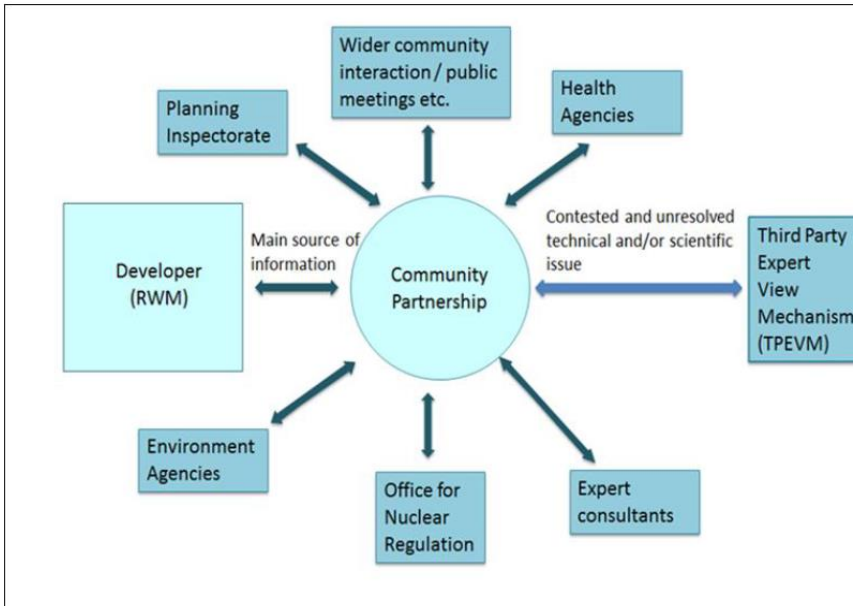


Figure 26 - Community Partnership interactions with external bodies

Monitoring and Retrievability – An ethical argument spanning generations.
During the MRWS process monitoring and retrievability were issues raised by the MRWS Partnership as conditions for community acceptance. However, at the time these questions remained unaddressed by the NDA as policy was and still is one of passive safety. Yet regulators who will have to be convinced of a "safety case" can never give a 100% guarantee concerning future safety. It is for this reason, any community which is being asked to approve the construction of a GDF by way of a test of public support will need to be certain of what risks (however small) exist and it follows no community will be able to do that unless it educated to understand what risks will persist both to their generation and for those who will follow. There is no reason to believe the same community concerns on monitoring and retrievability won't be an issue again and these may need to be addressed before a community in West Cumbria will give its consent for the siting of a GDF. An ethical matrix is given in Appendix outlining some of the

[269] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/766645/Third_Party_Expert_View_Mechanism_and_Annex.pdf
[270] UK Geological Society https://www.geolsoc.org.uk/

issues which will need to be addressed from different perspectives as the community engagement process progresses.

The issue of monitoring and potential retrievability has resource implications going forward but they also have the potential to be addressed in an intergenerational context by investment and may well have answers in the WWC policy in the Community Vision section and the "Significant Additional Investment" mentioned and as set out in section 6.79.

Significant Additional Investment. – Distributive Justice

Additional to annual community engagement funding for CP's as set out in the WWC policy, the community selected to host a GDF will receive "Significant Additional Investment which would be comparable to other international GDF Projects". As to what that might mean in the context distributable justice the only current comparable reference is with the Swedish waste inventory where the two communities involved in the Swedish GDF process will share €312M. A like for like inventory basis would be a difficult calculation to make as the UK's inventory continues to increase both by activity and volume but a conservative estimate would currently be between €5Bn-€6Bn. As to what that might mean in the context of the wider Cumberland Community and the potential to leverage long term public and or private investment, significant opportunities present themselves. Long-term sustainable revenue streams could fund an enduring monitoring and rolling stewardship programme when institutional control ceases. By way of example, a large infrastructure investment in two tidal power and transportation barrages spanning Morecambe Bay and the Duddon Estuary would generate in excess of 4Gw of renewable energy, connect West Cumbria with North Lancashire, serve the three nuclear communities of Sellafield, Barrow-in-Furness and Heysham, open up the Western Lake District to increased visitor numbers and supply cheaper electricity to both households in West Cumbria and large industrial users attracting further investment. The lifetime of a barrage scheme would be over 120 years.

<u>The arguments yet to be tested can be framed in the context of a "Decision Making Process and access to justice.</u>

1) By excluding the wider community (previously included in the MRWS Process) has the legitimacy of the democratic process been weakened?
2) Who will be "invited" to join the Community Partnerships and how will that be decided?
3) To what extent will investment be made available to "educate" communities so that when the final text of public support is made a community could be said to have the confidence to understand what risks it may be placing on future generations?
4) In the event that a community takes a future decision not to participate (for reasons of intergenerational ethics) after the WMO may have spent £100's of millions on investigating the suitability of the geology, which may support a safety, case then could the law be changed to ignore the will of the community in the National Interest?

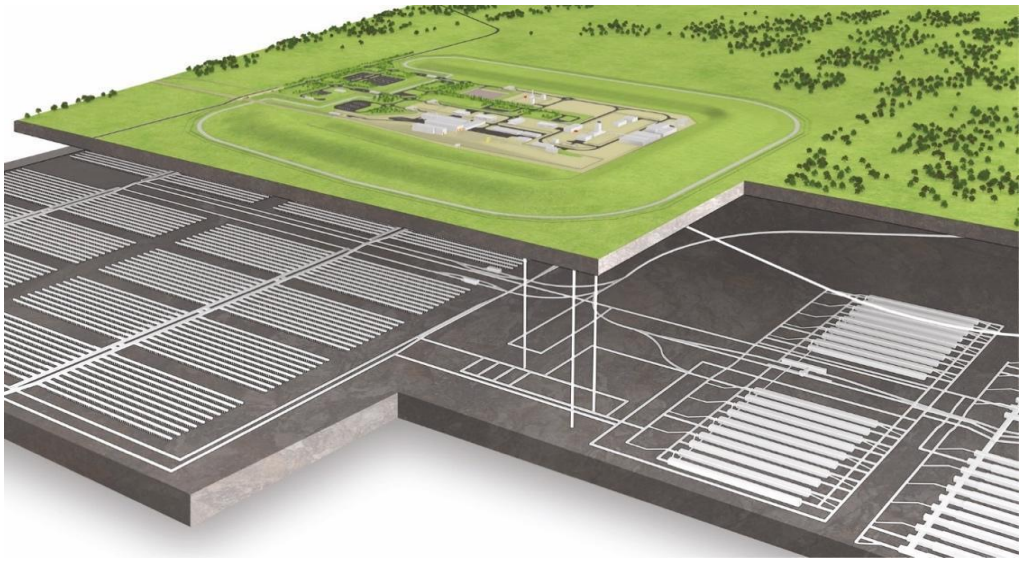


Figure 27 - Artist impression of surface and underground storage facilities of a Geological Disposal Facility

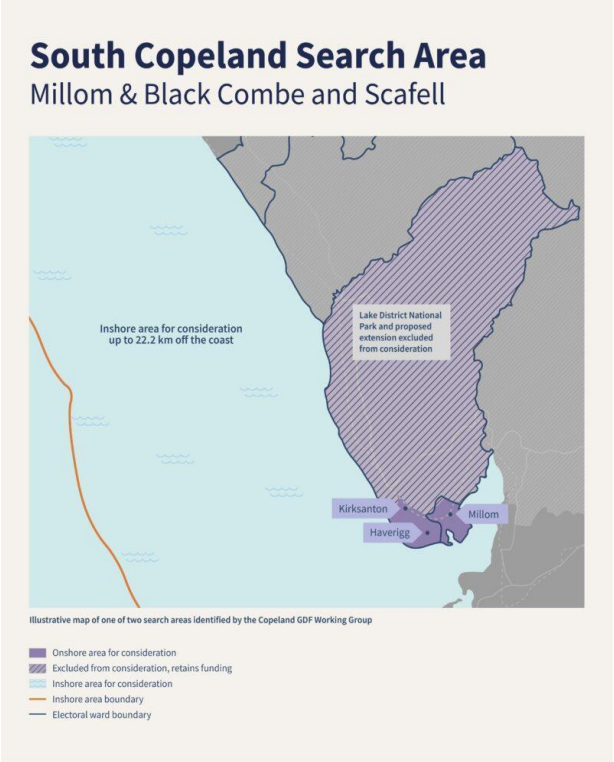


Figure 28 - South Copeland Search Area

Figure 29 - Mid Copeland Search Area

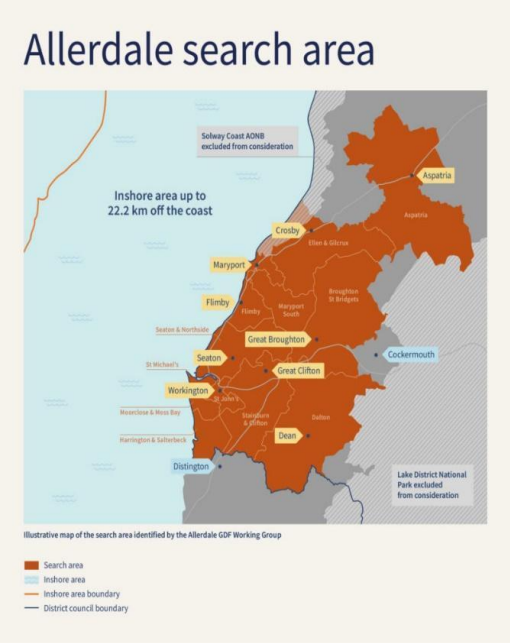


Figure 30 - Allerdale search area

Figure 31 - Theddlethorpe search area

	Autonomy	**Justice**	**Wellbeing**
Governmental Institutions	*Respecting the authority of democratically elected institutions and officials *Political decision-making legitimacy	* Building Partnerships, sharing decision making authority with stakeholders	* Implementing RWM strategies that lower the risk to the aggregate UK population
Nuclear Industry	* Freedom to generate and trade in (nuclear powered) electricity	* Ensuring benefits of continued electricity production outweigh risks/costs to the public	* Reducing risks to communities, future generations, workers and the environment
Host Community	*Self-determination in local land-use decision making *Volunteerism for eligible communities *Veto Power	*Receiving compensation or community benefits package *Avoiding 'bribery' i.e., not allowing development capital to be used to encourage economically dependent communities to volunteer	*Having protection from risks *Long-term socio-economic stability *Freedom from social stigma
Future Generations	*Freedom to adopt alternative RWM strategies if better technological solutions arise	*Better living conditions than current generations	*Continued unhindered access to resources
The Environment	*Representing non-human interests by proxy in a decision-making process	*Ensuring that non-humans are valued equally to humans in decision making	*Maintaining biodiversity *Protecting individual organisms or aggregate ecosystems from environmental degradation and resource depletion

Table 11 - Ethical matrix

Acknowledgement - Dr Matthew Cotton