“Study on radioactive waste classification schemes in the European Union”

Final report

ENER/2021/NUCL/SI2.853676

IDOM Consulting, Engineering, Architecture SAU
BGE Technology GmbH
Final Report December 2022

EUROPEAN COMMISSION

Directorate-General for Energy

Directorate D— Nuclear energy, safety and ITER

Unit D.2— Nuclear energy, nuclear waste and decommissioning

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European Commission

B-1049 Brussels

Luxembourg: Publications Office of the European Union, 2023

ISBN: 978-92-76-61578-1

DOI: 10.2833/987498

Catalogue number: MJ-08-22-340-EN-N

This document has been drafted under Contract ENER/2021/NUCL/SI2.853676 by:

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Abstract

English

In 1999, the European Commission published a recommendation[1] that Member States should be provided with guidance on a common approach to the classification of radioactive waste. Project ENER/D2/2020-377, entitled 'Study on radioactive waste classification schemes in the European Union', aims to provide an overview of the current radiological waste classification system in each of the Member States and to assess how such systems compare with the Commission recommendation. The project's ultimate objective is to determine if there is any merit in adopting a holistic approach to waste classification across the Member States. Liaison, both verbally and via a questionnaire, was undertaken with the waste management organisations of each Member State, in addition to a selection of waste producers. This EU-wide assessment was complemented by a survey on the public's awareness of radioactive classification schemes. In general terms, the feedback from both waste management organisations and waste producers was that existing radioactive waste classification schemes are considered to adequately facilitate cross-border cooperation in relation to radioactive waste. It was apparent that all Member States have developed their waste management strategy on the basis of national conditions and generally have country-specific waste classification systems that ensure safe waste management. Most Member States believe that their current approaches are working in an adequate manner, especially as EU directives have been incorporated into their legislation. Notwithstanding this fact, suggestions have been made on how an EU-wide holistic approach to waste classification could be established.

[1] Commission recommendation of 15 September 1999 on a classification system for solid radioactive waste (SEC(1999) 1302 final) (1999/669/EC, Euratom), OJ L 265, 13.10.1999, p. 37.

French

En 1999, la Commission Européenne (CE) a publié une Recommandation[2] pour fournir aux États Membres (EM) des préconisations sur une approche commune de la classification des déchets radioactifs. Le Projet ENER/D2/2020-377, intitulé (‘Étude sur les systèmes de classification des déchets radioactifs dans l’Union européenne (UE)’), vise à fournir une vue d’ensemble des systèmes actuels de classification des déchets radioactifs utilisés dans chacun des EM de l’UE et à évaluer de quelle manière ces systèmes sont comparables avec la Recommandation de la CE. L’objectif final du projet est de déterminer s’il y a lieu d’adopter une approche holistique de la classification des déchets dans les États membres de l’UE. Des contacts, à la fois verbaux et par le biais d’un questionnaire, ont été établis avec les Organisations de Gestion des Déchets (OGD) de chaque État membre de l’UE, ainsi qu’avec une sélection de Producteurs de Déchets. Cette évaluation à l’échelle de l’UE a été complétée par une enquête sur la sensibilisation du public aux systèmes de classification des déchets radioactifs. D’une manière générale, les OGD et les Producteurs de Déchets ont indiqué que les systèmes de classification des déchets radioactifs existants sont considérés comme facilitant de manière adéquate la coopération transfrontalière en matière de déchets radioactifs. Il est apparu que tous les États Membres ont élaboré leur stratégie de gestion des déchets en fonction de leur propre situation et disposent généralement de systèmes de classification des déchets propres à leur pays, leur garantissant ainsi une gestion sûre des déchets. La plupart des États Membres estiment que leur approche actuelle fonctionne de manière adéquate, d’autant plus que les directives de l’UE ont été intégrées dans leur législation. Malgré cela, des suggestions ont été faites sur la manière the une approche holistique de la classification des déchets pourrait être mise en place à l’échelle Européenne.

[2] Commission recommendation of 15 September 1999 on a classification system for solid radioactive waste (SEC(1999) 1302 final) (1999/669/EC, Euratom), OJ L 265, 13.10.1999, p. 37

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ABBREVIATIONS

ADR	Agreement concerning the International Carriage of Dangerous Goods by Road
DG Energy	Directorate-General for Energy
Euratom	European Atomic Energy Community
GSG	general safety guide
HASS	high-activity sealed source
HLW	high-level waste
IAEA	International Atomic Energy Agency
ILW	intermediate-level waste
LILW	low- and intermediate-level waste
LLW	low-level waste
NEA	Nuclear Energy Agency
NGO	non-governmental organisation
NORM	naturally occurring radioactive materials
NPP	nuclear power plant
OECD	Organisation for Economic Co-operation and Development
VLLW	very-low-level waste
VSLW	very-short-lived waste
WAC	waste acceptance criteria
WMO	waste management organisation

1. EXECUTIVE SUMMARY

The project was delivered through six interrelated tasks, generally conducted in consecutive order, although some parallel working was also undertaken. Task 1 was initiated first and involved undertaking a gap analysis of the extent of use of the recommended European Commission radioactive waste classification scheme in each Member State (as set out in the Commission recommendation on a classification system for solid radioactive waste, hereinafter 'the Commission recommendation'). The findings are summarised in Section 3. The differences and gaps between each Member State's waste classification scheme and the Commission recommendation were also noted. A final summation is presented in both written and tabular forms, and the information fed into all subsequent tasks of the project.

Section 4 presents the aims of Task 2 and how it was conducted. The primary objective was to analyse whether the Member States' waste classification practices cohere with the International Atomic Energy Agency (IAEA) general safety guide (GSG) *Classification of Radioactive Waste*, No GSG-1 (hereinafter 'IAEA GSG-1'). For this purpose, a thorough analysis of the waste classification system of each Member State was conducted, as summarised in Annex I. The section concludes with an assessment of the potential to harmonise classification schemes in the EU with respect to drafting an inventory of radioactive waste in its territory through adhering to IAEA GSG-1. In addition, transparency requirements and cross-border cooperation with respect to the utilisation of IAEA GSG-1 are discussed.

Section 5 discusses Task 3 of the project, which reviews the existing systems in the EU concerning the definition of waste categories. In practice, waste categories are needed to undertake safety analyses of waste-handling facilities (e.g. to draw up the safety case for a facility). The safety analyses in turn allow the identification of limits and conditions for the operation of waste facilities that form the basis for waste acceptance criteria (WAC). The main objective of WAC is thus to allow an increased level of safety in waste management. WAC not only define limits for radionuclides, they also define the permitted physical and chemical forms of the waste matrix and prescribe boundary conditions for transport containers, thus reducing the operational risk when handling radioactive materials. This section analyses existing practices in the application of WAC in the EU, with a special focus on the countries with an established nuclear power programme. The conclusions obtained were intended to inform the study's analysis of the current relevance of the Commission recommendation.

Task 4 assessed the awareness of the public of radioactive waste management in general and classification schemes in particular. To implement this task, the project team created a questionnaire to collect feedback from the public across the 27 Member States. The survey had 22 questions, which were intended to ascertain how well informed the respondents thought they were about nuclear waste classification, how much the respondents knew about radioactive waste and what their concerns might

be, and what their views were about a harmonised approach to radioactive waste across the Member States. To obtain comparable data, the questionnaire included a number of questions that were first asked in the 2008 Eurobarometer survey on radioactive waste. Based on the results, an analysis of the level of awareness the public have of these classification schemes and their views on the potential for a harmonised waste classification approach across the Member States are presented and discussed. Please refer to Section 6 of this report for further details.

Task 5, presented in Section 7, has the primary objective of identifying possible issues or barriers to cross-border cooperation arising from waste classification schemes. For this purpose, a 15-question survey was formulated by the project team and approved by the contracting authority (a service of the Commission's Directorate-General for Energy). The survey was sent out to 27 waste management organisations (WMOs) across all of the Member States and to a total of 50 waste producers, the latter covering the generation of different types of radiological waste (e.g. nuclear power plants, industry, naturally occurring radioactive materials, medical use, agriculture, research and the fuel cycle). Based on the survey results, how conducive existing national and international classification schemes are to effective and efficient cross-border cooperation is discussed.

Finally, Section 8 presents considerations for improving the EU's radioactive waste classification schemes. The aim of Task 6 of the project is to draft a synthetic review of the previous considerations about the radioactive waste classification schemes. The intention is to point out good practices, and challenges at EU level, and to outline considerations for an actionable holistic EU radioactive waste classification scheme, which would tackle the challenges and promote good practice. The analysis concludes with seven recommendations related to the following general areas:

- **Further and enhanced communication with citizens.** The survey of citizens provided a key message that many people did not really have a sound understanding of radioactive waste management issues. This was especially true of roles and responsibilities, transportation, the different types of waste and the fact that not all radioactive waste is hazardous. Enhanced communication should come from all components of the nuclear industry (WMOs, waste producers, regulators and government departments).
- **Development of a classification scheme based on the final solution for waste streams.** Adopting a harmonised waste classification system across the Member States is likely to lead to a different set of challenges, as many Member States, although recognising that harmonisation can often be positive, do not ideally wish to change the status quo. Generally, Member States manage their waste according to their final waste management/disposal concept, and then define waste classes based on the respective activities and half-lives of the isotopes. Disposal concepts are likely to differ between Member States due to different inventories and regulatory systems leading to the definition of different waste classes. One potential way to overcome differences between Member States and the associated challenges

would be to construct a classification based on the final solution for waste streams and define the waste classes based on the disposal solutions. High-level waste (HLW), for example, can be divided into two subclasses: waste from reprocessing and directly disposed spent fuel. Non-heat-generating waste can then be divided into waste for disposal in geological repositories, waste for disposal in intermediate depths, waste for disposal in near-surface repositories and waste for disposal in surface landfills.

- **A clearer distinction between radioactive materials and waste, and clarification of how each is defined.** A number of WMOs and waste producers remarked that radioactive materials and waste should be better defined. This is crucial as the international community strives to adopt the principles of the circular economy and adhere to the waste hierarchy.
- **How waste classes should be related to the requirements for transport, processing, storage and disposal.** An ideal and practical waste classification scheme should consider all aspects of interim and final waste management. In a top-down system, detailed requirements below the level of waste classes can be developed for issues related to processing, storage, transport and disposal. WAC help determine what can and cannot be accepted by the party receiving the waste for either storage or disposal. In this way, one waste classification system could be used to facilitate communication with the public or compare various international inventories through the higher levels of the scheme while the lower levels of the same scheme, with more detail, could facilitate professional exchange on requirements.
- **Any proposal for a harmonised waste classification should involve regulators, government departments, WMOs and waste producers.** Any consideration of the formulation and adoption of an EU-wide harmonised approach to radioactive waste classification should involve all relevant parties.
- **Actions for industry to gain/regain trust.** Further and enhanced communication with citizens would not only increase trust and transparency but potentially allow Member States to gain greater support for waste disposal initiatives in general.

2. INTRODUCTION

In 1992, the European Atomic Energy Community (Euratom) produced an action plan calling for concerted action on the safe management of radioactive waste. A key component of this plan was, where possible, to develop a common approach to radioactive management strategies and practices across the Community. In 1999, the Commission recommendation on a classification system for solid radioactive waste (hereinafter 'the Commission recommendation') ([3]) was published to provide Member States with guidance on a common approach to the classification of radioactive waste.

Later, in 2006 and 2011, respectively, further significant steps in this process were the adoption of Council Directive 2006/117/Euratom ([4]) (hereinafter 'the shipment directive') and Council Directive 2011/70/Euratom ([5]) (hereinafter 'the waste directive'). The latter in particular sets out a common framework, with obligations in terms of safety, protection of workers and the general public, and transparency, supplementing Council Directive 2013/59/Euratom on basic safety standards as regards spent fuel and radioactive waste ([6]).

In parallel with these developments within the Community, international standards evolved as well. In particular, the waste classification scheme published by the International Atomic Energy Agency (IAEA) in 1994 was superseded in 2009 by the current IAEA general safety guide (GSG), GSG-1 ([7]).

More recent reports ([8]) from the Commission and the outcome of a specific expert study ([9]) show that a revamping of the recommended classification system for radioactive waste may be needed.

In 2021, the Directorate-General for Energy (DG Energy) contracted IDOM Consulting, Engineering, Architecture, SAU, along with the consortium partner BGE Technology GmbH, to implement this project,

([3]) Commission recommendation of 15 September 1999 on a classification system for solid radioactive waste (SEC(1999) 1302 final) (1999/669/EC, Euratom), OJ L 265, 13.10.1999, p. 37.
([4]) Council Directive 2006/117/Euratom of 20 November 2006 on the supervision and control of shipments of radioactive waste and spent fuel, OJ L 337, 5.12.2006, p. 21.
([5]) 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, OJ L 199, 2.8.2011, p. 48.
([6]) Council Directive 2013/59/Euratom of 5 December 2013 laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation, and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom, OJ L 013, 17.1.2014, p. 1.
([7]) IAEA, *Classification of Radioactive Waste*, General Safety Guide No GSG-1, Vienna, 2009.
([8]) European Commission, Report from the Commission to the Council and the European Parliament on progress of implementation of Council Directive 2011/70/Euratom and an inventory of radioactive waste and spent fuel present in the Community's territory and the future prospects, COM(2017) 236 final; European Commission, Report from the Commission to the Council and the European Parliament on progress of implementation of Council Directive 2011/70/Euratom and an inventory of radioactive waste and spent fuel present in the Community's territory and the future prospect – Second report, COM(2019) 632 final.
([9]) European Commission, Directorate-General for Energy, *Benchmarking analysis of Member States approaches to definition of national inventories radioactive waste and spent fuel* – Final report, No ENER/2018/NUCL/SI2.778797, Publications Office of the European Union, Luxembourg, 2020.

entitled ‘Study on radioactive waste classification schemes in the European Union’, project code ENER/D2/2020-377.

The goal is to provide an overview of the current radiological waste classification systems in each of the Member States and assess how the systems compare with the Commission recommendation. The ultimate aim will be to determine if a holistic approach to waste classification across the Member States is warranted and, if so, to provide a recommendation on the improvements required in order to devise such a system. This in turn will have the potential to establish an assured EU-wide inventory of radioactive waste. In addition, the project will, through reaching out to a cross section of stakeholders (industry and the civilian population), determine the level of awareness regarding waste classification systems and assess the potential barriers to cross-border cooperation.

This 15-month project, starting in September 2021, was split into the following series of high-level tasks:

- Task 1: an analysis of potential gaps between each Member State’s waste classification systems and the Commission recommendation;
- Task 2: a comparison of Member States’ classification systems against IAEA GSG-1;
- Task 3: an analysis of how waste acceptance criteria (WAC) and Member States’ national strategies correlate to and depend on each other;
- Task 4: a survey of the public’s awareness of radioactive waste classification schemes;
- Task 5: an assessment of the potential barriers to cross-border cooperation at EU level;
- Task 6: a synthesis in view of a recommended European radioactive waste classification scheme.

3. TASK 1: GAP ANALYSIS BETWEEN PRACTICE AND THE RECOMMENDED CLASSIFICATION SCHEMES

Task 1 is entitled 'Gap analysis between practice and the recommended classification schemes' and has the objectives of analysing the extent of use of the recommended classification scheme, highlighting the gaps between practice and the recommended classification scheme in each Member State, and noting the gaps between the Commission recommendation and current international standards. A Europe-wide synthesis identifying common patterns will also be provided.

Task 1 will attempt to answer the following key question set by the Commission in the project scope:

> *Q1) to what extent is the EC's Recommendation relevant or applicable nowadays in the Euratom framework for nuclear safety and safe and responsible management of radioactive waste and spent fuel (the waste directive)?*

3.1. Methodology

A simple road map was devised in order to progress Task 1 of the project in a logical manner. This road map set out the various activities in chronological order:

- First, a review of all previous work (referenced by the Commission in the project's terms of reference) and references related to the subject of this project was undertaken.
- An assessment and summation of each Member State's waste classification practices took place.
- A high-level summary of the international context of radioactive waste classification was produced. This primarily focuses on IAEA GSG-1, but an assessment of other international guidance was undertaken in order to determine its potential relevance to the project (i.e. guidance from the United Nations Scientific Committee on the Effects of Atomic Radiation, the International Commission on Radiological Protection, the Organisation for Economic Co-operation and Development (OECD) / the Nuclear Energy Agency (NEA), etc.). Task 2 of the project provided a more detailed assessment of whether Member States are following IAEA GSG-1 or not.
- An assessment of each Member State's classification system was then performed against the Commission recommendation. Differences and gaps between each Member State's waste classification system and this recommendation were noted.
- The final summation is presented in both written and tabular forms (supported by a spreadsheet that contains details of all of the Member States' waste management and classification practices) in order for the information to feed into all subsequent tasks of the project.

- A final summation was made against Q1 set out by DG Energy in the tender.

The review was undertaken through assessing existing Commission documentation in addition to various online references. In some instances, the project team confirmed some of these facts directly with the waste management organisations (WMOs), especially during the completion of Task 2.

3.2. Review of Member States' waste classification schemes compared with the Commission recommendation

A factual appraisal of the current waste classification system in each Member State was undertaken. The results are documented in Annex I, European Union Member States' waste classification systems.

In providing a factual assessment of each Member State's classification system, it was clear that some countries (Ireland, Cyprus Luxembourg and Malta) that did not have civilian nuclear fuel cycle facilities or significant research programmes were unlikely to require a formal waste classification system. The only radioactive waste/materials in these countries arose from medical, sealed sources or minor research activities.

None of the 27 Member States exactly followed the classification scheme set out in the Commission recommendation, although many utilised it and/or IAEA GSG-1 as the basis for the rules to which they currently adhere.

3.2.1. Summary of international best practice

The review of each Member State's waste classification scheme was complemented by a high-level summary of the international context of radioactive waste classification. Reviewing the international context showed that apart from the IAEA, other internationally recognised organisations have not provided guidance on how to adopt a radioactive waste classification scheme (although it should be recognised that the development of such a scheme would not have been in their remit). These organisations include the International Commission on Radiological Protection, the United Nations Scientific Committee on the Effects of Atomic Radiation and the European Nuclear Safety Regulators Group, although the last of these does reference the IAEA classification scheme shown in IAEA GSG-1.

OECD/NEA do refer to waste classification within their work and projects relating to waste inventories. OECD/NEA published a report in 2020 entitled *National inventories and management strategies for spent nuclear fuel and radioactive waste* (NEA No 7424). Although the study was focused on national inventories, it did touch on the subject of waste classification and made the following observation: 'It should be noted that radioactive waste classification, along with the qualitative and quantitative criteria used, significantly depend on the current and/or planned short-term and long-term strategy of

radioactive waste management in a given country and on its nuclear infrastructure and regulatory practices'. A preceding study published in 2017 with the same report title (NEA No 7371) made an observation that although many Member States have developed waste classification schemes in line with IAEA GSG-1, only a few have adopted the GSG in its entirety. This was cited as being due to a number of factors, including the long-standing use of a different system and the logistical difficulties that would be encountered when switching to a new system. This point is worth revisiting when our current project provides recommendations about the merits of developing a harmonised waste classification across the 27 Member States. It is clear from these studies that the variances observed in the Member State's waste classification strategies will have an impact on how national inventories are constructed for each specific waste category (i.e. there will be little ability to make like-for-like comparisons).

As Task 2 of the project provides an in-depth assessment of how each Member State's radioactive waste classification system adheres to IAEA GSG-1, only a high-level assessment of this document was undertaken within Task 1. This high-level assessment has shown that many of the 27 Member States have developed their waste classification system by taking cognisance of the guidance set out in IAEA GSG-1.

3.2.2. Naturally occurring radioactive material waste

Task 1 also made a brief assessment of the status of naturally occurring radioactive material (NORM) waste within the various Member States. This assessment concluded that:

- NORM waste, including that from the mining and processing of uranium ore, belongs to the very-low-level waste (VLLW) category, except in a few circumstances (scales from the oil and gas industries) where it has particularly high activity concentrations;
- disposal of NORM waste can generally be accomplished in a landfill facility identified for VLLW;
- the upper limits for VLLW are one or two orders of magnitude higher than exemption levels for artificial radionuclides;
- the appropriate category for ultrafiltration waste is unclear.

Factors influencing the regulatory decision to define NORM waste as radioactive waste may include the structure of the legal framework, availability of infrastructure for waste treatment and disposal, or risk perception by the public. The literature assessed indicates that most of the Member States are trying not to dispose of NORM in their national disposal facilities as VLLW, because the volumes of NORM can be significant.

3.2.3. An overview of orphan radioactive sources

Task 1 also made a brief assessment of the status of NORM waste within various Member States. Directive 2003/122/Euratom ([10]) (hereinafter 'the HASS directive') requires EU Member States to establish a system for ensuring the safety and security of high-activity sealed sources (HASSs). These sources need to be subject to strict supervision from the moment they are manufactured to the moment they are placed in a recognised installation for long-term storage or final disposal. In addition, the HASS directive requires Member States to make arrangements for recovering orphan radioactive sources and dealing with situations in which orphan sources are encountered unexpectedly. These requirements are in line with the international guidance provided by the IAEA. In 2018, the HASS directive was repealed and replaced by the corresponding provisions in the new EU basic safety standards directive (Directive 2013/59/Euratom).

3.3. Findings across the EU Member States

The primary objective of Task 1 was to undertake a comparison of each Member State's radioactive waste classification system with the Commission recommendation. This section provides an overview of that assessment and the initial conclusions drawn.

The Commission recommendation proposed for its Member States was created with the view that a harmonised approach to the classification of radioactive waste would be beneficial in that it would improve communication and facilitate information management across the Community. This would in turn enable politicians and the public to more easily understand the classification of radioactive waste.

The classification system is primarily based on the IAEA's classification scheme (at the time, the relevant document was the IAEA's safety standards on the classification of radioactive waste (Safety Series No 111-G-1.1), but this was subsequently superseded in 2009 by IAEA GSG-1), with the exception that the IAEA's recommended limit for heat generation in low- and intermediate-level waste (LILW) (2 kW/m^3) was not retained. The proposed classification system is based on radioactivity content, duration and the thermal power generated, and is as follows:

- **Transition radioactive waste.** This is a type of radioactive waste (mainly from medical origin) that will decay within the period of temporary storage and may then be suitable for management outside of the regulatory control system, subject to compliance with clearance levels. It is suggested to use 5 years as the maximum duration of decay; beyond this period of 5 years, the waste should be regarded as LILW. The clearance levels are values established by national

([10]) Council Directive 2003/122/Euratom of 22 December 2003 on the control of high-activity sealed radioactive sources and orphan sources, OJ L 346, 31.12.2003, p. 57.

competent authorities and are expressed in terms of activity concentration and/or activity at or below which radioactive substances or materials containing radioactive substances arising from any practice subject to the requirement of reporting or authorisation may be released from the requirements of Directive 96/29/Euratom ([11]). These levels must follow the basic criteria used in Annex 1 to the Euratom basic safety standards under Council Directive 96/29/Euratom and must take into account any other technical guidance provided by the EU.

- **LILW.** In LILW, the concentration of radionuclides is such that generation of thermal power during its disposal is sufficiently low. These acceptable thermal power values are site-specific, and are set following safety assessments.
    - **The subset of short-lived waste.** This category includes radioactive waste with radionuclides with a half-life less than or equal to those of Cs-137 and Sr-90 (around 30 years), and a restricted alpha long-lived radionuclide concentration (limitation of long-lived alpha-emitting radionuclides to 4 000 Bq/g in individual waste packages and to an overall average of 400 Bq/g in the total waste volume).
    - **The subset of long-lived waste.** This covers long-lived radionuclides and alpha emitters whose concentrations exceed the limits for short-lived waste.
- **High-level waste (HLW).** This covers waste with a concentration of radionuclides high enough that generation of thermal power must be considered during its storage and disposal (the thermal power generation level is site-specific, and this waste mainly comes from the treatment/conditioning of spent nuclear fuel).

3.3.1. Earlier European Commission projects

In 2018, the European Commission commissioned a different study entitled 'Benchmarking analysis of Member States approaches to definition of national inventories radioactive waste and spent fuel', with the final report ([12]) released in February 2020. Although the focus of that project was on national inventories, the consultants did touch on waste classification within Chapter 5 and drew some conclusions. It is worth reiterating some of these below.

([11]) Council Directive 96/29/Euratom of 13 May 1996 laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionizing radiation, OJ L 159, 29.6.1996, p. 1.
([12]) European Commission, DG Energy, *Benchmarking analysis of Member States approaches to definition of national inventories radioactive waste and spent fuel – Final report*, No ENER/2018/NUCL/SI2.778797, Publications Office of the European Union, Luxembourg, 2020.

Finding #4 for example highlighted that '[a]ll the radioactive waste classification in-use in Member States are not necessarily supported by a legal framework, some being the result of past "good practices" in line with MS [Member State] radioactive waste installations with subsequent acceptance by regulators'.

They also concluded that:

> *For the majority of Member States (21), the waste classification is consistent with international IAEA recommendations, covering the entire range of radioactive waste: from exempt to high-level wastes. Such Member States are considered being in a position to efficiently categorize and identify any type of waste.*
>
> *It must be noted that in some cases, some divergence can be observed:*
>
> — *some categories can also be merged, when a common management route exists for two wastes categories (*Low and Intermediate level waste for example*), some Member State merge these categories in their classification.*
>
> — *some categories can be officially excluded by Member States, in France for example as there is no clearance levels in use for solid wastes, the 'exempt waste' category does not exist'.*

A further conclusion was that:

> *Some Member States (4) limited their waste classification, excluding the different types of wastes that do not exist in the country, without affecting the Member State capacity to handle all the present and future wastes.*
>
> *Conversely, issues were identified with some Member States, where the current classifications do not cover all the different types of waste to be generated during operation and future dismantling activities. A major challenge for these countries will be to develop or update the national classification (*e.g., Member State operating research reactors are not currently managing *HLW and ILW-LL [intermediate-level long-lived waste]*, but they will have to during dismantling of these installations*)'.*

3.3.2. Member State waste classification system comparison with the Commission recommendation

Table 1 provides a written summary of the conclusions drawn and briefly explains some of the differences found in our assessment of each Member State's waste classification system compared with that set out in the Commission recommendation.

All 27 of the Member States have essentially based their waste classification system on the classification set out in IAEA GSG-1 and/or the Commission recommendation. However, many of them show some level of variability from this, which is a factor in certain aspects that are specific to their Member States. A key variable is that many Member States declare having VLLW, which appears in IAEA GSG-1 but not in the Commission recommendation. This difference may purely be due to the fact that the VLLW category is a more recent category favoured by these Member States when it comes to potential disposal options. A further point worth noting is that some Member States declare having a very-short-lived waste (VSLW) category. VSLW also falls in line with IAEA GSG-1 and, although not shown in the Commission recommendation, one could argue that it fits within the transition radioactive waste category depicted in the latter. More Member States appear therefore to depict an overall waste classification system that is more closely aligned with IAEA GSG-1 than the Commission recommendation.

At a higher level, we could simply state that by including VSLW within the transition waste category, the 10 Member States do follow the Commission recommendation. However, in reality, even if we ignore these subtle variances between the waste classification system that each Member State declares and that set out in the Commission recommendation, when a direct comparison is made, one could argue that none of the EU Member States **exactly** follows the Commission recommendation. In an attempt to be a little more precise, we have designed a simple assessment process to categorise each Member State by simply making one of the following four statement (the conclusions of which are shown in Section 3.4):

- **exactly** follows the Commission recommendation – when the country classification system is exactly the same as that set out in the recommendation;
- **closely** follows the Commission recommendation – when the country classification essentially follows the three waste categories set out in the recommendation (transition, low-level waste (LLW) / intermediate-level waste (ILW), and HLW) and where the following aspects apply:
    - LLW/ILW is combined and subdivided into short- and long-lived waste;
    - additional subcategories are included;
    - different terminology is used for a similar category;
- **partly** follows the Commission recommendation – when the country classification essentially follows the three waste categories set out in the recommendation (transition, LLW/ILW, and HLW) and where the following aspects apply:
    - the LLW/ILW category is either not combined, or is not subdivided into short- and long-lived waste;
    - additional subcategories are included;

  - different terminology is used for a similar category;

- **differs from** the Commission recommendation – when the country classification system has many differences from that set out in the recommendation.

Table 1: Member States' radioactive waste classification schemes compared with the Commission recommendation

Member State	Comparison with the Commission recommendation
Austria	The radioactive waste classification system in Austria closely follows the Commission recommendation, except for the additional category of clearable waste – that is, waste that meets the regulatory clearance criteria.
Belgium	The radioactive waste classification system in Belgium closely follows the Commission recommendation but uses slightly different terminology and additionally considers two additional waste classes. Conditioned and unconditioned waste are separated out and VLLW and some short-lived waste are included in the category referred to as transition waste in the Commission recommendation. Belgium is additionally considering classifying radium-contaminated waste separately and classifying some NORM waste as radioactive waste.
Bulgaria	The Bulgarian radioactive waste classification system closely follows the Commission recommendation. Bulgaria's Category 1 waste equates to the transition waste category in the Commission recommendation; however, they further subdivide this category of waste into exempt, very-short-lived and very-low-level waste.
Croatia	The Croatian radioactive waste classification system differs from that set out in the Commission recommendation. In addition to having an exempt category, Croatia's system has a very-short-lived waste category and the LLW/ILW waste categories are split into short- and long-lived waste.
Cyprus	Cyprus only produces very small quantities of radioactive waste, which are safely stored until their radioactivity levels allow them to be released from regulatory control. Its waste classification system therefore differs from the Commission recommendation for waste classification.

Czechia	In Czechia, radioactive waste classification differs from that set out in the Commission recommendation. Radioactive waste is classified according to the planned disposal route and Czechia completely separates out VLLW, LLW and ILW. The LLW and ILW waste categories are not split into short- and long-lived waste. The temporary radioactive waste category essentially equates to the transition waste category in the Commission recommendation.
Denmark	Denmark partly follows the Commission recommendation in its classification of radioactive waste. The Danish waste classification system is based on the origin of the waste and the planned storage route, with most waste being classified as LILW. The VLLW category is also sometimes used when specific approval has been granted by the regulatory authorities. Exemptions may also be made on a case-by-case basis by the nuclear authority. Radioactive materials, including NORM, with no foreseen use are considered radioactive waste. Long- and short-lived waste is defined in a similar manner to that set out in the Commission recommendation.
Estonia	Estonia closely follows the Commission recommendation in its classification of radioactive waste. Like the Commission recommendation, it classifies both short-lived and long-lived LLW and ILW and, separately, HLW. Estonia has a waste category entitled ‘cleared waste’, which essentially equates to the category referred to as transition waste in the Commission recommendation, but also separately classifies short-lived waste. NORM waste generated as a result of processing raw materials with naturally occurring radionuclides (Th-232 and U-238 and radionuclides that belong to their decay chain), where their specific activity is higher than the clearance levels specified in the radiation act, is also specifically classified.
Finland	The Finnish radioactive waste classification scheme partly follows the Commission recommendation. It is based either on predisposal management or on disposal requirements. The classification system for predisposal is subdivided into VLLW, LLW, ILW and spent fuel, while the classification system for disposal splits the waste into short- and long-lived waste.
France	The French radioactive waste classification scheme partly follows the Commission recommendation. The French classification system splits LLW/ILW into three areas defined by lifetime, namely long-lived ILW, long-lived LLW and short-lived LLW/ILW. Three other classification areas – namely exempt waste, very-short-lived waste and VLLW – essentially equate to the category referred to as transition waste in the Commission recommendation.

Germany	The German radioactive waste classification scheme differs from that in the Commission recommendation. Waste classification is based on its heat-generating capability from a disposal viewpoint. Three categories are established, namely exempt waste, radioactive waste with negligible heat generation and heat-generating radioactive waste. Waste with negligible heat generation essentially corresponds to the categories of low- and intermediate-level radioactive waste. Heat-generating waste corresponds to high-level radioactive waste and some intermediate-level radioactive waste.
Greece	The radioactive waste classification scheme in Greece differs from the Commission recommendation. Greece's scheme has the categories very-short-lived waste, VLLW,LLW and ILW. Very short-lived waste is described as waste with a half-life less than 100 days. VLLW contains isotopes with less than a 30-year half-life, while LLW contains isotopes with a greater than 30-year half-life. A very small amount of waste may be classified as ILW due to the dismantling of the GRR-1 research reactor and NORM waste generally goes to landfill sites.
Hungary	The Hungarian radioactive waste classification scheme closely follows the Commission recommendation. It essentially revolves around the level of heat production during storage and/or disposal. Radioactive waste is classed as LLW or ILW where the heat production is negligible, and these two waste categories are further divided into short-lived (half-life less than 30 years) or long-lived waste. LLW and ILW are also refined further based on the activity concentration and exemption activity concentration. Waste is identified as HLW if heat production exceeds 2 kW/m3. Transition waste is not considered.
Ireland	The radioactive waste classification scheme in Ireland differs from the Commission recommendation. Ireland has no nuclear fuel cycle facilities; however, it does regulate all practices involving sources of ionising radiation, including the transport of radioactive materials, and occupational exposure to natural sources. Radioactive waste is classified simply by half-life (> 10 years) and by sector (medical, industrial, education and state) and then according to whether it is a sealed or unsealed source.
Italy	The Italian radioactive waste classification closely follows the Commission recommendation. In line with a number of EU Member States, it is specifically based on storage and waste disposal requirements. The scheme has categories of very-short-lived waste and VLLW, which can be cleared within 5 and 10 years, respectively. LLW and ILW can be split into long-lived and short-lived waste but based on activity concentration rather than half-life. HLW consists of waste that produces heat and/or contains high concentrations of long-lived isotopes.

Latvia	The radioactive waste classification scheme in Latvia partly follows the Commission recommendation. Waste is placed into two categories according to its planned management route. LLW is disposed of at the RADONS facility, while ILW is managed through long-term storage at the same facility. All spent fuel from the research reactor was sent to Russia in 2008, so no HLW or spent fuel remain in the country.
Lithuania	The radioactive waste classification scheme in Lithuania closely follows the Commission recommendation, and waste is classified according to the principle of disposal and its radiological characteristics. Solid radioactive waste is split into six categories. The first category is short-lived LLW and ILW, which is split into the subcategories VLLW, LLW and ILW. The second category is long-lived LILW, which is split into the subcategories LLW and ILW. The third category is HLW. Within the first two categories, the subcategories are split according to their surface dose rate. Sealed sources are classified separately.
Luxembourg	The radioactive waste classification scheme in Luxembourg differs from the Commission recommendation. While Luxembourg has no NPP or other major facilities generating radioactive substances, it does use radioactive sources in industry, medicine and, to a small extent, education and research. Radioactive waste is classified according to the Belgian classification system, by the half-life of the corresponding radionuclides and whether the disused sources are sealed or unsealed.
Malta	Malta's radioactive waste classification scheme differs from that in the Commission recommendation because there is no formal classification system. Radioactive sources are purely for medical and industrial use. These sources are disused sealed sources, nuclear medicine unsealed sources, uranium and thorium salts, and Am-241 lightning arrestors.
Netherlands	The radioactive waste classification scheme in the Netherlands differs from the Commission recommendation. The four high-level categories are based on the activity and half-life of the waste and include exempt waste, very-short-lived waste, LILW and HLW. The LILW category includes NORM and depleted uranium. The HLW category is split into heat-generating waste and non-heat-generating waste.
Poland	The radioactive waste classification scheme in Poland partly follows the Commission recommendation. Radioactive waste is split into three categories (LLW, ILW and HLW), and these categories are further divided into subcategories according to the half-lives and the concentration of the radioactive isotopes contained in the waste. Spent nuclear fuel intended for disposal is classified as HLW. Disused sealed radioactive sources form an additional radioactive waste category and depending on the level of activity are assigned to low-activity,

	medium-activity or high-activity sealed source subcategories, further subdivided into short-lived and long-lived waste depending on the rate of decay of the isotopes that they contain.
Portugal	The radioactive waste classification scheme in Portugal partly follows the Commission recommendation. Portugal's classification system includes VLLW, LLW and ILW and is essentially based on disposal requirements. Each of the three categories are split depending on the half-lives of radionuclides in the waste, separating those with a very short half-life of fewer than 100 days, a short half-life of fewer than 31 years and a long half-life of more than 31 years.
Romania	The radioactive waste classification scheme in Romania closely follows the Commission recommendation. The Romanian classification scheme refers to the disposal requirements for assuring waste isolation from the biosphere. It has separate categories for excluded waste, transitional waste and VLLW, but its definition of transitional waste is waste with activity concentrations above clearance levels. LLW and ILW are split into short-lived and long-lived radionuclides, the latter with a half-life of over 30 years. HLW is essentially split into liquid waste or solidified waste and spent fuel.
Slovakia	The radioactive waste classification system in Slovakia partly follows the Commission recommendation, but has an additional category for VLLW. It splits LLW and ILW into subcategories of short- and long-lived waste. Like some other Member States, the system is based around Slovakia's waste disposal objectives.
Slovenia	Slovenia's radioactive waste classification system closely follows that of the Commission recommendation in that it splits LILW into two separate categories, namely short-lived waste and long-lived waste. HLW and transition waste are also classified in the same manner as that seen in the Commission recommendation. The primary differentiator is that Slovenia has a separate category for VLLW, where the regulator may approve conditional clearance of this waste category. Slovenia also separately classifies NORM waste.
Spain	Spain's radioactive waste classification system partly follows that of the Commission recommendation and is based on Spain's storage and disposal arrangements (i.e. volume, radiological inventory and specific activity concentration limits). The classification system has a category for exempt waste, which can be released from regulatory control, and a VLLW category, which is a subcategory of its LLW/ILW category. HLW comprises long-lived alpha emitters and heat-generating waste. A further category, special radioactive waste (including fuel attachments, neutron sources, reactor components, etc.), cannot be received at El Cabril and is therefore managed in a similar manner to HLW.

Sweden	The radioactive waste classification scheme in Sweden partly follows the Commission recommendation. The system Sweden applies is in line with its existing and planned waste disposal routes. Sweden has a category of cleared material that is similar to the transition waste category set out in the Commission recommendation. However, it has separate categories for very-low-level waste, low-level short-lived waste, intermediate-level short-lived waste and low- and intermediate-level long-lived waste and a HLW category.

3.4. Overall conclusions

As explained in Section 3.3.2, drawing a firm conclusion about how close a Member State's waste classification system is to that set out in the Commission recommendation is not an exact science because some of the differences are quite subtle. However, it is hoped that the approach we have taken to drawing out our conclusions has been logical and allows the information to be summarised in an easy-to-view manner.

In terms of a high-level statement, therefore, our assessment has shown that, out of the 27 Member States, **none** has developed its waste classification system **exactly** in line with that set out in the Commission recommendation, **nine** follow the system **closely**, **nine** follow the system **partly** and **nine** have a classification system that **differs from** the recommendation.

The assessment has, however, shown that nearly all of the Member States have developed a radioactive waste classification system that takes cognisance of both the Commission recommendation and/or the classification set out in IAEA GSG-1, but one that additionally factors in specifics relevant to each Member State.

Member States such as Ireland, Cyprus, Luxembourg and Malta do not have nuclear fuel cycle facilities. They only produce minute quantities of radioactive waste, which generally revolve around sealed sources and medical waste. There is therefore little need for them to have a formal waste classification system, even though all relevant practices are regulated.

Some Member States' waste classification schemes follow the Commission recommendation closely in that the LLW/ILW categories are combined and subdivided into short- and long-lived waste. They may also adopt different terminology or include additional waste categories. Bulgaria, for example, uses category 1 waste, which equates to transition waste under the Commission recommendation. However, they subdivide this category of waste into exempt, very short lived and very low level. Austria also quite closely follows the recommendation but, in addition to having transition waste, it has a further category of clearable waste (i.e. waste that meets the regulatory clearance criteria).

A number of Member States (i.e. Denmark, Latvia, Finland and Sweden) partly follow the Commission recommendation (of splitting transition waste, LLW/ILW and HLW), but either have chosen not to combine the LLW/ILW categories, or do not subdivide these into short- and long-lived waste.

A number of Member States (i.e. Czechia, Denmark, Germany, Spain, Italy, Latvia, Lithuania, Hungary, Portugal, Romania, Slovakia, Finland and Sweden) have specifically adopted a waste classification system that relates to their own waste management strategy. In these instances, the declared system is influenced by their approach to radioactive waste storage and their eventual strategy for long-term disposal. A good example to cite is Spain, whose current operating waste disposal site at El Cabril can only receive VLLW, LLW and ILW. HLW, spent fuel and special waste, on the other hand, must be managed in the medium-/long-term within a centralised temporary storage facility, as a deep geological facility (as per current national plans) will only be in place around the year 2070. In Italy, they have categories of VSLW and VLLW, which can be cleared within 5 and 10 years, respectively. LLW and ILW can be split into long and short lived, as in the Commission recommendation, but this is based on activity concentration rather than half-life. HLW consists of waste with heat production and/or high concentrations of long-lived isotopes.

In addition to those Member States that adopt a classification system related to their waste management strategy, some other Member States have a classification system that differs from that set out within the Commission recommendation (Czechia, Greece and the Netherlands). The Netherlands, for example, uses four top-tier categories, which are based on activity and half-life. These categories equate to exempt waste, short-lived waste, LLW/ILW and HLW. The LLW/ILW category includes NORM and depleted uranium, whereas the HLW category is split into heat-generating waste and non-heat-generating waste.

The Commission recommendation keeps LLW/ILW together but subdivides them into short- and long-lived subsets. For short-lived waste, it includes waste that has a half-life of around 30 years and a restricted alpha long-lived radionuclide concentration (i.e. limitation of long-lived alpha-emitting radionuclides to 4 000 Bq/g in individual waste packages and to an overall average of 400 Bq/g in the total waste volume). A number of Member States follow a very similar approach of coupling LLW and ILW together, and splitting the category into short- and long-lived waste (i.e. Bulgaria, Estonia, Hungary, Austria, Poland and Slovenia). Other Member States, however, separate their LLW and ILW categories (i.e. Czechia, Croatia, Italy and Slovenia, although Croatia does define short-lived waste in the same manner). Belgium, Denmark and Finland provide examples of Member States where LLW/ILW are defined quite differently.

For ILW specifically, many Member States classify their waste using criteria such as heat emission, activity concentration, waste origin and half-life.

It can therefore be seen from the assessment that there is a wide level of variance between how each Member State provides a classification of its radioactive waste. None of the Member States exactly follows the Commission recommendation, although 18 of the 27 do follow it either closely or partly.

3.4.1. Relevance of the Commission recommendation nowadays in the European Atomic Energy Community framework for nuclear safety and safe and responsible management of radioactive waste and spent fuel (the waste directive)

The European Commission project's terms of reference require the following key question to be answered: '1) To what extent is the Recommendation relevant or applicable nowadays in the Euratom framework for nuclear safety and safe and responsible management of radioactive waste and spent fuel (the waste directive)?'

Over the years, the EU, especially Euratom, has striven to develop a legislative framework for the safe management of radioactive waste and spent fuel. In 1992, they produced an action plan in the field of radioactive waste and, in 1999, the Commission recommendation to which this current project refers was published. In 2006 and 2011, respectively, the shipment directive and the waste directive were adopted. The waste directive sets out a common framework for Member States, in terms of their expected obligations regarding safety, protection of workers and the general public, in a transparent manner, supplementing the Council's 2013 safety standards with respect to spent fuel and radioactive waste.

The European Commission concluded that a waste classification system as proposed under the Commission recommendation should be qualitative rather than prescriptive. As stated in this project's terms of reference, '[t]he key consideration was that any such qualitative classification system could never pre-empt the role of national regulatory authorities in the control of handling and disposal of radioactive waste at specific sites'.

The requirement for a national classification system is therefore reflected in Article 12(1)c of the waste directive and is strongly linked to the requirement for each Member State to declare its radioactive waste inventory, which Member States report on every 3 years as part of the provision of evidence on how they are implementing the waste directive. Work undertaken jointly by the European Commission and OECD/NEA (NEA No 7424 and NEA No 7371) showed that variances observed in each Member State's waste classification strategies will have an impact on how national inventories are constructed for each specific waste category (i.e. there will be little ability to make like-for-like comparisons).

Specific conclusions in relation to Q1 are the following:

- As highlighted previously, our assessment has shown that, out of the 27 Member States, **none** has developed its waste classification system **exactly** in line with that set out in the Commission

recommendation, **nine** follow the system **closely**, **nine** follow the system **partly** and **nine** have a classification system that **differs** from the recommendation.

- In a positive sense, the following points can be made:
    - The majority of Member States either closely or partly follow the Commission recommendation.
    - In most instances, Member States follow the Commission recommendation in how they classify HLW and spent fuel.
    - Some Member States combine LLW/ILW and then subdivide the combined category into short- and long-lived waste.
    - The current variable approaches adopted by the Member States are unlikely to produce a consistent approach to estimating an EU-wide radioactive waste inventory. Therefore, adopting the classification depicted in the Commission recommendation would enhance the chances of gaining a consistent approach to inventory estimates.
- Notwithstanding these positive points, the findings show that the current Commission recommendation as it stands, similarly to the guidance in IAEA GSG-1 (on which the Commission recommendation was based), merely acts as a guideline rather than being adhered to completely. This conclusion is drawn for the following reasons:
    - None of the Member States exactly follows the Commission recommendation.
    - Nearly all Member States, even if they follow the Commission recommendation in principle, have inserted specific in-country variations.
    - Many Member States reference the IAEA GSG-1 guidance rather than the Commission recommendation.
    - Many Member States separate LLW and ILW.
    - Many Member States base their classification system on their in-country waste management arrangements and disposal systems WAC. These will have matured considerably when compared with their status in 1999, which is when the Commission recommendation was produced.
    - For ILW specifically, how Member States classify their waste is inconsistent across the EU, using a variety of criteria, such as heat emission, activity concentration, waste origin and half-life.
    - Many Member States utilise a VLLW category.
    - NORM is rarely classified as waste in the Member States, but is in some. It is, however, not included within the Commission recommendation.

- For those Member States that do not have any nuclear fuel cycle facilities, there is probably no value in having a formalised waste classification system over and beyond that relating to exempt or transition waste.
- The European Commission itself recognised back in 1999 that any waste classification system should ideally be qualitative in nature.

4. TASK 2: COHERENCE IN THE USE OF THE INTERNATIONAL ATOMIC ENERGY AGENCY GENERAL SAFETY GUIDE

Task 2 is entitled 'Coherence in the use of the IAEA GSG on classification of radioactive waste' and has the objectives of analysing the extent of use of the classification scheme as recommended in IAEA GSG-1, noting gaps between practice and the recommended classification scheme, and assessing the usefulness of the guideline as a common baseline for reporting and cross-boundary cooperation.

Task 2 will attempt to answer the following key questions:

> *Q2) Would the IAEA GSG-1 ensure an appropriate level of harmonisation of classification schemes in the European Union with respect to drafting an inventory of radioactive waste in its territory?*
>
> *Q3) Would the IAEA GSG-1 ensure an appropriate level of harmonisation of classification schemes in the Union with respect to transparency and communication requirements?*
>
> *Q4) Would the IAEA GSG-1 ensure an appropriate level of harmonisation of classification schemes in the Union with respect to cross-border cooperation?*

4.1. Methodology

4.1.1. Data acquisition

First, published information on waste classification schemes in the Member States was collated through official reporting routes. The main sources of information were the IAEA's reports on the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management and the reports on the waste directive. The compiled data were cross-checked against the reporting on the status and trends project ([13]) – which was launched by the IAEA in collaboration with the OECD/NEA – or, if necessary, against the original national regulations.

([13]) IAEA, Status and trends in spent fuel and radioactive waste management, IAEA Nuclear Energy Series No NW-T-1.14, Vienna, 2018.

4.1.2. Data preparation and analysis

In order to facilitate the assessment of the Member States' waste classification schemes, the data gathered have been compiled in a table, which has been formatted in accordance with the recommended waste classification scheme of IAEA GSG-1; please refer to Table 2.

As this report will assess the national waste classification schemes against IAEA GSG-1, the reports for the aforementioned joint convention have been taken as the main basis for the data preparation. Where other reports provided additional information, this has been used to amend the data.

The individual waste classification schemes have first been compared with the scheme proposed by the IAEA and grouped into classes according to their degree of concordance. The grouping enabled the assessment of whether IAEA GSG-1 ensures an appropriate level of harmonisation of classification schemes in the EU with respect to:

- drafting an inventory of radioactive waste in its territory;
- transparency and communication requirements;
- cross-border cooperation.

In some cases, slightly different names are used in the English translations of the waste classes of individual Member States. For the sake of consistency, the terms from IAEA GSG-1 are used in this report. For example, instead of 'exemption waste', 'cleared waste', 'excluded waste' and the like, the term 'exempt waste' is used. Bulgaria uses the term 'category' for waste classes, so the original term 'category 1a' is used here instead of 'exempt waste'.

In the case of VSLW, often a term is used that expresses the process in which waste can be stored for a short period to allow decay to exempt values, for example 'transition waste'. Transition waste is also the term used in the European Commission's recommendations. To be consistent with the logic of this report, VSLW is used nevertheless.

If the original term would denominate a different class in IAEA GSG-1, the IAEA term is used anyway, but the original term is kept in brackets. For example, Austria introduced a 'low- and intermediate-level short-lived waste class', the description of which exactly matches IAEA's LLW class. Hence, the class is named 'LLW (low- and intermediate-level short-lived waste class)'.

Finally, in some Member States, waste classes spread over several waste classes of IAEA GSG-1. In these cases, the original term is kept.

The assessment of whether a Member State follows IAEA GSG-1 or not was carried out with the view to answering the questions related to Task 2. This means that it will be possible to not only assign

national waste classes to IAEA GSG-1, but also assign them the other way around, to allow for full comparability between national inventories.

In order to guide an understanding of the national waste classification schemes, a high-level summary of each country's national programme is provided in the next section, followed by a summary of IAEA's waste classification scheme as proposed in GSG-1. Details of the Member States' waste classes are provided in Annex I.

4.2. Review of Member States' waste classification schemes compared with International Atomic Energy Agency general safety guide No GSG-1

The objective of IAEA GSG-1 is to set out a general scheme for classifying radioactive waste that is based primarily on considerations of long-term safety and thus, by implication, disposal of the waste. The safety guide identifies the conceptual boundaries between different classes of waste and provides guidance on their definition on the basis of long-term safety considerations.

In the 2009 revision of IAEA GSG-1, six classes of waste were derived and used as the basis for the classification scheme:

1. **Exempt waste (EW).** This covers waste that meets the criteria for clearance, exemption or exclusion from regulatory control for radiation protection purposes.
2. **VSLW.** This covers waste that can be stored for decay over a limited period of up to a few years and subsequently cleared from regulatory control according to arrangements approved by the regulatory body regarding uncontrolled disposal, use or discharge. This class includes waste containing primarily radionuclides with very short half-lives, often used for research and medical purposes.
3. **VLLW.** This covers waste that does not necessarily meet the criteria of exempt waste, but that does not need a high level of containment and isolation, and, therefore, is suitable for disposal in near-surface landfill-type facilities with limited regulatory control. These landfill-type facilities may also contain other hazardous waste. Typical waste in this class includes soil and rubble with low levels of activity concentration. Concentrations of longer-lived radionuclides in VLLW are generally very limited.
4. **LLW.** This covers waste that is above clearance levels, but has limited amounts of long-lived radionuclides. This waste requires robust isolation and containment for periods of up to a few hundred years and is suitable for disposal in engineered near-surface facilities. This class covers a very broad range of waste. LLW may include short-lived radionuclides at higher levels of activity concentration, and also long-lived radionuclides, but only at relatively low levels of activity concentration.

5. **ILW.** This covers waste that, because of its content, particularly of long-lived radionuclides, requires a greater degree of containment and isolation than that provided by near-surface disposal. However, ILW needs no provision, or only limited provision, for heat dissipation during its storage and disposal. ILW may contain long-lived radionuclides, in particular alpha-emitting radionuclides that will not decay to a level of activity concentration acceptable for near-surface disposal during the time for which institutional controls can be relied upon. Therefore, waste in this class requires disposal at greater depths, of the order of tens of metres to a few hundred metres.
6. **HLW.** This covers waste with levels of activity concentration high enough to generate significant quantities of heat by the radioactive decay process or waste with large amounts of long-lived radionuclides that need to be considered in the design of a disposal facility for such waste. Disposal in deep, stable geological formations, usually several hundred metres or more below the surface, is the generally recognised option for disposal of HLW.

The waste classes are defined by a combination of activity and half-life in such a way that the radioactive inventory can be divided according to the final solution or, more precisely, the disposal. Hence, waste classification as proposed by IAEA GSG-1 is a solution-driven approach. Accordingly, the guideline offers a decision aid in the form of a graph in which the waste classes are plotted against activity and half-life, and the classes are assigned potential disposal options (Figure 1).

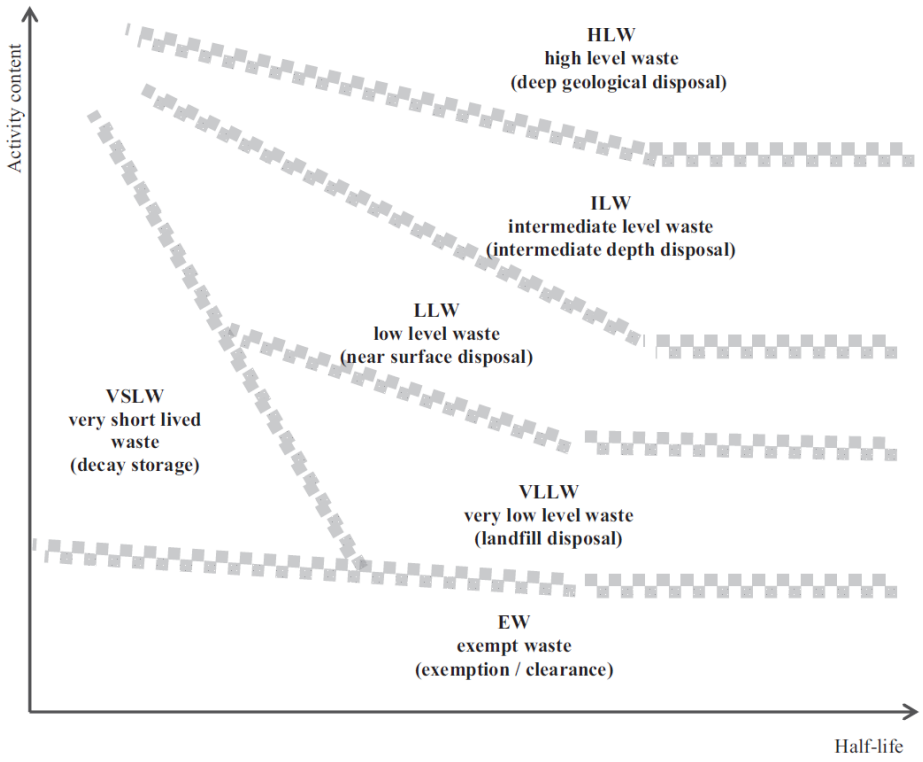

Figure 1: Conceptual illustration of the waste classification scheme proposed by IAEA GSG-1

The factual appraisal of the current waste classification system in each Member State presented in Annex I was used to compare current practices against IAEA GSG-1. The results of this comparation are presented in the following sections.

4.3. Findings across the EU Member States

This section provides a comparison of each Member State's radioactive waste classification system with the waste classification scheme proposed by IAEA GSG-1. In this section, an examination is presented of whether and how the national waste classification schemes are comparable with the IAEA proposal and can be translated to it.

In order to enable a comparison of not only the classification schemes of the individual Member States with IAEA GSG-1, but also the schemes of the Member States among themselves, it must, in principle, be possible to align the waste class categories in each scheme with corresponding categories in other schemes. A fundamental observation is that all Member States with existing repositories have radionuclide-specific definitions of waste classes. In accordance with IAEA GSG-1, this follows from defining the waste classes along the final solutions (i.e. the repository types). However, this makes a detailed comparison of the classification schemes between countries much more difficult.

Accordingly, the following assessment principles apply:

- If a classification scheme **differs** fundamentally from the scheme proposed by IAEA GSG-1, the classification scheme is assessed as different. The same applies if individual classes extend over more than one class of the IAEA GSG-1 and thus a transposition from IAEA GSG-1 to the classification of the Member State is not clearly possible.
- If a transposition between the two classification schemes is generally possible, but should ideally include some explanation (e.g. because the national waste classes are further separated on the basis of additional criteria and hence an unambiguous transposition of one scheme into the other is not possible), the scheme is said to **partly** follow IAEA GSG-1. This assessment also applies when several waste classes in the Member State are not defined.
- If the same waste classes are applied in the Member State and in IAEA GSG-1, but small differences in the description (e.g. additional detailed criteria) arise, then the Member State is said to **closely** follow GSG-1. In addition, if only one waste class is not defined in the Member State, the scheme is generally said to closely follow IAEA GSG-1.
- If no differences apply, the Member State is said to **exactly** follow IAEA GSG-1.

It should be emphasised once again at this point that the assessment of whether a Member State follows IAEA GSG-1 or not is primarily based on whether harmonisation (i.e. a direct exchange of information on the inventory of specific waste classes between the Member States) is possible. It is

therefore not an assessment of whether a classification scheme is correct or useful. It is also not an assessment of whether a translation of a national classification scheme to the GSG-1 scheme by itself is possible.

Table 2 summaries the findings across the Member States.

Table 2: Member States' radioactive waste classifications compared with IAEA GSG-1

Member State	Evaluation	Comparison with the IAEA GSG-1
Austria	In Austria, the short-lived waste class corresponds to the IAEA GSG-1 LLW class. VLLW is not defined.	**Austria's** scheme closely follows IAEA GSG-1.
Belgium	Very-short-lived waste and VLLW are not defined in Belgium.	**Belgium's** scheme partly follows IAEA GSG-1.
Bulgaria		**Bulgaria's** scheme exactly follows IAEA GSG-1.
Croatia	LLW and ILW are merged into the category LILW in Croatia; LILW is then further subdivided into short-lived and long-lived waste. LLW is not defined.	**Croatia's** scheme differs from IAEA GSG-1.
Cyprus	Though only a small volume of waste exists and not all waste classes are needed, Cyprus formally classifies its waste using the IAEA's waste classification system.	**Cyprus'** scheme exactly follows IAEA GSG-1.
Czechia		**Czechia's** scheme exactly follows IAEA GSG-1.
Denmark		**Denmark's** scheme exactly follows IAEA GSG-1.
Estonia	The definition of Estonia's low- and intermediate-level short-lived waste corresponds to VLLW in IAEA GSG-1. LLW and ILW are combined in Estonia into the LILW category.	**Estonia's** scheme differs from IAEA GSG-1.
Finland	Due to the separation of waste into short-lived and long-lived waste, the transposition of IAEA GSG-1 into Finnish waste classes is not fully possible.	**Finland's** scheme closely follows IAEA GSG-1.

France	There are no exemptions from control zones in nuclear installations in France. And even though very-short-lived waste is reported as a waste class, it does not apply to radioactive waste from nuclear installations. The distinction between short-lived waste and long-lived waste, with the simultaneous combination of short-lived LLW and short-lived ILW into a LILW class, does not allow the direct transposition of the French waste classes into IAEA GSG-1. In addition, NORM waste is only designated as such if it is below the limits for regulating radioactive materials. This is a different definition from that in IAEA GSG-1.	**France's** scheme differs from IAEA GSG-1.
Germany	Since all waste is to be disposed of in deep geological formations in Germany, the further subdivision of LILW makes no sense. This results in an overlap in the HLW and ILW categories.	**Germany's** scheme differs from IAEA GSG-1.
Greece	Though only a small volume of waste exists and not all waste classes are needed, Greece formally classifies its waste using the IAEA waste classification system.	**Greece's** scheme exactly follows IAEA GSG-1.
Hungary	The distinction between short-lived waste and long-lived waste, with the simultaneous combination of short-lived LLW and ILW into a short-lived LILW class does not allow the direct transposition of the Hungarian waste classes into IAEA GSG-1.	**Hungary's** scheme differs from IAEA GSG-1.
Ireland	Due to the very limited inventory of radioactive waste in Ireland, waste classes are defined by origin rather than by activity.	**Ireland's** scheme differs from IAEA GSG-1.
Italy	Waste classes principally directly follow IAEA GSG-1, but some additional definitions apply. Hence, the waste classifications schemes of Italy and IAEA GSG-1 are – strictly speaking – not identical.	**Italy's** scheme closely follows IAEA GSG-1.
Latvia	Waste classes in Latvia strictly consider the handling and disposal rules at the RADON site,	**Latvia's** scheme differs from IAEA GSG-1.

	and are hence not directly comparable to IAEA GSG-1.	
Lithuania	Due to the separation of waste into short-lived and long-lived waste, the transposition of IAEA GSG-1into Lithuanian waste classes is not fully possible. Furthermore, sealed sources form a separate waste class containing waste across Classes A to E. Due to the discrete nature of sealed sources, the assignment of single sealed sources to IAEA GSG-1 categories is possible.	**Lithuania's** scheme partly follows IAEA GSG-1.
Luxembourg	In Luxembourg, a simplified classification with regard to physical and chemical properties as well as origin applies. All waste can be assigned to the LLW category.	**Luxembourg's** scheme differs from IAEA GSG-1.
Malta	Malta has a limited number of disused sources in storage located at various sites. Malta has no formalised classification for radioactive waste.	**Malta's** scheme differs from IAEA GSG-1.
Netherlands	Due to the combination of waste classes, the straightforward transposition of Netherland's classes into IAEA GSG-1 is not possible.	**The Netherlands'** scheme differs from IAEA GSG-1.
Poland	The very consistent division of waste classes into low-, intermediate- and high-level waste on the one hand and transitional, short-lived and long-lived waste, and spent sealed sources on the other hand, with radionuclide-specific limits, facilitates the assignment of waste to the classes in Poland, but prevents their assignment to IAEA GSG-1. The same is true for the transposition of IAEA GSG-1 into Polish classes.	**Poland's** scheme differs from IAEA GSG-1.
Portugal		**Portugal's** scheme exactly follows IAEA GSG-1.
Romania	Due to the separation of waste into short-lived and long-lived waste, the transposition of IAEA GSG-1 into Romanian waste classes is not fully possible.	**Romania's** scheme closely follows IAEA GSG-1.

Slovakia		**Slovakia's** scheme exactly follows IAEA GSG-1.
Slovenia	LLW and ILW in Slovenia are combined as LILW, but LILW is then separated into short-lived waste and long-lived waste.	**Slovenia's** scheme differs from IAEA GSG-1.
Spain	Waste classification in Spain has a similar structure to IAEA GSG-1. But the names and definitions of waste classes (with the same names) are different.	**Spain's** scheme closely follows IAEA GSG-1.
Sweden	The waste classification scheme in Sweden is developed purely on the basis of existing disposal routes. In particular, long-lived LLW and long-lived ILW are combined into the low- and intermediate-level long-lived waste category.	**Sweden's** scheme differs from IAEA GSG-1.

As a reference, Annex II, Radioactive waste classification schemes comparison, presents the Member States' radioactive waste classification systems compared with IAEA GSG-1, shown here in Table 2, in combination with the comparison with the Commission recommendation, shown here in Table 1.

4.4. Overall conclusions

With the aim of verifying whether the waste classification system recommended in IAEA GSG-1 allows a harmonisation of the individual systems used in the Member States, an analysis of the waste classes of the Member States was carried out. The analysis was intended to answer whether a classification scheme harmonised with IAEA GSG-1 would:

- support the establishment of a common inventory;
- allow transparency and communication in the EU;
- facilitate transboundary cooperation.

4.4.1. Assessment of the potential to harmonise classification schemes in the EU with respect to drafting an inventory of radioactive waste in its territory by using International Atomic Energy Agency general safety guide No GSG-1

This section presents the conclusions in relation to Q2 set out in the project's terms of reference.

For the establishment of a Europe-wide inventory based on IAEA GSG-1, the waste classes of the Member States must be transferable to the classification scheme of the IAEA. Assuming that a radionuclide-specific inventory is not required, all inventories of those Member States that were

assessed as partially, closely or exactly matching that of IAEA GSG-1 in Section 4.3 can, in principle, be combined. This applies to 14 of the 27 Member States. For the remaining 13 Member States, there are conventions that allow the allocation of waste to IAEA classes.

A transfer strictly according to IAEA GSG-1 would lead to individual classes being unduly burdened. For example, there is no VLLW in Belgium, Germany, Croatia or Austria, so, in total, a greater volume of waste is allocated to LLW than would be the case with a strict interpretation of IAEA GSG-1. The effect is even more evident when exempt waste is considered. Without the possibility of releasing radioactive waste with very low activity from nuclear supervision, a disproportionately higher volume of radioactive waste is reported than with the possibility. The values are no longer comparable.

In essence, it is quite possible to describe a HLW inventory in Europe. With regard to ILW, it must be stated that LLW and ILW are so often combined that there is no clean traceability at European level, unless LLW and ILW are combined to form LILW.

However, even then, inaccuracies exist due to different categorisation of VLLW, especially exempt waste.

It remains to be said that, with regard to the existing waste classes of the Member States, an inventory of radioactive waste in Europe is without problems only for HLW. Harmonisation of the classification schemes in the Member States would have the consequence that the waste classes would no longer be congruent with the final solutions and the national repository types.

Accordingly, it seems most sensible to make an inventory at European level according to repository types rather than according to half-lives and activities in order to ensure comparability.

4.4.2. Assessment of potential to harmonise classification schemes in the EU with respect to transparency and communication requirements by using International Atomic Energy Agency general safety guide No GSG-1

This section presents the conclusions in relation to Q3 set out in the project's terms of reference.

Transparency and communication requirements always include explanations. These directly set out reasons for differences in the Member States. Nevertheless, there is a risk that waste that is designated very similarly – or in some Member States even the same – may be treated and disposed of differently. The communication challenge is again very clear in the example of exempt waste. In countries without the possibility of exemption, very large volumes of waste with very low activity are produced and disposed of on the surface, whereas exempt waste is disposed of in conventional dump sites or even used as recycled material (e.g. in the building industry). Surface repositories, on the other hand, are not even envisaged in some Member States.

Although the waste classification scheme proposed by IAEA GSG-1 is already developed with a view to the final solution for the waste (i.e. what kind of disposal facility can be used when waste is not exempted), it might make sense, especially for communication purposes, to report based on the final solutions for the radioactive waste. In cases where similar waste streams go to different repository types, there may be greater ambition to minimise the waste volume than in other cases. That may be the case, for example, for geological ILW repositories, and surface or near-surface ILW repositories. In this way, differences in waste volumes between, for example, France (without waste exemptions) and Germany (with waste exemptions and with geological disposal only for radioactive waste) become more readily explainable. An assessment of waste volumes is outside the scope of the current project. Therefore, the consequence of this suggestion cannot be quantified by the consortium.

4.4.3. Assessment of potential to harmonise classification schemes in the EU with respect to cross-border cooperation using International Atomic Energy Agency general safety guide No GSG-1

This section presents the conclusions in relation to Q4 set out in the project's terms of reference.

Transboundary activities such as transportation for services for conditioning, packaging or even disposal generally require detailed knowledge of the waste materials, volumes, and chemical and physical states concerned. In addition to the activities and half-lives, this includes, in particular, radionuclide-specific information and information on additional materials in the waste packages. Only on the basis of the classification scheme set out by IAEA GSG-1 can this information not be recorded. Generally, specific WAC apply to the transportation of radioactive materials and acceptance at the sites that are affected by the transboundary activities. This is discussed in detail in Task 3 of the project, the results of which are given in Section 5 of this report.

Transboundary activities are usually carried out by experts. They have an understanding of different classification schemes and the reasons for these differences. In the context of these activities, the scheme provided by IAEA GSG-1 helps to start an exchange of information.

Here, a common definition of terms helps to create a basis for their work.

5. TASK 3: WASTE CHARACTERISATION AND CLASSIFICATION SYSTEMS

Task 3 of the project is entitled ´Waste characterisation and classification systems´ and has the objective of reviewing the existing systems in the EU concerning the definition of waste categories. In practice, waste categories are needed for safety analyses of waste-handling facilities (e.g. to draw up the safety case for a facility). The safety analyses in turn allow the identification of limits and conditions for the operation of waste facilities. For waste deliverers' criteria, WAC are defined. The objective of WAC is to allow an increased level of safety in waste management.

Task 3 analyses existing practices in the EU of the application of WAC. A special focus in this task is on countries with a substantial current or former nuclear power programme (i.e. those where nuclear power plants (NPPs) are sited). These countries are Belgium, Bulgaria, Czechia, Germany, Spain, France, Italy, Lithuania, Hungary, the Netherlands, Romania, Slovenia, Slovakia, Finland and Sweden. This focus shall inform the project in the analysis of the current relevance of the Commission recommendation.

Task 3 attempts to answer the following key questions:

> *Q5) Given the amount and quality of WAC, how mature is the sector in terms of availability of requirements and know-how? Is the level of maturity sufficient to develop European guidance to promote best practices and address remaining challenges?*
>
> *Q6) Is there a set of features representing a minimum common denominator for European waste classification schemes? What are those features?*
>
> *Q7) What are those features of a classification scheme that would ensure a comprehensive and consistent inventory of radioactive waste in the Community's territory?*

5.1. Methodology

This project task was divided into the following two subtasks for its implementation:

- Subtask 3a is entitled 'Characterisation and classification systems' and has the objective of obtaining the WAC to be complied with for waste to be pretreated, treated, conditioned, transported, stored or disposed of in operating or planned facilities. Only processes related to waste disposal will be considered.
- Subtask 3b is entitled 'Analysis of correlation and dependence of WAC and national strategies', and has the objectives of analysing the obtained WAC, developing correlations between WAC and disposal routes or other elements of national strategies, and identifying general trends and recurring patterns.

The original intention was to primarily use the official reports of the Member States, especially reports to the European Commission and IAEA, to extract the relevant information on WAC. As these reports do not contain any information on the WAC, the criteria should have been obtained from the respective websites of the national WMOs as far as possible. However, in most Member States, information on WAC was not readily available on websites, in which cases the WMOs of the Member States were contacted directly with the request to provide the WAC.

Often the reluctance of WMOs to provide the requested information was observed throughout the project. A barrier to providing WAC is that, especially in countries with large nuclear programmes, multiple organisations are often involved in radioactive waste management and, therefore, WMOs may not have access to other organisations' WAC. In addition, WAC are often subject to confidentiality requirements, whether for commercial reasons or nuclear security requirements. Finally, WMOs have seen that there is a risk that WAC, if taken out of context, will be misinterpreted. For a correct analysis of WAC, WMOs need to be heavily involved. This work should not, according to some WMOs, be coordinated, let alone carried out, by independent third parties.

The fact that a comparison of WAC generally can be useful, especially for communication purposes, is not denied by the WMOs. However, many contacts referred to similar activities in international organisations, not least the Euratom-funded 'European Joint Programme on Radioactive Waste Management' (EURAD) project, in which a comparison of WAC is also currently being carried out by the involved WMOs.

As a result, responses to the consortium's request were often provided late after an extensive approval process or as summary information, or in a few cases, they were not provided at all. If WAC were accessible, they were usually available in only the national languages. In these cases, the documents had to be translated before they could be analysed.

WAC were generally not available in full for all countries and all process steps or facilities. Therefore, the information was supplemented with information from other projects and reports with similar objectives. To be mentioned are the following projects:

- 'Pre-disposal management of radioactive waste' (Predis) – *Deliverable 2.4: International approaches to establishing a waste acceptance system*.
- 'Thermal treatment for radioactive waste minimisation and hazard reduction' (Theramin) – *Deliverable D4.1: Waste acceptance criteria and requirements in terms of characterisation*.
- EURAD –*Milestone 88: Current use of waste acceptance criteria (WAC) in European Union Member-States and some associated countries*, work package 9 (Routes).

In essence, extensive information on at least some facilities or process steps is available for Belgium, Czechia, Germany, Spain, Italy, Lithuania, the Netherlands, Slovenia and Sweden. Summaries of the

WAC practices were used for France, Hungary, Romania and Slovakia. No information could be analysed for Bulgaria or Finland.

As a general rule, acceptance criteria for facilities and process steps are analysed only when they are relevant to third parties. In many cases, facilities process and store radioactive waste in different facilities on a specific site in a stepwise process. For each process step, facility-specific criteria for entering the step are applicable, but are not relevant to waste deliverers. An important focus of this project is to evaluate transboundary waste management issues. In addition, intermediate steps do not provide relevant information for the identification of a general inventory. Hence, on-site processes do not provide any relevant findings and are therefore not analysed further.

Furthermore, technical requirements only have been analysed for the current project. Generally, administrative requirements for the waste deliverer also apply, such as demonstration of an adequate quality assurance system, or a sufficient education and training of staff, and a comprehensive documentation of the waste. Generally, for the purpose of delivering waste to foreign facilities, the administrative requirements are agreed in individual arrangements (e.g. audits and specific conditions). Regarding the identification of an inventory, administrative requirements do not provide any relevant findings and are therefore not analysed further.

Finally, WAC consist of three elements: a parameter, its value and a method for its determination (measurement, substantiation or demonstration). With regard to the objective of this work package, namely to realise the establishment of an overall waste inventory in Europe, the first two elements of WAC are particularly relevant. Accordingly, the analysis of the methods for verifying compliance with the WAC will not be pursued further in this report.

The WAC collected as described above were first assigned to the relevant process steps of storage, transport, processing or disposal. Within the process steps, the WAC were recorded on a facility-specific basis as far as possible. The individual criteria of a facility were then assigned to requirement groups, whereby the final grouping was developed iteratively in the course of the project and was based on the typical characteristics of the WAC. The requirement groups used are as follows:

- The requirements describing the nature of the waste's radiotoxicity are grouped under **radiological** requirements. Here, mainly information on the inventory and its radiological limits can be found.
- For waste handling, external variables such as **contamination and dose rate** limits are the main factors.
- The behaviour of the waste, especially over long periods or during waste processing, is determined through reaction processes and mechanical processes. Therefore, compliance with requirements for **biological, chemical and physical properties** are essential for the safety of

the facilities.

- If the safety of radioactive waste cannot be achieved through geology during disposal, **packaging** carries a special responsibility.
- A fifth group, '**general requirements**', was introduced in order to be able to consider requirements that cannot be clearly assigned to one of the four main groups.

In order to analyse WACs in terms of their suitability for the establishment of an EU-wide inventory, they were compared at the available level of detail. The comparison was made at the levels of both process steps and requirement groups.

As a general rule, no references are made throughout the report to specific WAC documents because of the commercially or otherwise sensitive natures of the documents. In other cases, the WAC documents are not stand-alone documents and must be put into the wider context of the national programme. To have a consistent approach in referencing documents, the available information is summarised in the following sections. As some of the information is either commercially sensitive or underlies security restrictions, a complete, detailed overview cannot be given.

5.2. Review of waste acceptance criteria

5.2.1. General observations

Generally, WAC are developed to ensure the safe operations of a facility. Hence, they are based on potential emissions during the normal operations of the respective facility, and releases caused by accidents and emergencies. Defining appropriate WAC ensures that regulatory release limits for all circumstances are complied with by taking into account processes and technologies used for the operations of the facility, and potential emergency situations. Although processes and technologies may be similar at different sites, they always have to consider site specifics such as waste streams; the national disposal programme; local environmental and geological conditions; and applicable regulations, namely nuclear regulations, but also others such as groundwater regulations; and, in particular, site-specific features, for example the types and interfaces of all nuclear facilities on the site. Compliance with WAC is essential to ensure the safe operation of a facility and the implementation of the national programme for the safe management of radioactive waste. The WAC are therefore part of the operating licences of the facilities.

As a result, catalogues of requirements are created that are practically impossible to compare in detail between facilities. For example, even though all Land collecting facilities in Germany basically have to fulfil the same tasks for the same types of waste, their WAC differ due to site-specific technical capabilities and processes.

Furthermore, it can be observed that, as a rule, there are no facilities that carry out only one process step and prepare waste for only one waste class for the next process step. Generally speaking, facilities accept radioactive waste according to their specific WAC, and sort, store and treat the individual, sorted waste types for further steps. Accordingly, it is hardly possible to define a continuous, unambiguous sequence of WAC in order to establish uniform requirements or classifications across countries.

Only the criteria for transport refer, in all Member States, to international standards, namely the Agreement concerning the International Carriage of Dangerous Goods by Road (ADR), and are comparable in structure and content. The ADR, an international agreement under the United Nations Economic Commission for Europe, is adapted every 2 years to the latest technical and legal findings. It is the most important set of regulations for the transport of dangerous goods on international transport routes, and is partly supplemented or harmonised by other national and international regulations, such as the IAEA specific safety requirement *Regulations for the Safe Transport of Radioactive Material,* No SSR-6.

5.2.2. Requirements groups

5.2.2.1. General requirements

Basically, discrete waste properties are evaluated through specific WAC, which can be assigned to the four essential requirement groups mentioned above. General requirements, on the other hand, give guidance beyond the essential requirements groups. The general requirements can refer to requirements that are not directly measurable or that affect several requirement groups at the same time.

For example, in the case of waste treatment facilities, certain types of waste that cannot be processed in the facility have to be rejected. Examples are injection needles, batteries, metallic uranium, metallic plutonium and sealed sources. Materials that are otherwise permitted can also be excluded under certain conditions. For certain process steps, for example, no waste containing lead, borosilicate glass or boron carbide is accepted in a Belgian facility if these materials were used for shielding.

For disposal, on the other hand, materials for fixation can be specified. In a Swedish facility, for example, waste in the form of ion-exchange resins, concentrates, sludge or other liquid waste must be solidified with cement or bitumen prior to disposal.

It is also possible to guide someone through applying WAC using a set of general requirements. Instead of listing similar requirements for different waste types, general requirements can point to relevant essential requirements. In the decree ruling on requirements for transportation of radioactive material in Czechia, types of packaging are defined at the beginning of the document and, directly after the definition, pointers to the appropriate requirements on the packaging are listed.

General requirements are important for waste-handling facilities but, due to their site-specific character and their administrative function, they do not support the identification of any common approaches.

5.2.2.2. Radiological requirements

Radiological requirements generally define radionuclide-specific limits for waste acceptance based on a site-specific safety analysis.

Safe handling and safe transportation of waste are usually ensured not by the radionuclide inventory but by technical means, especially connected to the packaging. Hence, radiological requirements are not usually applied to transportation.

Facilities that process waste are bound to the discharge limits in their licence conditions. The ability to comply with the discharge limits relies heavily on the processing technology and the ability to retain any pollution. Hence, waste acceptance limits for the amount of radionuclides per volume or weight are derived from the given discharge limits and capabilities of the facilities used. The limits are defined solely on the basis of operational aspects of the facility, not on the basis of further process steps. For the management of a waste stream, facilities are chosen in order to 'optimise' the waste with a view to further waste management steps. For example, technology can separate a certain volume of medium hazardous waste into a small volume of hazardous waste and a larger volume of nearly non-hazardous waste.

Although, in the case of processing facilities, the quality of the facility is usually given the credit for safety, safety is not ensured by technical barriers alone in the case of storage and disposal facilities. In storage facilities, waste packages are accessible and are likely to be handled several times in the facility. Hence, radiological limits specifically refer to inventories of packages. By contrast, in disposal facilities, it is more likely that the entire facility is at risk. Hence, radiological limits are defined for the whole facility. In addition, mainly due to certain release scenarios, such as well drilling through a confined place in the disposal facility, specific limits on waste packages are in place as well.

Radiological requirements are an important basis for the definition of waste classes for disposal. However, looking at radiological requirements of predisposal facilities, they do not provide information on the final solution for the waste. Radioactive waste can generally be processed by utilising different technologies to assign it to a certain waste class. On the other hand, processing waste in a certain facility usually results in waste for multiple waste streams. In summary, radiological requirements are important for assigning waste to a certain waste class, but usually requirements on a facility-specific level do not support the identification of any common approaches.

5.2.2.3. Requirements for biological, chemical and physical properties

This requirement group contains requirements for the general behaviour or general properties of waste. Limits are derived from the given boundary conditions in the facility, which depend on the technology used and the governing regulations. The requirements defined here ensure the safe operation of the facilities during the processing of the waste, or the inactivity of the waste during interim storage and disposal, so that the integrity of the barriers can also be ensured over long periods.

A first essential classification of the properties is whether the waste is solid or liquid. In principle, liquid waste is not permitted for disposal, and residual moisture is only tolerated to a very limited extent. Furthermore, there are differences in the requirements for liquid waste for interim storage and processing facilities. For example, limits for pH values for interim storage are usually given in a much narrower band than for processing facilities. For example, the pH value for a Land collecting facility in Germany with pure storage must be between 5 and 9, for a Land collecting facility with connected conditioning it may already be between 3.5 and 10; in Belgium, radioactive acids may have a pH value of up to 2 and radioactive bases a pH value of up to 11.5 in a conditioning facility.

For processing facilities, further requirements may be defined that are crucial for processing. These include ignition temperatures to ensure operational safety, or limits for flowability so that the liquid waste can be pumped, for example. Oils that may have a high viscosity and low ignition temperatures must therefore usually be collected and conditioned separately.

Strict requirements for reactivity are generally imposed. The most important properties that are controlled are flammability or combustibility and corrosiveness (i.e. potential gas production). Flammable waste is excluded from repositories. In principle, this also applies to interim storage facilities; at least, the flammability of waste is only allowed to stay within narrow limits. In particular, due to the long periods considered for disposal, gas formation due to corrosion cannot always be completely ruled out. However, as flammable or explosive gases such as hydrogen are usually produced in the process, special requirements are placed on the waste, and especially on the materials that are to hold the waste.

Gas production can also result from fermentation processes during the storage of carcasses. In general, the decomposition of biogenic materials involves a large number of biological processes, the products of which pose a particular hazard, whether directly during release, through the decomposition of barriers or through gas production during corrosion processes. Therefore, as a rule, the disposal of biological waste is not permitted and interim storage is subject to strict limitations. For processing facilities, restrictions apply above all to the delivery of animal carcasses, for example. They must generally be frozen and may not exceed certain weight limits.

There are further requirements that are very facility specific. As a rule, potential hazards are excluded by limiting the amounts of certain materials in radioactive waste. This often concerns hydrocarbon-based materials, but can also apply to weights of metals, for example.

Overall, it becomes clear that requirements are developed, defined and approved in a very facility-specific manner. There are cases in which different WAC are defined for similar use cases with basically the same regulatory boundary conditions. For example, the limits for the permitted pH value for the acceptance of liquid waste or the permitted compositions for solid waste at German Land collecting facilities differ. It is therefore neither possible nor meaningful to identify common procedures in detail via this requirement group. As the differences result from the safety analyses, which take facility-specific boundary conditions into account, the differences cannot be levelled out. On the contrary, it can be disadvantageous from a safety point of view if it is prescribed that the requirements should be standardised in detail in the EU.

5.2.2.4. Requirements for dose rate and contamination

Limits for dose rates and contamination are necessary above all to avoid the effects of ionising radiation on the environment and humans. Uninvolved persons (i.e. untrained and unprotected persons) must be particularly safeguarded. The waste comes closest to this group of people during transport, which is why limits for dose rates and contamination often cover all further process steps.

In this context, limit values for contamination are usually aligned with measurement procedures. Thus, in most cases, 4 Bq/cm² may not be exceeded as the limit value for beta and gamma emitters, and 0.4 Bq/cm² is the limit value for alpha emitters.

Dose rates are even more frequently subject to national radiation protection regulations. Limit values are usually given as a function of the distance to the waste package. Typical values are dose rates lower than 2 mSv/h at the cask surface and 0.1 mSv/h at a distance of 2 m from the cask.

The dose rate limits depend on the waste-handling processes at the facility, which becomes clear when looking at final storage facilities. Effective shielding is often ensured by materials that may be disadvantageous in the long term, given the requirements for their disposal. Therefore, higher dose rates are accepted at the expense of restrictions in handling.

In summary, it can be stated that requirements for dose rates and contamination are largely harmonised through internationally agreed regulations on the transport of waste. Regarding the details, however, the international requirements are specified and partly adapted by national regulations and facility-specific operating licences.

5.2.2.5. Packaging requirements

Requirements for packaging are derived from the need to meet requirements for dose rates and contamination, to be able to handle waste safely, and to confine radionuclides with different biological, chemical and physical properties. Packaging is therefore essential to ensure the safety of facilities and is thus subject to strict regulations. In some cases, this goes so far that facilities not only stipulate requirements for the containers, but also specify from which manufacturer the containers must be procured. This ensures that the necessary level of quality is maintained.

For waste handling, the outer and inner dimensions of the containers, the shielding effect and the containers' weight are particularly decisive. Materials for the containers are specified for different waste streams. Properties such as the physical state (solid, liquid or gaseous), tendency to gas formation (e.g. through evaporation, fermentation or corrosion) and retention effect of the filling materials are taken into account.

In general, a distinction is made between outer and inner containers. The outer containers are used for safe transport or storage. They must therefore be stable and have certain standard dimensions. Steel drums in various sizes are therefore common for transport and interim storage. In addition, rectangular containers manufactured to certain International Organization for Standardization standards are also accepted for interim storage. Depending on the radiotoxicity of the waste, shielding of the containers, usually made of concrete, is required. For disposal, the material mix used has a major influence on the long-term performance of the facility. Therefore, less steel is used for disposal casks. For long-term safety, leak tightness must be ensured. This is ensured by specific requirements for the surface properties and by measures for safe handling of the waste containers. For this purpose, containers with standard dimensions are usually prescribed to facilitate handling with equipment specially designed for disposal; they must not exceed a total weight and must be stackable.

Inner containers are used for safe loading and unloading of the outer containers. They ensure that the waste is safely enclosed and cannot react with other materials. This can be particularly relevant for liquids or animal carcasses, for example. The inner containers may also be used for short-term storage under certain circumstances. Obviously, the inner containers must not be larger than the dimensions or heavier than the maximum weights of the containers used in the facility. The materials and designs used can vary greatly. As long as it is ensured that the containers retain their containment function for the time required, inner containers may be barrels, buckets, bags, bottles or other.

Unconditioned waste in particular can carry special risks due to its properties. These are taken into account through special requirements for the loading of the containers. For example, animal carcasses may only be delivered deep-frozen in order to avoid decomposition and gas formation. If gas formation cannot be safely ruled out in other cases, containers must not be fully loaded, in order to avoid an

impermissible build-up of pressure in the container. Long ends or sharp edges are generally not permitted or must be protected so that other waste or the containers are not damaged.

5.2.3. Process steps

5.2.3.1. Transportation

The ADR generally regulates, among other things, the classification of goods to be transported as dangerous goods; the use of packaging for dangerous goods; and the construction and testing regulations for containers, tanks and, in some cases, vehicles for the transport of dangerous goods. Further special regulations are laid down for radioactive materials. Depending on the waste class, certain requirements apply to packaging.

Generally, radionuclide-specific limits and requirements apply to different waste classes. Furthermore, limits are defined for surface contamination by beta and gamma emitters (usually 4 Bq/cm²), for surface contamination by alpha emitters (usually 0.4 Bq/cm²) and for the dose rate at the container surface (usually 2 mSv/h).

The ADR defines specific requirements for the containers. The minimum and maximum dimensions of the containers are defined, including requirements for their shape. For example, accumulations of water are to be avoided and anchorage points prevent the containers from slipping during transport. The containers must meet certain tightness requirements, for which typical environmental conditions are defined. For example, typical rainfall is to be assumed. The containers must also be designed to protect against sinking and be able to withstand water pressures corresponding to a depth of up to 200 m. Other environmental conditions include normal temperature ranges, for example between – 40 °C and + 38 °C, or solar radiation. A typical value is 800 W/m² of solar radiation over 12 hours on horizontal, upward-facing and unshaded surfaces. Sufficient stability of the containers is achieved by designing against drop tests (e.g. for containers with a total mass between 5 000 kg and 10 000 kg from a height of 0.9 m), against stacking tests (the containers must be able to carry five times their maximum mass) and puncture tests (a drop of a rod with a mass of 6 kg onto the weakest point of the container).

In some Member States, the ADR requirements are amended to meet national requirements. Specific licenses with specific conditions are needed when special waste or failed canisters have to be transported. However, in general, the ADR is always the basis. The chapters in the ADR related to radioactive materials particularly stipulate packaging requirements and requirements on dose rate and contamination. Other requirements apply when other hazardous materials are to be considered and, of course, in transport licenses.

5.2.3.2. Processing

Processing facilities have the task of preparing the raw waste for further process steps. Therefore, they must be able to accept a wide range of waste. Due to the active processing of waste in facilities subject to tight permit limits, the requirements are described in great detail. This applies in particular to the biological, chemical and physical properties of the waste, as these are the main factors determining the operation of the facilities and any releases. The radionuclide inventory is also important for the release from the facilities, as different radionuclides can be retained differently depending on their volatility and chemical properties.

Put simply, compression plants cannot necessarily process the waste that incineration plants can, and vice versa. Accordingly, the requirements for different processing plants sometimes differ considerably, although the treated waste may even belong to the same class.

For on-site handling, the inner containers are important. Therefore, requirements are also in place for these. The type of container and its size, mass and density are regulated.

5.2.3.3. Storage

Requirements for the interim storage process step are primarily aimed at handling in the interim storage facility and at the stability of the waste for the period of interim storage. On the one hand, standardised containers are advantageous for handling, so requirements for dimensions, mass and the type of outer containers are usually defined. On the other hand, handling is restricted by dose rate and contamination, so these parameters are also regulated.

In order to be able to guarantee the sufficient stability of the radioactive waste, it must be as inactive as possible. Accordingly, it is generally required that the stored materials must be flame retardant, non-explosive and non-gas-forming. Therefore, residual moisture must be largely excluded in solid waste; liquid waste should be neither acidic nor basic; and cadavers that can decompose are generally not allowed at all, or must be specially prepared and enclosed. Often containers must not be under excess pressure, or their contents must not be prone to gas formation.

As intermediate storage facilities are also used to store waste that is to be processed first, the requirements for the waste must also allow raw waste to be delivered in certain quantities. This is usually made possible by providing a relatively wide range of containers, which in turn are subject to strict requirements for tightness and stability. For example, containers must be fitted with special linings to ensure leak-tightness, or larger free volumes must be kept available to compensate for any gas formation.

5.2.3.4. Disposal

Requirements for the disposal process step are primarily aimed at safely enclosing the waste for very long periods. For this purpose, the waste must be securely packaged and the radionuclides must be enclosed in a solid matrix. As the contents of containers, by definition, can no longer be directly monitored once the container is sealed, any damage caused by handling must be ruled out. This is ensured by, among other things, specially developed emplacement technologies, which only allow a small selection of repository container types. Requirements for disposal casks therefore primarily relate to mass and dimensions. The disposal casks must also be able to carry site-specific loads over the period under consideration, which depends on the environmental conditions.

Containment in a solid matrix is ensured by biological, chemical and physical requirements. As a rule, all materials must be inactivated. Free liquids, and putrescible and infectious materials are not permitted; only dry, inorganic waste is allowed. Materials prone to chemical reactions are excluded. Fixing material must be fully cured and only certain fixing materials are allowed.

The quantity of radionuclides permitted is restricted, particularly with respect to long-term safety and possible hazard scenarios. Container-specific limits apply, for example in the event that a well drilling hits exactly one container, and, at the same time, limits apply to the entire facility if regional events are relevant to the repository.

As waste containers must be handled in the repository as well, limits are also set for the dose rate and for surface contamination. These are again often based on the regulations in the ADR.

5.3. Overall conclusions

The primary objective of Task 3 was to collate WAC from a variety of facilities across the EU, with a focus on the Member States with NPP programmes. The WAC were to be analysed with a view to identifying recurring patterns and developing a proposal for guidance to promote best practices. This section provides an overview of that analysis.

5.3.1. Maturity of the sector in terms of the availability of requirements and know-how

This section presents the conclusions in relation to Q5 set out in the project's terms of reference.

The analysis of the WAC showed that there is a deep understanding in the Member States of the need for the development of the requirements. Strictly speaking, the requirements derive directly from the fact that WAC are crucial for the operation of waste treatment facilities, and are therefore an important part of licencing and thus of nuclear regulatory supervision. WAC are derived from safety analyses performed on the basis of national regulations, the national inventory, facility-specific conditions and

environmental information. For the available WAC, it can be said that they clearly reflect a comprehensive and closed picture. It should be noted that, although they are an essential building block in the assessment of waste treatment facilities, they are only one building block.

Some countries have not provided information on WAC, even after repeated requests. The reasons given for this are mainly commercial confidentiality. Refusal due to a supposed lack of know-how was not assumed.

WAC are developed specifically for a facility. The requirements do not define the form in which the waste leaves the facility, but only the form in which the waste can be delivered. Furthermore, the requirements differ not only between process steps, but also between facilities for the same process step in the same regulatory system. The role of the individual facility is derived from the national programme, but cannot be derived from the WAC. However, no pattern can be discerned as to which waste is treated how and to what end. The aim of processing facilities is to transfer waste to a safe state. Processing can, for example, lead to a reduction in volume through incineration if the radioactivity is concentrated, or to an increase in volume If the radioactivity is reduced when the waste is dissolved in concrete or glass. Mixed forms may also be present. Which form of processing is preferred depends strongly on the national programme.

In terms of guidance and best practice, it would make sense not to prescribe specific requirements, but to explain that the requirements have to be developed in a certain manner. Awareness of different levels of requirements would help to develop meaningful WAC for facilities. A sensible approach has been developed by the European Repository Development Organisation group, which is briefly summarised here.

At the top level (level 1), national regulations apply. All further and more detailed rulings and guidance have to obey these regulations. On the next level (level 2), strategic requirements are set by the WMOs based on their own policy and preferences, and apply to the entire process. These requirements can be adopted from outside organisations (e.g. the IAEA), which would have the advantage that commonly agreed best practice would be used.

Requirements at level 3 are specific to transport, processing, storage or disposal, and are thus system level. Therefore, these are requirements that are valid for the whole process step. Hence, for disposal, for example, the requirements apply to all the types of repositories and host rocks.

Safety functions (level 4) then apply to a specific part of the facility of a process step. This can be, for disposal, the disposal container, host rock or engineered barrier. The safety functions say what must be done. The subcategories of shield, contain, isolate, handle and monitor are only to help.

Level 5 gives the design requirements and states which value needs to be reached in order to fulfil the requirement stated in level 4.

5.3.2. Presence of features representing a minimum common denominator for European waste classification schemes

This section presents the conclusions in relation to Q6 set out in the project's terms of reference.

For the reasons mentioned above, no approaches for overarching waste classes can be derived from the facility-specific WAC. This applies to the establishment of waste classes at national level and even more so at European level. It must therefore be emphasised again at this point that WAC are established specifically for facilities in order to ensure their safe operation. Waste classes, on the other hand, serve higher-level objectives, for example to provide governments or international organisations with an overview of the inventory in the territory.

The different tasks of WAC and national waste classes mean that it is difficult or impossible to define a link between acceptance criteria and waste classes that allows for a smooth transfer of information in both directions.

Strictly speaking, the only minimum common denominator is the distinction between HLW and non-HLW. Even this can be misleading, as waste that is not HLW is treated very differently from country to country. A country such as Germany, which disposes of all radioactive waste in deep geological repositories, will go to great lengths to minimise the volume of waste, which includes greater efforts to release materials from regulatory controls on radioactive waste. By contrast, such an effort is not necessary for a country that does not allow release and can also dispose of waste on the surface. As a result, however, the volume to be disposed of is significantly higher.

The comparison of HLW quantities is also only possible to a limited extent without further explanation. In countries where reprocessing of spent fuel is permitted, the amount of HLW is significantly lower than in countries that do not pursue reprocessing.

5.3.3. Features of a classification scheme ensuring a comprehensive and consistent inventory of radioactive waste in the Community's territory

This section presents the conclusions in relation to Q7 set out in the project's terms of reference.

In order to be able to compare the inventories between countries and thus also combine these into a common European inventory, certain preconditions must be met.

First of all, it must be clear that the operational classifications of different waste types must be subject to the requirements of the individual facilities. Direct comparability is thus difficult. However, quasitranslation aids can be found that allow the quantities of waste types in a facility to be transferred into a national system of waste classes.

A national system of waste classes reflects the national radioactive waste management programme. This is closely associated with the final solutions (i.e. the types of repositories envisaged in the country). However, these in turn determine the quantities of waste.

Therefore, it seems reasonable to define the waste classes along the final disposal solutions. HLW can be divided into two subclasses: waste from reprocessing and directly disposed spent fuel. Non-heat-generating waste can then be divided into waste for disposal in geological repositories, waste for disposal at intermediate depths, waste for disposal in near-surface repositories and waste for disposal in surface landfills. It would also be important to estimate the amount of waste released in order to establish comparability with countries where release is not possible. It will certainly be a challenge to obtain historical data on release.

6. TASK 4: THE PUBLIC'S AWARENESS OF RADIOACTIVE WASTE CLASSIFICATION SCHEMES

Task 4 is entitled 'The public's awareness of radioactive waste classification schemes' and has two primary objectives. The first objective is to gain an understanding of the level of awareness the public have of classification schemes, whereas the second is to gain their views on the potential for a harmonised waste classification approach across the Member States.

6.1. Methodology

A simple road map was devised in order to progress Task 4 in a logical and chronological manner (Figure 2).

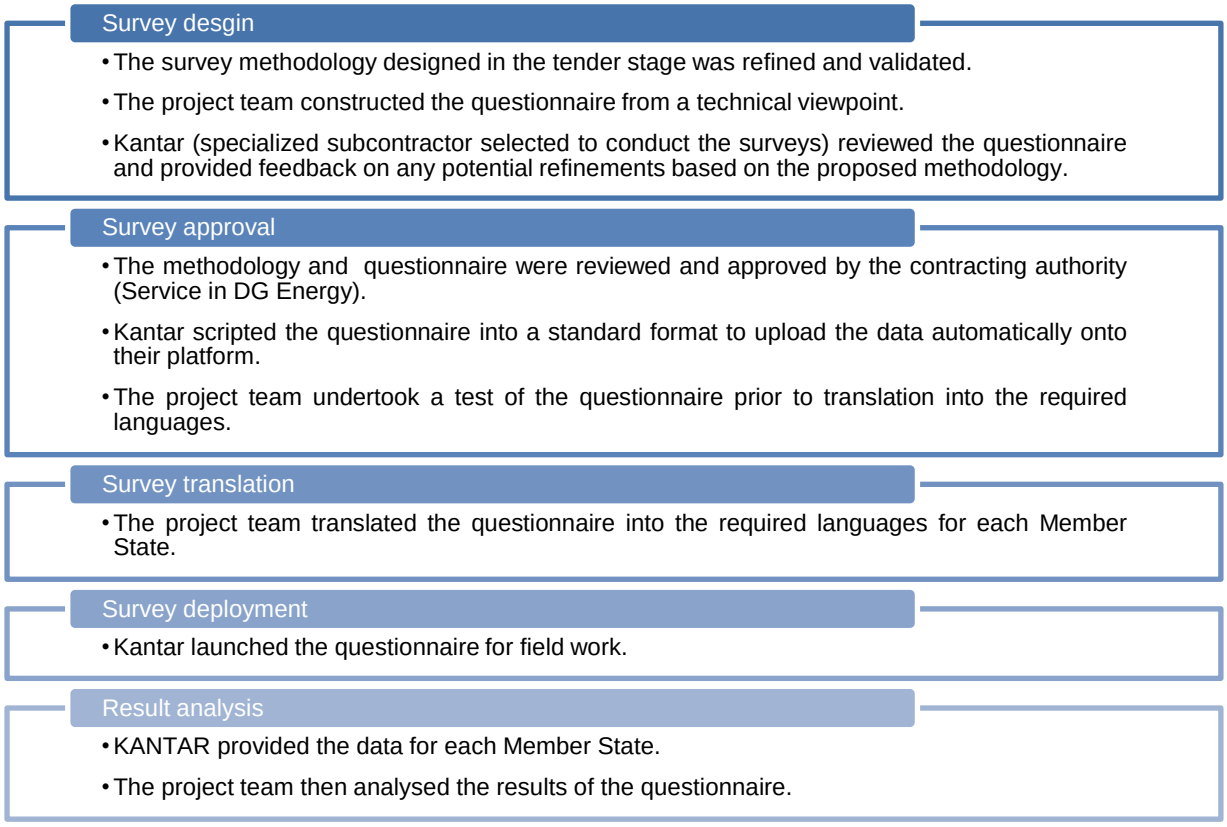

Figure 2: Methodology for Task 4

6.2. Questionnaire definition

Although it is impossible to predict the outcome in advance, it was important that the questionnaire was designed in such a manner that the project team would be able to provide answers to Q8, Q9 and Q10 set out in the project's scope (as reproduced below):

Q8) What is the information about radioactive waste that interests the public most?

Q9) To what extent are existing national and international classification schemes conducive to increased transparency for the public?

Q10) What are those features of a classification scheme that would ensure an appropriate level of transparency for the public?

The questionnaire took each respondent around 10 minutes to complete, and a variety of question styles were utilised. For example, some questions required a yes/no answer, whereas others asked if the respondent agreed or disagreed with a statement.

One of the requirements of Task 4 was to include a number of questions initially set out in the 2008 Eurobarometer survey (notwithstanding the fact that the 2008 survey was not merely focused on radioactive waste classification). Providing a comparison between the answers acquired during the 2008 Eurobarometer survey with the current survey will help to determine if there has been a change of viewpoint over the last 13 years. In order for this comparison to be of any value, it will be necessary to provide a consistent approach to how the results are demographically (i.e. based on the age, sex, profession, etc., of each respondent) assessed.

Although the primary focus of this project is related to radioactive waste classification, it was deemed necessary to ask some questions about waste disposal, orphan sources, NORM waste and transboundary issues. The rationale behind this approach is that these subjects are mentioned in the project scope and can be inferred from the questions (Q8, Q9 and Q10 for Task 4).

With due consideration of the project scope, it was logical to split the survey into three distinct, yet interconnected parts, namely parts to ascertain:

- how well informed the respondents thought they were about nuclear waste classification;
- how much the respondents knew about radioactive waste and what their concerns might have been;
- what their views were about a harmonised approach to radioactive waste across the Member States.

The questions utilised for Task 4 were as follows (please note Q3, Q4, Q5, Q11, Q16 and Q17 were taken from the 2008 Eurobarometer survey).

The first 10 questions aimed to understand how much the respondents knew about radioactive waste.

Q1. **Is your country one of those in the EU which produces radioactive waste?** Answers should be: yes, I believe it produces radioactive waste; no, I don't believe it produces radioactive waste; or I don't know either way.

Q2. **Radioactive waste can result from the activities of a range of industries, especially the nuclear industry. Do you understand the different types and origins of radioactive waste?** Answers should be: yes, completely; yes, to some degree; or no, not at all.

Q3. **Please assess the following statement: there are several categories of radioactive waste, for example low-, intermediate- and high-level waste.** Answers should be: I am aware that there are differences but I don't understand them, or don't know.

Q4. **Please assess the following statement: some non-nuclear industries produce radioactive waste.** Answers should be: yes, no or don't know.

Q5. **All radioactive waste is very dangerous.** Answers should be: true or false.

Q6. **Do you know who is responsible for the safe management of radioactive waste in your country?** Answers should be: yes, I know definitively who is responsible; yes, I believe I know who is responsible; or no, I don't know who is responsible.

A NORM summary statement was provided: 'Radioactive elements in minerals and ores originally found in the environment are commonly known as NORM – naturally occurring radioactive material. Activities like mining and oil/gas production can sometimes concentrate such NORM and therefore potentially pose a risk to workers, public or the environment.'

Q7. **Are you aware of the industries in your country which might produce naturally occurring radioactive material (NORM) wastes?** Answers should be: yes, I am familiar with which industries produce NORM wastes; yes, I am partly familiar with which industries produce NORM wastes; or no, I am not familiar with which industries produce NORM wastes.

Q8. **Do you believe that naturally occurring radioactive material (NORM) wastes should be managed in the same regulated manner as radioactive wastes emanating from the nuclear industry?** Answers should be: yes, I believe they should be managed in the same manner as nuclear industry wastes; or no, I don't think it is necessary that they are managed in the same manner as nuclear industry wastes.

Q9. **With respect to how radioactive waste is regulated in your country, how familiar are you with the regulation process?** Answers should be: yes, I am familiar with how radioactive waste is regulated in my country; I have a limited understanding of how radioactive waste is regulated in my country; or no, I am not aware of how radioactive waste is regulated in my country.

Q10. **With respect to the communication about how radioactive wastes are classified and managed, who do you trust the most?** Answers should be: scientists, academia, industry, government, regulators and non-governmental organisations (NGOs). (Please rank in order of the level of trust.)

The next four questions aimed to understand how well informed the respondents believed they were about radioactive waste.

A radioactive waste management summary statement was made: 'Radioactive waste has to be safely managed from the moment it is generated. Such management may take the form of either short/long term storage or in many instances final disposal.'

Q11. **How well informed do you think you are about radioactive waste?** Answers should be: well informed, partly informed or not informed at all.

Q12. **Are you aware of opportunities in your country for the general public to discuss or learn about radioactive waste management with either industry or regulatory organisations?** Answers should be: yes, I am aware of potential opportunities; or no, I am not aware of any opportunities.

- Supplemental question. **If you answered yes to question 12, please could you highlight from your experience which of these types of opportunities for gaining information about radioactive waste management you are aware of.** Answers should be: government websites, industry websites, regulatory websites, public meetings, site stakeholder groups, media outlets and other. (Please select all that apply.)

Q13. **Which of the following aspects of radioactive waste management might you be particularly interested in?** Answers should be: not interested, waste regulation, waste storage, waste disposal and the transportation of wastes. (Please place these statements in an order of preference.)

Q14. **Would you like to know more about how radioactive waste is classified and managed in your country?** Answers should be: yes, I would be interested in learning more; or no, I am not really interested in this subject.

The final eight questions aimed to understand their views about having a harmonised approach across the EU for the classification of radioactive waste.

Q15. **To what extent do you agree or disagree with the following statement: I have concerns about how radioactive waste is managed in my country.** Answers should be: totally agree, tend to agree, tend to disagree, totally disagree or don't know.

Q16. **To what extent do you agree or disagree with the following statement: each EU Member State should dispose of its own radioactive waste in its territory?** Answers should be: totally agree, tend to agree, tend to disagree, totally disagree or don't know.

Q17. **To what extent do you agree or disagree with the following statement: harmonised and consistent methodologies should be developed within the EU to manage radioactive waste.** Answers should be: totally agree, tend to agree, tend to disagree, totally disagree or don't know.

Q18. **To what extent do you agree or disagree with the following statement: a harmonised radioactive waste classification scheme for all EU Member States would ensure an appropriate level of transparency for EU citizens.** Answers should be: totally agree, tend to agree, tend to disagree, totally disagree or don't know.

Q19. **Which of the following would facilitate greater transparency in how radioactive wastes are classified for EU citizens?** Answers should be: information should be readily available on the websites of the regulators, information should be readily available on the websites of the waste producers, waste producers should take out advertisements in national newspapers, and waste producers should hold information sessions at schools. (Please place these statements in an order of preference.)

Q20. **To what extent do you agree or disagree with the following statement: different categories of radioactive waste should be managed in a manner which reflects their level of hazard.** Answers should be: totally agree, tend to agree, tend to disagree, totally disagree or don't know.

Q21. **To what extent do you agree or disagree with the following statement: materials (e.g. concrete, and metals such as steel and copper) with very low levels of radioactivity should be considered for reuse/recycling instead of being viewed as radioactive waste.** Answers should be: totally agree, tend to agree, tend to disagree, totally disagree or don't know.

Q22. **To what extent do you agree or disagree with the following statement: if it can be proved that they will be safely managed, radioactive wastes and/or materials should be allowed to be transported from one EU Member State to another for final disposal.** Answers should be: totally agree*, tend to agree, tend to disagree, totally disagree or don't know.*

6.3. Sample definition

The survey utilised for data gathering was based on the following parameters.

- **Survey method.** We used an online survey.

- **Survey length.** The survey took around 10 minutes.
- **Geographical representation.** It covered all 27 Member States.
- **Number of responses.** There were 1 000 samples per Member State, apart from Ireland and Luxembourg, which only targeted 500 people; and Cyprus and Malta, which targeted 300 and 200, respectively.
- **Deployment period.** The respondents completed the survey between March and April 2022.
- **Audience.** It covered a nationally representative sample. It was necessary to eventually be able to split the acquired results up demographically so that the comparison with the 2008 Eurobarometer survey would be of value. The demographic groups proposed are shown in Figure 3.

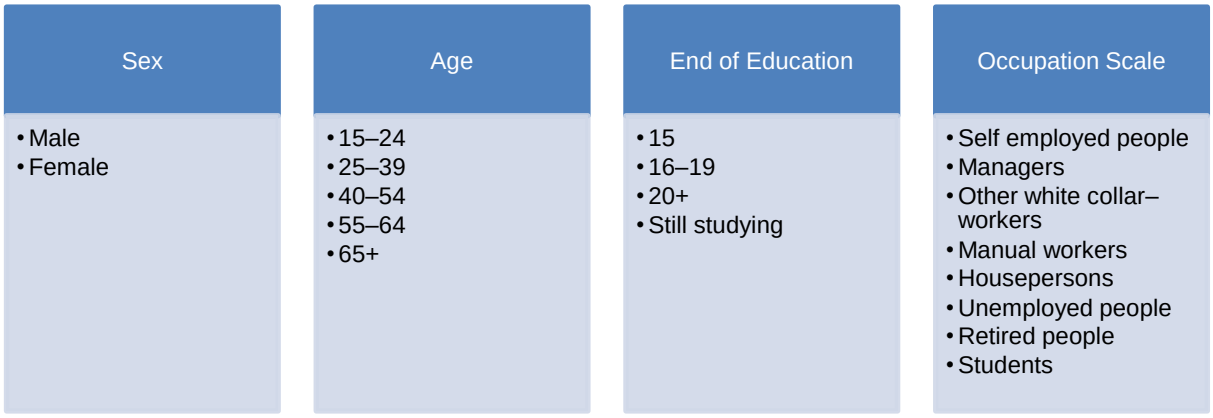

Figure 3: Demographic groups considered for the Task 4 survey

6.4. Survey findings and analysis

On analysis of the results, it was decided to present the main findings at a high level prior to investigating and subsequently elucidating the minutiae of the detail in a comprehensive analysis. This analysis has been conducted on a question-by-question basis, and the results are summarised in the following assessment categories.

- A high-level analysis was undertaken per question at EU level, but, where relevant, also at Member State level and if there was any difference between Member States with or without nuclear power programmes. The analysis includes a review of the differences between this survey and the 2008 Eurobarometer survey.

- A detailed analysis that took cognisance of the survey sample information was undertaken. Only a brief summary is included in this report, the results for all 27Member States' responses are provided in detail within Annex III, Public awareness survey – Detailed results.

6.4.1. Q1 – is your country one of those in the EU which produces radioactive waste?

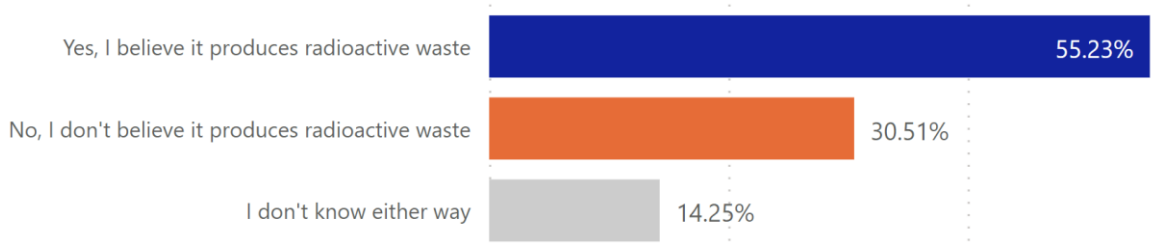

Figure 4: EU-27 Member States' answers to Q1

In total, 55 % of the respondents believed that their country produces radioactive waste. This statistic increased for the group of Member States with either a current or former nuclear power programme (Figure 4) ([14]). When the Member States with a current or former nuclear power programme were selected, it can be seen that 68 % believed that they produced radioactive waste; this is 37 percentage points more than the answers received from those countries without a current or former nuclear power programme. The fact that 45 % of the total respondents did not think that their Member States produces radioactive waste is significant because all Member States produce radioactive waste, regardless of whether they have a nuclear power programme or not.

Lithuania's answer was the least, and Italy´s answer was the second least, accurate out of the Member States with a current or former nuclear power programme. The fact that Lithuania and Italy phased out the last of their nuclear power programmes in 2009 and 1991 respectively may be one reason why its respondents were less certain.

The most accurate answer out of those Member States without current or former nuclear power programmes was seen in Greece, with 12 percentage points less than Italy (a nation with a former nuclear power programme) and 47 percentage points less than France (a nation with a long-established and well-documented nuclear power programme).

The least accurate answers were seen in Austria, Portugal, Latvia, Estonia, Lithuania, Malta and Ireland. Less than 30 % of the respondents in these Member States felt that they produced radioactive waste. These are Member States with no ascertainable plans, within the public domain, to incorporate nuclear power generation in the future.

([14]) Please refer to Section 1.2, Classification of Member States by nuclear power programmes, of Annex III, Public awareness survey – Detailed results.

6.4.2. Q2 – do you understand the different types and origins of radioactive waste?

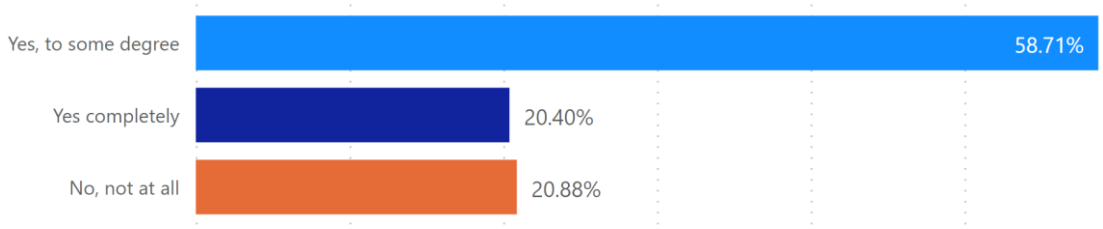

Figure 5: EU-27 Member States' answers to Q2

Some 80 % of respondents felt that they understood that there are different types of radioactive waste either completely or to some degree, as shown in Figure 5.

A significant difference in perspectives cannot be seen between the Member States with and without a current or former nuclear power programme. However, 8 % more respondents from the group of Member States without a current or former nuclear power programme did not feel they understood the different types of radioactive waste.

It was seen that all of the Member States, except for Denmark, displayed the same overall trend in that respondents had some degree of knowledge about the different types of radioactive waste. In the case of Denmark, slightly more respondents stated that they did not understand the different types of radioactive waste.

6.4.3. Q3 – there are several categories of radioactive waste, for example low-, intermediate- and high-level waste

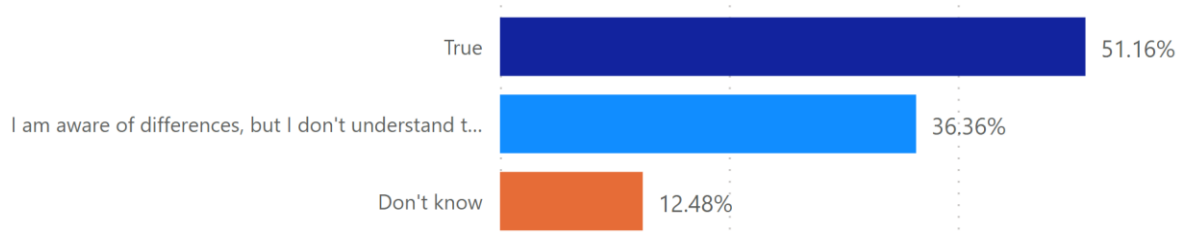

Figure 6: EU-27 Member States' answers to Q3

In total, 88 % of respondents knew that there are several categories of radioactive waste. As can be observed in Figure 6, around half state that the question's premise is 'true'. However, although awareness that there are different categories of radioactive waste was reasonably high, 49 % either did not understand the differences or had no knowledge of the topic.

The answers were mixed for those Member States with and without current or former nuclear power programmes, with all following a similar trend overall. All of the Member States showed a high level of awareness that there were different categories of radioactive waste.

Q3 comparison with the 2008 Eurobarometer survey

When asked about their understanding that there are different types of radioactive waste, the overall feedback was relatively similar between the two surveys. It should be noted, however, that the question was phrased slightly differently in each survey. In the 2022 survey, a larger percentage stated that they were aware of the differences but did not necessarily understand them, and fewer respondents than in 2008 (– 10 percentage points) stated that they did not understand them (Figure 7 and Figure 8).

Figure 7: 2008 Eurobarometer survey answers to Q3

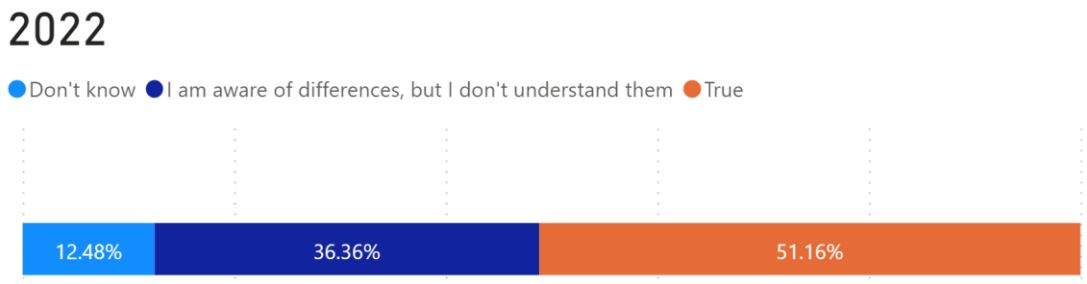

Figure 8: 2022 Member States' answers to Q3

6.4.4. Q4 – some non-nuclear industries produce radioactive waste

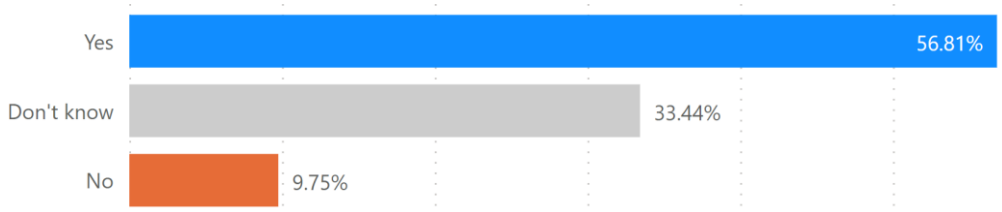

Figure 9: Member States' answers to Q4

Figure 9 shows that 43 % of respondents answered that either non-nuclear industries do not produce radioactive waste or they did not know if some non-nuclear industries produce radioactive waste. The figures might also be reflective of the answers provided for Q1, where 45 % of respondents reported that they did not believe that their Member State produced radioactive waste.

There was a wide range seen between the percentages of the answers between the different Member States. The most accurate answers in relation to the in-country situation were provided by Croatia, and the least accurate were provided by Denmark.

Q4 comparison with the 2008 Eurobarometer survey

When asked if they knew that non-nuclear industries produced radioactive waste, the overall feedback was relatively similar between the two surveys (Figure 10 and Figure 11).

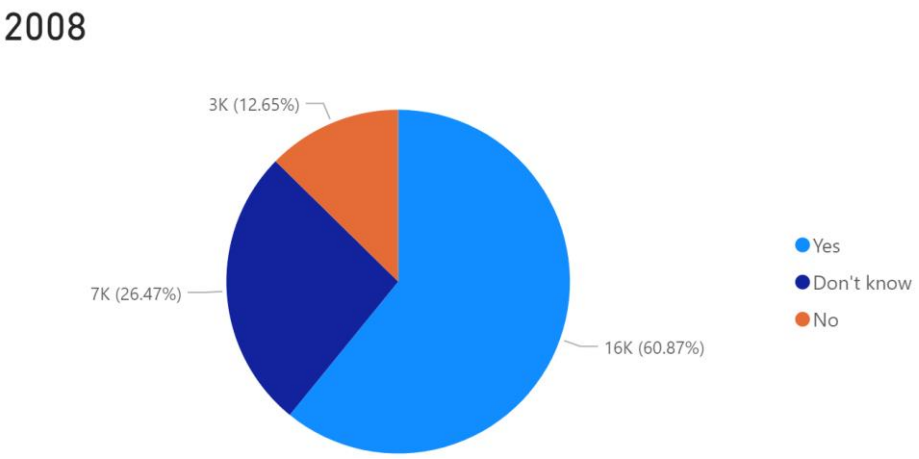

Figure 10: 2008 Eurobarometer survey answers to Q4

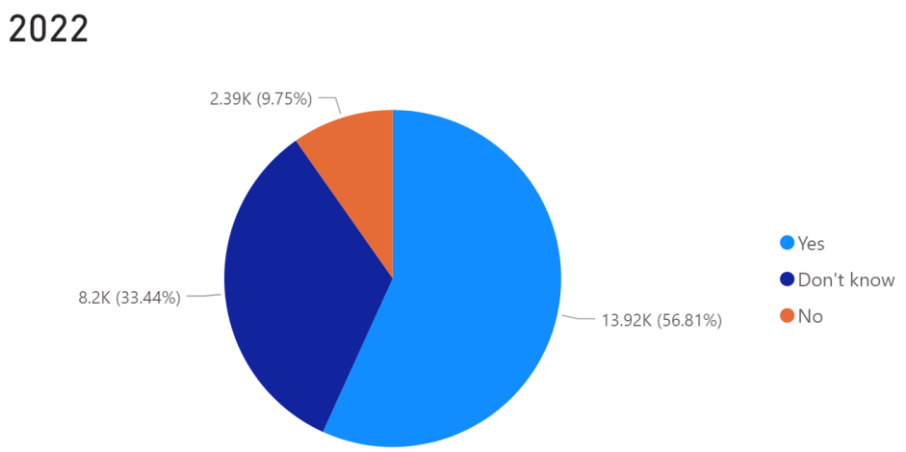

Figure 11: 2022 EU-27 answers to Q4

6.4.5. Q5 – all radioactive waste is very dangerous

Figure 12. EU-27 Member States' answers to Q5

Overall, 82 % of respondents felt that all radioactive waste is very dangerous. A small number of respondents, as can be seen in Figure 12, did not consider all radioactive waste to be very dangerous. The ratio of responses does not vary significantly for Member States with a current or former nuclear power programme and without a current or former nuclear power programme.

A majority believing that all radioactive waste is very dangerous occurs in all of the Member States.

Q5 comparison with the 2008 Eurobarometer survey

The 2022 survey was phrased slightly differently but, when asked if they thought all radioactive waste was dangerous, the overall feedback was relatively similar between the surveys (Figure 13 and Figure 14).

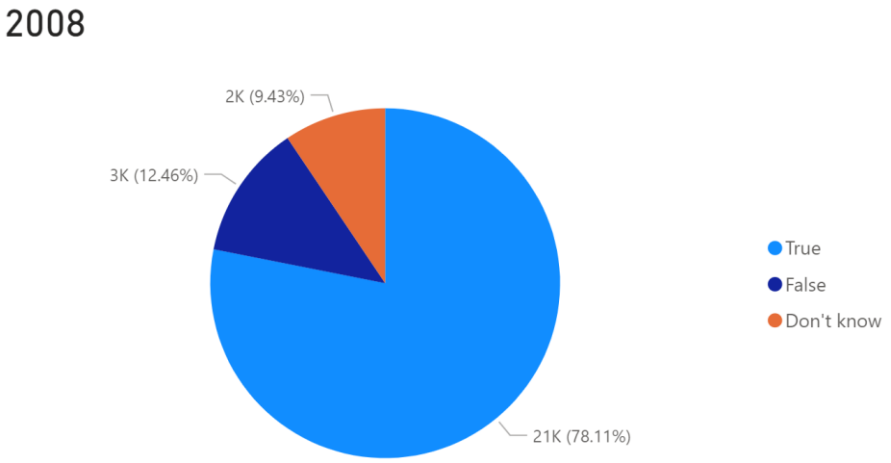

Figure 13: 2008 Eurobarometer survey answers to Q5

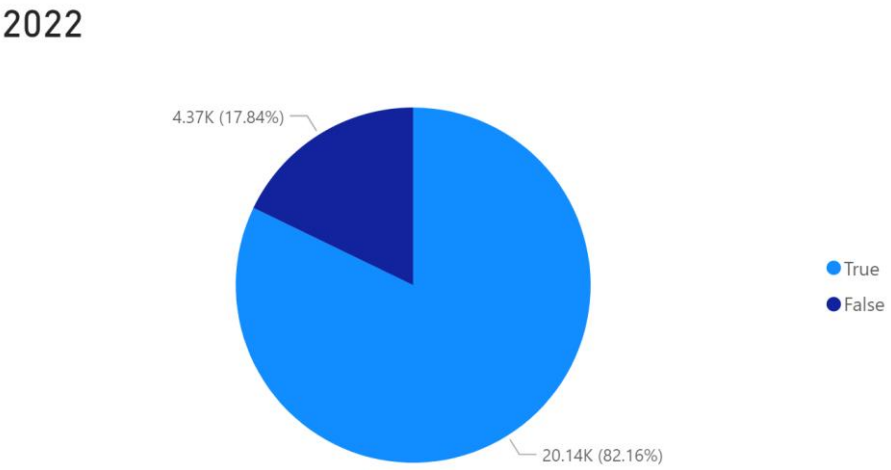

Figure 14: 2022 EU-27 answers to Q5

6.4.6. Q6 – do you know who is responsible for the safe management of radioactive waste in your country

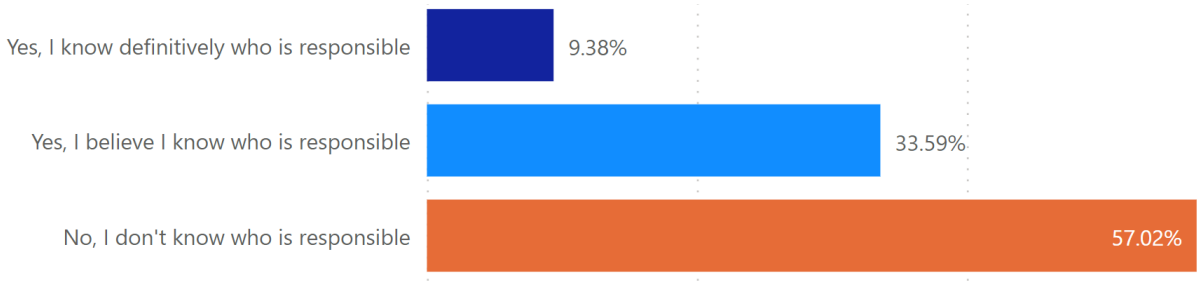

Figure 15: EU-27 Member States' answers to Q6

In total, 57 % of respondents did not know who had responsibility for the safe management of radioactive waste, around a third stated that they believed they knew who is responsible and a very

small proportion of respondents answered that they knew who is responsible, as can be observed in Figure 15. Respondents were 17 percentage points more likely to select 'no' in Member States without a current or former nuclear power programme than in Member States with a current or former nuclear power programme.

The results are fairly mixed for the Member States with and without a current or former nuclear power programme. However, it can be seen that the three Member States in which respondents were least certain of who was responsible do not have a current or former nuclear power programme. Contrary to this, the three where respondents were most certain that they knew who is responsible do have a current or former nuclear power programme.

In terms of their knowledge of who is responsible for the safe management of radioactive waste, all of the individual Member States highlighted some uncertainty (i.e. in no instance did more of a Member State's respondents choose 'I know definitively' than 'I believe I know'). Only six Member States, Czechia, Slovenia, Finland, Slovakia, Sweden and Romania, had a majority of respondents who either knew definitively or felt they knew who was responsible.

6.4.7. Q7 – are you aware of the industries in your country which might produce naturally occurring radioactive material (NORM) wastes?

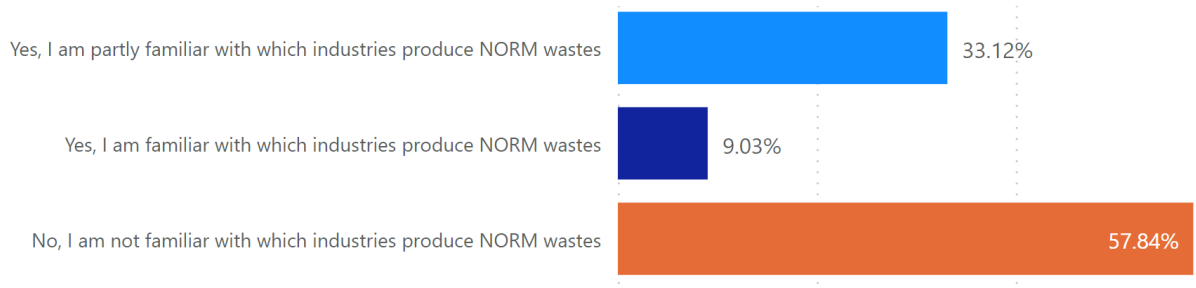

Figure 16: EU-27 Member States' answers to Q7

In total, 58 % did not know which industries produced NORM waste. As can be seen in Figure 16, 33 % felt that they were partly familiar with which industries generate NORM waste, and a small percentage answered that they were familiar with which industries produce NORM waste. The number of responses from the group of Member States without a current or former nuclear power programme (that did not know which industries produced NORM waste) outweigh the responses from the Member States with a current or former nuclear power programme by 13 percentage points.

In most Member States, the largest proportion of respondents answered that they were not familiar with which industries produce NORM waste. The exceptions to this trend were Slovenia, Bulgaria, Czechia

and Romania; in this case more respondents answered that they were partly familiar with which industries produced NORM waste.

As mentioned previously, a noticeable difference in viewpoints was shown by the Member States with a current or former nuclear power programme, and the Member States without a current or former nuclear power programme. These differences are summarised below.

- The five Member States that were found to be least certain are Member States without an active nuclear power programme, of which Lithuania is the only that has a former nuclear power programme.
- The five that were more inclined to state that they are partly familiar with which industries produce NORM waste are Member States with active nuclear power programmes.
- Out of the five countries that felt they had some understanding of which industries produced NORM waste, Bulgaria, Czechia and Romania have a documented history of uranium mining.

6.4.8. Q8 – do you believe that naturally occurring radioactive material (NORM) wastes should be managed in the same regulated manner as radioactive wastes emanating from the nuclear industry?

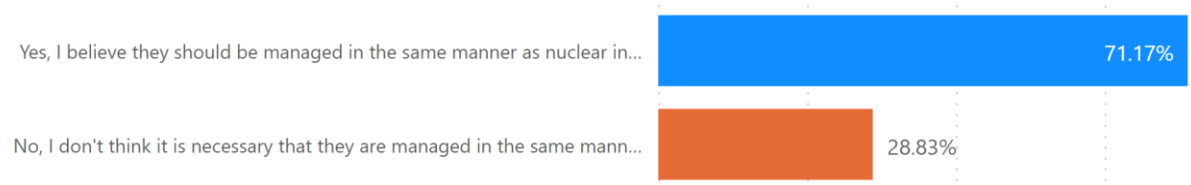

Figure 17: EU-27 Member States' answers to Q8

In total, 71 % of respondents felt that NORM waste should be managed in the same regulated manner as nuclear industry waste (Figure 17). There was not a significant difference between the answers received from the group of Member States with a current or former nuclear power programme and the group of Member States without a current or former nuclear power programme. Luxembourg was the only Member State where a slight majority did not think it was necessary for NORM waste to be managed in the same manner as nuclear industry waste.

6.4.9. Q9 – with respect to how radioactive waste is regulated in your country, how familiar are you with the regulation process?

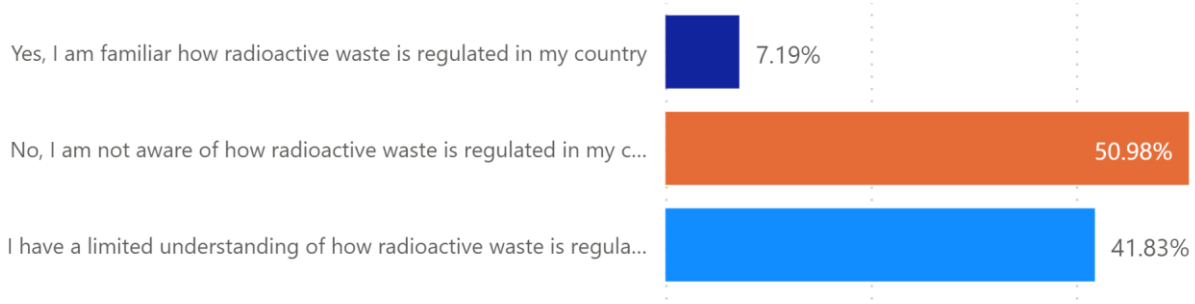

Figure 18: EU-27 Member States' answers to Q9

Only 7 % of respondents felt that they were familiar with how radioactive waste was regulated; half of all respondents were not aware of how radioactive waste is regulated in their country, and Figure 18 shows that 42 % felt that they had a limited understanding. The group of Member States with a current or former nuclear power programme were more certain that they had some understanding of the regulation process than the group of Member States without a current or former nuclear power programme. Overall, the respondents from the group of Member States without a current or former nuclear power programme were 11 percentage points more likely to answer that they did not understand the regulation process than respondents from the Member States with a current or former nuclear power programme.

6.4.10. Q10 – with respect to the communication about how radioactive wastes are classified and managed, who do you trust the most?

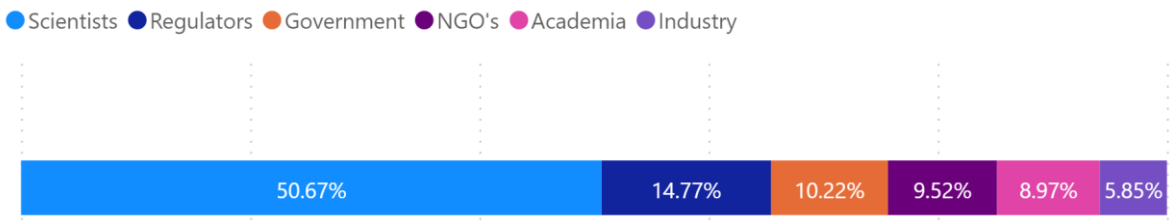

Figure 19: EU-27 Member States' answers to Q10

Q10 asked the public to provide their opinions on who they trust the most with communicating how radioactive waste is classified and managed. They were asked to rank the options from most to least trustworthy. As can be seen in Figure 19, 51 % of respondents answered that they trusted scientists the most, whereas only 6 % stated that they trusted industry the most. There is not a significant difference seen between the answers provided by the groups of Member States with and without a current or former nuclear power programme.

All of the Member States followed the same trend as the EU overall. However, Finland proved to be an outlier because, although they followed the same trend, Finnish respondents ranked industry higher than respondents from other Member States. Further to this, Czechia, Hungary and Bulgaria trusted scientists and regulators to an almost equal degree.

6.4.11. Q11 – how well informed do you think you are about radioactive waste?

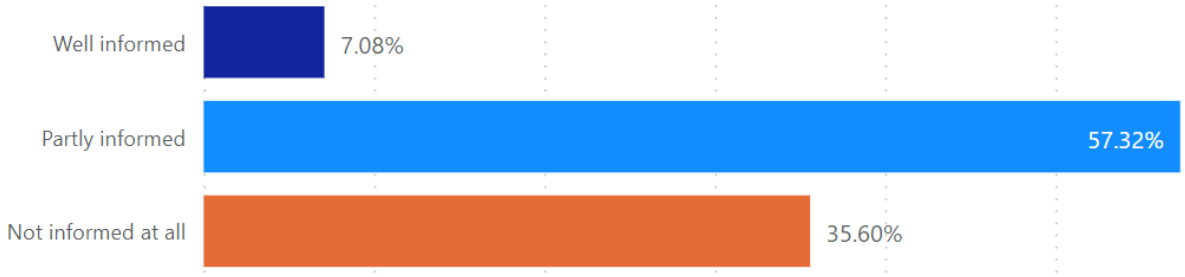

Figure 20: EU-27 Member States' answers to Q11

Only 7 % of respondents felt that they were well informed, 57 % stated that they felt partly informed and 36 % answered that they are not informed at all (Figure 20). The same overall trend is displayed by the groups of Member States with and without a current or former nuclear power programme. However, respondents from the group without a current or former nuclear power programme were 10 percentage points more likely to answer that they were not informed at all (42 %, compared with 32 % for those with a programme).

The responses were mixed between the Member States with and without current or former nuclear power programmes. However, the high-level analysis showed that, on average, the group of Member States without a current or former nuclear power programme had a 10-percentage-point-larger pool of respondents who did not believe they were informed about radioactive waste than the group of Member States with a current or former nuclear power programme. This difference in awareness is more easily visualised when a view is taken of the Member States that exhibited the most and least awareness:

- Finland, Lithuania and Romania (Member States with a current or former nuclear power programme) were the Member States that displayed the greatest beliefs of being informed.
- Ireland and Estonia (Member States without a current or former nuclear power programme) felt the least informed about radioactive waste.

Further to the above, the following outliers were identified:

- A total of 41 % of respondents from France felt that they were not informed.
- The Netherlands was the second-least-informed Member State.

Q11 comparison with the 2008 Eurobarometer survey

When asked how well informed they felt about radioactive waste in the current survey, 57 % stated that they felt they were partly informed. In 2008, only 22 % felt they were partly informed. Moreover, the proportion of respondents who answered 'not informed' decreased from 73 % in 2008 to 36 % in 2022 (Figure 21 and Figure 22).

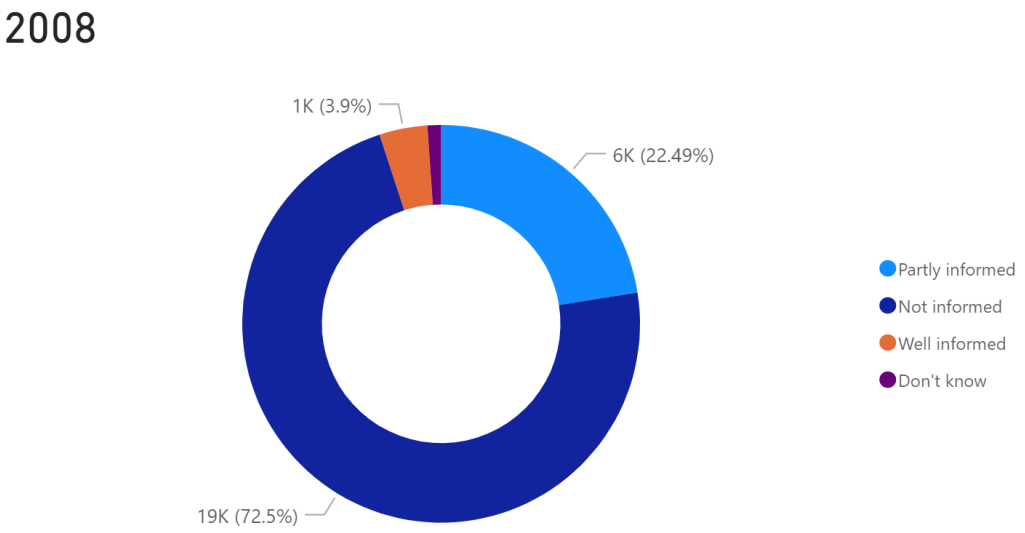

Figure 21: 2008 Eurobarometer survey answers to Q11

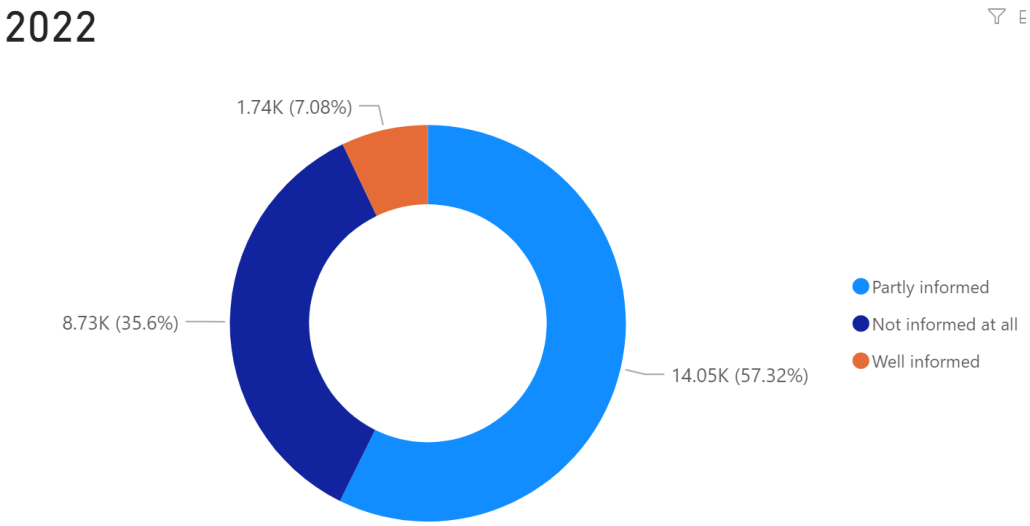

Figure 22: 2022 EU-27 answers to Q11

6.4.12. Q12 – are you aware of opportunities in your country for the general public to discuss or learn about radioactive waste management with either industry or regulatory organisations?

Figure 23. EU-27 Member States' answers to Q12

In total, 69 % of respondents stated that they were not aware of opportunities for the general public to discuss or learn about radioactive waste management (Figure 23). The same overall trend was displayed by the Member States with and without current or former nuclear power programmes, and no significant difference in perspective was found between the groups.

Poland, Croatia and Slovenia were the most aware of opportunities to discuss or learn about radioactive waste management, and were the only three Member States to record a majority in that regard. Furthermore, the following outliers were identified.

- Only 23 % of French respondents were aware of opportunities to discuss or learn about radioactive waste management.
- Polish respondents were the most certain that they knew of potential opportunities to discuss or learn about radioactive waste management.

6.4.13. Q13 – which of the following aspects of radioactive waste management might you be particularly interested in?

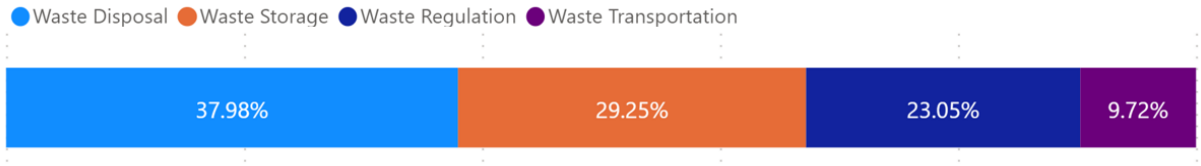

Figure 24: EU-27 Member States' answers to Q13

The respondents were interested to similar degrees in disposal, storage and regulation (Figure 24). There was less interest in transportation.

The respondents from the groups of Member States with and without current or former nuclear power programmes were not found to display any significant differences in perspective, and followed the same overall trend.

6.4.14. Q14 – would you like to know more about how radioactive waste is classified and managed in your country?

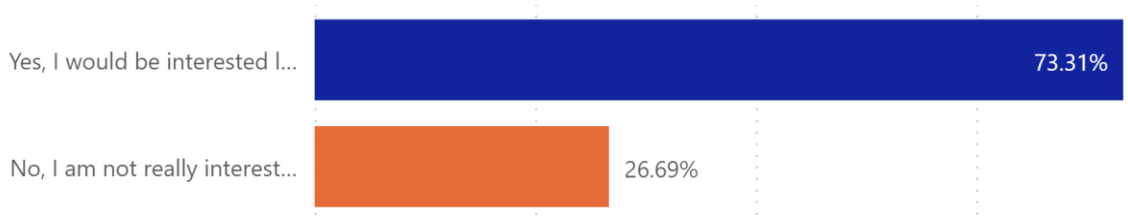

Figure 25. EU-27 Member States' answers to Q14

Overall, 73 % of respondents stated that they would like to know more about how radioactive waste is managed and classified (Figure 25). The same trend as seen for the EU-27 overall was observed for the Member States with and without a current or former nuclear power programme.

All of the Member States displayed an interest in learning more about waste management and classification, with the exception of Estonia, where respondents were slightly less interested than interested in learning more.

6.4.15. Q15 – I have concerns about how radioactive waste is managed in my country

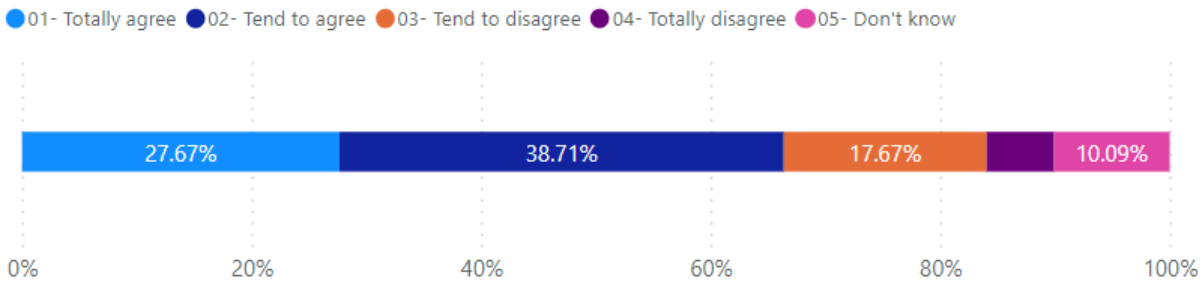

Figure 26: EU-27 Member States' answers to Q15

Overall, 66 % of respondents either totally agreed or tended to agree that they had concerns about how radioactive waste was managed (Figure 26). The same trend as seen for the EU-27 overall was observed for the Member States with and without a current or former nuclear power programme.

The individual Member States followed the same trend overall and significant differences in perspectives were not found. However, the Netherlands was found to be a small outlier because more

of its respondents either tended to or totally disagreed with the idea that they had concerns about how radioactive waste is managed in their country.

6.4.16. Q16 – each EU Member State should dispose of its own radioactive waste in its territory

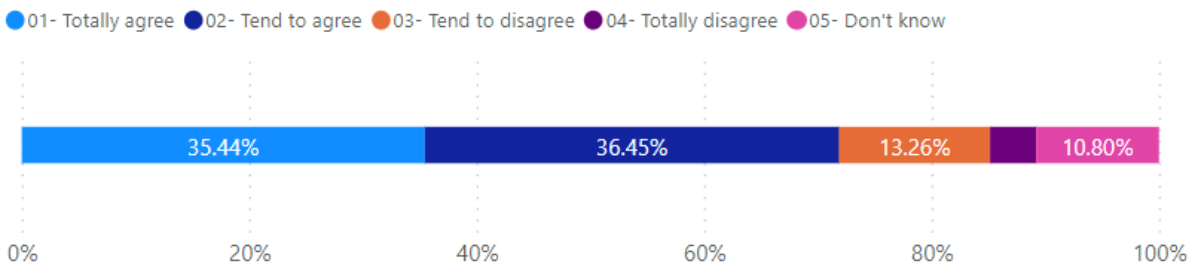

Figure 27: EU-27 Member States' answers to Q16

Overall, 72 % of respondents either totally agreed or tended to agree that each Member State should dispose of its own radioactive waste (Figure 27). The same trend as seen for the EU-27 overall is observed for the Member States with and without a current or former nuclear power programme. The individual Member States followed the same trend overall and significant differences in perspectives were not found.

Q16 comparison with the 2008 Eurobarometer survey

When respondents were asked if a Member State should dispose of its own radioactive waste, a smaller proportion of 35 % agreed with this statement in the 2022 survey compared with the 63 % observed in the survey in 2008 (Figure 28 and Figure 29).

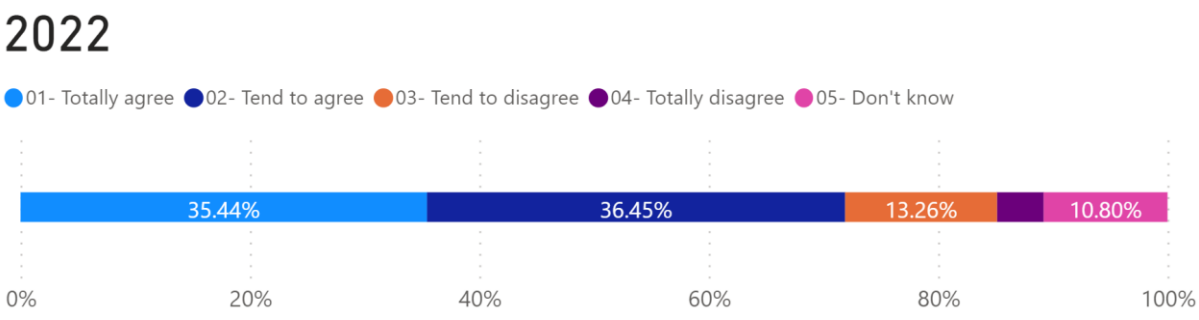

Figure 28: 2022 Member States' answers to Q16

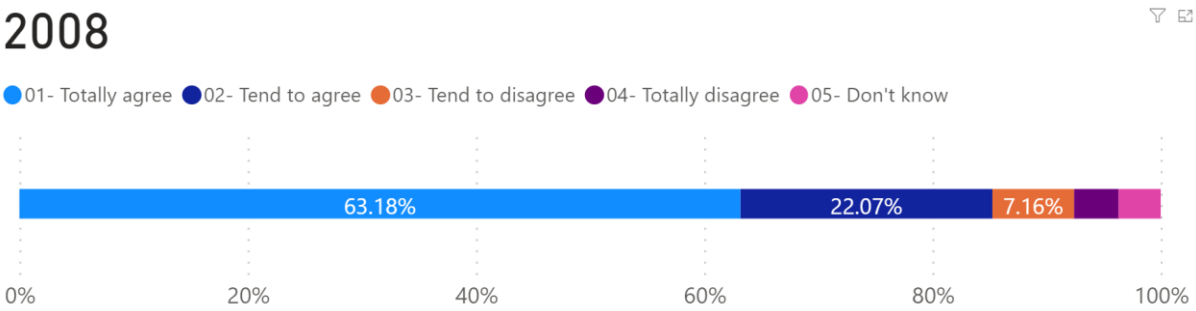

Figure 29: 2008 Eurobarometer survey answers to Q16

6.4.17. Q17 – harmonised and consistent methodologies should be developed within the EU to manage radioactive waste

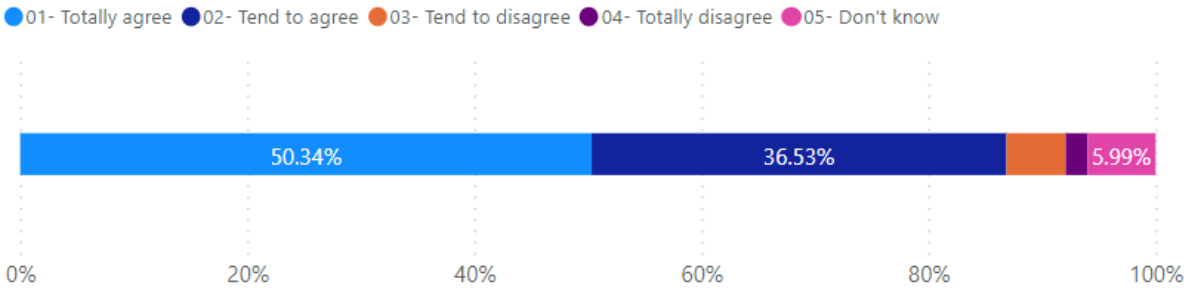

Figure 30: EU-27 Member States' answers to Q17

Overall, 87 % of respondents either totally agreed or tended to agree that harmonised approaches to manage radioactive waste should be developed across the EU (Figure 30). The same trend as seen for the EU-27 overall was observed for the Member States with and without a current or former nuclear power programme. The individual Member States followed the same trend overall and significant differences in perspectives were not found.

Q17 comparison with the 2008 Eurobarometer survey

When respondents were asked if harmonised approaches should be taken to manage radioactive waste across the EU, the results were relatively similar between the two surveys. However, the number of respondents who totally agreed decreased by 16 percentage points, from 66 % to 50 %, between the 2008 and 2022 surveys (Figure 31 and Figure 32).

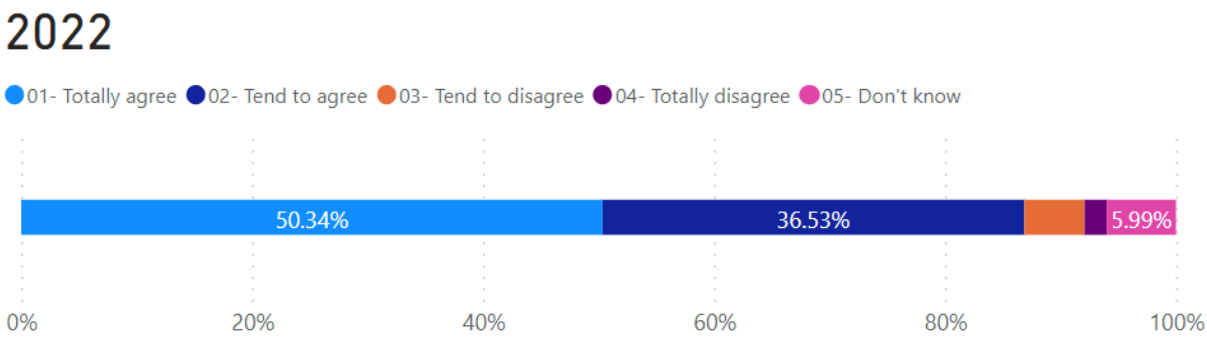

Figure 31: 2022 Member States' answers to Q17

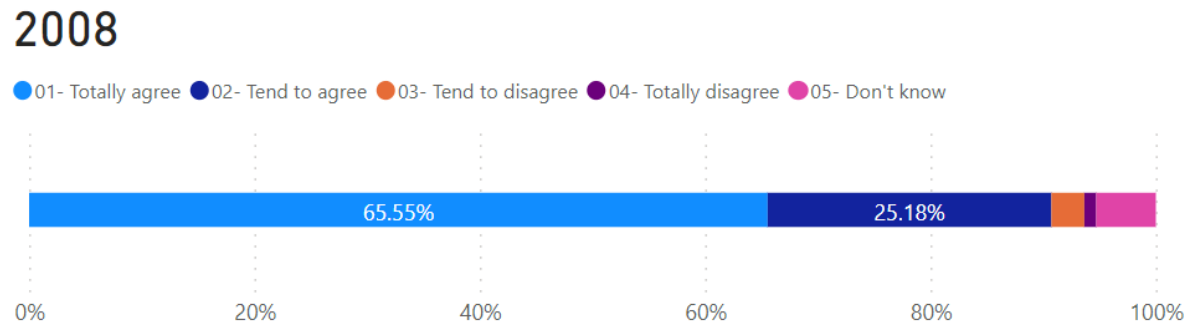

Figure 32: 2008 Eurobarometer survey answers to Q17

6.4.18. Q18 – a harmonised radioactive waste classification scheme for all EU Member States would ensure an appropriate level of transparency for EU citizens

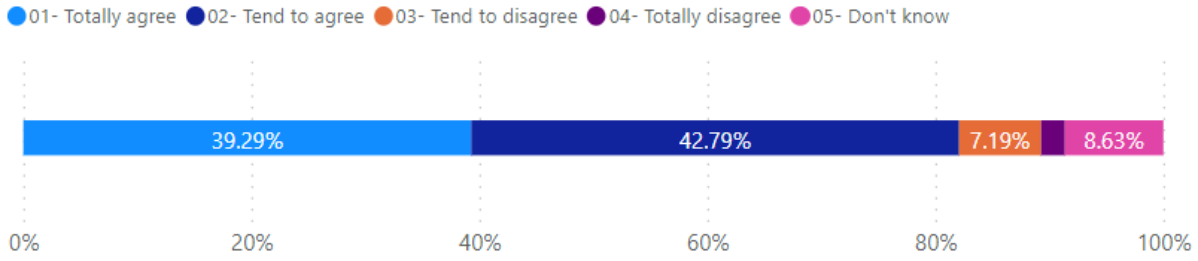

Figure 33: EU-27 Member States' answers to Q18

Overall, 82 % of respondents either totally agreed or tended to agree that harmonised approaches would lead to greater transparency (Figure 33). The same trend as seen for the EU-27 overall was observed for the Member States with and without current or former nuclear power programmes. The individual Member States followed the same trend overall and significant differences in perspectives were not found.

6.4.19. Q19 – which of the following would facilitate greater transparency in how radioactive wastes are classified for EU citizens? Rank them from most to least facilitating.

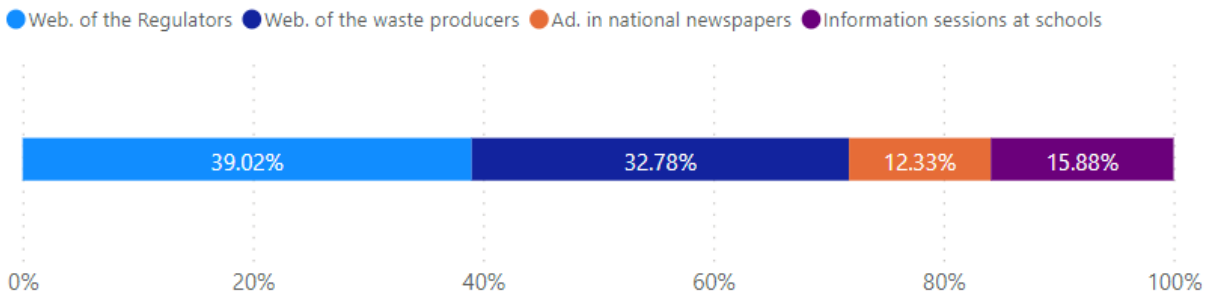

Figure 34: EU-27 Member States' answers to Q19

Q19 asked respondents to rank the options that would facilitate greater transparency in how radioactive waste is classified for EU citizens (Figure 34). It was found that there was an almost equal preference for the websites of the regulators and the websites of the waste producers. There was less interest in information sessions at schools and advertisements in national newspapers. This trend was also observed in the groups of Member States with and without current or former nuclear power programmes.

The answers provided by each Member State showed that they followed a similar trend, as detailed in the high-level analysis. However, the following Member States were identified as slight outliers: Malta, Slovakia, Cyprus, Denmark.

- Maltese, Cypriot and Danish respondents showed an almost equal interest in the websites of the regulators and waste producers, and information sessions at schools. This contrasted with the significantly less interest they displayed with respect to advertisements in national newspapers.
- Slovak respondents showed an almost equal interest in the websites of the regulators and waste producers, and advertisements in national newspapers. This contrasted with the significantly less interest they displayed with respect to information sessions at schools.

6.4.20. Q20 – different categories of radioactive waste should be managed in a manner which reflects their level of hazard

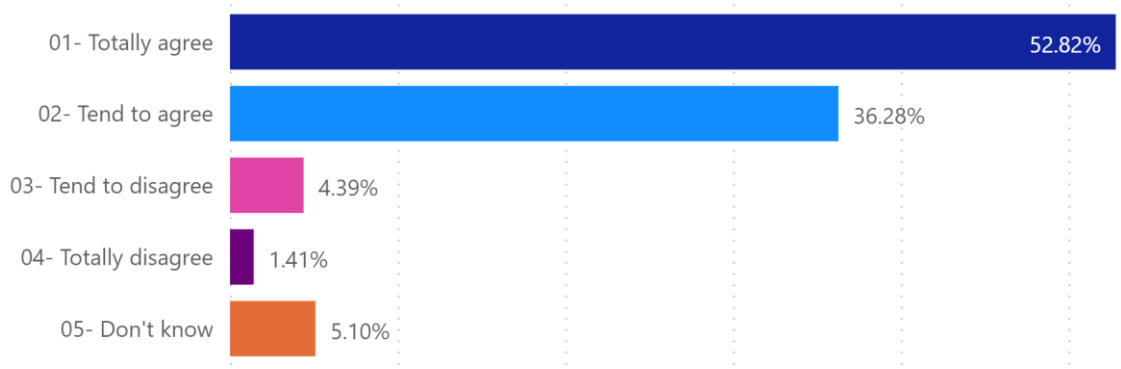

Figure 35: EU-27 Member States' answers to Q20

Overall, 89 % of respondents either totally agreed or tended to agree that different categories of radioactive waste should be managed in a manner that reflects the level of hazard (Figure 35). This trend was also observed in the cases of the groups of Member States with and without current or former nuclear power programmes.

Respondents from each Member State followed the same overall trend. Furthermore, a correlation between the answers and the groups of Member States with or without current or former nuclear power programmes was not found. In addition, no outliers were identified because a significant difference in the order of magnitudes of the answers was not observed.

6.4.21. Q21 – materials (e.g. concrete, and metals such as steel and copper) with very low levels of radioactivity should be considered for reuse/recycling instead of being viewed as radioactive waste

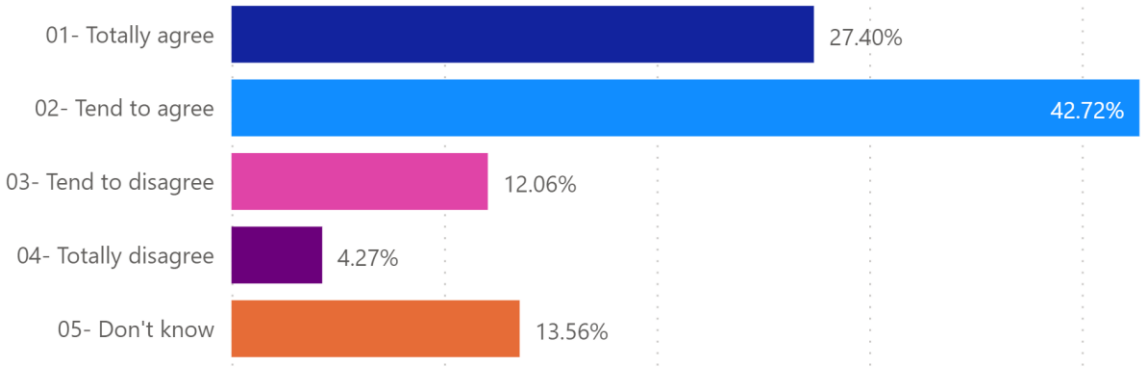

Figure 36: EU-27 Member States' answers to Q21

Overall, 70 % of respondents either totally agreed or tended to agree that materials with very low levels of radioactivity could be reused or recycled (Figure 36). This trend was also observed in the groups of Member States with and without current or former nuclear power programmes.

All of the Member States followed the same overall trend by answering that they either totally agreed or tended to agree that materials with very low levels of radioactivity should be considered for reuse/recycling. In addition, there was no observable correlation between the answers and whether or not the Member State has a current or former nuclear power programme. Moreover, the order of magnitudes of the responses were not found to have fluctuated significantly and, as a result, no outliers were identified.

6.4.22. Q22 – if it can be proved that they will be safely managed, radioactive wastes and/or materials should be allowed to be transported from one EU Member State to another for final disposal

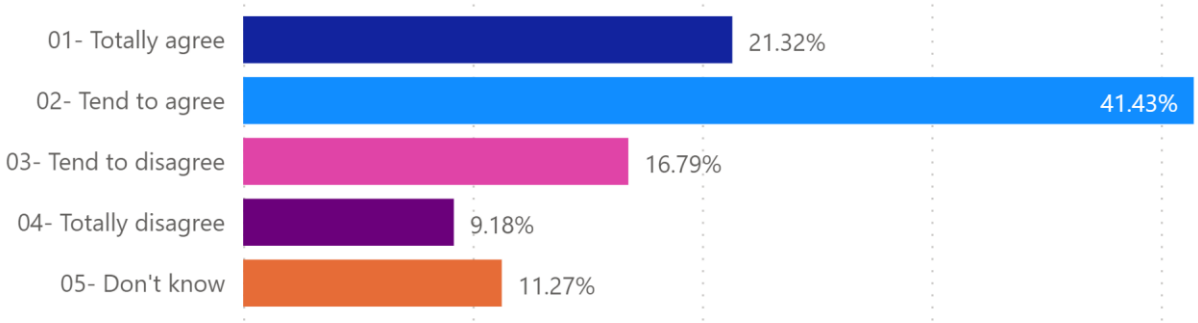

Figure 37: EU-27 Member States' answers to Q22

Overall, 63 % of respondents either totally agreed or tended to agree that radioactive waste could be transported to another Member State for final disposal (Figure 37). This trend was also observed in the cases of the groups of Member States with and without current or former nuclear power programmes.

All of the Member States followed the same overall trend by answering that they either totally agreed or tended to agree that, if it can be proved that they will be safely managed, radioactive waste and/or materials should be allowed to be transported from one EU Member State to another for final disposal. In addition, there was no observable correlation between the answers and whether or not the Member State has a current or former nuclear power programme. Moreover, the order of magnitudes of the responses were not found to have fluctuated significantly and, as a result, no outliers were identified.

6.4.23. Detailed analysis

A detailed results report of the survey conducted is provided in Annex III.

Some key insights are highlighted in this section in terms of the demographic sample selected for the survey (based on sex, age, age when education ended and occupation scale parameters, as described in Section 6.3).

Throughout the study, it was found that, in general, the demographics did not vary significantly with respect to the different categories defined; this means that, more often than not, the same trend was observed for each category as the overall trend that was detailed in the high-level analysis.

Regarding the **age** of the respondents, the older the respondents were, the more likely they were to believe that their Member State produces radioactive waste.

In general, with respect to **occupation status**, the manager and self-employed categories appeared to demonstrate a greater level of knowledge than other categories, or at least a greater confidence in their knowledge. It could be inferred from these results that those in positions of authority, or rather those that have more autonomy/responsibility in their current occupation, felt the most certain about their responses:

- For Q6, for example, manager was the only category where the majority of respondents did not select that they did not know who was responsible for the safe management of radioactive waste.
- For Q7, manager and self-employed were the only categories where the majority selected that they were aware of the industries that produce NORM waste.
- For Q9, manager, self-employed and student categories were the only categories where a majority did not select that they did not know who was responsible for regulating radioactive waste.

Regarding the **age when education ended** category, responses did not vary significantly across the survey. The most remarkable finding was in Q5, where the number of respondents who selected that all radioactive waste is dangerous was higher for those who ended their education at an early age (i.e. at 15, or between the ages of 16 and 19). This figure decreased by 6 percentage points for those who ended their education in the 20 + age range. Those who were still studying therefore believed the least that all types of radioactive waste are dangerous.

Concerning the **sex** category, the survey results shows that male respondents declared having a greater understanding of the different aspects of radioactive waste management than female respondents did. This statement is supported by the following points:

- 10 percentage points more female respondents than male respondents answered that they did not know whether or not their country produces radioactive waste.

- Although both male and female respondents stated that they mostly felt that they understood the different types and origins of radioactive waste to some degree, 14 percentage points more female respondents than male respondents selected ‘no, not at all’, and 11 percentage points more male respondents than female respondents selected ‘yes, completely’.
- When asked about the different categories of radioactive waste, 8 % more female respondents than male respondents answered that they were aware of the differences but did not understand them.
- When asked if non-nuclear industries produce radioactive waste, 10 % more male respondents than female respondents answered ‘yes’, whereas 11 % more female respondents than male respondents stated that they ‘don’t know’.
- Regarding whether or not the respondents knew who is responsible for the safe management of radioactive waste in their country, 10 % more male respondents than female respondents stated that they ‘believe they know’, whereas 16 % more female respondents than male respondents stated that they ‘do not know’.
- There was a noticeable difference in the perspectives of male and female respondents with respect to their awareness of how radioactive waste is regulated in their country in that 12 % more male respondents than female respondents believed that they were either aware or partly aware of the regulatory procedure in their country.

6.5. Overall conclusions and trends

6.5.1. Q1 to Q10 – how much the respondents knew about radioactive waste and what their concerns might be

In general, when comparing the groups of Member States with and without a current or former nuclear power programme, there were not many differences in the responses. Where differences did exist, they reflected greater knowledge held by citizens in Member States with an active nuclear power programme. In relation to specific individual questions, findings are as follows:

Q1. In total, 55 % of the respondents believed that their country produces radioactive waste. Overall, 68 % of respondents from the group of Member States with a current or former nuclear power programme believed that their country produces radioactive waste, compared with the 31 % who answered this out of the group of Member States without a current or former nuclear power programme.

Q2. Some 80 % of respondents felt that they understood that there are different types of radioactive waste either completely or to some degree. There was no apparent correlation between the responses with respect to whether or not a Member State has a current or former nuclear power programme.

Except for Denmark, the overall trend was consistent for each Member State; the respondents from Denmark were found to be the least aware of radioactive waste out of all of the Member States, and Denmark was the only Member State in which the largest proportion of respondents chose 'no' over some degree of or complete understanding.

Q3. In total, 87 % of respondents knew that there are several categories of radioactive waste, but 36 % did not understand the differences. There was no apparent correlation between the responses and whether or not a Member State has a current or former nuclear power programme.

Q4. Overall, 43 % of respondents answered that either non-nuclear industries do not produce radioactive waste or they did not know if some non-nuclear industries produce radioactive waste. A similar lack of understanding was exhibited in the responses to Q1. There was no apparent correlation between the responses and whether or not a Member State has a current or former nuclear power programme.

Q5. Overall, 82 % of respondents felt that all radioactive waste is very dangerous, and no difference was seen for groups of Member States with and without current or former nuclear power programmes. It is known that, under certain conditions and parameters, the radiological exposure presented by low levels of radioactive waste can be less than the background radiation to which an individual might be subject. Therefore, it can be inferred from the results that the EU public are still not well informed about the potential hazards presented by different categories of nuclear waste, and that some waste and materials may actually present negligible hazards. These findings and considerations can be considered in parallel to those to Q2, where a similar level of misunderstanding was shown.

Q6. In total, 57 % of respondents did not know who had responsibility for the safe management of radioactive waste. A total of 68 % of respondents from the group of Member States without a current or former nuclear power programme were not aware of who had responsibility for the safe management of radioactive waste, compared with the 51 % from the group of Member States that do have a programme. Only six Member States, Czechia, Slovenia, Finland, Slovakia, Sweden and Romania, had a majority of respondents who either knew definitively or felt they knew who was responsible.

Q7. In total, 58 % did not know which industries produced NORM waste. A total of 66 % of respondents from the group of Member States without a current or former nuclear power programme did not know which industries produced NORM waste, compared with the 53 % from the group of Member States that do have a current or former nuclear power programme. Out of the five countries that felt they had some understanding of which industries produced NORM waste, Bulgaria, Czechia and Romania have a documented history of uranium mining.

Q8. In total, 71 % of respondents felt that NORM waste should be managed in the same regulated manner as nuclear industry waste. It can be inferred from these results that citizens do not completely

understand that NORM waste is generally equivalent to VLLW/LLW, and that the majority of NORM does not always need to be disposed of in engineered facilities, as other documented management solutions exist. A significant difference in perspective was not found between the groups of Member States with and without a current or former nuclear power programme. Luxembourg was the only Member State where a slight majority did not think it was necessary for NORM waste to be managed in the same manner as nuclear industry waste.

Q9. Only 7 % of respondents felt that they were familiar with how radioactive waste was regulated. A total of 58 % of respondents from the group of Member States without a current or former nuclear power programme did not understand the regulation process, compared with 47 % of the group of Member States that do have a programme. France proved to be an interesting outlier, as the fact that only 7 % of their respondents were familiar with how radioactive waste is regulated could be considered surprising for a country with a long-established nuclear power programme and an energy matrix dominated by nuclear power generation (around 80 % of power).

Q10. In total, 51 % of respondents answered that they trusted scientists the most, whereas only 6 % stated that they trusted industry the most. A significant difference was not found between the answers provided by the groups of Member States with and without current or former nuclear power programmes. However, Finland was found to be an outlier among the Member States because 21 % of Finnish respondents selected industry as the most trustworthy.

6.5.2. Q11 to Q14 – how well informed the respondents thought they were about radioactive waste classification

Q11. Only 7 % of respondents felt that they were well informed about radioactive waste. In addition, a significant difference in perspective was not found between the groups of Member States with and without a current or former nuclear power programme. Similarly to Q9, France proved to be an outlier, as the fact that French respondents did not feel well informed could be considered surprising for a country with a long-established nuclear power programme and an energy matrix dominated by nuclear power generation. In addition to France, the Netherlands presented as an interesting outlier because it was found to have the third-highest number of respondents who answered that they were not informed at all. The Netherlands has an active NPP and, in 2021, the government announced plans to build two new nuclear units. Moreover, the Netherlands (through its main research reactor) produces around half of Europe’s medical radioisotopes.

Q12. In total, 69 % of respondents stated that they were not aware of opportunities for the general public to discuss or learn about radioactive waste management. In addition, a significant difference in perspective was not found between the groups of Member States with and without a current or former nuclear power programme. As with Q9 and Q11, France was found to be an outlier, as only 23 % of

French respondents were aware of opportunities to discuss or learn about radioactive waste management. Another interesting anomaly was observed in that Polish respondents were the most certain that they knew of potential opportunities to discuss or learn about radioactive waste management. Poland is a Member State without any history of nuclear power generation. However, Poland does plan to have nuclear power from about 2033.

Q13. The respondents provided almost equal answers for disposal, storage and regulation with respect to the aspects of radioactive waste management in which they were particularly interested. There was less interest in transportation. This might reflect the fact that citizens are not aware that waste and materials are transported across international boundaries. A significant difference in perspective was not found between the groups of Member States with and without a current or former nuclear power programme.

Q14. Overall, 73 % of respondents stated that they would like to know more about how radioactive waste is managed and classified. A significant difference was not found between the answers provided by the groups of Member States with and without current or former nuclear power programmes. Estonia was the only Member State where respondents were slightly less interested than interested in learning more about waste management and classification.

6.5.3. Q15 to Q22 – what are the respondents' views about a harmonised approach to radioactive waste across the Member States.

Q15. Overall, 66 % of respondents either totally agreed or tended to agree that they had concerns about how radioactive waste was managed. The groups of Member States with and without current or former nuclear power programmes followed the same overall trend, and a significant difference in perspectives was not found. The Netherlands was found to be a small outlier because more of its respondents either tended to or totally disagreed with the idea that they had concerns about how radioactive waste is managed in their country.

Q16. Overall, 72 % of respondents either totally agreed or tended to agree that each Member State should dispose of its own radioactive waste. The groups of Member States with and without current or former nuclear power programmes followed the same overall trend, and a significant difference in perspectives was not found. The individual Member States followed the same overall trend, and there were no observations or outliers worth noting.

Q17. Overall, 87 % of respondents either totally agreed or tended to agree that harmonised approaches to manage radioactive waste should be developed across the EU. The groups of Member States with and without current or former nuclear power programmes followed the same overall trend, and a significant difference in perspectives was not found. The individual Member States followed the same overall correlation, and there were no observations or outliers worth noting.

Q18. Overall, 82 % of respondents either totally agreed or tended to agree that harmonised approaches would lead to greater transparency. The groups of Member States with and without current or former nuclear power programmes followed the same overall trend, and a significant difference in perspectives was not found. The individual Member States followed the same overall trend, and there were no observations or outliers worth noting. It should, however, be noted that when this question was asked, the respondent was not told whether their Member States had, or previously had had, a nuclear power programme.

Q19. When asked to rank which option would facilitate greater transparency in how radioactive waste is classified for EU citizens, it was found that there was an almost equal preference for the websites of the regulators and the websites of the waste producers. On the other hand, there was less interest in information sessions at schools and advertisements in national newspapers. This trend was also observed in the groups of Member States with and without current or former nuclear power programmes. The majority of the Member States followed a similar trend, as detailed in the high-level analysis. However, Malta, Slovakia, Cyprus and Denmark were identified as outliers. Maltese, Cypriot and Danish respondents showed an almost equal interest in the websites of the regulators and waste producers, and information sessions at schools. This contrasted with the significantly less interest they displayed with respect to advertisements in national newspapers. Slovak respondents showed an almost equal interest in the websites of the regulators and waste producers, and advertisements in national newspapers. This contrasted with the significantly less interest they displayed with respect to information sessions at schools.

Q20. Overall, 89 % of respondents either totally agreed or tended to agree that different categories of radioactive waste should be managed in a manner that reflects the level of hazard. This does not align with the answers to Q5 (where it was found that the public felt that all radioactive waste was hazardous). In addition, it is a further indication of the public's apparent uncertainty about the different types of radioactive waste (as indicated by their answers to Q2 to Q4). Further to this, a significant difference in perspective was not found between the groups of Member States with and without current or former nuclear power programmes. The individual Member States followed the same overall trend, and there were no observations or outliers worth noting.

Q21. Overall, 70 % of respondents either totally agreed or tended to agree that materials with very low levels of radioactivity could be reused or recycled. This trend was also observed in the groups of Member States with and without current or former nuclear power programmes, both of which did not exhibit any significant differences in perspective. The individual Member States followed the same overall trend, and there were no observations or outliers worth noting.

Q22. Overall, 63 % of respondents either totally agreed or tended to agree that radioactive waste could be transported to another Member State for final disposal. This slightly contradicts the answers to Q16,

where 72 % of respondents either totally agreed or tended to agree that each Member State should dispose of its own radioactive waste in its territory. Further to this, a significant difference in perspective was not found between the groups of Member States with and without current or former nuclear power programmes. The individual Member States followed the same overall trend, and there were no observations or outliers worth noting.

6.5.4. Comparison with the 2008 Eurobarometer survey

Providing a comparison between the survey results acquired during the 2008 Eurobarometer survey and the current survey should be considered carefully. Between 2008 and the time when this survey was deployed (between March and April 2022), a number of events and other factors may have had an impact on public opinion with respect to nuclear power and radioactive waste management during the intervening period.

It should be noted that some of these events (e.g. the Fukushima nuclear disaster, and conflicts adjacent to and on NPP sites in Ukraine), due to media coverage, may have more of an impact on an individual's opinion than other events (e.g. changes in guidance and legislation). Public opinion may have been swayed in either a positive or negative manner. Some relevant events are identified below:

- In terms of EU legislation and international guidance, a number of initiatives have been introduced. In 2009, for example, the IAEA released its GSG *Classification of Radioactive Waste* (GSG-1), and, in 2011, the Council of the European Union adopted Directive 2011/70/Euratom (i.e. the waste directive).
- In 2011, the Fukushima accident made headline news, and eventually led to a number of Member States either curtailing or reducing their nuclear programmes.
- Political and environmental issues may also have influenced public opinion in more recent years. The European Commission has recently added nuclear energy activities to the EU taxonomy, a classification system for sustainable economic activities. The general public may have taken this announcement into account when replying to the current project survey.
- The recent situation in Ukraine, especially with regard to potential environmental/health impacts in the Chernobyl Exclusion Zone and at the Zaporizhzhia NPP sites, has again raised concerns about nuclear safety for European citizens.
- The current economic tensions, potentially exacerbated by the events taking place in Ukraine, may, conversely, have led to an increased level of support for nuclear power over a reliance on fossil fuels from outside the EU.

- As the recent survey was conducted during a relatively short time frame between March and April 2022, it is unlikely that there would be any significant differences of opinion between those responding in March and those responding later in April.

Q3. When asked about their understanding that there are different types of radioactive waste, the overall feedback was relatively similar between the two surveys. It should be noted, however, that the question was phrased slightly differently in each survey. There has been a slight increase in public awareness that there are different types of radioactive waste, but they mostly still do not understand the different waste types.

Q4. When asked if they knew that non-nuclear industries produced radioactive waste, the overall feedback was relatively similar between the two surveys.

Q5. The 2022 survey was phrased slightly differently but, when asked if they thought all radioactive waste was dangerous, the overall feedback was relatively similar.

Q11. When asked how well informed they felt about radioactive waste, there was a marked increase in awareness between the 2008 Eurobarometer and the 2022 survey: the proportion of respondents who answered 'not informed' decreased from 73 % in 2008 to 36 % in 2022.

Q16. When respondents were asked if a Member State should dispose of its own radioactive waste, there was a marked decrease in support between the 2008 Eurobarometer to the 2022 survey: 35 % agreed with this statement in the 2022 survey, compared with the 63 % observed in the survey in 2008.

Q17. When respondents were asked if harmonised approaches should be taken to manage radioactive waste across the EU, the results were relatively similar between the two surveys. However, the number of respondents who totally agreed decreased by 16 percentage points from 66 % to 50 % when comparing the 2008 and 2022 surveys.

6.5.5. Information about radioactive waste that interests the public most

This section aims specifically to address Q8 set out in the project's terms of reference.

The analysis showed that the following aspects of radioactive waste interested the EU population the most:

- There was generally positive support for the reuse/recycling of lightly contaminated materials.
- A high percentage of respondents would like to know more about the various aspects of radioactive waste management and classification.

- Many respondents declared that they would be interested to know more about waste regulation, waste storage and waste disposal. There was less interest in knowing more about waste transportation.

6.5.6. How conducive existing national and international classification schemes are to increased transparency for the public

This section aims specifically to address Q9 set out in the project's terms of reference.

It was observed that the public were partially aware of the existing classification schemes of radioactive waste in their countries. It was additionally found that the surveyed population trusts information received from scientists more than any other source of information. Conversely, the general public were found to trust industry the least.

In addition to the above, the following points were observed:

- Overall, the respondents had a reasonable understanding of if radioactive waste was produced in their Member State or not.
- A high percentage of respondents felt that harmonised approaches across the EU would be beneficial and add to transparency. In addition, with respect to transparency, it was seen that there was an almost equal preference towards seeing information displayed on the websites of regulators and the websites of the waste producers. Feedback showed that there was less interest in developing information sessions at schools or providing information in advertisements in national newspapers.

6.5.7. Features of a classification scheme that would ensure an appropriate level of transparency for the public

This section aims specifically to address Q10 set out in the project's terms of reference.

The survey showed that:

- a very high percentage of respondents felt that all radioactive waste was dangerous;
- an extremely low percentage of respondents were familiar with how radioactive waste was regulated;
- only 6 % of respondents stated that they trusted industry the most;
- a very low percentage of respondents stated that they felt well informed about radioactive waste;

- a relatively high percentage of respondents stated that they were not aware of opportunities for the general public to discuss or learn about radioactive waste management.

Based on the above findings, a greater harmonisation of waste classification schemes across Member States was seen as a mechanism by which greater transparency could be provided. Improved communication at both EU and Member State levels, especially via the preferred mechanisms, would also enhance transparency, as would increasing trust in industry. Communication about the different waste types and how they are appropriately managed would also go some way towards allowing citizens to better understand and trust the waste management approaches.

7. TASK 5: BARRIERS TO CROSS-BORDER COOPERATION

Task 5 is entitled 'Barriers to cross-border cooperation' and has the primary objective of identifying possible issues or barriers to cross-border cooperation arising from waste classification schemes.

7.1. Methodology

A simple road map was devised in order to progress Task 5 of the project in a logical manner. This road map sets out the various activities in a chronological order.

The Task 5 road map requires the following activities to be undertaken by the project team (further details on the key activities can be found below):

- Relevant waste producers across the Member States and all EU-27 WMOs were first identified.
- The generated list was then shared with the contracting authority (a service of DG Energy) in order to gain its approval.
- The questionnaire was designed (both in terms of the questions and its methodology) via a survey platform called Microsoft Forms.
- Once designed, the questionnaire was shared with DG Energy for its approval.
- The questionnaire was tested among the project team.
- The project team produced a summary explaining the project, providing instructions and containing the necessary links to the survey platform (Microsoft Forms).
- Next, the questionnaire was sent out to the nominated organisations in each Member State.
- The project team analysed the initial results of the questionnaire, drew conclusions and fed these into the intermediate report.
- Further reminders were sent to the WMOs and waste producers in order to gain further responses. In addition, DG Energy sent a request to Forum Atomic Européen members to also fill out the survey.
- The final analysis and conclusions drawn are captured within this final report.

7.1.1. Identification of waste producers and waste management organisations

The first activity was to identify the Member State' WMOs and main radioactive waste producers that would be targeted in the survey. An initial list was produced and forwarded to DG Energy for its approval.

The sample of waste producers selected included entities and organisations with different duties across the EU in order to gather a wide spectrum of feedback on transboundary issues, based on the following considerations.

- Waste producers were selected from Member States with nuclear power programmes (specifically Belgium, Bulgaria, Croatia, Czechia, Finland, France, Germany, Hungary, Lithuania, Netherlands, Romania, Slovakia, Slovenia, Spain and Sweden), and from other Member States with non-nuclear power infrastructures (Austria, Denmark, Greece, Ireland, Italy, Poland and Portugal).
- Waste producers were selected to cover the generation of different types of radiological waste (e.g. NPP, industry, NORM, medical use, agriculture, research or fuel cycle).

7.1.2. Questionnaire design

The methodology and the questionnaire to be adopted for the survey were formulated and approved by DG Energy. It was designed in a manner to ensure that all questions could be answered in between 10 and 15 minutes, as any greater length of time is unlikely to gain a response.

The questionnaire was split into two sections. The first of these related to the specific organisation and the role of the individual responding to the questionnaire. The second section constituted the technical questions related to cross-border cooperation.

Although it is impossible to predict the outcome in advance, it was important that the questionnaire was designed in such a manner that we could provide an answer to Q11, Q12, Q13 and Q14 set out in the project's scope, as highlighted below:

Q11) To what extent are existing national and international classification schemes conducive to effective and efficient cross-border cooperation?

Q12) How are national and international classification schemes perceived by waste generators, waste management operators/organisations in respect to cross-border cooperation?

Q13) How do national classification schemes condition/influence cross-border cooperation?

Q14) What are those features of a classification scheme that would promote cross-border cooperation?

The questions utilised for Task 5, and the associated analysis, are presented in Section 8.2. Due to the potential for different responses from the WMOs and waste producers, a decision was made to present the responses separately. However, correlations and relevant trends will be stated, where relevant.

7.1.3. Questionnaire implementation

The online survey was conducted via Microsoft Forms, and the received responses were a mixture of single-choice, multiple-choice or written answers, as shown in Figure 38. The access link to the survey was sent to all WMOs and the main waste producers for their participation, accompanied by an introductory letter.

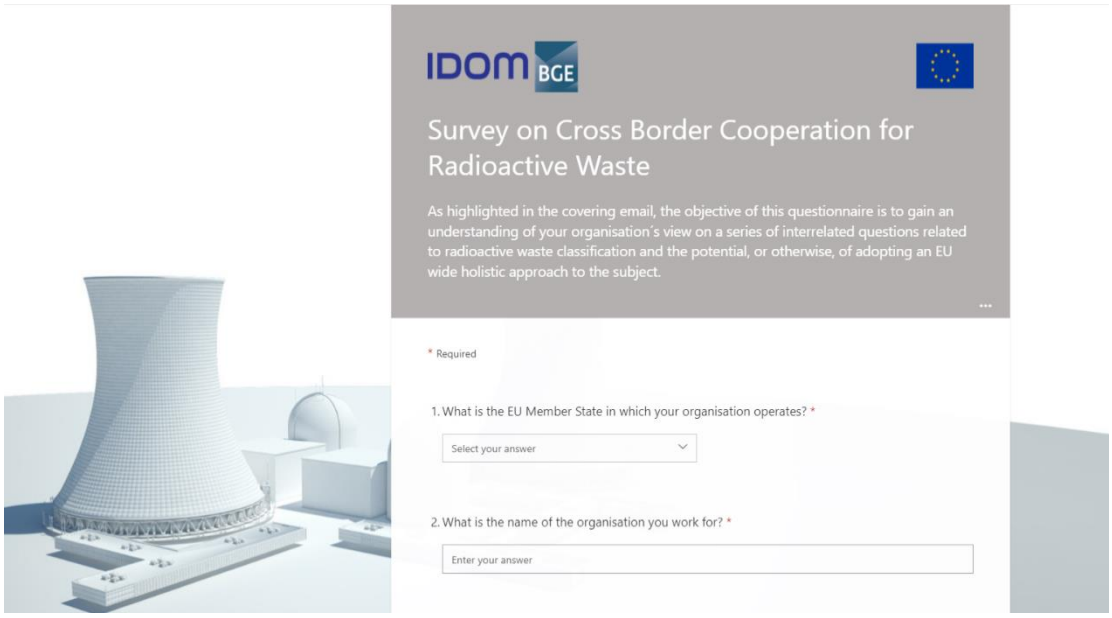

Figure 38: Task 5 online questionnaire

7.2. Findings across Member States

The survey was sent out to 27 WMOs across all of the Member States and to a total of 50 waste producers. Responses were eventually received from 23 of the WMOs and from 14 of the waste producers. The feedback obtained is analysed in the following sections, and the detailed results can be found in Annex IV, Cross-border cooperation survey – Detailed results.

7.2.1. Survey results from the waste management organisations

Q1. Are you satisfied that the existing radioactive waste classification scheme adopted in your country facilitates the efficient management of the different waste streams produced by the nuclear and/or other industries (wastes from research, health service providers, etc.)?
WMOs in all Member States responded 'yes' to this question, apart from in Malta. The Maltese WMO supported its answer by stating that it only has a limited amount of waste, none of which is long lived. All short-lived waste in Malta is stored until it has adequately decayed.
Q2. Is the radioactive waste classification system adopted by your country conducive to effective and efficient cross-border cooperation with other EU Member States in relation to waste treatment/conditioning or disposal?
WMO in all Member States responded 'yes' to this question, apart from in Malta and Sweden. The Maltese WMO supported its answer by stating that its regulations and national framework make reference to the use of appropriate classification of radioactive waste as and when required. However, it has not yet adopted a formal classification system due to the limited amount of radioactive waste. The Swedish WMO supported its answer by saying that its adopted system was conducive, with the notable exception of sending samples for analysis. It stated that the Swedish regulator has chosen to classify all samples, however small, as nuclear waste, which makes cross-border cooperation more complicated.

Q3. Is the radioactive waste classification system adopted by your country a barrier specifically to effective and efficient transportation of radioactive wastes to or from other EU Member States?

Of 23 respondents to this question, only 6 WMOs replied that their adopted system was a barrier, whereas 17 replied that it was not. Those that stated it was some form of barrier were from Bulgaria, Estonia, Finland and Sweden. The Estonian WMO stated that because there is no unified waste classification system across the EU, it needs to familiarise itself with each Member State's approach, which often requires additional time and different paperwork. WMOs from the other three Member States did not respond as to why it was deemed a barrier.

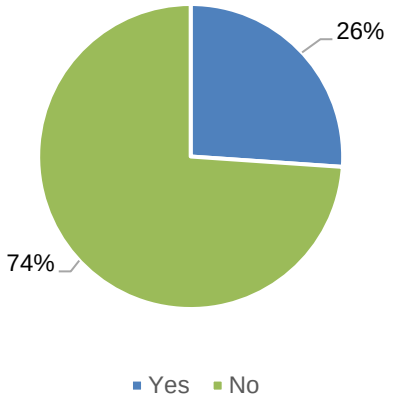

Figure 39: WMO split of responses to Q3

WMOs from some Member States (e.g. Greece and Malta) stated that they do not transport waste across state lines.

WMOs from many of the Member States highlighted that, as they adhered to IAEA safety standards and guidance, the transportation of radioactive waste across state lines was not a problem. None of the Member States' WMOs stated that they did not follow the shipment directive. Many cited that they had incorporated it into their own legislation.

The Italian WMO supported its answer by stating that its classification system is in line with international classifications and that the activity values for each category are well defined, therefore allowing it to understand how waste must be managed during transport, including being in line with the rules of the Member State to which waste is being shipped.

The response from the Croatian WMO was that the system was not a barrier, as the radioactive waste classification system is complementary to those in other Member States.

For the Spanish WMO, its classification system is not a barrier, and the adopted categories can be easily assimilated to other national categories in order to transport waste. For the WMO, the most important point is that the reference used for waste transport is the ADR, which offers an objective package classification system without ambiguities that is the same for everyone.

The German WMO stated that its system was not a barrier, but remarked that the purpose of waste classification is to plan radioactive waste management thinking from the end point, as stated in IAEA

GSG-1, and it is not specifically used to fulfil the requirements of transport regulations. Therefore, there is no influence or impact on transport to and from other Member States.

In Slovenia, shipments into and out of Member States (and also other countries) are subject to the limitations and requirements established by internal legislation, EU legislation, and international and bilateral agreements. In general, the export and import of waste is possible and should also be reported within the inventory records. Slovenia's waste classification systems do not therefore present a specific barrier, especially when the classification system in another Member State has been implemented based on the Commission recommendation.

WMOs in some Member States highlighted that the differences in classification schemes between the Member States results in some materials being declared as radioactive waste in some and as exempt material in others. One Member State's WMO also commented that WAC was more important than the classification system when selecting a disposal option.

Q4. Would a harmonised radioactive waste classification system across all EU Member States be beneficial or detrimental to the current waste management system in your country?

Out of the 23 responses to this question, 7 felt that it would be beneficial, 14 provided a neutral response and 2 felt that it would be detrimental.

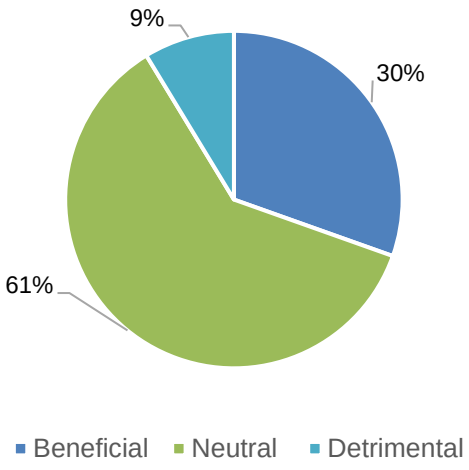

Figure 40: WMO split of responses to Q4

Of those respondents who felt it would be beneficial, many commented that such harmonisation would promote easier cooperation in the radioactive waste transport domain, and facilitate overall safe and efficient waste management. One respondent remarked that it would promote the exchange of knowledge and experience between countries, whereas another felt it would facilitate greater understanding across all involved stakeholders as to whether waste coming from the shipping country will be included in the same category as in the recipient country.

WMOs in Member States that do not transport waste across borders often provided a neutral answer. Others commented that it would depend on what a harmonised classification system might be based on. Any harmonisation would need to take into consideration the waste disposal logistics (geology, hydrogeology and seismic) of each Member State, which in turn influence their current WAC.

The two respondents who felt that a harmonised system would be detrimental gave slightly different reasons. One remarked that the adopted radioactive waste classification schemes were not designed for transport but for final disposal requirements in line with different disposal concepts. The other felt that although a harmonised system could indeed facilitate communication with other countries for the purpose of cross-border cooperation, changing an existing classification system would require assessing the impact on existing facilities in Member States, and could have a major impact on financial and human resources. The latter added that, from the strict point of view of transport, it is not necessary to have a uniform classification, as the need to unequivocally identify the material is already covered by the ADR. They were therefore not convinced that the benefits of change outweigh the damages and costs that this change would bring. They further added that it should be remembered that, during the preparation of the waste directive, it was not possible to establish a harmonised definition of common radioactive waste for all Member States, and therefore it will be difficult to establish a harmonised classification now.

As depicted within the conclusions for Q3, none of the Member States' WMOs declared that they did not follow the shipment directive. In addition, many cited that they had incorporated it into their own legislation.

The Austrian WMO commented that it did not see a harmonised waste classification system having a great impact on their current waste management system. The shipment directive has been transposed into Austrian law and Austria strictly adheres to it.

The Slovenian WMO felt that a harmonised system would definitely be very beneficial, especially for predisposal and disposal activities. The system could allow or simplify procedures for radioactive waste treatment and conditioning prior to disposal, and would also enable easier planning for regional or EU-level joint predisposal and disposal activities.

The Romanian WMO stated that a harmonised radioactive waste classification system would not affect its current waste classification system but, ideally, any modification of an existing classification system should be supported by a conversion system from the new to the old system.

Germany follows the shipment directive, subject to licensing in Germany (and in the other Member States involved in the transboundary movement of waste). Current German legislation requires that the consignor must submit an application to the competent licencing authority, the Federal Office for Economic Affairs and Export Control for each shipment of these materials from Germany.

Q5. Would a harmonised radioactive waste classification system across all EU Member States be beneficial or detrimental to effective and efficient cross-border cooperation with such EU Member States?

WMOs in some Member States answered this question in a similar manner to how they answered Q4. The majority of respondents (13) felt that it would be beneficial, 9 provided a neutral response, and 1 felt that it would be detrimental.

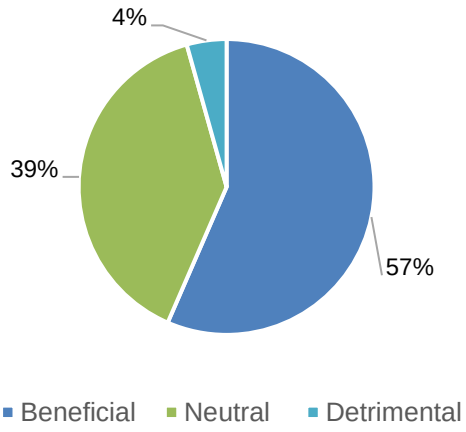

Figure 41: WMO split of responses to Q5

For those respondents who felt it would be beneficial, the main reasons cited were that it would promote easier and efficient cooperation in the radioactive waste transport domain between the Member States, and it would be easier to agree on scopes of cooperation. Harmonisation should reduce the risk of errors and provide more effective communication between supervisors, involved organisations and national regulatory bodies, and reduce administrative procedures and provide clarity regarding the overall classification system. One respondent felt that it would allow Member States to use the existing predisposal and disposal radioactive waste management services in other Member States. Harmonisation would enable easier radioactive waste inventories and, if there is already an EU open energy union, then the radioactive waste open market for services should also be part of it. Another respondent commented that this harmonisation could be beneficial with respect to potential multinational repository options.

WMOs in Member States that do not transport waste across borders often provided a neutral answer, and one added that it would depend on whether it took into account the needs of smaller Member States with limited resources and limited waste production. One respondent commented that it was not necessarily obvious that problems with cross-border cooperation stem from the lack of a harmonised radioactive waste classification system.

The one respondent who felt it would be detrimental provided a similar answer to that highlighted for Q4 (i.e. they were not convinced that the benefits of change outweigh the damages and costs that this change would bring).

Q6. Would a harmonised radioactive waste classification system across all EU Member States be beneficial or detrimental specifically to the transportation of radioactive waste across international borders?

The answers to this question reflected the fact that, although it is more specific to cross-border waste transport, it is not dissimilar to Q5. Out of the respondents to this question, 11 felt it would be beneficial, whereas 12 provided a neutral response. None of the respondents felt that it would be detrimental.

Reasons cited for why it could be beneficial were similar to those in Q5 (i.e. harmonisation should make transport easier; as all Member States use the same waste 'language', it should save a considerable amount of time and probably also avoid some bureaucracy).

Of those that provided a neutral answer, many remarked that international standards (e.g. the IAEA, the ADR) are already followed and a harmonised waste classification system, in their minds, would not change this. One respondent stated that the most important barriers to the cross-border transportation of radioactive waste may be more sociopolitical than technical in nature.

Q7. Are there any specific features of your country's radioactive waste classification system which act to strengthen the effective and efficient cross-border cooperation with other EU Member States in relation to waste treatment, conditioning or disposal? Supplementary question: if yes, please list these. Supplementary question: if no, would a harmonised radioactive waste classification system across all EU Member States help to improve such effective and efficient cross-border cooperation?

Out of the responses to this question, 7 replied that their Member State did possess strengthening features conducive to cross-border cooperation, whereas 16 replied that it did not.

Those that answered positively stated that they essentially followed the IAEA radioactive waste classification system set out in IAEA GSG-1. The Greek WMO, for example, commented that as Greece utilises the generic classification theme set out by the IAEA (exempt waste/VLLW/LLW/ILW), this is a feature that eases cross-border cooperation.

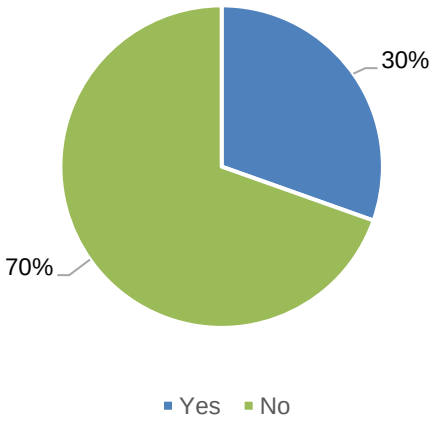

Figure 42: WMO split of responses to Q7

Although the Slovenian classification system is based on the Commission recommendation, it currently has no specific features aimed at strengthening cross-border cooperation. The only small specificity is the classification of NORM and technologically enhanced NORM waste as a radioactive waste, which is in line with some other Member States.

WMOs in a number of Member States, including Czechia, Germany, Croatia, Slovenia and Slovakia, stated that they did not have any specific features conducive to cross-border cooperation.

Those who answered negatively were asked if a harmonised radioactive waste classification system across all Member States would help to improve the efficiency of cross-border cooperation. The answers to this supplementary question were mixed, with most believing it would be beneficial, although others had either a negative or neutral viewpoint. The respondents who believed that a harmonised waste classification system could be beneficial stated that it could be advantageous to achieving final disposal; would promote communication that in turn could facilitate a universal understanding of disposal solutions for similar waste classes; would improve cross-border cooperation between Member States; and could simplify both the legislative procedure and the permit process in relation to transportation.

Those who held a negative attitude towards a harmonised radioactive waste classification system slightly contradicted the above viewpoints by suggesting that the WAC of the disposal facilities would be more important than the classification of waste. It was also suggested that more detailed waste characterisation would be beneficial, and that the most important barriers to successful cross-border transportation are more sociopolitical than technical in nature.

As Germany's national classification system is not related to transport regulations but is tailored towards Germany's disposal options (as required by IAEA GSG-1), it may differ significantly from that of other countries. There is therefore no interconnection between the national classification system and international cooperation in relation to waste treatment, conditioning or disposal.

The Romanian WMO commented that, currently, it did not have an interest in cross-border harmonisation as it only sends radioactive waste for processing in another country. In this instance, the operators have to prepare the waste packages to fit the acceptance criteria.

The Spanish WMO reiterated that, based on its experience, the current classification system favours successful cross-border activities.

Q8. Are radioactive waste materials exported from your country to another EU Member State? Supplementary question: if yes, what type of waste materials are exported and to whom?
Out of the respondents to this question, 11 replied that radioactive waste materials were exported to other Member States, whereas 12 replied that they were not. The types of materials that were exported included HLW for reprocessing, combustible waste, scrap metals, disused sealed radioactive sources, materials for recycling, liquid waste, and foreign waste (treated and conditioned) that are being repatriated.
Q9. Are radioactive waste materials imported into your country from another EU Member State? Supplementary question; if yes, what type of waste materials are imported and from whom?
Out of the respondents to this question, 9 replied that radioactive waste materials were imported to their Member States from other Member States, whereas 14 replied that they were not. The types of materials that were imported included residues from smelting factories, waste resulting from the reprocessing of spent fuel, exposed materials for experimental purposes and disused sealed radioactive sources.
Q10. Are there instances when radioactive waste materials might be exported/imported to/from non-EU countries? Supplementary question: if yes, which countries?
Out of the respondents to this question, 6 replied that radioactive waste materials were either imported or exported to/from non-EU countries, whereas 17 replied that they were not. Countries to which materials were either exported or imported included Japan (reprocessing), Russia (reprocessing), the United Kingdom (reprocessing), and the United States (material reuse and return agreements).
Q11. If radioactive waste is exported/imported from or into your country, what are the specific reasons for this? Please select all relevant options. Options are waste disposal, waste treatment/conditioning, reprocessing and other.
The reasons for import/export were quite variable and included the following: spent nuclear fuel for reprocessing, material reuse, storage, disposal, waste treatment/conditioning, recycling of radioactive metals and return of Ra-226 sources.

Q12. If radioactive waste is exported/imported from or into your country, how is this undertaken?
In those Member States that either exported or imported radioactive waste materials, a variety of transport options were utilised, including road, river, sea, rail and air.
Q13. Has your country developed legislation to cover the export/import of radioactive waste to or from other EU Member States? Supplementary question: if not, does your country follow international guidance (i.e. European Atomic Energy Community, International Atomic Energy Agency).
Of the answers received, WMOs in 20 Member States said that they had developed legislation to cover the import/export of radioactive waste to/from other Member States. The other three stated that they applied EU directives and legislature, the shipment directive guideline and the ADR.
Q14. Does your country have clear lines of communication with each EU Member State with respect to cross-border cooperation?
Out of the respondents to this question, 17 replied that their Member State had clear lines of communication with other Member States for cross border cooperation, whereas 6 stated that they did not.
Q15. Do you wish to add any further comments on the subject of cross-border cooperation which you feel we may not have covered in the preceding questions?
A number of additional comments were made about the survey and are as follows. • One of the WMOs felt that it was not the ideal organisation to fill out the survey, and it did not import or export radioactive materials or waste. • One WMO felt that it was not able to answer the question on lines of communication as they did not know about this topic. • For small-inventory Member States, the export of small volumes of (for example) ILW to Member States that already have the appropriate disposal facilities (e.g. deep geological disposal) could be a great advantage. In exchange, the small-inventory Member States could receive larger volumes of VLLW to LLW to dispose in their near-surface disposal facilities. • One respondent stated that all of the questions are regarding radioactive waste. However, their customers transport radioactive materials across borders and only call it waste once it is in the country in which it will be stored. In some cases, the radioactive material comes

directly to the WMO from another EU country (after reprocessing/treatment/conditioning). The WMO has clear lines of communication with several foreign parties for coordination and advice, but it is very rarely the responsible party, as it does not yet (officially) deal with radioactive waste.

- One respondent felt that Q14, 'Are radioactive waste materials exported from your country to another EU Member State?', was not specific enough. It needed to be clearer what was meant by cross-border cooperation. For example, is it cross-border cooperation due to environmental procedures such as strategic environmental assessment, environmental impact assessment, etc.; regarding radioactive waste management in joint radioactive waste management (predisposal and disposal) projects; or in knowledge exchange? Although, ultimately, cross-border cooperation is a national responsibility, this should not prevent WMOs from using proven solutions from other industries, or stop them from undertaking efficient, easier, safer and economically attractive joint activities.
- One respondent commented that the in-transit Member States should probably be included in the cross-border cooperation for radioactive waste, in addition to the exporting/importing Member States.
- One respondent commented that the objective of their Member State's radioactive waste management policy is to ensure the safe management of waste and spent nuclear fuel. There is specific legislation – Law No 111/1996 and Governmental Ordinance No 11/2003, the regulations for import, export and intra-Community transfer of radioactive waste – that states what is prohibited, and lists the following exemptions: spent fuel from research reactors will be returned to the country of origin, under agreement; the transfer of disused sealed sources, which must be returned to the supplier or manufacturer; the transfer of radioactive waste for treatment or spent fuel for processing, with subsequent return of the waste product for final disposal; and the transfer of radioactive waste or spent fuel to another country for final disposal, but only when the receiving country has the technical and administrative capability to meet international standards.

7.2.2. Survey results from the waste producers

Q1. Are you satisfied that the existing radioactive waste classification scheme adopted in your country facilitates the efficient management of the different waste streams produced by the nuclear and/or other industries (wastes from research, health service providers, etc.)?
Of the 14 responses received, 13 said that they were satisfied that existing radioactive waste classification schemes facilitated the efficient management of the different waste streams produced.

The waste producer that responded negatively (a university) stated that the current system penalised research activities.

Q2. Is the radioactive waste classification system adopted by your country conducive to effective and efficient cross-border cooperation with other EU Member States in relation to waste treatment/conditioning or disposal?

All but two respondents agreed that the waste classification system in their Member State was conducive to effective and efficient cross-border cooperation with other EU Member States in relation to treatment/conditioning or disposal.

One respondent stated that the radioactive waste classification system in their country (Germany) was tailored to the conditions in the designated repository and is based on the specifications from its planning approval decision. From this, specifications for the description, classification and conditioning of waste are derived. For these reasons, it is doubtful that these specifications harmonise with the specifications in other European countries.

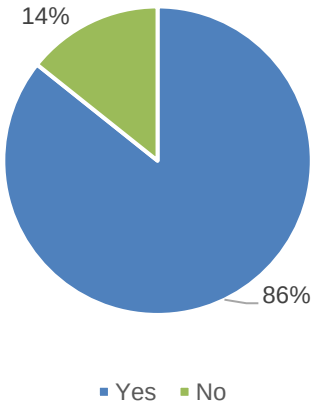

Figure 43: WP split of responses to Q2

Another respondent felt that, for efficient cooperation, the treatment and packaging to be used should be identical in all Member States.

Q3. Is the radioactive waste classification system adopted by your country a barrier specifically to effective and efficient transportation of radioactive waste to or from other Member States?

The response to this question was almost equally split, with six respondents stating that their waste classification system was a barrier specifically to the effective transportation of radioactive waste across borders, whereas eight respondents felt that it was not.

Those that felt it was not a barrier highlighted that their systems were either well aligned with those of other Member States or that any differences between systems were minor. One respondent commented that, even though limits in terms of disposal and transport law can differ, the waste producer is used to following the different areas of law where they apply, especially as the ADR / Agreement Concerning the International Carriage of Dangerous Goods by Rail are valid in all EU Member States. Another stated that waste has successfully been transported across borders without problems. One respondent also noted that they successfully follow IAEA guidance.

Q4. Would a harmonised radioactive waste classification system across all EU Member States be beneficial or detrimental to the current waste management system in your country?

Only one of the respondents felt that it would be detrimental to have a harmonised waste classification system across the EU when compared with their current waste management system, with four feeling it would be beneficial and nine providing a neutral response.

The respondent who stated that it would be detrimental highlighted that, as they have a final repository on site, they can apply a waste classification optimised to their needs. They saw no benefits to adopting a harmonised classification system for waste-handling operations, as harmonisation would probably cause extra work and may result in unoptimised handling.

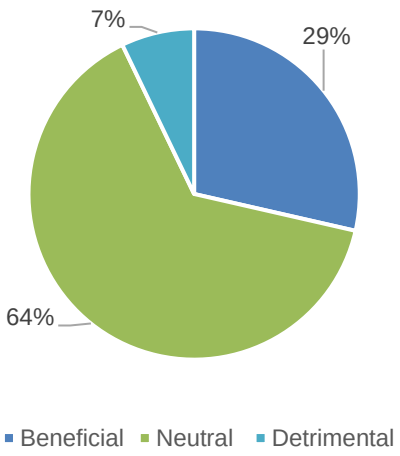

Figure 44: WP split of responses to Q4

Those who felt it would be beneficial provided the following reasons.

- 'Ensuring a harmonised classification system at a European level ensures alignment with a standard accepted by the whole EU, without interpretations.'
- 'It would be useful with a common definition of what is to be considered a 'material' and what is to be considered as waste. While the current differences have been managed a harmonised system would be even better.'
- 'The transfer of wastes overseas would be facilitated for disposal not foreseen in the country.'

Those who provided a neutral response highlighted the following reasons.

- 'As geology is different, at least incrementally if not in some regard significantly, for different types of host rock the acceptance criteria for different repositories will differ anyway. It does not matter that much if this is expressed also in a different terminology and limits for waste classification.'
- 'Irrespective of any improvement, it will be welcome, although the current waste classification system in the country is already highly harmonised with most EU's MSs [Member States], in particular those with NPP's or decommissioning programs.'
- 'We do not see any major gains from increased harmonisation. Today, when we export material or waste, it is always in accordance with the acceptance criteria of the "recipient".'
- 'Such harmonisation would, indisputably, bring new opportunities and enhance feasibility of transboundary activities – which would be fruitful and beneficial, in the first instance, – for those countries/stakeholders, which actively conducts transboundary activities (like cross

border transportation of radioactive wastes). The classification system adopted in this country is a part of a legal and regulatory framework which is finely tailored to local scope, tasks and challenges posed for efficient radioactive waste treatment in the country. Their radioactive waste management strategy is focused on predisposal treatment and disposal of radioactive waste produced within the country, avoiding import of radioactive waste from abroad. Meanwhile, it is not prohibited by their radioactive waste management law to export radioactive waste for treatment. However, this opportunity is not seen as a wide practice, the only significant transboundary activities in the country are the overseas delivery of disused sealed spent sources (DSRS) of ionising radiation from enterprises and organisations (e.g. medicine institutions) for handing this radioactive waste over – back to parent vendors/manufacturers (according to agreements since 2006).'

- 'The processes for declaring and documenting waste are already well advanced in our MS. However, there are still some important clarification points that are currently being worked on. The plan for European harmonisation could result in a halt or even a step backwards in the process which is not what Waste Producers want. On the other hand, a harmonised system would make it possible to increase capacity and efficiency in joint waste treatment. Harmonisation therefore creates both opportunities and risks.'

Q5. Would a harmonised radioactive waste classification system across all EU Member States be beneficial or detrimental to effective and efficient cross-border cooperation with such EU Member States?

None of the respondents felt that a harmonised radioactive waste classification system would be detrimental to effective cross-border cooperation, one response was neutral and 13 respondents thought that it would be beneficial. All of the respondents who felt that it would be beneficial commented that harmonisation could facilitate greater communication, reduce bureaucracy and improve cross-border cooperation.

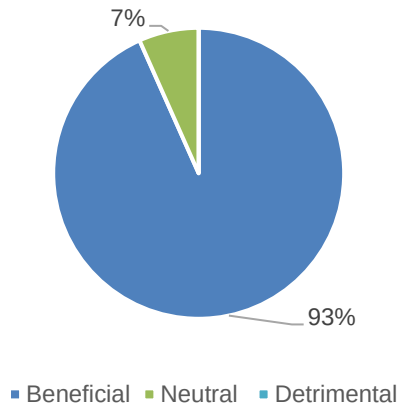

Figure 45: WP split of responses to Q5

One respondent stated that '[s]uch harmonisation would, indisputably, bring new opportunities and enhance feasibility of transboundary activities – which would be fruitful and beneficial, in the first instance, – for those countries/stakeholders, which actively conducts transboundary activities (like cross border transportation of radioactive wastes).'

Another specifically commented that reporting to the IAEA or Euratom, making comparisons or communicating with other European NPPs would probably be easier.

Q6. Would a harmonised radioactive waste classification system across all EU Member States be beneficial or detrimental specifically to the transportation of radioactive waste across international borders?

In terms of how a harmonised radioactive waste classification system might have an impact on specifically the transportation of radioactive waste across international borders, eight respondents felt that it would be beneficial, whereas six respondents provided a neutral response.

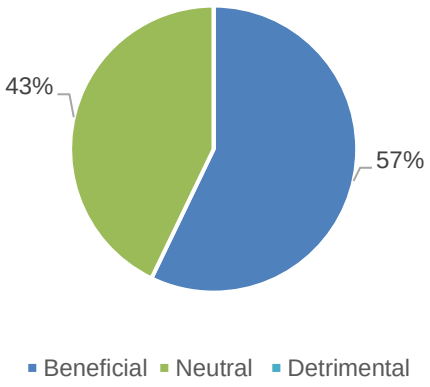

Figure 46: WP split of responses to Q6

The respondents who felt it would be beneficial highlighted reasons such as it would result in a unification of the rules and requirements; applying the same criteria will make it easier to obtain permits; and even though the current system has demonstrated reliability, it could, in some instances, be improved. One of the respondents stated that there were no major issues in transportation and everything was quite well harmonised already due to the ADR.

One respondent said that '[s]uch harmonisation would, indisputably, bring new opportunities and enhance feasibility of transboundary activities – which would be fruitful and beneficial, in the first instance, – for those countries/stakeholders, which actively conducts transboundary activities (like cross border transportation of radioactive wastes).'

One of the respondents who provided a neutral answer stated that, nowadays, materials and waste can be transported without much difficulty, as their transport companies are licensed all over the world.

Q7. Are there any specific features of your country's radioactive waste classification system which act to strengthen the effective and efficient cross border cooperation with other EU Member States in relation to waste treatment, conditioning or disposal? Supplementary question: if yes, please list these. Supplementary question: if no, would a harmonised radioactive waste classification system across all EU Member States help to improve such effective and efficient cross-border cooperation?

Only 2 of the 14 waste producers stated that they had some specific features within their country's radioactive waste classification system that acted to strengthen effective cross-border cooperation.

One of these waste producers highlighted the incorporation of learning from previous experiences, as it had imported waste and scrap metals for treatment followed by repatriation of the residual waste since 1983 for combustible waste and since 1988 for contaminated metals. Those waste producers that responded that they did not have any specific features agreed that it is currently not really an issue, but that harmonised approaches can always lead to potential benefits.

Q8. Are radioactive waste materials exported from your country to another EU Member State? Supplementary question: if yes, what type of waste materials are exported and to whom?

Of the 14 respondents, 9 stated that they exported waste to another EU Member State, whereas 5 stated that they did not. The types of waste exported included the following:

- HLW (to France), and ILW and VLLW to several countries for decontamination and clearance (the waste is returned);
- LILW, specifically burnable waste for incineration and metallic waste for melting – the waste is sent to Sweden for treatment;
- burnable waste (LLW) for incineration in Sweden, ash and sorted waste being returned to Germany, metal for melting in Sweden, and non-releasable material and secondary waste to be returned;
- radioactive sources;
- residues from treatment campaigns that are being repatriated.

Q9. Are radioactive waste materials imported into your country from another EU Member State? Supplementary question: if yes, what type of waste materials are imported and from whom? Written answer required.

Of the 14 respondents, 11 stated that they imported waste from another EU Member State while 3 stated that they did not. The types of waste imported included:

- radioactive waste from France resulting from equipment maintenance by an outside contractor – that is, waste such as radioactive exhausted ion-exchange resin and protective gear;
- radioactive sources;
- HLW from reprocessing spent fuel and uranium tails;
- metals for melting with the secondary waste being returned;

- waste only temporarily imported for treatment – the residues are always returned to the country of origin within 3 years of the import date.

Q10. Are there instances when radioactive waste materials might be exported/imported to/from non-EU countries? Supplementary question: if yes, which countries.

Of the 14 respondents, 9 stated that they either exported or imported waste to/from a non-EU country, whereas 5 stated that they did not. The countries involved included the United Kingdom and the United States.

Q11. If radioactive waste is exported/imported from or into your country, what are the specific reasons for this? Please select all relevant options. Options are waste disposal, waste treatment/conditioning, reprocessing and other.

The reasons cited for the export or import of radioactive waste included waste disposal, treatment/conditioning, reprocessing, incineration, maintenance of contaminated equipment and metal melting.

Q12. If radioactive waste is exported/imported from or into your country, how is this undertaken?

For those waste producers that either exported or imported radioactive waste materials, a variety of transport options were utilised, including road, sea, rail and air.

Q13. Has your country developed legislation to cover the export/import of radioactive waste to or from other EU Member States? Supplementary question: if not, does your country follow international guidance (i.e. European Atomic Energy Community, International Atomic Energy Agency)?

All of the respondents stated that their countries had developed legislation to cover the export or import of radioactive waste to or from other Member States. When the WMOs were asked this question, 3 of the 23 respondents highlighted that they had not, but that they followed international guidelines.

Q14. Does your country have clear lines of communication with each EU Member State with respect to cross-border cooperation?

Only one of the respondents felt that they did not have clear lines of communication with each EU Member State with respect to cross-border cooperation.

Q15. Do you wish to add any further comments on the subject of cross-border cooperation which you feel we may not have covered in the preceding questions?
A number of additional comments were made about the survey and are as follows. • Recent legislation provides for the inbound control of finished metal products. It is superfluous. • The radioactive waste classification system in their country is not focused primarily on the transfer of radioactive waste from and into other States for treatment/disposal; rather, it is focused on self-sustaining predisposal treatment and disposal of radioactive waste produced in their country only (i.e. radioactive waste from decommissioning of NPP and other local radioactive waste). However, since the radioactive waste classification system carefully follows IAEA GSG-1, it is tailored enough for efficient cross-border cooperation according to their particular tasks, needs and endeavours regarding radioactive waste management (e.g. as stipulated in a strategic document that outlines strategic guidelines for the management of radioactive waste, *Development program for decommissioning of nuclear power facilities and radioactive waste management for 2021–2030*, which was approved by the government). • A clear distinction must be made between contaminated material and nuclear waste.

7.3. Overall conclusions

As previously stated, due to the different roles played by the WMOs and the waste producers, it felt logical to separate the two groups' survey results.

Although we were able to describe in reasonable detail the objectives of the project, we were not able to forecast how the information acquired might be utilised by the European Commission in the future. Moving towards an EU-wide harmonised approach to radioactive waste classification has the potential to require changes to the current arrangements of some Member States. It was clear, therefore, from some of the discussions held and answers received that the organisations we contacted were wary, and in some instances reluctant, to provide answers to the survey.

All bar one of the WMOs (Malta) stated that they were satisfied that existing radioactive waste classification schemes in their country facilitated the efficient management of the different types of waste streams. The vast majority of respondents felt that their current waste classification system was not a barrier specifically to the effective transportation of radioactive waste across borders. The reasons provided were that they adhered to the IAEA safety standards and practices, they had incorporated the

shipment directive, they follow the ADR, their own system is complementary to those of other Member States or they did not transport waste across state lines.

In relation to having a harmonised waste classification system across the EU and how it would have an impact on their country-specific waste management, the WMOs provided mixed responses. Although only two felt it would be detrimental, twice as many provided a neutral response than provided a positive one. Those who felt it would be beneficial often commented that such harmonisation would promote easier cooperation in the radioactive waste transport domain, and facilitate overall safe and efficient waste management. There was a recognition that any harmonisation would need to take into consideration the waste disposal logistics (geology, hydrogeology and seismic) of each Member State and therefore their current WAC. One of the respondents who felt that such harmonisation would be detrimental stated that it was not necessary because the need to identify waste materials is already covered by the ADR. Specifically in relation to the potential benefits of a harmonised waste classification system for cross border cooperation, only one felt it would be detrimental. The respondent was not convinced that the benefits of change outweighed the damages and costs that this change would bring.

About a third of the WMOs stated that they did have some specific features within their country's radioactive waste classification system that worked to strengthen effective cross-border cooperation, but that they essentially followed the IAEA radioactive waste classification system set out in IAEA GSG-1. The Greek WMO, for example, believed that utilising this classification eases cross-border cooperation.

Those who had no specific features provided mixed responses as to whether a harmonised radioactive waste classification system across all Member States would help to improve the efficiency of cross-border cooperation. Member States such as Czechia, Germany, Croatia, Slovenia and Slovakia stated that they did not have any specific features conducive to cross-border cooperation.

About half of the WMOs reported that radioactive waste materials were exported to other Member States or imported from them. The types of materials that crossed international borders included HLW for reprocessing, combustible waste, scrap metals, disused sealed radioactive sources, and foreign waste that is being repatriated. Some transportation of waste was also to/from non-Member States including Japan, Russia, the United Kingdom and the United States. A variety of transport options were utilised, including road, river, sea, rail and air.

The majority of Member States' WMOs said that they had developed legislation to cover the import/export of radioactive waste to/from other Member States, whereas those that had not developed legislation stated that they applied EU directives and legislation, the shipment directive guideline and the ADR. Most Member States' WMOs also noted that they had clear lines of communication with other Member States for cross-border cooperation.

All bar one of the waste producers stated that they were satisfied that existing radioactive waste classification schemes in their country facilitated the efficient management of the different types of waste streams, and all bar two agreed that it was conducive to efficient cross-border cooperation with other Member States in relation to waste treatment/conditioning or disposal. A respondent from Germany stated that the radioactive waste classification system in their country was tailored to the conditions in the designated repository. Another respondent, however, felt that, for efficient cooperation, the treatment and packaging to be used should be identical in all Member States.

About half of the waste producers felt that their current waste classification system was not a barrier specifically to the effective transportation of radioactive waste across borders because they followed the IAEA guidance, they followed EU directives, or their systems were well aligned with other Member States or that any differences were minor.

In relation to having a harmonised waste classification system across the EU and how it would have an impact on their country-specific waste management, almost all of the waste producers either responded positively or provided a neutral viewpoint (i.e. only one of them felt it would be detrimental). One of the highlighted benefits for harmonisation was the potential to improve the distinction between radioactive materials and waste. An even more positive response was gained when asked if a harmonised radioactive waste classification system would be beneficial to effective cross-border cooperation. With respect to how such a system might impact specifically on the transportation of radioactive waste across international borders, all respondents either felt it would be beneficial or provided a neutral response.

Only two of the waste producers stated that they had some specific features within their country's radioactive waste classification system that act to strengthen effective cross-border cooperation, citing that it is currently not really an issue.

The majority of waste producers said that they either exported or imported waste to other EU's Member States in addition to a few non-EU countries. Reasons for this transportation included waste disposal, treatment/conditioning, reprocessing, incineration, maintenance of contaminated equipment and metal melting. Transport mechanisms included road, sea, rail and air.

All of the waste producers stated that their countries had developed legislation to cover the export or import of radioactive waste to or from other Member States, and only one felt that they did not have clear lines of communication with each EU Member State with respect to cross-border cooperation.

It was felt that a harmonised approach to radioactive waste classification across the Member States links into a number of different but interrelated components (i.e. each Member State's waste management system, cross-border cooperation, and the transport of waste into or from other Member States).

It was clear that the Member States that only produces small quantities of radioactive waste are unlikely to have developed a formalised waste classification system and would rarely transport this waste across international borders.

The majority of respondents admitted that, in principle, a harmonised approach to radioactive waste classification across the EU would be positive. However, this response was often tempered by the view that cross-border cooperation was already working in a positive manner. Radioactive waste is imported/exported across EU Member States' boundaries and also to/from some non-EU countries. Nearly all respondents specifically highlighted that existing in-country legislation, EU legislation and other international guidance had reduced any significant problems related to the transportation of waste across international borders. Some did not specifically comment on this aspect.

Overall, the waste producers seemed to be more supportive of having a harmonised approach to waste classification across the EU than the WMOs. This may relate to the fact that any such harmonisation, and therefore potential change, might have more of an impact on the WMOs than the waste producers.

A number of respondents noted that the survey related to only radioactive 'waste' rather than to 'materials' as well. It was felt that a clearer distinction needed to be made between contaminated material and nuclear waste.

7.3.1. How conducive existing national and international classification schemes are to effective and efficient cross-border cooperation

This section aims specifically to address Q11 set out in the project's terms of reference.

The feedback suggests that existing classification schemes are mostly conducive to effective and efficient cross-border cooperation. It was felt that existing classification schemes are proven to be successful in carrying out the treatment/conditioning or disposal of radioactive waste, and that they are not considered to be a barrier to the transportation of radioactive waste across borders. Radioactive waste is currently imported and exported across the borders of several Member States without any significant disruption, and the transit of this waste also successfully takes place between Member States and non-EU countries. All of the Member States have developed legislation to cover the export/import of radioactive waste to or from other Member States (in most instances, through incorporating the shipment directive into their legislation and following other international guidance. All Member States already have clear lines of communication with each Member States with respect to cross-border cooperation.

The above statements provide a general overview of the Member States' viewpoints, but it should be noted that only a small number of the respondents, across both the WMOs and waste producers, were able to highlight specific features of their existing classification schemes that act to strengthen cross-

border cooperation. The answers provided were positive, but the idea that a harmonised approach to waste classification could add additional benefits to this area was acknowledged on a number of occasions.

One small difference to note between the WMOs and waste producers was that a greater percentage of the latter considered existing classification schemes to be a potential barrier to the transportation of radioactive waste across international borders. They did not, however, expand on this view by providing any specific reasons.

7.3.2. How national and international classification schemes are perceived by waste producers and waste management operators with respect to cross-border cooperation

This section aims specifically to address Q12 set out in the project's terms of reference.

The general response from both WMOs and waste producers was that existing radioactive waste classification schemes are considered to adequately facilitate cross-border cooperation in relation to radioactive waste. Some Member States, especially those producing negligible waste, reported that they did not transport radioactive waste across international borders. Of those that did transport waste across borders, many noted that the efficient management of different waste streams produced by the nuclear and/or other industries already takes place, and that these schemes are conducive to effective and efficient cross-border cooperation with other Member States (specifically in relation to waste treatment/conditioning or disposal).

Many of the Member States highlighted that they adhered to the IAEA safety standards and guidance as well as the ADR.

One waste producer did, however, feel that the current waste classification scheme in their country penalised research activities, whereas one of the WMOs stated that, as their regulator classified all samples as waste, it had made cross-border cooperation unnecessarily complicated.

7.3.3. How national classification schemes condition/influence cross-border cooperation

This section aims specifically to address Q13 set out in the project's terms of reference.

National classification schemes were not found to significantly impede cross-border cooperation, but it was observed that they may slightly influence such cooperation. In particular, some Member States highlighted that the differences in classification schemes between them resulted in some materials being declared radioactive waste in some states and exempt material in others. It was suggested that a clearer distinction between radioactive materials and waste could only be beneficial.

Some Member States remarked that different waste disposal concepts may influence different classification schemes.

One of the respondents stated that their national classification scheme led to no major issues with transportation or cross-border cooperation, and that everything was already well harmonised due to the ADR.

7.3.4. Features of a classification scheme that would promote cross-border cooperation

This section aims specifically to address Q14 set out in the project's terms of reference.

Notwithstanding the fact that most Member States remarked that cross-border cooperation was well established, it was found that a number of specific features of existing radioactive waste classification schemes were helping to promote it. For example, the majority of Member States have developed legislation to cover the export/import of radioactive waste to or from other Member States, and almost all Member States already have clear lines of communication with other Member States with respect to cross-border cooperation. Following the IAEA guidance on both classification and transportation was likely to enhance cross-border cooperation. Most respondents recognised that a harmonised approach to waste classification schemes should help promote cross-border cooperation. Learning from experience was a further trait that came across in the survey feedback.

8. TASK 6: CONSIDERATIONS FOR IMPROVING EUROPEAN RADIOACTIVE WASTE CLASSIFICATION SCHEMES

Task 6 is entitled ´Considerations for improving European radioactive waste classification schemes´ and has the aim of drafting a synthetic review of the previous considerations about the radioactive waste classification schemes.

The intention is to identify good practices; to, where applicable, point out best practices, and challenges at national and EU levels; and outline an actionable European radioactive waste classification scheme that would tackle the challenges and promote good practice.

8.1. Practices

The assessment conducted of EU Member States' waste management practices and waste classification strategies, coupled with the Task 5 survey results, has shown that EU directives and international standards are adhered to by Member States.

The IAEA's safety standards on the classification of radioactive waste (Safety Series No 111-G-1.1) were used as the foundation for the Commission recommendation. This IAEA safety standards were superseded in 2009 by IAEA GSG-1. All Member States utilise either the Commission recommendation or IAEA GSG-1 as the basis for their own waste classification strategies. It should be noted, however, that no Member State exactly follows the Commission recommendation, as, in many instances, they factor in specifics (e.g. VLLW or short-lived waste) relevant to their own Member State.

Waste classes are mainly used for reporting and communication purposes such as compliance with national or international reporting requirements, or for discussions with stakeholders. The assignment of waste to specific classes enables a structured starting point for the development of reports aiming to compare several waste streams, to produce a first assessment of a waste stream's compliance with acceptance criteria for a facility, or to provide a high-level description of its toxicity. Hence, waste classification serves different information needs accompanied by different levels of information details. In turn, the identification of good or best practices must be performed in line with the application of the waste classification system.

Waste classes originated on a national basis to enable the development of management strategies for radioactive waste. Generally, the aim of waste management is either the safe disposal of radioactive waste or the exemption of materials (i.e., generally, their release from nuclear regulatory control). As all Member States have developed their waste management strategies on the basis of national conditions, they generally have country-specific waste classification systems ensuring safe waste management.

Against this background, all waste classification systems are to be considered good practice in so far as they serve the purpose of safe disposal or exemption.

Generally speaking, adhering to an internationally agreed waste classification system, such as that set out in IAEA GSG-1 or the Commission recommendation, can be viewed as best practice. In terms of information and communication at EU level, waste classification systems following IAEA GSG-1 provide the broadest common ground for exchange and comparison. Against this background, countries closely following IAEA GSG-1, as identified in Section 4, do, therefore, follow best practice. It should be noted though, as explained above, that, over time, several countries have developed a waste classification system serving their own national requirements. These systems may not follow IAEA GSG-1, but are nevertheless defined as good practice in the task at hand.

To facilitate cross-border cooperation, more detailed information on the waste concerned is usually needed. Of relevance are the acceptance criteria of the process steps that the waste must undergo. However, the process steps involve specific technologies and processes on specific sites, which make the definition of generic requirements difficult or even impossible; see Section 5 for more details on this issue.

Nevertheless, for the transportation of radioactive waste, the Member States adhere to a detailed set of requirements as part of the ADR, which is a key reference point for waste transport either internally or across borders. Furthermore, adherence to the shipment directive ensures adequate supervision and control of shipments of radioactive waste and spent fuel at EU and national levels.

In Task 1, we undertook a high-level assessment of the status of NORM waste and HASSs within the various Member States. This assessment showed that the HASS directive required Member States to establish a system for ensuring the safety and security of HASSs. In 2018, this directive was repealed and replaced by the corresponding provisions in the new EU basic safety standards directive (Directive 2013/59/Euratom). The Task 5 survey showed that both NORM materials/waste and HAAS are often transported across EU borders, and that, in relation specifically to HAAS, this directive is actively adhered to by the Member States' WMOs and waste producers.

A concept being promoted by the international community, including the IAEA, and the European Commission, through the European Green Deal is the 'circular economy'. The European Green Deal is a set of policy initiatives by the European Commission with the overarching aim of making Europe climate neutral in 2050. The potential to recycle and reuse materials, rather than always designating them as waste, is seen as being crucial. The eventual adoption and success of this concept could be affected by how radioactive waste is classified, especially where there may be discrepancies around what is a material and what might be waste (see Section 8.4).

8.2. Challenges at European level

The outcome of the study has highlighted that there are some challenges faced by the WMOs and waste producers in relation to existing waste classification schemes or if a harmonised waste classification approach is to be adopted by the EU. However, in the main, most Member States believed that their current approaches are working in an adequate manner, especially as EU directives have been incorporated into their legislation. If the European Commission decides to propose a harmonised waste classification system across the Member States, this is, however, likely to lead to a different set of challenges. It was clear in the Task 5 survey responses (see Section 7) that many Member States, although recognising that harmonisation can often be positive, do not ideally wish to change the status quo. Some Member States base their waste classification on their final waste management/disposal concept, and this is clearly likely to differ between Member States.

One of the biggest challenges at EU level is the duty, especially for WMOs, to compile inventories to comply with different national and international requirements. Due to different reporting requirements and waste management programmes, it is difficult to align the different reporting schemes. Nevertheless, procedures have been developed to translate data into the required inventory formats. The current necessary effort leads to a certain resistance against all new activities around waste management classification.

Another challenge concerns transparency. The volumes and radiotoxicity of waste in seemingly similar classes vary considerably between countries depending on the classification scheme and on the final solutions for waste. On the basis of the existing waste classification schemes, these differences are difficult to explain to the public, which can therefore reduce credibility and transparency.

Where there are challenges, there are often also opportunities, and it is equally important that these are not overlooked. Opportunities resulting from a harmonised approach to waste classification might include reduced paperwork, greater transparency, justification towards an adopted approach, and simplified and consistent definitions. However, some Member States felt that any opportunities might not necessarily outweigh the challenges.

One of the main challenges highlighted in Task 4 (see Section 6) of the project relates to a general lack of trust of industry. Industry was perceived to be the least trusted institution (when compared with academia, government, regulators, NGOs, etc.), so further work to gain/regain trust undertaken by industry would clearly be beneficial.

In addition, it was seen that there is a low level of understanding of waste management practices in general, especially around the level of hazard, NORM waste, regulation and overall responsibilities. Improved communication at all levels could help to overcome the lack of understanding not only around these issues, but also around where the underpinning information can be transparently acquired.

8.3. Addressing transparency issues

The results from Task 4 (see Section 6) highlighted that there was a lack of basic knowledge about radioactive waste management in general, and more specifically around waste classification and transportation, across EU Member States' citizens. A high percentage of respondents claimed to not know where information related to radioactive waste management could be found, in spite of the wealth of information and data that are publicly available. This could be due to the ineffective communication of those parties responsible for producing, managing and regulating radioactive waste. Further and enhanced communication with citizens would increase trust and transparency, and would, potentially, allow Member States to gain greater support for waste disposal initiatives. We propose that greater communication around the following subject areas could be beneficial:

- where the responsibility for the safe management of radioactive waste lies;
- how radioactive waste is regulated;
- the fact that non-nuclear industries also produce radioactive waste;
- the different NORM industries and the types of waste they produce;
- the fact that not all radioactive waste is equally hazardous.

It should also be considered that transparency is not only about making information available, but also about presenting it in a comprehensible way. In public discussion, the focus is on the final disposal of radioactive waste, but a comparison between the Member States shows that there are sometimes considerable differences in the designation or allocation of waste to certain classes. This clearly stands in the way of providing comprehensible information. It therefore makes sense to introduce a uniform designation of waste classes that refers to the final solution of waste treatment. In this way, waste streams are automatically classified according to their toxicity and can be compared between countries.

If guideline values are additionally assigned to the classes, especially for determining radiotoxicity, incoming waste for upstream process steps can also be assigned to a class. In this way, a closed picture of the entire radioactive inventory can be formed for the public, allowing comparability between countries. For example, if a waste stream such as operational waste from a distinct NPP is to be conditioned, it obviously has to follow the WAC of the respective facility. As the objective of conditioning is known, the waste stream could also carry the distinct information on the ratio of waste for specific final solutions, as, for example, described in Section 8.5. In this way, the volume and radiotoxicity of the incoming waste stream can be reported, along with the information on the volume of waste for each potential final solution.

8.4. Addressing cross-border cooperation

Transboundary activities in the context of the present project refer to the transport or transfer of radioactive waste for treatment or even final disposal in the facilities of another country. The transport and acceptance of waste is always subject to strict criteria.

Most, if not all, Member States felt that cross-border cooperation is already well established, and the acquired feedback did not intimate the existence of any significant obstacles. For those Member States with well-established nuclear power programmes, the transport of radioactive materials across borders has taken place for many years. The export/import of radioactive waste was essentially for limited waste disposal, treatment/conditioning, reprocessing, incineration, maintenance of contaminated equipment and metal melting. A variety of transport options were utilised for cross-border transport, including road, sea, rail and air. It should be noted that many Member States do not allow radioactive waste originating from another Member State to be disposed of in their Member State or transported across their borders with the intention of final disposal.

Although national classification schemes were not found to significantly impede cross-border cooperation, it was observed that they may slightly influence such cooperation.

Classification into the usual waste classes does not provide a sufficient depth of information, but can allow a first rough classification. Following the basic idea of the European Repository Development Organisation (the association for multinational radioactive waste solutions), however, the waste classes can be underpinned by requirements for the documentation of the waste.

Each waste class could be classified according to the process steps of transport, processing, storage and disposal. The classifications in turn could include radiological descriptions; descriptions of the biological, chemical and physical properties; descriptions of the dose rate and contamination; and descriptions of the packaging. Documentation structured in this way would allow a direct assessment of whether a waste stream can be accepted from a particular facility. It might even be possible to define higher-level safety requirements on this basis, which would support a uniform approach in Europe.

In relation to the waste classification system used, a number of WMOs and waste producers highlighted in the study that the differences in classification schemes between them resulted in some materials being declared as radioactive waste in some instances and as exempt material in others.

A number of respondents to the survey conducted in this study stated that everything was already well harmonised due to compliance with the ADR and the shipment directive.

The majority of Member States have developed legislation to cover the export/import of radioactive waste to or from other Member State, and almost all already have clear lines of communication with

other Member States with respect to cross-border cooperation. As highlighted above, it should be noted that many Member States do not allow radioactive waste originating from another Member State to be disposed of within their Member State.

8.5. An outline of an actionable European radioactive waste classification scheme

This section aims to propose how the abovementioned challenges might be addressed and how the adopted/available practices can be promoted.

During the analysis of whether the waste classification system recommended in IAEA GSG-1 allows the harmonisation of the individual systems used in the Member States, it became clear that the classification systems were established against the background of the final solutions for the individual waste streams (i.e. the selected repository types). Although this makes it possible for higher-level reports to summarise data in such a way that they fit into an overarching classification system, in some cases, significant differences become apparent in the details. Radionuclide-specific definitions of waste classes, and the contraction or omission of classes make a comparison between national waste classification systems impossible.

For instance, the fact that some materials are declared as radioactive waste in some instances and as exempt material in others has caused some challenges for Member States. It was felt that a clearer distinction needed to be made between contaminated material and nuclear waste.

The possibility of defining VLLW, which is usually disposed of in surface facilities, allows for lower requirements for conditioning and packaging of the waste than when this waste is considered together with LILW. Usually, the lower requirements result in larger volumes of waste, which in turn are characterised by lower toxicity. This is particularly evident in countries where waste cannot be exempted or in countries where all waste is to be placed in geological repositories. The reported waste volumes in these cases differ by several orders of magnitude.

As the waste classes used in the individual Member States are based on the national programmes, which have existing licences built on facility-specific safety analyses and a national regulatory system as a basis, the classification systems used operationally cannot be changed. Thus, there will always be the difficulties mentioned above when reporting for higher-level international agreements.

One way to overcome these difficulties is seen in a classification based on the final solution for waste streams. An example for a waste classification scheme would be:

- non-radiotoxic waste for **surface disposal**;
- very-low-level radiotoxic waste for **surface disposal**;
- low-level radiotoxic waste for **near-surface disposal**;

- intermediate radiotoxic waste for **intermediate-depth disposal**;
- higher intermediate radiotoxic waste for **deep geological disposal**;
- HLW for **deep geological disposal**.

It seems reasonable to define the waste classes along the disposal solutions. HLW can be divided into two subclasses: waste from reprocessing and directly disposed spent fuel. Non-heat-generating waste can then be divided into waste for disposal in geological repositories, waste for disposal at intermediate depths, waste for disposal in near-surface repositories and waste for disposal in surface landfills. It would also be important to estimate the amount of waste released in order to establish comparability with countries where release is not possible. It will certainly be a challenge to obtain historical data on release.

With such a system, there is less demand for the technical expertise needed to simultaneously assess, for example, the importance of longevity and activity of radionuclides. In this way, communication with the public, drafting a common inventory allowing for comparison between countries, and cross-boundary activities are supported. Nevertheless, if such a classification system were to be implemented, WMOs and regulators must be involved, as they will be responsible for reporting, and would be best able to identify the consequences and possible challenges.

In summary, as Member States appear to take greater cognisance of IAEA GSG-1 than the Commission recommendation, it may be logical to further align the latter with the former. However, prior to any updates to the recommendation to provide a more harmonised waste classification system, it may be necessary to better understand the potential obstacles or challenges Member States may face in making any changes to their existing classification system. Questions regarding this were not specifically asked or otherwise raised during the project. Although the authors of this report recognise the value of a harmonised waste classification system that is valid at all levels of radioactive waste management, care has to be taken when considering a potential new national classification system. An assessment of the impact of a new national classification system on the national programmes of the Member States is beyond the scope of this project, and can only be done with considerable involvement of the affected parties, especially waste producers, WMOs and regulators. Nevertheless, the authors see a clear chance that the application of the proposed waste classification system would allow for a simple translation matrix between national classification systems and the system for reporting at EU level.

In relation to having a harmonised waste classification system across the EU and how it would have an impact on their country-specific waste management, the WMOs provided mixed responses in the study. Although only two felt it would be detrimental, twice as many provided a neutral response, than provided a positive one.

The majority of waste producers did admit that, in principle, a harmonised approach to radioactive waste classification across the EU should be positive. Overall, the waste producers seemed to be more supportive of having a harmonised approach to waste classification across the EU than the WMOs. This may relate to the fact that any such harmonisation, and therefore potential change, might have more of an impact on the WMOs than the waste producers.

8.6. Summary of key recommendations

This section summarises the key recommendations stemming from the previous subsections.

Recommendation 1

Further and enhanced communication with citizens

EU citizens have a lack of knowledge about radioactive waste management in general, and more specifically around waste classification and transportation. Further and enhanced communication with citizens would not only increase trust and transparency but would potentially allow Member States to gain greater support for waste disposal initiatives. We propose that greater communication around the following subject areas could be beneficial:

- where the responsibility for the safe management of radioactive waste lies;
- how radioactive waste is regulated;
- the fact that non-nuclear industries also produce radioactive waste;
- the different NORM industries and the types of waste they produce;
- the fact that not all radioactive waste is hazardous.

Recommendation 2

Develop a classification scheme based on the final solution for waste streams

One way to overcome the difficulties discussed in the previous section is seen in a classification based on the final solution for waste streams. An example for a waste classification scheme would be:

- non-radiotoxic waste for **surface disposal**;
- very-low-level radiotoxic waste for **surface disposal**;
- low-level radiotoxic waste for **near-surface disposal**;
- intermediate radiotoxic waste for **intermediate-depth disposal**;
- higher intermediate radiotoxic waste for **deep geological disposal**;
- HLW for **deep geological disposal**.

With such a system, there is less demand for the technical expertise needed to simultaneously assess, for example, the importance of longevity and activity of radionuclides. In this way, communication with the public, drafting a common inventory allowing for comparison between countries, and cross-boundary activities are supported. The proposed system would be a multi-tiered system, with an overarching level for reporting purposes, to which the national or facility-specific systems developed and relevant to the handling of waste can be subordinated.

Recommendation 3

A clearer distinction between radioactive materials and waste

Because some materials are declared radioactive waste in some instances and exempt material in others, a clearer distinction between radioactive materials and waste might be beneficial.

In some cases, waste from nuclear applications may have properties that make it suitable for further use. This applies, for example, to used radiation sources that can be reused after reprocessing. It can also apply to low-level materials that can be used, for example, as an additive for concrete to stabilise higher-level waste. In order to enable or simplify further use, it may be useful to designate corresponding materials as radioactive material and not as radioactive waste.

Recommendation 4

Assess potential obstacles and opportunities prior to any updates to the Commission recommendation

As Member States appear to take greater cognisance of IAEA GSG-1 than the Commission recommendation, it may be logical to further align the latter with the former, for example by including VLLW. However, prior to any updates to the Commission recommendation to provide a more harmonised waste classification system, it may be necessary to better understand the potential obstacles or challenges a Member State may face in making any changes to their existing classification system. Questions regarding this were not specifically asked or otherwise raised during the project. It is equally important, however, to not merely look at challenges but also consider any potential opportunities.

Recommendation 5

Waste classes should be related with requirements for transport, processing, storage and disposal

Each waste class could be classified according to the process steps of transport, processing, storage and disposal. The classifications in turn could include radiological descriptions; descriptions of the biological, chemical and physical properties; descriptions of the dose rate and contamination; and descriptions of the packaging. Such structured documentation would allow a direct assessment of

whether a waste stream can be accepted from a particular facility. It might even be possible to define higher-level safety requirements on this basis, which would support a uniform approach in Europe.

Although this further detail may become too incomprehensible for the public, it may be helpful for professional exchanges to structure requirements. However, by linking the requirements to the waste classes, closed reporting is possible, which can present information based on the same data in ways that are appropriate for each target group.

Recommendation 6

A proposal for a harmonised waste classification should also involve WMOs and waste producers

If a harmonised waste classification system across the EU is eventually pursued, it will be important to first establish a robust understanding of any challenges and opportunities that might result. Gaining this understanding should not be limited to the regulators and other government departments, but should also consider the WMOs and waste producers (where applicable).

Recommendation 7

Actions to gain/regain trust undertaken by Industry

The public survey highlighted that industry was perceived to be the least trusted institution (when compared with academia, government, regulators, NGOs, etc.), so further work to gain/regain trust undertaken by industry would be beneficial.

ANNEX I: EUROPEAN UNION MEMBER STATES' WASTE CLASSIFICATION SYSTEMS

LIST OF TABLES

ABBREVIATIONS

COVRA	Central Organisation for Radioactive Waste
EU	European Union
GSG	General Safety Guide
HLW	high-level waste
IAEA	International Atomic Energy Agency
LILW	low- and intermediate-level waste
LLW	low-level waste
NORM	naturally occurring radioactive material
NPP	nuclear power plant
VLLW	very-low-level waste
VVER	water–water energetic reactor

1. DESCRIPTION OF EUROPEAN UNION MEMBER STATES' WASTE CLASSIFICATION SYSTEMS

The aim of this section is to provide a summary of the factual information acquired for each European Union (EU) Member State with regard to how they classify their radioactive waste.

1.1. Austria

In Austria, the Federal Minister for Climate Action, Environment, Energy, Mobility, Innovation and Technology acts as the regulatory authority for issues relating to the management of radioactive waste, including the siting, construction and operation of storage facilities.

Austria has neither a nuclear power plant (NPP) nor any other fuel cycle facility in operation. However, there is an operational TRIGA (Mark II) research reactor in Vienna. Spent nuclear fuel from this reactor is stored on-site in dry or wet storage facilities, until it is eventually shipped to the United States.

Austria operates one central radioactive waste management and interim storage facility, Nuclear Engineering Seibersdorf GmbH, for predisposal management, including the treatment, conditioning and interim storage of all low- and intermediate-level waste (LILW).

In Austria, the following classes of radioactive waste are applied:

- ***exempt waste***
- ***very-short-lived waste***
- ***low-level waste (short-lived waste (LILW-SL))***
- ***intermediate-level waste (long-lived waste (LILW-LL))***
- ***high-level waste (HLW).***

1.2. Belgium

In Belgium, the **Belgian Agency for Radioactive Waste and Enriched Fissile Materials** is responsible for the management of all radioactive materials in the country, including their transport, treatment, conditioning, storage and disposal.

Belgium has seven pressurised water reactors in operation. Three research reactors are also in operation, one of which is being dismantled. Radioactive waste can be classified as unconditioned or conditioned waste. The categorisation of unconditioned waste depends on the physical state of the waste, the nature of the emitters, the activity concentration and the applicable treatment. These characteristics are summarised by a three-position alphanumeric code (e.g. A,3,1, where A = solid

waste, 3 = low-level alpha-contaminated waste and 1 = combustible waste). Each waste category has corresponding criteria for acceptance by the Belgian Agency for Radioactive Waste and Enriched Fissile Materials.

- ***Category A*** *waste is short-lived low- and intermediate-level conditioned waste and is claimed to be equivalent to the low-level waste (LLW) class of the International Atomic Energy Agency (IAEA).*
- ***Category B*** *waste is long-lived low- or intermediate-level conditioned waste and is claimed to be equivalent to the IAEA's intermediate-level waste (ILW) class.*
- ***Category C*** *waste is high-level conditioned waste.*

1.3. Bulgaria

In Bulgaria, the State Enterprise Radioactive Waste is responsible for the management of all radioactive materials in the country, including their transport, treatment, conditioning, storage and disposal.

Nuclear facilities are concentrated at the Kozloduy NPP site, where six power units have been built. Two reactors are currently in operation and four are in the process of being decommissioned. In addition, the site has waste disposal facilities, medical units, radioactive sources for use in industry and facilities for the transportation of radioactive material.

Radioactive waste is classified based on the separation of solid radioactive waste into categories and subcategories with the aim of achieving long-term safe management and disposal.

- ***Category 1*** *waste contains radionuclides with low activity.*
    - ***Category 1a*** *is equivalent to exempt waste.*
    - ***Category 1b*** *is equivalent to very-short-lived waste.*
    - ***Category 1c*** *is equivalent to very-low-level waste (VLLW).*
- ***Category 2*** *waste includes LILW.*
    - ***Category 2a*** *is equivalent to LLW.*
    - ***Category 2b*** *is equivalent to ILW.*
- ***Category 3*** *waste includes HLW.*

1.4. Croatia

In Croatia, the State Office for Radiological and Nuclear Safety is responsible for the provision of radioactive waste management services.

Although there are no NPPs in Croatia (it shares the Krško NPP with Slovenia, which is on Slovenian territory), small quantities of institutional radioactive waste originate from medical, industrial and

scientific activities in the country. Croatia, as co-owner of the Krško NPP, is responsible for the disposal of half of the radioactive waste and spent nuclear fuel from the plant and, accordingly, for establishing a radioactive waste management facility.

Radioactive waste is classified in the following manner:

- ***exempt waste***
- ***very-short-lived waste***
- ***LILW***
    - ***short-lived waste***
    - ***long-lived waste***
- ***HLW.***

1.5. Cyprus

Cyprus does not operate any nuclear installations, so the main use of ionising radiation in the country is in medicine. This radiation also has some applications in industry and research. All sources of ionising radiation used in the country are imported from abroad. Therefore, radioactive waste is produced in low volumes and has very low radioactivity levels. Radioisotopes in the resulting radioactive waste have short half-lives and are kept in suitable licenced facilities within the premises of the licensees until their radioactivity levels decrease below the levels required for release from regulatory control (clearance levels). They are then disposed as non-radioactive waste.

The responsibility for the administration of the legislation for the responsible and safe management of radioactive waste is assigned to the regulatory authority, the Minister of Labour, Welfare and Social Insurance, which acts through the Radiation Inspection and Control Service of the Department of Labour Inspection.

Cyprus formally classifies its waste according to the IAEA's waste classification system:

- ***exempt waste***
- ***very-short-lived waste***
- ***VLLW***
- ***LLW***
- ***ILW***
- ***HLW.***

1.6. Czechia

In Czechia, the Radioactive Waste Repository Authority is responsible for the management of activities related to the disposal of radioactive waste and spent fuel. The State Office for Nuclear Safety is responsible for ensuring safety during nuclear activities.

Six water–water energetic reactor (VVER) units (four in Dukovany NPP and two in Temelín NPP) and three research reactors (two in Řež and one in Prague) are in operation.

There are spent fuel and HLW storage facilities at a number of locations and a radioactive waste repository in Dukovany. Two other radioactive waste repositories are in operation (in Richard and Bratrství) and a further one (in Hostim) is closed.

Radioactive waste is categorised according to its disposal:

- ***very-short-lived waste***
- ***VLLW***
- ***LLW***
- ***ILW***
- ***HLW.***

1.7. Denmark

In Denmark, Danish Decommissioning is responsible for the management of all radioactive materials in the country. The only Danish waste management facility subject to the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management is located at the Risø site and is licenced and operated by Danish Decommissioning.

Denmark had three nuclear research reactors, located at the Risø National Laboratory, north of Roskilde on the island of Zeeland. DR-1 stopped operating in 2001 and was fully decommissioned in 2006. A pool reactor (DR-2) was closed in 1975 and a heavy water reactor (DR-3) was closed in 2000. Fuel fabrication facilities for DR-2 and DR-3 were closed in 2002. The Risø National Laboratory was incorporated into the Technical University of Denmark and is now known as the Risø National Laboratory for Sustainable Energy. Although fission research at Risø has stopped, nuclear research (including fusion research) continues. Its Hevesy Laboratory houses a cyclotron, which is used for radioactive isotope production.

Though waste is managed in accordance with operational requirements for reporting purposes, Denmark applies the waste classification scheme recommended by the IAEA:

- ***exempt waste***

- ***very-short-lived waste***
- ***VLLW***
- ***LLW***
- ***ILW***
- ***HLW.***

1.8. Estonia

In Estonia, **A.L.A.R.A.** Ltd is the radioactive waste management agency. The main sources of radioactive waste are the decommissioning of facilities from past practices (from the Soviet period), as well as the use of radioactive sources in industry, medicine, and to a small extent education and research. Estonia has two shut-down nuclear submarine reactors from the Soviet period, in long-term safe storage at the Paldiski site. All spent nuclear fuel was sent back to Russia. There is also a facility for the interim storage of LILW at the Paldiski site. A further radioactive waste management facility, which was used during Soviet times, is situated in Tammiku and is currently being decommissioned.

In Estonia, radioactive waste is classified as follows:

- ***exempt waste***
- ***naturally occurring radioactive material (NORM) waste***
- ***very-short-lived waste***
- ***VLLW***
- ***low- and intermediate-level long-lived waste***
- ***HLW.***

1.9. Finland

The Radiation and Nuclear Safety Authority is an independent governmental organisation responsible for the regulatory control of radiation and nuclear safety in Finland (safety, security and safeguarding).

There are currently two NPPs operating in Finland: the Loviisa and Olkiluoto plants. Spent fuel from the NPP units is stored in interim pool-type storage facilities at the power plant sites for tens of years until it is disposed of. The interim spent fuel storage facilities have already been in operation for about 30 years. The spent nuclear fuel disposal project has progressed as planned. However, the decommissioning of the FiR 1 research reactor is in the licencing phase.

Geological disposal facilities for LILW have been in operation since the 1990s at the Olkiluoto and Loviisa NPP sites. The Olkiluoto disposal facility is also the current route for the disposal of radioactive waste originating from the use of radiation for industrial, medical and research purposes.

The Finnish radioactive waste classification system includes two main categories: nuclear waste, and radioactive waste not originating from the use of nuclear energy and the associated nuclear fuel cycle (non-nuclear radioactive waste).

The classification system for the purpose of the predisposal management of LILW from nuclear facilities, including NPPs, is based on the activity concentrations given in Radiation and Nuclear Safety Authority Regulation Y/4/2018. Solid and liquid waste arising from the controlled area of an NPP contain almost exclusively short-lived beta and gamma emitters and are grouped into the following activity categories:

- ***exempt waste***
- ***VLLW***
- ***LLW***
    - *short-lived waste*
    - *long-lived waste*
- ***ILW***
    - *short-lived waste*
    - *long-lived waste*
- ***HLW.***

1.10. France

ANDRA, the national radioactive waste management agency, is responsible for designing, building and operating waste disposal facilities and keeping an up-to-date national inventory of radioactive materials and waste.

Spent fuel assemblies, from nuclear power reactors and research reactors, are first of all stored on-site at the facilities. They are then transferred to the reprocessing plant at La Hague, operated by Orano, or to the facilities operated by the Alternative Energies and Atomic Energy Commission, pending their reprocessing and then the disposal of the residual waste.

France has multiple radioactive waste storage facilities (interim solution) and three radioactive waste surface disposal centres (final solution): two facilities for low- and intermediate-level short-lived waste (one having ceased to receive waste in 1994 and the other in service) and a facility that receives VLLW. In addition, two waste disposal facility projects are currently being conducted:

- Cigéo, a disposal project (repository) in a deep geological formation for HLW and intermediate-level long-lived waste;
- a subsurface repository for low-level long-lived waste.

The French classification of radioactive waste is based on two parameters: the activity level of the radionuclides it contains and their radioactive half-lives.

Regarding their radioactive half-lives, a distinction is made between very-short-lived waste, with a half-life shorter than 100 days; short-lived waste, in which the radioactivity comes primarily from radionuclides with a half-life of 31 years or fewer; and long-lived waste, which contains a large quantity of radionuclides with a half-life of longer than 31 years.

Depending on the radioactive half-life and the activity level, eight main waste categories have been defined:

- ***exempt waste***
- ***NORM waste***
- ***very-short-lived waste***
- ***VLLW***
- ***low- and intermediate-level short-lived waste***
- ***low-level long-lived waste***
- ***intermediate-level long-lived waste***
- ***HLW.***

1.11. Germany

Regulation is undertaken at federal government and *Länder* authority levels. At federal level, the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection and the Federal Office for the Safety of Nuclear Waste Management are the principal regulatory authorities. In addition, **Bundesgesellschaft für Endlagerung**, a state-owned company under private law, is responsible for the disposal of all radioactive materials in the country. The interim storage facilities are operated by the Company for Interim Storage, and the waste producers are responsible for the conditioning and packaging of the waste to be finally accepted by the company. Germany has three NPPs, two research reactors and four small training reactors in operation. There are also other sources of radioactive waste materials (i.e. medical, industrial, etc.).

In Germany, all radioactive waste is intended to be disposed of in deep geological formations. Therefore, there is no need to differentiate between waste containing radionuclides with short half-lives and waste containing radionuclides with comparatively long half-lives. Therefore, no measures or precautions are required to separate any radioactive waste produced.

The definition and categorisation of radioactive waste must therefore comply with the requirements for the assessment of the safety of underground disposal facilities. Germany decided to choose a new

classification, with particular consideration for aspects relevant to disposal. The classification initially includes the following basic subdivisions:

- ***exempt waste***
- ***radioactive waste with negligible heat generation***
- ***heat-generating radioactive waste.***

1.12. Greece

The Greek Atomic Energy Commission is the competent regulatory authority for control, regulation and supervision in the fields of nuclear energy, nuclear technology, radiological and nuclear safety, and radiation protection.

Greece has no NPPs, so radioactive waste originates from medicine, research and industry, including waste from the past operation of the research reactor GRR-1. Most of the radioactive waste is very-short-lived waste, VLLW or LLW. A small amount of ILW may have resulted from the decommissioning of GRR-1, while any spent fuel was sent to the United States.

The only facility currently serving as a centralised facility for the management and storage of radioactive waste that cannot be discharged on-site is the new radioactive waste interim storage facility. The license of the facility includes the interim storage of radioactive waste and disused radiation sources, dismantling of low-activity sources, characterisation of radioactive waste, repackaging and re-sorting of radioactive waste and radioactive sources, and de-characterisation and clearance of radioactive waste.

In terms of radioactive waste classification, criteria of a half-life of 100 days and a half-life of 30 years are applied to distinguish between very-short-lived waste and long-lived radioactive waste, respectively. Radioactive waste is categorised as follows:

- ***very-short-lived waste***
- ***VLLW***
- ***LLW***
- ***ILW.***

1.13. Hungary

The Public Limited Company for Radioactive Waste Management is responsible for the operation of radioactive waste and spent fuel management facilities, the preparation for final disposal of HLW and the decommissioning of nuclear facilities.

Four VVER-440/213 pressurised water reactor units are operated by the MVM Paks NPP. A water–water-type reactor, operated by the Centre for Energy Research, and the training reactor of the Budapest University of Technology and Economics are also in operation.

Hungary has the following radioactive waste and spent fuel management facilities:

- a spent fuel interim storage facility in Paks;
- the National Radioactive Waste Repository in Bátaapáti, for the disposal of LILW originating from the Paks NPP;
- a radioactive waste treatment and disposal facility (for institutional radioactive waste) in Püspökszilágy.

The general classification of radioactive waste is as follows:

- ***VLLW***
- ***low- and intermediate-level short-lived waste***
- ***low-level long-lived waste***
- ***intermediate-level long-lived waste***
- ***HLW.***

1.14. Ireland

The Environmental Protection Agency, through its Office of Radiation Protection and Environmental Monitoring, regulates radiation in Ireland, while Enva offers radioactive waste management services and is licenced by the Radiological Protection Institute of Ireland to transport, store and export radioactive material.

There are no NPPs, research reactors or waste facilities in Ireland. However, all practices involving sources of ionising radiation, including the transportation of radioactive materials, and occupational exposure to natural sources, are regulated. Ireland uses radioactive materials in the form of sealed and unsealed sources in support of its high-technology industries and its medical and other societal infrastructure. The most important radioactive installation in Ireland is the cyclone M2i Limited, based in Dublin. In addition, small amounts of naturally occurring radioactive materials are produced and discharged as a result of Ireland's exploitation of natural resources.

The limits in licenced conditions relating to the disposal of radioactive waste in Ireland are generally set at levels such that it can be demonstrated that exposure to the public will be very low, typically in doses of less than 10 µSv/year.

In Ireland, radioactive waste is classified simply by its half-life (> 10 years) and by the sector from which it originates (medical, industrial, education and state), and then according to whether it is a sealed or unsealed source.

1.15. Italy

The main national operator entitled to perform spent fuel and radioactive waste management and decommissioning activities is **Società Gestione Impianti Nucleari**. Four NPPs, namely Garigliano (a boiling water reactor), Latina (MAGNOX), Trino (a pressurised water reactor) and Caorso (a boiling water reactor), have been shut down.

The other fuel cycle installations (two pilot reprocessing plants and one plutonium fuel fabrication installation) ceased activities and currently are preparing for decommissioning. In addition, four research reactors and a few temporary storage facilities for medical and industrial waste are in operation. Radioactive waste is classified in the following manner:

- ***very-short-lived waste***
- ***VLLW***
- ***LLW***
- ***ILW***
- ***HLW.***

1.16. Latvia

The Radiation Safety Centre of the State Environmental Service is in charge of supervising the nuclear and radioactive facilities in Latvia, overseeing every phase in each facility, from licencing and operation through to decommissioning. Latvia has no NPP or nuclear fuel cycle facilities but has one pool-type 5 MW research reactor (the Salaspils Research Reactor), which was shut down in 1998 and is currently in the decommissioning stage.

Radioactive isotopes and radiation generators are mainly used for medical, scientific and industrial purposes. There are two main facilities for these:

- the radioactive waste near-surface disposal site RADONS;
- a pretreatment and conditioning facility at the Salaspils site, which also stores conditioned cemented radioactive waste prior to transportation to RADONS.

The main operator is the state limited liability company **Latvian Environment, Geology and Meteorology Centre**, which is responsible for the management of RADONS and the Salaspils research reactor.

Radioactive waste is classified into two main types, according to the planned management route:

- ***LLW***
- ***ILW.***

The VLLW class is not considered, as this class of waste is disposed together with LLW. There is no HLW or spent fuel in the country, as all fuel from the Salaspils research reactor was sent to its country of origin (Russia) in 2008.

1.17. Lithuania

Lithuania has one NPP, Ignalina NPP, but both of its units have been shut down and defueled.

The State Nuclear Power Safety Inspectorate regulates nuclear and radiation safety, as well as security at nuclear power and radioactive waste management facilities, and safety and security during the transportation of nuclear and nuclear fuel cycle materials. The **Ignalina NPP** is responsible for the safe management of radioactive waste emanating from the plant, for the waste accepted for storage from isotope application and for the disposal of all radioactive waste.

All radioactive waste management facilities in Lithuania are considered nuclear facilities and, apart from the Maišiagala storage facility, are all situated in the territory of the Ignalina NPP. In accordance with the nuclear facilities decommissioning and radioactive waste management development programme 2021–2030, the state enterprise Ignalina NPP is also responsible for the implementation of a geological repository for radioactive waste.

Radioactive waste in Lithuania is classified according to the principle of disposal and the radiological characteristics of the waste. The following waste classes apply:

- ***Class A – VLLW;***
- ***Class B – LLW – short lived;***
- ***Class C – ILW – short lived;***
- ***Class D – LLW – long lived;***
- ***Class E – ILW – long lived;***
- ***Class F – disused sealed sources;***
- ***HLW.***

1.18. Luxembourg

In Luxembourg, the Radiation Protection Department is responsible for radioactive waste management policies and practices. While Luxembourg has no NPPs or other major facilities generating radioactive

substances, it does use radioactive sources in industry, medicine, and to a small extent education and research.

All disused sealed sources have to be returned to their country of origin or, if this turns out to be impossible, to a foreign waste management facility.

There is still a collection point (Local de collecte de déchets radioactifs) in Luxembourg for radioactive waste (arising mostly through orphan sources), where the radioactive materials are collected and packed for transportation to a dedicated facility in Belgium. Radioactive waste is classified according to the Belgian classification system – that is, by the half-life of the corresponding radionuclides and whether the disused sources are sealed or unsealed.

1.19. Malta

Malta does not conduct any nuclear fuel cycle activities or have any facility producing radioactive material. The **Commission for the Protection from Ionising and Non-Ionising Radiation** is the public entity responsible for radiation protection. Radioactive sources are used for medical and industrial purposes. Although Malta has no formalised classification of waste, it does have the following waste types:

- ***disused sealed sources***
- ***nuclear medicine unsealed sources***
- ***uranium and thorium salts***
- ***Am-241 lightning arrestors.***

1.20. Netherlands

The **Central Organisation for Radioactive Waste** (COVRA) has facilities for the long-term interim storage of low-, intermediate- and high-level waste. HLW includes spent fuel from research reactors, waste from molybdenum production and waste from reprocessing the spent fuel of the Borssele NPP. COVRA also manages radioactive waste of non-nuclear origin.

There is one NPP in operation, the Borssele NPP; one reactor undergoing decommissioning, the Dodewaard boiling water reactor (at the safe enclosure stage); two research reactors, the Petten High Flux Reactor (used for the production of medical and industrial isotopes) and the University of Delft research reactor (used for academic research); an enrichment company (Urenco); and a centralised storage facility for waste (COVRA). Spent fuel from the Borssele NPP is reprocessed in France, with the resultant vitrified and metallic HLW stored in the High-Level Radioactive Waste Treatment and Storage Building at COVRA.

Radioactive waste and spent fuel is divided into four categories:

- ***exempt waste***
- ***very-short-lived waste***
- ***LILW***
- ***HLW.***

1.21. Poland

The National Atomic Energy Agency is a central organ of governmental administration with the competence to deal with nuclear safety and radiological protection issues.

Poland has not had any nuclear fuel cycle facilities apart from facilities for uranium mining. The mining of uranium ore ended in 1968, and processing was terminated in 1973. Current radioactive waste originates from research reactors, scientific and educational institutions, industry and hospitals.

The National Centre for Nuclear Research operates the MARIA research reactor, which is located in Świerk. LILW is processed and stored by the state-owned public utility Radioactive Waste Management Plant. The plant operates spent nuclear fuel storage facilities, radioactive waste management facilities and the national radioactive waste repository located in Różan. The repository is a near-surface-type repository, intended for the disposal of short-lived LILW (containing radionuclides with a half-life shorter than 30 years). It is also used to store LLW (mainly alpha radioactive waste), waiting to be placed in a deep geological repository.

Radioactive waste is classified into three categories with regard to the concentration of radioactive isotopes contained in the waste plus a category for spent sealed sources. These categories are further divided into subcategories according to the half-lives and concentration of radioactive isotopes contained in the waste. The following classes apply:

- ***transitional waste (low level, intermediate level and high level)***
- ***short-lived waste (low level, intermediate level and high level)***
- ***long-lived waste (low level, intermediate level and high level)***
- ***spent sealed sources (low level, intermediate level and high level).***

1.22. Portugal

In Portugal, the Regulatory Commission for the Safety of Nuclear Installations undertakes the regulatory oversight of the safe management of spent fuel and radioactive waste and the transportation of spent fuel and radioactive waste.

Portugal has no NPPs but produces radioactive waste from medical, industrial and research in the form of sealed and unsealed sources and spent fuel from the Portuguese Research Reactor.

Liquid effluents produced from the Portuguese Research Reactor, and effluents from medical applications are either stored locally by the operators and later discharged or discharged immediately (depending on the foreseen activity concentration) according to the defined discharge limits.

Solid radioactive waste and disused sealed sources are stored centrally in a national radioactive waste facility, Pavilhão de Resíduos Radioativos, located at the same site as the Portuguese Research Reactor. The Regulatory Commission for the Safety of Nuclear Installations has already licenced 48 radioactive waste management and storage facilities in hospitals and research centres.

The classification of radioactive waste is included in the national programme and is summarised as:

- ***very-short-lived waste***
- ***VLLW***
- ***LLW***
- ***ILW***
- ***HLW.***

1.23. Romania

The National Commission for Nuclear Activities Control is the regulatory authority for nuclear safety and security of Romania, responsible for the regulation, licencing and control of nuclear activities. The Nuclear and Radioactive Waste Agency is responsible for promoting the peaceful use of nuclear energy and related research and development programmes and for the coordination, at national level, of the safe administration of spent nuclear fuel and of radioactive waste, including their disposal.

There are a number of nuclear installations in Romania:

- the Cernavoda NPP and its associated spent fuel storage and radioactive waste management facilities;
- the TRIGA research reactor and its associated spent fuel storage and radioactive waste management facilities;
- the nuclear fuel manufacturing plant and its associated radioactive waste management facilities;
- the decommissioned VVR-S research reactor in Măgurele, near Bucharest, and its associated radioactive waste management facilities.

The general classification of waste depends on the requirements for assuring the isolation of waste from the biosphere during its disposal:

- ***exempt waste***
- ***very-short-lived waste***
- ***VLLW***
- ***LLW***
    - ***short-lived waste***
    - ***long-lived waste***
- ***ILW***
    - ***short-lived waste***
    - ***long-lived waste***
- ***HLW.***

1.24. Slovakia

The Nuclear Regulatory Authority of the Slovak Republic is responsible for the regulation of nuclear safety, and the Ministry of Health (Public Health Authority of the Slovak Republic) is responsible for the regulation of radiation protection. The owner and holder of the operating license for the remaining nuclear installations is Jadrová a vyraďovacia spoločnost, which is also the licence holder for the decommissioning of NPPs.

At present, there are four VVER-440/V213 nuclear units in operation, two units at Jaslovské Bohunice and another two units at Mochovce. At the Jaslovské Bohunice site, two NPPs are in the decommissioning stage.

Radioactive waste is classified based on its activity and is defined by Section 5 of the Nuclear Regulatory Authority of the Slovak Republic Decree No 30/2012 Coll., laying down the details of the requirements for the management of nuclear materials, radioactive waste and spent nuclear fuel:

- ***very-short-lived waste***
- ***VLLW***
- ***LLW***
- ***ILW***
- ***HLW.***

1.25. Slovenia

The Agency for Radwaste Management is responsible for radioactive waste management, including the management of institutional radioactive waste, the long-term surveillance of radioactive waste, the

maintenance of disposal sites for uranium mining and milling waste, and the disposal of radioactive waste from the Krško NPP. In addition, the Slovenian Nuclear Safety Administration is the competent authority in the area of nuclear and radiation safety and radioactive waste management.

Slovenia has a small nuclear programme: one operating NPP (the Krško NPP), one research reactor (at the Jožef Stefan Institute Reactor Infrastructure Centre) and one central storage facility for the storage of LILW arising from medical, industrial and research. In addition, there is also a closed and remediated uranium mine in Žirovski Vrh, with two remediated disposal sites for mining and milling waste at the site. Slovenia has no facility for the final disposal of radioactive waste or spent nuclear fuel.

With regard to the level and type of radioactivity, solid radioactive waste is classified as follows:

- ***very-short-lived waste***
- ***VLLW***
- ***short-lived LILW***
- ***long-lived LILW***
- ***HLW***
- ***radioactive waste containing naturally occurring radionuclides.***

1.26. Spain

In Spain, the Ministry for Ecological Transition establishes the management policy to be implemented in relation to radioactive waste. The public company **Enresa** is in charge of managing spent fuel and radioactive waste.

Spain's nuclear fleet is made up of five nuclear facilities with seven reactors. One is decommissioned and another is in the process of being decommissioned. Fuel cycle and waste disposal facilities and research centres include the Juzbado fuel assembly manufacturing facility, the El Cabril waste disposal centre and the Research Centre for Energy, Environment and Technology.

Radioactive waste in Spain is classified according to the management facilities authorised for a certain volume and radiological inventory and certain limits on specific activity concentrations based on the nature of the different radioactive elements in place:

- ***exempt waste***
- ***VLLW***
- ***LLW***
- ***special waste***
- ***HLW.***

1.27. Sweden

The Swedish Radiation Safety Authority is the regulatory authority for nuclear safety, radiation protection, nuclear security and nuclear non-proliferation. The Swedish Nuclear Fuel and Waste Management Company is responsible for the provision of services in the field of radioactive waste and spent fuel management.

There are three NPPs in the country, that is Forsmark, Oskarshamn and Ringhals, with a total of six reactors in operation. Other nuclear facilities in Sweden include a nuclear fuel fabrication plant, an interim spent fuel storage facility and a disposal facility for short-lived LILW.

In relation to radioactive waste classification, there is an established waste characterisation system that is used by the Swedish nuclear industry. The characterisation system is destination-driven and customised with regard to existing and planned repositories (end points).

- ***exempt material***
- ***VLLW***
- ***low-level short-lived waste***
- ***intermediate-level short-lived waste***
- ***low- and intermediate-level long-lived waste***
- ***HLW.***

2. SUMMARY OF THE MEMBER STATES' CLASSIFICATION SCHEMES

Table A1.1 Summary of Member States' radioactive waste classification schemes

Member State	Radioactive waste classification as per IAEA GSG-1 framework					
	Exempt waste	Very-short-lived waste	VLLW	LLW	ILW	HLW
Austria	The radionuclide-specific values for clearance are derived from the internationally accepted concept of a 10 µSv/year additional dose.	**Very-short-lived waste:** (Mainly of medical origin.) Waste that decays within the period of temporary storage to clearance levels. It contains radionuclides with very short half-lives, shorter than 100 days, requiring up to 5 years of storage to reach activity concentrations below clearance levels.		**Low-level waste (short-lived waste (LILW-SL)):** Radioactive waste with radionuclides with a half-life shorter than or equal to those of Cs-137 and Sr-90 (below 30 years), with a restricted long-lived alpha-emitting radionuclide concentration (limitation of long-lived alpha-emitting radionuclides to 4 000 Bq/g in individual waste packages and to an overall average of 400 Bq/g in the total waste volume). For classification purposes, at Nuclear Engineering Seibersdorf GmbH internal waste acceptance criteria for interim storage uses the limit of 400 Bq/g of long-lived alpha-emitting radionuclides per waste package (instead of 4 000 Bq/g per package).	**Intermediate-level waste (long-lived waste (LILW-LL)):** Waste with long-lived alpha-emitting radionuclides (half-life > 30 years) whose concentration exceeds the limit for short-lived waste.	**HLW (pro forma category; there is no HLW in Austria):** Waste with an activity concentration high enough to generate significant quantities of heat by the radioactive decay process or waste with large amounts of long-lived radionuclides that need to be considered in the design of a disposal facility.

Belgium	Exemption levels are defined on a radionuclide-specific basis.			**Category A:** Short-lived low- and intermediate-level conditioned waste containing limited quantities of long-lived radionuclides. This waste contains small amounts of mainly beta and gamma emitters with half-lives shorter than 30 years and traces of longer-lived emitters. It poses a risk to people and the environment for several hundreds of years, and requires surface or near-surface disposal. It is claimed to correspond to the IAEA's LLW classification.	**Category B:** Low- and intermediate-level conditioned waste contaminated with such quantities of long-lived radionuclides that it poses a risk to people and the environment for several tens to several hundreds of thousands of years in some cases, with limited quantities of short-lived radionuclides. This waste contains mainly alpha emitters with half-lives exceeding 30 years, together, in some cases, with intermediate amounts of beta and gamma emitters. Its thermal power is potentially significant at the time of its conditioning, but it will emit too little heat after the storage period to be classified as Category C waste. It is claimed to correspond to the IAEA's ILW classification.	**Category C:** High-level conditioned waste containing large quantities of long-lived radionuclides that, like Category B waste, poses a risk for several tens to several hundreds of thousands of years in some cases. This waste contains substantial amounts of beta and gamma emitters with short and medium half-lives, together with longer-lived alpha emitters. One of its major characteristics is the considerable amount of heat that it emits. Its thermal power causes a significant temperature increase in the host rock.
Bulgaria	**Category 1:** Waste containing radionuclides with low activity, which do not require the implementation of measures for radiation protection or do not need a high level of isolation and containment.			**Category 2:** Waste containing radionuclides in concentrations that require measures for reliable isolation and containment		**Category 3:** Waste with a concentration of radionuclides at which heat release must be taken into account during storage and burial.

	Category 1a: Waste that has the activity levels required for exemption from regulatory control under the act on the safe use of nuclear energy.	**Category 1b:** Very-short-lived waste with a short half-life (no more than 100 days) whose activity decreases below the levels for exemption after storage for a limited period of time (usually not more than several years).	**Category 1c:** VLLW with specific levels of activity exceeding by a minimal value the levels for exemption and with a very low content of long-lived radionuclides, which represent a limited radiological risk. For this category of waste, the application of specific measures for radiation protection or for isolation and containment is not required.	**Category 2a:** LILW containing mainly short-lived radionuclides (with a half-life no longer than that of ^{137}Cs) and long-lived radionuclides at significantly lower levels of activity, limited for long-lived alpha emitters to under 4×10^6 Bq/kg for each individual package and a maximum average value for all packages in the respective facility of 4×10^5 Bq/kg.	**Category 2b:** LILW containing long-lived radionuclides at activity levels of long-lived alpha emitters exceeding the limits for Category 2a.	
Croatia	**Exempt waste:** Waste with radionuclide activity concentrations or total activity at or below prescribed exemption or clearance levels.	**Very-short-lived waste:** Radioactive waste containing radionuclides with a half-life shorter than 100 days that will decay to below clearance levels within 3 years.		**LILW – short-lived waste:** Radioactive waste containing radionuclides with a half-life shorter than 30 years with radionuclide activity concentrations or a total activity that will remain above prescribed exemption or clearance levels 3 years after their creation, and with a heat generation rate below 2 kW/m³. Waste containing radionuclides with a half-life shorter than 30 years (limited for long-lived alpha-emitting radionuclides to 4 000 Bq/g in individual waste packages and for the total waste volume to an overall average of 400 Bq/g) **LILW – long-lived waste:** Radioactive waste containing radionuclides with a half-life shorter than 30 years and radionuclide activity concentrations or a total activity that will remain above prescribed exemption or clearance levels 3 years after their creation, and with a heat generation rate below 2 kW/m³. Waste with radionuclide activity concentrations exceeding the limits for short-lived waste.		**HLW:** Radioactive waste with a thermal power above 2 kW/m³ and radionuclide activity concentrations exceeding the limits for short-lived waste.

Cyprus	**Exempt waste:** Exemption from the requirements of the law is translated into exemptions with regard to the specific and total activity of materials that are being handled, used or disposed of as radioactive waste and exemptions with regard to practices (see to Council Directive 96/29/Euratom)	**Very-short-lived waste:** Radioisotopes with short half-lives are kept in suitable licenced facilities within the premises of licensees until their radioactivity levels decrease below the levels required for release from regulatory control (clearance levels) and are then disposed of as usual (non-radioactive) waste.	**VLLW**	**LLW**	**ILW**	**HLW**
Czechia	Radionuclide-specific limits for clearance are defined by law.	**Very-short-lived waste:** Waste whose radioactivity after short-term storage (up to 5 years) does not exceed clearance levels.	**VLLW:** Waste that has a radioactivity higher than that of temporary radioactive waste, but that does not require any special measures during disposal.	**LLW:** Waste with a radioactivity higher than that of temporary radioactive waste but that at the same time contains limited amounts of long-lived radionuclides. Waste with radionuclides with a half-life shorter than 30 years (including Cs-137) and with limited mass activity of long-term alpha sources (per cask up to 4 000 kBq/kg and with a mean value 400 kBq/kg for the total volume of waste produced in one calendar year).	**ILW:** Waste containing a significant amount of long-lived radionuclides Waste that cannot be classified as 'short-term waste'.	**HLW:** Waste for which heat generation from the decay of contained radionuclides must be taken into account during its storage and disposal.

<table>
<tr><td>Denmark</td><td>Exempt waste:
Clearance values are expressed as either radionuclide-specific values in Bq/g or mass-specific values (for buildings and surfaces) in Bq/cm².</td><td colspan="2">Very-short-lived waste</td><td>VLLW:
Waste that results from the operation and decommissioning of research reactors and from medical and technical applications.</td><td>LLW:
Waste that results from the operation and decommissioning of research reactors and from medical and technical sources.</td><td>ILW:
Waste that results from the operation and decommissioning of research reactors.</td><td>HLW:
Waste that results from the operation and decommissioning of research reactors.</td></tr>
<tr><td>Estonia</td><td>Exempt waste:
Waste with radionuclide activity concentrations or a total activity that are lower than the clearance levels.</td><td>Very-short-lived waste:
Radioactive waste that contains radionuclides with less than a 100-day half-life and that decay below the clearance levels established under Article 62 (3) of the radiation act within up to 5 years.</td><td>VLLW
Radioactive waste that contains beta and gamma sources with half-lives shorter than 30 years and a limited amount of long-lived alpha sources (no more than 4 000 Bq/g for one waste package and no more than an average of 400 Bq/g for all waste packages).</td><td colspan="3">Low- and intermediate-level long-lived waste:
Radioactive waste that contains radionuclides with a half-life longer than 30 years with an activity concentration higher than that for low- and intermediate-activity short-lived waste that will generate less than 2 kW/m³ heat energy during radioactive decay.</td><td>HLW:
(There is no such waste in Estonia.)
Radioactive waste that generates more than 2 kW/m³ of heat energy during radioactive decay.</td></tr>
<tr><td></td><td></td><td colspan="2">NORM waste:
Waste produced as a result of handling raw materials containing substances that contain natural radionuclides (Th-232 and U-238 and radionuclides in their decay series), the specific activity of which is greater than clearance levels.</td><td colspan="3"></td><td></td></tr>
</table>

Finland	**Exempt waste:** Waste with radionuclide activity concentrations below the clearance levels defined in regulations. Waste with very-short-lived radionuclides will be stored temporarily until the requirements for exemption are met.		**VLLW:** Nuclear waste for which the average activity concentration of significant radionuclides does not exceed the value of 100 kBq/kg and for which the total activity does not exceed the values laid down in Section 6 (1) of the nuclear energy decree (161/1988)	**LLW:** Nuclear waste that, because of its low level of activity, can be processed without any special radiation protection arrangements. The activity concentration of such waste is usually not more than 1 MBq/kg. **Short-lived waste:** This refers to nuclear waste for which the calculated activity concentration after 500 years is below the level of 100 MBq/kg in each disposed waste package and below an average value of 10 MBq/kg in waste in one emplacement room. **Long-lived waste:** This refers to nuclear waste for which the calculated activity concentration after 500 years is above 100 MBq/kg in a disposed waste package and above an average value of 10 MBq/kg in waste in one emplacement room.	**ILW:** Nuclear waste that, because of its high level of activity, requires effective radiation protection arrangements when processed. The activity concentration of such waste is usually between 1 MBq/kg and 10 GBq/kg. **Short-lived waste:** This refers to nuclear waste for which the calculated activity concentration after 500 years is below the level of 100 MBq/kg in each disposed waste package and below an average value of 10 MBq/kg in waste in one emplacement room. **Long-lived waste:** This refers to nuclear waste for which the calculated activity concentration after 500 years is above 100 MBq/kg in a disposed waste package, or above an average value of 10 MBq/kg in waste in one emplacement room.	**HLW:** Waste that, because of its high level of activity, requires highly effective radiation protection arrangements when processed and usually also cooling. The activity concentration of such waste is usually more than 10 GBq/kg.

<table>
<tr>
<td rowspan="2">France</td>
<td>Exempt waste:
The management policy for the VLLW produced by nuclear facilities in France is not based on zoning in nuclear installations. There is no free release from controlled zones.</td>
<td rowspan="2">Very-short-lived waste:
Waste that contains radionuclides with a half-life of shorter than 100 days. This waste mainly comes from the medical and research sectors. It is stored at the site on which it was used to allow radioactive decay, before it is disposed of through a conventional route in line with its physical, chemical and biological characteristics.</td>
<td rowspan="2">VLLW:
This mainly includes waste from the decommissioning of nuclear facilities and material with a percentage of natural radionuclides.</td>
<td colspan="2">Short-lived LILW:
This mainly includes waste from the operation of nuclear facilities, envisaged for storage in near-surface disposal facilities. Waste containing very-short-lived radionuclides will be stored temporarily until it complies with the exemption levels.</td>
<td rowspan="2">HLW:
Waste resulting from the reprocessing of spent nuclear fuel. The provided disposal route is deep geological repository.</td>
</tr>
<tr>
<td>NORM waste:
Waste with radionuclide activity concentrations that do not exceed the exemption values of 1 Bq/g for the U-238 and Th-232 chains can be stored in conventional waste storage facilities on the basis of physico-chemical criteria alone.</td>
<td>Low-level long-lived waste:
This mainly includes graphite- and radium-bearing waste. The graphite-bearing waste comes mainly from the former gas-cooled reactor technology and mainly contains long-lived beta radionuclides such as C-14 and Cl-36. Their activity levels range from 10 000 to 100 000 Bq/g. Radium-bearing waste, most of which comes from non-NPP activities (e.g. the processing of ores containing rare earth elements), mainly contains long-lived alpha-emitting radionuclides, with an activity of between several tens of Becquerels per gram and several thousand Becquerels per gram. This waste category also includes other types of waste, such as certain legacy bitumen packages and residues from the uranium conversion process carried out in the Comurhex plant in Malvési.</td>
<td>Intermediate-level long-lived waste:
This mainly includes waste from spent fuels after processing and from the maintenance and operation of processing plants. It primarily consists of structural waste from nuclear fuels – that is, the hulls (cladding sections) and end-pieces, packaged in cement-encapsulated or compacted waste packages, as well as technological waste (used tools, equipment, etc.), or even waste resulting from the treatment of effluents, such as certain sludge. The activity of those residues ranges from 1 million to 1 billion Bq/g. There is either no heat release or negligible heat release.</td>
</tr>
</table>

Germany	**Exempt waste:** Free release is linked to values falling below those specified in the radiation protection ordinance, Annex 4, Table 1, columns 3 and 5–14, or to the proof that by releasing the substance into the economic cycle individuals of the population are exposed only to an effective dose of around 10 µSv per calendar year.			**Radioactive waste with negligible heat generation:** This term was quantified in the scope of the planning works for the Konrad repository. The implementation of this planning requirement led to the establishment that the increase in the host rock's temperature caused by the decay heat of the radionuclides contained in the waste packages must not exceed 3 °K on average. This value corresponds to the natural temperature difference at a depth difference of 100 metres in mines. The temperature difference of 3 °K corresponds to a mean thermal output of about 200 W/m^3 of waste.	**Heat-generating radioactive waste:** Waste is characterised by high radionuclide activity concentrations and therefore a high decay heat.	
Greece	Clearance levels are defined.	**Very-short-lived waste:** Waste with a half-life shorter than 100 days). Decay and clearance are employed. Generic and conditional clearance levels apply.	**VLLW:** Waste containing isotopes with half-lives shorter than 30 years and activities about two orders higher than the exempted values. Waste with radionuclides with longer half-lives can also be considered VLLW (e.g. Ra-116), if their activity is very low.	**LLW:** Waste that does not contain long-lived (i.e. half-life > 30 years) radionuclides. Long-lived radionuclides could be present in LLW, if the activity concentration is lower than 400 Bq/g on average for long-lived alpha-emitting radionuclides, or 10 kBq/g for long-lived beta-emitting and/or gamma-emitting radionuclides.	**ILW:** Small amounts of ILW may result from the operation of the research reactor.	
Hungary	To be released from regulatory control, the activity concentration of the waste must decrease to below the general exemption activity concentration value, or the activity of a sealed radioactive source with a half-life shorter than 100 days does not exceed the relevant exemption activity, or the activity of a		**VLLW:** Low-level short-lived radioactive waste: — isotope-specific exemption activity concentration (SMEAK) for isotopes with a half-life of no longer than 30 years ≤ 50; — SMEAK for isotopes with a half-	**Low- and intermediate-level short-lived waste:** $\sum_i AK_i/SMEAK_i \leq 1$		**HLW:** Waste for which the heat production should be taken into account during the design and operation of storage and disposal processes. Radioactive waste producing more than 2 kW/m^3 of heat and waste for which the total activity of the waste package is such that it falls to Category 1 according to the physical protection

	sealed radioactive source with a half-life longer than 100 days does not exceed one tenth of the relevant exemption activity. If the radioactive material includes more than one radionuclide, then the criteria should be fulfilled for the sum of the ratio of the activity and relevant exemption activity of each radionuclide. To be released from radiation protection regulatory control, the reprocessing, reuse or disposal as non-hazardous waste (including incineration) of artificial radionuclides should not result in an individual annual dose to any member of the public exceeding 30 µSv effective dose, and the effective dose should remain below 1 mSv/year in the occurrence of low-probability events, or the surplus effective dose from the practice with naturally occurring radionuclides to one person should be 1 mSv/year at most.		life of longer than 30 years ≤ 1. If the radioactive waste contains more types of radioisotopes, then it is classified according to the following formulas: — for isotopes with a half-life of no longer than 30 years, $\sum_i AK_i/SMEAK_i \leq 50$; — for isotopes with a half-life of longer than 30 years, $\sum_i AK_i/ÀMEAK_i \leq 1$. AK_i: activity concentration of radioactive isotope i with a half-life of longer than 30 years $SMEAK_i$: isotope-specific exemption activity concentration of isotope i with a half-life of longer than 30 years $ÀMEAK_i$: general exemption activity concentration of radioisotope i	**Low-level long-lived waste:** SMEAK ≤ 1 000, or for waste with more than one radionuclide, $\sum_i AK_i/SMEAK_i \leq 1\,000$ The concentration of radionuclides with a half-life of more than 30 years exceeds the limit determined for short-lived radioactive waste.	**Intermediate-level long-lived waste:** SMEAK > 1 000, or for waste with more than one radionuclide, $\sum_i AK_i/SMEAK_i > 1\,000$ The concentration of radionuclides with a half-life of more than 30 years exceeds the limit determined for short-lived radioactive waste.	decree should always be classified as HLW.

Ireland	There are exemptions with regard to the specific and total activity of materials that are being handled, used or disposed of as radioactive waste and exemptions with regard to practices. It was decided not to include the concept of clearance levels in the legislation.					
Italy	Limits for the release of waste from regulatory control are defined.	**Very-short-lived waste:** Radioactive waste containing radionuclides with a very short half-life, shorter than 100 days, requiring up to 5 years to reach activity concentrations lower than values specified in regulations. This category also includes radioactive waste containing mainly short-lived radionuclides that over a period of up to 10 years reaches an activity concentration beneath the clearance levels	**VLLW:** Radioactive waste with an activity concentration that does not meet the criteria set out for exempt waste but is lower than 100 Bq/g, with a maximum alpha contribution of 10 Bq/g for alpha-emitting long-lived radionuclides. This waste will be disposed of in the near-surface disposal facilities at the national repository.	**LLW:** Radioactive waste that does not meet the criteria established for exempt waste and requires containment and isolation periods of up to a few hundred years. This category includes radioactive waste with activity concentrations of up to 5 MBq/g for short-lived radionuclides, of up to 40 kBq/g for the long-lived isotopes of Nickel and of up to 400 Bq/g for long-lived radionuclides.	**ILW:** Radioactive waste with radionuclide activity concentrations exceeding the values set out for LLW, with low heat generation. This includes waste containing a high percentage of long-lived radionuclides, which requires disposal in geological formations. This category includes radioactive waste characterised by activity concentrations of greater than 5 MBq/g for short-lived radionuclides, of greater than 40 kBq/g for long-lived isotopes of Nickel and of greater than 400 Bq/g for long-lived non-heat-producing radionuclides. This category also includes waste characterised by activity concentrations of up to 400 Bq/g for alpha-emitting radionuclides and mainly containing beta/gamma-emitting radionuclides, including long-lived radionuclides.	**HLW:** Radioactive waste with high radionuclide activity concentrations, generating a significant amount of heat or with high concentrations of long-lived radionuclides, which requires a degree of isolation and containment for a period of thousands of years or longer. This waste will be disposed of in geological formations.

		and will be stored temporarily in surface facilities.				
Latvia				**LLW**	**ILW**	

Lithuania	Unconditional clearance levels are established by Nuclear Safety Requirements BSR-1.9.2-2011 'Derivation and Use of Clearance Levels of Radionuclides for Materials and Waste Generated during Activities in the Area of Nuclear Energy' (2011). Clearance criteria are established when materials, equipment, installations, buildings or waste contaminated with radionuclides or containing radionuclides may be used or disposed of without any application of requirements for radiation protection.		**Class A – VLLW:** Radioactive waste with radiological characteristic values that exceed clearance levels but are lower than the characteristic values for LLW, with a surface dose rate of less than 0.5 mSv/h This waste contains beta-emitting and/or gamma-emitting radionuclides with half-lives shorter than 30 years, including Cs-137, and/or long-lived alpha-emitting radionuclides with activity concentrations less than 4 000 Bq/g in individual waste	**Class B – LLW – short lived:** Radioactive waste with radiological characteristics between those of VLLW and HLW, and with a surface dose rate of 0.5–2 mSv/h. This waste contains beta-emitting and/or gamma-emitting radionuclides with half-lives shorter than 30 years, including Cs-137, and/or long-lived alpha-emitting radionuclides with activity concentrations of less than 4 000 Bq/g in individual waste packages, on condition that an overall average activity concentration of long-lived alpha-emitting radionuclides is less than 400 Bq/g per waste package.	**Class C – ILW – short lived:** Radioactive waste with radiological characteristics between those of VLLW and HLW, and with a surface dose rate of greater than 2 mSv/h. Waste containing beta-emitting and/or gamma-emitting radionuclides with half-lives shorter than 30 years, including Cs-137, and/or long-lived alpha-emitting radionuclides with activity concentrations less than 4 000 Bq/g in individual waste packages, on the condition that the overall average activity concentration of long-lived alpha-emitting radionuclides is less than 400 Bq/g per waste package.	**HLW:** Radioactive waste that should be placed in a deep geological repository owing to its significant capacity to emit heat generated during radioactive decay or owing the amount of long-lived radionuclides it contains.

			packages on the condition that the overall average activity concentration of long-lived alpha-emitting radionuclides is less than 400 Bq/g per waste package.	**Class D – LLW – long lived:** Radioactive waste with radiological characteristics between those of VLLW and HLW, and with a surface dose rate of 10 mSv/h or below. Waste containing long-lived alpha-emitting radionuclides with measured and/or calculated, using approved methods, activity concentrations of more than 4 000 Bq/g in individual waste packages, on the condition that the overall average activity concentration of long-lived alpha-emitting radionuclides exceeds 400 Bq/g per waste package.	**Class E – ILW – long lived:** Radioactive waste with radiological characteristics between those of VLLW and HLW, and with a surface dose rate of greater than 10 mSv/h. Waste containing long-lived alpha-emitting radionuclides with measured and/or calculated, using approved methods, activity concentrations of more than 4 000 Bq/g in individual waste packages, on the condition that the overall average activity concentration of long-lived alpha-emitting radionuclides exceeds 400 Bq/g per waste package.	
			Class F – disused sealed sources: Depending on acceptance criteria, 30 % equivalent to VLLW, 30 % equivalent to LLW and 40 % equivalent to ILW.			
Luxembourg						
Malta						
Netherlands	**Exempt waste:** Radioactive waste whose activity or activity concentrations are below the exemption/clearance levels.	**Very-short-lived waste**	**LILW:** Includes NORM waste, which in turn includes depleted uranium. NORM waste with an activity concentration of up to 10 times the clearance level will be managed as VLLW at two designated landfills.		**HLW:** Waste consisting of spent fuel from NPPs and research reactors and reprocessing waste. This category is separated into two subcategories: heat-producing waste and non-heat-producing waste.	

Poland	Limits for the exemption of waste from regulatory control exist.			**Low-level transitional waste:** Waste that will decay within a period of 3 years below the value given in third column of Annex III, with an activity concentration of less than 10^4 × value.	**Intermediate-level transitional waste:** Waste that will decay within a period of 3 years to below the value given in the third column of Annex III, with an activity concentration of between 10^4 x value and 10^7 × value.	**High-level transitional waste:** Waste that will decay within a period of 5 years to below the value given in the third column of Annex III, with an activity concentration of greater than 10^7 × value.
				Low-level short-lived waste: Waste containing radionuclides with a half-life shorter than 30 years, with the average long-lived radionuclide concentration restricted to 400 kBq/kg and the maximum long-lived radionuclide concentration resulting from material inhomogeneity in a representative 1 kg sample restricted to 4 000 kBq, or waste containing only long-lived radionuclides, with the average radionuclide concentration restricted to 400 kBq/kg. Waste with an activity concentration of less than 10^4 × value.	**Intermediate-level short-lived waste:** Waste containing radionuclides with a half-life shorter than 30 years, with the average long-lived radionuclide concentration restricted to 400 kBq/kg and the maximum long-lived radionuclide concentration resulting from material inhomogeneity in a representative 1 kg sample restricted to 4 000 kBq, or waste containing only long-lived radionuclides, with the average radionuclide concentration restricted to 400 kBq/kg Waste with an activity concentration of between 10^4 × value and 10^7 × value.	**High-level short-lived waste:** Waste containing radionuclides with a half-life shorter than 30 years, with the average long-lived radionuclide concentration restricted to 400 kBq/kg and the maximum long-lived radionuclide concentration resulting from material inhomogeneity in a representative 1 kg sample restricted to 4 000 kBq, or waste containing only long-lived radionuclides, with the average radionuclide concentration restricted to 400 kBq/kg Waste with an activity concentration greater than 10^7 × value.
				Low-level long-lived waste: Waste whose average long-lived radionuclide concentration exceeds 400 kBq/kg, and whose activity concentration is less than 10^4 × value.	**Intermediate-level long-lived waste:** Waste whose average long-lived radionuclide concentration exceeds 400 kBq/kg, and whose activity concentration is between 10^4 × value and 10^7 × value.	**High-level long-lived waste:** Waste whose average long-lived radionuclide concentration exceeds 400 kBq/kg, and whose activity concentration is greater than 10^7 × value.
				Low-level spent sealed sources: Activity of the source exceeds a specific value, but is less than 10^8 Bq.	**Intermediate-level spent sealed sources:** Activity is between 10^8 and 10^{12} Bq.	**High-level spent sealed sources:** Activity of the source is greater than 10^{12} Bq.
Portugal	Clearance levels are defined in accordance with Council Directive 2013/59/Euratom.	**Very-short-lived waste:** Waste with a half-life of less than 100 days,	**VLLW:** Waste with activity concentrations slightly above the release limits.	**LLW:** Waste with an activity concentration above the release limit but with only a very limited amount of long-lived radionuclides.	**ILW:** Waste containing radionuclides with long half-lives and with a contact dose rate of greater than 2 mSv/h.	**HLW:** Waste producing a considerable amount of heat (> 2 kW/m³).

		meaning that its activity will decay to clearance level within a few years.				
Romania	**Exempt waste:** Waste containing radionuclides with an activity concentration so small that the waste can be released from regulatory control.	**Very-short-lived waste (transitional radioactive waste):** waste with activity concentrations above clearance levels, but that decays to below clearance levels within a reasonable storage period (not more than 5 years).	**VLLW:** Short-lived waste in which the activity concentrations are above the clearance levels but the radioactive content is below the level established by the National Commission for Nuclear Activities Control for defining LLW.	**Low-level short-lived radioactive waste:** Radioactive waste in which the activity concentrations are above the established levels for the definition of VLLW but the radioactive content and thermal power are below those of HLW. **LLW** does not require shielding during handling or transportation. **Short-lived radioactive waste** has a half-life shorter than 30 years.	**Intermediate-level short-lived radioactive waste:** Radioactive waste in which the activity concentration is above the established levels for the definition of VLLW but the radioactive content and thermal power are below those of HLW. **ILW** generally requires shielding during handling, but needs little or no provision for heat dissipation during handling or transportation. **Short-lived radioactive waste** has a half-life shorter than 30 years.	**HLW:** (a) liquid radioactive waste containing for the most part fission products and actinides existing initially in the spent fuel and forming the residues of the first extraction cycle of reprocessing; (b) the solidified radioactive waste of (a) and the spent fuel; (c) any other radioactive waste with activity concentrations similar to the waste mentioned in (a) and (b).
				Low-level long-lived radioactive waste: Waste containing radionuclides with a half-life shorter than 30 years in quantities and/or activity concentrations above established values for which isolation from the biosphere is necessary for more time than the duration of institutional control.	**Intermediate-level long-lived radioactive waste:** Waste containing radionuclides with a half-life of more than 30 years in quantities and/or activity concentrations above established values for which isolation from the biosphere is necessary for more time than the duration of institutional control.	

Slovakia	The act on basic safety requirements for the protection of health of workers and the population from ionising radiation and the act on the protection, support and development of public health and on changes and amendments to some acts as amended define release limits.	**Very-short-lived waste:** Waste whose activity falls below the limit value for its introduction to the environment during storage.	**VLLW:** Waste whose activity is slightly higher than the limit value for its release into the environment, containing mainly short-lived radionuclides or a low concentration of long-lived radionuclides, and which during storage requires a lower degree of isolation from the environment through a system of engineered barriers, or does not require a system of engineered barriers. The period of institutional control is shorter, as in the case of near-surface-type repositories	**LLW:** Waste in which the average specific activity of long-lived radionuclides, especially radionuclides emitting alpha radiation, is less than 400 Bq/g, with a maximum specific activity of long-lived radionuclides, especially radionuclides emitting alpha radiation locally, less than 4 000 Bq/g, This waste does not produce residual heat, and following conditioning should meet the safe operating limits and conditions to be stored in near-surface-type repositories.	**ILW:** Waste in which the average specific activity of long-lived radionuclides, especially radionuclides emitting alpha radiation, is greater than or equal to 400 Bq/g. The waste may produce residual heat, and fewer measures are required for its removal than in the case of HLW. Following conditioning, it does not reach safe operating limits or meet the conditions for near-surface-type repositories.	**HLW:** Waste in which the average specific activity of long-lived radionuclides, especially radionuclides emitting alpha radiation, exceeds values specified for LILW and requires measures for the removal of residual heat and can be deposited only in a deep geological repository.
Slovenia	Waste can be exempted.	**Very-short-lived waste:** Waste whose activity falls below the release limit during storage in less than 5 years.	**VLLW:** Waste for which the competent regulatory body for nuclear and radiation safety may approve conditional clearance.	**Short-lived LILW:** Waste with insignificant heat generation. Short-lived LILW containing radionuclides with a half-life shorter than 30 years and a specific activity of alpha emitters equal to or lower than 4 000 Bq/g for an individual package but on average not higher than 400 Bq/g in the overall amount of LILW.		**HLW:** Waste that contains radionuclides whose decay generates such an amount of heat that this has to be considered in its management.
		Radioactive waste containing naturally occurring radionuclides: Radionuclides that are produced in the processing of nuclear mineral materials or		**Long-lived LILW:** Waste with insignificant heat generation. Long-lived LILW for which the specific activity of alpha emitters exceeds the limitations for short-lived LILW.		

		other industrial processes and are not sealed sources of radiation.				
Spain	**Exempt waste:** Waste with a sum of partial activity concentrations less than or equal to 1 Bq/g.		**VLLW:** This type of waste is considered a subgroup of LILW and, in general, has radionuclide-specific activities of between 1 Bq/g and 10 Bq/g. Activities may also reach several thousands in the case of some low-radiotoxicity radionuclides or in small amounts of radionuclides.	**LLW:** Includes waste whose activity involves the presence of beta- or gamma-emitting radionuclides with a short to medium half-life (shorter than 30 years) and whose long-lived radionuclide content is very low or limited. Those with short-lived radionuclides can be temporarily stored, processed, conditioned and definitively disposed of at the El Cabril disposal facility in the province of Córdoba.	**Special waste:** This includes nuclear fuel attachments, neutron sources (used in core instrumentation) or components from the reactor vessel system and internal components of the reactor, which are generally metallic and due to their radiological features cannot be managed at the El Cabril disposal facility. Like long-life and high-activity waste, this means that its storage time and definitive disposal is planned in a manner similar to HLW.	**HLW:** This waste contains long-lived alpha-emitting radionuclides, with a half-life exceeding 30 years, in remarkable concentrations, generating heat due to the effects of radioactive decay, as they have high specific activities. Disposal is envisaged in deep geological repositories.
Sweden	**Exempt waste:** Material with such small amounts of radionuclides that it has been released from regulatory control.		**VLLW:** Waste whose activity concentration is less than 300 kBq/kg. Waste containing small amounts of short-lived radionuclides with a half-life shorter than 31 years, with a dose rate for the waste package of less than 0.5 mSv/h. Long-lived radionuclides with a half-life greater than 31 years can be present in restricted quantities.	**Low-level short-lived waste:** Waste containing small amounts of short-lived radionuclides with a half-life shorter than 31 years and for which the dose rate for the waste package (including unshielded waste) of less than 2 mSv/h. Long-lived radionuclides with a half-life greater than 31 years can be present in restricted quantities.	**Intermediate-level short-lived waste:** Waste that contains a significant amount of short-lived radionuclides, with a half-life shorter than 31 years and for which the dose rate for the waste package is less than 500 mSv/h. Long-lived radionuclides with a half-life greater than 31 years can be present in restricted quantities.	**HLW:** Waste with a typical decay heat of greater than 2 kW/m^3 and containing significant amounts of long-lived radionuclides with a half-life greater than 31 years, exceeding the restricted quantities for short-lived waste. This waste requires cooling and radiation shielding during intermediate storage and transport.
				Low- and intermediate-level long-lived waste: Waste containing significant amounts of long-lived radionuclides with a half-life greater than 31 years and exceeding the restricted quantities for short-lived waste.		

ANNEX II: RADIOACTIVE WASTE CLASSIFICATION SCHEMES COMPARISON

LIST OF TABLES

ABBREVIATIONS

EU	European Union
GSG	General Safety Guide
HLW	high-level waste
IAEA	International Atomic Energy Agency
ILW	intermediate-level waste
LILW	low- and intermediate-level waste
LLW	low-level waste
NORM	naturally occurring radioactive materials
NPP	nuclear power plant
VLLW	very-low-level waste

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TASK 1 & TASK 2 RADIOACTIVE WASTE CLASSIFICATION SCHEMES COMPARISON

Table A2.1 Task 1 and Task 2 radioactive waste classification schemes comparison

Member State	Evaluation	Comparison with IAEA GSG-1	Comparison with the European Commission recommendation
Austria	In Austria, the short-lived waste class corresponds to the IAEA GSG-1 LLW class. VLLW is not defined.	**Austria's** scheme closely follows IAEA GSG-1.	The radioactive waste classification system in Austria closely follows the Commission recommendation, except for the additional category of clearable waste – that is, waste that meets the regulatory clearance criteria.
Belgium	Very-short-lived waste and VLLW are not defined in Belgium.	**Belgium's** scheme partly follows IAEA GSG-1.	The radioactive waste classification system in Belgium closely follows the Commission recommendation but uses slightly different terminology and additionally considers two additional waste classes. Conditioned and unconditioned waste are separated out and VLLW and some short-lived waste are included in the category referred to as transition waste in the Commission recommendation. Belgium is additionally considering classifying radium-contaminated waste separately and classifying some NORM waste as radioactive waste.
Bulgaria		**Bulgaria's** scheme exactly follows IAEA GSG-1.	The Bulgarian radioactive waste classification system closely follows the Commission recommendation. Bulgaria's Category 1 waste equates to the transition waste category in the Commission recommendation; however, they further subdivide this category of waste into exempt, very-short-lived and very-low-level waste.
Croatia	LLW and ILW are merged into the category LILW in Croatia; LILW is then further subdivided into short-lived and long-lived waste. LLW is not defined.	**Croatia's** scheme differs from IAEA GSG-1.	The Croatian radioactive waste classification system differs from that set out in the Commission recommendation. In addition to having an exempt category, Croatia's system has a very-short-lived waste category and the LLW/ILW waste categories are split into short- and long-lived waste.
Cyprus	Though only a small volume of waste exists and not all waste classes are needed, Cyprus	**Cyprus'** scheme exactly follows IAEA GSG-1.	Cyprus only produces very small quantities of radioactive waste, which are safely stored until their radioactivity levels allow them to be released from regulatory control.

	formally classifies its waste using the IAEA's waste classification system.		Its waste classification system therefore differs from the Commission recommendation for waste classification.
Czechia		**Czechia's** scheme exactly follows IAEA GSG-1.	In Czechia, radioactive waste classification differs from that set out in the Commission recommendation. Radioactive waste is classified according to the planned disposal route and Czechia completely separates out VLLW, LLW and ILW. The LLW and ILW waste categories are not split into short- and long-lived waste. The temporary radioactive waste category essentially equates to the transition waste category in the Commission recommendation.
Denmark		**Denmark's** scheme exactly follows IAEA GSG-1.	Denmark partly follows the Commission recommendation in its classification of radioactive waste. The Danish waste classification system is based on the origin of the waste and the planned storage route, with most waste being classified as LILW. The VLLW category is also sometimes used when specific approval has been granted by the regulatory authorities. Exemptions may also be made on a case-by-case basis by the nuclear authority. Radioactive materials, including NORM, with no foreseen use are considered radioactive waste. Long- and short-lived waste is defined in a similar manner to that set out in the Commission recommendation.
Estonia	The definition of Estonia's low- and intermediate-level short-lived waste corresponds to VLLW in IAEA GSG-1. LLW and ILW are combined in Estonia into the LILW category.	**Estonia's** scheme differs from IAEA GSG-1.	Estonia closely follows the Commission recommendation in its classification of radioactive waste. Like the Commission recommendation, it classifies both short-lived and long-lived LLW and ILW and, separately, HLW. Estonia has a waste category entitled 'cleared waste', which essentially equates to the category referred to as transition waste in the Commission recommendation, but also separately classifies short-lived waste. NORM waste generated as a result of processing raw materials with naturally occurring radionuclides (Th-232 and U-238 and radionuclides that belong to their decay chain), where their specific activity is higher than the clearance levels specified in the radiation act, is also specifically classified.
Finland	Due to the separation of waste into short-lived and long-lived waste, the transposition of IAEA GSG-1 into Finnish waste classes is not fully possible.	**Finland's** scheme closely follows IAEA GSG-1.	The Finnish radioactive waste classification scheme partly follows the Commission recommendation. It is based either on predisposal management or on disposal requirements. The classification system for predisposal is subdivided into VLLW,

			LLW, ILW and spent fuel, while the classification system for disposal splits the waste into short- and long-lived waste.
France	There are no exemptions from control zones in nuclear installations in France. And even though very-short-lived waste is reported as a waste class, it does not apply to radioactive waste from nuclear installations. The distinction between short-lived waste and long-lived waste, with the simultaneous combination of short-lived LLW and short-lived ILW into a LILW class, does not allow the direct transposition of the French waste classes into IAEA GSG-1. In addition, NORM waste is only designated as such if it is below the limits for regulating radioactive materials. This is a different definition from that in IAEA GSG-1.	**France's** scheme differs from IAEA GSG-1.	The French radioactive waste classification scheme partly follows the Commission recommendation. The French classification system splits LLW/ILW into three areas defined by lifetime, namely long-lived ILW, long-lived LLW and short-lived LLW/ILW. Three other classification areas – namely exempt waste, very-short-lived waste and VLLW – essentially equate to the category referred to as transition waste in the Commission recommendation.
Germany	Since all waste is to be disposed of in deep geological formations in Germany, the further subdivision of LILW makes no sense. This results in an overlap in the HLW and ILW categories.	**Germany's** scheme differs from IAEA GSG-1.	The German radioactive waste classification scheme differs from that in the Commission recommendation. Waste classification is based on its heat-generating capability from a disposal viewpoint. Three categories are established, namely exempt waste, radioactive waste with negligible heat generation and heat-generating radioactive waste. Waste with negligible heat generation essentially corresponds to the categories of low- and intermediate-level radioactive waste. Heat-generating waste corresponds to high-level radioactive waste and some intermediate-level radioactive waste.
Greece	Though only a small volume of waste exists and not all waste classes are needed, Greece formally classifies its waste using the IAEA waste classification system.	**Greece's** scheme exactly follows IAEA GSG-1.	The radioactive waste classification scheme in Greece differs from the Commission recommendation. Greece's scheme has the categories very-short-lived waste, VLLW,LLW and ILW. Very short-lived waste is described as waste with a half-life less than 100 days. VLLW contains isotopes with less than a 30-year half-life, while LLW contains isotopes with a greater than 30-year half-life. A very small amount of waste

			may be classified as ILW due to the dismantling of the GRR-1 research reactor and NORM waste generally goes to landfill sites.
Hungary	The distinction between short-lived waste and long-lived waste, with the simultaneous combination of short-lived LLW and ILW into a short-lived LILW class does not allow the direct transposition of the Hungarian waste classes into IAEA GSG-1.	**Hungary's** scheme differs from IAEA GSG-1.	The Hungarian radioactive waste classification scheme closely follows the Commission recommendation. It essentially revolves around the level of heat production during storage and/or disposal. Radioactive waste is classed as LLW or ILW where the heat production is negligible, and these two waste categories are further divided into short-lived (half-life less than 30 years) or long-lived waste. LLW and ILW are also refined further based on the activity concentration and exemption activity concentration. Waste is identified as HLW if heat production exceeds 2 kW/m^3. Transition waste is not considered.
Ireland	Due to the very limited inventory of radioactive waste in Ireland, waste classes are defined by origin rather than by activity.	**Ireland's** scheme differs from IAEA GSG-1.	The radioactive waste classification scheme in Ireland differs from the Commission recommendation. Ireland has no nuclear fuel cycle facilities; however, it does regulate all practices involving sources of ionising radiation, including the transport of radioactive materials, and occupational exposure to natural sources. Radioactive waste is classified simply by half-life (> 10 years) and by sector (medical, industrial, education and state) and then according to whether it is a sealed or unsealed source.
Italy	Waste classes principally directly follow IAEA GSG-1, but some additional definitions apply. Hence, the waste classifications schemes of Italy and IAEA GSG-1 are – strictly speaking – not identical.	**Italy's** scheme closely follows IAEA GSG-1.	The Italian radioactive waste classification closely follows the Commission recommendation. In line with a number of EU Member States, it is specifically based on storage and waste disposal requirements. The scheme has categories of very-short-lived waste and VLLW, which can be cleared within 5 and 10 years, respectively. LLW and ILW can be split into long-lived and short-lived waste but based on activity concentration rather than half-life. HLW consists of waste that produces heat and/or contains high concentrations of long-lived isotopes.
Latvia	Waste classes in Latvia strictly consider the handling and disposal rules at the RADON site, and are hence not directly comparable to IAEA GSG-1.	**Latvia's** scheme differs from IAEA GSG-1.	The radioactive waste classification scheme in Latvia partly follows the Commission recommendation. Waste is placed into two categories according to its planned management route. LLW is disposed of at the RADONS facility, while ILW is managed through long-term storage at the same facility. All spent fuel from the research reactor was sent to Russia in 2008, so no HLW or spent fuel remain in the country.

Lithuania	Due to the separation of waste into short-lived and long-lived waste, the transposition of IAEA GSG-1into Lithuanian waste classes is not fully possible. Furthermore, sealed sources form a separate waste class containing waste across Classes A to E. Due to the discrete nature of sealed sources, the assignment of single sealed sources to IAEA GSG-1 categories is possible.	**Lithuania's** scheme partly follows IAEA GSG-1.	The radioactive waste classification scheme in Lithuania closely follows the Commission recommendation, and waste is classified according to the principle of disposal and its radiological characteristics. Solid radioactive waste is split into six categories. The first category is short-lived LLW and ILW, which is split into the subcategories VLLW, LLW and ILW. The second category is long-lived LILW, which is split into the subcategories LLW and ILW. The third category is HLW. Within the first two categories, the subcategories are split according to their surface dose rate. Sealed sources are classified separately.
Luxembourg	In Luxembourg, a simplified classification with regard to physical and chemical properties as well as origin applies. All waste can be assigned to the LLW category.	**Luxembourg's** scheme differs from IAEA GSG-1.	The radioactive waste classification scheme in Luxembourg differs from the Commission recommendation. While Luxembourg has no NPP or other major facilities generating radioactive substances, it does use radioactive sources in industry, medicine and, to a small extent, education and research. Radioactive waste is classified according to the Belgian classification system, by the half-life of the corresponding radionuclides and whether the disused sources are sealed or unsealed.
Malta	Malta has a limited number of disused sources in storage located at various sites. Malta has no formalised classification for radioactive waste.	**Malta's** scheme differs from IAEA GSG-1.	Malta's radioactive waste classification scheme differs from that in the Commission recommendation because there is no formal classification system. Radioactive sources are purely for medical and industrial use. These sources are disused sealed sources, nuclear medicine unsealed sources, uranium and thorium salts, and Am-241 lightning arrestors.
Netherlands	Due to the combination of waste classes, the straightforward transposition of Netherland's classes into IAEA GSG-1 is not possible.	**The Netherlands'** scheme differs from IAEA GSG-1.	The radioactive waste classification scheme in the Netherlands differs from the Commission recommendation. The four high-level categories are based on the activity and half-life of the waste and include exempt waste, very-short-lived waste, LILW and HLW. The LILW category includes NORM and depleted uranium. The HLW category is split into heat-generating waste and non-heat-generating waste.
Poland	The very consistent division of waste classes into low-, intermediate- and high-level waste on the one hand and transitional, short-lived and long-lived waste, and spent sealed sources on	**Poland's** scheme differs from IAEA GSG-1.	The radioactive waste classification scheme in Poland partly follows the Commission recommendation. Radioactive waste is split into three categories (LLW, ILW and HLW), and these categories are further divided into subcategories according to the half-lives and the concentration of the radioactive isotopes contained in the waste.

	the other hand, with radionuclide-specific limits, facilitates the assignment of waste to the classes in Poland, but prevents their assignment to IAEA GSG-1. The same is true for the transposition of IAEA GSG-1 into Polish classes.		Spent nuclear fuel intended for disposal is classified as HLW. Disused sealed radioactive sources form an additional radioactive waste category and depending on the level of activity are assigned to low-activity, medium-activity or high-activity sealed source subcategories, further subdivided into short-lived and long-lived waste depending on the rate of decay of the isotopes that they contain.
Portugal		**Portugal's** scheme exactly follows IAEA GSG-1.	The radioactive waste classification scheme in Portugal partly follows the Commission recommendation. Portugal's classification system includes VLLW, LLW and ILW and is essentially based on disposal requirements. Each of the three categories are split depending on the half-lives of radionuclides in the waste, separating those with a very short half-life of fewer than 100 days, a short half-life of fewer than 31 years and a long half-life of more than 31 years.
Romania	Due to the separation of waste into short-lived and long-lived waste, the transposition of IAEA GSG-1 into Romanian waste classes is not fully possible.	**Romania's** scheme closely follows IAEA GSG-1.	The radioactive waste classification scheme in Romania closely follows the Commission recommendation. The Romanian classification scheme refers to the disposal requirements for assuring waste isolation from the biosphere. It has separate categories for excluded waste, transitional waste and VLLW, but its definition of transitional waste is waste with activity concentrations above clearance levels. LLW and ILW are split into short-lived and long-lived radionuclides, the latter with a half-life of over 30 years. HLW is essentially split into liquid waste or solidified waste and spent fuel.
Slovakia		**Slovakia's** scheme exactly follows IAEA GSG-1.	The radioactive waste classification system in Slovakia partly follows the Commission recommendation, but has an additional category for VLLW. It splits LLW and ILW into subcategories of short- and long-lived waste. Like some other Member States, the system is based around Slovakia's waste disposal objectives.
Slovenia	LLW and ILW in Slovenia are combined as LILW, but LILW is then separated into short-lived waste and long-lived waste.	**Slovenia's** scheme differs from IAEA GSG-1.	Slovenia's radioactive waste classification system closely follows that of the Commission recommendation in that it splits LILW into two separate categories, namely short-lived waste and long-lived waste. HLW and transition waste are also classified in the same manner as that seen in the Commission recommendation. The primary differentiator is that Slovenia has a separate category for VLLW, where the

			regulator may approve conditional clearance of this waste category. Slovenia also separately classifies NORM waste.
Spain	Waste classification in Spain has a similar structure to IAEA GSG-1. But the names and definitions of waste classes (with the same names) are different.	**Spain's** scheme closely follows IAEA GSG-1.	Spain's radioactive waste classification system partly follows that of the Commission recommendation and is based on Spain's storage and disposal arrangements (i.e. volume, radiological inventory and specific activity concentration limits). The classification system has a category for exempt waste, which can be released from regulatory control, and a VLLW category, which is a subcategory of its LLW/ILW category. HLW comprises long-lived alpha emitters and heat-generating waste. A further category, special radioactive waste (including fuel attachments, neutron sources, reactor components, etc.), cannot be received at El Cabril and is therefore managed in a similar manner to HLW.
Sweden	The waste classification scheme in Sweden is developed purely on the basis of existing disposal routes. In particular, long-lived LLW and long-lived ILW are combined into the low- and intermediate-level long-lived waste category.	**Sweden's** scheme differs from IAEA GSG-1.	The radioactive waste classification scheme in Sweden partly follows the Commission recommendation. The system Sweden applies is in line with its existing and planned waste disposal routes. Sweden has a category of cleared material that is similar to the transition waste category set out in the Commission recommendation. However, it has separate categories for very-low-level waste, low-level short-lived waste, intermediate-level short-lived waste and low- and intermediate-level long-lived waste and a HLW category.

ANNEX III: PUBLIC AWARENESS SURVEY – DETAILED RESULTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS

EU	European Union
NORM	naturally occurring radioactive material

1. GENERAL INFORMATION

This section presents the sample information from and characteristic distributions employed in the survey conducted in Task 4 of this project and defines the classification of Member States by nuclear power programmes that were referenced as a pre-assessment category in the final report's high-level analysis.

The aggregate results for Task 4 per Member State with regard to each question are presented in Section 2 and the individual Member States' complete sets of results can be found in Section 3.

1.1. Survey sample information

The number of responses per Member State can be seen in Table A3.1. The full extent of the survey methodology is described in Section 7 of the final report. In essence, once the initial design, approval and translation of the survey had been completed, the survey was deployed by Kantar (the specialised subcontractor selected to conduct the survey), and the results were subsequently analysed by the project team.

Table A3. 1 Number of surveys completed by the EU Member States

Member State	Number of survey responses
Belgium	1 000
Bulgaria	1 000
Czechia	1 000
Denmark	1 000
Germany	1 000
Estonia	1 000
Ireland	500
Greece	1 000
Spain	1 000
France	1 000
Croatia	1 000
Italy	1 000
Cyprus	300
Latvia	1 000
Lithuania	1 000
Luxemburg	500
Hungary	1 000

Malta	200
Netherlands	1 000
Austria	1 000
Poland	1 000
Portugal	1 000
Romania	1 000
Slovenia	1 000
Slovakia	1 000
Finland	1 000
Sweden	1 000

A summary of the survey sample can be seen in Figure 1. The survey was conducted on a nationally representative sample, with the aim of gauging the views of the European public, ensuring an appropriate degree of diversity of backgrounds. Full details are given in Section 7 of the final report.

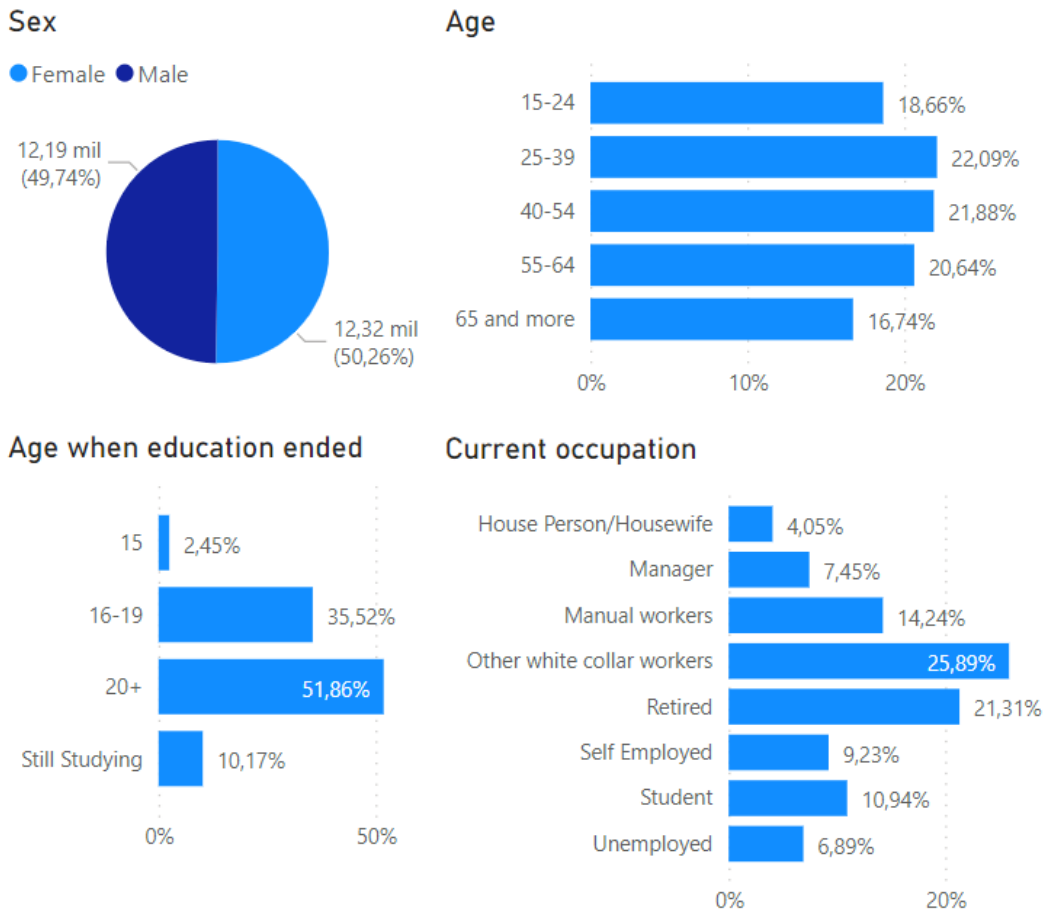

Figure 1. Summary of survey sample for the total number of participants

1.2. Classification of Member States by nuclear power programme

In the high-level analysis, an analytical split was incorporated between the groups of Member States with and without current or former nuclear power programmes. These groups were referred to throughout the analysis and are detailed in Table A3.2.

Table A3. 2 List of Member States with and without current or former nuclear power programmes

Member States with a current or former nuclear power programme (16)	Member States without a current or former nuclear power programme (11)
Belgium (*)	Denmark
Bulgaria	Estonia
Czechia	Ireland
Germany (*)	Greece
Spain (*)	Cyprus
France	Latvia
Croatia	Luxembourg
Italy (**)	Malta
Lithuania (**)	Austria
Hungary	Poland (***)
Netherlands	Portugal
Romania	
Slovenia	
Slovakia	
Finland	
Sweden	

(*) Belgium, Germany and Spain are currently phasing out their nuclear power plants.

(**) Italy and Lithuania phased out the last of their nuclear power plants in 1991 and 2009, respectively.

(***) Poland recently committed to nuclear power generation and expects to start this around 2033.

2. EU MEMBER STATES' AGGREGATE RESULTS

The responses to the 22 survey questions of the survey carried out in Task 4, with regard to the EU27 overall and sorted for each Member State, can be found in this section. As stated in the final report, it was found that, in general, the demographics did not vary significantly with regard to the different categories defined; therefore, more often than not the same trend was observed as for the overall trend that was detailed in the high-level analysis. The most pertinent points are noted in Section 7 of the final report, and a complete analysis of those statements can be found alongside the relevant questions below.

Q1. Is your country one of those in the EU which produces radioactive waste?

Table A3. 3 Responses to Q1 for each EU Member State

Member State	Yes, I believe it produces radioactive waste (%)	No, I don't believe it produces radioactive waste (%)	I don't know either way (%)
France	85.10	5.20	9.70
Hungary	82.30	8.80	8.90
Slovenia	81.10	11.00	7.90
Czechia	77.80	11.30	10.90
Belgium	77.30	9.30	13.40
Germany	77.12	10.29	12.59
Finland	74.80	14.40	10.80
Sweden	70.63	15.38	13.99
Slovakia	69.93	17.08	12.99
Netherlands	69.30	10.50	20.20
Bulgaria	63.90	17.30	18.80
Spain	68.50	18.30	13.20
Romania	59.20	30.20	10.60
Croatia	55.80	33.10	11.10
Italy	51.25	35.79	12.96
Greece	38.80	48.70	12.50
Cyprus	36.33	48.00	15.67
Denmark	33.80	52.70	13.50
Poland	33.50	43.50	23.00
Luxembourg	31.67	56.57	11.75
Austria	29.40	59.20	11.40

Portugal	29.10	56.10	14.80
Latvia	28.10	44.50	27.40
Estonia	27.47	54.75	17.78
Lithuania	27.07	58.94	13.99
Malta	21.89	62.19	15.92
Ireland	21.80	52.00	26.20

Age

The same pattern of responses was found across all of the age ranges. However, an observation worth noting is that the older the respondents are the more likely they are to be aware that their Member State produces radioactive waste.

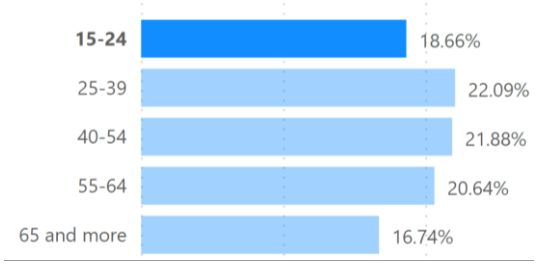

Figure 2. EU27 15–24 age category

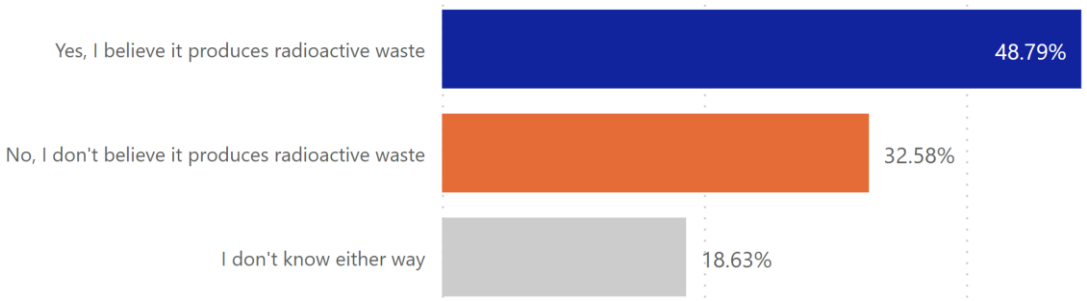

Figure 3. Q1 responses for the 15–24 age category

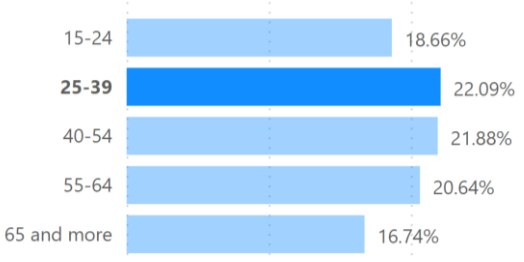

Figure 4. EU27 25–39 age category

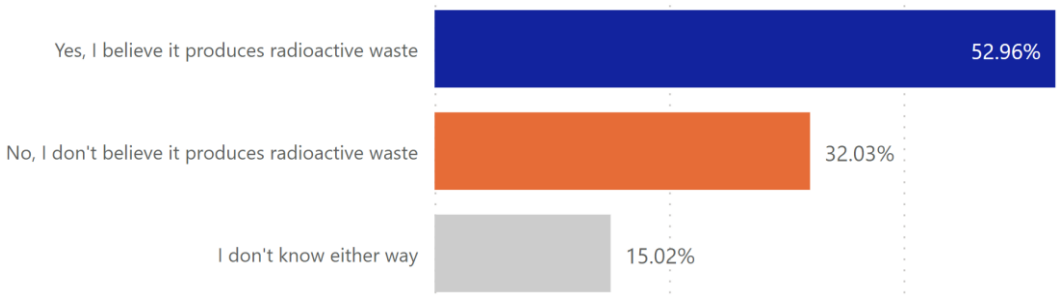

Figure 5. Q1 responses for the 25–39 age category

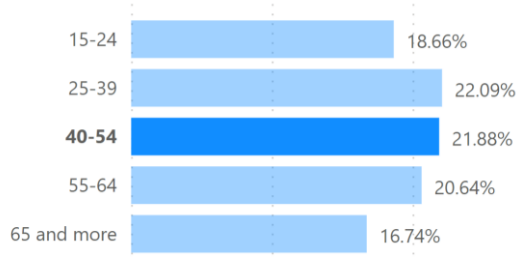

Figure 6. EU27 40–54 age category

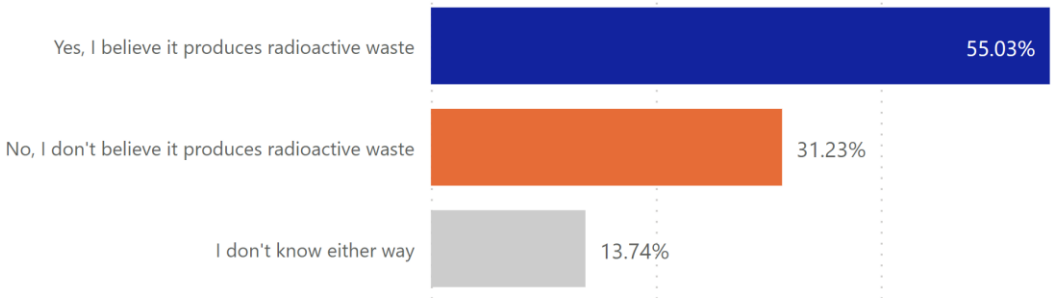

Figure 7. Q1 responses for the 40–54 age category

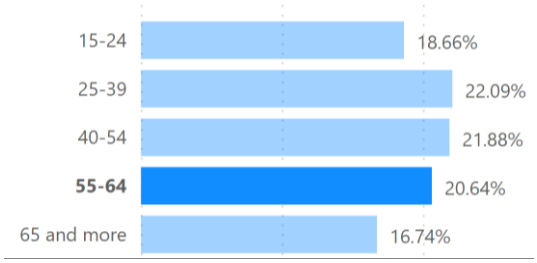

Figure 8. EU27 55–64 age category

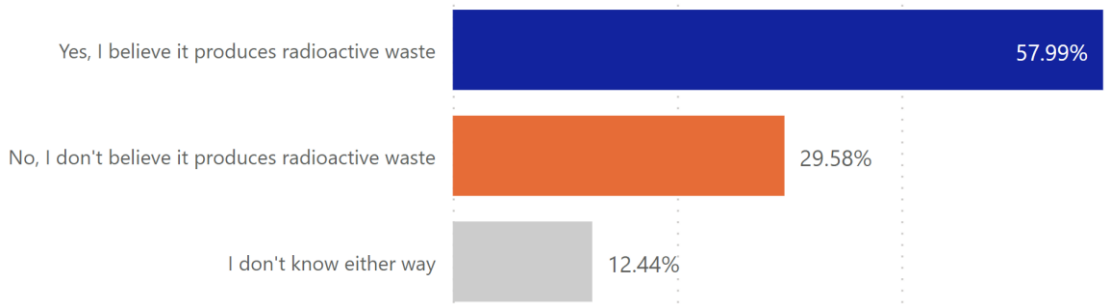

Figure 9. Q1 responses for the 55–64 age category

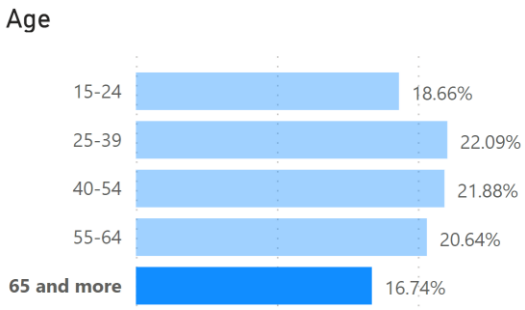

Figure 10. EU27 65 + age category

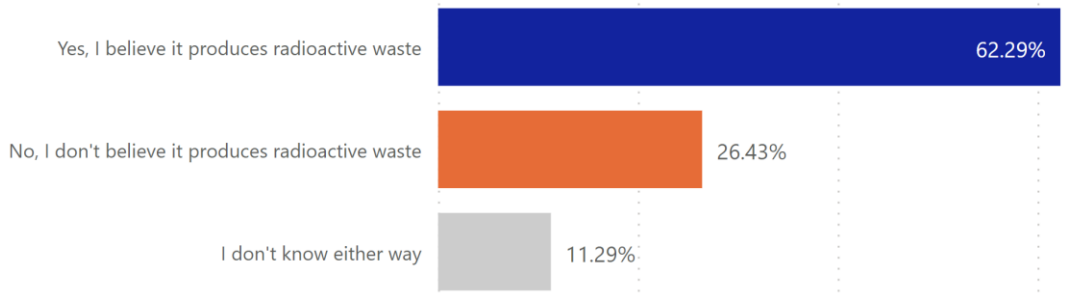

Figure 11. Q1 responses for the 65 + age category

Current occupation

The same pattern of responses was broadly observed irrespective of the respondents' current occupation. However, some differences in perspective were found.

- Those in the retired category selected the response 'Yes, I believe it produces radioactive waste' the most, more by 13 percentage points than those in the student category, who selected it the least.
- Those in the manager category selected the response 'No, I don't believe it produces radioactive waste' the most, more by 9 percentage points than those in the houseperson category, who selected it the least.

- Those in the houseperson category selected the response ‘I don’t know either way’ the most, more by 16 percentage points than those in the manager category, who selected it the least.

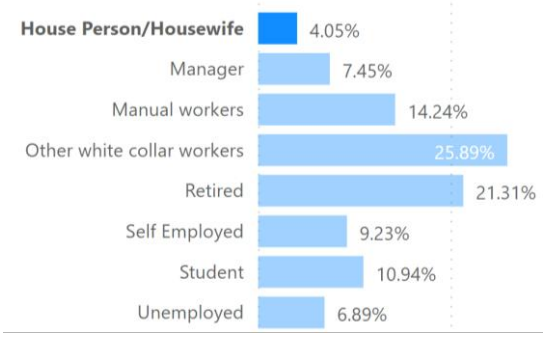

Figure 12. EU27 houseperson category

Figure 13. Q1 responses for the houseperson demographic

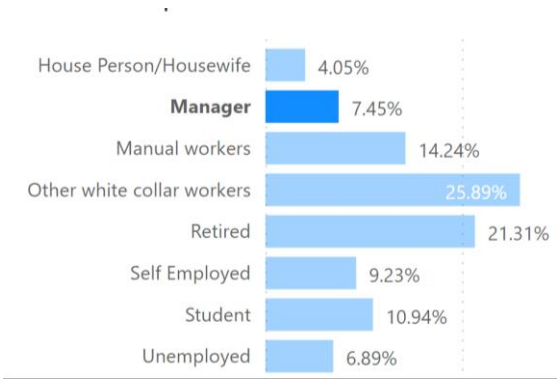

Figure 14. EU27 manager category

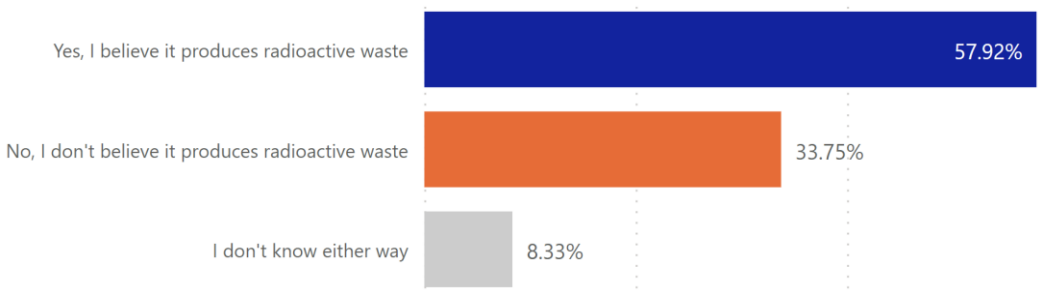

Figure 15. Q1 responses for the manager demographic

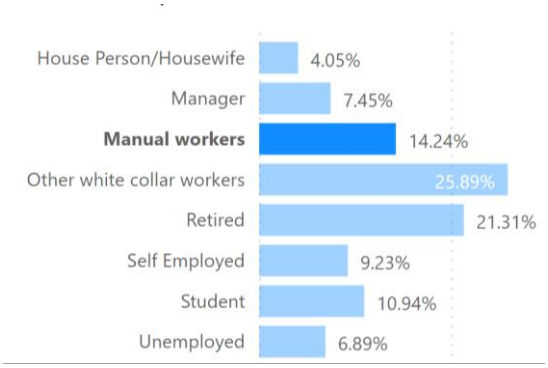

Figure 16. EU27 manual worker category

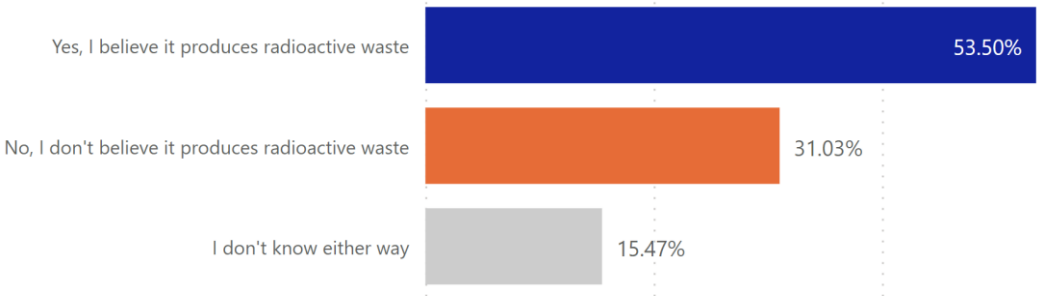

Figure 17. Q1 responses for the manager demographic

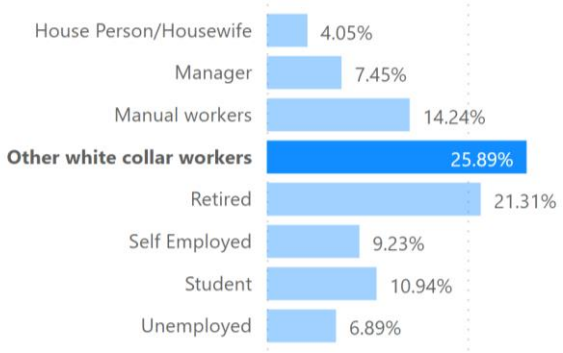

Figure 18. EU27 other white-collar worker category

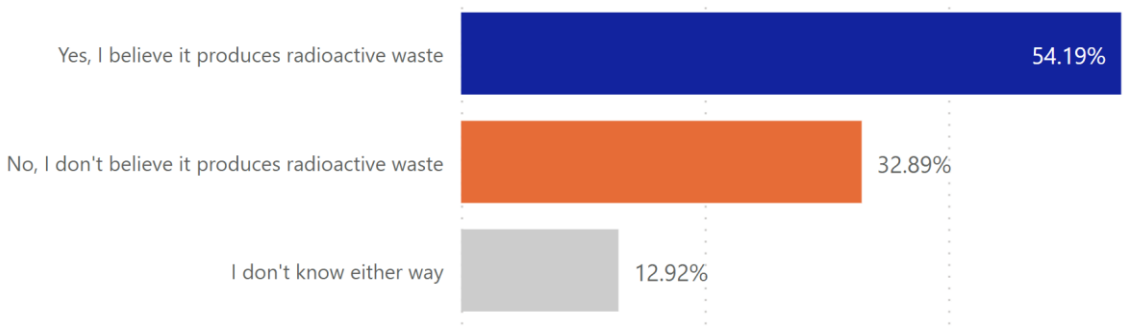

Figure 19. Q1 responses for the other white-collar worker demographic

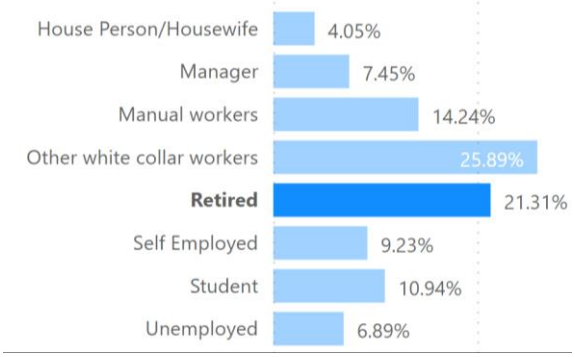

Figure 20. EU27 retired category

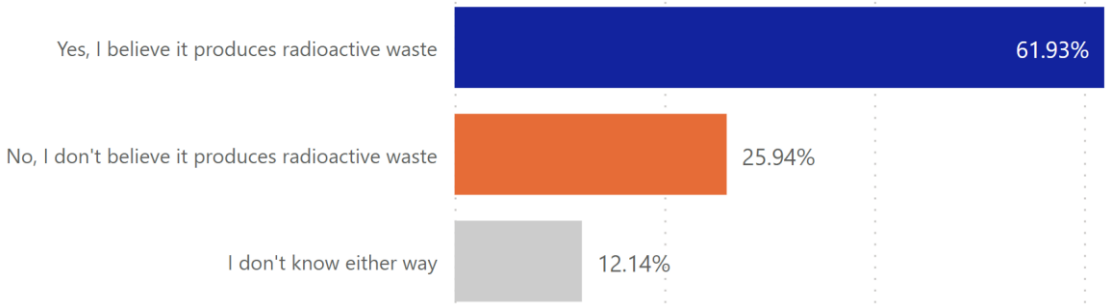

Figure 21. Q1 responses for the retired demographic

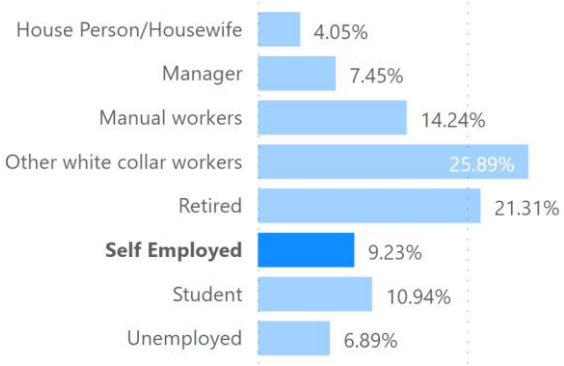

Figure 22. EU27 self-employed category

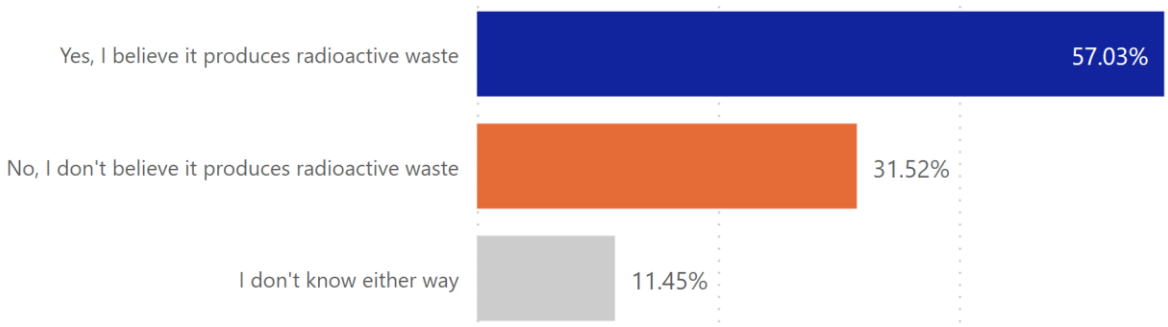

Figure 23. Q1 responses for the self-employed demographic

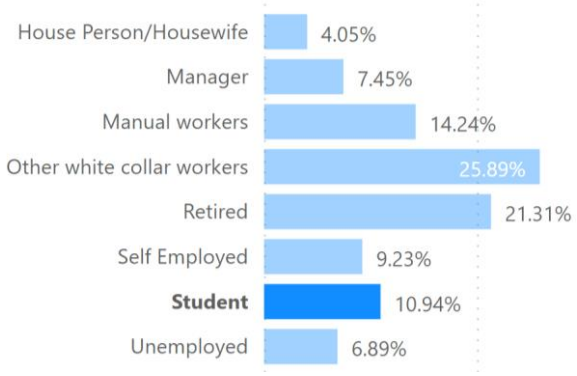

Figure 24. EU27 student category

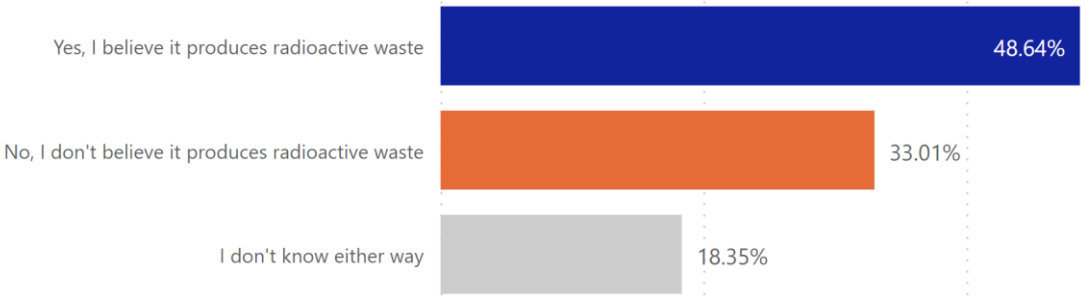

Figure 25. Q1 responses for the student demographic

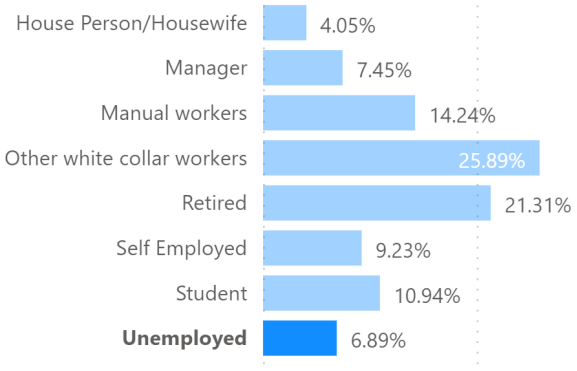

Figure 26. EU27 unemployed category

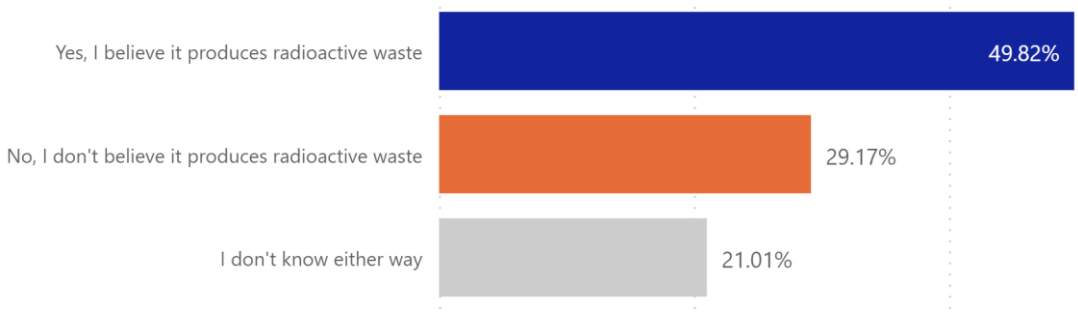

Figure 27. Q1 responses for the unemployed demographic

Q2. Radioactive waste can result from the activities of a range of industries, especially the nuclear industry. Do you understand the different types and origins of radioactive waste?

Table A3. 4 Responses to Q2 for each EU Member State

Member State	Yes, completely (%)	Yes, to some degree (%)	No, not at all (%)
Luxembourg	12.75	71.12	16.14
Slovakia	10.19	66.93	22.88
Poland	28.40	63.30	8.30
Croatia	27.20	64.00	8.80
Finland	31.40	61.60	7.00
Sweden	26.07	61.84	12.09
Italy	17.45	61.22	21.34
Germany	10.79	60.84	28.37
Hungary	9.30	60.80	29.90
Latvia	4.20	60.60	35.20
Austria	7.50	60.30	32.20
Portugal	9.50	60.10	30.40
Lithuania	17.78	59.64	22.58
Estonia	5.00	59.24	35.76
Slovenia	34.70	59.00	6.30
Spain	32.90	58.70	8.40
Netherlands	19.60	57.70	22.70
Greece	36.40	58.50	5.10
Romania	34.70	57.30	8.00
Malta	25.37	55.72	18.91
Bulgaria	31.40	54.80	13.80
Ireland	16.40	54.60	29.00
Czechia	16.80	54.30	28.90
Belgium	22.90	53.50	23.60
France	22.10	52.20	25.70
Cyprus	41.00	48.00	11.00
Denmark	11.70	43.60	44.70

Sex

Both male and female respondents mostly feel that they understand the different types and origins of radioactive waste to some degree. However, differences in perspective include:

- more females than males (by 14 percentage points) selected the response 'No, not at all'.
- more males than females (by 11 percentage points) selected the response 'Yes completely'.

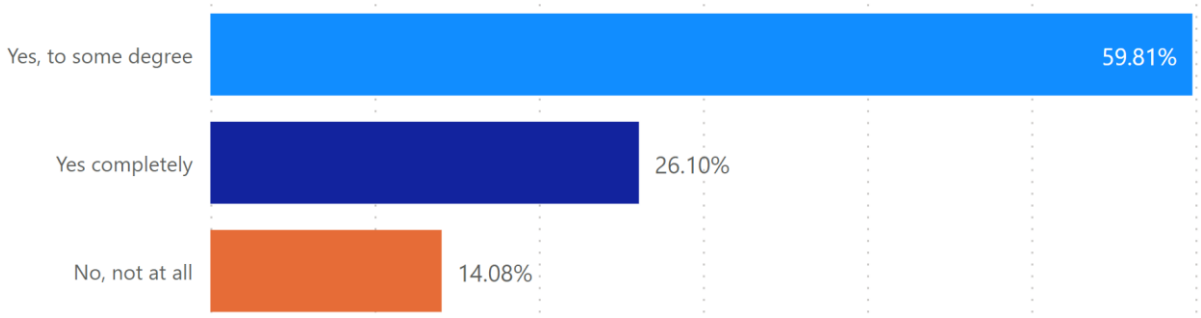

Figure 28. Q2 responses for the male demographic

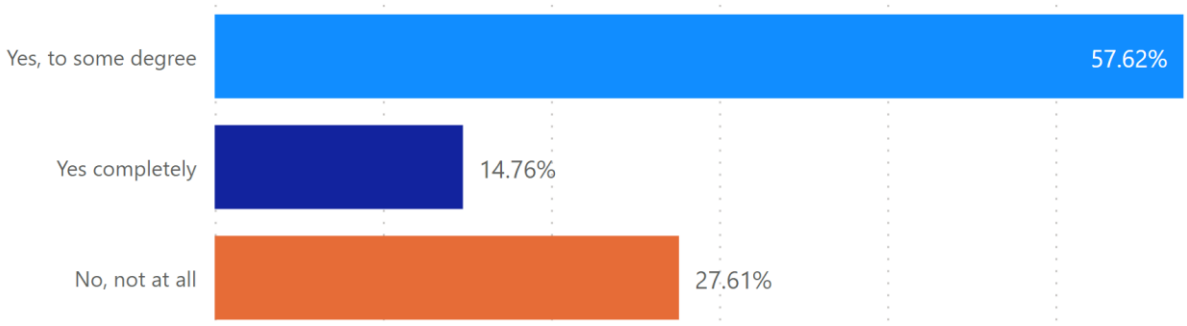

Figure 29. Q2 responses for the female demographic

Age when education ended

The majority of respondents, irrespective of their age when their education ended, understand that there are different types and origins of radioactive waste. And observations to note are as follows.

- The percentage of respondents who were found to understand that there are different types of radioactive waste increases in direct proportion to their age when their education ended.
- The respondents who were still studying were the most aware that there are different types of radioactive waste.

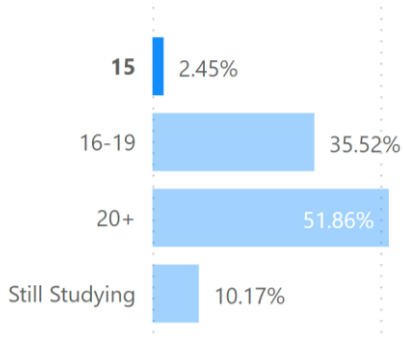

Figure 30. EU27 age of 15 when education ended category

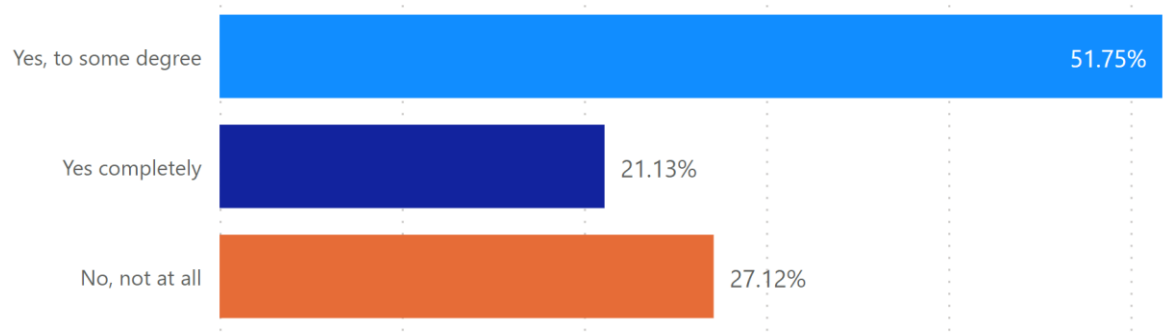

Figure 31. Q2 responses for the age of 15 when education ended demographic

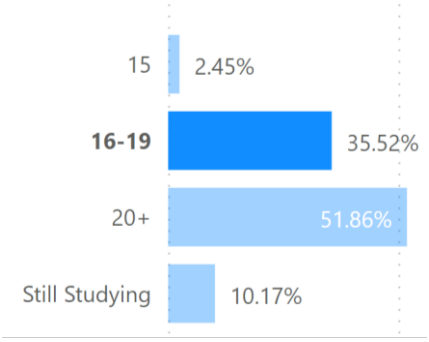

Figure 32. EU27 age of 16–19 when education ended category

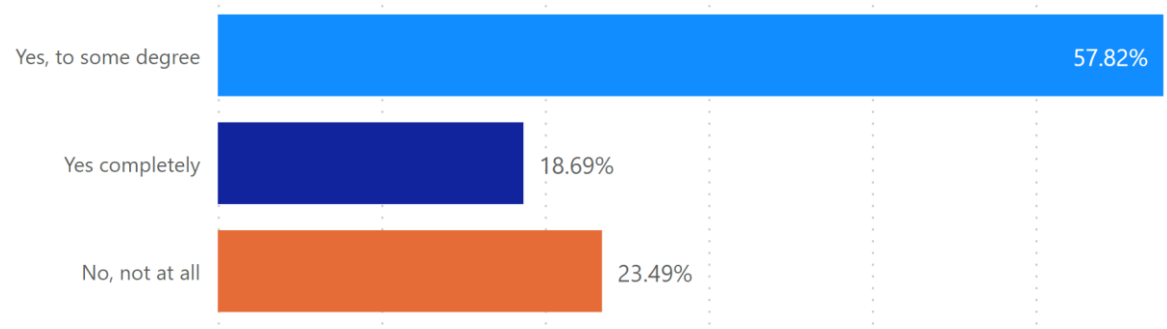

Figure 33. Q2 responses for the age of 16–19 when education ended demographic

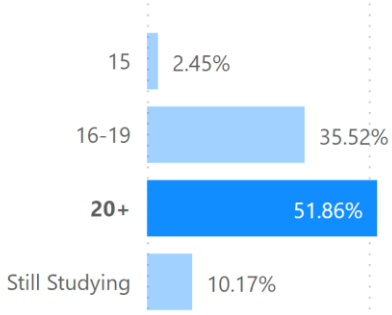

Figure 34. EU27 age of 20 + when education ended category

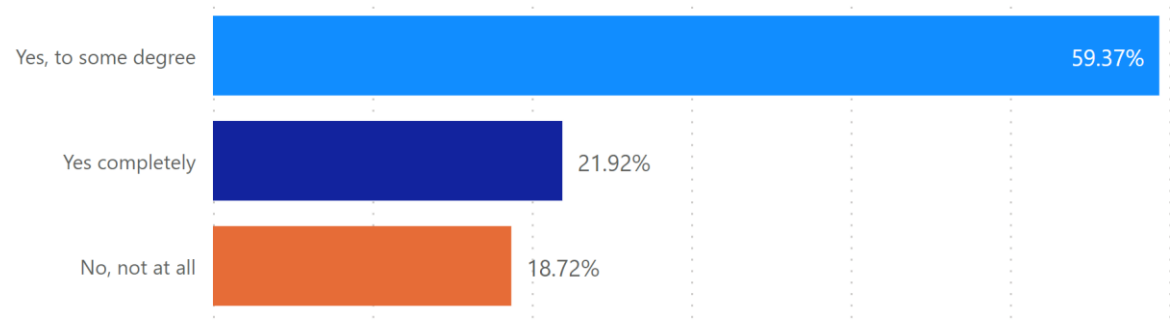

Figure 35. Q2 responses for the age of 20 + when education ended demographic

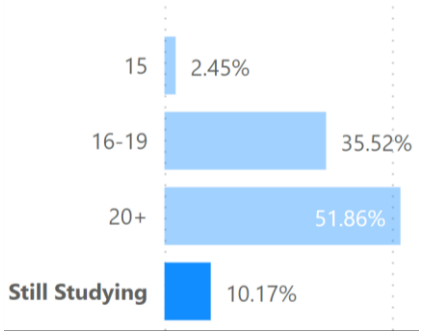

Figure 36. EU27 still studying category

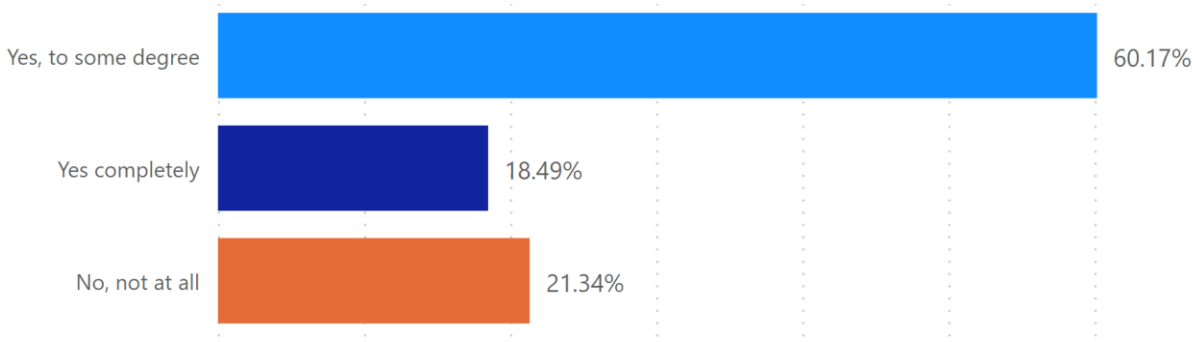

Figure 37. Q2 responses for the still studying demographic

Q3. Please assess the following statement: there are several categories of radioactive waste, for example low-, intermediate- and high-level waste.

Table A3. 5 Responses to Q3 for each EU Member State

Member State	True (%)	I am aware of differences, but I don't understand them (%)	Don't know
Romania	66.90	28.70	4.40
Luxembourg	64.34	25.70	9.96
Greece	61.10	26.90	12.00
Sweden	64.04	19.38	16.58
Croatia	58.80	37.70	3.50
Spain	56.50	33.50	10.00
France	58.20	32.70	9.10
Slovenia	56.40	39.20	4.40
Germany	54.65	31.47	13.89
Austria	53.90	32.30	13.80
Cyprus	53.67	27.00	19.33
Estonia	52.65	31.57	15.78
Portugal	52.30	28.30	19.40
Hungary	52.10	32.90	15.00
Italy	51.05	39.68	9.27
Lithuania	49.65	38.06	12.29
Bulgaria	49.60	38.50	11.90
Belgium	48.20	37.00	14.80
Czechia	47.30	39.80	12.90
Denmark	47.30	33.30	19.40
Poland	46.70	44.60	8.70
Finland	46.60	38.50	14.90
Netherlands	43.80	40.30	15.90
Malta	41.29	42.29	16.42
Ireland	37.20	47.00	15.80
Slovakia	32.97	53.95	13.09
Latvia	27.60	59.70	12.70

Comparison of question 3 responses with Eurobarometer responses

When respondents were asked about their understanding that there are different types of radioactive waste, the overall feedback was relatively similar between the two surveys. It should be noted, however, that the question was phrased slightly differently. In the 2022 survey, a higher percentage of respondents stated they were aware of the differences but did not necessarily understand them and fewer respondents than in 2008 (– 9 percentage points) stated that they did not know if the statement was true.

Figure 38. Responses to Q3 in the 2008 Eurobarometer

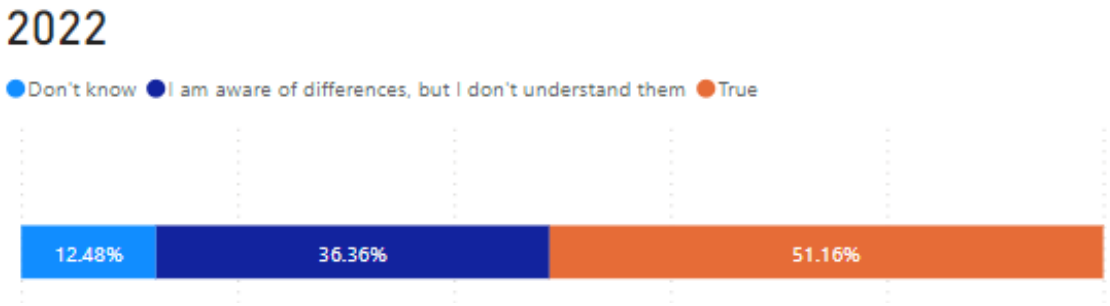

Figure 39. Responses to Q3 in the 2022 survey of the EU27

Q4. Please assess the following statement: some non-nuclear industries produce radioactive waste.

Table A3. 6 Responses to Q4 for each EU Member State

Member State	Yes (%)	No (%)	Don't know (%)
Croatia	82.00	5.00	13.00
Romania	66.00	8.70	25.30
Slovenia	65.90	8.30	25.80
Spain	64.40	9.20	26.40
Estonia	61.84	6.09	32.07
Latvia	63.00	5.80	31.20
Poland	60.80	7.70	31.50
France	59.40	8.20	32.40
Italy	59.42	10.47	30.11
Greece	58.60	10.60	30.80
Finland	57.60	9.10	33.30
Austria	57.00	8.20	34.80
Czechia	57.00	9.20	33.80
Malta	56.72	7.96	35.32
Portugal	56.60	8.80	34.60
Bulgaria	56.10	11.30	32.60
Hungary	55.60	11.40	33.00
Cyprus	54.33	11.33	34.33
Ireland	53.20	8.60	38.20
Luxembourg	52.79	10.56	36.65
Germany	51.25	10.99	37.76
Lithuania	48.35	11.29	40.36
Belgium	48.30	14.90	36.80
Netherlands	46.30	11.30	42.40
Slovakia	46.15	14.39	39.46
Sweden	45.15	11.49	43.36
Denmark	44.40	12.00	43.60

Comparison of question 4 responses with Eurobarometer responses

When respondents were asked if they knew that non-nuclear industries produced radioactive waste, the overall feedback was relatively similar between the two surveys.

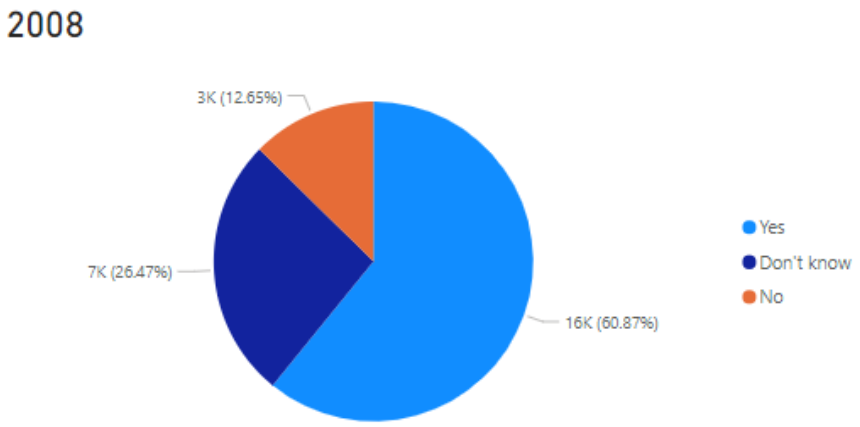

Figure 40. Responses to Q4 in the 2008 Eurobarometer

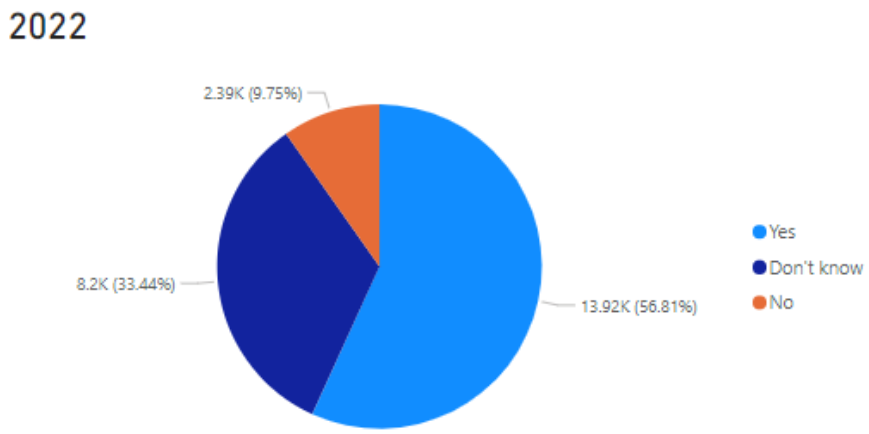

Figure 41. Responses to Q4 in the 2022 survey of the EU27

Current occupation

Responses from the majority of respondents, irrespective of their current occupation, were found to follow the same overall pattern. However, some differences in perspective were observed.

- The manager category selected 'yes' the most, with 67 % responding in this way; this exceeds the lowest percentage, observed for the houseperson category, by 21 percentage points.
- The houseperson category selected 'don't know' the most, with 44 % responding in this way; this exceeds the lowest percentage, observed for the manager category, by 21 percentage points.

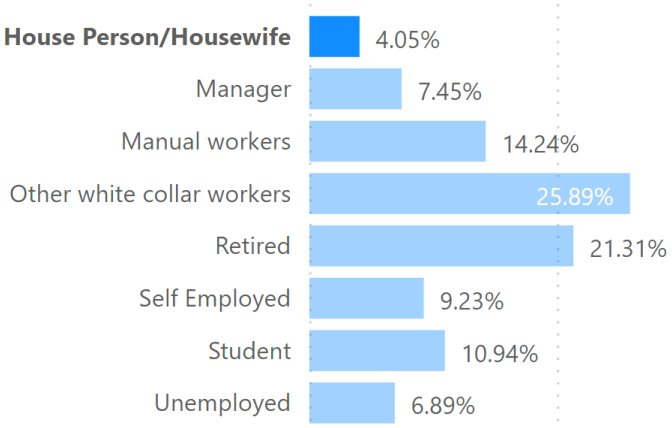

Figure 42. EU27 houseperson category

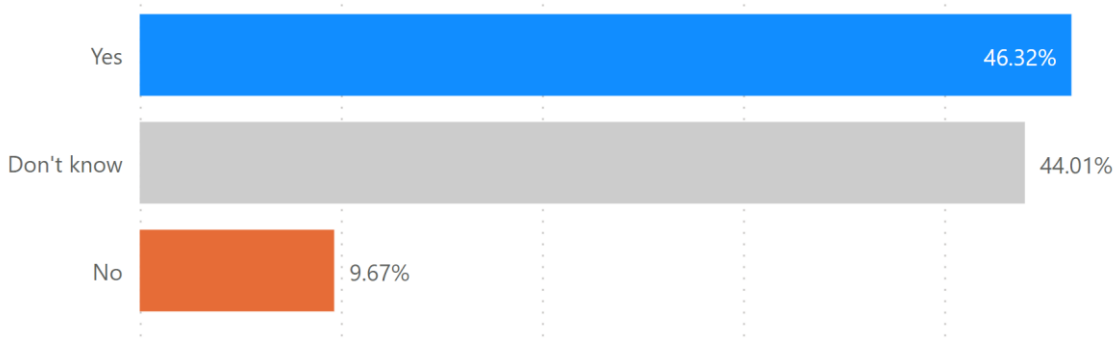

Figure 43. Q4 responses for the houseperson demographic

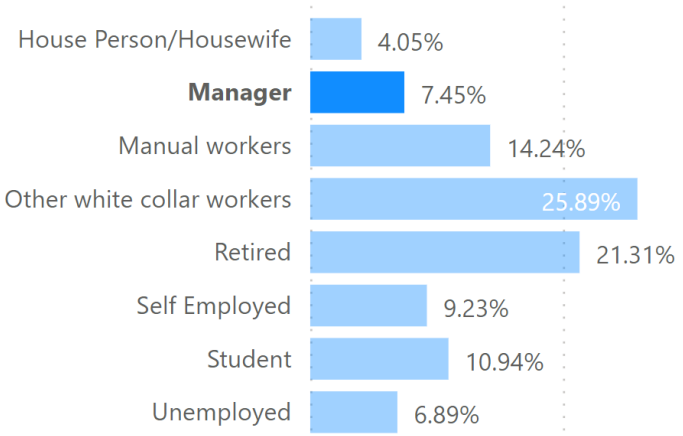

Figure 44. EU27 manager category

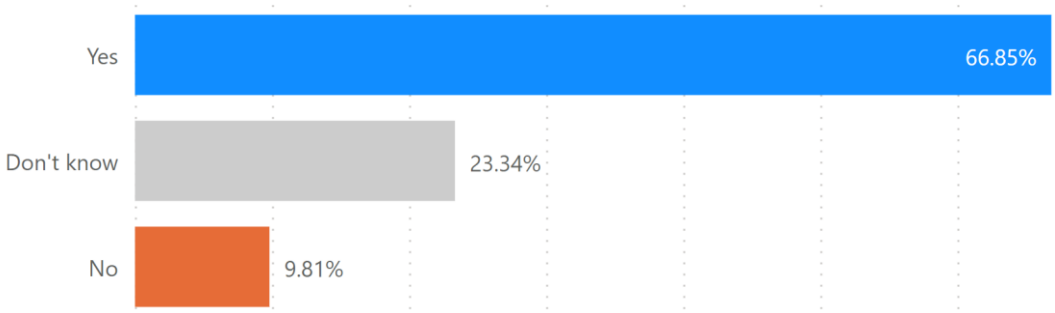

Figure 45. Q4 responses for the manager demographic

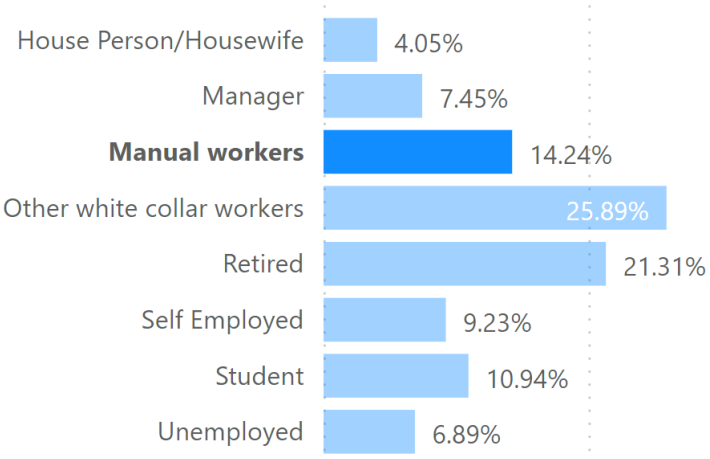

Figure 46. EU27 manual worker category

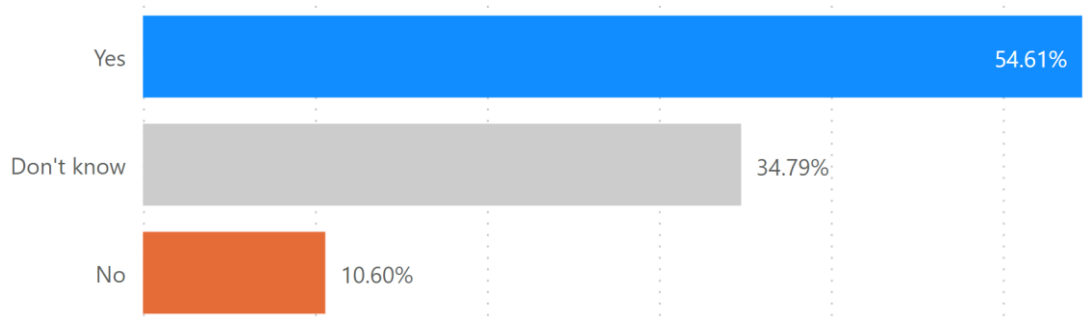

Figure 47. Q4 responses for the manual worker demographic

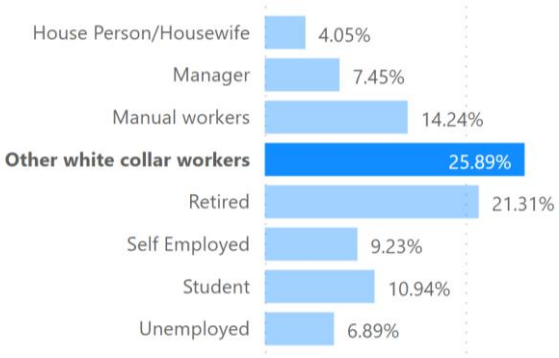

Figure 48. EU27 other white-collar worker category

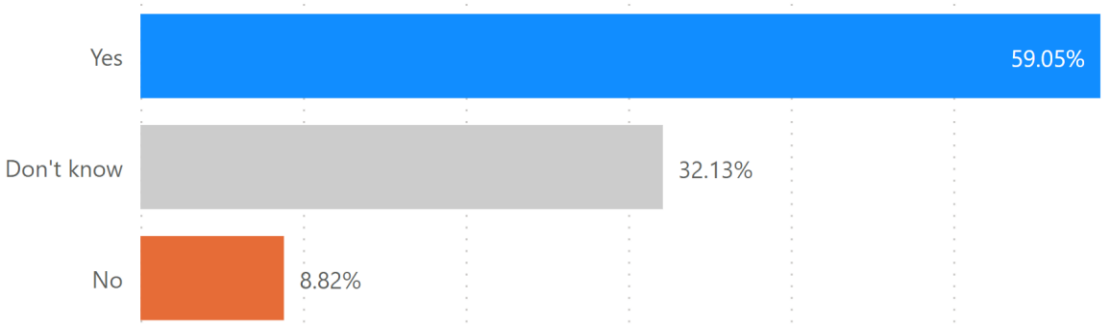

Figure 49. Q4 responses for the other white-collar worker demographic

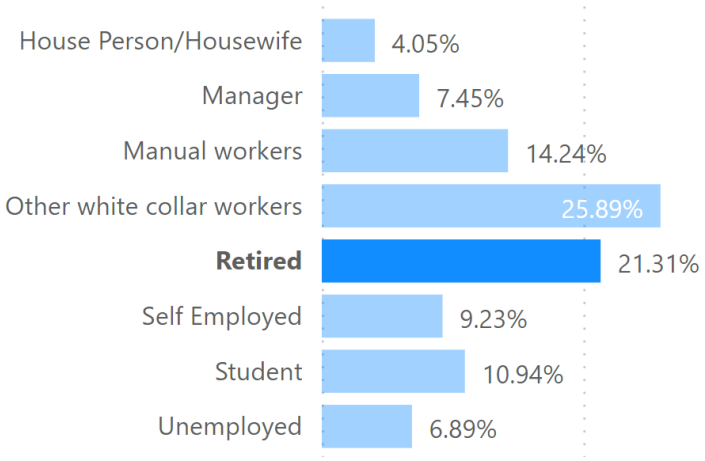

Figure 50. EU27 retired category

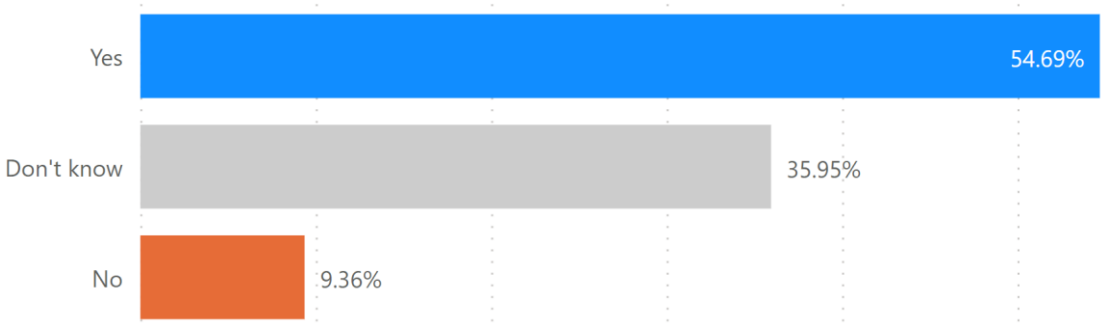

Figure 51. Q4 responses for the retired demographic

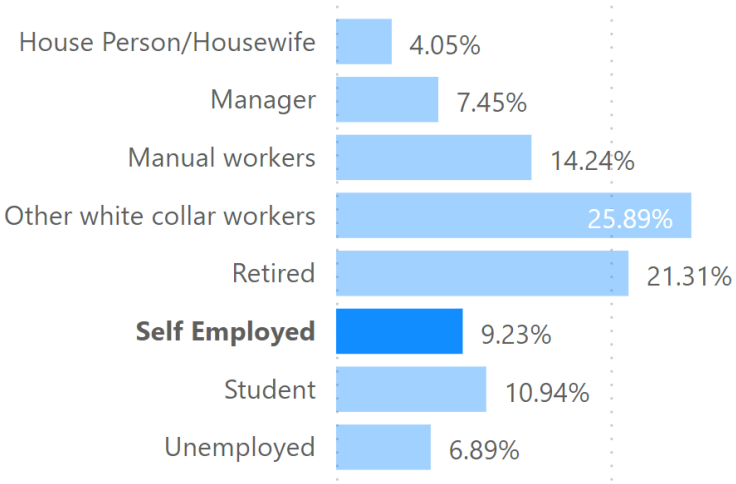

Figure 52. EU27 self-employed category

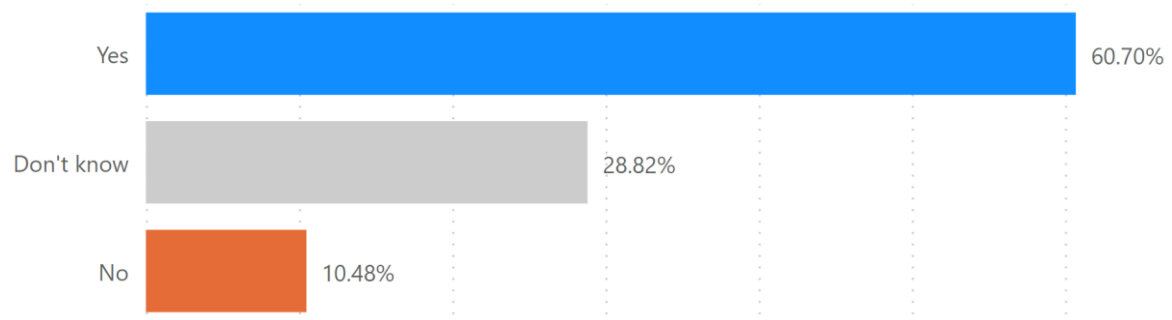

Figure 53. Q4 responses for the self-employed demographic

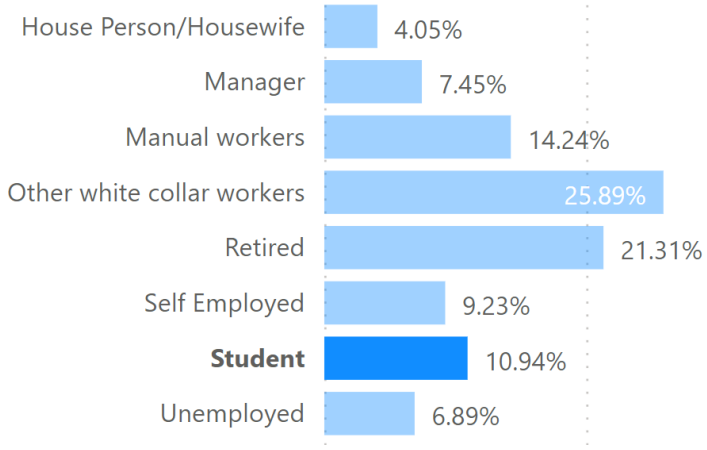

Figure 54. EU27 student category

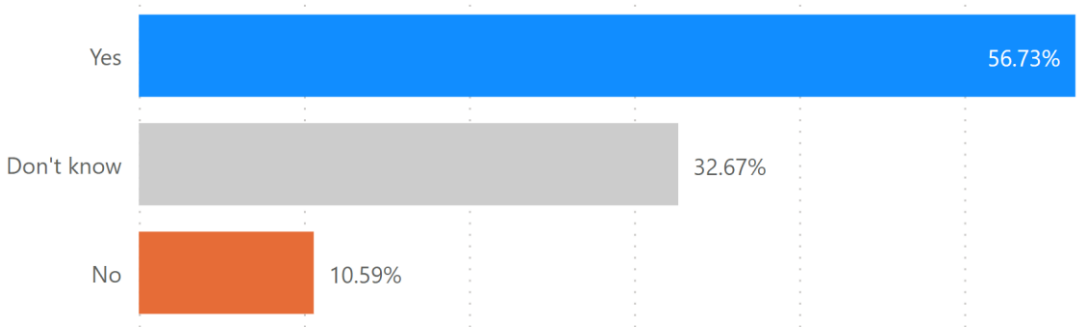

Figure 55. Q4 responses for the student demographic

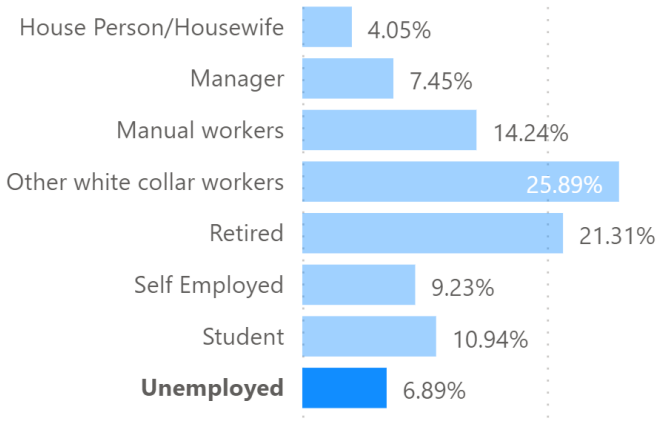

Figure 56. EU27 unemployed category

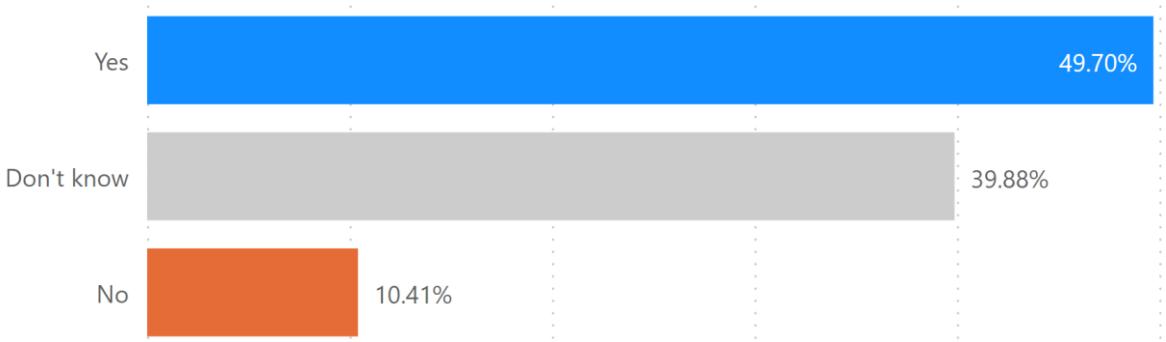

Figure 57. Q4 responses for the unemployed demographic

Q5. Please assess the following statement: all radioactive waste is very dangerous.

Table A3. 7 Responses to Q5 for each EU Member State

Member State	True (%)	False (%)
Romania	91.50	8.50
Hungary	89.90	10.10
Latvia	89.80	10.20
Lithuania	87.21	12.79
Bulgaria	86.80	13.20
Greece	86.80	13.20
Poland	86.80	13.20
Croatia	86.50	13.50
Ireland	86.00	14.00
Italy	85.44	14.56
Germany	84.82	15.18
Slovakia	84.62	15.38
Estonia	82.62	17.38
Finland	81.90	18.10
Portugal	81.20	18.80
Spain	81.00	19.00
Cyprus	80.67	19.33
Czechia	80.50	19.50
Slovenia	80.50	19.50
Malta	78.61	21.39
Austria	78.00	22.00
Luxembourg	75.70	24.30
Sweden	75.42	24.58
France	74.60	25.40
Belgium	73.40	26.60
Denmark	71.50	28.50
Netherlands	71.40	28.60

Comparison of question 5 responses with Eurobarometer responses

The question in the 2022 survey was phrased slightly differently from the one in the Eurobarometer, but when respondents were asked if they thought all radioactive waste was dangerous, the overall feedback was relatively similar.

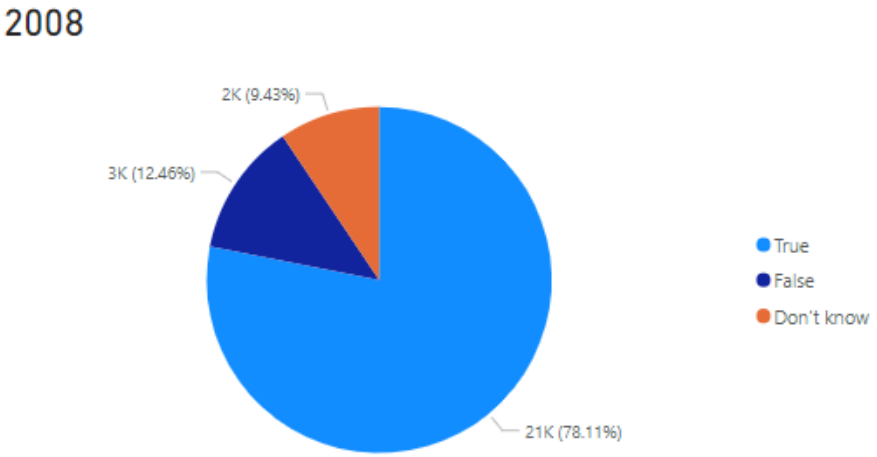

Figure 58. Responses to Q5 in the 2008 Eurobarometer

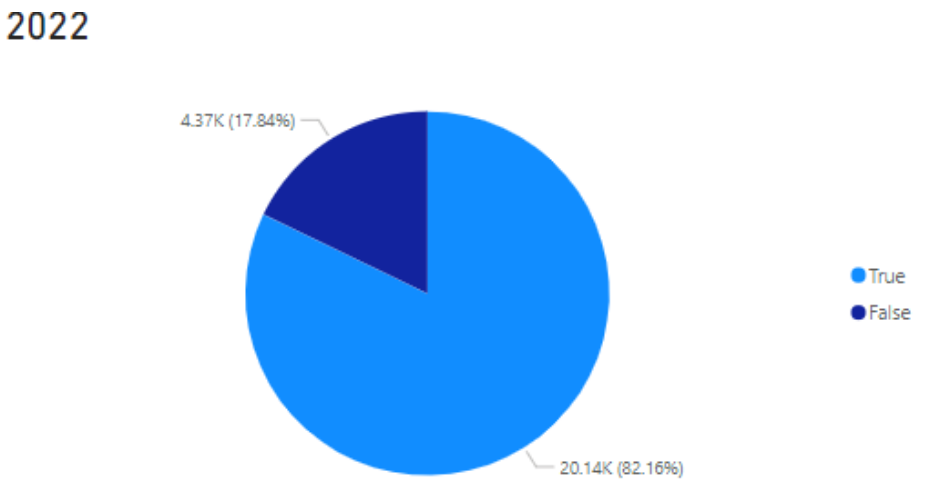

Figure 59. Responses to Q5 in the 2022 survey of the EU27

Age when education ended

The vast majority of respondents, irrespective of educational background, believe that all radioactive waste is very dangerous. And the following was observed.

- More than 80 % of all of the categories, except for the still studying category, selected the response ‘true’.
- Some 30 % of the still studying category selected the response ‘false’. This exceeds the lowest percentage, seen for the age of 15 when education ended category, by 18 percentage points.

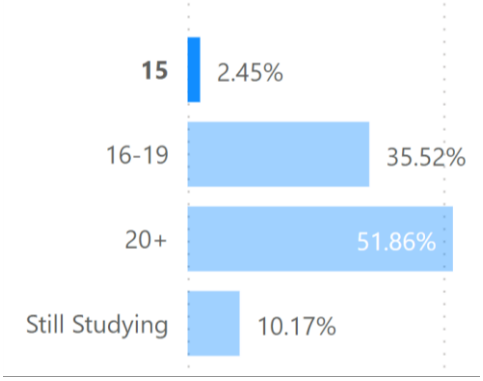

Figure 60. EU27 age of 15 when education ended category

Figure 61. Q5 responses for the age of 15 when age when education ended demographic

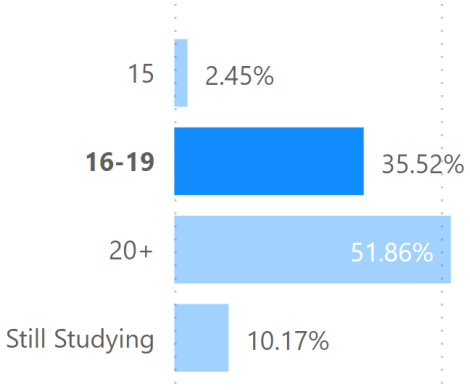

Figure 62. EU27 age of 16–19 when education ended category

Figure 63. Q5 responses for the age of 16–19 when education ended demographic

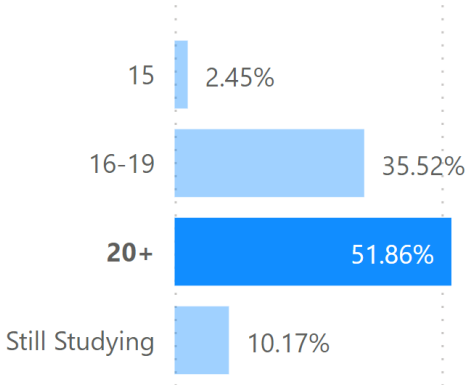

Figure 64. EU27 age of 20 + when education ended category

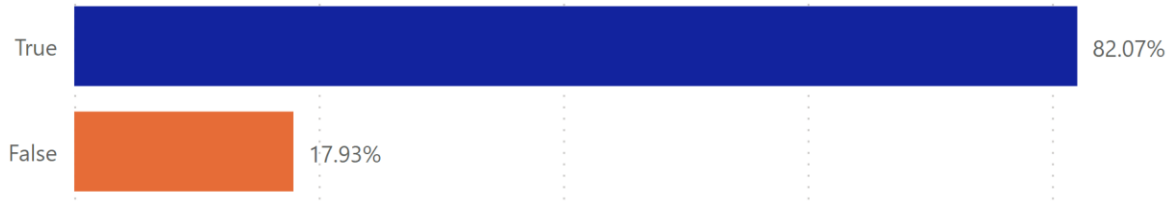

Figure 65. Q5 responses for the age of 20 + when education ended demographic

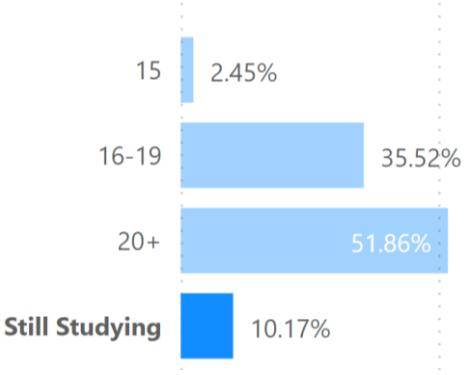

Figure 66. EU27 still studying category

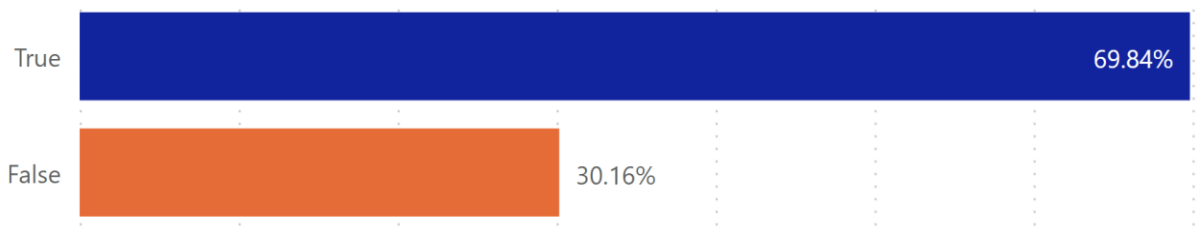

Figure 67. Q5 responses for the still studying demographic

Q6. Do you know who is responsible for the safe management of radioactive waste in your country?

Table A3. 8 Responses to Q6 for each EU Member State

Member State	Yes, I know definitively who is responsible (%)	Yes, I believe I know who is responsible (%)	No, I don't know who is responsible (%)
Czechia	12.10	45.90	42.00
Slovenia	14.50	44.90	40.60
Finland	14.00	43.40	42.60
Slovakia	8.99	42.56	48.45
Sweden	13.09	42.36	44.56
Lithuania	4.60	39.46	55.94
Croatia	8.60	37.20	54.20
Denmark	10.70	36.90	52.40
Romania	16.00	41.70	42.30
Germany	8.09	35.86	56.04
Poland	8.70	36.30	55.00
Netherlands	9.40	35.80	54.80
Spain	10.50	35.70	53.80
France	12.30	35.60	52.10
Hungary	7.50	32.30	60.20
Bulgaria	12.70	32.10	55.20
Belgium	14.90	30.60	54.50
Greece	8.10	29.70	62.20
Italy	9.37	27.52	63.11
Estonia	3.80	25.37	70.83
Cyprus	8.67	25.33	66.00
Luxembourg	3.19	24.10	72.71
Latvia	3.50	22.20	74.30
Ireland	5.80	21.40	72.80
Malta	6.47	20.40	73.13
Austria	5.40	18.30	76.30
Portugal	4.70	16.90	78.40

Age

The same overall trend in responses was observed irrespective of the age category. However, two minor observations were made.

- The older the age category, the greater the number of respondents who felt that they knew who was responsible for the safe management of radioactive waste.
- Conversely, the younger the age category, the greater the number of respondents who did not know who was responsible.

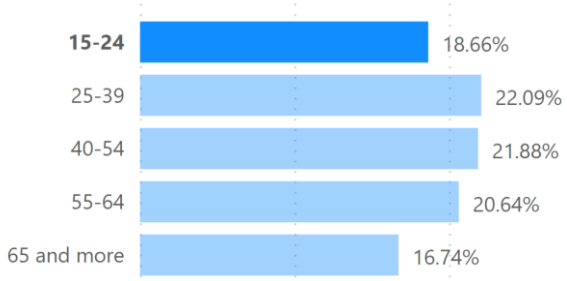

Figure 68. EU27 15–24 age category

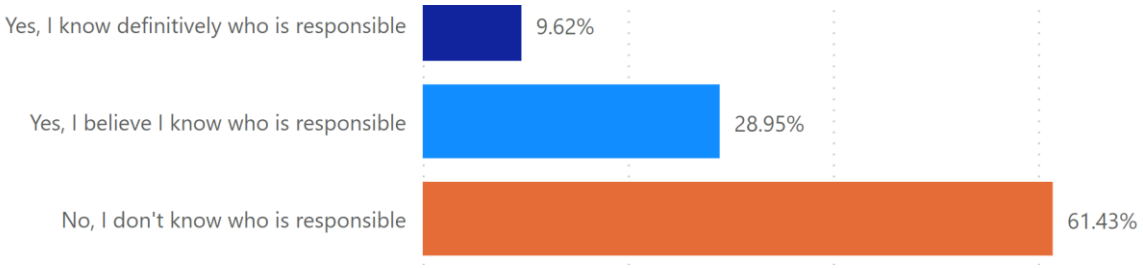

Figure 69. Q6 responses for the 15–24 age demographic

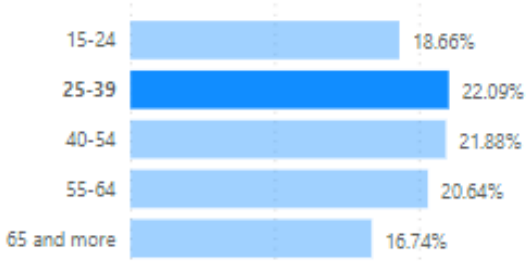

Figure 70. EU27 25–39 age category

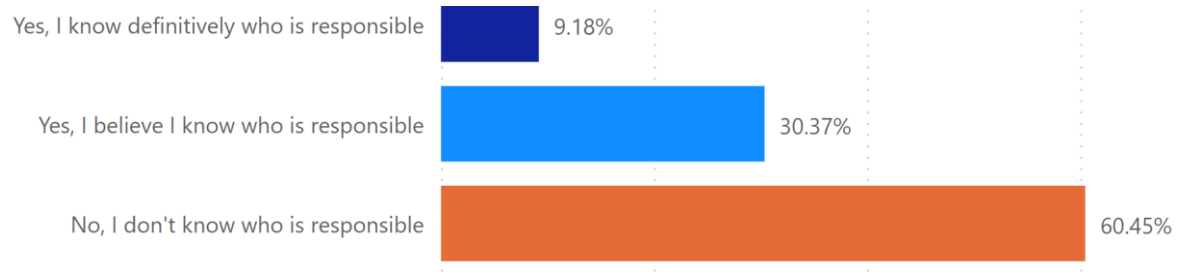

Figure 71. Q6 responses for the 25–39 age demographic

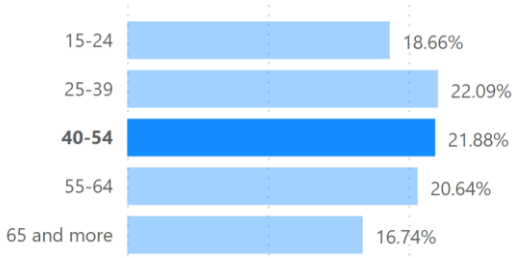

Figure 72. EU27 40–54 age category

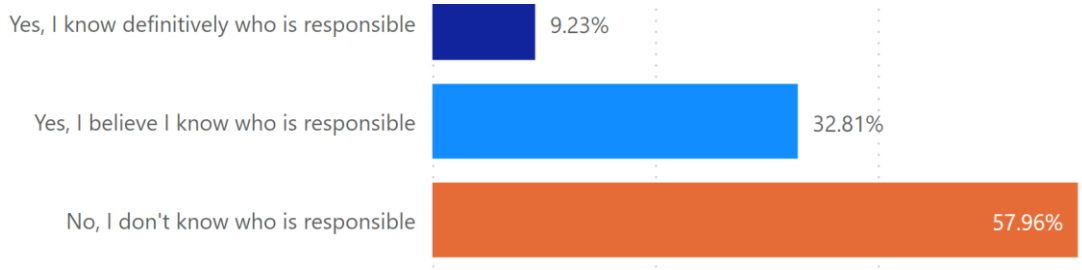

Figure 73. Q6 responses for the 40–54 age demographic

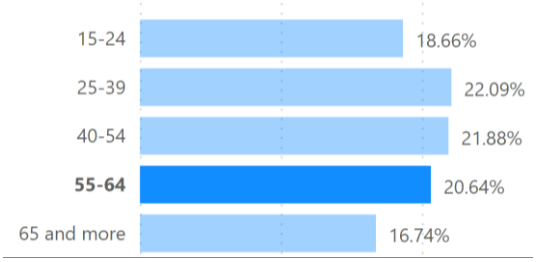

Figure 74. EU27 55–64 age category

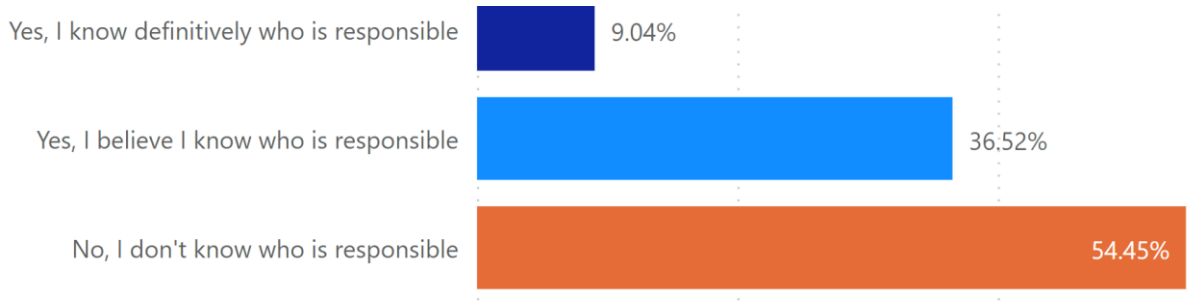

Figure 75. Q6 responses for the 55–64 age demographic

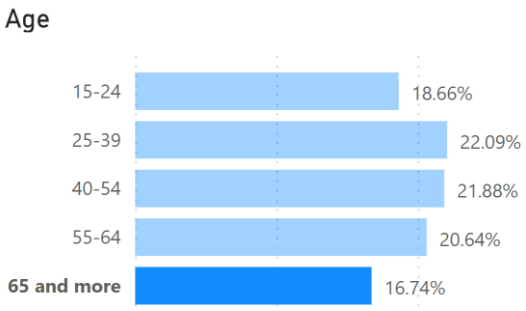

Figure 76. EU27 65 + category

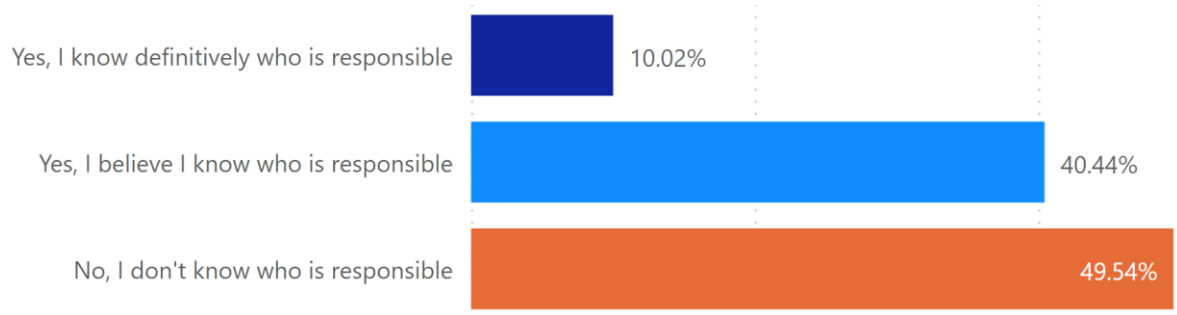

Figure 77. Q6 responses for the 65 + age demographic

Q7. Are you aware of the industries in your country which might produce naturally occurring radioactive material (NORM) wastes?

Table A3. 9 Responses to Q7 for each EU Member State

Member State	Yes, I am familiar with which industries produce NORM wastes (%)	Yes, I am partly familiar with which industries produce NORM wastes (%)	No, I am not familiar with which industries produce NORM wastes (%)
Latvia	2.30	23.90	73.80
Luxembourg	3.59	21.91	74.50
Lithuania	2.70	25.57	71.73
Estonia	4.40	25.07	70.53
Ireland	7.60	24.40	68.00
Netherlands	7.40	24.60	68.00
Portugal	4.70	27.30	68.00
Denmark	8.90	23.20	67.90
Austria	7.50	26.00	66.50
Malta	8.96	27.36	63.68
France	7.50	29.00	63.50
Greece	8.80	28.00	63.20
Belgium	10.10	27.60	62.30
Cyprus	8.00	30.67	61.33
Germany	9.99	29.47	60.54
Sweden	5.89	34.37	59.74
Italy	8.97	33.60	57.43
Spain	7.80	35.70	56.50
Croatia	8.50	38.00	53.50
Finland	12.90	34.50	52.60
Slovakia	8.79	38.86	52.35
Poland	10.40	39.30	50.30
Hungary	8.80	43.80	47.40
Slovenia	14.90	44.50	40.60
Bulgaria	14.30	45.40	40.30
Czechia	18.70	45.90	35.40
Romania	17.30	50.10	32.60

Q8. Do you believe that naturally occurring radioactive material (NORM) wastes should be managed in the same regulated manner as radioactive wastes emanating from the nuclear industry?

Table A3. 10 Responses to Q8 for each EU Member State

Member State	Yes, I believe they should be managed in the same manner as nuclear industry wastes (%)	No, I don't think it is necessary that they are managed in the same manner as nuclear industry wastes (%)
Spain	83.00	17.00
Greece	83.60	16.40
Romania	82.00	18.00
Bulgaria	79.40	20.60
France	78.80	21.20
Slovenia	78.80	21.20
Croatia	77.60	22.40
Hungary	77.60	22.40
Cyprus	77.00	23.00
Ireland	77.00	23.00
Poland	73.00	27.00
Slovakia	72.83	27.17
Portugal	71.70	28.30
Estonia	71.53	28.47
Italy	70.79	29.21
Latvia	70.20	29.80
Czechia	69.10	30.90
Malta	68.16	31.84
Sweden	67.03	32.97
Belgium	66.20	33.80
Germany	66.13	33.87
Finland	63.20	36.80
Denmark	63.00	37.00
Netherlands	60.40	39.60
Austria	59.20	40.80
Lithuania	58.84	41.16
Luxembourg	49.00	51.00

Q9. With respect to how radioactive waste is regulated in your country, how familiar are you with the regulation process?

Table A3. 11 Responses to Q9 for each EU Member State

Member State	Yes, I am familiar with how radioactive waste is regulated in my country (%)	I have a limited understanding of how radioactive waste is regulated in my country (%)	No, I am not aware of how radioactive waste is regulated in my country (%)
Luxembourg	3.39	25.70	70.92
Estonia	2.90	27.47	69.63
Austria	5.50	29.30	65.20
Ireland	4.00	31.80	64.20
Denmark	8.40	32.90	58.70
Hungary	3.00	40.60	56.40
Czechia	6.00	38.00	56.00
Malta	3.48	40.80	55.72
Latvia	5.80	40.10	54.10
Spain	5.10	41.10	53.80
Netherlands	6.00	40.30	53.70
Portugal	5.20	41.70	53.10
Greece	7.30	40.10	52.60
Cyprus	7.00	41.00	52.00
Belgium	8.00	40.40	51.60
Slovakia	6.29	42.66	51.05
Lithuania	3.40	46.65	49.95
France	7.20	43.30	49.50
Italy	5.68	45.96	48.35
Croatia	6.40	45.40	48.20
Poland	6.70	47.00	46.30
Sweden	10.29	45.95	43.76
Bulgaria	10.20	47.50	42.30
Germany	9.99	46.85	43.16
Slovenia	10.90	49.50	39.60
Romania	12.40	49.40	38.20
Finland	17.10	53.40	29.50

Age

The same trend in responses was observed across all of the age categories, except the 15–24 age category, of which a slight majority of 55 % felt that they either were aware of or had a limited understanding of how radioactive waste is regulated in their country.

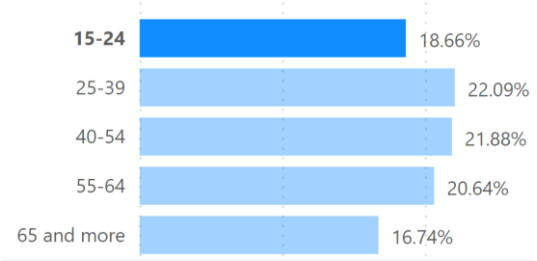

Figure 78. EU27 15–24 age category

Figure 79. Q9 responses for the 15–24 age demographic

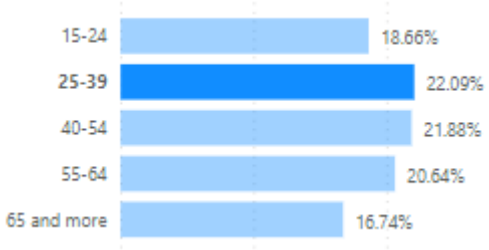

Figure 80. EU27 25–39 age category

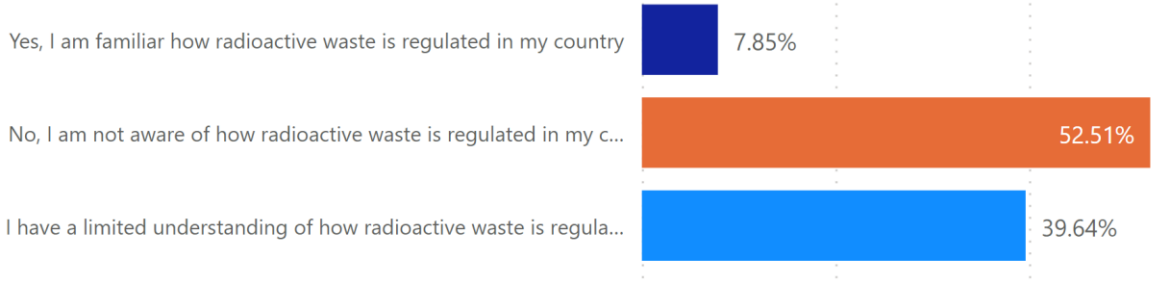

Figure 81. Q9 responses for the 25–39 age demographic

Figure 82. EU27 40–54 age category

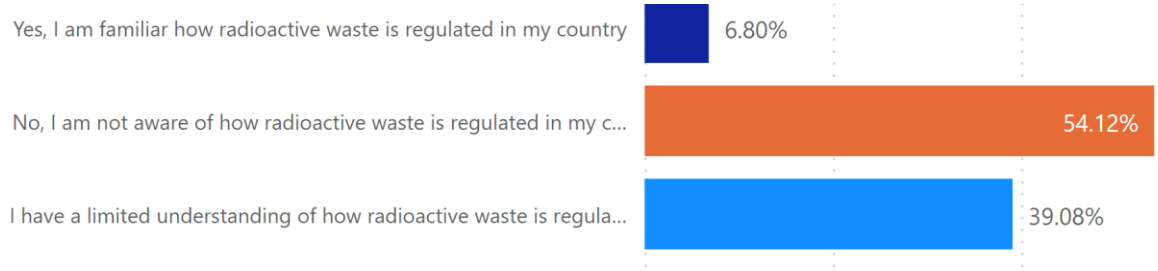

Figure 83. Q9 responses for the 40–54 age demographic

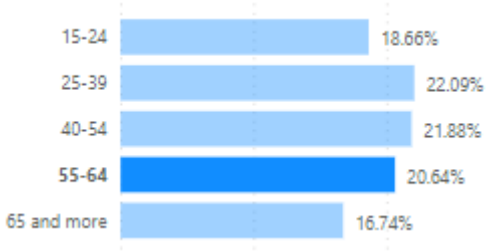

Figure 84. EU27 55–64 age category

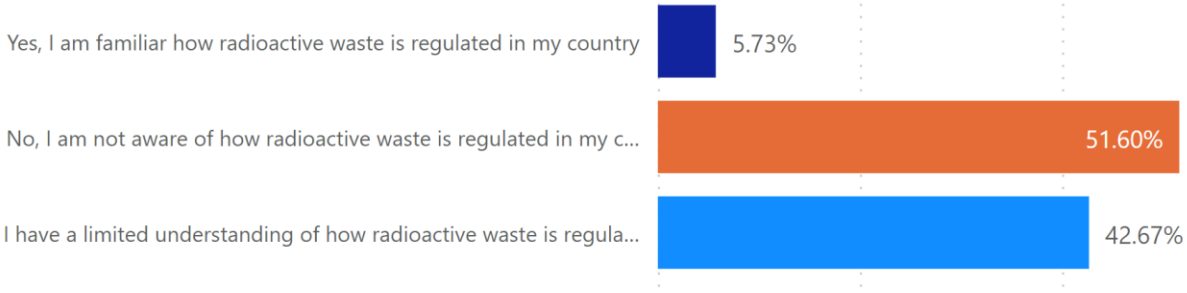

Figure 85. Q9 responses for the 55–64 age demographic

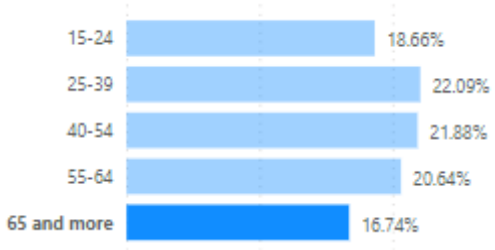

Figure 86. EU27 65 + age category

Figure 87. Q9 responses for the 65 + age demographic

Current occupation

There are noticeable differences in respondents' perspectives depending on their current occupation.

- The majority of housepersons, manual workers, other white-collar workers, retired people and unemployed people were not aware of how radioactive waste was regulated in their countries.
- The majority of managers, students and self-employed people felt that they were familiar or had some understanding of how radioactive waste is regulated in their countries.

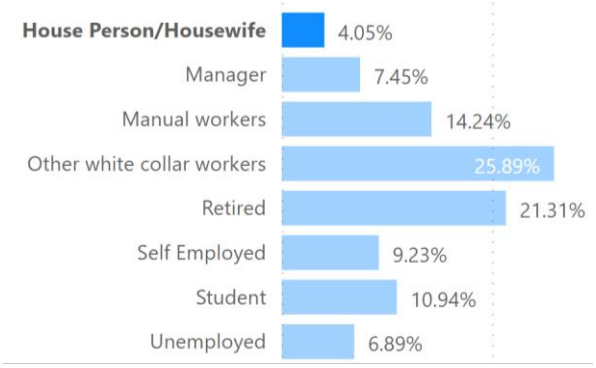

Figure 88. EU27 houseperson category

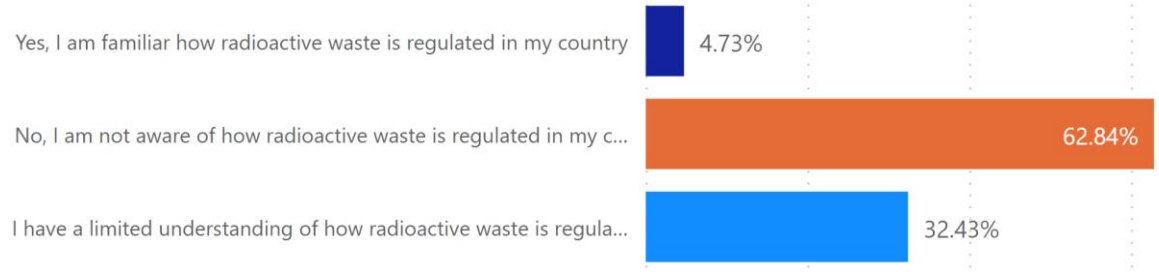

Figure 89. Q9 responses for the houseperson demographic

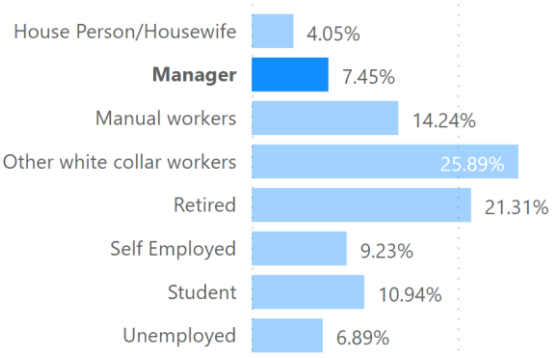

Figure 90. EU27 manager category

Figure 91. Q9 responses for the manager demographic

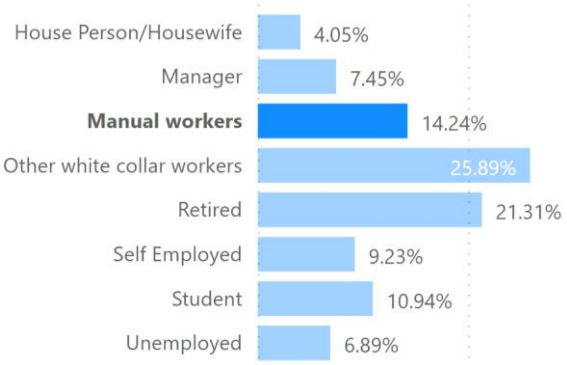

Figure 92. EU27 manual worker category

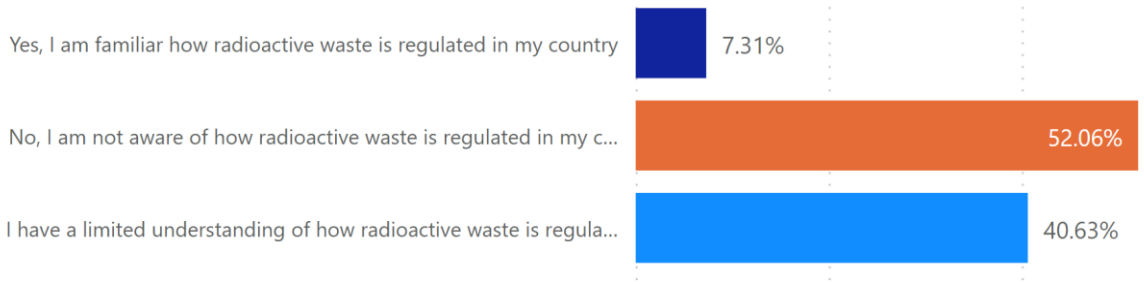

Figure 93. Q9 responses for the manual worker demographic

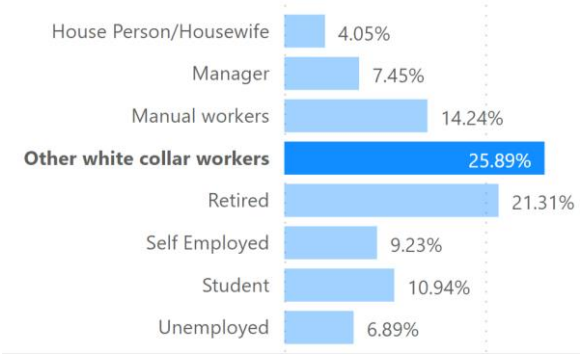

Figure 94. EU27 other white-collar worker demographic

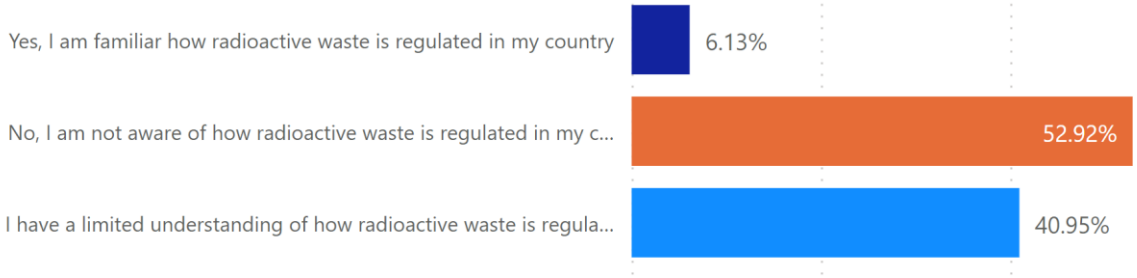

Figure 95. Q9 responses for the other white-collar worker demographic

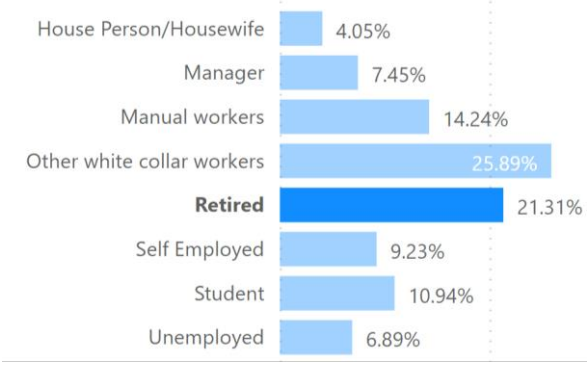

Figure 96. EU27 retired category

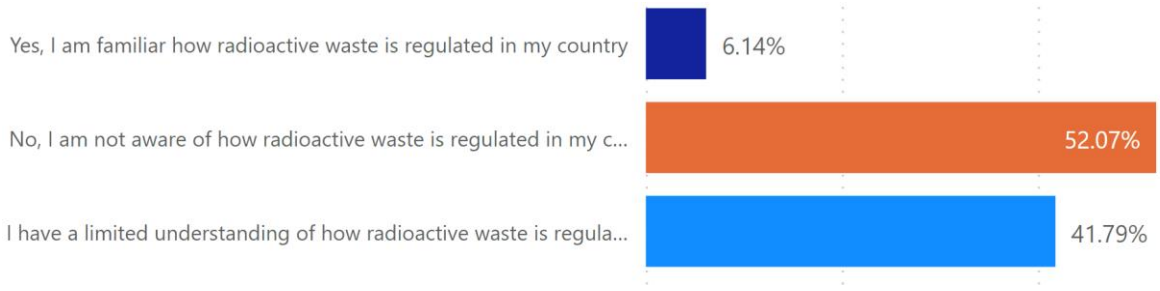

Figure 97. Q9 responses for the retired demographic

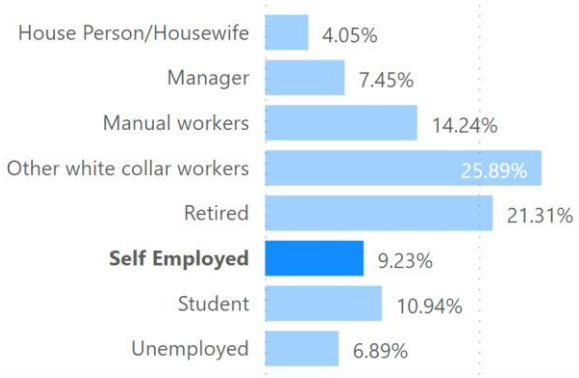

Figure 98. EU27 self-employed category

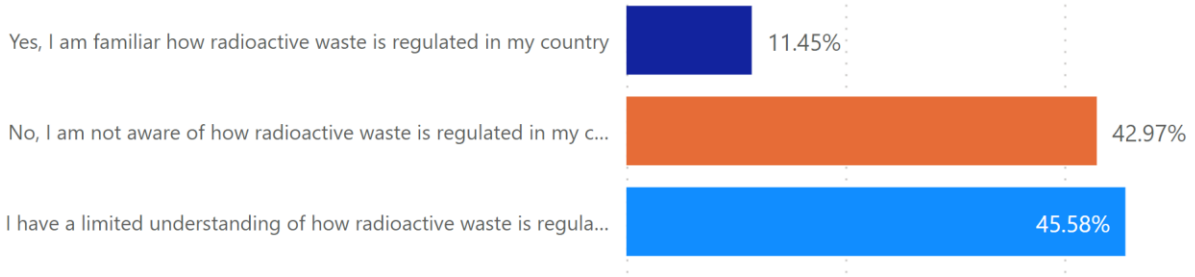

Figure 99. Q9 responses for the self-employed demographic

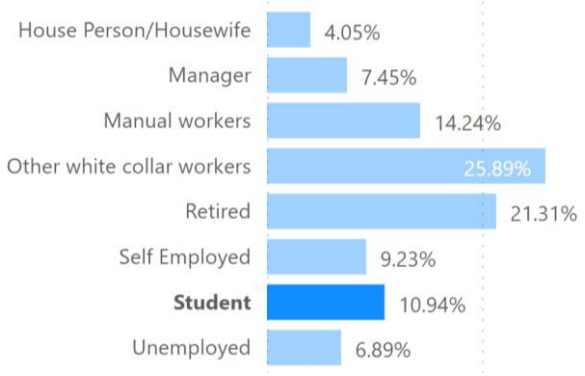

Figure 100. EU27 student category

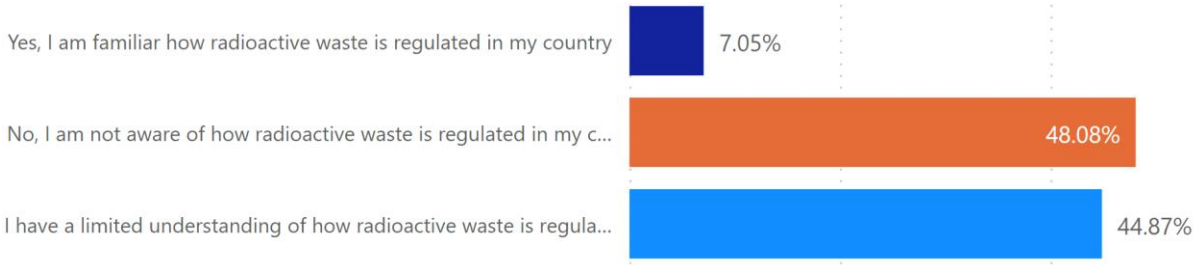

Figure 101. Q9 responses for the student demographic

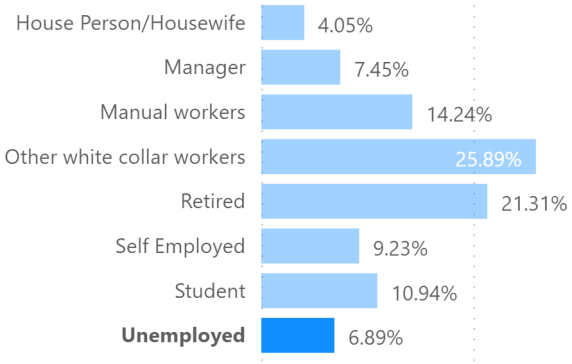

Figure 102. EU27 unemployed category

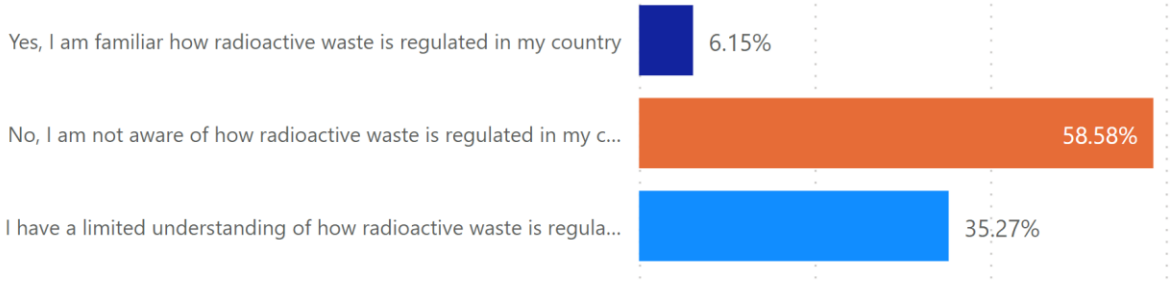

Figure 103. Q9 responses for the unemployed demographic

Q10. With respect to the communication about how radioactive wastes are classified and managed, who do you trust the most?

Table A3. 12 Answers to Q10 for each EU Member State

Member State	Scientists (%)	Regulators (%)	Government (%)	NGOs (%)	Academia (%)	Industry (%)
Greece	72.60	7.30	4.30	3.10	10.20	2.50
Spain	68.60	8.80	6.60	6.10	5.00	4.90
Cyprus	65.00	8.33	7.67	5.67	10.00	3.33
Sweden	63.54	3.70	16.38	5.00	4.60	6.79
Croatia	59.00	10.00	3.10	16.50	8.10	3.30
Lithuania	56.74	5.69	11.69	9.19	14.69	2.00
Austria	56.70	15.50	5.60	13.70	3.70	4.80
Slovenia	56.20	7.40	5.00	19.10	4.10	8.20
Malta	55.22	11.94	9.95	14.93	4.98	2.99
Latvia	53.10	13.00	8.30	5.90	15.70	4.00
Luxembourg	52.39	16.14	14.74	8.57	5.98	2.19
Belgium	51.00	10.80	14.40	9.50	7.60	6.70
Portugal	50.60	18.70	10.00	13.30	3.70	3.70
Slovakia	50.35	19.58	4.90	6.69	9.89	8.59
Ireland	50.00	22.40	13.60	6.20	5.60	2.20
Finland	49.40	9.30	14.00	2.90	3.30	21.10
Estonia	48.35	6.49	7.19	4.20	30.57	3.20
France	47.70	8.20	14.10	21.80	3.00	5.20
Netherlands	47.10	16.10	19.20	3.90	7.80	5.90
Germany	46.25	17.08	11.79	13.99	4.60	6.29
Romania	46.20	21.00	8.80	11.00	5.90	7.10
Poland	42.60	13.90	12.80	14.10	10.20	6.40
Denmark	40.70	24.70	13.70	7.60	5.00	8.30
Italy	40.68	27.72	10.57	10.67	6.78	3.59
Czechia	39.20	24.70	8.20	4.30	15.60	8.00
Hungary	38.90	28.10	8.40	11.90	8.60	4.10
Bulgaria	34.10	20.00	12.80	6.70	21.40	5.00

NB: NGO, non-governmental organisation.

Q11. How well informed do you think you are about radioactive waste?

Table A3. 13 Responses to Q11 for each EU Member State

Member State	Well informed (%)	Partly informed (%)	Not informed at all (%)
Finland	12.70	69.30	18.00
Lithuania	3.90	67.63	28.47
Romania	10.20	67.30	22.50
Croatia	8.90	66.50	24.60
Bulgaria	11.80	66.20	22.00
Malta	4.48	64.18	31.34
Hungary	4.30	63.70	32.00
Sweden	9.69	62.24	28.07
Italy	6.18	61.62	32.20
Germany	6.79	60.04	33.17
Czechia	6.10	59.40	34.50
Slovenia	11.30	58.50	30.20
Luxembourg	4.78	57.37	37.85
Poland	5.40	57.10	37.50
Latvia	3.60	56.30	40.10
Spain	5.70	55.80	38.50
Portugal	3.20	55.60	41.20
Slovakia	6.99	53.85	39.16
Austria	5.00	52.40	42.60
France	7.40	51.40	41.20
Greece	6.90	50.70	42.40
Cyprus	7.00	51.00	42.00
Belgium	8.30	49.50	42.20
Denmark	10.90	45.90	43.20
Netherlands	7.80	45.50	46.70
Estonia	2.90	49.05	48.05
Ireland	4.40	44.00	51.60

Comparison of question 11 responses with Eurobarometer responses

When asked how well informed they felt about radioactive waste in the latest survey, 57 % stated that they felt that they were partly informed. In 2008, only 22 % felt that they were partly informed. Moreover, the proportion of respondents who responded that they were not informed decreased from 73 % in 2008 to 36 % in 2022.

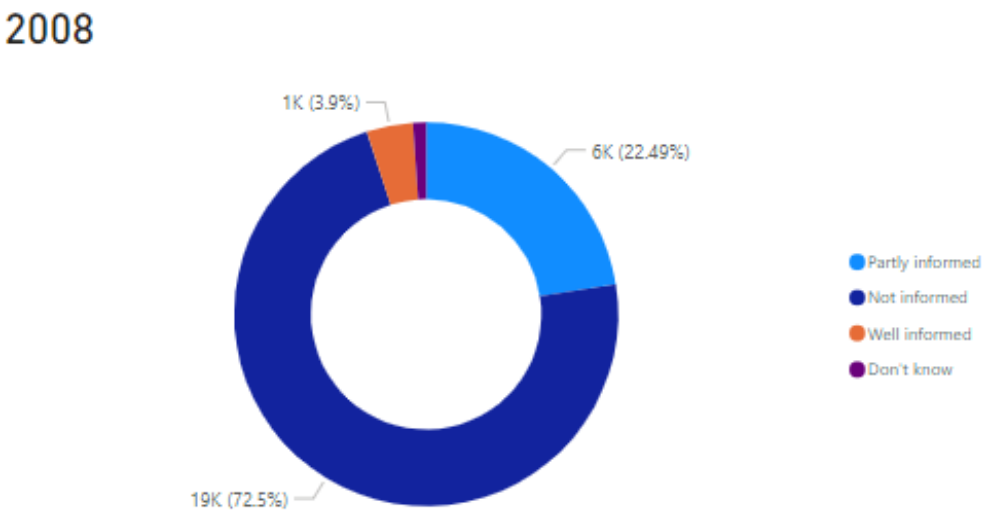

Figure 104. Responses to Q11 in the 2008 Eurobarometer

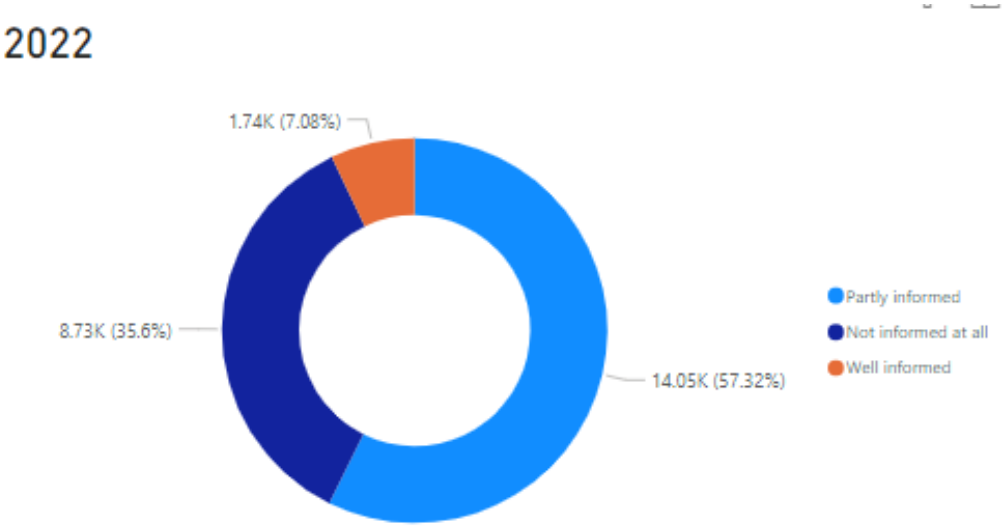

Figure 105. Responses to Q11 in the 2022 survey of the EU27

Age when education ended

The same trend in responses was seen irrespective of respondents' educational background. However, two differences in perspective were found.

- Respondents who were 15 years old when their education ended were most likely to feel that they were not informed. By 11 percentage points, more respondents from this category selected this option than the category with the lowest proportion of responses for this option, namely the respondents who were still studying.
- Respondents' awareness of radioactive waste increased in direct proportion to the age when their education ended.

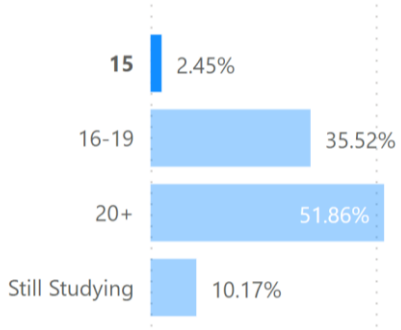

Figure 106. EU27 age of 15 when education ended category

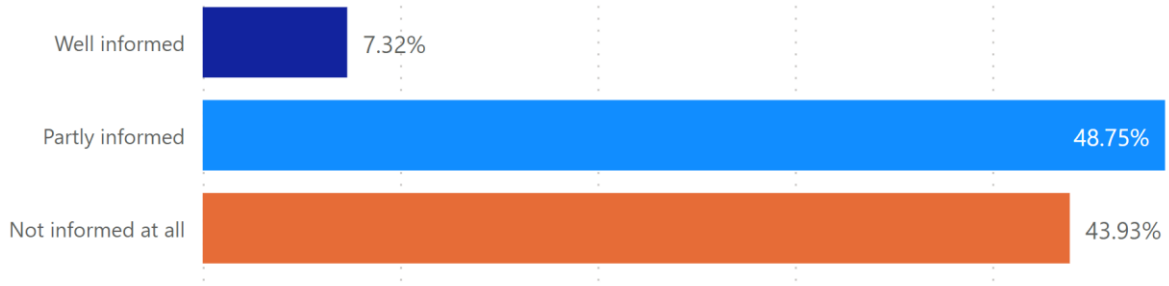

Figure 107. Q11 responses for the age of 15 when education ended demographic

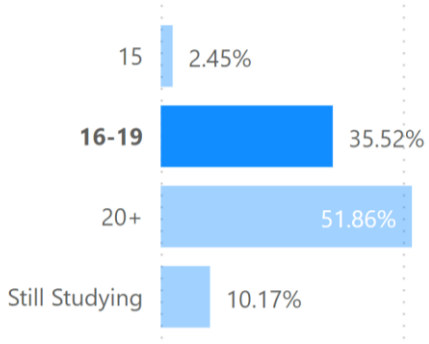

Figure 108. EU27 age of 16–19 when education ended category

Figure 109. Q11 responses for the age of 16–19 when education ended demographic

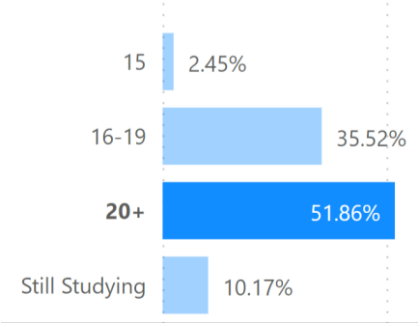

Figure 110. EU27 age of 20 + when education ended category

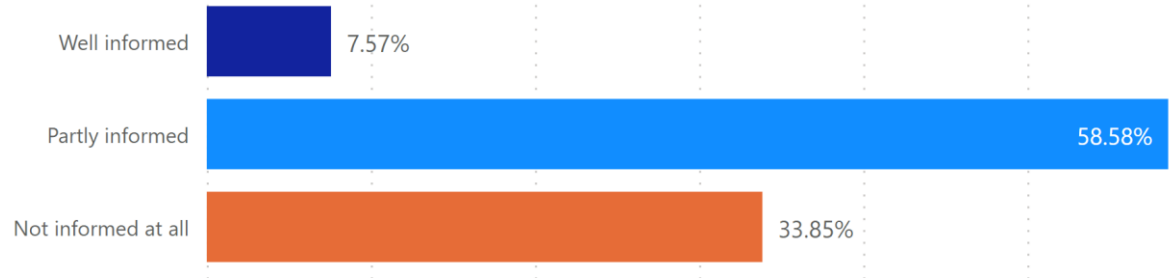

Figure 111. Q11 responses for the age of 20 + when education ended demographic

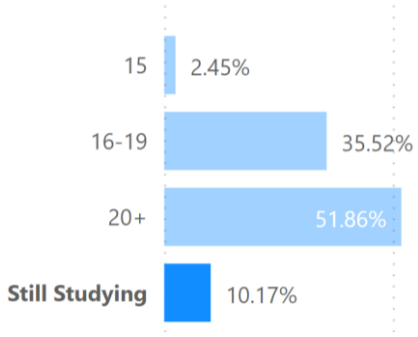

Figure 112. EU27 still studying category

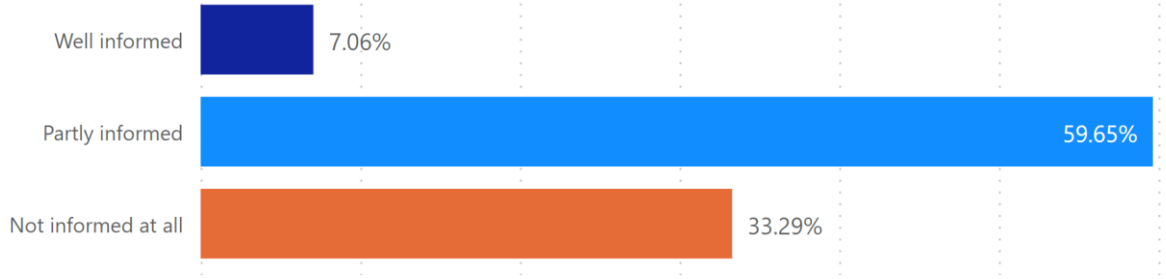

Figure 113. Q11 responses for the still studying demographic

Q12. Are you aware of opportunities in your country for the general public to discuss or learn about radioactive waste management with either industry or regulatory organisations?

Table A3. 14 Responses to Q12 for each EU Member State

Member State	Yes, I am aware of potential opportunities (%)	No, I am not aware of any opportunities (%)
Luxembourg	12.15	87.85
Austria	15.70	84.30
Estonia	15.98	84.02
Ireland	18.20	81.80
Hungary	20.70	79.30
Latvia	22.20	77.80
Portugal	21.50	78.50
Slovakia	22.68	77.32
France	22.50	77.50
Malta	23.38	76.62
Greece	25.30	74.70
Spain	26.70	73.30
Romania	27.40	72.60
Lithuania	27.87	72.13
Belgium	28.40	71.60
Cyprus	29.33	70.67
Netherlands	30.10	69.90
Germany	33.37	66.63
Bulgaria	33.80	66.20
Denmark	33.80	66.20
Finland	37.00	63.00
Czechia	34.60	65.40
Italy	37.59	62.41
Sweden	41.06	58.94
Slovenia	52.00	48.00
Croatia	57.60	42.40
Poland	58.10	41.90

Age

The same trend in responses was seen irrespective of the age category of the respondents. And a linear correlation was observed.

- The older the age category of the respondents, the higher the percentage of respondents who were found to be unaware of potential opportunities to discuss or learn about radioactive waste. By 14 percentage points, more respondents from the 65 + category selected this option than the category with the lowest proportion of responses, the 15–24 category.

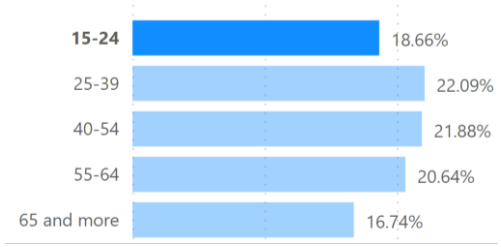

Figure 114. EU27 15–24 age category

Figure 115. Q12 responses for the 15–24 age demographic

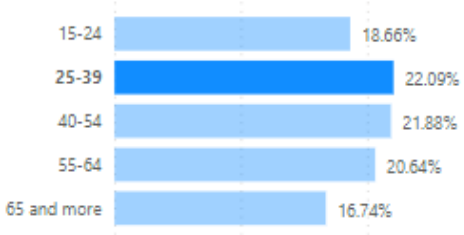

Figure 116. EU27 25–39 age category

Figure 117. Q12 responses for the 25–39 age demographic

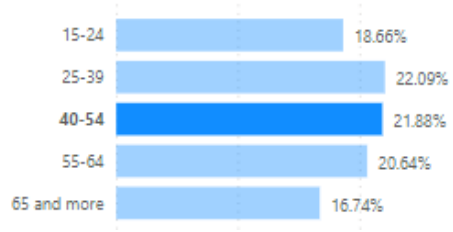

Figure 118. EU27 40–54 age category

Figure 119. Q12 responses for the 40–54 age demographic

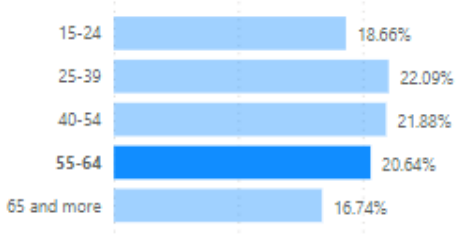

Figure 120. EU27 55–64 age category

Figure 121. Q12 responses for the 55–64 age demographic

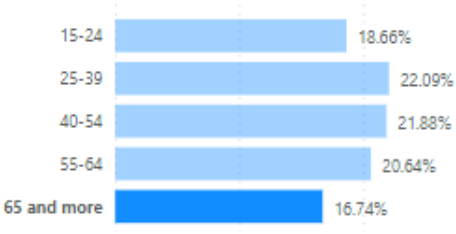

Figure 122. EU27 65 + age category

Figure 123. Q12 responses for the 65 + age demographic

Age when education ended

The same overall trend in responses can be seen irrespective of respondents' educational background. However, the following difference in perspective can be observed.

- The older the age of the respondents when their education ended, the higher the percentage that felt they were aware of potential opportunities to discuss or learn about radioactive waste management.

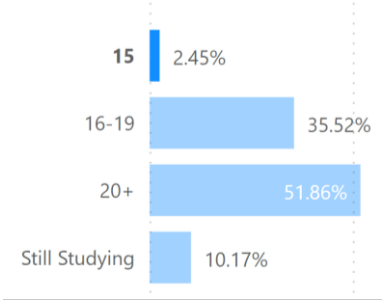

Figure 124. EU27 age of 15 when education ended category

Figure 125. Q12 responses for the age of 15 when education ended demographic

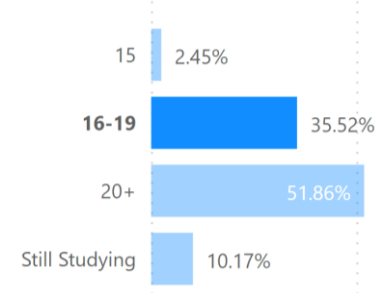

Figure 126. EU27 age of 16–19 when education ended category

Figure 127. Q12 responses for the age of 16–19 when education ended demographic

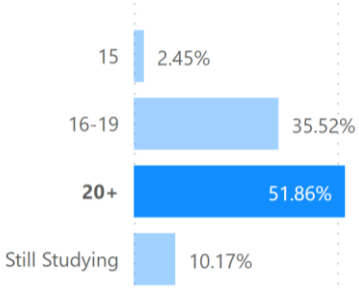

Figure 128. EU27 age of 20 + when education ended category

Figure 129. Q12 responses for the age of 20 + when education ended demographic

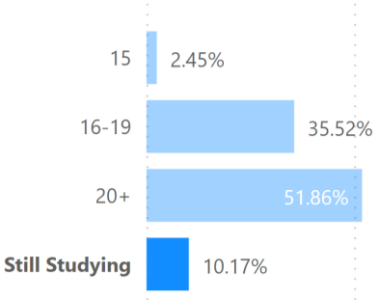

Figure 130. EU27 still studying category

Figure 131. Q12 responses for the still studying demographic

Q13. Which of the following aspects of radioactive waste management might you be particularly interested in?

Table A3. 15 Responses to Q13 for each EU Member State

Member State	Waste disposal (%)	Waste storage (%)	Waste regulation (%)	Waste transportation (%)
Germany	52.41	16.19	15.45	15.95
Finland	51.32	28.82	9.61	10.26
Italy	51.06	15.72	27.20	6.02
Austria	50.31	10.14	23.28	16.27
Latvia	50.27	29.26	13.19	7.28
Portugal	48.70	16.59	28.79	5.92
Poland	50.12	24.48	15.62	9.79
Malta	46.91	18.52	25.93	8.64
Ireland	45.48	12.66	29.97	11.89
Spain	44.84	25.08	23.13	6.95
Belgium	41.06	28.08	19.74	11.13
Romania	40.65	24.86	28.11	6.38
Sweden	40.34	44.68	7.56	7.42
Denmark	39.95	32.72	18.27	9.07
Luxembourg	39.68	31.52	20.41	8.39
France	39.39	29.37	22.73	8.51
Hungary	38.30	32.92	17.69	11.09
Croatia	37.87	33.15	22.36	6.63
Netherlands	35.77	35.92	16.84	11.48
Estonia	33.13	34.49	26.96	5.42
Slovenia	32.90	40.19	15.63	11.28
Lithuania	28.05	30.31	37.11	4.53
Bulgaria	22.05	33.37	30.69	13.89
Slovakia	20.28	40.56	25.13	14.03
Czechia	14.95	56.66	17.29	11.10
Greece	11.96	23.33	53.34	11.37
Cyprus	10.48	27.51	44.54	17.47

Q14. Would you like to know more about how radioactive waste is classified and managed in your country?

Table A3. 16 Responses to Q14 for each EU Member State

Member State	Yes, I would be interested learning more (%)	No, I am not really interested in this subject (%)
Portugal	88.60	11.40
Spain	87.60	12.40
Greece	86.70	13.30
Italy	86.64	13.36
Romania	86.30	13.70
Bulgaria	86.10	13.90
Croatia	84.70	15.30
Cyprus	80.33	19.67
Poland	79.30	20.70
Malta	78.11	21.89
Hungary	77.60	22.40
Luxembourg	77.29	22.71
France	76.10	23.90
Slovenia	74.70	25.30
Ireland	74.60	25.40
Czechia	73.20	26.80
Finland	69.00	31.00
Austria	67.90	32.10
Slovakia	67.23	32.77
Lithuania	67.63	32.37
Denmark	65.70	34.30
Germany	64.64	35.36
Sweden	63.64	36.36
Belgium	63.50	36.50
Latvia	63.40	36.60
Netherlands	53.30	46.70
Estonia	47.05	52.95

Q15. To what extent do you agree or disagree with the following statement: I have concerns about how radioactive waste is managed in my country?

Table A3. 17 Responses to Q15 for each EU Member State

Member State	Totally agree (%)	Tend to agree (%)	Tend to disagree (%)	Totally disagree (%)	Don't know (%)
Greece	48.20	35.50	8.50	1.20	6.60
Spain	45.30	41.60	7.70	1.60	3.80
Portugal	44.30	41.80	6.70	1.80	5.40
Cyprus	44.00	31.67	8.00	1.67	14.67
Romania	42.90	41.10	10.40	1.70	3.90
Croatia	38.30	41.70	10.60	2.80	6.60
Bulgaria	36.80	40.40	12.40	3.40	7.00
Germany	34.77	40.06	13.99	5.00	6.19
Italy	30.21	45.66	13.36	2.39	8.37
Slovenia	29.90	41.60	17.10	7.20	4.20
Austria	29.10	32.20	24.60	7.00	7.10
France	28.40	42.90	15.50	4.00	9.20
Hungary	27.00	43.50	18.00	6.00	5.50
Malta	26.37	35.32	15.92	4.48	17.91
Poland	26.20	47.00	11.60	3.40	11.80
Belgium	23.80	38.50	19.70	8.00	10.00
Denmark	23.50	26.80	20.00	12.20	17.50
Slovakia	20.98	39.86	19.38	4.10	15.68
Ireland	20.20	36.60	17.20	4.00	22.00
Latvia	19.00	35.20	23.80	6.00	16.00
Finland	18.50	37.80	24.20	11.50	8.00
Lithuania	17.28	48.35	17.68	2.70	13.99
Sweden	16.68	33.67	26.77	13.89	8.99
Estonia	16.28	38.16	24.38	6.59	14.59
Czechia	15.30	34.00	29.00	11.90	9.80
Luxembourg	14.74	32.67	27.69	5.18	19.72
Netherlands	9.30	29.80	29.50	13.40	18.00

Q16. To what extent do you agree or disagree with the following statement: each EU Member State should dispose of its own radioactive waste in its territory?

Table A3. 18 Responses to Q16 for each EU Member State

Member State	Totally agree (%)	Tend to agree (%)	Tend to disagree (%)	Totally disagree (%)	Don't know (%)
Romania	63.80	25.40	5.80	0.80	4.20
Croatia	50.60	31.80	8.10	3.20	6.30
Poland	45.90	38.00	4.50	2.30	9.30
Cyprus	40.67	32.67	8.00	5.00	13.67
Portugal	40.30	40.00	12.60	2.00	5.10
Greece	40.00	34.40	9.20	3.20	13.20
Finland	38.80	35.70	13.20	3.30	9.00
Bulgaria	37.90	32.90	14.50	6.10	8.60
France	37.90	42.10	8.80	2.10	9.10
Spain	37.10	35.80	15.90	5.50	5.70
Malta	36.82	33.83	18.91	2.49	7.96
Germany	36.36	34.17	13.99	4.80	10.69
Slovenia	36.60	33.00	16.30	7.30	6.80
Italy	35.29	39.98	11.67	2.39	10.67
Austria	35.10	32.90	17.60	3.50	10.90
Denmark	34.00	27.70	12.40	8.60	17.30
Hungary	32.60	39.70	13.50	4.40	9.80
Sweden	32.37	39.36	10.19	4.50	13.59
Slovakia	31.77	35.86	14.69	3.40	14.29
Ireland	30.20	40.00	10.40	1.40	18.00
Belgium	29.60	35.50	14.70	5.60	14.60
Lithuania	28.07	46.35	10.69	1.50	13.39
Latvia	27.60	34.70	19.40	5.00	13.30
Luxembourg	24.90	34.86	25.10	4.98	10.16
Netherlands	23.70	40.80	15.60	6.00	13.90
Estonia	23.28	40.46	18.38	3.90	13.99
Czechia	22.60	42.40	19.10	4.90	11.00

Comparison of question 16 responses with Eurobarometer responses

When asked if a Member State should dispose of its own radioactive waste, a lower number of 35 % agreed to this statement in the 2022 survey than in the survey in 2008, in which 63 % agreed.

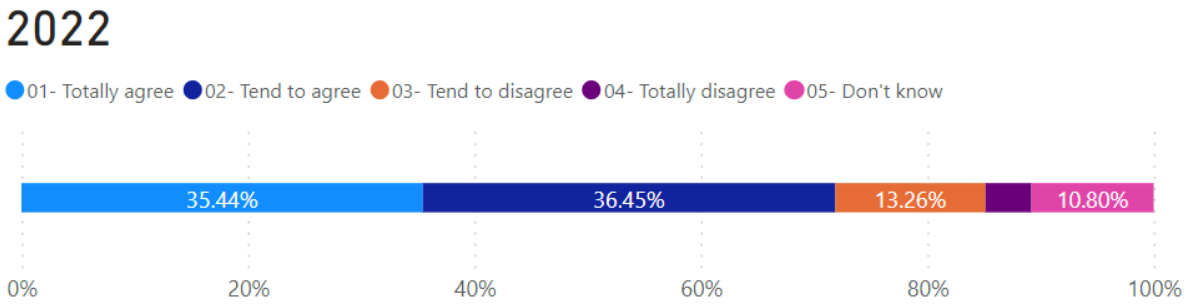

Figure 132. Responses to Q16 in the 2022 survey in EU Member States

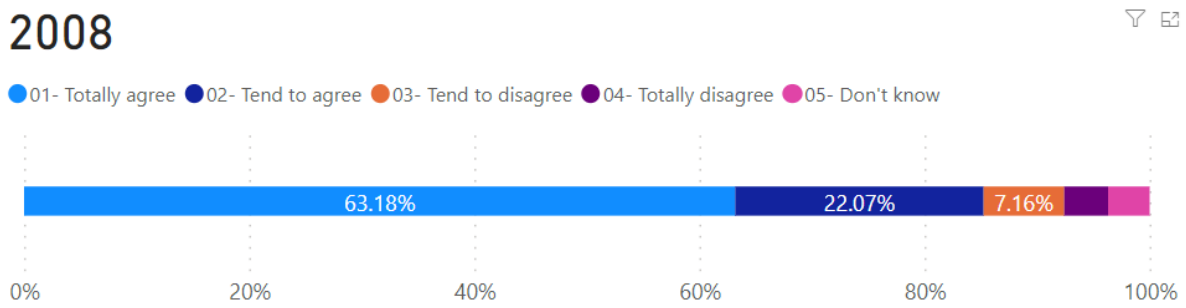

Figure 133. Responses to Q16 in the 2008 Eurobarometer

Q17. To what extent do you agree or disagree with the following statement: harmonised and consistent methodologies should be developed within the EU to manage radioactive waste?

Table A3. 19 Responses to Q17 for each EU Member State

Member State	Totally agree (%)	Tend to agree (%)	Tend to disagree (%)	Totally disagree (%)	Don't know
Cyprus	69.33	21.67	4.00	0.00	5.00
Romania	66.80	27.30	3.10	0.40	2.40
Croatia	64.80	26.70	4.30	1.80	2.40
Portugal	64.50	29.10	2.70	1.10	2.60
Greece	61.10	31.90	3.30	1.00	2.70
Austria	60.10	31.80	3.90	0.70	3.50
Slovenia	58.90	25.00	6.30	5.50	4.30
Italy	56.83	33.80	4.99	1.50	2.89
Malta	55.72	31.34	4.48	1.99	6.47
Spain	55.50	36.30	4.30	1.00	2.90
Latvia	55.30	33.70	4.80	1.80	4.40
Germany	54.45	34.37	5.09	1.30	4.80
Hungary	54.20	37.70	3.90	0.40	3.80
Poland	53.50	36.00	2.90	2.00	5.60
Bulgaria	50.40	37.10	5.90	2.80	3.80
Luxembourg	48.21	43.43	3.78	0.00	4.58
Lithuania	47.85	45.55	1.40	0.80	4.40
Denmark	43.80	32.60	7.60	3.90	12.10
Estonia	42.06	45.75	4.50	1.80	5.89
Ireland	41.40	41.40	5.40	1.40	10.40
Slovakia	40.76	42.06	6.29	2.20	8.69
Belgium	40.60	39.50	8.10	3.20	8.60
Finland	39.60	40.30	7.40	1.00	11.70
Sweden	38.96	39.26	7.79	2.60	11.39
France	38.60	45.40	6.00	1.70	8.30
Netherlands	35.70	44.00	6.90	3.10	10.30
Czechia	32.20	44.70	9.60	4.50	9.00

Comparison of question 17 responses with Eurobarometer responses

When asked if harmonised approaches should be taken to manage radioactive waste across the EU, the results were relatively similar between the two surveys. However, the number of respondents who totally agreed decreased by 16 percentage points, from 66 % to 50 %, between the 2008 survey and the 2022 survey.

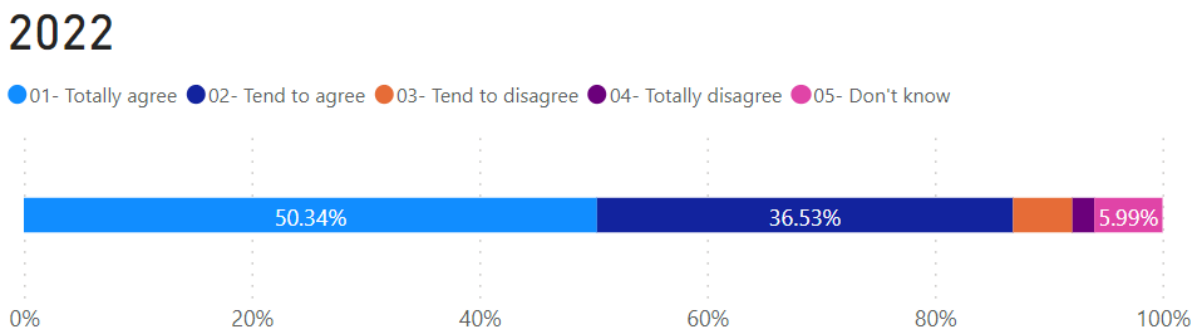

Figure 134. Responses to Q17 in the 2022 survey in EU Member States

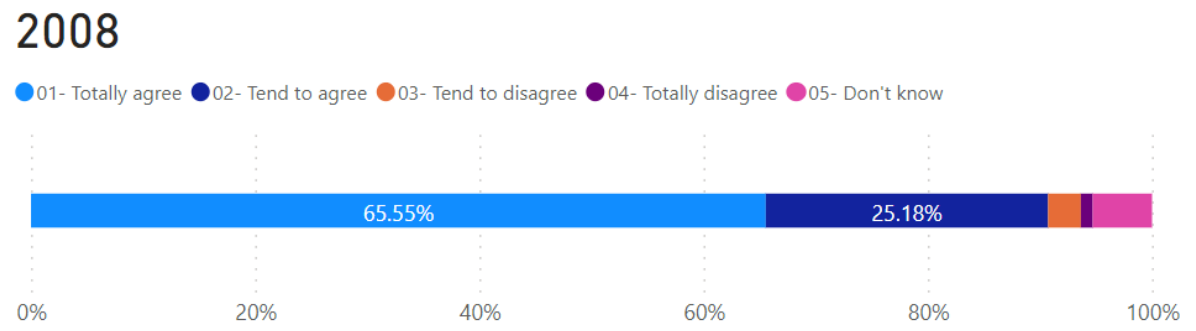

Figure 135. Responses to Q17 in the 2008 Eurobarometer

Q18. To what extent do you agree or disagree with the following statement: a harmonised radioactive waste classification scheme for all EU Member States would ensure an appropriate level of transparency for EU citizens?

Table A3. 20 Responses to Q18 for each EU Member State

Member State	Totally agree (%)	Tend to agree (%)	Tend to disagree (%)	Totally disagree (%)	Don't know (%)
Portugal	60.80	32.40	3.20	1.00	2.60
Romania	58.60	32.40	4.50	0.70	3.80
Cyprus	51.67	34.67	4.67	1.00	8.00
Malta	51.24	36.82	5.47	0.50	5.97
Italy	49.45	39.78	5.68	1.20	3.89
Greece	46.70	42.80	5.80	0.70	4.00
Croatia	45.90	42.40	5.50	1.50	4.70
Poland	45.40	41.00	3.60	2.50	7.50
Austria	44.60	41.40	6.50	1.50	6.00
Spain	44.50	42.00	6.30	1.50	5.70
Latvia	44.30	39.70	5.90	1.60	8.50
Slovenia	44.30	35.10	10.50	4.90	5.20
Germany	42.36	40.26	8.39	2.30	6.69
Luxembourg	40.84	47.41	4.78	0.40	6.57
Bulgaria	39.80	40.40	9.90	3.10	6.80
Ireland	39.20	43.80	3.60	1.80	11.60
Hungary	36.70	43.80	9.80	1.50	8.20
Lithuania	35.46	53.15	3.30	1.60	6.49
France	33.80	48.30	6.30	1.80	9.80
Finland	33.10	45.10	7.90	1.40	12.50
Denmark	32.60	36.90	9.40	4.00	17.10
Belgium	31.70	44.20	9.90	3.70	10.50
Estonia	29.97	52.35	4.90	2.00	10.79
Sweden	26.37	47.45	8.49	2.50	15.18
Czechia	25.90	47.10	9.60	3.80	13.60
Slovakia	23.78	49.35	10.39	2.30	14.19
Netherlands	20.80	47.70	13.80	2.60	15.10

Q19. Which of the following would facilitate greater transparency in how radioactive wastes are classified for EU citizens? Rank them from most to least facilitating.

Table A3. 21 Responses to Q19 for each EU Member State

Member State	Website of the regulators (%)	Website of the WPs (%)	Advertisements in national newspapers (%)	Information sessions in schools (%)
Sweden	51.25	25.57	8.89	14.29
Romania	47.20	37.50	7.60	7.70
Italy	46.96	26.62	8.97	17.45
Bulgaria	44.70	35.20	8.30	11.80
Hungary	44.10	28.40	10.40	17.10
Lithuania	44.06	29.57	13.09	13.29
Austria	43.50	27.60	12.70	16.20
Czechia	43.20	39.30	8.40	9.10
Latvia	43.20	32.70	10.30	13.80
Greece	42.80	30.50	10.00	16.70
Germany	41.66	31.17	12.49	14.69
Poland	41.30	36.60	7.90	14.20
Netherlands	37.70	35.00	12.00	15.30
Portugal	37.70	29.60	13.90	18.80
Malta	37.31	24.38	10.45	27.86
Luxembourg	36.85	34.26	12.35	16.53
Ireland	36.80	33.20	12.40	17.60
Croatia	35.70	36.70	13.60	14.00
Slovakia	35.56	26.67	25.87	11.89
Estonia	34.37	39.36	8.69	17.58
Cyprus	34.00	29.67	11.33	25.00
Finland	33.40	43.90	9.60	13.10
Denmark	32.40	23.20	12.40	32.00
Slovenia	31.90	36.80	15.80	15.50
Spain	30.80	34.00	14.80	20.40
France	29.30	34.40	21.40	14.90
Belgium	28.70	35.20	17.00	19.10

Q20. To what extent do you agree or disagree with the following statement: different categories of radioactive waste should be managed in a manner which reflects their level of hazard?

Table A3. 22 Responses to Q20 for each EU Member State

Member State	Totally agree (%)	Tend to agree (%)	Tend to disagree (%)	Totally disagree (%)	Don't know (%)
Cyprus	65.67	26.00	3.33	0.67	4.33
Hungary	64.40	29.80	2.60	0.40	2.80
Romania	63.90	29.40	3.50	0.40	2.80
Slovenia	62.10	26.00	5.40	3.60	2.90
Finland	62.00	28.50	4.20	1.90	3.40
Malta	59.70	33.83	2.99	0.50	2.99
Greece	59.50	32.10	3.70	1.30	3.40
Spain	59.30	32.20	4.20	1.20	3.10
Croatia	56.80	33.20	4.80	2.40	2.80
Estonia	56.54	37.16	1.20	0.00	5.09
Austria	55.80	32.90	4.60	1.50	5.20
Portugal	55.40	38.20	3.00	0.70	2.70
Italy	54.54	36.29	4.69	1.40	3.09
Bulgaria	54.20	35.50	4.60	2.60	3.10
Denmark	51.40	30.90	6.10	2.00	9.60
Ireland	51.00	37.40	3.60	0.60	7.40
Luxembourg	50.60	43.63	2.79	0.20	2.79
Latvia	49.90	37.20	4.10	1.00	7.80
Czechia	47.90	39.60	4.00	1.60	6.90
Lithuania	47.75	47.35	1.60	0.70	2.60
Poland	45.70	43.80	2.40	1.30	6.80
France	46.40	41.70	4.80	0.90	6.20
Germany	45.55	40.26	6.59	1.70	5.89
Sweden	45.45	39.36	5.89	1.20	8.09
Slovakia	44.96	40.66	5.89	1.60	6.89
Belgium	43.60	38.90	7.50	2.50	7.50
Netherlands	38.60	42.80	7.40	2.00	9.20

Q21. To what extent do you agree or disagree with the following statement: materials (e.g. concrete, and metals such as steel and copper) with very low levels of radioactivity should be considered for reuse/recycling instead of being viewed as radioactive waste?

Table A3. 23 Responses to Q21 for each EU Member State

Member State	Totally agree (%)	Tend to agree (%)	Tend to disagree (%)	Totally disagree (%)	Don't know (%)
Cyprus	47.00	30.67	9.00	3.33	10.00
Croatia	43.40	37.30	10.90	4.30	4.10
Malta	41.29	41.29	8.96	3.48	4.98
Romania	37.90	40.30	10.10	4.30	7.40
Slovenia	35.90	39.20	12.70	4.60	7.60
Latvia	32.10	41.70	10.20	4.20	11.80
Bulgaria	30.40	41.50	14.80	3.60	9.70
Greece	30.20	37.70	11.80	7.10	13.20
Denmark	29.30	34.40	10.40	4.80	21.10
Poland	29.20	43.50	8.60	2.60	16.10
Finland	28.90	39.70	12.20	4.80	14.40
Spain	27.70	42.80	11.50	3.60	14.40
Slovakia	27.17	44.66	10.39	4.10	13.69
Portugal	26.90	51.00	11.20	1.50	9.40
Estonia	26.37	50.35	8.69	1.40	13.19
Czechia	25.90	46.60	9.30	2.50	15.70
Austria	25.60	40.60	15.30	4.70	13.80
Hungary	24.90	48.10	13.20	4.10	9.70
Italy	24.03	45.06	13.56	5.08	12.26
Lithuania	22.88	48.65	11.29	2.80	14.39
Ireland	22.80	41.00	10.80	4.00	21.40
Germany	21.68	40.06	17.88	6.39	13.99
Netherlands	21.00	41.20	13.40	5.80	18.60
Belgium	19.50	41.90	13.50	5.40	19.70
Luxembourg	19.32	50.20	14.74	5.38	10.36
France	18.50	44.30	14.30	4.60	18.30
Sweden	18.48	42.86	12.99	5.89	19.78

Q22. To what extent do you agree or disagree with the following statement: if it can be proved that they will be safely managed, radioactive wastes and/or materials should be allowed to be transported from one EU Member State to another for final disposal?

Table A3. 24 Responses to Q22 for each EU Member State

Member State	Totally agree (%)	Tend to agree (%)	Tend to disagree (%)	Totally disagree (%)	Don't know (%)
Slovenia	34.50	41.00	12.40	6.60	5.50
Cyprus	31.00	38.00	12.33	9.00	9.67
Malta	29.35	46.27	10.95	8.46	4.98
Spain	27.20	42.70	14.60	5.70	9.80
Romania	27.10	31.80	15.80	19.00	6.30
Croatia	26.60	37.80	17.30	12.70	5.60
Bulgaria	24.50	35.10	19.60	12.20	8.60
Latvia	24.20	39.90	17.30	8.40	10.20
Estonia	23.18	47.95	12.39	5.00	11.49
Portugal	22.80	45.00	18.00	7.10	7.10
Poland	22.80	45.80	12.20	6.50	12.70
Denmark	22.50	33.40	13.70	11.20	19.20
Finland	22.30	44.00	15.90	6.80	11.00
Italy	21.04	47.16	15.75	6.28	9.77
Lithuania	19.58	49.25	14.99	4.20	11.99
Luxembourg	19.52	45.42	22.31	5.38	7.37
Greece	19.40	35.30	16.70	18.00	10.60
Hungary	19.40	41.90	18.20	9.60	10.90
Ireland	17.80	43.20	16.20	6.00	16.80
France	17.40	41.70	18.20	7.80	14.90
Czechia	17.30	45.60	15.60	8.70	12.80
Sweden	17.18	39.06	18.68	9.59	15.48
Netherlands	17.00	48.30	13.90	7.60	13.20
Belgium	16.60	44.70	17.40	7.10	14.20
Austria	16.10	37.30	22.50	12.00	12.10
Germany	15.18	37.46	24.08	10.69	12.59
Slovakia	14.69	37.96	20.98	12.19	14.19

3. INDIVIDUAL MEMBER STATES' RESULTS

The results of the survey obtained for each Member State are provided in this section.

AUSTRIA

Are you…?	
Total	N=1000
Male	50%
Female	50%
How old are you?	
Total	100%
Promedio	45.57
Media	46.00
Desviación estándar	16.33
Hidden for age recode	
Total	N=1000
15-24	15%
25-39	24%
40-54	24%
55-64	24%
65 and more	13%
How old were you when your education ended?	
Total	N=1000
15	3%
16-19	50%
20+	39%
Still Studying	8%
What is your current occupation?	
Total	N=1000
Self Employed	7%
Manager	10%
Other white collar workers	32%
Manual workers	12%
House Person/Housewife	4%
Unemployed	6%
Retired	22%
Student	8%

Q1: Is your country one of those in the EU which produces radioactive waste?	
Total	N=1000
Yes, I believe it produces radioactive waste	29%
No, I don't believe it produces radioactive waste	59%
I don't know either way	11%
Q2: Radioactive waste can result from the activities of a range of industries, especially the nuclear industry. Do you understand the different types and origins of radioactive waste?	
Total	N=1000
Yes completely	8%
Yes, to some degree	60%
No, not at all	32%
Q3: Please assess the following statement: There are several categories of radioactive waste, for example low, intermediate, and high-level waste.	
Total	N=1000
True	54%
I am aware of differences, but I don't understand them	32%
Don't know	14%
Q4: Please assess the following statement: Some non-nuclear industries produce radioactive waste.	
Total	N=1000
Yes	57%
No	8%
Don't know	35%

Q5: All radioactive waste is very dangerous.						
Total	N=1000					
True	78%					
False	22%					
Q6: Do you know who is responsible for the safe management of radioactive waste in your country?						
Total	N=1000					
Yes, I know definitively who is responsible	5%					
Yes, I believe I know who is responsible	18%					
No, I don't know who is responsible	76%					
Q7: Are you aware of the industries in your country which might produce naturally occurring radioactive material (NORM) wastes?						
Total	N=1000					
Yes, I am familiar with which industries produce NORM wastes	8%					
Yes, I am partly familiar with which industries produce NORM wastes	26%					
No, I am not familiar with which industries produce NORM wastes	67%					
Q8: Do you believe that naturally occurring radioactive material (NORM) wastes should be managed in the same regulated manner as radioactive wastes emanating from the nuclear industry?						
Total	N=1000					
Yes, I believe they should be managed in the same manner as nuclear industry wastes	59%					
No, I don't think it is necessary that they are managed in the same manner as nuclear industry wastes	41%					
Q9: With respect to how radioactive waste is regulated in your country, how familiar are you with the regulation process?						
Total	N=1000					
Yes, I am familiar how radioactive waste is regulated in my country	6%					
I have a limited understanding of how radioactive waste is regulated in my country	29%					
No, I am not aware of how radioactive waste is regulated in my country	65%					
Q10: With respect to the communication about how radioactive wastes are classified and managed, who do you trust the most?						
	Scientist (A)	**Academia (B)**	**Industry (C)**	**Government (D)**	**Regulators (E)**	**NGO's (F)**
Total	N=1000	N=1000	N=1000	N=1000	N=1000	N=1000
Rank1	57%	4%	5%	6%	16%	14%
Rank2	19%	18%	12%	7%	25%	20%
Rank3	12%	21%	13%	9%	27%	19%
Rank4	7%	26%	17%	16%	19%	16%
Rank5	3%	19%	21%	31%	11%	15%
Rank6	1%	13%	34%	32%	3%	17%
Q11: How well informed do you think you are about radioactive waste?						
Total	N=1000					
Well Informed	5%					
Partly Informed	52%					
Not informed at all	43%					
Q12: Are you aware of opportunities in your country for the general public to discuss or learn about radioactive waste management with either industry or regulatory organizations?						
Total	N=1000					
Yes I am aware of potential opportunities	16%					
No I am not aware of any opportunities	84%					

Q12B: Please could you highlight from your experience which of these types of opportunities for gaining information about radioactive waste management you are aware of.

Total	N=157
Government Websites	35%
Industry Websites	41%
Regulatory Websites	51%
Public Meetings	27%
Site Stakeholder Groups	45%
Media Outlets	37%
Other	8%

Q13: Which of the following aspects of radioactive waste management might you be particularly interested in?

	Waste Regulation (A)	**Waste Storage (B)**	**Waste disposal (C)**	**Waste transportation (D)**
Total	N=799	N=799	N=799	N=799
Rank1	23%	10%	50%	16%
Rank2	14%	37%	19%	30%
Rank3	12%	36%	15%	37%
Rank4	50%	17%	16%	17%

Q14: Would you like to know more about how radioactive waste is classified and managed in your country?

Total	N=1000
Yes, I would be interested learning more	68%
No, I am not really interested in this subject	32%

To what extent do you agree or disagree with the following statements?

	Q15: I have concerns about how radioactive waste is managed in my country. (A)	**Q16: Each EU Member State should dispose of its own radioactive waste in its territory. (B)**	**Q17: Harmonized and consistent methodologies should be developed within the EU to manage radioactive waste. (C)**	**Q18: A harmonized radioactive waste classification scheme for all EU Member States would ensure an appropriate level of transparency for EU citizens. (D)**
Total	N=1000	N=1000	N=1000	N=1000
Totally agree	29%	35%	60%	45%
Tend to agree	32%	33%	32%	41%
Tend to disagree	25%	18%	4%	7%
Totally disagree	7%	4%	1%	2%
Don't know	7%	11%	4%	6%

Q19: Which of the following would facilitate greater transparency in how radioactive wastes are classified for EU citizens?

	Information should be readily available on the websites of the regulators (A)	**Information should be readily available on the websites of the waste producers (B)**	**Waste producers should take out advertisements in national newspapers (C)**	**Waste producers should hold information sessions at schools (D)**
Total	N=1000	N=1000	N=1000	N=1000
Rank1	44%	28%	13%	16%
Rank2	28%	41%	18%	14%
Rank3	18%	19%	31%	33%
Rank4	11%	12%	39%	38%

To what extent do you agree or disagree with the following statements?				
	Q20: Different categories of radioactive waste should be managed in a manner which reflects their level of hazard. (A)	**Q21: Materials (e.g. concrete, metals such as steel and copper) with very low levels of radioactivity should be considered for reuse/recycling instead of being viewed as radioactive waste. (B)**	**Q22: If it can be proved that they will be safely managed, radioactive wastes and/or materials should be allowed to be transported from one EU Member State to another for final disposal. (C)**	
Total	N=1000	N=1000	N=1000	
Totally agree	56%	26%	16%	
Tend to agree	33%	41%	37%	
Tend to disagree	5%	15%	23%	
Totally disagree	2%	5%	12%	
Don’t know	5%	14%	12%	

BELGIUM

Are you…?	
Total	N=1000
Male	50%
Female	50%
How old are you?	
Total	100%
Promedio	45.79
Media	48.00
Desviación estándar	18.36
Hidden for age recode	
Total	N=1000
15-24	20%
25-39	20%
40-54	21%
55-64	19%
65 and more	21%
How old were you when your education ended?	
Total	N=1000
15	4%
16-19	38%
20+	49%
Still Studying	9%
What is your current occupation?	
Total	N=1000
Self Employed	7%
Manager	6%
Other white collar workers	22%
Manual workers	12%
House Person/Housewife	7%
Unemployed	7%
Retired	26%
Student	13%

Q1: Is your country one of those in the EU which produces radioactive waste?	
Total	N=1000
Yes, I believe it produces radioactive waste	77%
No, I don't believe it produces radioactive waste	9%
I don't know either way	13%
Q2: Radioactive waste can result from the activities of a range of industries, especially the nuclear industry. Do you understand the different types and origins of radioactive waste?	
Total	N=1000
Yes completely	23%
Yes, to some degree	54%
No, not at all	24%
Q3: Please assess the following statement: There are several categories of radioactive waste, for example low, intermediate, and high-level waste.	
Total	N=1000
True	48%
I am aware of differences, but I don't understand them	37%
Don't know	15%
Q4: Please assess the following statement: Some non-nuclear industries produce radioactive waste.	
Total	N=1000
Yes	48%
No	15%
Don't know	37%

Q5: All radioactive waste is very dangerous.						
Total	N=1000					
True	73%					
False	27%					
Q6: Do you know who is responsible for the safe management of radioactive waste in your country?						
Total	N=1000					
Yes, I know definitively who is responsible	15%					
Yes, I believe I know who is responsible	31%					
No, I don't know who is responsible	55%					
Q7: Are you aware of the industries in your country which might produce naturally occurring radioactive material (NORM) wastes?						
Total	N=1000					
Yes, I am familiar with which industries produce NORM wastes	10%					
Yes, I am partly familiar with which industries produce NORM wastes	28%					
No, I am not familiar with which industries produce NORM wastes	62%					
Q8: Do you believe that naturally occurring radioactive material (NORM) wastes should be managed in the same regulated manner as radioactive wastes emanating from the nuclear industry?						
Total	N=1000					
Yes, I believe they should be managed in the same manner as nuclear industry wastes	66%					
No, I don't think it is necessary that they are managed in the same manner as nuclear industry wastes	34%					
Q9: With respect to how radioactive waste is regulated in your country, how familiar are you with the regulation process?						
Total	N=1000					
Yes, I am familiar how radioactive waste is regulated in my country	8%					
I have a limited understanding of how radioactive waste is regulated in my country	40%					
No, I am not aware of how radioactive waste is regulated in my country	52%					
Q10: With respect to the communication about how radioactive wastes are classified and managed, who do you trust the most?						
	Scientist (A)	**Academia (B)**	**Industry (C)**	**Government (D)**	**Regulators (E)**	**NGO's (F)**
Total	N=1000	N=1000	N=1000	N=1000	N=1000	N=1000
Rank1	51%	8%	7%	14%	11%	10%
Rank2	21%	28%	9%	11%	17%	14%
Rank3	12%	23%	12%	14%	25%	14%
Rank4	8%	18%	15%	16%	25%	19%
Rank5	5%	13%	24%	22%	15%	21%
Rank6	3%	11%	35%	22%	8%	22%
Q11: How well informed do you think you are about radioactive waste?						
Total	N=1000					
Well Informed	8%					
Partly Informed	50%					
Not informed at all	42%					
Q12: Are you aware of opportunities in your country for the general public to discuss or learn about radioactive waste management with either industry or regulatory organizations?						
Total	N=1000					
Yes I am aware of potential opportunities	28%					
No I am not aware of any opportunities	72%					

Q12B: Please could you highlight from your experience which of these types of opportunities for gaining information about radioactive waste management you are aware of.

Total	N=284
Government Websites	51%
Industry Websites	29%
Regulatory Websites	46%
Public Meetings	20%
Site Stakeholder Groups	26%
Media Outlets	42%
Other	8%

Q13: Which of the following aspects of radioactive waste management might you be particularly interested in?

	Waste Regulation (A)	**Waste Storage (B)**	**Waste disposal (C)**	**Waste transportation (D)**
Total	N=755	N=755	N=755	N=755
Rank1	20%	28%	41%	11%
Rank2	22%	30%	26%	21%
Rank3	27%	21%	20%	32%
Rank4	30%	20%	13%	36%

Q14: Would you like to know more about how radioactive waste is classified and managed in your country?

Total	N=1000
Yes, I would be interested learning more	64%
No, I am not really interested in this subject	37%

To what extent do you agree or disagree with the following statements?

	Q15: I have concerns about how radioactive waste is managed in my country. (A)	**Q16: Each EU Member State should dispose of its own radioactive waste in its territory. (B)**	**Q17: Harmonized and consistent methodologies should be developed within the EU to manage radioactive waste. (C)**	**Q18: A harmonized radioactive waste classification scheme for all EU Member States would ensure an appropriate level of transparency for EU citizens. (D)**
Total	N=1000	N=1000	N=1000	N=1000
Totally agree	24%	30%	41%	32%
Tend to agree	39%	36%	40%	44%
Tend to disagree	20%	15%	8%	10%
Totally disagree	8%	6%	3%	4%
Don't know	10%	15%	9%	11%

Q19: Which of the following would facilitate greater transparency in how radioactive wastes are classified for EU citizens?

	Information should be readily available on the websites of the regulators (A)	**Information should be readily available on the websites of the waste producers (B)**	**Waste producers should take out advertisements in national newspapers (C)**	**Waste producers should hold information sessions at schools (D)**
Total	N=1000	N=1000	N=1000	N=1000
Rank1	29%	35%	17%	19%
Rank2	33%	31%	19%	18%
Rank3	21%	19%	29%	31%
Rank4	18%	14%	35%	33%

To what extent do you agree or disagree with the following statements?				
	Q20: Different categories of radioactive waste should be managed in a manner which reflects their level of hazard. (A)	**Q21: Materials (e.g. concrete, metals such as steel and copper) with very low levels of radioactivity should be considered for reuse/recycling instead of being viewed as radioactive waste. (B)**	**Q22: If it can be proved that they will be safely managed, radioactive wastes and/or materials should be allowed to be transported from one EU Member State to another for final disposal. (C)**	
Total	N=1000	N=1000	N=1000	
Totally agree	44%	20%	17%	
Tend to agree	39%	42%	45%	
Tend to disagree	8%	14%	17%	
Totally disagree	3%	5%	7%	
Don’t know	8%	20%	14%	

BULGARIA

Are you…?	
Total	N=1000
Male	50%
Female	50%
How old are you?	
Total	100%
Promedio	42.33
Media	42.00
Desviación estándar	15.85
Hidden for age recode	
Total	N=1000
15-24	22%
25-39	24%
40-54	24%
55-64	23%
65 and more	8%
How old were you when your education ended?	
Total	N=1000
15	0%
16-19	39%
20+	53%
Still Studying	8%
What is your current occupation?	
Total	N=1000
Self Employed	11%
Manager	8%
Other white collar workers	37%
Manual workers	18%
House Person/Housewife	1%
Unemployed	7%
Retired	9%
Student	9%

Q1: Is your country one of those in the EU which produces radioactive waste?	
Total	N=1000
Yes, I believe it produces radioactive waste	64%
No, I don't believe it produces radioactive waste	17%
I don't know either way	19%
Q2: Radioactive waste can result from the activities of a range of industries, especially the nuclear industry. Do you understand the different types and origins of radioactive waste?	
Total	N=1000
Yes completely	31%
Yes, to some degree	55%
No, not at all	14%
Q3: Please assess the following statement: There are several categories of radioactive waste, for example low, intermediate, and high-level waste.	
Total	N=1000
True	50%
I am aware of differences, but I don't understand them	39%
Don't know	12%
Q4: Please assess the following statement: Some non-nuclear industries produce radioactive waste.	
Total	N=1000
Yes	56%
No	11%
Don't know	33%

Q5: All radioactive waste is very dangerous.						
Total	N=1000					
True	87%					
False	13%					
Q6: Do you know who is responsible for the safe management of radioactive waste in your country?						
Total	N=1000					
Yes, I know definitively who is responsible	13%					
Yes, I believe I know who is responsible	32%					
No, I don't know who is responsible	55%					
Q7: Are you aware of the industries in your country which might produce naturally occurring radioactive material (NORM) wastes?						
Total	N=1000					
Yes, I am familiar with which industries produce NORM wastes	14%					
Yes, I am partly familiar with which industries produce NORM wastes	45%					
No, I am not familiar with which industries produce NORM wastes	40%					
Q8: Do you believe that naturally occurring radioactive material (NORM) wastes should be managed in the same regulated manner as radioactive wastes emanating from the nuclear industry?						
Total	N=1000					
Yes, I believe they should be managed in the same manner as nuclear industry wastes	79%					
No, I don't think it is necessary that they are managed in the same manner as nuclear industry wastes	21%					
Q9: With respect to how radioactive waste is regulated in your country, how familiar are you with the regulation process?						
Total	N=1000					
Yes, I am familiar how radioactive waste is regulated in my country	10%					
I have a limited understanding of how radioactive waste is regulated in my country	48%					
No, I am not aware of how radioactive waste is regulated in my country	42%					
Q10: With respect to the communication about how radioactive wastes are classified and managed, who do you trust the most?						
	Scientist (A)	**Academia (B)**	**Industry (C)**	**Government (D)**	**Regulators (E)**	**NGO's (F)**
Total	N=1000	N=1000	N=1000	N=1000	N=1000	N=1000
Rank1	34%	21%	5%	13%	20%	7%
Rank2	24%	29%	10%	11%	17%	9%
Rank3	15%	19%	17%	10%	23%	17%
Rank4	12%	12%	20%	13%	22%	21%
Rank5	9%	11%	24%	21%	14%	21%
Rank6	6%	8%	24%	32%	6%	26%
Q11: How well informed do you think you are about radioactive waste?						
Total	N=1000					
Well Informed	12%					
Partly Informed	66%					
Not informed at all	22%					
Q12: Are you aware of opportunities in your country for the general public to discuss or learn about radioactive waste management with either industry or regulatory organizations?						
Total	N=1000					
Yes I am aware of potential opportunities	34%					
No I am not aware of any opportunities	66%					

Q12B: Please could you highlight from your experience which of these types of opportunities for gaining information about radioactive waste management you are aware of.

Total	N=338
Government Websites	41%
Industry Websites	44%
Regulatory Websites	49%
Public Meetings	39%
Site Stakeholder Groups	37%
Media Outlets	53%
Other	13%

Q13: Which of the following aspects of radioactive waste management might you be particularly interested in?

	Waste Regulation (A)	**Waste Storage (B)**	**Waste disposal (C)**	**Waste transportation (D)**
Total	N=857	N=857	N=857	N=857
Rank1	31%	33%	22%	14%
Rank2	20%	31%	26%	23%
Rank3	25%	19%	27%	29%
Rank4	24%	17%	26%	33%

Q14: Would you like to know more about how radioactive waste is classified and managed in your country?

Total	N=1000
Yes, I would be interested learning more	86%
No, I am not really interested in this subject	14%

To what extent do you agree or disagree with the following statements?

	Q15: I have concerns about how radioactive waste is managed in my country. (A)	**Q16: Each EU Member State should dispose of its own radioactive waste in its territory. (B)**	**Q17: Harmonized and consistent methodologies should be developed within the EU to manage radioactive waste. (C)**	**Q18: A harmonized radioactive waste classification scheme for all EU Member States would ensure an appropriate level of transparency for EU citizens. (D)**
Total	N=1000	N=1000	N=1000	N=1000
Totally agree	37%	38%	50%	40%
Tend to agree	40%	33%	37%	40%
Tend to disagree	12%	15%	6%	10%
Totally disagree	3%	6%	3%	3%
Don’t know	7%	9%	4%	7%

Q19: Which of the following would facilitate greater transparency in how radioactive wastes are classified for EU citizens?

	Information should be readily available on the websites of the regulators (A)	**Information should be readily available on the websites of the waste producers (B)**	**Waste producers should take out advertisements in national newspapers (C)**	**Waste producers should hold information sessions at schools (D)**
Total	N=1000	N=1000	N=1000	N=1000
Rank1	45%	35%	8%	12%
Rank2	33%	42%	12%	14%
Rank3	14%	13%	35%	39%
Rank4	9%	11%	45%	36%

To what extent do you agree or disagree with the following statements?				
	Q20: Different categories of radioactive waste should be managed in a manner which reflects their level of hazard. (A)	**Q21: Materials (e.g. concrete, metals such as steel and copper) with very low levels of radioactivity should be considered for reuse/recycling instead of being viewed as radioactive waste. (B)**	**Q22: If it can be proved that they will be safely managed, radioactive wastes and/or materials should be allowed to be transported from one EU Member State to another for final disposal. (C)**	
Total	N=1000	N=1000	N=1000	
Totally agree	54%	30%	25%	
Tend to agree	36%	42%	35%	
Tend to disagree	5%	15%	20%	
Totally disagree	3%	4%	12%	
Don’t know	3%	10%	9%	

CROATIA

Are you…?	
Total	N=1000
Male	50%
Female	50%
How old are you?	
Total	100%
Promedio	43.13
Media	43.00
Desviación estándar	16.31
Hidden for age recode	
Total	N=1000
15-24	21%
25-39	23%
40-54	23%
55-64	23%
65 and more	10%
How old were you when your education ended?	
Total	N=1000
15	1%
16-19	45%
20+	44%
Still Studying	10%
What is your current occupation?	
Total	N=1000
Self Employed	9%
Manager	4%
Other white collar workers	33%
Manual workers	11%
House Person/Housewife	2%
Unemployed	10%
Retired	19%
Student	13%

Q1: Is your country one of those in the EU which produces radioactive waste?	
Total	N=1000
Yes, I believe it produces radioactive waste	56%
No, I don't believe it produces radioactive waste	33%
I don't know either way	11%
Q2: Radioactive waste can result from the activities of a range of industries, especially the nuclear industry. Do you understand the different types and origins of radioactive waste?	
Total	N=1000
Yes completely	27%
Yes, to some degree	64%
No, not at all	9%
Q3: Please assess the following statement: There are several categories of radioactive waste, for example low, intermediate, and high-level waste.	
Total	N=1000
True	59%
I am aware of differences, but I don't understand them	38%
Don't know	4%
Q4: Please assess the following statement: Some non-nuclear industries produce radioactive waste.	
Total	N=1000
Yes	82%
No	5%
Don't know	13%

Q5: All radioactive waste is very dangerous.						
Total	N=1000					
True	87%					
False	14%					
Q6: Do you know who is responsible for the safe management of radioactive waste in your country?						
Total	N=1000					
Yes, I know definitively who is responsible	9%					
Yes, I believe I know who is responsible	37%					
No, I don't know who is responsible	54%					
Q7: Are you aware of the industries in your country which might produce naturally occurring radioactive material (NORM) wastes?						
Total	N=1000					
Yes, I am familiar with which industries produce NORM wastes	9%					
Yes, I am partly familiar with which industries produce NORM wastes	38%					
No, I am not familiar with which industries produce NORM wastes	54%					
Q8: Do you believe that naturally occurring radioactive material (NORM) wastes should be managed in the same regulated manner as radioactive wastes emanating from the nuclear industry?						
Total	N=1000					
Yes, I believe they should be managed in the same manner as nuclear industry wastes	78%					
No, I don't think it is necessary that they are managed in the same manner as nuclear industry wastes	22%					
Q9: With respect to how radioactive waste is regulated in your country, how familiar are you with the regulation process?						
Total	N=1000					
Yes, I am familiar how radioactive waste is regulated in my country	6%					
I have a limited understanding of how radioactive waste is regulated in my country	45%					
No, I am not aware of how radioactive waste is regulated in my country	48%					
Q10: With respect to the communication about how radioactive wastes are classified and managed, who do you trust the most?						
	Scientist (A)	**Academia (B)**	**Industry (C)**	**Government (D)**	**Regulators (E)**	**NGO's (F)**
Total	N=1000	N=1000	N=1000	N=1000	N=1000	N=1000
Rank1	59%	8%	3%	3%	10%	17%
Rank2	22%	35%	7%	3%	16%	17%
Rank3	11%	24%	12%	6%	24%	23%
Rank4	5%	20%	19%	9%	31%	18%
Rank5	2%	9%	34%	23%	15%	16%
Rank6	2%	5%	24%	56%	4%	10%
Q11: How well informed do you think you are about radioactive waste?						
Total	N=1000					
Well Informed	9%					
Partly Informed	67%					
Not informed at all	25%					
Q12: Are you aware of opportunities in your country for the general public to discuss or learn about radioactive waste management with either industry or regulatory organizations?						
Total	N=1000					
Yes I am aware of potential opportunities	58%					
No I am not aware of any opportunities	42%					

Q12B: Please could you highlight from your experience which of these types of opportunities for gaining information about radioactive waste management you are aware of.

Total	N=576
Government Websites	22%
Industry Websites	39%
Regulatory Websites	46%
Public Meetings	40%
Site Stakeholder Groups	21%
Media Outlets	75%
Other	14%

Q13: Which of the following aspects of radioactive waste management might you be particularly interested in?

	Waste Regulation (A)	**Waste Storage (B)**	**Waste disposal (C)**	**Waste transportation (D)**
Total	N=890	N=890	N=890	N=890
Rank1	22%	33%	38%	7%
Rank2	17%	34%	32%	18%
Rank3	30%	21%	19%	30%
Rank4	31%	12%	11%	46%

Q14: Would you like to know more about how radioactive waste is classified and managed in your country?

Total	N=1000
Yes, I would be interested learning more	85%
No, I am not really interested in this subject	15%

To what extent do you agree or disagree with the following statements?

	Q15: I have concerns about how radioactive waste is managed in my country. (A)	**Q16: Each EU Member State should dispose of its own radioactive waste in its territory. (B)**	**Q17: Harmonized and consistent methodologies should be developed within the EU to manage radioactive waste. (C)**	**Q18: A harmonized radioactive waste classification scheme for all EU Member States would ensure an appropriate level of transparency for EU citizens. (D)**
Total	N=1000	N=1000	N=1000	N=1000
Totally agree	38%	51%	65%	46%
Tend to agree	42%	32%	27%	42%
Tend to disagree	11%	8%	4%	6%
Totally disagree	3%	3%	2%	2%
Don't know	7%	6%	2%	5%

Q19: Which of the following would facilitate greater transparency in how radioactive wastes are classified for EU citizens?

	Information should be readily available on the websites of the regulators (A)	**Information should be readily available on the websites of the waste producers (B)**	**Waste producers should take out advertisements in national newspapers (C)**	**Waste producers should hold information sessions at schools (D)**
Total	N=1000	N=1000	N=1000	N=1000
Rank1	36%	37%	14%	14%
Rank2	33%	34%	19%	14%
Rank3	17%	16%	41%	26%
Rank4	14%	13%	27%	46%

To what extent do you agree or disagree with the following statements?				
	Q20: Different categories of radioactive waste should be managed in a manner which reflects their level of hazard. (A)	**Q21: Materials (e.g. concrete, metals such as steel and copper) with very low levels of radioactivity should be considered for reuse/recycling instead of being viewed as radioactive waste. (B)**	**Q22: If it can be proved that they will be safely managed, radioactive wastes and/or materials should be allowed to be transported from one EU Member State to another for final disposal. (C)**	
Total	N=1000	N=1000	N=1000	
Totally agree	57%	43%	27%	
Tend to agree	33%	37%	38%	
Tend to disagree	5%	11%	17%	
Totally disagree	2%	4%	13%	
Don’t know	3%	4%	6%	

CYPRUS

Are you…?	
Total	N=300
Male	38%
Female	62%
How old are you?	
Total	100%
Promedio	32.84
Media	31.00
Desviación estándar	10.85
Hidden for age recode	
Total	N=300
15-24	27%
25-39	46%
40-54	23%
55-64	3%
65 and more	0%
How old were you when your education ended?	
Total	N=300
15	1%
16-19	26%
20+	59%
Still Studying	14%
What is your current occupation?	
Total	N=300
Self Employed	14%
Manager	7%
Other white collar workers	42%
Manual workers	6%
House Person/Housewife	2%
Unemployed	12%
Retired	1%
Student	16%

Q1: Is your country one of those in the EU which produces radioactive waste?	
Total	N=300
Yes, I believe it produces radioactive waste	36%
No, I don't believe it produces radioactive waste	48%
I don't know either way	16%
Q2: Radioactive waste can result from the activities of a range of industries, especially the nuclear industry. Do you understand the different types and origins of radioactive waste?	
Total	N=300
Yes completely	41%
Yes, to some degree	48%
No, not at all	11%
Q3: Please assess the following statement: There are several categories of radioactive waste, for example low, intermediate, and high-level waste.	
Total	N=300
True	54%
I am aware of differences, but I don't understand them	27%
Don't know	19%
Q4: Please assess the following statement: Some non-nuclear industries produce radioactive waste.	
Total	N=300
Yes	54%
No	11%
Don't know	34%

Q5: All radioactive waste is very dangerous.						
Total	N=300					
True	81%					
False	19%					
Q6: Do you know who is responsible for the safe management of radioactive waste in your country?						
Total	N=300					
Yes, I know definitively who is responsible	9%					
Yes, I believe I know who is responsible	25%					
No, I don't know who is responsible	66%					
Q7: Are you aware of the industries in your country which might produce naturally occurring radioactive material (NORM) wastes?						
Total	N=300					
Yes, I am familiar with which industries produce NORM wastes	8%					
Yes, I am partly familiar with which industries produce NORM wastes	31%					
No, I am not familiar with which industries produce NORM wastes	61%					
Q8: Do you believe that naturally occurring radioactive material (NORM) wastes should be managed in the same regulated manner as radioactive wastes emanating from the nuclear industry?						
Total	N=300					
Yes, I believe they should be managed in the same manner as nuclear industry wastes	77%					
No, I don't think it is necessary that they are managed in the same manner as nuclear industry wastes	23%					
Q9: With respect to how radioactive waste is regulated in your country, how familiar are you with the regulation process?						
Total	N=300					
Yes, I am familiar how radioactive waste is regulated in my country	7%					
I have a limited understanding of how radioactive waste is regulated in my country	41%					
No, I am not aware of how radioactive waste is regulated in my country	52%					
Q10: With respect to the communication about how radioactive wastes are classified and managed, who do you trust the most?						
	Scientist (A)	**Academia (B)**	**Industry (C)**	**Government (D)**	**Regulators (E)**	**NGO's (F)**
Total	N=300	N=300	N=300	N=300	N=300	N=300
Rank1	65%	10%	3%	8%	8%	6%
Rank2	20%	34%	11%	6%	21%	8%
Rank3	8%	19%	16%	11%	30%	16%
Rank4	5%	18%	21%	13%	22%	21%
Rank5	1%	13%	26%	18%	13%	29%
Rank6	1%	7%	24%	43%	5%	20%
Q11: How well informed do you think you are about radioactive waste?						
Total	N=300					
Well Informed	7%					
Partly Informed	51%					
Not informed at all	42%					
Q12: Are you aware of opportunities in your country for the general public to discuss or learn about radioactive waste management with either industry or regulatory organizations?						
Total	N=300					
Yes I am aware of potential opportunities	29%					
No I am not aware of any opportunities	71%					
Q12B: Please could you highlight from your experience which of these types of opportunities for gaining information about radioactive waste management you are aware of.						
Total	N=88					
Government Websites	49%					
Industry Websites	50%					
Regulatory Websites	49%					
Public Meetings	26%					

Site Stakeholder Groups	38%
Media Outlets	69%
Other	10%

Q13: Which of the following aspects of radioactive waste management might you be particularly interested in?

	Waste Regulation (A)	Waste Storage (B)	Waste disposal (C)	Waste transportation (D)
Total	N=229	N=229	N=229	N=229
Rank1	45%	28%	10%	17%
Rank2	19%	29%	19%	33%
Rank3	13%	30%	33%	25%
Rank4	24%	14%	38%	25%

Q14: Would you like to know more about how radioactive waste is classified and managed in your country?

Total	
Yes, I would be interested learning more	80%
No, I am not really interested in this subject	20%

To what extent do you agree or disagree with the following statements?

	Q15: I have concerns about how radioactive waste is managed in my country. (A)	Q16: Each EU Member State should dispose of its own radioactive waste in its territory. (B)	Q17: Harmonized and consistent methodologies should be developed within the EU to manage radioactive waste. (C)	Q18: A harmonized radioactive waste classification scheme for all EU Member States would ensure an appropriate level of transparency for EU citizens. (D)
Total	N=300	N=300	N=300	N=300
Totally agree	44%	41%	69%	52%
Tend to agree	32%	33%	22%	35%
Tend to disagree	8%	8%	4%	5%
Totally disagree	2%	5%	0%	1%
Don’t know	15%	14%	5%	8%

Q19: Which of the following would facilitate greater transparency in how radioactive wastes are classified for EU citizens?

	Information should be readily available on the websites of the regulators (A)	Information should be readily available on the websites of the waste producers (B)	Waste producers should take out advertisements in national newspapers (C)	Waste producers should hold information sessions at schools (D)
Total	N=300	N=300	N=300	N=300
Rank1	34%	30%	11%	25%
Rank2	32%	34%	17%	17%
Rank3	19%	21%	31%	29%
Rank4	15%	15%	41%	29%

To what extent do you agree or disagree with the following statements?				
	Q20: Different categories of radioactive waste should be managed in a manner which reflects their level of hazard. (A)	**Q21: Materials (e.g. concrete, metals such as steel and copper) with very low levels of radioactivity should be considered for reuse/recycling instead of being viewed as radioactive waste. (B)**	**Q22: If it can be proved that they will be safely managed, radioactive wastes and/or materials should be allowed to be transported from one EU Member State to another for final disposal. (C)**	
Total	N=300	N=300	N=300	
Totally agree	66%	47%	31%	
Tend to agree	26%	31%	38%	
Tend to disagree	3%	9%	12%	
Totally disagree	1%	3%	9%	
Don’t know	4%	10%	10%	

CZECH REPUBLIC

Are you…?	
Total	N=1000
Male	50%
Female	50%
How old are you?	
Total	100%
Promedio	45.98
Media	47.00
Desviación estándar	18.21
Hidden for age recode	
Total	N=1000
15-24	20%
25-39	20%
40-54	20%
55-64	20%
65 and more	20%
How old were you when your education ended?	
Total	N=1000
15	3%
16-19	44%
20+	43%
Still Studying	11%
What is your current occupation?	
Total	N=1000
Self Employed	12%
Manager	4%
Other white collar workers	21%
Manual workers	17%
House Person/Housewife	5%
Unemployed	3%
Retired	27%
Student	12%

Q1: Is your country one of those in the EU which produces radioactive waste?	
Total	N=1000
Yes, I believe it produces radioactive waste	78%
No, I don't believe it produces radioactive waste	11%
I don't know either way	11%
Q2: Radioactive waste can result from the activities of a range of industries, especially the nuclear industry. Do you understand the different types and origins of radioactive waste?	
Total	N=1000
Yes completely	17%
Yes, to some degree	54%
No, not at all	29%
Q3: Please assess the following statement: There are several categories of radioactive waste, for example low, intermediate, and high-level waste.	
Total	N=1000
True	47%
I am aware of differences, but I don't understand them	40%
Don't know	13%
Q4: Please assess the following statement: Some non-nuclear industries produce radioactive waste.	
Total	N=1000
Yes	57%
No	9%
Don't know	34%

Q5: All radioactive waste is very dangerous.						
Total	N=1000					
True	81%					
False	20%					
Q6: Do you know who is responsible for the safe management of radioactive waste in your country?						
Total	N=1000					
Yes, I know definitively who is responsible	12%					
Yes, I believe I know who is responsible	46%					
No, I don't know who is responsible	42%					
Q7: Are you aware of the industries in your country which might produce naturally occurring radioactive material (NORM) wastes?						
Total	N=1000					
Yes, I am familiar with which industries produce NORM wastes	19%					
Yes, I am partly familiar with which industries produce NORM wastes	46%					
No, I am not familiar with which industries produce NORM wastes	35%					
Q8: Do you believe that naturally occurring radioactive material (NORM) wastes should be managed in the same regulated manner as radioactive wastes emanating from the nuclear industry?						
Total	N=1000					
Yes, I believe they should be managed in the same manner as nuclear industry wastes	69%					
No, I don't think it is necessary that they are managed in the same manner as nuclear industry wastes	31%					
Q9: With respect to how radioactive waste is regulated in your country, how familiar are you with the regulation process?						
Total	N=1000					
Yes, I am familiar how radioactive waste is regulated in my country	6%					
I have a limited understanding of how radioactive waste is regulated in my country	38%					
No, I am not aware of how radioactive waste is regulated in my country	56%					
Q10: With respect to the communication about how radioactive wastes are classified and managed, who do you trust the most?						
	Scientist (A)	**Academia (B)**	**Industry (C)**	**Government (D)**	**Regulators (E)**	**NGO's (F)**
Total	N=1000	N=1000	N=1000	N=1000	N=1000	N=1000
Rank1	39%	16%	8%	8%	25%	4%
Rank2	24%	29%	12%	9%	19%	7%
Rank3	16%	17%	17%	12%	25%	14%
Rank4	10%	16%	21%	17%	19%	17%
Rank5	7%	15%	23%	25%	9%	22%
Rank6	4%	8%	20%	29%	3%	36%
Q11: How well informed do you think you are about radioactive waste?						
Total	N=1000					
Well Informed	6%					
Partly Informed	59%					
Not informed at all	35%					
Q12: Are you aware of opportunities in your country for the general public to discuss or learn about radioactive waste management with either industry or regulatory organizations?						
Total	N=1000					
Yes I am aware of potential opportunities	35%					
No I am not aware of any opportunities	65%					

Q12B: Please could you highlight from your experience which of these types of opportunities for gaining information about radioactive waste management you are aware of.

Total	N=346
Government Websites	34%
Industry Websites	41%
Regulatory Websites	60%
Public Meetings	18%
Site Stakeholder Groups	27%
Media Outlets	55%
Other	10%

Q13: Which of the following aspects of radioactive waste management might you be particularly interested in?

	Waste Regulation (A)	**Waste Storage (B)**	**Waste disposal (C)**	**Waste transportation (D)**
Total	N=856	N=856	N=856	N=856
Rank1	17%	57%	15%	11%
Rank2	21%	22%	30%	27%
Rank3	26%	14%	33%	27%
Rank4	36%	7%	22%	35%

Q14: Would you like to know more about how radioactive waste is classified and managed in your country?

Total	N=1000
Yes, I would be interested learning more	73%
No, I am not really interested in this subject	27%

To what extent do you agree or disagree with the following statements?

	Q15: I have concerns about how radioactive waste is managed in my country. (A)	**Q16: Each EU Member State should dispose of its own radioactive waste in its territory. (B)**	**Q17: Harmonized and consistent methodologies should be developed within the EU to manage radioactive waste. (C)**	**Q18: A harmonized radioactive waste classification scheme for all EU Member States would ensure an appropriate level of transparency for EU citizens. (D)**
Total	N=1000	N=1000	N=1000	N=1000
Totally agree	15%	23%	32%	26%
Tend to agree	34%	42%	45%	47%
Tend to disagree	29%	19%	10%	10%
Totally disagree	12%	5%	5%	4%
Don't know	10%	11%	9%	14%

Q19: Which of the following would facilitate greater transparency in how radioactive wastes are classified for EU citizens?

	Information should be readily available on the websites of the regulators (A)	**Information should be readily available on the websites of the waste producers (B)**	**Waste producers should take out advertisements in national newspapers (C)**	**Waste producers should hold information sessions at schools (D)**
Total	N=1000	N=1000	N=1000	N=1000
Rank1	43%	39%	8%	9%
Rank2	37%	42%	12%	10%
Rank3	12%	13%	48%	27%
Rank4	8%	6%	32%	54%

To what extent do you agree or disagree with the following statements?				
	Q20: Different categories of radioactive waste should be managed in a manner which reflects their level of hazard. (A)	**Q21: Materials (e.g. concrete, metals such as steel and copper) with very low levels of radioactivity should be considered for reuse/recycling instead of being viewed as radioactive waste. (B)**	**Q22: If it can be proved that they will be safely managed, radioactive wastes and/or materials should be allowed to be transported from one EU Member State to another for final disposal. (C)**	
Total	N=1000	N=1000	N=1000	
Totally agree	48%	26%	17%	
Tend to agree	40%	47%	46%	
Tend to disagree	4%	9%	16%	
Totally disagree	2%	3%	9%	
Don’t know	7%	16%	13%	

DENMARK

Are you…?		
Total	N=1000	
Male	50%	
Female	50%	
How old are you?		
Total	100%	
Promedio	47.38	
Media	50.00	
Desviación estándar	17.72	
Hidden for age recode		
Total	N=1000	
15-24	16%	
25-39	21%	
40-54	22%	
55-64	22%	
65 and more	20%	
How old were you when your education ended?		
Total	N=1000	
15	4%	
16-19	24%	
20+	65%	
Still Studying	7%	
What is your current occupation?		
Total	N=1000	
Self Employed	5%	
Manager	7%	
Other white collar workers	7%	
Manual workers	36%	
House Person/Housewife	2%	
Unemployed	8%	
Retired	28%	
Student	8%	

Q1: Is your country one of those in the EU which produces radioactive waste?		
Total	N=1000	
Yes, I believe it produces radioactive waste	34%	
No, I don't believe it produces radioactive waste	53%	
I don't know either way	14%	
Q2: Radioactive waste can result from the activities of a range of industries, especially the nuclear industry. Do you understand the different types and origins of radioactive waste?		
Total	N=1000	
Yes completely	12%	
Yes, to some degree	44%	
No, not at all	45%	
Q3: Please assess the following statement: There are several categories of radioactive waste, for example low, intermediate, and high-level waste.		
Total	N=1000	
True	47%	
I am aware of differences, but I don't understand them	33%	
Don't know	19%	
Q4: Please assess the following statement: Some non-nuclear industries produce radioactive waste.		
Total	N=1000	
Yes	44%	
No	12%	
Don't know	44%	

Q5: All radioactive waste is very dangerous.						
Total	N=1000					
True	72%					
False	29%					
Q6: Do you know who is responsible for the safe management of radioactive waste in your country?						
Total	N=1000					
Yes, I know definitively who is responsible	11%					
Yes, I believe I know who is responsible	37%					
No, I don't know who is responsible	52%					
Q7: Are you aware of the industries in your country which might produce naturally occurring radioactive material (NORM) wastes?						
Total	N=1000					
Yes, I am familiar with which industries produce NORM wastes	9%					
Yes, I am partly familiar with which industries produce NORM wastes	23%					
No, I am not familiar with which industries produce NORM wastes	68%					
Q8: Do you believe that naturally occurring radioactive material (NORM) wastes should be managed in the same regulated manner as radioactive wastes emanating from the nuclear industry?						
Total	N=1000					
Yes, I believe they should be managed in the same manner as nuclear industry wastes	63%					
No, I don't think it is necessary that they are managed in the same manner as nuclear industry wastes	37%					
Q9: With respect to how radioactive waste is regulated in your country, how familiar are you with the regulation process?						
Total	N=1000					
Yes, I am familiar how radioactive waste is regulated in my country	8%					
I have a limited understanding of how radioactive waste is regulated in my country	33%					
No, I am not aware of how radioactive waste is regulated in my country	59%					
Q10: With respect to the communication about how radioactive wastes are classified and managed, who do you trust the most?						
	Scientist (A)	**Academia (B)**	**Industry (C)**	**Government (D)**	**Regulators (E)**	**NGO's (F)**
Total	N=1000	N=1000	N=1000	N=1000	N=1000	N=1000
Rank1	41%	5%	8%	14%	25%	8%
Rank2	24%	17%	8%	13%	28%	10%
Rank3	15%	18%	15%	17%	21%	14%
Rank4	10%	20%	18%	19%	14%	20%
Rank5	6%	24%	19%	20%	7%	23%
Rank6	5%	16%	32%	17%	5%	25%
Q11: How well informed do you think you are about radioactive waste?						
Total	N=1000					
Well Informed	11%					
Partly Informed	46%					
Not informed at all	43%					
Q12: Are you aware of opportunities in your country for the general public to discuss or learn about radioactive waste management with either industry or regulatory organizations?						
Total	N=1000					
Yes I am aware of potential opportunities	34%					
No I am not aware of any opportunities	66%					

Q12B: Please could you highlight from your experience which of these types of opportunities for gaining information about radioactive waste management you are aware of.

Total	N=338
Government Websites	52%
Industry Websites	34%
Regulatory Websites	39%
Public Meetings	25%
Site Stakeholder Groups	29%
Media Outlets	50%
Other	8%

Q13: Which of the following aspects of radioactive waste management might you be particularly interested in?

	Waste Regulation (A)	**Waste Storage (B)**	**Waste disposal (C)**	**Waste transportation (D)**
Total	N=761	N=761	N=761	N=761
Rank1	18%	33%	40%	9%
Rank2	16%	30%	29%	24%
Rank3	29%	21%	20%	30%
Rank4	37%	16%	10%	37%

Q14: Would you like to know more about how radioactive waste is classified and managed in your country?

Total	N=1000
Yes, I would be interested learning more	66%
No, I am not really interested in this subject	34%

To what extent do you agree or disagree with the following statements?

	Q15: I have concerns about how radioactive waste is managed in my country. (A)	**Q16: Each EU Member State should dispose of its own radioactive waste in its territory. (B)**	**Q17: Harmonized and consistent methodologies should be developed within the EU to manage radioactive waste. (C)**	**Q18: A harmonized radioactive waste classification scheme for all EU Member States would ensure an appropriate level of transparency for EU citizens. (D)**
Total	N=1000	N=1000	N=1000	N=1000
Totally agree	24%	34%	44%	33%
Tend to agree	27%	28%	33%	37%
Tend to disagree	20%	12%	8%	9%
Totally disagree	12%	9%	4%	4%
Don't know	18%	17%	12%	17%

Q19: Which of the following would facilitate greater transparency in how radioactive wastes are classified for EU citizens?

	Information should be readily available on the websites of the regulators (A)	**Information should be readily available on the websites of the waste producers (B)**	**Waste producers should take out advertisements in national newspapers (C)**	**Waste producers should hold information sessions at schools (D)**
Total	N=1000	N=1000	N=1000	N=1000
Rank1	32%	23%	12%	32%
Rank2	34%	25%	12%	30%
Rank3	24%	37%	15%	24%
Rank4	10%	15%	61%	14%

To what extent do you agree or disagree with the following statements?				
	Q20: Different categories of radioactive waste should be managed in a manner which reflects their level of hazard. (A)	**Q21: Materials (e.g. concrete, metals such as steel and copper) with very low levels of radioactivity should be considered for reuse/recycling instead of being viewed as radioactive waste. (B)**	**Q22: If it can be proved that they will be safely managed, radioactive wastes and/or materials should be allowed to be transported from one EU Member State to another for final disposal. (C)**	
Total	N=1000	N=1000	N=1000	
Totally agree	51%	29%	23%	
Tend to agree	31%	34%	33%	
Tend to disagree	6%	10%	14%	
Totally disagree	2%	5%	11%	
Don’t know	10%	21%	19%	

ESTONIA

Are you…?	
Total	N=1001
Male	50%
Female	50%
How old are you?	
Total	100%
Promedio	48.22
Media	50.00
Desviación estándar	17.75
Hidden for age recode	
Total	N=1001
15-24	15%
25-39	20%
40-54	22%
55-64	22%
65 and more	21%
How old were you when your education ended?	
Total	N=1001
15	0%
16-19	18%
20+	64%
Still Studying	17%
What is your current occupation?	
Total	N=1001
Self Employed	5%
Manager	9%
Other white collar workers	30%
Manual workers	18%
House Person/Housewife	2%
Unemployed	4%
Retired	21%
Student	10%

Q1: Is your country one of those in the EU which produces radioactive waste?	
Total	N=1001
Yes, I believe it produces radioactive waste	27%
No, I don't believe it produces radioactive waste	55%
I don't know either way	18%
Q2: Radioactive waste can result from the activities of a range of industries, especially the nuclear industry. Do you understand the different types and origins of radioactive waste?	
Total	N=1001
Yes completely	5%
Yes, to some degree	59%
No, not at all	36%
Q3: Please assess the following statement: There are several categories of radioactive waste, for example low, intermediate, and high-level waste.	
Total	N=1001
True	53%
I am aware of differences, but I don't understand them	32%
Don't know	16%
Q4: Please assess the following statement: Some non-nuclear industries produce radioactive waste.	
Total	N=1001
Yes	62%
No	6%
Don't know	32%

Q5: All radioactive waste is very dangerous.						
Total	N=1001					
True	83%					
False	17%					
Q6: Do you know who is responsible for the safe management of radioactive waste in your country?						
Total	N=1001					
Yes, I know definitively who is responsible	4%					
Yes, I believe I know who is responsible	25%					
No, I don't know who is responsible	71%					
Q7: Are you aware of the industries in your country which might produce naturally occurring radioactive material (NORM) wastes?						
Total	N=1001					
Yes, I am familiar with which industries produce NORM wastes	4%					
Yes, I am partly familiar with which industries produce NORM wastes	25%					
No, I am not familiar with which industries produce NORM wastes	71%					
Q8: Do you believe that naturally occurring radioactive material (NORM) wastes should be managed in the same regulated manner as radioactive wastes emanating from the nuclear industry?						
Total	N=1001					
Yes, I believe they should be managed in the same manner as nuclear industry wastes	72%					
No, I don't think it is necessary that they are managed in the same manner as nuclear industry wastes	28%					
Q9: With respect to how radioactive waste is regulated in your country, how familiar are you with the regulation process?						
Total	N=1001					
Yes, I am familiar how radioactive waste is regulated in my country	3%					
I have a limited understanding of how radioactive waste is regulated in my country	27%					
No, I am not aware of how radioactive waste is regulated in my country	70%					
Q10: With respect to the communication about how radioactive wastes are classified and managed, who do you trust the most?						
	Scientist (A)	**Academia (B)**	**Industry (C)**	**Government (D)**	**Regulators (E)**	**NGO's (F)**
Total	N=1001	N=1001	N=1001	N=1001	N=1001	N=1001
Rank1	48%	31%	3%	7%	6%	4%
Rank2	32%	38%	5%	7%	12%	6%
Rank3	9%	14%	13%	17%	27%	20%
Rank4	6%	10%	17%	22%	24%	20%
Rank5	3%	5%	22%	25%	21%	24%
Rank6	1%	3%	41%	22%	8%	25%
Q11: How well informed do you think you are about radioactive waste?						
Total	N=1001					
Well Informed	3%					
Partly Informed	49%					
Not informed at all	48%					
Q12: Are you aware of opportunities in your country for the general public to discuss or learn about radioactive waste management with either industry or regulatory organizations?						
Total	N=1001					
Yes I am aware of potential opportunities	16%					
No I am not aware of any opportunities	84%					

Q12B: Please could you highlight from your experience which of these types of opportunities for gaining information about radioactive waste management you are aware of.

Total	N=160
Government Websites	47%
Industry Websites	35%
Regulatory Websites	58%
Public Meetings	28%
Site Stakeholder Groups	20%
Media Outlets	69%
Other	9%

Q13: Which of the following aspects of radioactive waste management might you be particularly interested in?

	Waste Regulation (A)	**Waste Storage (B)**	**Waste disposal (C)**	**Waste transportation (D)**
Total	N=664	N=664	N=664	N=664
Rank1	27%	34%	33%	5%
Rank2	21%	26%	31%	23%
Rank3	21%	25%	21%	33%
Rank4	31%	14%	15%	39%

Q14: Would you like to know more about how radioactive waste is classified and managed in your country?

Total	N=1001
Yes, I would be interested learning more	47%
No, I am not really interested in this subject	53%

To what extent do you agree or disagree with the following statements?

	Q15: I have concerns about how radioactive waste is managed in my country. (A)	**Q16: Each EU Member State should dispose of its own radioactive waste in its territory. (B)**	**Q17: Harmonized and consistent methodologies should be developed within the EU to manage radioactive waste. (C)**	**Q18: A harmonized radioactive waste classification scheme for all EU Member States would ensure an appropriate level of transparency for EU citizens. (D)**
Total	N=1001	N=1001	N=1001	N=1001
Totally agree	16%	23%	42%	30%
Tend to agree	38%	40%	46%	52%
Tend to disagree	24%	18%	4%	5%
Totally disagree	7%	4%	2%	2%
Don't know	15%	14%	6%	11%

Q19: Which of the following would facilitate greater transparency in how radioactive wastes are classified for EU citizens?

	Information should be readily available on the websites of the regulators (A)	**Information should be readily available on the websites of the waste producers (B)**	**Waste producers should take out advertisements in national newspapers (C)**	**Waste producers should hold information sessions at schools (D)**
Total	N=1001	N=1001	N=1001	N=1001
Rank1	34%	39%	9%	18%
Rank2	38%	39%	9%	14%
Rank3	18%	15%	30%	38%
Rank4	9%	7%	52%	31%

To what extent do you agree or disagree with the following statements?				
	Q20: Different categories of radioactive waste should be managed in a manner which reflects their level of hazard. (A)	**Q21: Materials (e.g. concrete, metals such as steel and copper) with very low levels of radioactivity should be considered for reuse/recycling instead of being viewed as radioactive waste. (B)**	**Q22: If it can be proved that they will be safely managed, radioactive wastes and/or materials should be allowed to be transported from one EU Member State to another for final disposal. (C)**	
Total	N=1001	N=1001	N=1001	
Totally agree	57%	26%	23%	
Tend to agree	37%	50%	48%	
Tend to disagree	1%	9%	12%	
Totally disagree	0%	1%	5%	
Don’t know	5%	13%	11%	

FINLAND

Are you…?	
Total	N=1000
Male	50%
Female	50%
How old are you?	
Total	100%
Promedio	45.92
Media	47.00
Desviación estándar	17.95
Hidden for age recode	
Total	N=1000
15-24	19%
25-39	21%
40-54	21%
55-64	21%
65 and more	19%
How old were you when your education ended?	
Total	N=1000
15	5%
16-19	31%
20+	53%
Still Studying	12%
What is your current occupation?	
Total	N=1000
Self Employed	8%
Manager	5%
Other white collar workers	19%
Manual workers	15%
House Person/Housewife	2%
Unemployed	12%
Retired	26%
Student	12%

Q1: Is your country one of those in the EU which produces radioactive waste?	
Total	N=1000
Yes, I believe it produces radioactive waste	75%
No, I don't believe it produces radioactive waste	14%
I don't know either way	11%
Q2: Radioactive waste can result from the activities of a range of industries, especially the nuclear industry. Do you understand the different types and origins of radioactive waste?	
Total	N=1000
Yes completely	31%
Yes, to some degree	62%
No, not at all	7%
Q3: Please assess the following statement: There are several categories of radioactive waste, for example low, intermediate, and high-level waste.	
Total	N=1000
True	47%
I am aware of differences, but I don't understand them	39%
Don't know	15%
Q4: Please assess the following statement: Some non-nuclear industries produce radioactive waste.	
Total	N=1000
Yes	58%
No	9%
Don't know	33%

Q5: All radioactive waste is very dangerous.						
Total	N=1000					
True	82%					
False	18%					
Q6: Do you know who is responsible for the safe management of radioactive waste in your country?						
Total	N=1000					
Yes, I know definitively who is responsible	14%					
Yes, I believe I know who is responsible	43%					
No, I don't know who is responsible	43%					
Q7: Are you aware of the industries in your country which might produce naturally occurring radioactive material (NORM) wastes?						
Total	N=1000					
Yes, I am familiar with which industries produce NORM wastes	13%					
Yes, I am partly familiar with which industries produce NORM wastes	35%					
No, I am not familiar with which industries produce NORM wastes	53%					
Q8: Do you believe that naturally occurring radioactive material (NORM) wastes should be managed in the same regulated manner as radioactive wastes emanating from the nuclear industry?						
Total	N=1000					
Yes, I believe they should be managed in the same manner as nuclear industry wastes	63%					
No, I don't think it is necessary that they are managed in the same manner as nuclear industry wastes	37%					
Q9: With respect to how radioactive waste is regulated in your country, how familiar are you with the regulation process?						
Total	N=1000					
Yes, I am familiar how radioactive waste is regulated in my country	17%					
I have a limited understanding of how radioactive waste is regulated in my country	53%					
No, I am not aware of how radioactive waste is regulated in my country	30%					
Q10: With respect to the communication about how radioactive wastes are classified and managed, who do you trust the most?						
	Scientist (A)	**Academia (B)**	**Industry (C)**	**Government (D)**	**Regulators (E)**	**NGO's (F)**
Total	N=1000	N=1000	N=1000	N=1000	N=1000	N=1000
Rank1	49%	3%	21%	14%	9%	3%
Rank2	24%	16%	26%	13%	16%	5%
Rank3	13%	21%	19%	14%	24%	9%
Rank4	7%	25%	13%	18%	23%	14%
Rank5	4%	23%	10%	22%	18%	22%
Rank6	2%	11%	11%	19%	10%	47%
Q11: How well informed do you think you are about radioactive waste?						
Total	N=1000					
Well Informed	13%					
Partly Informed	69%					
Not informed at all	18%					
Q12: Are you aware of opportunities in your country for the general public to discuss or learn about radioactive waste management with either industry or regulatory organizations?						
Total	N=1000					
Yes I am aware of potential opportunities	37%					
No I am not aware of any opportunities	63%					

Q12B: Please could you highlight from your experience which of these types of opportunities for gaining information about radioactive waste management you are aware of.

Total	N=370
Government Websites	43%
Industry Websites	67%
Regulatory Websites	46%
Public Meetings	24%
Site Stakeholder Groups	15%
Media Outlets	41%
Other	11%

Q13: Which of the following aspects of radioactive waste management might you be particularly interested in?

	Waste Regulation (A)	**Waste Storage (B)**	**Waste disposal (C)**	**Waste transportation (D)**
Total	N=760	N=760	N=760	N=760
Rank1	10%	29%	51%	10%
Rank2	17%	38%	23%	23%
Rank3	27%	21%	17%	35%
Rank4	46%	12%	9%	33%

Q14: Would you like to know more about how radioactive waste is classified and managed in your country?

Total	N=1000
Yes, I would be interested learning more	69%
No, I am not really interested in this subject	31%

To what extent do you agree or disagree with the following statements?

	Q15: I have concerns about how radioactive waste is managed in my country. (A)	**Q16: Each EU Member State should dispose of its own radioactive waste in its territory. (B)**	**Q17: Harmonized and consistent methodologies should be developed within the EU to manage radioactive waste. (C)**	**Q18: A harmonized radioactive waste classification scheme for all EU Member States would ensure an appropriate level of transparency for EU citizens. (D)**
Total	N=1000	N=1000	N=1000	N=1000
Totally agree	19%	39%	40%	33%
Tend to agree	38%	36%	40%	45%
Tend to disagree	24%	13%	7%	8%
Totally disagree	12%	3%	1%	1%
Don’t know	8%	9%	12%	13%

Q19: Which of the following would facilitate greater transparency in how radioactive wastes are classified for EU citizens?

	Information should be readily available on the websites of the regulators (A)	**Information should be readily available on the websites of the waste producers (B)**	**Waste producers should take out advertisements in national newspapers (C)**	**Waste producers should hold information sessions at schools (D)**
Total	N=1000	N=1000	N=1000	N=1000
Rank1	33%	44%	10%	13%
Rank2	38%	34%	13%	16%
Rank3	17%	14%	36%	33%
Rank4	12%	8%	42%	38%

To what extent do you agree or disagree with the following statements?				
	Q20: Different categories of radioactive waste should be managed in a manner which reflects their level of hazard. (A)	**Q21: Materials (e.g. concrete, metals such as steel and copper) with very low levels of radioactivity should be considered for reuse/recycling instead of being viewed as radioactive waste. (B)**	**Q22: If it can be proved that they will be safely managed, radioactive wastes and/or materials should be allowed to be transported from one EU Member State to another for final disposal. (C)**	
Total	N=1000	N=1000	N=1000	
Totally agree	62%	29%	22%	
Tend to agree	29%	40%	44%	
Tend to disagree	4%	12%	16%	
Totally disagree	2%	5%	7%	
Don’t know	3%	14%	11%	

FRANCE

Are you…?	
Total	N=1000
Male	50%
Female	50%
How old are you?	
Total	100%
Promedio	46.24
Media	47.00
Desviación estándar	18.08
Hidden for age recode	
Total	N=1000
15-24	20%
25-39	20%
40-54	20%
55-64	20%
65 and more	20%
How old were you when your education ended?	
Total	N=1000
15	3%
16-19	41%
20+	48%
Still Studying	8%
What is your current occupation?	
Total	N=1000
Self Employed	7%
Manager	8%
Other white collar workers	20%
Manual workers	14%
House Person/Housewife	6%
Unemployed	4%
Retired	29%
Student	12%

Q1: Is your country one of those in the EU which produces radioactive waste?	
Total	N=1000
Yes, I believe it produces radioactive waste	85%
No, I don't believe it produces radioactive waste	5%
I don't know either way	10%
Q2: Radioactive waste can result from the activities of a range of industries, especially the nuclear industry. Do you understand the different types and origins of radioactive waste?	
Total	N=1000
Yes completely	22%
Yes, to some degree	52%
No, not at all	26%
Q3: Please assess the following statement: There are several categories of radioactive waste, for example low, intermediate, and high-level waste.	
Total	N=1000
True	58%
I am aware of differences, but I don't understand them	33%
Don't know	9%
Q4: Please assess the following statement: Some non-nuclear industries produce radioactive waste.	
Total	N=1000
Yes	59%
No	8%
Don't know	32%

Q5: All radioactive waste is very dangerous.						
Total	N=1000					
True	75%					
False	25%					
Q6: Do you know who is responsible for the safe management of radioactive waste in your country?						
Total	N=1000					
Yes, I know definitively who is responsible	12%					
Yes, I believe I know who is responsible	36%					
No, I don't know who is responsible	52%					
Q7: Are you aware of the industries in your country which might produce naturally occurring radioactive material (NORM) wastes?						
Total	N=1000					
Yes, I am familiar with which industries produce NORM wastes	8%					
Yes, I am partly familiar with which industries produce NORM wastes	29%					
No, I am not familiar with which industries produce NORM wastes	64%					
Q8: Do you believe that naturally occurring radioactive material (NORM) wastes should be managed in the same regulated manner as radioactive wastes emanating from the nuclear industry?						
Total	N=1000					
Yes, I believe they should be managed in the same manner as nuclear industry wastes	79%					
No, I don't think it is necessary that they are managed in the same manner as nuclear industry wastes	21%					
Q9: With respect to how radioactive waste is regulated in your country, how familiar are you with the regulation process?						
Total	N=1000					
Yes, I am familiar how radioactive waste is regulated in my country	7%					
I have a limited understanding of how radioactive waste is regulated in my country	43%					
No, I am not aware of how radioactive waste is regulated in my country	50%					
Q10: With respect to the communication about how radioactive wastes are classified and managed, who do you trust the most?						
	Scientist (A)	**Academia (B)**	**Industry (C)**	**Government (D)**	**Regulators (E)**	**NGO's (F)**
Total	N=1000	N=1000	N=1000	N=1000	N=1000	N=1000
Rank1	48%	3%	5%	14%	8%	22%
Rank2	28%	15%	9%	13%	16%	20%
Rank3	12%	20%	14%	15%	25%	15%
Rank4	7%	22%	15%	13%	27%	16%
Rank5	4%	23%	22%	20%	17%	13%
Rank6	1%	19%	35%	25%	7%	14%
Q11: How well informed do you think you are about radioactive waste?						
Total	N=1000					
Well Informed	7%					
Partly Informed	51%					
Not informed at all	41%					
Q12: Are you aware of opportunities in your country for the general public to discuss or learn about radioactive waste management with either industry or regulatory organizations?						
Total	N=1000					
Yes I am aware of potential opportunities	23%					
No I am not aware of any opportunities	78%					

Q12B: Please could you highlight from your experience which of these types of opportunities for gaining information about radioactive waste management you are aware of.

Total	N=225
Government Websites	57%
Industry Websites	48%
Regulatory Websites	61%
Public Meetings	36%
Site Stakeholder Groups	28%
Media Outlets	39%
Other	11%

Q13: Which of the following aspects of radioactive waste management might you be particularly interested in?

	Waste Regulation (A)	**Waste Storage (B)**	**Waste disposal (C)**	**Waste transportation (D)**
Total	N=858	N=858	N=858	N=858
Rank1	23%	29%	39%	9%
Rank2	21%	31%	30%	18%
Rank3	23%	28%	17%	32%
Rank4	33%	12%	14%	41%

Q14: Would you like to know more about how radioactive waste is classified and managed in your country?

Total	N=1000
Yes, I would be interested learning more	76%
No, I am not really interested in this subject	24%

To what extent do you agree or disagree with the following statements?

	Q15: I have concerns about how radioactive waste is managed in my country. (A)	**Q16: Each EU Member State should dispose of its own radioactive waste in its territory. (B)**	**Q17: Harmonized and consistent methodologies should be developed within the EU to manage radioactive waste. (C)**	**Q18: A harmonized radioactive waste classification scheme for all EU Member States would ensure an appropriate level of transparency for EU citizens. (D)**
Total	N=1000	N=1000	N=1000	N=1000
Totally agree	28%	38%	39%	34%
Tend to agree	43%	42%	45%	48%
Tend to disagree	16%	9%	6%	6%
Totally disagree	4%	2%	2%	2%
Don't know	9%	9%	8%	10%

Q19: Which of the following would facilitate greater transparency in how radioactive wastes are classified for EU citizens?

	Information should be readily available on the websites of the regulators (A)	**Information should be readily available on the websites of the waste producers (B)**	**Waste producers should take out advertisements in national newspapers (C)**	**Waste producers should hold information sessions at schools (D)**
Total	N=1000	N=1000	N=1000	N=1000
Rank1	29%	34%	21%	15%
Rank2	32%	31%	19%	18%
Rank3	23%	21%	34%	22%
Rank4	16%	13%	26%	45%

To what extent do you agree or disagree with the following statements?				
	Q20: Different categories of radioactive waste should be managed in a manner which reflects their level of hazard. (A)	**Q21: Materials (e.g. concrete, metals such as steel and copper) with very low levels of radioactivity should be considered for reuse/recycling instead of being viewed as radioactive waste. (B)**	**Q22: If it can be proved that they will be safely managed, radioactive wastes and/or materials should be allowed to be transported from one EU Member State to another for final disposal. (C)**	
Total	N=1000	N=1000	N=1000	
Totally agree	46%	19%	17%	
Tend to agree	42%	44%	42%	
Tend to disagree	5%	14%	18%	
Totally disagree	1%	5%	8%	
Don’t know	6%	18%	15%	

GERMANY

Are you…?		
Total	N=1001	
Male	50%	
Female	50%	
How old are you?		
Total	100%	
Promedio	46.51	
Media	49.00	
Desviación estándar	18.35	
Hidden for age recode		
Total	N=1001	
15-24	20%	
25-39	20%	
40-54	20%	
55-64	20%	
65 and more	20%	
How old were you when your education ended?		
Total	N=1001	
15	1%	
16-19	46%	
20+	43%	
Still Studying	10%	
What is your current occupation?		
Total	N=1001	
Self Employed	6%	
Manager	8%	
Other white collar workers	29%	
Manual workers	12%	
House Person/Housewife	4%	
Unemployed	5%	
Retired	25%	
Student	10%	

Q1: Is your country one of those in the EU which produces radioactive waste?		
Total	N=1001	
Yes, I believe it produces radioactive waste	77%	
No, I don't believe it produces radioactive waste	10%	
I don't know either way	13%	
Q2: Radioactive waste can result from the activities of a range of industries, especially the nuclear industry. Do you understand the different types and origins of radioactive waste?		
Total	N=1001	
Yes completely	11%	
Yes, to some degree	61%	
No, not at all	28%	
Q3: Please assess the following statement: There are several categories of radioactive waste, for example low, intermediate, and high-level waste.		
Total	N=1001	
True	55%	
I am aware of differences, but I don't understand them	31%	
Don't know	14%	
Q4: Please assess the following statement: Some non-nuclear industries produce radioactive waste.		
Total	N=1001	
Yes	51%	
No	11%	
Don't know	38%	

Q5: All radioactive waste is very dangerous.						
Total	N=1001					
True	85%					
False	15%					
Q6: Do you know who is responsible for the safe management of radioactive waste in your country?						
Total	N=1001					
Yes, I know definitively who is responsible	8%					
Yes, I believe I know who is responsible	36%					
No, I don't know who is responsible	56%					
Q7: Are you aware of the industries in your country which might produce naturally occurring radioactive material (NORM) wastes?						
Total	N=1001					
Yes, I am familiar with which industries produce NORM wastes	10%					
Yes, I am partly familiar with which industries produce NORM wastes	29%					
No, I am not familiar with which industries produce NORM wastes	61%					
Q8: Do you believe that naturally occurring radioactive material (NORM) wastes should be managed in the same regulated manner as radioactive wastes emanating from the nuclear industry?						
Total	N=1001					
Yes, I believe they should be managed in the same manner as nuclear industry wastes	66%					
No, I don't think it is necessary that they are managed in the same manner as nuclear industry wastes	34%					
Q9: With respect to how radioactive waste is regulated in your country, how familiar are you with the regulation process?						
Total	N=1001					
Yes, I am familiar how radioactive waste is regulated in my country	10%					
I have a limited understanding of how radioactive waste is regulated in my country	47%					
No, I am not aware of how radioactive waste is regulated in my country	43%					
Q10: With respect to the communication about how radioactive wastes are classified and managed, who do you trust the most?						
	Scientist (A)	**Academia (B)**	**Industry (C)**	**Government (D)**	**Regulators (E)**	**NGO's (F)**
Total	N=1001	N=1001	N=1001	N=1001	N=1001	N=1001
Rank1	46%	5%	6%	12%	17%	14%
Rank2	21%	19%	11%	12%	23%	14%
Rank3	15%	19%	13%	15%	22%	16%
Rank4	9%	22%	17%	17%	19%	17%
Rank5	6%	21%	20%	21%	13%	18%
Rank6	2%	15%	33%	23%	5%	21%
Q11: How well informed do you think you are about radioactive waste?						
Total	N=1001					
Well Informed	7%					
Partly Informed	60%					
Not informed at all	33%					
Q12: Are you aware of opportunities in your country for the general public to discuss or learn about radioactive waste management with either industry or regulatory organizations?						
Total	N=1001					
Yes I am aware of potential opportunities	33%					
No I am not aware of any opportunities	67%					
Q12B: Please could you highlight from your experience which of these types of opportunities for gaining information about radioactive waste management you are aware of.						
Total	N=334					
Government Websites	40%					
Industry Websites	34%					
Regulatory Websites	51%					
Public Meetings	32%					
Site Stakeholder Groups	42%					
Media Outlets	51%					
Other	10%					

Q13: Which of the following aspects of radioactive waste management might you be particularly interested in?					
	Waste Regulation (A)	**Waste Storage (B)**	**Waste disposal (C)**	**Waste transportation (D)**	
Total	N=809	N=809	N=809	N=809	
Rank1	15%	16%	52%	16%	
Rank2	11%	41%	19%	29%	
Rank3	14%	29%	18%	39%	
Rank4	60%	13%	11%	16%	

Q14: Would you like to know more about how radioactive waste is classified and managed in your country?	
Total	N=1001
Yes, I would be interested learning more	65%
No, I am not really interested in this subject	35%

To what extent do you agree or disagree with the following statements?					
	Q15: I have concerns about how radioactive waste is managed in my country. (A)	**Q16: Each EU Member State should dispose of its own radioactive waste in its territory. (B)**	**Q17: Harmonized and consistent methodologies should be developed within the EU to manage radioactive waste. (C)**	**Q18: A harmonized radioactive waste classification scheme for all EU Member States would ensure an appropriate level of transparency for EU citizens. (D)**	
Total	N=1001	N=1001	N=1001	N=1001	
Totally agree	35%	36%	54%	42%	
Tend to agree	40%	34%	34%	40%	
Tend to disagree	14%	14%	5%	8%	
Totally disagree	5%	5%	1%	2%	
Don't know	6%	11%	5%	7%	

Q19: Which of the following would facilitate greater transparency in how radioactive wastes are classified for EU citizens?					
	Information should be readily available on the websites of the regulators (A)	**Information should be readily available on the websites of the waste producers (B)**	**Waste producers should take out advertisements in national newspapers (C)**	**Waste producers should hold information sessions at schools (D)**	
Total	N=1001	N=1001	N=1001	N=1001	
Rank1	42%	31%	12%	15%	
Rank2	29%	40%	17%	14%	
Rank3	17%	17%	35%	31%	
Rank4	12%	12%	35%	41%	

To what extent do you agree or disagree with the following statements?				
	Q20: Different categories of radioactive waste should be managed in a manner which reflects their level of hazard. (A)	**Q21: Materials (e.g. concrete, metals such as steel and copper) with very low levels of radioactivity should be considered for reuse/recycling instead of being viewed as radioactive waste. (B)**	**Q22: If it can be proved that they will be safely managed, radioactive wastes and/or materials should be allowed to be transported from one EU Member State to another for final disposal. (C)**	
Total	N=1001	N=1001	N=1001	
Totally agree	46%	22%	15%	
Tend to agree	40%	40%	37%	
Tend to disagree	7%	18%	24%	
Totally disagree	2%	6%	11%	
Don’t know	6%	14%	13%	

GREECE

Are you…?	
Total	N=1000
Male	50%
Female	50%
How old are you?	
Total	100%
Promedio	44.12
Media	44.00
Desviación estándar	14.91
Hidden for age recode	
Total	N=1000
15-24	15%
25-39	26%
40-54	26%
55-64	25%
65 and more	8%
How old were you when your education ended?	
Total	N=1000
15	1%
16-19	25%
20+	64%
Still Studying	10%
What is your current occupation?	
Total	N=1000
Self Employed	18%
Manager	5%
Other white collar workers	29%
Manual workers	6%
House Person/Housewife	3%
Unemployed	14%
Retired	15%
Student	11%

Q1: Is your country one of those in the EU which produces radioactive waste?	
Total	N=1000
Yes, I believe it produces radioactive waste	39%
No, I don't believe it produces radioactive waste	49%
I don't know either way	13%
Q2: Radioactive waste can result from the activities of a range of industries, especially the nuclear industry. Do you understand the different types and origins of radioactive waste?	
Total	N=1000
Yes completely	36%
Yes, to some degree	59%
No, not at all	5%
Q3: Please assess the following statement: There are several categories of radioactive waste, for example low, intermediate, and high-level waste.	
Total	N=1000
True	61%
I am aware of differences, but I don't understand them	27%
Don't know	12%
Q4: Please assess the following statement: Some non-nuclear industries produce radioactive waste.	
Total	N=1000
Yes	59%
No	11%
Don't know	31%

Q5: All radioactive waste is very dangerous.						
Total	N=1000					
True	87%					
False	13%					
Q6: Do you know who is responsible for the safe management of radioactive waste in your country?						
Total	N=1000					
Yes, I know definitively who is responsible	8%					
Yes, I believe I know who is responsible	30%					
No, I don't know who is responsible	62%					
Q7: Are you aware of the industries in your country which might produce naturally occurring radioactive material (NORM) wastes?						
Total	N=1000					
Yes, I am familiar with which industries produce NORM wastes	9%					
Yes, I am partly familiar with which industries produce NORM wastes	28%					
No, I am not familiar with which industries produce NORM wastes	63%					
Q8: Do you believe that naturally occurring radioactive material (NORM) wastes should be managed in the same regulated manner as radioactive wastes emanating from the nuclear industry?						
Total	N=1000					
Yes, I believe they should be managed in the same manner as nuclear industry wastes	84%					
No, I don't think it is necessary that they are managed in the same manner as nuclear industry wastes	16%					
Q9: With respect to how radioactive waste is regulated in your country, how familiar are you with the regulation process?						
Total	N=1000					
Yes, I am familiar how radioactive waste is regulated in my country	7%					
I have a limited understanding of how radioactive waste is regulated in my country	40%					
No, I am not aware of how radioactive waste is regulated in my country	53%					
Q10: With respect to the communication about how radioactive wastes are classified and managed, who do you trust the most?						
	Scientist (A)	**Academia (B)**	**Industry (C)**	**Government (D)**	**Regulators (E)**	**NGO's (F)**
Total	N=1000	N=1000	N=1000	N=1000	N=1000	N=1000
Rank1	73%	10%	3%	4%	7%	3%
Rank2	15%	41%	6%	7%	23%	7%
Rank3	7%	21%	11%	12%	36%	14%
Rank4	3%	15%	18%	21%	23%	21%
Rank5	2%	9%	33%	27%	8%	23%
Rank6	1%	4%	30%	29%	3%	33%
Q11: How well informed do you think you are about radioactive waste?						
Total	N=1000					
Well Informed	7%					
Partly Informed	51%					
Not informed at all	42%					
Q12: Are you aware of opportunities in your country for the general public to discuss or learn about radioactive waste management with either industry or regulatory organizations?						
Total	N=1000					
Yes I am aware of potential opportunities	25%					
No I am not aware of any opportunities	75%					

Q12B: Please could you highlight from your experience which of these types of opportunities for gaining information about radioactive waste management you are aware of.

Total	N=253
Government Websites	38%
Industry Websites	38%
Regulatory Websites	60%
Public Meetings	32%
Site Stakeholder Groups	49%
Media Outlets	60%
Other	10%

Q13: Which of the following aspects of radioactive waste management might you be particularly interested in?

	Waste Regulation (A)	**Waste Storage (B)**	**Waste disposal (C)**	**Waste transportation (D)**
Total	N=853	N=853	N=853	N=853
Rank1	53%	23%	12%	11%
Rank2	13%	29%	24%	34%
Rank3	12%	25%	30%	33%
Rank4	21%	22%	35%	22%

Q14: Would you like to know more about how radioactive waste is classified and managed in your country?

Total	N=1000
Yes, I would be interested learning more	87%
No, I am not really interested in this subject	13%

To what extent do you agree or disagree with the following statements?

	Q15: I have concerns about how radioactive waste is managed in my country. (A)	**Q16: Each EU Member State should dispose of its own radioactive waste in its territory. (B)**	**Q17: Harmonized and consistent methodologies should be developed within the EU to manage radioactive waste. (C)**	**Q18: A harmonized radioactive waste classification scheme for all EU Member States would ensure an appropriate level of transparency for EU citizens. (D)**
Total	N=1000	N=1000	N=1000	N=1000
Totally agree	48%	40%	61%	47%
Tend to agree	36%	34%	32%	43%
Tend to disagree	9%	9%	3%	6%
Totally disagree	1%	3%	1%	1%
Don’t know	7%	13%	3%	4%

Q19: Which of the following would facilitate greater transparency in how radioactive wastes are classified for EU citizens?

	Information should be readily available on the websites of the regulators (A)	**Information should be readily available on the websites of the waste producers (B)**	**Waste producers should take out advertisements in national newspapers (C)**	**Waste producers should hold information sessions at schools (D)**
Total	N=1000	N=1000	N=1000	N=1000
Rank1	43%	31%	10%	17%
Rank2	30%	39%	17%	14%
Rank3	15%	18%	38%	29%
Rank4	12%	12%	36%	41%

To what extent do you agree or disagree with the following statements?				
	Q20: Different categories of radioactive waste should be managed in a manner which reflects their level of hazard. (A)	**Q21: Materials (e.g. concrete, metals such as steel and copper) with very low levels of radioactivity should be considered for reuse/recycling instead of being viewed as radioactive waste. (B)**	**Q22: If it can be proved that they will be safely managed, radioactive wastes and/or materials should be allowed to be transported from one EU Member State to another for final disposal. (C)**	
Total	N=1000	N=1000	N=1000	
Totally agree	60%	30%	19%	
Tend to agree	32%	38%	35%	
Tend to disagree	4%	12%	17%	
Totally disagree	1%	7%	18%	
Don’t know	3%	13%	11%	

HUNGARY

Are you…?	
Total	N=1000
Male	50%
Female	50%
How old are you?	
Total	100%
Promedio	47.97
Media	49.00
Desviación estándar	16.87
Hidden for age recode	
Total	N=1000
15-24	13%
25-39	22%
40-54	22%
55-64	22%
65 and more	21%
How old were you when your education ended?	
Total	N=1000
15	3%
16-19	38%
20+	53%
Still Studying	7%
What is your current occupation?	
Total	N=1000
Self Employed	7%
Manager	4%
Other white collar workers	26%
Manual workers	19%
House Person/Housewife	5%
Unemployed	5%
Retired	28%
Student	6%

Q1: Is your country one of those in the EU which produces radioactive waste?	
Total	N=1000
Yes, I believe it produces radioactive waste	82%
No, I don't believe it produces radioactive waste	9%
I don't know either way	9%
Q2: Radioactive waste can result from the activities of a range of industries, especially the nuclear industry. Do you understand the different types and origins of radioactive waste?	
Total	N=1000
Yes completely	9%
Yes, to some degree	61%
No, not at all	30%
Q3: Please assess the following statement: There are several categories of radioactive waste, for example low, intermediate, and high-level waste.	
Total	N=1000
True	52%
I am aware of differences, but I don't understand them	33%
Don't know	15%
Q4: Please assess the following statement: Some non-nuclear industries produce radioactive waste.	
Total	N=1000
Yes	56%
No	11%
Don't know	33%

Q5: All radioactive waste is very dangerous.						
Total	N=1000					
True	90%					
False	10%					
Q6: Do you know who is responsible for the safe management of radioactive waste in your country?						
Total	N=1000					
Yes, I know definitively who is responsible	8%					
Yes, I believe I know who is responsible	32%					
No, I don't know who is responsible	60%					
Q7: Are you aware of the industries in your country which might produce naturally occurring radioactive material (NORM) wastes?						
Total	N=1000					
Yes, I am familiar with which industries produce NORM wastes	9%					
Yes, I am partly familiar with which industries produce NORM wastes	44%					
No, I am not familiar with which industries produce NORM wastes	47%					
Q8: Do you believe that naturally occurring radioactive material (NORM) wastes should be managed in the same regulated manner as radioactive wastes emanating from the nuclear industry?						
Total	N=1000					
Yes, I believe they should be managed in the same manner as nuclear industry wastes	78%					
No, I don't think it is necessary that they are managed in the same manner as nuclear industry wastes	22%					
Q9: With respect to how radioactive waste is regulated in your country, how familiar are you with the regulation process?						
Total	N=1000					
Yes, I am familiar how radioactive waste is regulated in my country	3%					
I have a limited understanding of how radioactive waste is regulated in my country	41%					
No, I am not aware of how radioactive waste is regulated in my country	56%					
Q10: With respect to the communication about how radioactive wastes are classified and managed, who do you trust the most?						
	Scientist (A)	**Academia (B)**	**Industry (C)**	**Government (D)**	**Regulators (E)**	**NGO's (F)**
Total	N=1000	N=1000	N=1000	N=1000	N=1000	N=1000
Rank1	39%	9%	4%	8%	28%	12%
Rank2	26%	27%	9%	10%	20%	8%
Rank3	16%	21%	16%	9%	23%	15%
Rank4	11%	22%	24%	10%	17%	17%
Rank5	5%	16%	31%	19%	10%	19%
Rank6	4%	5%	16%	44%	2%	29%
Q11: How well informed do you think you are about radioactive waste?						
Total	N=1000					
Well Informed	4%					
Partly Informed	64%					
Not informed at all	32%					
Q12: Are you aware of opportunities in your country for the general public to discuss or learn about radioactive waste management with either industry or regulatory organizations?						
Total	N=1000					
Yes I am aware of potential opportunities	21%					
No I am not aware of any opportunities	79%					

Q12B: Please could you highlight from your experience which of these types of opportunities for gaining information about radioactive waste management you are aware of.

Total	N=207
Government Websites	44%
Industry Websites	52%
Regulatory Websites	57%
Public Meetings	25%
Site Stakeholder Groups	34%
Media Outlets	39%
Other	6%

Q13: Which of the following aspects of radioactive waste management might you be particularly interested in?

	Waste Regulation (A)	**Waste Storage (B)**	**Waste disposal (C)**	**Waste transportation (D)**
Total	N=893	N=893	N=893	N=893
Rank1	18%	33%	38%	11%
Rank2	22%	33%	25%	20%
Rank3	28%	21%	18%	33%
Rank4	32%	14%	18%	36%

Q14: Would you like to know more about how radioactive waste is classified and managed in your country?

Total	N=1000
Yes, I would be interested learning more	78%
No, I am not really interested in this subject	22%

To what extent do you agree or disagree with the following statements?

	Q15: I have concerns about how radioactive waste is managed in my country. (A)	**Q16: Each EU Member State should dispose of its own radioactive waste in its territory. (B)**	**Q17: Harmonized and consistent methodologies should be developed within the EU to manage radioactive waste. (C)**	**Q18: A harmonized radioactive waste classification scheme for all EU Member States would ensure an appropriate level of transparency for EU citizens. (D)**
Total	N=1000	N=1000	N=1000	N=1000
Totally agree	27%	33%	54%	37%
Tend to agree	44%	40%	38%	44%
Tend to disagree	18%	14%	4%	10%
Totally disagree	6%	4%	0%	2%
Don't know	6%	10%	4%	8%

Q19: Which of the following would facilitate greater transparency in how radioactive wastes are classified for EU citizens?

	Information should be readily available on the websites of the regulators (A)	**Information should be readily available on the websites of the waste producers (B)**	**Waste producers should take out advertisements in national newspapers (C)**	**Waste producers should hold information sessions at schools (D)**
Total	N=1000	N=1000	N=1000	N=1000
Rank1	44%	28%	10%	17%
Rank2	32%	41%	14%	13%
Rank3	14%	20%	36%	30%
Rank4	10%	11%	40%	39%

To what extent do you agree or disagree with the following statements?				
	Q20: Different categories of radioactive waste should be managed in a manner which reflects their level of hazard. (A)	**Q21: Materials (e.g. concrete, metals such as steel and copper) with very low levels of radioactivity should be considered for reuse/recycling instead of being viewed as radioactive waste. (B)**	**Q22: If it can be proved that they will be safely managed, radioactive wastes and/or materials should be allowed to be transported from one EU Member State to another for final disposal. (C)**	
Total	N=1000	N=1000	N=1000	
Totally agree	64%	25%	19%	
Tend to agree	30%	48%	42%	
Tend to disagree	3%	13%	18%	
Totally disagree	0%	4%	10%	
Don’t know	3%	10%	11%	

IRELAND

Are you…?		
Total	N=500	
Male	50%	
Female	50%	
How old are you?		
Total	100%	
Promedio	45.96	
Media	46.00	
Desviación estándar	18.21	
Hidden for age recode		
Total	N=500	
15-24	20%	
25-39	20%	
40-54	20%	
55-64	19%	
65 and more	20%	
How old were you when your education ended?		
Total	N=500	
15	6%	
16-19	40%	
20+	44%	
Still Studying	10%	
What is your current occupation?		
Total	N=500	
Self Employed	9%	
Manager	11%	
Other white collar workers	22%	
Manual workers	12%	
House Person/Housewife	8%	
Unemployed	8%	
Retired	20%	
Student	10%	

Q1: Is your country one of those in the EU which produces radioactive waste?		
Total	N=500	
Yes, I believe it produces radioactive waste	22%	
No, I don't believe it produces radioactive waste	52%	
I don't know either way	26%	
Q2: Radioactive waste can result from the activities of a range of industries, especially the nuclear industry. Do you understand the different types and origins of radioactive waste?		
Total	N=500	
Yes completely	16%	
Yes, to some degree	55%	
No, not at all	29%	
Q3: Please assess the following statement: There are several categories of radioactive waste, for example low, intermediate, and high-level waste.		
Total	N=500	
True	37%	
I am aware of differences, but I don't understand them	47%	
Don't know	16%	
Q4: Please assess the following statement: Some non-nuclear industries produce radioactive waste.		
Total	N=500	
Yes	53%	
No	9%	
Don't know	38%	

Q5: All radioactive waste is very dangerous.						
Total	N=500					
True	86%					
False	14%					
Q6: Do you know who is responsible for the safe management of radioactive waste in your country?						
Total	N=500					
Yes, I know definitively who is responsible	6%					
Yes, I believe I know who is responsible	21%					
No, I don't know who is responsible	73%					
Q7: Are you aware of the industries in your country which might produce naturally occurring radioactive material (NORM) wastes?						
Total	N=500					
Yes, I am familiar with which industries produce NORM wastes	8%					
Yes, I am partly familiar with which industries produce NORM wastes	24%					
No, I am not familiar with which industries produce NORM wastes	68%					
Q8: Do you believe that naturally occurring radioactive material (NORM) wastes should be managed in the same regulated manner as radioactive wastes emanating from the nuclear industry?						
Total	N=500					
Yes, I believe they should be managed in the same manner as nuclear industry wastes	77%					
No, I don't think it is necessary that they are managed in the same manner as nuclear industry wastes	23%					
Q9: With respect to how radioactive waste is regulated in your country, how familiar are you with the regulation process?						
Total	N=500					
Yes, I am familiar how radioactive waste is regulated in my country	4%					
I have a limited understanding of how radioactive waste is regulated in my country	32%					
No, I am not aware of how radioactive waste is regulated in my country	64%					
Q10: With respect to the communication about how radioactive wastes are classified and managed, who do you trust the most?						
	Scientist (A)	**Academia (B)**	**Industry (C)**	**Government (D)**	**Regulators (E)**	**NGO's (F)**
Total	N=500	N=500	N=500	N=500	N=500	N=500
Rank1	50%	6%	2%	14%	22%	6%
Rank2	23%	20%	9%	13%	25%	10%
Rank3	13%	15%	15%	15%	24%	18%
Rank4	9%	21%	19%	18%	15%	18%
Rank5	5%	23%	20%	17%	9%	26%
Rank6	1%	15%	34%	23%	5%	21%
Q11: How well informed do you think you are about radioactive waste?						
Total	N=500					
Well Informed	4%					
Partly Informed	44%					
Not informed at all	52%					
Q12: Are you aware of opportunities in your country for the general public to discuss or learn about radioactive waste management with either industry or regulatory organizations?						
Total	N=500					
Yes I am aware of potential opportunities	18%					
No I am not aware of any opportunities	82%					

Q12B: Please could you highlight from your experience which of these types of opportunities for gaining information about radioactive waste management you are aware of.

Total	N=91
Government Websites	66%
Industry Websites	63%
Regulatory Websites	53%
Public Meetings	42%
Site Stakeholder Groups	20%
Media Outlets	51%
Other	3%

Q13: Which of the following aspects of radioactive waste management might you be particularly interested in?

	Waste Regulation (A)	**Waste Storage (B)**	**Waste disposal (C)**	**Waste transportation (D)**
Total	N=387	N=387	N=387	N=387
Rank1	30%	13%	45%	12%
Rank2	24%	33%	24%	19%
Rank3	22%	35%	17%	26%
Rank4	23%	19%	14%	44%

Q14: Would you like to know more about how radioactive waste is classified and managed in your country?

Total	N=500
Yes, I would be interested learning more	75%
No, I am not really interested in this subject	25%

To what extent do you agree or disagree with the following statements?

	Q15: I have concerns about how radioactive waste is managed in my country. (A)	**Q16: Each EU Member State should dispose of its own radioactive waste in its territory. (B)**	**Q17: Harmonized and consistent methodologies should be developed within the EU to manage radioactive waste. (C)**	**Q18: A harmonized radioactive waste classification scheme for all EU Member States would ensure an appropriate level of transparency for EU citizens. (D)**
Total	N=500	N=500	N=500	N=500
Totally agree	20%	30%	41%	39%
Tend to agree	37%	40%	41%	44%
Tend to disagree	17%	10%	5%	4%
Totally disagree	4%	1%	1%	2%
Don’t know	22%	18%	10%	12%

Q19: Which of the following would facilitate greater transparency in how radioactive wastes are classified for EU citizens?

	Information should be readily available on the websites of the regulators (A)	**Information should be readily available on the websites of the waste producers (B)**	**Waste producers should take out advertisements in national newspapers (C)**	**Waste producers should hold information sessions at schools (D)**
Total	N=500	N=500	N=500	N=500
Rank1	37%	33%	12%	18%
Rank2	37%	36%	14%	13%
Rank3	16%	17%	35%	32%
Rank4	11%	13%	39%	37%

To what extent do you agree or disagree with the following statements?				
	Q20: Different categories of radioactive waste should be managed in a manner which reflects their level of hazard. (A)	**Q21: Materials (e.g. concrete, metals such as steel and copper) with very low levels of radioactivity should be considered for reuse/recycling instead of being viewed as radioactive waste. (B)**	**Q22: If it can be proved that they will be safely managed, radioactive wastes and/or materials should be allowed to be transported from one EU Member State to another for final disposal. (C)**	
Total	N=500	N=500	N=500	
Totally agree	51%	23%	18%	
Tend to agree	37%	41%	43%	
Tend to disagree	4%	11%	16%	
Totally disagree	1%	4%	6%	
Don’t know	7%	21%	17%	

ITALY

Are you…?	
Total	N=1003
Male	50%
Female	50%
How old are you?	
Total	100%
Promedio	46.09
Media	47.00
Desviación estándar	17.80
Hidden for age recode	
Total	N=1003
15-24	20%
25-39	20%
40-54	20%
55-64	20%
65 and more	20%
How old were you when your education ended?	
Total	N=1003
15	4%
16-19	47%
20+	38%
Still Studying	11%
What is your current occupation?	
Total	N=1003
Self Employed	12%
Manager	4%
Other white collar workers	28%
Manual workers	8%
House Person/Housewife	8%
Unemployed	8%
Retired	19%
Student	13%

Q1: Is your country one of those in the EU which produces radioactive waste?	
Total	N=1003
Yes, I believe it produces radioactive waste	51%
No, I don't believe it produces radioactive waste	36%
I don't know either way	13%
Q2: Radioactive waste can result from the activities of a range of industries, especially the nuclear industry. Do you understand the different types and origins of radioactive waste?	
Total	N=1003
Yes completely	17%
Yes, to some degree	61%
No, not at all	21%
Q3: Please assess the following statement: There are several categories of radioactive waste, for example low, intermediate, and high-level waste.	
Total	N=1003
True	51%
I am aware of differences, but I don't understand them	40%
Don't know	9%
Q4: Please assess the following statement: Some non-nuclear industries produce radioactive waste.	
Total	N=1003
Yes	59%
No	10%
Don't know	30%

Q5: All radioactive waste is very dangerous.						
Total	N=1003					
True	85%					
False	15%					
Q6: Do you know who is responsible for the safe management of radioactive waste in your country?						
Total	N=1003					
Yes, I know definitively who is responsible	9%					
Yes, I believe I know who is responsible	28%					
No, I don't know who is responsible	63%					
Q7: Are you aware of the industries in your country which might produce naturally occurring radioactive material (NORM) wastes?						
Total	N=1003					
Yes, I am familiar with which industries produce NORM wastes	9%					
Yes, I am partly familiar with which industries produce NORM wastes	34%					
No, I am not familiar with which industries produce NORM wastes	57%					
Q8: Do you believe that naturally occurring radioactive material (NORM) wastes should be managed in the same regulated manner as radioactive wastes emanating from the nuclear industry?						
Total	N=1003					
Yes, I believe they should be managed in the same manner as nuclear industry wastes	71%					
No, I don't think it is necessary that they are managed in the same manner as nuclear industry wastes	29%					
Q9: With respect to how radioactive waste is regulated in your country, how familiar are you with the regulation process?						
Total	N=1003					
Yes, I am familiar how radioactive waste is regulated in my country	6%					
I have a limited understanding of how radioactive waste is regulated in my country	46%					
No, I am not aware of how radioactive waste is regulated in my country	48%					
Q10: With respect to the communication about how radioactive wastes are classified and managed, who do you trust the most?						
	Scientist (A)	**Academia (B)**	**Industry (C)**	**Government (D)**	**Regulators (E)**	**NGO's (F)**
Total	N=1003	N=1003	N=1003	N=1003	N=1003	N=1003
Rank1	41%	7%	4%	11%	28%	11%
Rank2	26%	20%	6%	11%	23%	13%
Rank3	16%	19%	11%	15%	22%	16%
Rank4	9%	24%	17%	16%	16%	18%
Rank5	5%	19%	23%	24%	8%	22%
Rank6	2%	11%	40%	23%	4%	20%
Q11: How well informed do you think you are about radioactive waste?						
Total	N=1003					
Well Informed	6%					
Partly Informed	62%					
Not informed at all	32%					
Q12: Are you aware of opportunities in your country for the general public to discuss or learn about radioactive waste management with either industry or regulatory organizations?						
Total	N=1003					
Yes I am aware of potential opportunities	38%					
No I am not aware of any opportunities	62%					
Q12B: Please could you highlight from your experience which of these types of opportunities for gaining information about radioactive waste management you are aware of.						
Total	N=377					
Government Websites	46%					
Industry Websites	48%					
Regulatory Websites	48%					
Public Meetings	30%					

Site Stakeholder Groups	17%
Media Outlets	58%
Other	5%

Q13: Which of the following aspects of radioactive waste management might you be particularly interested in?

	Waste Regulation (A)	Waste Storage (B)	Waste disposal (C)	Waste transportation (D)
Total	N=897	N=897	N=897	N=897
Rank1	27%	16%	51%	6%
Rank2	24%	31%	25%	20%
Rank3	23%	33%	13%	32%
Rank4	26%	21%	11%	43%

Q14: Would you like to know more about how radioactive waste is classified and managed in your country?

Total	N=1003
Yes, I would be interested learning more	87%
No, I am not really interested in this subject	13%

To what extent do you agree or disagree with the following statements?

	Q15: I have concerns about how radioactive waste is managed in my country. (A)	Q16: Each EU Member State should dispose of its own radioactive waste in its territory. (B)	Q17: Harmonized and consistent methodologies should be developed within the EU to manage radioactive waste. (C)	Q18: A harmonized radioactive waste classification scheme for all EU Member States would ensure an appropriate level of transparency for EU citizens. (D)
Total	N=1003	N=1003	N=1003	N=1003
Totally agree	30%	35%	57%	49%
Tend to agree	46%	40%	34%	40%
Tend to disagree	13%	12%	5%	6%
Totally disagree	2%	2%	1%	1%
Don’t know	8%	11%	3%	4%

Q19: Which of the following would facilitate greater transparency in how radioactive wastes are classified for EU citizens?

	Information should be readily available on the websites of the regulators (A)	Information should be readily available on the websites of the waste producers (B)	Waste producers should take out advertisements in national newspapers (C)	Waste producers should hold information sessions at schools (D)
Total	N=1003	N=1003	N=1003	N=1003
Rank1	47%	27%	9%	17%
Rank2	27%	42%	14%	16%
Rank3	15%	18%	32%	34%
Rank4	11%	13%	45%	32%

To what extent do you agree or disagree with the following statements?				
	Q20: Different categories of radioactive waste should be managed in a manner which reflects their level of hazard. (A)	**Q21: Materials (e.g. concrete, metals such as steel and copper) with very low levels of radioactivity should be considered for reuse/recycling instead of being viewed as radioactive waste. (B)**	**Q22: If it can be proved that they will be safely managed, radioactive wastes and/or materials should be allowed to be transported from one EU Member State to another for final disposal. (C)**	
Total	N=1003	N=1003	N=1003	
Totally agree	55%	24%	21%	
Tend to agree	36%	45%	47%	
Tend to disagree	5%	14%	16%	
Totally disagree	1%	5%	6%	
Don’t know	3%	12%	10%	

LATVIA

Are you…?	
Total	N=1000
Male	50%
Female	50%
How old are you?	
Total	100%
Promedio	47.59
Media	49.00
Desviación estándar	17.68
Hidden for age recode	
Total	N=1000
15-24	16%
25-39	22%
40-54	20%
55-64	21%
65 and more	21%
How old were you when your education ended?	
Total	N=1000
15	1%
16-19	23%
20+	62%
Still Studying	15%
What is your current occupation?	
Total	N=1000
Self Employed	7%
Manager	11%
Other white collar workers	31%
Manual workers	17%
House Person/Housewife	4%
Unemployed	3%
Retired	21%
Student	8%

Q1: Is your country one of those in the EU which produces radioactive waste?	
Total	N=1000
Yes, I believe it produces radioactive waste	28%
No, I don't believe it produces radioactive waste	45%
I don't know either way	27%
Q2: Radioactive waste can result from the activities of a range of industries, especially the nuclear industry. Do you understand the different types and origins of radioactive waste?	
Total	N=1000
Yes completely	4%
Yes, to some degree	61%
No, not at all	35%
Q3: Please assess the following statement: There are several categories of radioactive waste, for example low, intermediate, and high-level waste.	
Total	N=1000
True	28%
I am aware of differences, but I don't understand them	60%
Don't know	13%
Q4: Please assess the following statement: Some non-nuclear industries produce radioactive waste.	
Total	N=1000
Yes	63%
No	6%
Don't know	31%

Q5: All radioactive waste is very dangerous.						
Total	N=1000					
True	90%					
False	10%					
Q6: Do you know who is responsible for the safe management of radioactive waste in your country?						
Total	N=1000					
Yes, I know definitively who is responsible	4%					
Yes, I believe I know who is responsible	22%					
No, I don't know who is responsible	74%					
Q7: Are you aware of the industries in your country which might produce naturally occurring radioactive material (NORM) wastes?						
Total	N=1000					
Yes, I am familiar with which industries produce NORM wastes	2%					
Yes, I am partly familiar with which industries produce NORM wastes	24%					
No, I am not familiar with which industries produce NORM wastes	74%					
Q8: Do you believe that naturally occurring radioactive material (NORM) wastes should be managed in the same regulated manner as radioactive wastes emanating from the nuclear industry?						
Total	N=1000					
Yes, I believe they should be managed in the same manner as nuclear industry wastes	70%					
No, I don't think it is necessary that they are managed in the same manner as nuclear industry wastes	30%					
Q9: With respect to how radioactive waste is regulated in your country, how familiar are you with the regulation process?						
Total	N=1000					
Yes, I am familiar how radioactive waste is regulated in my country	6%					
I have a limited understanding of how radioactive waste is regulated in my country	40%					
No, I am not aware of how radioactive waste is regulated in my country	54%					
Q10: With respect to the communication about how radioactive wastes are classified and managed, who do you trust the most?						
	Scientist (A)	**Academia (B)**	**Industry (C)**	**Government (D)**	**Regulators (E)**	**NGO's (F)**
Total	N=1000	N=1000	N=1000	N=1000	N=1000	N=1000
Rank1	53%	16%	4%	8%	13%	6%
Rank2	26%	34%	7%	9%	16%	9%
Rank3	8%	19%	15%	13%	28%	17%
Rank4	7%	16%	19%	17%	23%	19%
Rank5	4%	8%	25%	23%	16%	24%
Rank6	2%	8%	30%	30%	5%	25%
Q11: How well informed do you think you are about radioactive waste?						
Total	N=1000					
Well Informed	4%					
Partly Informed	56%					
Not informed at all	40%					
Q12: Are you aware of opportunities in your country for the general public to discuss or learn about radioactive waste management with either industry or regulatory organizations?						
Total	N=1000					
Yes I am aware of potential opportunities	22%					
No I am not aware of any opportunities	78%					

Q12B: Please could you highlight from your experience which of these types of opportunities for gaining information about radioactive waste management you are aware of.

Total	N=222
Government Websites	42%
Industry Websites	59%
Regulatory Websites	56%
Public Meetings	14%
Site Stakeholder Groups	25%
Media Outlets	60%
Other	3%

Q13: Which of the following aspects of radioactive waste management might you be particularly interested in?

	Waste Regulation (A)	**Waste Storage (B)**	**Waste disposal (C)**	**Waste transportation (D)**
Total	N=728	N=728	N=728	N=728
Rank1	13%	29%	50%	7%
Rank2	13%	38%	27%	22%
Rank3	19%	22%	15%	44%
Rank4	55%	10%	8%	27%

Q14: Would you like to know more about how radioactive waste is classified and managed in your country?

Total	N=1000
Yes, I would be interested learning more	63%
No, I am not really interested in this subject	37%

To what extent do you agree or disagree with the following statements?

	Q15: I have concerns about how radioactive waste is managed in my country. (A)	**Q16: Each EU Member State should dispose of its own radioactive waste in its territory. (B)**	**Q17: Harmonized and consistent methodologies should be developed within the EU to manage radioactive waste. (C)**	**Q18: A harmonized radioactive waste classification scheme for all EU Member States would ensure an appropriate level of transparency for EU citizens. (D)**
Total	N=1000	N=1000	N=1000	N=1000
Totally agree	19%	28%	55%	44%
Tend to agree	35%	35%	34%	40%
Tend to disagree	24%	19%	5%	6%
Totally disagree	6%	5%	2%	2%
Don’t know	16%	13%	4%	9%

Q19: Which of the following would facilitate greater transparency in how radioactive wastes are classified for EU citizens?

	Information should be readily available on the websites of the regulators (A)	**Information should be readily available on the websites of the waste producers (B)**	**Waste producers should take out advertisements in national newspapers (C)**	**Waste producers should hold information sessions at schools (D)**
Total	N=1000	N=1000	N=1000	N=1000
Rank1	43%	33%	10%	14%
Rank2	30%	41%	14%	15%
Rank3	16%	17%	34%	34%
Rank4	11%	9%	43%	37%

To what extent do you agree or disagree with the following statements?				
	Q20: Different categories of radioactive waste should be managed in a manner which reflects their level of hazard. (A)	**Q21: Materials (e.g. concrete, metals such as steel and copper) with very low levels of radioactivity should be considered for reuse/recycling instead of being viewed as radioactive waste. (B)**	**Q22: If it can be proved that they will be safely managed, radioactive wastes and/or materials should be allowed to be transported from one EU Member State to another for final disposal. (C)**	
Total	N=1000	N=1000	N=1000	
Totally agree	50%	32%	24%	
Tend to agree	37%	42%	40%	
Tend to disagree	4%	10%	17%	
Totally disagree	1%	4%	8%	
Don’t know	8%	12%	10%	

LITHUANIA

Are you…?	
Total	N=1001
Male	50%
Female	50%
How old are you?	
Total	100%
Promedio	47.57
Media	49.00
Desviación estándar	16.91
Hidden for age recode	
Total	N=1001
15-24	15%
25-39	20%
40-54	23%
55-64	23%
65 and more	19%
How old were you when your education ended?	
Total	N=1001
15	0%
16-19	41%
20+	52%
Still Studying	6%
What is your current occupation?	
Total	N=1001
Self Employed	11%
Manager	13%
Other white collar workers	29%
Manual workers	14%
House Person/Housewife	3%
Unemployed	3%
Retired	19%
Student	7%

Q1: Is your country one of those in the EU which produces radioactive waste?	
Total	N=1001
Yes, I believe it produces radioactive waste	27%
No, I don't believe it produces radioactive waste	59%
I don't know either way	14%
Q2: Radioactive waste can result from the activities of a range of industries, especially the nuclear industry. Do you understand the different types and origins of radioactive waste?	
Total	N=1001
Yes completely	18%
Yes, to some degree	60%
No, not at all	23%
Q3: Please assess the following statement: There are several categories of radioactive waste, for example low, intermediate, and high-level waste.	
Total	N=1001
True	50%
I am aware of differences, but I don't understand them	38%
Don't know	12%
Q4: Please assess the following statement: Some non-nuclear industries produce radioactive waste.	
Total	N=1001
Yes	48%
No	11%
Don't know	40%

Q5: All radioactive waste is very dangerous.						
Total	N=1001					
True	87%					
False	13%					
Q6: Do you know who is responsible for the safe management of radioactive waste in your country?						
Total	N=1001					
Yes, I know definitively who is responsible	5%					
Yes, I believe I know who is responsible	39%					
No, I don't know who is responsible	56%					
Q7: Are you aware of the industries in your country which might produce naturally occurring radioactive material (NORM) wastes?						
Total	N=1001					
Yes, I am familiar with which industries produce NORM wastes	3%					
Yes, I am partly familiar with which industries produce NORM wastes	26%					
No, I am not familiar with which industries produce NORM wastes	72%					
Q8: Do you believe that naturally occurring radioactive material (NORM) wastes should be managed in the same regulated manner as radioactive wastes emanating from the nuclear industry?						
Total	N=1001					
Yes, I believe they should be managed in the same manner as nuclear industry wastes	59%					
No, I don't think it is necessary that they are managed in the same manner as nuclear industry wastes	41%					
Q9: With respect to how radioactive waste is regulated in your country, how familiar are you with the regulation process?						
Total	N=1001					
Yes, I am familiar how radioactive waste is regulated in my country	3%					
I have a limited understanding of how radioactive waste is regulated in my country	47%					
No, I am not aware of how radioactive waste is regulated in my country	50%					
Q10: With respect to the communication about how radioactive wastes are classified and managed, who do you trust the most?						
	Scientist (A)	**Academia (B)**	**Industry (C)**	**Government (D)**	**Regulators (E)**	**NGO's (F)**
Total	N=1001	N=1001	N=1001	N=1001	N=1001	N=1001
Rank1	57%	15%	2%	12%	6%	9%
Rank2	22%	29%	5%	14%	14%	16%
Rank3	10%	20%	9%	18%	23%	21%
Rank4	6%	16%	17%	16%	24%	21%
Rank5	3%	12%	26%	18%	22%	18%
Rank6	2%	8%	41%	22%	11%	15%
Q11: How well informed do you think you are about radioactive waste?						
Total	N=1001					
Well Informed	4%					
Partly Informed	68%					
Not informed at all	28%					
Q12: Are you aware of opportunities in your country for the general public to discuss or learn about radioactive waste management with either industry or regulatory organizations?						
Total	N=1001					
Yes I am aware of potential opportunities	28%					
No I am not aware of any opportunities	72%					

Q12B: Please could you highlight from your experience which of these types of opportunities for gaining information about radioactive waste management you are aware of.

Total	N=279
Government Websites	61%
Industry Websites	41%
Regulatory Websites	58%
Public Meetings	18%
Site Stakeholder Groups	31%
Media Outlets	67%
Other	6%

Q13: Which of the following aspects of radioactive waste management might you be particularly interested in?

	Waste Regulation (A)	**Waste Storage (B)**	**Waste disposal (C)**	**Waste transportation (D)**
Total	N=795	N=795	N=795	N=795
Rank1	37%	30%	28%	5%
Rank2	20%	34%	29%	16%
Rank3	17%	21%	25%	38%
Rank4	26%	15%	17%	42%

Q14: Would you like to know more about how radioactive waste is classified and managed in your country?

Total	N=1001
Yes, I would be interested learning more	68%
No, I am not really interested in this subject	32%

To what extent do you agree or disagree with the following statements?

	Q15: I have concerns about how radioactive waste is managed in my country. (A)	**Q16: Each EU Member State should dispose of its own radioactive waste in its territory. (B)**	**Q17: Harmonized and consistent methodologies should be developed within the EU to manage radioactive waste. (C)**	**Q18: A harmonized radioactive waste classification scheme for all EU Member States would ensure an appropriate level of transparency for EU citizens. (D)**
Total	N=1001	N=1001	N=1001	N=1001
Totally agree	17%	28%	48%	35%
Tend to agree	48%	46%	46%	53%
Tend to disagree	18%	11%	1%	3%
Totally disagree	3%	1%	1%	2%
Don't know	14%	13%	4%	6%

Q19: Which of the following would facilitate greater transparency in how radioactive wastes are classified for EU citizens?

	Information should be readily available on the websites of the regulators (A)	**Information should be readily available on the websites of the waste producers (B)**	**Waste producers should take out advertisements in national newspapers (C)**	**Waste producers should hold information sessions at schools (D)**
Total	N=1001	N=1001	N=1001	N=1001
Rank1	44%	30%	13%	13%
Rank2	30%	42%	15%	12%
Rank3	17%	17%	39%	28%
Rank4	9%	11%	33%	47%

To what extent do you agree or disagree with the following statements?				
	Q20: Different categories of radioactive waste should be managed in a manner which reflects their level of hazard. (A)	**Q21: Materials (e.g. concrete, metals such as steel and copper) with very low levels of radioactivity should be considered for reuse/recycling instead of being viewed as radioactive waste. (B)**	**Q22: If it can be proved that they will be safely managed, radioactive wastes and/or materials should be allowed to be transported from one EU Member State to another for final disposal. (C)**	
Total	N=1001	N=1001	N=1001	
Totally agree	48%	23%	20%	
Tend to agree	47%	49%	49%	
Tend to disagree	2%	11%	15%	
Totally disagree	1%	3%	4%	
Don’t know	3%	14%	12%	

LUXEMBOURG

Are you…?	
Total	N=501
Male	50%
Female	50%
How old are you?	
Total	100%
Promedio	47.58
Media	49.00
Desviación estándar	17.14
Hidden for age recode	
Total	N=501
15-24	12%
25-39	25%
40-54	23%
55-64	19%
65 and more	22%
How old were you when your education ended?	
Total	N=501
15	2%
16-19	30%
20+	60%
Still Studying	8%
What is your current occupation?	
Total	N=501
Self Employed	3%
Manager	8%
Other white collar workers	42%
Manual workers	4%
House Person/Housewife	5%
Unemployed	1%
Retired	29%
Student	9%

Q1: Is your country one of those in the EU which produces radioactive waste?	
Total	N=501
Yes, I believe it produces radioactive waste	32%
No, I don't believe it produces radioactive waste	57%
I don't know either way	12%
Q2: Radioactive waste can result from the activities of a range of industries, especially the nuclear industry. Do you understand the different types and origins of radioactive waste?	
Total	N=501
Yes completely	13%
Yes, to some degree	71%
No, not at all	16%
Q3: Please assess the following statement: There are several categories of radioactive waste, for example low, intermediate, and high-level waste.	
Total	N=501
True	64%
I am aware of differences, but I don't understand them	26%
Don't know	10%
Q4: Please assess the following statement: Some non-nuclear industries produce radioactive waste.	
Total	N=501
Yes	53%
No	11%
Don't know	37%

Q5: All radioactive waste is very dangerous.						
Total	N=501					
True	76%					
False	24%					
Q6: Do you know who is responsible for the safe management of radioactive waste in your country?						
Total	N=501					
Yes, I know definitively who is responsible	3%					
Yes, I believe I know who is responsible	24%					
No, I don't know who is responsible	73%					
Q7: Are you aware of the industries in your country which might produce naturally occurring radioactive material (NORM) wastes?						
Total	N=501					
Yes, I am familiar with which industries produce NORM wastes	3%					
Yes, I am partly familiar with which industries produce NORM wastes	22%					
No, I am not familiar with which industries produce NORM wastes	75%					
Q8: Do you believe that naturally occurring radioactive material (NORM) wastes should be managed in the same regulated manner as radioactive wastes emanating from the nuclear industry?						
Total	N=501					
Yes, I believe they should be managed in the same manner as nuclear industry wastes	49%					
No, I don't think it is necessary that they are managed in the same manner as nuclear industry wastes	51%					
Q9: With respect to how radioactive waste is regulated in your country, how familiar are you with the regulation process?						
Total	N=501					
Yes, I am familiar how radioactive waste is regulated in my country	3%					
I have a limited understanding of how radioactive waste is regulated in my country	26%					
No, I am not aware of how radioactive waste is regulated in my country	71%					
Q10: With respect to the communication about how radioactive wastes are classified and managed, who do you trust the most?						
	Scientist (A)	**Academia (B)**	**Industry (C)**	**Government (D)**	**Regulators (E)**	**NGO's (F)**
Total	N=501	N=501	N=501	N=501	N=501	N=501
Rank1	52%	6%	2%	15%	16%	9%
Rank2	23%	26%	3%	13%	22%	14%
Rank3	12%	22%	11%	13%	21%	21%
Rank4	9%	20%	15%	17%	24%	16%
Rank5	4%	18%	17%	26%	13%	22%
Rank6	1%	9%	52%	17%	4%	18%
Q11: How well informed do you think you are about radioactive waste?						
Total	N=501					
Well Informed	5%					
Partly Informed	57%					
Not informed at all	38%					
Q12: Are you aware of opportunities in your country for the general public to discuss or learn about radioactive waste management with either industry or regulatory organizations?						
Total	N=501					
Yes I am aware of potential opportunities	12%					
No I am not aware of any opportunities	88%					

Q12B: Please could you highlight from your experience which of these types of opportunities for gaining information about radioactive waste management you are aware of.

Total	N=60
Government Websites	63%
Industry Websites	50%
Regulatory Websites	35%
Public Meetings	33%
Site Stakeholder Groups	23%
Media Outlets	50%
Other	15%

Q13: Which of the following aspects of radioactive waste management might you be particularly interested in?

	Waste Regulation (A)	**Waste Storage (B)**	**Waste disposal (C)**	**Waste transportation (D)**
Total	N=440	N=440	N=440	N=440
Rank1	20%	31%	40%	8%
Rank2	20%	31%	30%	19%
Rank3	25%	23%	21%	31%
Rank4	35%	15%	9%	41%

Q14: Would you like to know more about how radioactive waste is classified and managed in your country?

Total	N=501
Yes, I would be interested learning more	77%
No, I am not really interested in this subject	23%

To what extent do you agree or disagree with the following statements?

	Q15: I have concerns about how radioactive waste is managed in my country. (A)	**Q16: Each EU Member State should dispose of its own radioactive waste in its territory. (B)**	**Q17: Harmonized and consistent methodologies should be developed within the EU to manage radioactive waste. (C)**	**Q18: A harmonized radioactive waste classification scheme for all EU Member States would ensure an appropriate level of transparency for EU citizens. (D)**
Total	N=501	N=501	N=501	N=501
Totally agree	15%	25%	48%	41%
Tend to agree	33%	35%	44%	47%
Tend to disagree	28%	25%	4%	5%
Totally disagree	5%	5%	0%	0%
Don’t know	20%	10%	5%	7%

Q19: Which of the following would facilitate greater transparency in how radioactive wastes are classified for EU citizens?

	Information should be readily available on the websites of the regulators (A)	**Information should be readily available on the websites of the waste producers (B)**	**Waste producers should take out advertisements in national newspapers (C)**	**Waste producers should hold information sessions at schools (D)**
Total	N=501	N=501	N=501	N=501
Rank1	37%	34%	12%	17%
Rank2	33%	34%	18%	15%
Rank3	18%	20%	31%	31%
Rank4	12%	12%	39%	37%

To what extent do you agree or disagree with the following statements?				
	Q20: Different categories of radioactive waste should be managed in a manner which reflects their level of hazard. (A)	**Q21: Materials (e.g. concrete, metals such as steel and copper) with very low levels of radioactivity should be considered for reuse/recycling instead of being viewed as radioactive waste. (B)**	**Q22: If it can be proved that they will be safely managed, radioactive wastes and/or materials should be allowed to be transported from one EU Member State to another for final disposal. (C)**	
Total	N=501	N=501	N=501	
Totally agree	50%	19%	19%	
Tend to agree	44%	50%	46%	
Tend to disagree	3%	15%	22%	
Totally disagree	0%	5%	5%	
Don’t know	3%	10%	7%	

MALTA

Are you…?		
Total	N=201	
Male	46%	
Female	54%	
How old are you?		
Total	100%	
Promedio	32.06	
Media	30.00	
Desviación estándar	11.57	
Hidden for age recode		
Total	N=201	
15-24	34%	
25-39	38%	
40-54	24%	
55-64	3%	
65 and more	1%	
How old were you when your education ended?		
Total	N=201	
15	4%	
16-19	28%	
20+	44%	
Still Studying	23%	
What is your current occupation?		
Total	N=201	
Self Employed	11%	
Manager	15%	
Other white collar workers	32%	
Manual workers	11%	
House Person/Housewife	4%	
Unemployed	4%	
Retired	4%	
Student	18%	

Q1: Is your country one of those in the EU which produces radioactive waste?		
Total	N=201	
Yes, I believe it produces radioactive waste	22%	
No, I don't believe it produces radioactive waste	62%	
I don't know either way	16%	
Q2: Radioactive waste can result from the activities of a range of industries, especially the nuclear industry. Do you understand the different types and origins of radioactive waste?		
Total	N=201	
Yes completely	25%	
Yes, to some degree	56%	
No, not at all	19%	
Q3: Please assess the following statement: There are several categories of radioactive waste, for example low, intermediate, and high-level waste.		
Total	N=201	
True	41%	
I am aware of differences, but I don't understand them	42%	
Don't know	16%	
Q4: Please assess the following statement: Some non-nuclear industries produce radioactive waste.		
Total	N=201	
Yes	57%	
No	8%	
Don't know	35%	

Q5: All radioactive waste is very dangerous.		
Total	N=201	
True	79%	
False	21%	
Q6: Do you know who is responsible for the safe management of radioactive waste in your country?		
Total	N=201	
Yes, I know definitively who is responsible	6%	
Yes, I believe I know who is responsible	20%	
No, I don't know who is responsible	73%	
Q7: Are you aware of the industries in your country which might produce naturally occurring radioactive material (NORM) wastes?		
Total	N=201	
Yes, I am familiar with which industries produce NORM wastes	9%	
Yes, I am partly familiar with which industries produce NORM wastes	27%	
No, I am not familiar with which industries produce NORM wastes	64%	
Q8: Do you believe that naturally occurring radioactive material (NORM) wastes should be managed in the same regulated manner as radioactive wastes emanating from the nuclear industry?		
Total	N=201	
Yes, I believe they should be managed in the same manner as nuclear industry wastes	68%	
No, I don't think it is necessary that they are managed in the same manner as nuclear industry wastes	32%	
Q9: With respect to how radioactive waste is regulated in your country, how familiar are you with the regulation process?		
Total	N=201	
Yes, I am familiar how radioactive waste is regulated in my country	3%	
I have a limited understanding of how radioactive waste is regulated in my country	41%	
No, I am not aware of how radioactive waste is regulated in my country	56%	

Q10: With respect to the communication about how radioactive wastes are classified and managed, who do you trust the most?

	Scientist (A)	**Academia (B)**	**Industry (C)**	**Government (D)**	**Regulators (E)**	**NGO's (F)**
Total	N=201	N=201	N=201	N=201	N=201	N=201
Rank1	55%	5%	3%	10%	12%	15%
Rank2	18%	20%	9%	13%	21%	18%
Rank3	13%	18%	12%	9%	28%	19%
Rank4	6%	21%	14%	12%	24%	22%
Rank5	4%	17%	27%	22%	8%	20%
Rank6	3%	19%	34%	33%	6%	5%

Q11: How well informed do you think you are about radioactive waste?		
Total	N=201	
Well Informed	4%	
Partly Informed	64%	
Not informed at all	31%	
Q12: Are you aware of opportunities in your country for the general public to discuss or learn about radioactive waste management with either industry or regulatory organizations?		
Total	N=201	
Yes I am aware of potential opportunities	23%	
No I am not aware of any opportunities	77%	

Q12B: Please could you highlight from your experience which of these types of opportunities for gaining information about radioactive waste management you are aware of.

Total	N=47
Government Websites	64%
Industry Websites	49%
Regulatory Websites	47%
Public Meetings	30%
Site Stakeholder Groups	4%
Media Outlets	62%
Other	11%

Q13: Which of the following aspects of radioactive waste management might you be particularly interested in?

	Waste Regulation (A)	**Waste Storage (B)**	**Waste disposal (C)**	**Waste transportation (D)**
Total	N=162	N=162	N=162	N=162
Rank1	26%	19%	47%	9%
Rank2	25%	28%	27%	20%
Rank3	26%	27%	15%	31%
Rank4	23%	26%	11%	40%

Q14: Would you like to know more about how radioactive waste is classified and managed in your country?

Total	N=201
Yes, I would be interested learning more	78%
No, I am not really interested in this subject	22%

To what extent do you agree or disagree with the following statements?

	Q15: I have concerns about how radioactive waste is managed in my country. (A)	**Q16: Each EU Member State should dispose of its own radioactive waste in its territory. (B)**	**Q17: Harmonized and consistent methodologies should be developed within the EU to manage radioactive waste. (C)**	**Q18: A harmonized radioactive waste classification scheme for all EU Member States would ensure an appropriate level of transparency for EU citizens. (D)**
Total	N=201	N=201	N=201	N=201
Totally agree	26%	37%	56%	51%
Tend to agree	35%	34%	31%	37%
Tend to disagree	16%	19%	4%	5%
Totally disagree	4%	2%	2%	0%
Don’t know	18%	8%	6%	6%

Q19: Which of the following would facilitate greater transparency in how radioactive wastes are classified for EU citizens?

	Information should be readily available on the websites of the regulators (A)	**Information should be readily available on the websites of the waste producers (B)**	**Waste producers should take out advertisements in national newspapers (C)**	**Waste producers should hold information sessions at schools (D)**
Total	N=201	N=201	N=201	N=201
Rank1	37%	24%	10%	28%
Rank2	31%	38%	16%	15%
Rank3	19%	22%	27%	32%
Rank4	12%	16%	46%	25%

To what extent do you agree or disagree with the following statements?				
	Q20: Different categories of radioactive waste should be managed in a manner which reflects their level of hazard. (A)	**Q21: Materials (e.g. concrete, metals such as steel and copper) with very low levels of radioactivity should be considered for reuse/recycling instead of being viewed as radioactive waste. (B)**	**Q22: If it can be proved that they will be safely managed, radioactive wastes and/or materials should be allowed to be transported from one EU Member State to another for final disposal. (C)**	
Total	N=201	N=201	N=201	
Totally agree	60%	41%	29%	
Tend to agree	34%	41%	46%	
Tend to disagree	3%	9%	11%	
Totally disagree	0%	3%	8%	
Don’t know	3%	5%	5%	

NETHERLANDS

Are you…?	
Total	N=1000
Male	49%
Female	51%
How old are you?	
Total	100%
Promedio	46.92
Media	50.00
Desviación estándar	19.12
Hidden for age recode	
Total	N=1000
15-24	20%
25-39	18%
40-54	21%
55-64	21%
65 and more	21%
How old were you when your education ended?	
Total	N=1000
15	5%
16-19	40%
20+	44%
Still Studying	11%
What is your current occupation?	
Total	N=1000
Self Employed	9%
Manager	12%
Other white collar workers	18%
Manual workers	12%
House Person/Housewife	7%
Unemployed	9%
Retired	20%
Student	14%

Q1: Is your country one of those in the EU which produces radioactive waste?	
Total	N=1000
Yes, I believe it produces radioactive waste	69%
No, I don't believe it produces radioactive waste	11%
I don't know either way	20%
Q2: Radioactive waste can result from the activities of a range of industries, especially the nuclear industry. Do you understand the different types and origins of radioactive waste?	
Total	N=1000
Yes completely	20%
Yes, to some degree	58%
No, not at all	23%
Q3: Please assess the following statement: There are several categories of radioactive waste, for example low, intermediate, and high-level waste.	
Total	N=1000
True	44%
I am aware of differences, but I don't understand them	40%
Don't know	16%
Q4: Please assess the following statement: Some non-nuclear industries produce radioactive waste.	
Total	N=1000
Yes	46%
No	11%
Don't know	42%

Q5: All radioactive waste is very dangerous.						
Total	N=1000					
True	71%					
False	29%					
Q6: Do you know who is responsible for the safe management of radioactive waste in your country?						
Total	N=1000					
Yes, I know definitively who is responsible	9%					
Yes, I believe I know who is responsible	36%					
No, I don't know who is responsible	55%					
Q7: Are you aware of the industries in your country which might produce naturally occurring radioactive material (NORM) wastes?						
Total	N=1000					
Yes, I am familiar with which industries produce NORM wastes	7%					
Yes, I am partly familiar with which industries produce NORM wastes	25%					
No, I am not familiar with which industries produce NORM wastes	68%					
Q8: Do you believe that naturally occurring radioactive material (NORM) wastes should be managed in the same regulated manner as radioactive wastes emanating from the nuclear industry?						
Total	N=1000					
Yes, I believe they should be managed in the same manner as nuclear industry wastes	60%					
No, I don't think it is necessary that they are managed in the same manner as nuclear industry wastes	40%					
Q9: With respect to how radioactive waste is regulated in your country, how familiar are you with the regulation process?						
Total	N=1000					
Yes, I am familiar how radioactive waste is regulated in my country	6%					
I have a limited understanding of how radioactive waste is regulated in my country	40%					
No, I am not aware of how radioactive waste is regulated in my country	54%					
Q10: With respect to the communication about how radioactive wastes are classified and managed, who do you trust the most?						
	Scientist (A)	**Academia (B)**	**Industry (C)**	**Government (D)**	**Regulators (E)**	**NGO's (F)**
Total	N=1000	N=1000	N=1000	N=1000	N=1000	N=1000
Rank1	47%	8%	6%	19%	16%	4%
Rank2	21%	28%	9%	15%	23%	5%
Rank3	15%	22%	11%	16%	27%	10%
Rank4	9%	21%	16%	16%	17%	21%
Rank5	6%	14%	24%	18%	10%	28%
Rank6	2%	7%	35%	16%	7%	33%
Q11: How well informed do you think you are about radioactive waste?						
Total	N=1000					
Well Informed	8%					
Partly Informed	46%					
Not informed at all	47%					
Q12: Are you aware of opportunities in your country for the general public to discuss or learn about radioactive waste management with either industry or regulatory organizations?						
Total	N=1000					
Yes I am aware of potential opportunities	30%					
No I am not aware of any opportunities	70%					

Q12B: Please could you highlight from your experience which of these types of opportunities for gaining information about radioactive waste management you are aware of.

Total	N=301
Government Websites	59%
Industry Websites	25%
Regulatory Websites	55%
Public Meetings	20%
Site Stakeholder Groups	29%
Media Outlets	39%
Other	12%

Q13: Which of the following aspects of radioactive waste management might you be particularly interested in?

	Waste Regulation (A)	**Waste Storage (B)**	**Waste disposal (C)**	**Waste transportation (D)**
Total	N=671	N=671	N=671	N=671
Rank1	17%	36%	36%	11%
Rank2	19%	29%	27%	25%
Rank3	25%	20%	22%	33%
Rank4	39%	15%	15%	31%

Q14: Would you like to know more about how radioactive waste is classified and managed in your country?

Total	N=1000
Yes, I would be interested learning more	53%
No, I am not really interested in this subject	47%

To what extent do you agree or disagree with the following statements?

	Q15: I have concerns about how radioactive waste is managed in my country. (A)	**Q16: Each EU Member State should dispose of its own radioactive waste in its territory. (B)**	**Q17: Harmonized and consistent methodologies should be developed within the EU to manage radioactive waste. (C)**	**Q18: A harmonized radioactive waste classification scheme for all EU Member States would ensure an appropriate level of transparency for EU citizens. (D)**
Total	N=1000	N=1000	N=1000	N=1000
Totally agree	9%	24%	36%	21%
Tend to agree	30%	41%	44%	48%
Tend to disagree	30%	16%	7%	14%
Totally disagree	13%	6%	3%	3%
Don’t know	18%	14%	10%	15%

Q19: Which of the following would facilitate greater transparency in how radioactive wastes are classified for EU citizens?

	Information should be readily available on the websites of the regulators (A)	**Information should be readily available on the websites of the waste producers (B)**	**Waste producers should take out advertisements in national newspapers (C)**	**Waste producers should hold information sessions at schools (D)**
Total	N=1000	N=1000	N=1000	N=1000
Rank1	38%	35%	12%	15%
Rank2	32%	38%	12%	18%
Rank3	18%	17%	31%	35%
Rank4	12%	11%	45%	32%

To what extent do you agree or disagree with the following statements?				
	Q20: Different categories of radioactive waste should be managed in a manner which reflects their level of hazard. (A)	**Q21: Materials (e.g. concrete, metals such as steel and copper) with very low levels of radioactivity should be considered for reuse/recycling instead of being viewed as radioactive waste. (B)**	**Q22: If it can be proved that they will be safely managed, radioactive wastes and/or materials should be allowed to be transported from one EU Member State to another for final disposal. (C)**	
Total	N=1000	N=1000	N=1000	
Totally agree	39%	21%	17%	
Tend to agree	43%	41%	48%	
Tend to disagree	7%	13%	14%	
Totally disagree	2%	6%	8%	
Don’t know	9%	19%	13%	

POLAND

Are you…?	
Total	N=1000
Male	50%
Female	50%
How old are you?	
Total	100%
Promedio	45.71
Media	46.00
Desviación estándar	18.01
Hidden for age recode	
Total	N=1000
15-24	20%
25-39	20%
40-54	20%
55-64	20%
65 and more	20%
How old were you when your education ended?	
Total	N=1000
15	1%
16-19	25%
20+	64%
Still Studying	10%
What is your current occupation?	
Total	N=1000
Self Employed	9%
Manager	8%
Other white collar workers	21%
Manual workers	18%
House Person/Housewife	4%
Unemployed	7%
Retired	24%
Student	9%

Q1: Is your country one of those in the EU which produces radioactive waste?	
Total	N=1000
Yes, I believe it produces radioactive waste	34%
No, I don't believe it produces radioactive waste	44%
I don't know either way	23%
Q2: Radioactive waste can result from the activities of a range of industries, especially the nuclear industry. Do you understand the different types and origins of radioactive waste?	
Total	N=1000
Yes completely	28%
Yes, to some degree	63%
No, not at all	8%
Q3: Please assess the following statement: There are several categories of radioactive waste, for example low, intermediate, and high-level waste.	
Total	N=1000
True	47%
I am aware of differences, but I don't understand them	45%
Don't know	9%
Q4: Please assess the following statement: Some non-nuclear industries produce radioactive waste.	
Total	N=1000
Yes	61%
No	8%
Don't know	32%

Q5: All radioactive waste is very dangerous.						
Total	N=1000					
True	87%					
False	13%					
Q6: Do you know who is responsible for the safe management of radioactive waste in your country?						
Total	N=1000					
Yes, I know definitively who is responsible	9%					
Yes, I believe I know who is responsible	36%					
No, I don't know who is responsible	55%					
Q7: Are you aware of the industries in your country which might produce naturally occurring radioactive material (NORM) wastes?						
Total	N=1000					
Yes, I am familiar with which industries produce NORM wastes	10%					
Yes, I am partly familiar with which industries produce NORM wastes	39%					
No, I am not familiar with which industries produce NORM wastes	50%					
Q8: Do you believe that naturally occurring radioactive material (NORM) wastes should be managed in the same regulated manner as radioactive wastes emanating from the nuclear industry?						
Total	N=1000					
Yes, I believe they should be managed in the same manner as nuclear industry wastes	73%					
No, I don't think it is necessary that they are managed in the same manner as nuclear industry wastes	27%					
Q9: With respect to how radioactive waste is regulated in your country, how familiar are you with the regulation process?						
Total	N=1000					
Yes, I am familiar how radioactive waste is regulated in my country	7%					
I have a limited understanding of how radioactive waste is regulated in my country	47%					
No, I am not aware of how radioactive waste is regulated in my country	46%					
Q10: With respect to the communication about how radioactive wastes are classified and managed, who do you trust the most?						
	Scientist (A)	**Academia (B)**	**Industry (C)**	**Government (D)**	**Regulators (E)**	**NGO's (F)**
Total	N=1000	N=1000	N=1000	N=1000	N=1000	N=1000
Rank1	43%	10%	6%	13%	14%	14%
Rank2	23%	22%	8%	12%	17%	18%
Rank3	13%	20%	13%	10%	22%	22%
Rank4	10%	17%	19%	11%	27%	16%
Rank5	7%	16%	27%	20%	14%	16%
Rank6	4%	15%	26%	35%	6%	14%
Q11: How well informed do you think you are about radioactive waste?						
Total	N=1000					
Well Informed	5%					
Partly Informed	57%					
Not informed at all	38%					
Q12: Are you aware of opportunities in your country for the general public to discuss or learn about radioactive waste management with either industry or regulatory organizations?						
Total	N=1000					
Yes I am aware of potential opportunities	58%					
No I am not aware of any opportunities	42%					

Q12B: Please could you highlight from your experience which of these types of opportunities for gaining information about radioactive waste management you are aware of.

Total	N=581
Government Websites	46%
Industry Websites	41%
Regulatory Websites	41%
Public Meetings	33%
Site Stakeholder Groups	48%
Media Outlets	71%
Other	5%

Q13: Which of the following aspects of radioactive waste management might you be particularly interested in?

	Waste Regulation (A)	**Waste Storage (B)**	**Waste disposal (C)**	**Waste transportation (D)**
Total	N=858	N=858	N=858	N=858
Rank1	16%	24%	50%	10%
Rank2	15%	36%	26%	23%
Rank3	21%	25%	16%	39%
Rank4	49%	14%	9%	28%

Q14: Would you like to know more about how radioactive waste is classified and managed in your country?

Total	N=1000
Yes, I would be interested learning more	79%
No, I am not really interested in this subject	21%

To what extent do you agree or disagree with the following statements?

	Q15: I have concerns about how radioactive waste is managed in my country. (A)	**Q16: Each EU Member State should dispose of its own radioactive waste in its territory. (B)**	**Q17: Harmonized and consistent methodologies should be developed within the EU to manage radioactive waste. (C)**	**Q18: A harmonized radioactive waste classification scheme for all EU Member States would ensure an appropriate level of transparency for EU citizens. (D)**
Total	N=1000	N=1000	N=1000	N=1000
Totally agree	26%	46%	54%	45%
Tend to agree	47%	38%	36%	41%
Tend to disagree	12%	5%	3%	4%
Totally disagree	3%	2%	2%	3%
Don’t know	12%	9%	6%	8%

Q19: Which of the following would facilitate greater transparency in how radioactive wastes are classified for EU citizens?

	Information should be readily available on the websites of the regulators (A)	**Information should be readily available on the websites of the waste producers (B)**	**Waste producers should take out advertisements in national newspapers (C)**	**Waste producers should hold information sessions at schools (D)**
Total	N=1000	N=1000	N=1000	N=1000
Rank1	41%	37%	8%	14%
Rank2	33%	38%	14%	15%
Rank3	16%	15%	37%	32%
Rank4	10%	11%	40%	39%

To what extent do you agree or disagree with the following statements?				
	Q20: Different categories of radioactive waste should be managed in a manner which reflects their level of hazard. (A)	**Q21: Materials (e.g. concrete, metals such as steel and copper) with very low levels of radioactivity should be considered for reuse/recycling instead of being viewed as radioactive waste. (B)**	**Q22: If it can be proved that they will be safely managed, radioactive wastes and/or materials should be allowed to be transported from one EU Member State to another for final disposal. (C)**	
Total	N=1000	N=1000	N=1000	
Totally agree	46%	29%	23%	
Tend to agree	44%	44%	46%	
Tend to disagree	2%	9%	12%	
Totally disagree	1%	3%	7%	
Don’t know	7%	16%	13%	

PORTUGAL

Are you…?	
Total	N=1000
Male	50%
Female	50%
How old are you?	
Total	100%
Promedio	42.94
Media	43.00
Desviación estándar	15.13
Hidden for age recode	
Total	N=1000
15-24	16%
25-39	28%
40-54	27%
55-64	22%
65 and more	8%
How old were you when your education ended?	
Total	N=1000
15	3%
16-19	32%
20+	57%
Still Studying	8%
What is your current occupation?	
Total	N=1000
Self Employed	17%
Manager	6%
Other white collar workers	35%
Manual workers	9%
House Person/Housewife	2%
Unemployed	9%
Retired	11%
Student	11%

Q1: Is your country one of those in the EU which produces radioactive waste?	
Total	N=1000
Yes, I believe it produces radioactive waste	29%
No, I don't believe it produces radioactive waste	56%
I don't know either way	15%
Q2: Radioactive waste can result from the activities of a range of industries, especially the nuclear industry. Do you understand the different types and origins of radioactive waste?	
Total	N=1000
Yes completely	10%
Yes, to some degree	60%
No, not at all	30%
Q3: Please assess the following statement: There are several categories of radioactive waste, for example low, intermediate, and high-level waste.	
Total	N=1000
True	52%
I am aware of differences, but I don't understand them	28%
Don't know	19%
Q4: Please assess the following statement: Some non-nuclear industries produce radioactive waste.	
Total	N=1000
Yes	57%
No	9%
Don't know	35%

Q5: All radioactive waste is very dangerous.						
Total	N=1000					
True	81%					
False	19%					
Q6: Do you know who is responsible for the safe management of radioactive waste in your country?						
Total	N=1000					
Yes, I know definitively who is responsible	5%					
Yes, I believe I know who is responsible	17%					
No, I don't know who is responsible	78%					
Q7: Are you aware of the industries in your country which might produce naturally occurring radioactive material (NORM) wastes?						
Total	N=1000					
Yes, I am familiar with which industries produce NORM wastes	5%					
Yes, I am partly familiar with which industries produce NORM wastes	27%					
No, I am not familiar with which industries produce NORM wastes	68%					
Q8: Do you believe that naturally occurring radioactive material (NORM) wastes should be managed in the same regulated manner as radioactive wastes emanating from the nuclear industry?						
Total	N=1000					
Yes, I believe they should be managed in the same manner as nuclear industry wastes	72%					
No, I don't think it is necessary that they are managed in the same manner as nuclear industry wastes	28%					
Q9: With respect to how radioactive waste is regulated in your country, how familiar are you with the regulation process?						
Total	N=1000					
Yes, I am familiar how radioactive waste is regulated in my country	5%					
I have a limited understanding of how radioactive waste is regulated in my country	42%					
No, I am not aware of how radioactive waste is regulated in my country	53%					
Q10: With respect to the communication about how radioactive wastes are classified and managed, who do you trust the most?						
	Scientist (A)	**Academia (B)**	**Industry (C)**	**Government (D)**	**Regulators (E)**	**NGO's (F)**
Total	N=1000	N=1000	N=1000	N=1000	N=1000	N=1000
Rank1	51%	4%	4%	10%	19%	13%
Rank2	24%	13%	7%	9%	28%	18%
Rank3	12%	17%	11%	16%	22%	23%
Rank4	7%	22%	16%	17%	18%	21%
Rank5	4%	24%	21%	26%	9%	16%
Rank6	2%	21%	42%	22%	4%	9%
Q11: How well informed do you think you are about radioactive waste?						
Total	N=1000					
Well Informed	3%					
Partly Informed	56%					
Not informed at all	41%					
Q12: Are you aware of opportunities in your country for the general public to discuss or learn about radioactive waste management with either industry or regulatory organizations?						
Total	N=1000					
Yes I am aware of potential opportunities	22%					
No I am not aware of any opportunities	79%					

Q12B: Please could you highlight from your experience which of these types of opportunities for gaining information about radioactive waste management you are aware of.

Total	N=215
Government Websites	48%
Industry Websites	39%
Regulatory Websites	43%
Public Meetings	19%
Site Stakeholder Groups	28%
Media Outlets	72%
Other	7%

Q13: Which of the following aspects of radioactive waste management might you be particularly interested in?

	Waste Regulation (A)	**Waste Storage (B)**	**Waste disposal (C)**	**Waste transportation (D)**
Total	N=844	N=844	N=844	N=844
Rank1	29%	17%	49%	6%
Rank2	26%	31%	23%	20%
Rank3	22%	30%	13%	35%
Rank4	24%	22%	15%	39%

Q14: Would you like to know more about how radioactive waste is classified and managed in your country?

Total	N=1000
Yes, I would be interested learning more	89%
No, I am not really interested in this subject	11%

To what extent do you agree or disagree with the following statements?

	Q15: I have concerns about how radioactive waste is managed in my country. (A)	**Q16: Each EU Member State should dispose of its own radioactive waste in its territory. (B)**	**Q17: Harmonized and consistent methodologies should be developed within the EU to manage radioactive waste. (C)**	**Q18: A harmonized radioactive waste classification scheme for all EU Member States would ensure an appropriate level of transparency for EU citizens. (D)**
Total	N=1000	N=1000	N=1000	N=1000
Totally agree	44%	40%	65%	61%
Tend to agree	42%	40%	29%	32%
Tend to disagree	7%	13%	3%	3%
Totally disagree	2%	2%	1%	1%
Don’t know	5%	5%	3%	3%

Q19: Which of the following would facilitate greater transparency in how radioactive wastes are classified for EU citizens?

	Information should be readily available on the websites of the regulators (A)	**Information should be readily available on the websites of the waste producers (B)**	**Waste producers should take out advertisements in national newspapers (C)**	**Waste producers should hold information sessions at schools (D)**
Total	N=1000	N=1000	N=1000	N=1000
Rank1	38%	30%	14%	19%
Rank2	33%	37%	15%	15%
Rank3	16%	20%	32%	32%
Rank4	13%	13%	39%	35%

To what extent do you agree or disagree with the following statements?				
	Q20: Different categories of radioactive waste should be managed in a manner which reflects their level of hazard. (A)	**Q21: Materials (e.g. concrete, metals such as steel and copper) with very low levels of radioactivity should be considered for reuse/recycling instead of being viewed as radioactive waste. (B)**	**Q22: If it can be proved that they will be safely managed, radioactive wastes and/or materials should be allowed to be transported from one EU Member State to another for final disposal. (C)**	
Total	N=1000	N=1000	N=1000	
Totally agree	55%	27%	23%	
Tend to agree	38%	51%	45%	
Tend to disagree	3%	11%	18%	
Totally disagree	1%	2%	7%	
Don’t know	3%	9%	7%	

ROMANIA

Are you…?	
Total	N=1000
Male	50%
Female	50%
How old are you?	
Total	100%
Promedio	43.83
Media	44.00
Desviación estándar	17.24
Hidden for age recode	
Total	N=1000
15-24	22%
25-39	22%
40-54	22%
55-64	21%
65 and more	14%
How old were you when your education ended?	
Total	N=1000
15	2%
16-19	28%
20+	62%
Still Studying	9%
What is your current occupation?	
Total	N=1000
Self Employed	8%
Manager	10%
Other white collar workers	27%
Manual workers	12%
House Person/Housewife	5%
Unemployed	4%
Retired	21%
Student	14%

Q1: Is your country one of those in the EU which produces radioactive waste?	
Total	N=1000
Yes, I believe it produces radioactive waste	59%
No, I don't believe it produces radioactive waste	30%
I don't know either way	11%
Q2: Radioactive waste can result from the activities of a range of industries, especially the nuclear industry. Do you understand the different types and origins of radioactive waste?	
Total	N=1000
Yes completely	35%
Yes, to some degree	57%
No, not at all	8%
Q3: Please assess the following statement: There are several categories of radioactive waste, for example low, intermediate, and high-level waste.	
Total	N=1000
True	67%
I am aware of differences, but I don't understand them	29%
Don't know	4%
Q4: Please assess the following statement: Some non-nuclear industries produce radioactive waste.	
Total	N=1000
Yes	66%
No	9%
Don't know	25%

Q5: All radioactive waste is very dangerous.						
Total	N=1000					
True	92%					
False	9%					
Q6: Do you know who is responsible for the safe management of radioactive waste in your country?						
Total	N=1000					
Yes, I know definitively who is responsible	16%					
Yes, I believe I know who is responsible	42%					
No, I don't know who is responsible	42%					
Q7: Are you aware of the industries in your country which might produce naturally occurring radioactive material (NORM) wastes?						
Total	N=1000					
Yes, I am familiar with which industries produce NORM wastes	17%					
Yes, I am partly familiar with which industries produce NORM wastes	50%					
No, I am not familiar with which industries produce NORM wastes	33%					
Q8: Do you believe that naturally occurring radioactive material (NORM) wastes should be managed in the same regulated manner as radioactive wastes emanating from the nuclear industry?						
Total	N=1000					
Yes, I believe they should be managed in the same manner as nuclear industry wastes	82%					
No, I don't think it is necessary that they are managed in the same manner as nuclear industry wastes	18%					
Q9: With respect to how radioactive waste is regulated in your country, how familiar are you with the regulation process?						
Total	N=1000					
Yes, I am familiar how radioactive waste is regulated in my country	12%					
I have a limited understanding of how radioactive waste is regulated in my country	49%					
No, I am not aware of how radioactive waste is regulated in my country	38%					
Q10: With respect to the communication about how radioactive wastes are classified and managed, who do you trust the most?						
	Scientist (A)	**Academia (B)**	**Industry (C)**	**Government (D)**	**Regulators (E)**	**NGO's (F)**
Total	N=1000	N=1000	N=1000	N=1000	N=1000	N=1000
Rank1	46%	6%	7%	9%	21%	11%
Rank2	24%	20%	13%	9%	19%	14%
Rank3	14%	19%	20%	10%	23%	15%
Rank4	9%	21%	23%	12%	19%	17%
Rank5	5%	21%	22%	19%	13%	20%
Rank6	2%	13%	15%	41%	6%	23%
Q11: How well informed do you think you are about radioactive waste?						
Total	N=1000					
Well Informed	10%					
Partly Informed	67%					
Not informed at all	23%					
Q12: Are you aware of opportunities in your country for the general public to discuss or learn about radioactive waste management with either industry or regulatory organizations?						
Total	N=1000					
Yes I am aware of potential opportunities	27%					
No I am not aware of any opportunities	73%					

Q12B: Please could you highlight from your experience which of these types of opportunities for gaining information about radioactive waste management you are aware of.

Total	N=274
Government Websites	46%
Industry Websites	49%
Regulatory Websites	65%
Public Meetings	18%
Site Stakeholder Groups	37%
Media Outlets	62%
Other	7%

Q13: Which of the following aspects of radioactive waste management might you be particularly interested in?

	Waste Regulation (A)	**Waste Storage (B)**	**Waste disposal (C)**	**Waste transportation (D)**
Total	N=925	N=925	N=925	N=925
Rank1	28%	25%	41%	6%
Rank2	19%	31%	24%	26%
Rank3	24%	28%	15%	33%
Rank4	28%	16%	20%	36%

Q14: Would you like to know more about how radioactive waste is classified and managed in your country?

Total	N=1000
Yes, I would be interested learning more	86%
No, I am not really interested in this subject	14%

To what extent do you agree or disagree with the following statements?

	Q15: I have concerns about how radioactive waste is managed in my country. (A)	**Q16: Each EU Member State should dispose of its own radioactive waste in its territory. (B)**	**Q17: Harmonized and consistent methodologies should be developed within the EU to manage radioactive waste. (C)**	**Q18: A harmonized radioactive waste classification scheme for all EU Member States would ensure an appropriate level of transparency for EU citizens. (D)**
Total	N=1000	N=1000	N=1000	N=1000
Totally agree	43%	64%	67%	59%
Tend to agree	41%	25%	27%	32%
Tend to disagree	10%	6%	3%	5%
Totally disagree	2%	1%	0%	1%
Don’t know	4%	4%	2%	4%

Q19: Which of the following would facilitate greater transparency in how radioactive wastes are classified for EU citizens?

	Information should be readily available on the websites of the regulators (A)	**Information should be readily available on the websites of the waste producers (B)**	**Waste producers should take out advertisements in national newspapers (C)**	**Waste producers should hold information sessions at schools (D)**
Total	N=1000	N=1000	N=1000	N=1000
Rank1	47%	38%	8%	8%
Rank2	36%	46%	9%	10%
Rank3	10%	10%	50%	30%
Rank4	7%	7%	34%	53%

To what extent do you agree or disagree with the following statements?				
	Q20: Different categories of radioactive waste should be managed in a manner which reflects their level of hazard. (A)	**Q21: Materials (e.g. concrete, metals such as steel and copper) with very low levels of radioactivity should be considered for reuse/recycling instead of being viewed as radioactive waste. (B)**	**Q22: If it can be proved that they will be safely managed, radioactive wastes and/or materials should be allowed to be transported from one EU Member State to another for final disposal. (C)**	
Total	N=1000	N=1000	N=1000	
Totally agree	64%	38%	27%	
Tend to agree	29%	40%	32%	
Tend to disagree	4%	10%	16%	
Totally disagree	0%	4%	19%	
Don’t know	3%	7%	6%	

SLOVAKIA

Are you…?	
Total	N=1000
Male	50%
Female	50%
How old are you?	
Total	100%
Promedio	42.05
Media	41.00
Desviación estándar	16.88
Hidden for age recode	
Total	N=1000
15-24	24%
25-39	24%
40-54	24%
55-64	17%
65 and more	12%
How old were you when your education ended?	
Total	N=1000
15	1%
16-19	47%
20+	41%
Still Studying	11%
What is your current occupation?	
Total	N=1000
Self Employed	15%
Manager	5%
Other white collar workers	16%
Manual workers	20%
House Person/Housewife	6%
Unemployed	7%
Retired	19%
Student	11%

Q1: Is your country one of those in the EU which produces radioactive waste?	
Total	N=1000
Yes, I believe it produces radioactive waste	70%
No, I don't believe it produces radioactive waste	17%
I don't know either way	13%
Q2: Radioactive waste can result from the activities of a range of industries, especially the nuclear industry. Do you understand the different types and origins of radioactive waste?	
Total	N=1000
Yes completely	10%
Yes, to some degree	67%
No, not at all	23%
Q3: Please assess the following statement: There are several categories of radioactive waste, for example low, intermediate, and high-level waste.	
Total	N=1000
True	33%
I am aware of differences, but I don't understand them	54%
Don't know	13%
Q4: Please assess the following statement: Some non-nuclear industries produce radioactive waste.	
Total	N=1000
Yes	46%
No	14%
Don't know	39%

Q5: All radioactive waste is very dangerous.						
Total	N=1000					
True	85%					
False	15%					
Q6: Do you know who is responsible for the safe management of radioactive waste in your country?						
Total	N=1000					
Yes, I know definitively who is responsible	9%					
Yes, I believe I know who is responsible	43%					
No, I don't know who is responsible	48%					
Q7: Are you aware of the industries in your country which might produce naturally occurring radioactive material (NORM) wastes?						
Total	N=1000					
Yes, I am familiar with which industries produce NORM wastes	9%					
Yes, I am partly familiar with which industries produce NORM wastes	39%					
No, I am not familiar with which industries produce NORM wastes	52%					
Q8: Do you believe that naturally occurring radioactive material (NORM) wastes should be managed in the same regulated manner as radioactive wastes emanating from the nuclear industry?						
Total	N=1000					
Yes, I believe they should be managed in the same manner as nuclear industry wastes	73%					
No, I don't think it is necessary that they are managed in the same manner as nuclear industry wastes	27%					
Q9: With respect to how radioactive waste is regulated in your country, how familiar are you with the regulation process?						
Total	N=1000					
Yes, I am familiar how radioactive waste is regulated in my country	6%					
I have a limited understanding of how radioactive waste is regulated in my country	43%					
No, I am not aware of how radioactive waste is regulated in my country	51%					
Q10: With respect to the communication about how radioactive wastes are classified and managed, who do you trust the most?						
	Scientist (A)	**Academia (B)**	**Industry (C)**	**Government (D)**	**Regulators (E)**	**NGO's (F)**
Total	N=1000	N=1000	N=1000	N=1000	N=1000	N=1000
Rank1	50%	10%	9%	5%	20%	7%
Rank2	20%	26%	15%	9%	22%	9%
Rank3	13%	19%	17%	8%	26%	16%
Rank4	8%	21%	22%	10%	20%	20%
Rank5	5%	14%	22%	24%	10%	26%
Rank6	3%	11%	15%	45%	3%	23%
Q11: How well informed do you think you are about radioactive waste?						
Total	N=1000					
Well Informed	7%					
Partly Informed	54%					
Not informed at all	39%					
Q12: Are you aware of opportunities in your country for the general public to discuss or learn about radioactive waste management with either industry or regulatory organizations?						
Total	N=1000					
Yes I am aware of potential opportunities	23%					
No I am not aware of any opportunities	77%					

Q12B: Please could you highlight from your experience which of these types of opportunities for gaining information about radioactive waste management you are aware of.

Total	N=227
Government Websites	37%
Industry Websites	50%
Regulatory Websites	58%
Public Meetings	31%
Site Stakeholder Groups	30%
Media Outlets	47%
Other	10%

Q13: Which of the following aspects of radioactive waste management might you be particularly interested in?

	Waste Regulation (A)	**Waste Storage (B)**	**Waste disposal (C)**	**Waste transportation (D)**
Total	N=783	N=783	N=783	N=783
Rank1	25%	41%	20%	14%
Rank2	16%	28%	31%	25%
Rank3	22%	20%	29%	29%
Rank4	37%	12%	19%	32%

Q14: Would you like to know more about how radioactive waste is classified and managed in your country?

Total	N=1000
Yes, I would be interested learning more	67%
No, I am not really interested in this subject	33%

To what extent do you agree or disagree with the following statements?

	Q15: I have concerns about how radioactive waste is managed in my country. (A)	**Q16: Each EU Member State should dispose of its own radioactive waste in its territory. (B)**	**Q17: Harmonized and consistent methodologies should be developed within the EU to manage radioactive waste. (C)**	**Q18: A harmonized radioactive waste classification scheme for all EU Member States would ensure an appropriate level of transparency for EU citizens. (D)**
Total	N=1000	N=1000	N=1000	N=1000
Totally agree	21%	32%	41%	24%
Tend to agree	40%	36%	42%	49%
Tend to disagree	19%	15%	6%	10%
Totally disagree	4%	3%	2%	2%
Don't know	16%	14%	9%	14%

Q19: Which of the following would facilitate greater transparency in how radioactive wastes are classified for EU citizens?

	Information should be readily available on the websites of the regulators (A)	**Information should be readily available on the websites of the waste producers (B)**	**Waste producers should take out advertisements in national newspapers (C)**	**Waste producers should hold information sessions at schools (D)**
Total	N=1000	N=1000	N=1000	N=1000
Rank1	36%	27%	26%	12%
Rank2	31%	37%	17%	15%
Rank3	21%	21%	36%	22%
Rank4	13%	15%	21%	51%

To what extent do you agree or disagree with the following statements?				
	Q20: Different categories of radioactive waste should be managed in a manner which reflects their level of hazard. (A)	**Q21: Materials (e.g. concrete, metals such as steel and copper) with very low levels of radioactivity should be considered for reuse/recycling instead of being viewed as radioactive waste. (B)**	**Q22: If it can be proved that they will be safely managed, radioactive wastes and/or materials should be allowed to be transported from one EU Member State to another for final disposal. (C)**	
Total	N=1000	N=1000	N=1000	
Totally agree	45%	27%	15%	
Tend to agree	41%	45%	38%	
Tend to disagree	6%	10%	21%	
Totally disagree	2%	4%	12%	
Don’t know	7%	14%	14%	

SLOVENIA

Are you…?		
Total	N=1000	
Male	50%	
Female	50%	
How old are you?		
Total	100%	
Promedio	44.19	
Media	44.00	
Desviación estándar	16.87	
Hidden for age recode		
Total	N=1000	
15-24	19%	
25-39	23%	
40-54	23%	
55-64	21%	
65 and more	14%	
How old were you when your education ended?		
Total	N=1000	
15	2%	
16-19	40%	
20+	49%	
Still Studying	10%	
What is your current occupation?		
Total	N=1000	
Self Employed	11%	
Manager	9%	
Other white collar workers	18%	
Manual workers	16%	
House Person/Housewife	3%	
Unemployed	11%	
Retired	22%	
Student	10%	

Q1: Is your country one of those in the EU which produces radioactive waste?		
Total	N=1000	
Yes, I believe it produces radioactive waste	81%	
No, I don't believe it produces radioactive waste	11%	
I don't know either way	8%	
Q2: Radioactive waste can result from the activities of a range of industries, especially the nuclear industry. Do you understand the different types and origins of radioactive waste?		
Total	N=1000	
Yes completely	35%	
Yes, to some degree	59%	
No, not at all	6%	
Q3: Please assess the following statement: There are several categories of radioactive waste, for example low, intermediate, and high-level waste.		
Total	N=1000	
True	56%	
I am aware of differences, but I don't understand them	39%	
Don't know	4%	
Q4: Please assess the following statement: Some non-nuclear industries produce radioactive waste.		
Total	N=1000	
Yes	66%	
No	8%	
Don't know	26%	

Q5: All radioactive waste is very dangerous.						
Total	N=1000					
True	81%					
False	20%					
Q6: Do you know who is responsible for the safe management of radioactive waste in your country?						
Total	N=1000					
Yes, I know definitively who is responsible	15%					
Yes, I believe I know who is responsible	45%					
No, I don't know who is responsible	41%					
Q7: Are you aware of the industries in your country which might produce naturally occurring radioactive material (NORM) wastes?						
Total	N=1000					
Yes, I am familiar with which industries produce NORM wastes	15%					
Yes, I am partly familiar with which industries produce NORM wastes	45%					
No, I am not familiar with which industries produce NORM wastes	41%					
Q8: Do you believe that naturally occurring radioactive material (NORM) wastes should be managed in the same regulated manner as radioactive wastes emanating from the nuclear industry?						
Total	N=1000					
Yes, I believe they should be managed in the same manner as nuclear industry wastes	79%					
No, I don't think it is necessary that they are managed in the same manner as nuclear industry wastes	21%					
Q9: With respect to how radioactive waste is regulated in your country, how familiar are you with the regulation process?						
Total	N=1000					
Yes, I am familiar how radioactive waste is regulated in my country	11%					
I have a limited understanding of how radioactive waste is regulated in my country	50%					
No, I am not aware of how radioactive waste is regulated in my country	40%					
Q10: With respect to the communication about how radioactive wastes are classified and managed, who do you trust the most?						
	Scientist (A)	**Academia (B)**	**Industry (C)**	**Government (D)**	**Regulators (E)**	**NGO's (F)**
Total	N=1000	N=1000	N=1000	N=1000	N=1000	N=1000
Rank1	56%	4%	8%	5%	7%	19%
Rank2	22%	24%	12%	6%	17%	19%
Rank3	11%	27%	13%	6%	27%	16%
Rank4	6%	23%	17%	12%	28%	15%
Rank5	4%	14%	30%	21%	16%	15%
Rank6	1%	8%	20%	50%	6%	16%
Q11: How well informed do you think you are about radioactive waste?						
Total	N=1000					
Well Informed	11%					
Partly Informed	59%					
Not informed at all	30%					
Q12: Are you aware of opportunities in your country for the general public to discuss or learn about radioactive waste management with either industry or regulatory organizations?						
Total	N=1000					
Yes I am aware of potential opportunities	52%					
No I am not aware of any opportunities	48%					

Q12B: Please could you highlight from your experience which of these types of opportunities for gaining information about radioactive waste management you are aware of.

Total	N=520
Government Websites	29%
Industry Websites	37%
Regulatory Websites	40%
Public Meetings	32%
Site Stakeholder Groups	35%
Media Outlets	78%
Other	7%

Q13: Which of the following aspects of radioactive waste management might you be particularly interested in?

	Waste Regulation (A)	**Waste Storage (B)**	**Waste disposal (C)**	**Waste transportation (D)**
Total	N=851	N=851	N=851	N=851
Rank1	16%	40%	33%	11%
Rank2	15%	32%	36%	17%
Rank3	31%	18%	20%	32%
Rank4	39%	11%	11%	40%

Q14: Would you like to know more about how radioactive waste is classified and managed in your country?

Total	N=1000
Yes, I would be interested learning more	75%
No, I am not really interested in this subject	25%

To what extent do you agree or disagree with the following statements?

	Q15: I have concerns about how radioactive waste is managed in my country. (A)	**Q16: Each EU Member State should dispose of its own radioactive waste in its territory. (B)**	**Q17: Harmonized and consistent methodologies should be developed within the EU to manage radioactive waste. (C)**	**Q18: A harmonized radioactive waste classification scheme for all EU Member States would ensure an appropriate level of transparency for EU citizens. (D)**
Total	N=1000	N=1000	N=1000	N=1000
Totally agree	30%	37%	59%	44%
Tend to agree	42%	33%	25%	35%
Tend to disagree	17%	16%	6%	11%
Totally disagree	7%	7%	6%	5%
Don’t know	4%	7%	4%	5%

Q19: Which of the following would facilitate greater transparency in how radioactive wastes are classified for EU citizens?

	Information should be readily available on the websites of the regulators (A)	**Information should be readily available on the websites of the waste producers (B)**	**Waste producers should take out advertisements in national newspapers (C)**	**Waste producers should hold information sessions at schools (D)**
Total	N=1000	N=1000	N=1000	N=1000
Rank1	32%	37%	16%	16%
Rank2	33%	35%	19%	15%
Rank3	19%	16%	40%	25%
Rank4	17%	13%	26%	45%

To what extent do you agree or disagree with the following statements?				
	Q20: Different categories of radioactive waste should be managed in a manner which reflects their level of hazard. (A)	**Q21: Materials (e.g. concrete, metals such as steel and copper) with very low levels of radioactivity should be considered for reuse/recycling instead of being viewed as radioactive waste. (B)**	**Q22: If it can be proved that they will be safely managed, radioactive wastes and/or materials should be allowed to be transported from one EU Member State to another for final disposal. (C)**	
Total	N=1000	N=1000	N=1000	
Totally agree	62%	36%	35%	
Tend to agree	26%	39%	41%	
Tend to disagree	5%	13%	12%	
Totally disagree	4%	5%	7%	
Don’t know	3%	8%	6%	

Spain

Are you…?		
Total	N=1000	
Male	50%	
Female	50%	
How old are you?		
Total	100%	
Promedio	45.84	
Media	47.00	
Desviación estándar	17.90	
Hidden for age recode		
Total	N=1000	
15-24	20%	
25-39	20%	
40-54	20%	
55-64	20%	
65 and more	20%	
How old were you when your education ended?		
Total	N=1000	
15	6%	
16-19	28%	
20+	53%	
Still Studying	14%	
What is your current occupation?		
Total	N=1000	
Self Employed	8%	
Manager	6%	
Other white collar workers	25%	
Manual workers	13%	
House Person/Housewife	5%	
Unemployed	8%	
Retired	20%	
Student	15%	

Q1: Is your country one of those in the EU which produces radioactive waste?		
Total	N=1000	
Yes, I believe it produces radioactive waste	69%	
No, I don't believe it produces radioactive waste	18%	
I don't know either way	13%	
Q2: Radioactive waste can result from the activities of a range of industries, especially the nuclear industry. Do you understand the different types and origins of radioactive waste?		
Total	N=1000	
Yes completely	33%	
Yes, to some degree	59%	
No, not at all	8%	
Q3: Please assess the following statement: There are several categories of radioactive waste, for example low, intermediate, and high-level waste.		
Total	N=1000	
True	57%	
I am aware of differences, but I don't understand them	34%	
Don't know	10%	
Q4: Please assess the following statement: Some non-nuclear industries produce radioactive waste.		
Total	N=1000	
Yes	64%	
No	9%	
Don't know	26%	

Q5: All radioactive waste is very dangerous.						
Total	N=1000					
True	81%					
False	19%					
Q6: Do you know who is responsible for the safe management of radioactive waste in your country?						
Total	N=1000					
Yes, I know definitively who is responsible	11%					
Yes, I believe I know who is responsible	36%					
No, I don't know who is responsible	54%					
Q7: Are you aware of the industries in your country which might produce naturally occurring radioactive material (NORM) wastes?						
Total	N=1000					
Yes, I am familiar with which industries produce NORM wastes	8%					
Yes, I am partly familiar with which industries produce NORM wastes	36%					
No, I am not familiar with which industries produce NORM wastes	57%					
Q8: Do you believe that naturally occurring radioactive material (NORM) wastes should be managed in the same regulated manner as radioactive wastes emanating from the nuclear industry?						
Total	N=1000					
Yes, I believe they should be managed in the same manner as nuclear industry wastes	83%					
No, I don't think it is necessary that they are managed in the same manner as nuclear industry wastes	17%					
Q9: With respect to how radioactive waste is regulated in your country, how familiar are you with the regulation process?						
Total	N=1000					
Yes, I am familiar how radioactive waste is regulated in my country	5%					
I have a limited understanding of how radioactive waste is regulated in my country	41%					
No, I am not aware of how radioactive waste is regulated in my country	54%					
Q10: With respect to the communication about how radioactive wastes are classified and managed, who do you trust the most?						
	Scientist (A)	**Academia (B)**	**Industry (C)**	**Government (D)**	**Regulators (E)**	**NGO's (F)**
Total	N=1000	N=1000	N=1000	N=1000	N=1000	N=1000
Rank1	69%	5%	5%	7%	9%	6%
Rank2	16%	31%	12%	8%	22%	12%
Rank3	9%	21%	17%	10%	30%	13%
Rank4	4%	19%	19%	13%	25%	20%
Rank5	1%	16%	23%	26%	10%	25%
Rank6	1%	8%	25%	36%	5%	25%
Q11: How well informed do you think you are about radioactive waste?						
Total	N=1000					
Well Informed	6%					
Partly Informed	56%					
Not informed at all	39%					
Q12: Are you aware of opportunities in your country for the general public to discuss or learn about radioactive waste management with either industry or regulatory organizations?						
Total	N=1000					
Yes I am aware of potential opportunities	27%					
No I am not aware of any opportunities	73%					

Q12B: Please could you highlight from your experience which of these types of opportunities for gaining information about radioactive waste management you are aware of.

Total	N=267
Government Websites	45%
Industry Websites	51%
Regulatory Websites	62%
Public Meetings	25%
Site Stakeholder Groups	31%
Media Outlets	54%
Other	7%

Q13: Which of the following aspects of radioactive waste management might you be particularly interested in?

	Waste Regulation (A)	**Waste Storage (B)**	**Waste disposal (C)**	**Waste transportation (D)**
Total	N=921	N=921	N=921	N=921
Rank1	23%	25%	45%	7%
Rank2	24%	31%	26%	19%
Rank3	26%	28%	14%	33%
Rank4	27%	17%	16%	41%

Q14: Would you like to know more about how radioactive waste is classified and managed in your country?

Total	N=1000
Yes, I would be interested learning more	88%
No, I am not really interested in this subject	12%

To what extent do you agree or disagree with the following statements?

	Q15: I have concerns about how radioactive waste is managed in my country. (A)	**Q16: Each EU Member State should dispose of its own radioactive waste in its territory. (B)**	**Q17: Harmonized and consistent methodologies should be developed within the EU to manage radioactive waste. (C)**	**Q18: A harmonized radioactive waste classification scheme for all EU Member States would ensure an appropriate level of transparency for EU citizens. (D)**
Total	N=1000	N=1000	N=1000	N=1000
Totally agree	45%	37%	56%	45%
Tend to agree	42%	36%	36%	42%
Tend to disagree	8%	16%	4%	6%
Totally disagree	2%	6%	1%	2%
Don’t know	4%	6%	3%	6%

Q19: Which of the following would facilitate greater transparency in how radioactive wastes are classified for EU citizens?

	Information should be readily available on the websites of the regulators (A)	**Information should be readily available on the websites of the waste producers (B)**	**Waste producers should take out advertisements in national newspapers (C)**	**Waste producers should hold information sessions at schools (D)**
Total	N=1000	N=1000	N=1000	N=1000
Rank1	31%	34%	15%	20%
Rank2	32%	31%	19%	18%
Rank3	21%	20%	31%	27%
Rank4	16%	15%	35%	35%

To what extent do you agree or disagree with the following statements?				
	Q20: Different categories of radioactive waste should be managed in a manner which reflects their level of hazard. (A)	**Q21: Materials (e.g. concrete, metals such as steel and copper) with very low levels of radioactivity should be considered for reuse/recycling instead of being viewed as radioactive waste. (B)**	**Q22: If it can be proved that they will be safely managed, radioactive wastes and/or materials should be allowed to be transported from one EU Member State to another for final disposal. (C)**	
Total	N=1000	N=1000	N=1000	
Totally agree	59%	28%	27%	
Tend to agree	32%	43%	43%	
Tend to disagree	4%	12%	15%	
Totally disagree	1%	4%	6%	
Don’t know	3%	14%	10%	

SWEDEN

Are you…?		
Total	N=1001	
Male	50%	
Female	50%	
How old are you?		
Total	100%	
Promedio	46.12	
Media	47.00	
Desviación estándar	18.58	
Hidden for age recode		
Total	N=1001	
15-24	20%	
25-39	20%	
40-54	20%	
55-64	20%	
65 and more	20%	
How old were you when your education ended?		
Total	N=1001	
15	3%	
16-19	34%	
20+	53%	
Still Studying	10%	
What is your current occupation?		
Total	N=1001	
Self Employed	5%	
Manager	5%	
Other white collar workers	30%	
Manual workers	9%	
House Person/Housewife	2%	
Unemployed	9%	
Retired	26%	
Student	14%	

Q1: Is your country one of those in the EU which produces radioactive waste?		
Total	N=1001	
Yes, I believe it produces radioactive waste	71%	
No, I don't believe it produces radioactive waste	15%	
I don't know either way	14%	
Q2: Radioactive waste can result from the activities of a range of industries, especially the nuclear industry. Do you understand the different types and origins of radioactive waste?		
Total	N=1001	
Yes completely	26%	
Yes, to some degree	62%	
No, not at all	12%	
Q3: Please assess the following statement: There are several categories of radioactive waste, for example low, intermediate, and high-level waste.		
Total	N=1001	
True	64%	
I am aware of differences, but I don't understand them	19%	
Don't know	17%	
Q4: Please assess the following statement: Some non-nuclear industries produce radioactive waste.		
Total	N=1001	
Yes	45%	
No	11%	
Don't know	43%	

Q5: All radioactive waste is very dangerous.						
Total	N=1001					
True	75%					
False	25%					
Q6: Do you know who is responsible for the safe management of radioactive waste in your country?						
Total	N=1001					
Yes, I know definitively who is responsible	13%					
Yes, I believe I know who is responsible	42%					
No, I don't know who is responsible	45%					
Q7: Are you aware of the industries in your country which might produce naturally occurring radioactive material (NORM) wastes?						
Total	N=1001					
Yes, I am familiar with which industries produce NORM wastes	6%					
Yes, I am partly familiar with which industries produce NORM wastes	34%					
No, I am not familiar with which industries produce NORM wastes	60%					
Q8: Do you believe that naturally occurring radioactive material (NORM) wastes should be managed in the same regulated manner as radioactive wastes emanating from the nuclear industry?						
Total	N=1001					
Yes, I believe they should be managed in the same manner as nuclear industry wastes	67%					
No, I don't think it is necessary that they are managed in the same manner as nuclear industry wastes	33%					
Q9: With respect to how radioactive waste is regulated in your country, how familiar are you with the regulation process?						
Total	N=1001					
Yes, I am familiar how radioactive waste is regulated in my country	10%					
I have a limited understanding of how radioactive waste is regulated in my country	46%					
No, I am not aware of how radioactive waste is regulated in my country	44%					
Q10: With respect to the communication about how radioactive wastes are classified and managed, who do you trust the most?						
	Scientist (A)	**Academia (B)**	**Industry (C)**	**Government (D)**	**Regulators (E)**	**NGO's (F)**
Total	N=1001	N=1001	N=1001	N=1001	N=1001	N=1001
Rank1	64%	5%	7%	16%	4%	5%
Rank2	20%	23%	14%	19%	12%	12%
Rank3	7%	21%	20%	17%	18%	16%
Rank4	5%	16%	17%	14%	27%	21%
Rank5	3%	18%	20%	12%	25%	23%
Rank6	1%	17%	22%	22%	14%	23%
Q11: How well informed do you think you are about radioactive waste?						
Total	N=1001					
Well Informed	10%					
Partly Informed	62%					
Not informed at all	28%					
Q12: Are you aware of opportunities in your country for the general public to discuss or learn about radioactive waste management with either industry or regulatory organizations?						
Total	N=1001					
Yes I am aware of potential opportunities	41%					
No I am not aware of any opportunities	59%					

Q12B: Please could you highlight from your experience which of these types of opportunities for gaining information about radioactive waste management you are aware of.

Total	N=411
Government Websites	61%
Industry Websites	38%
Regulatory Websites	45%
Public Meetings	28%
Site Stakeholder Groups	36%
Media Outlets	19%
Other	17%

Q13: Which of the following aspects of radioactive waste management might you be particularly interested in?

	Waste Regulation (A)	**Waste Storage (B)**	**Waste disposal (C)**	**Waste transportation (D)**
Total	N=714	N=714	N=714	N=714
Rank1	8%	45%	40%	7%
Rank2	12%	27%	39%	21%
Rank3	24%	18%	15%	43%
Rank4	57%	10%	6%	28%

Q14: Would you like to know more about how radioactive waste is classified and managed in your country?

Total	N=1001
Yes, I would be interested learning more	64%
No, I am not really interested in this subject	36%

To what extent do you agree or disagree with the following statements?

	Q15: I have concerns about how radioactive waste is managed in my country. (A)	**Q16: Each EU Member State should dispose of its own radioactive waste in its territory. (B)**	**Q17: Harmonized and consistent methodologies should be developed within the EU to manage radioactive waste. (C)**	**Q18: A harmonized radioactive waste classification scheme for all EU Member States would ensure an appropriate level of transparency for EU citizens. (D)**
Total	N=1001	N=1001	N=1001	N=1001
Totally agree	17%	32%	39%	26%
Tend to agree	34%	39%	39%	47%
Tend to disagree	27%	10%	8%	8%
Totally disagree	14%	4%	3%	2%
Don't know	9%	14%	11%	15%

Q19: Which of the following would facilitate greater transparency in how radioactive wastes are classified for EU citizens?

	Information should be readily available on the websites of the regulators (A)	**Information should be readily available on the websites of the waste producers (B)**	**Waste producers should take out advertisements in national newspapers (C)**	**Waste producers should hold information sessions at schools (D)**
Total	N=1001	N=1001	N=1001	N=1001
Rank1	51%	26%	9%	14%
Rank2	27%	48%	12%	13%
Rank3	14%	15%	44%	28%
Rank4	8%	11%	36%	45%

To what extent do you agree or disagree with the following statements?				
	Q20: Different categories of radioactive waste should be managed in a manner which reflects their level of hazard. (A)	**Q21: Materials (e.g. concrete, metals such as steel and copper) with very low levels of radioactivity should be considered for reuse/recycling instead of being viewed as radioactive waste. (B)**	**Q22: If it can be proved that they will be safely managed, radioactive wastes and/or materials should be allowed to be transported from one EU Member State to another for final disposal. (C)**	
Total	N=1001	N=1001	N=1001	
Totally agree	45%	18%	17%	
Tend to agree	39%	43%	39%	
Tend to disagree	6%	13%	19%	
Totally disagree	1%	6%	10%	
Don’t know	8%	20%	15%	

ANNEX IV: CROSS-BORDER COOPERATION SURVEY – DETAILED RESULTS

LIST OF TABLES

ABBREVIATIONS

EU	European Union
WMO	waste management organisation
WP	waste producer (of radioactive waste)

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1. CROSS-BORDER COOPERATION SURVEY – DETAILED RESULTS

This annex contains the detailed results of the survey deployed in Task 5 of the project. The survey was sent out to 27 waste management organisations (WMOs) across all of the EU Member States and to a total of 50 waste producers (WPs). Responses were received from 23 of the WMOs and from 14 of the WPs.

1.1. Question 1 survey responses

Q1. Are you satisfied that the existing radioactive waste classification scheme adopted in your country facilitates the efficient management of the different waste streams produced by the nuclear and/or other industries (wastes from research, health service providers, etc.)?

1.1.1. Question 1 waste management organisation responses

Table A4. 1 Q1 WMO responses

Member State	Yes/no
Austria	Yes
Belgium	Yes
Bulgaria	Yes
Croatia	Yes
Cyprus	Yes
Czechia	Yes
Denmark	Yes
Estonia	Yes
Finland	Yes
France	Yes
Germany	Yes
Greece	Yes
Hungary	Yes
Italy	Yes
Malta	No
Netherlands	Yes
Poland	Yes
Portugal	Yes

Romania	Yes
Slovakia	Yes
Slovenia	Yes
Spain	Yes
Sweden	Yes

1.1.2. Question 1 waste producer responses

Table A4. 2 Q1 WP responses

Member State	Yes/no
Belgium WP 1	Yes
Belgium WP 2	No
Finland	Yes
Germany WP 1	Yes
Germany WP 2	Yes
Italy WP 1	No
Lithuania	Yes
Netherlands	Yes
Romania	Yes
Slovenia	Yes
Spain WP 1	Yes
Spain WP 2	Yes
Sweden WP 1	Yes
Sweden WP 2	Yes

1.2. Question 2 survey responses

Q2. Is the radioactive waste classification system adopted by your country conducive to effective and efficient cross-border cooperation with other EU Member States in relation to waste treatment/conditioning or disposal?

1.2.1. Question 2 waste management organisation responses

Table A4. 3 Q2 WMO responses

Member State	Yes/no
Austria	Yes

Belgium	Yes
Bulgaria	Yes
Croatia	Yes
Cyprus	Yes
Czechia	Yes
Denmark	Yes
Estonia	Yes
Finland	Yes
France	Yes
Germany	Yes
Greece	Yes
Hungary	Yes
Italy	Yes
Malta	No
Netherlands	Yes
Poland	Yes
Portugal	Yes
Romania	Yes
Slovakia	Yes
Slovenia	Yes
Spain	Yes
Sweden	No

1.2.2. Question 2 waste producer responses

Table A4. 4 Q2 WP responses

Member State	Yes/no
Belgium WP 1	Yes
Belgium WP 2	Yes
Finland	Yes
Germany WP 1	Yes
Germany WP 2	No
Italy	Yes
Lithuania	Yes
Netherlands	Yes

Romania	Yes
Slovenia	Yes
Spain WP 1	Yes
Spain WP 2	No
Sweden WP 1	Yes
Sweden WP 2	Yes

1.3. Question 3 survey responses

Q3. Is the radioactive waste classification system adopted by your country a barrier specifically to effective and efficient transportation of radioactive waste to or from other EU Member States? **A follow-up question was circulated following the publication of the intermediate report:** if it is a barrier, please could you briefly explain why?

1.3.1. Question 3 waste management organisation responses

Table A4. 5 Q3 WMO responses

Member State	Yes/no
Austria	No
Belgium	No
Bulgaria	Yes
Croatia	No
Cyprus	No
Czechia	No
Denmark	No
Estonia	Yes
Finland	Yes
France	No
Germany	No
Greece	No
Hungary	No
Italy	No
Malta	No
Netherlands	No
Poland	No
Portugal	No

Romania	No
Slovakia	No
Slovenia	No
Spain	No
Sweden	Yes

1.3.2. Question 3 waste producer responses

Table A4. 6 Q3 WP responses

Member State	Yes/no
Belgium WP 1	Yes
Belgium WP 2	No
Finland	No
Germany WP 1	No
Germany WP 2	No
Italy	Yes
Lithuania	No
Netherlands	No
Romania	Yes
Slovenia	No
Spain WP 1	Yes
Spain WP 2	Yes
Sweden WP 1	No
Sweden WP 2	Yes

1.4. Question 4 survey responses

Q4. Would a harmonised radioactive waste classification system across all EU Member States be beneficial or detrimental to the current waste management system in your country? **A follow-up question was circulated following the publication of the intermediate report:** please could you highlight if you work to the EU's directive on shipments of radioactive waste and spent fuel (2006/117/Euratom) and if not why not?

1.4.1. Question 4 waste management organisation responses

Table A4. 7 Q4 WMO responses

Member State	Beneficial/neutral/ detrimental
Austria	Neutral
Belgium	Beneficial
Bulgaria	Neutral
Croatia	Beneficial
Cyprus	Neutral
Czechia	Neutral
Denmark	Beneficial
Estonia	Neutral
Finland	Neutral
France	Neutral
Germany	Detrimental
Greece	Neutral
Hungary	Neutral
Italy	Beneficial
Malta	Neutral
Netherlands	Neutral
Poland	Neutral
Portugal	Beneficial
Romania	Neutral
Slovakia	Beneficial
Slovenia	Beneficial
Spain	Detrimental
Sweden	Neutral

1.4.2. Question 4 waste producer responses

Table A4. 8 Q4 WP responses

Member State	Beneficial/neutral/ detrimental
Belgium WP 1	Neutral
Belgium WP 2	Neutral
Finland	Detrimental

Germany WP 1	Neutral
Germany WP 2	Neutral
Italy	Beneficial
Lithuania	Neutral
Netherlands	Neutral
Romania	Beneficial
Slovenia	Beneficial
Spain WP 1	Neutral
Spain WP 2	Neutral
Sweden WP 1	Beneficial
Sweden WP 2	Neutral

1.5. Question 5 survey responses

Q5. Would a harmonised radioactive waste classification system across all EU Member States be beneficial or detrimental to effective and efficient cross-border cooperation with such EU Member States?

1.5.1. Question 5 waste management organisation responses

Table A4. 9 Q5 WMO responses

Member State	Beneficial/neutral/ detrimental
Austria	Neutral
Belgium	Beneficial
Bulgaria	Neutral
Croatia	Beneficial
Cyprus	Neutral
Czechia	Neutral
Denmark	Beneficial
Estonia	Beneficial
Finland	Beneficial
France	Neutral
Germany	Neutral
Greece	Beneficial
Hungary	Beneficial

Italy	Beneficial
Malta	Neutral
Netherlands	Beneficial
Poland	Beneficial
Portugal	Beneficial
Romania	Neutral
Slovakia	Beneficial
Slovenia	Beneficial
Spain	Detrimental
Sweden	Neutral

1.5.2. Question 5 waste producer responses

Table A4. 10 Q5 WP responses

Member State	Beneficial/neutral/ detrimental
Belgium WP 1	Neutral
Belgium WP 2	Beneficial
Finland	Beneficial
Germany WP 1	Beneficial
Germany WP 2	Beneficial
Italy	Beneficial
Lithuania	Beneficial
Netherlands	Beneficial
Romania	Beneficial
Slovenia	Beneficial
Spain WP 1	Beneficial
Spain WP 2	Beneficial
Sweden WP 1	Beneficial
Sweden WP 2	Beneficial

1.6. Question 6 survey responses

Q6. Would a harmonised radioactive waste classification system across all EU Member States be beneficial or detrimental specifically to the transportation of radioactive waste across international borders?

1.6.1. Question 6 waste management organisation responses

Table A4. 11 Q6 WMO responses

Member State	Beneficial/neutral/ detrimental
Austria	Neutral
Belgium	Neutral
Bulgaria	Neutral
Croatia	Neutral
Cyprus	Neutral
Czechia	Neutral
Denmark	Beneficial
Estonia	Beneficial
Finland	Neutral
France	Beneficial
Germany	Neutral
Greece	Beneficial
Hungary	Neutral
Italy	Beneficial
Malta	Beneficial
Netherlands	Beneficial
Poland	Neutral
Portugal	Beneficial
Romania	Neutral
Slovakia	Beneficial
Slovenia	Beneficial
Spain	Neutral
Sweden	Beneficial

1.6.2. Question 6 waste producer responses

Table A4. 12 Q6 WP responses

Member State	Beneficial/neutral/ detrimental
Belgium WP 1	Neutral
Belgium WP 2	Beneficial
Finland	Neutral

Germany WP 1	Neutral
Germany WP 2	Neutral
Italy	Beneficial
Lithuania	Beneficial
Netherlands	Beneficial
Romania	Beneficial
Slovenia	Beneficial
Spain WP 1	Beneficial
Spain WP 2	Neutral
Sweden WP 1	Beneficial
Sweden WP 2	Neutral

1.7. Question 7 survey responses

Q7. Are there any specific features of your country's radioactive waste classification system which act to strengthen the effective and efficient cross-border cooperation with other EU Member States in relation to waste treatment, conditioning or disposal? Supplementary question: if yes, please list these. Supplementary question: if no, would a harmonised radioactive waste classification system across all EU Member States help to improve such effective and efficient cross-border cooperation? **A follow-up question was circulated following the publication of the intermediate report:** if there are, please could you provide a brief summary of what these features might be?

1.7.1. Question 7 waste management organisation responses

Table A4. 13 Q7 WMO responses

Member State	Yes/no
Austria	No
Belgium	Yes
Bulgaria	No
Croatia	No
Cyprus	Yes
Czechia	No
Denmark	No
Estonia	No
Finland	No
France	Yes

Germany	No
Greece	Yes
Hungary	No
Italy	Yes
Malta	No
Netherlands	No
Poland	No
Portugal	No
Romania	Yes
Slovakia	No
Slovenia	Yes
Spain	No
Sweden	No

1.7.2. Question 7 waste producer responses

Table A4. 14 Q7 WP responses

Member State	Yes/no
Belgium WP 1	No
Belgium WP 2	No
Finland	No
Germany WP 1	No
Germany WP 2	No
Italy	No
Lithuania	No
Netherlands	No
Romania	No
Slovenia	No
Spain WP 1	Yes
Spain WP 2	No
Sweden WP 1	Yes
Sweden WP 2	No

1.8. Question 8 survey responses

Q8. Are radioactive waste materials exported from your country to another EU Member State? Supplementary question: if yes, what type of waste materials are exported and to whom?

1.8.1. Question 8 waste management organisation responses

Table A4. 15 Q8 WMO responses

Member State	Yes/no
Austria	Yes
Belgium	Yes
Bulgaria	No
Croatia	No
Cyprus	No
Czechia	Yes
Denmark	Yes
Estonia	Yes
Finland	No
France	Yes
Germany	No
Greece	No
Hungary	No
Italy	Yes
Malta	No
Netherlands	No
Poland	No
Portugal	No
Romania	No
Slovakia	Yes
Slovenia	Yes
Spain	Yes
Sweden	Yes

1.8.2. Question 8 waste producer responses

Table A4. 16 Q8 WP responses

Member State	Yes/no
Belgium WP 1	Yes
Belgium WP 2	No
Finland	Yes
Germany WP 1	Yes
Germany WP 2	Yes
Italy	Yes
Lithuania	No
Netherlands	No
Romania	No
Slovenia	Yes
Spain WP 1	Yes
Spain WP 2	Yes
Sweden WP 1	Yes
Sweden WP 2	No

1.9. Question 9 survey responses

Q9. Are radioactive waste materials imported into your country from another EU Member State? Supplementary question: if yes, what type of waste materials are imported and from whom?

1.9.1. Question 9 waste management organisation responses

Table A4. 17 Q9 WMO responses

Member State	Yes/no
Austria	No
Belgium	Yes
Bulgaria	No
Croatia	No
Cyprus	No
Czechia	Yes
Denmark	No
Estonia	Yes

Finland	No
France	No
Germany	Yes
Greece	No
Hungary	No
Italy	Yes
Malta	No
Netherlands	No
Poland	No
Portugal	No
Romania	No
Slovakia	Yes
Slovenia	Yes
Spain	Yes
Sweden	Yes

1.9.2. Question 9 waste producer responses

Table A4. 18 Q9 WP responses

Member State	Yes/no
Belgium WP 1	Yes
Belgium WP 2	Yes
Finland	Yes
Germany WP 1	Yes
Germany WP 2	Yes
Italy	Yes
Lithuania	No
Netherlands	Yes
Romania	No
Slovenia	Yes
Spain WP 1	No
Spain WP 2	Yes
Sweden WP 1	Yes
Sweden WP 2	Yes

1.10. Question 10 survey responses

Q10. Are there instances when radioactive waste materials might be exported/imported to/from non-EU countries? Supplementary question: if yes, which countries?

1.10.1. Question 10 waste management organisation responses

Table A4. 19 Q10 WMO responses

Member State	Yes/no
Austria	No
Belgium	No
Bulgaria	Yes
Croatia	No
Cyprus	No
Czechia	No
Denmark	Yes
Estonia	No
Finland	No
France	Yes
Germany	No
Greece	No
Hungary	No
Italy	No
Malta	No
Netherlands	No
Poland	No
Portugal	No
Romania	No
Slovakia	No
Slovenia	Yes
Spain	Yes
Sweden	Yes

1.10.2. Question 10 waste producer responses

Table A4. 20 Q10 WP responses

Member State	Yes/no
Belgium WP 1	No
Belgium WP 2	No
Finland	Yes
Germany WP 1	Yes
Germany WP 2	Yes
Italy	Yes
Lithuania	No
Netherlands	No
Romania	No
Slovenia	Yes
Spain WP 1	Yes
Spain WP 2	Yes
Sweden WP 1	Yes
Sweden WP 2	Yes

1.11. Question 11 survey responses

Q11. If radioactive waste is exported/imported from or into your country, what are the specific reasons for this? Please select all relevant options. Options are waste disposal, waste treatment/conditioning, reprocessing and other.

1.11.1. Question 11 waste management organisation responses

Table A4. 21 Q11 WMO responses

Member State	Reasons for the export/import of radioactive waste from/into the Member State
Austria	Waste treatment/conditioning
Belgium	Waste disposal, waste treatment/conditioning, reprocessing, recycling of radioactive metals
Bulgaria	Reprocessing – in the future, import back into Bulgaria is expected when high-level waste from the reprocessing of the spent fuel has to be returned for storage and disposal
Croatia	Waste treatment/conditioning
Cyprus	N/A

Czechia	For experimental use
Denmark	Waste treatment/conditioning
Estonia	Waste treatment/conditioning
Finland	Is not exported/imported
France	Reprocessing
Germany	Reprocessing
Greece	No such activities yet
Hungary	Is not practised, but treatment (e.g. incineration) could be an option in the future
Italy	Waste treatment/conditioning, reprocessing
Malta	Waste disposal
Netherlands	Waste treatment/conditioning
Poland	Waste treatment/conditioning
Portugal	N/A
Romania	Waste treatment/conditioning
Slovakia	Waste treatment/conditioning
Slovenia	Waste disposal, waste treatment/conditioning, reprocessing
Spain	Waste treatment/conditioning
Sweden	Waste treatment/conditioning, analysis

1.11.2. Question 11 waste producer responses

Table A4. 22 Q11 WP responses

Member State	Reasons for the export/import of radioactive waste from/into the Member State
Belgium WP 1	Waste treatment/conditioning, reprocessing, maintenance of contaminated equipment.
Belgium WP 2	Waste treatment/conditioning.
Finland	Waste treatment/conditioning. Export is only allowed for sealed sources to the country of origin, waste with minimal radioactivity for treatment or small amounts of waste for research purposes. Import is, in practice, prohibited. Secondary waste from treatment has to be returned to Finland.
Germany WP 1	Waste treatment/conditioning, waste disposal.
Germany WP 2	Waste treatment/conditioning.
Italy	Reprocessing, waste treatment/conditioning, waste disposal.
Lithuania	There are no preconditions for radioactive waste export/import.
Netherlands	Reprocessing.

Romania	Some radioactive waste produced at the Cernavodă nuclear power plant is transferred to EU countries (intra-Community shipments) for treatment (incineration of combustible radioactive waste, metal melting) in compliance with the requirements of Directive 2006/117/Euratom.
Slovenia	Waste treatment/conditioning, reprocessing.
Spain WP 1	Waste treatment/conditioning, waste disposal.
Spain WP 2	Waste treatment/conditioning.
Sweden WP 1	Waste treatment/conditioning. Metals are treated aiming for clearance and recycling.
Sweden WP 2	Waste treatment/conditioning, spent nuclear fuel post-irradiation investigation or reconditioning.

1.12. Question 12 survey responses

Q12. If radioactive waste is exported/imported from or into your country, how is this undertaken?

1.12.1. Question 12 waste management organisation responses

Table A4. 23 Q12 WMO responses

Member State	Method employed to export/import radioactive waste from/into the Member State
Austria	Road, rail.
Belgium	Rail, sea, road.
Bulgaria	Rail, river.
Croatia	Road – due to the specific situation, with Croatia being a co-owner of the nuclear power plant located in Slovenia, in the future radioactive waste will be imported to Croatia mostly by road transport.
Cyprus	N/A.
Czechia	Road, air.
Denmark	Road.
Estonia	Road, sea.
Finland	Is not exported/imported.
France	Rail, sea.
Germany	Rail, road.
Greece	There are no such activities yet.
Hungary	It is not practised, but most probably road could be an option.
Italy	Road, rail.
Malta	Air, sea.
Netherlands	Road.
Poland	Road.

Portugal	N/A.
Romania	Sea, road.
Slovakia	Road.
Slovenia	Road, sea.
Spain	Road, sea.
Sweden	Road, sea.

1.12.2. Question 12 waste producer responses

Table A4. 24 Q12 WP responses

Member State	Reasons for the export/import of radioactive waste from/into the Member State
Belgium WP 1	Road, rail, air, sea.
Belgium WP 2	Road.
Finland	Road, sea, rail, air.
Germany WP 1	Road, rail, sea.
Germany WP 2	Rail, road, sea.
Italy	Road.
Lithuania	There are no pre-conditions for radioactive waste export/import.
Netherlands	Rail.
Romania	Intra-Community shipment of radioactive waste sent for treatment is by road and sea (by ferry) or by road.
Slovenia	Road, sea.
Spain WP 1	Road, sea.
Spain WP 2	Road, rail, air, sea.
Sweden WP 1	Road, rail, sea.
Sweden WP 2	Road, sea.

1.13. Question 13 survey responses

Q13. Has your country developed legislation to cover the export/import of radioactive waste to or from other EU Member States? Supplementary question: if not, does your country follow international guidance (i.e. European Atomic Energy Community, International Atomic Energy Agency)?

1.13.1. Question 13 waste management organisation responses

Table A4. 25 Q13 WMO responses

Member State	Yes/no
Austria	Yes
Belgium	Yes
Bulgaria	No
Croatia	Yes
Cyprus	No
Czechia	Yes
Denmark	Yes
Estonia	Yes
Finland	Yes
France	Yes
Germany	Yes
Greece	Yes
Hungary	Yes
Italy	Yes
Malta	Yes
Netherlands	No
Poland	Yes
Portugal	Yes
Romania	Yes
Slovakia	Yes
Slovenia	Yes
Spain	Yes
Sweden	Yes

1.13.2. Question 13 waste producer responses

Table A4. 26 Q13 WP responses

Member State	Yes/no
Belgium WP 1	Yes
Belgium WP 2	Yes
Finland	Yes

Germany WP 1	Yes
Germany WP 2	Yes
Italy	Yes
Lithuania	Yes
Netherlands	Yes
Romania	Yes
Slovenia	Yes
Spain WP 1	Yes
Spain WP 2	Yes
Sweden WP 1	Yes
Sweden WP 2	Yes

1.14. Question 14 survey responses

Q14. Does your country have clear lines of communication with each EU Member State with respect to cross-border cooperation?

1.14.1. Question 14 waste management organisation responses

Table A4. 27 Q14 WMO responses

Member State	Yes/no
Austria	Yes
Belgium	Yes
Bulgaria	No
Croatia	Yes
Cyprus	Yes
Czechia	Yes
Denmark	No
Estonia	No
Finland	No
France	Yes
Germany	Yes
Greece	Yes
Hungary	No
Italy	Yes

Malta	No
Netherlands	Yes
Poland	Yes
Portugal	Yes
Romania	Yes
Slovakia	Yes
Slovenia	Yes
Spain	Yes
Sweden	Yes

1.14.2. Question 14 waste producer responses

Table A4. 28 Q14 WP responses

Member State	Yes/no
Belgium WP 1	No
Belgium WP 2	Yes
Finland	Yes
Germany WP 1	Yes
Germany WP 2	Yes
Italy	Yes
Lithuania	Yes
Netherlands	Yes
Romania	Yes
Slovenia	Yes
Spain WP 1	Yes
Spain WP 2	Yes
Sweden WP 1	Yes
Sweden WP 2	Yes

1.15. Question 15 survey responses

Q15. Do you wish to add any further comments on the subject of cross-border cooperation which you feel we may not have covered in the preceding questions?

1.15.1. Question 15 waste management organisation responses

Table A4. 29 Q15 WMO responses

Member State	Comment
Austria	N/A.
Belgium	No.
Bulgaria	Probably the in-transit countries should be included in the cross-border cooperation for radioactive waste in addition to the exporting/importing countries.
Croatia	N/A.
Cyprus	N/A.
Czechia	No.
Denmark	No.
Estonia	No.
Finland	No.
France	Our organisation does not import or export radioactive material or waste.
Germany	No.
Greece	For small-inventory Member States, the export of small volumes of (e.g.) - intermediate-level waste to Member States which already have the appropriate disposal facilities (e.g. deep geological disposal) could be a great advantage. In return, the small-inventory Member States could receive larger volumes of very-low-level waste / low-level waste for disposal in their near-surface disposal facilities.
Hungary	No.
Italy	No.
Malta	No.
Netherlands	Our customers transport radioactive materials across international borders and only call it waste once it is in the country it will be stored in. In some cases, the radioactive material comes directly to us from another EU country (after reprocessing/treatment/conditioning). We do have clear lines of communication with several foreign parties for coordination and advice.
Poland	No.
Portugal	No.
Romania	The objective of the Romanian radioactive waste management policy is to ensure the safe management of waste and spent nuclear fuel. There is specific legislation, namely Law 111/1996 and Governmental Ordinance 11/2003, that relates to the regulation of the import, export and intra-Community transfer of radioactive waste. They state that it is prohibited and subject to the following exemptions: spent fuel from research reactors will be returned to the country of origin, under agreement; the transfer of disused sealed sources, which must be returned to the supplier or manufacturer; and the transfer of radioactive waste for treatment or spent fuel for processing, with subsequent return of the waste product for final

	disposal; the transfer of radioactive waste or spent fuel to another country for final disposal, but only when the receiving country has the technical and administrative capability to meet international standards.
Slovakia	No.
Slovenia	While there is always national responsibility for cross-border cooperation, this should not prevent us from using already proven solutions from other industries or from enabling efficient, easier, safer and economically attractive joint activities.
Spain	No.
Sweden	No.

1.15.2. Question 15 waste producer responses

Table A4. 30 Q15 WP responses

Member State	Comment
Belgium WP 1	A clear distinction needs to be made between contaminated material and nuclear waste.
Belgium WP 2	No.
Finland	No.
Germany WP 1	No.
Germany WP 2	No.
Italy	No.
Lithuania	The Lithuanian radioactive waste classification system is focused primarily on self-sustaining pre-disposal treatment and disposal of radioactive waste produced in Lithuania only (i.e. radioactive waste from decommissioning of Ignalina nuclear power plant, other local radioactive waste). As the Lithuanian radioactive waste classification system carefully follows the International Atomic Energy Agency's General Safety Guide (GSG-1), it is tailored enough for efficient cross-border cooperation according to Lithuania's particular tasks, needs and endeavours regarding radioactive waste management. This is stipulated in a strategic document which outlines strategic guidelines for the management of radioactive waste (*Development program for decommissioning of nuclear power facilities and radioactive waste management for 2021–2030*, approved by the Government of the Republic of Lithuania).
Netherlands	No.
Romania	No.
Slovenia	No.
Spain WP 1	No .
Spain WP 2	No.
Sweden WP 1	No.
Sweden WP 2	No.

“Study on radioactive waste classification schemes in the European Union”

ENER/2021/NUCL/SI2.853676

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