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**Inventory of radioactive waste and spent fuel present in the Community's territory and
the future prospects**

Accompanying the document

**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 - FOURTH REPORT**

{COM(2026) 512 final} - {SWD(2026) 286 final}

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List of abbreviations

DSRS	Disused sealed radioactive sources
EU	European Union
HLW	High-level waste
IAEA	International Atomic Energy Agency
ILW	Intermediate-level waste
LLW	Low-level waste
NORM	Naturally occurring radioactive material
RAW	Radioactive waste
SF	Spent fuel
tHM	Tons of heavy metal
VLLW	Very low-level waste

1. Introduction

According to Article 14(2)(b) of Council Directive 2011/70/Euratom¹, which establishes a Community framework for the responsible and safe management of spent fuel and radioactive waste ('the Directive'), the European Commission ('the Commission'), on the basis of the Member States' reports, is to submit to the European Parliament and the Council an inventory of radioactive waste and spent fuel present in the Community's territory and its future prospects.

The goal of this Staff Working Document (SWD) is to present **an overview of radioactive waste and spent fuel inventory in the European Union, as well as its future prospects**, and to provide background information to the inventory data presented in the Fourth Report from the Commission to the Council and the European Parliament on the progress of implementation of Council Directive 2011/70/Euratom, and an inventory of radioactive waste and spent fuel present in the Community's territory, along with its future prospects (COM(2026) 512).

This fourth SWD includes inventory data as of the end of 2023, although a few Member States reported inventory as of end-2022 or as of mid-2024 (more information on the inventory dates are provided in Chapter 2 – Sources of information). The document provides an overview of:

- the total radioactive waste and spent fuel inventory on EU territory as of the end of 2023;
- a forecast of the EU inventory for 2030, based on available information reported by Member States;
- updated trends of radioactive waste and spent fuel inventory in the EU.

Updated information about the Member States' installations generating radioactive waste and spent fuel, national policies, programmes, concepts, plans and financing mechanisms is summarised in the SWD(2026) 286 on the progress of the implementation of Council Directive 2011/70/Euratom.

2. Sources of information

The European Union radioactive waste and spent fuel inventory data presented in this document is based on the **fourth national reports** submitted by all Member States in 2024.

Article 14(1) of the Directive indicates that Member States can take advantage of the review and reporting under the Joint Convention². During previous reporting cycles, the deadlines for submission of national reports to both legal instruments were different, resulting in a number of Member States reporting their inventory data to the Joint Convention and to the

¹ 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 199/48, 2.8.2011.

² The Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.

Commission using different reference dates. Due to the delay caused by the COVID-19 pandemic, the deadlines for submission of the Joint Convention reports shifted in the last cycle. For the first time, the deadlines for reporting under the Joint Convention and submission of national reports on the implementation of the Directive to the Commission were the same (August 2024), so all Member States have used the same radioactive waste and spent fuel inventory data for both reporting obligations.

Twenty Member States out of 27 reported their inventory data from 2023. Three Member States (France, Italy, and Spain) reported their inventory data as of 2022, while the remaining four Member States have chosen to report even newer inventory data.

France, which accounts for approximately 72% of the overall EU radioactive waste volume, reported its inventory data for 2022. However, since the submission of its report to the Commission, France has produced and published updated inventory data for 2023³. In order to provide an overview of the latest situation and to ensure the accuracy and timeliness of the data, the newer French inventory data (as of the end of 2023) has been used in this report. With this change, the distribution of radioactive waste volumes by reporting year is:

- approximately 95% inventory with the reference date as of 2023;
- approximately 5% inventories with the reference dates of 2022;
- 0.003% with the reference date of 2024.

Based on this, 2023 has been chosen as the reference date for the overall EU radioactive waste and spent fuel inventory in this document, to simplify data presentation.

For the trend analysis, inventory data from previous Commission reports is used. It should be noted that the inventory data provided in the first and second Commission reports included inventory information from the United Kingdom. As the United Kingdom left the European Union on 31 January 2020, all the historical inventory data used for identification of trends have been adjusted, i.e. the historical inventory data from 2013 and 2016 presented in this report were adjusted to represent inventory of 27 European Union Member States.

It needs to be noted that, in preparation of this report, most of the **sources of uncertainty** identified in the document SWD(2017)161 final, remained valid. In other words:

- Member States are using different radioactive waste classification schemes. For EU inventory aggregation purposes conversion to a common reporting basis is necessary (IAEA GSG-1 classification⁴; see Chapter 4 below). However, transition from one classification scheme to another often introduces uncertainties, as the radioactive waste classes in different national classification schemes sometimes cannot be directly matched. In such situations, transformation is carried out on a ‘best approximation’ basis.

³ <https://inventaire.andra.fr>.

⁴ Classification of Radioactive Waste. IAEA Safety Standards No. GSG-1, 2009, Vienna.

- Several Member States do not have a separate VLLW class, and all VLLW radioactive waste is included in the LLW class. This is primarily due to the planned disposal routes, where the intention is for all short-lived radioactive waste (VLLW and LLW) to be disposed of in the same facility. In most cases, using the same management route renders the introduction of additional waste classes unnecessary. As a result, at the EU level, VLLW quantities are underestimated, and LLW quantities are overestimated.
- Member States use different fundamental properties (i.e. volume, mass) to report amounts of unconditioned waste. Conversion from mass to volume without detailed knowledge of the radioactive waste treatment/conditioning methods used can result in significant uncertainties⁵.
- Member States use different approaches to report the volume of radioactive waste; some report volumes as the actual volume in storage, while others report estimated volumes after conditioning for disposal. For inventory aggregation purposes, the estimated volumes of radioactive waste to be emplaced in disposal are preferred, since this represents the final step in management of radioactive waste. The use of actual radioactive waste volumes in storage can lead to significant uncertainties, especially when estimating the need for disposal capacities.

Usually, the most significant volume changes (reduction) occur as a result of liquid radioactive waste and sludge treatment and conditioning for disposal. The same is true for combustible and compactible radioactive waste, as well as for the treatment of metallic waste.

In the fourth national reports, most of the Member States reported estimated disposal volumes for unconditioned waste. This allows for the reduction of uncertainties and the improvement of consistency and comparability of the data.

- Reporting of disused sealed radioactive sources varies from country to country. Countries with large nuclear programmes generally integrate disused sealed radioactive sources into other large radioactive waste streams and do not report them separately. Countries where the disused sealed radioactive sources make up a significant part of the national inventory report them separately from the other radioactive waste. In such cases, disused sealed radioactive sources are reported only as number of sources.
- Knowledge of radioactive contamination of facilities subject to decommissioning plays an important role in predicting amounts of decommissioning waste. Detailed characterisation of a facility subject to decommissioning increases the precision in forecasting the amount of radioactive waste, however, only when decommissioning is well progressed will the actual categories and amounts of waste be fully known. This is also valid for the limited knowledge of characteristics of some legacy wastes.
- Future radioactive waste inventories highly depend on various decisions introducing additional uncertainties in the projection of future radioactive waste inventories, e.g.
 - Technological decisions, such as the selection of treatment and conditioning options, the choice between immediate or deferred decommissioning, the decision to retrieve disposed radioactive waste, might have significant impact

⁵ A simple approach is to use $1 \text{ t} \equiv 1 \text{ m}^3$ equivalence.

on the projection of future radioactive waste inventories (e.g. volumes, waste classes).

- Political decisions and changes in the legal/regulatory framework, such as the development of new nuclear facilities, changes to the nuclear fuel cycle or introduction of new radioactive waste classes.

When the development of Member States' inventories over time was assessed, the following additional sources of uncertainties remained.

- Differences in the reference dates of Member States' inventories. For the current reporting period, the majority of all Member States reported inventories as of the end of 2023 and only a few Member States have chosen to report inventories with the reference dates of 2022 or 2024.
- Change in radioactive waste status. During the reporting period, no changes were reported in the status of previously disposed radioactive waste. However, some Member States plan to recover previously disposed radioactive waste in the future, process it, and re-dispose of it in existing and/or newly constructed disposal facilities. Re-disposal activities might affect the overall radioactive waste inventory as a result of subsequent re-treatment and re-disposal. There are already a few Member States that have taken a decision on the remediation of disposal sites; thus, their radioactive waste is considered as stored whilst awaiting retrieval.

3. Sources of radioactive waste and spent fuel

Radioactive waste is generated in all Member States of the European Union, although the quantities are very small in non-nuclear power Member States compared to those Member States operating nuclear power plants. The radioactive waste inventory in small countries usually consists of disused sealed radioactive sources or small amounts of orphan/legacy radioactive materials. Small volumes of radioactive waste are generated as a result of non-power uses of radioactive materials, such as the manufacturing of radioactive materials for use in medical and industrial applications, or research facilities like laboratories and research reactors. Most of the Member States with research reactors have an agreement in place to return spent fuel to the suppliers.

Most of the radioactive waste come from nuclear power plants and associated nuclear fuel cycle activities, i.e. from conversion of uranium to fuel fabrication, to its use for electricity generation, and the subsequent reprocessing of spent fuel. In the fourth national report, 17 Member States have declared spent fuel. Some of those Member States have chosen to reprocess spent fuel, some Member States have chosen the once-through fuel cycle option when spent fuel will be directly disposed in deep geological disposal. A few Member States applied both approaches – part of their spent fuel is reprocessed and the remaining part will be directly disposed. Currently, spent fuel is stored in specialised storage facilities until final disposal facilities become available. In terms of activity, most of the radioactive waste is generated during operation of nuclear facilities. However, in terms of volume, most of the

waste comes from decommissioning nuclear power plants and other nuclear facilities at the end of their useful lifetime, and it is mainly low-level waste.

Few Member States manage radioactive materials from extractive industries, e.g. past uranium mining and milling activities. In some of them, these materials are declared as radioactive waste and reported as a part of their radioactive waste inventory, whereas in other Member States that is not the case. Therefore, an aggregate estimate and comparison of inventories of waste containing naturally occurring radioactive material between Member States, or the compilation of an overall European Union inventory (including NORM waste), are currently not possible and therefore falls outside the scope of this report.

4. Classification of radioactive waste and spent fuel

In line with Article 12(1)(c) of the Directive, Member States need to develop, as part of their national programmes, and notify to the Commission, radioactive waste and spent fuel inventories in accordance with an appropriate classification. Correspondingly, Member States reported in their fourth national reports on their radioactive waste and spent fuel inventories based on radioactive waste classifications that may differ from one Member State to another.

As in the previous report, in order to make radioactive waste and spent fuel inventories comparable among different Member States and in order to aggregate the overall inventory on the territory of the European Union, Member States inventories have been translated into a common classification scheme. The IAEA GSG-1 classification system has been chosen for that purpose in order to facilitate Member States reporting to various international organisations (e.g. IAEA) and instruments (e.g. Joint Convention).

The categories of radioactive waste used for data aggregation are as follows.

- **Very low-level waste (VLLW):** waste 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.
- **Low-level waste (LLW):** waste that is above clearance levels, but with limited amounts of long-lived radionuclides. Such 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.
- **Intermediate-level waste (ILW):** 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.

- **High-level waste (HLW):** 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.

In addition to the above-mentioned waste classes, the IAEA GSG-1 classification system lays down the following:

- **Exempt waste** with concentrations of radionuclides small enough to not require provisions for radiation protection. Such material can be cleared from regulatory control and does not require any further consideration from a regulatory control perspective.
- **Very short-lived waste** containing only very short half-life radionuclides. Such waste can be stored until the activity has fallen beneath the levels of clearance, allowing for the cleared waste to be managed as conventional waste.

The latter two waste classes do not require future long-term management or disposal as radioactive waste due to their short-lifetime and/or levels. This allows them to be exempted or cleared from regulatory control. Accordingly, exempt waste and very short-lived waste are in most cases not reported by Member States. Therefore, these waste classes have not been used for data aggregation in the present document.

Several Member States combine VLLW and LLW, or do not have a separate VLLW class. In the latter case, such material could be subject to clearance in accordance with the respective national legislation. Reflecting the disposal routes, several Member States also use a combined waste class, 'low and intermediate-level waste' (LILW). Where a system other than the IAEA GSG-1 classification system is used for reporting by Member States, a conversion provided by the Member States is applied in this report in order to achieve the transformation from the national to the IAEA classification system.

Spent fuel (SF) is also considered in its entirety, whether it might be intended for reprocessing or awaiting decision for future long-term management (reprocessing or disposal).

5. Current radioactive waste and spent fuel inventory in the European Union

This Section is dedicated to the presentation and analysis of the radioactive waste and spent fuel inventory present in the Community's territory and its future prospects as required by Article 14(2)(b) of the Directive. The information used to compile this Section was primarily collected from the fourth national reports. The details on the reported national inventories are given in Annex I of this document. The first Commission report contained information on the

radioactive waste disposed of at sea (Table I.8 of the Staff Working Document SWD(2017)161 final). As such disposal practices were prohibited by the London Convention that entered into force in 1975, and no new information has emerged since publication of the first Commission report, information on radioactive waste disposed of at sea is excluded from this document.

The Section is composed of two parts – the first part deals with the radioactive waste inventory and the second part is dedicated to the spent fuel inventory.

Overall, inventory data reported in the fourth national reports are generally consistent with the data provided in national programmes and third national reports. In most of the cases, national reports provided sufficient information to explain non-typical changes in the inventories (e.g. successful volume reduction programmes resulting in reduction of waste amounts without presence of disposal activities). However, the number of sources of uncertainties previously listed in Section 2 of this document still remains an obstacle for most complete and comprehensive reporting of national and EU inventory.

EU radioactive waste inventory

The estimated total inventory of radioactive waste on European Union territory at the end of 2023 was 2 593 000 m³. Approximately 65% of this waste has already been disposed of (1 692 000 m³), while 35% (901 000 m³) is still in storage and will have to be managed in the future. Compared to the 2019 radioactive waste inventory, reported in the last Commission report, there has been a 10% increase in total radioactive waste volumes. Between 2016 and 2019 there was a 5% total radioactive waste inventory increase. The larger increase in radioactive waste volumes can be attributed to a longer period between inventory reports, as well as progress in decommissioning nuclear power plants, which has resulted in larger volumes of VLLW and LLW.

Table 1 and Figure 1 summarises the overall amounts of radioactive waste in the European Union with comparison to previous reporting (i.e. development since 2019).

Table 1: Volumes of radioactive waste in the European Union in 2019 and 2023.

Waste class	EU RAW Amounts (m ³ , rounded to thousands) ⁶					
	Stored		Disposed		Total	
	2019	2023	2019	2023	2019	2023
VLLW	233 000	303 000	462 000	558 000	695 000	861 000
LLW	353 000	385 000	1 068 000	1 113 000	1 421 000	1 497 000
ILW	191 000	208 000	22 000	21 000	213 000	229 000
HLW	4 800	5 200	0	0	4 800	5 200
Total (m³)	782 000	901 000	1 552 000	1 692 000	2 334 000	2 593 000

Figure 1: Distribution of the RAW in the EU between stored and disposed waste by waste class at the end of 2019 and 2023.



Figure 2 and Figure 3 provides information on the distribution of radioactive waste in the European Union by waste class and by management status. As it can be seen from those figures, the distribution of radioactive waste by class has not changed significantly compared

⁶ Except for HLW, which is rounded to hundreds.

to 2019. As in previous reporting, VLLW and LLW together make up approximately 90% of the overall waste amount. The share of ILW has slightly decreased and is now estimated at 8.8% (see Figure 3). HLW makes by far the smallest fraction of the overall waste volume, accounting for less than 0.2% (all HLW is kept in storage).

Figure 2: Distribution of the total RAW in the EU between stored and disposed waste at the end of 2019 and 2023.

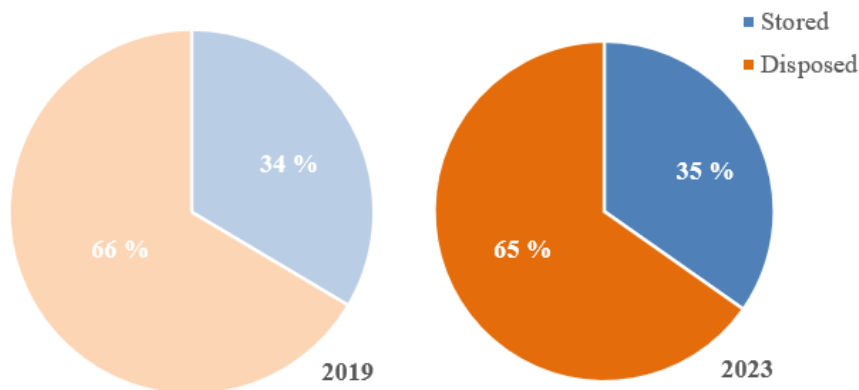
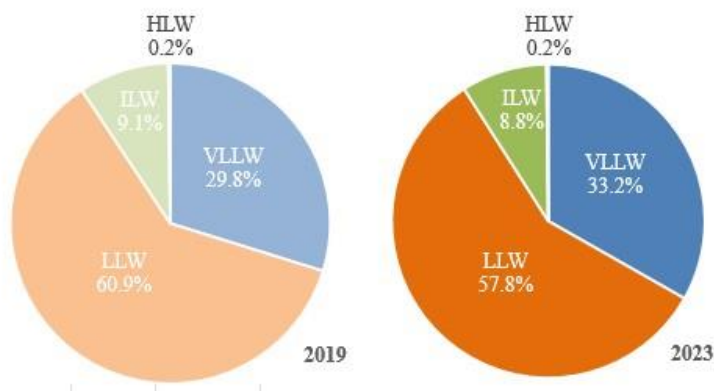


Figure 3: Distribution of the total RAW in the EU by waste category at the end of 2019 and 2023.



Even though LLW dominates radioactive waste inventory, two specific points should be taken into consideration.

- The majority of Member States without nuclear power programme and some nuclear Member States do not have separate VLLW class as defined in the IAEA GSG-1 waste classification scheme. In such cases all the VLLW is reported as part of LLW waste class, meaning that for some Member States the actual fraction of disposed LLW volumes could be significantly lower.

- Some Member States do not register (partially or completely) VLLW amounts in their national inventory.

Both above-mentioned issues lead to a situation where VLLW amounts are underestimated and LLW overestimated.

The total quantity of the **disposed radioactive waste** as of end-2023 equals 1 692 000 m³. This is approximately 65% of total RAW and consists mainly of LLW, i.e. 66% of the disposed radioactive waste is LLW. At the end of 2023, 65% of the total VLLW volume was reported as disposed of and the amount of VLLW disposed has steadily increased. At the same time, 74% of LLW is reported as disposed. Few Member States have reported small amounts of ILW disposed of (1.4% of the total disposed waste). Some Member States are considering whether to retrieve ILW and re-dispose of it in new disposal facilities.

The total reported volume of **stored radioactive waste** in 2023 was 901 000 m³. LLW makes up most of this amount (42.7%), while VLLW and ILW make up 33.7% and 23.1%, respectively. The HLW fraction in the overall radioactive waste in storage is 0.6% and it remains unchanged since the previous report.

Radioactive waste inventory - trends in the EU

The development of the total amount of radioactive waste (Table 2), radioactive waste in storage (Table 3) and radioactive waste which has been disposed of (Table 4) is based on the data from the previous Commission reports published in 2017 (inventory data from 2013), 2019 (inventory data 2016), 2024 (inventory data 2019), and on the current data from the fourth national reports (inventory data 2023).

Table 2: Development of total radioactive waste inventory since 2013.

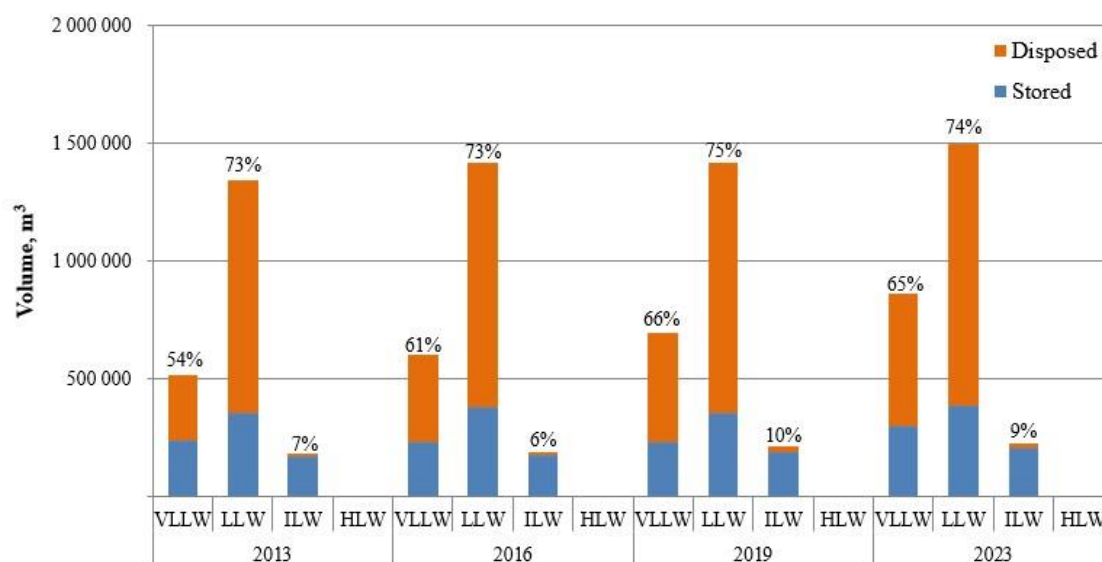
Waste class	Total amount (m ³ , rounded to thousands) ⁷			
	2013*	2016*	2019	2023
VLLW	515 000	601 000	696 000	861 000
LLW	1 345 000	1 420 000	1 420 000	1 497 000
ILW	185 000	190 000	213 000	229 000
HLW	4 300	4 500	4 800	5 200
Total (m³)	2 049 000	2 216 000	2 334 000	2 593 000

* Inventory from 2013 and 2016 refers to 27 Member States without the United Kingdom.

⁷ Except for HLW, which is rounded to hundreds.

Figure 4 presents the development of radioactive waste inventory for the period 2013-2023. The amounts of radioactive waste steadily increase for each waste class, with the LLW remaining dominant waste class in terms of total volume and disposal rate.

Figure 4: Development of total radioactive waste volumes since the end of 2013 (with the percentage of waste disposed of indicated).



Development of the stored radioactive waste volumes (per waste category) is presented in Table 3.

Table 3: Development of stored radioactive waste in the 2013-2023 period.

Waste class	Stored amount (m ³ , rounded to thousands) ⁸			
	2013*	2016*	2019	2023
VLLW	236 000	233 000	233 000	303 000
LLW	358 000	381 000	353 000	385 000
ILW	173 000	178 000	191 000	208 000
HLW	4 300	4 500	4 800	5 200
Total (m³)	771 000	797 000	782 000	901 000

* Inventory from 2013 and 2016 refers to 27 Member States without the United Kingdom.

⁸ Except for HLW, which is rounded to hundreds.

There are currently no operational deep geological disposal facilities for ILW and HLW. Consequently, the amounts of stored ILW and HLW are steadily increasing over time. The amounts of VLLW and LLW in storage are affected by differences in generation, treatment and disposal rates. During different time periods, their respective amounts in storage may therefore increase or decrease. The volume of stored VLLW and LLW is fairly stable and has not changed significantly since 2013. This shows that the disposal rate of VLLW and LLW is aligned with the generation rate of the radioactive waste.

Table 4 shows **the development of radioactive waste disposal over time**. It shows a steady increase of disposed VLLW and LLW since 2013, confirming that the disposal system is functioning properly.

Table 4: Development of radioactive waste disposals in the 2013-2023 period.

Waste class	Disposed amount (m ³ , rounded to thousands) ⁹			
	2013*	2016*	2019	2023
VLLW	279 000	369 000	462 000	558 000
LLW	987 000	1 039 000	1 068 000	1 113 000
ILW	12 000	12 000	22 000	21 000
HLW	0	0	0	0
Total (m³)	1 279 000	1 420 000	1 552 000	1 692 000

* Inventory from 2013 and 2016 refers to 27 Member States without the United Kingdom.

Table 4 also shows that some Member States are disposing of ILW. However, this is not yet widespread practice. These disposals, in accordance with the IAEA classification, consist mainly of highly active disused radioactive sealed sources containing short-lived radionuclides. Approximately 91% of ILW is still kept in storage and pending proper disposal facilities.

Overall, situation remains broadly the same compared to the situation described in the previous Commission reports. Approximately 26% of the LLW amount generated is kept in storage. There has been no systematic increase in the amounts in storage between 2013 and 2023 and the overall LLW amount of waste generated and disposed is generally in equilibrium. LLW disposal is dominated by Member States with large LLW inventories (primarily France), whereas a number of Member States with smaller inventories do not yet dispose of their LLW. For ILW the situation is very different. In 2023, approximately 9% of the total ILW volume was reported as disposed. There is a steady increase of ILW in storage.

⁹ Except for HLW, which is rounded to hundreds.

For HLW and spent fuel declared as radioactive waste, the first disposal facility is expected to start operation soon in Finland, followed by similar facilities in Sweden (in around 2030) and France (in around 2035). Therefore, the amounts of HLW and spent fuel in storage should be expected to increase steadily in line with their generation.

Currently, 12 Member States¹⁰ have radioactive waste disposal facilities either in operation or closed (nuclear power programme countries: Czechia, Finland, France, Germany, Hungary, Lithuania, Romania, Slovakia, Spain, Sweden; non-nuclear programme countries: Latvia and Poland). Based on the information from the national programmes and reports, several Member States are in the process of siting or building the disposal facilities and it is expected that more disposal facilities will become operational in the coming years.

This report presents the status of RAW inventory for all Member States. However, there are significant differences in the amounts of managed radioactive waste between Member States with and without nuclear power programmes. Because of this difference in scale, this document presents the inventories for Member States with and without nuclear power programme separately.

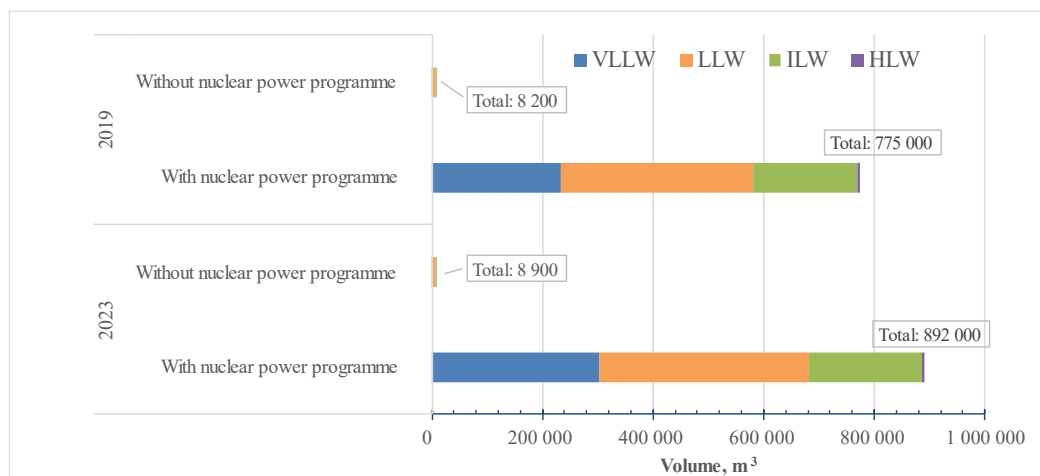
There are fifteen^{11,12} European Union Member States that operate or have operated nuclear power plants. At aggregate level, these Member States have 100 times the amount of RAW stored on their territory as compared with the 12 Member States without nuclear power programme. This difference varies between RAW classes and e.g. for VLLW it is almost 5 400 times and for LLW and ILW it is 57 and 85 times, respectively. The large difference in VLLW amounts can be clarified by the fact that the majority of the Member States without nuclear power programmes do not use the VLLW classification and classify all their short-lived radioactive waste as LLW. It can be clearly seen that Member States without nuclear power programmes are contributing very little to the overall European Union radioactive waste inventory in storage (see Figure 5).

¹⁰ Bulgaria and Lithuania categorised and using these past disposal (RADON type) facilities as storage facilities. See Table 5 of the Staff Working Document (2024)¹²³ on Progress of Implementation of Council Directive 2011/70/Euratom.

¹¹ Krško NPP is co-owned by Slovenia and Croatia. The radioactive waste and spent fuel inventory at Krško NPP is equally owned by Slovenia and Croatia.

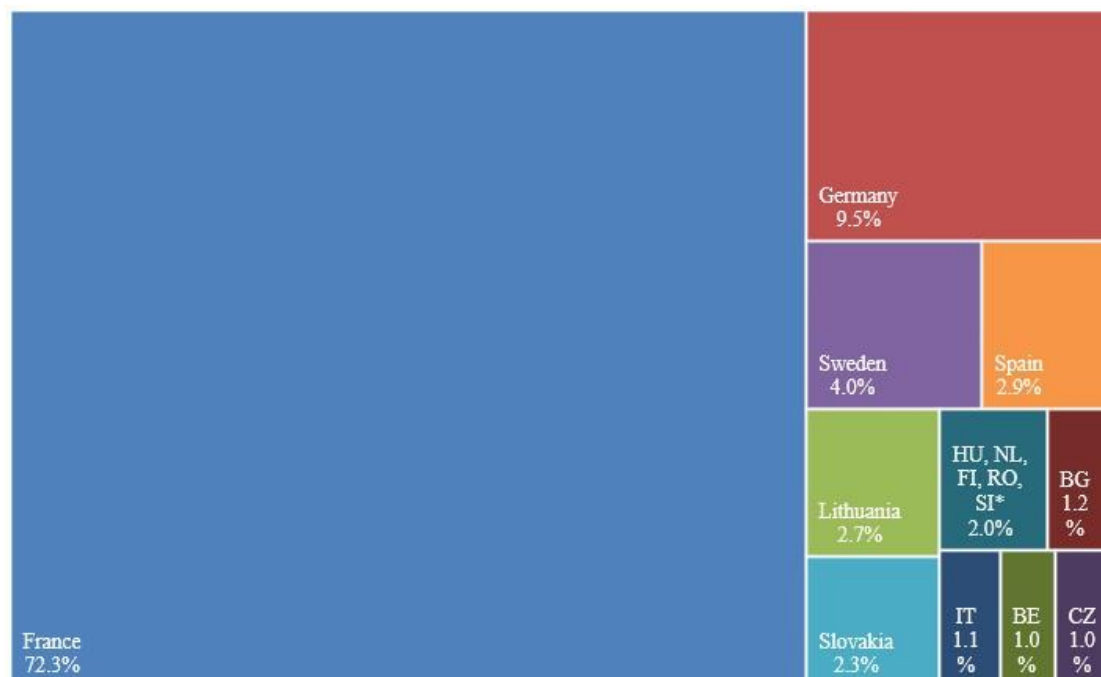
¹² Belgium, Bulgaria, Czechia, Finland, France, Germany, Hungary, Italy, Lithuania, the Netherlands, Romania, Slovakia, Slovenia, Spain, Sweden.

Figure 5: Volumes of stored radioactive waste by class in Member States with and without nuclear power programmes, end of 2019 and 2023.



Altogether, Member States with nuclear power programmes account for 99% of the radioactive waste inventory in the European Union. The percentage share of the total RAW in 2023 between Member States with nuclear power programme is presented in Figure 6.

Figure 6: Distribution of total volumes of radioactive waste (2 580 000 m³) in Member States with nuclear power programmes, end of 2023¹³.

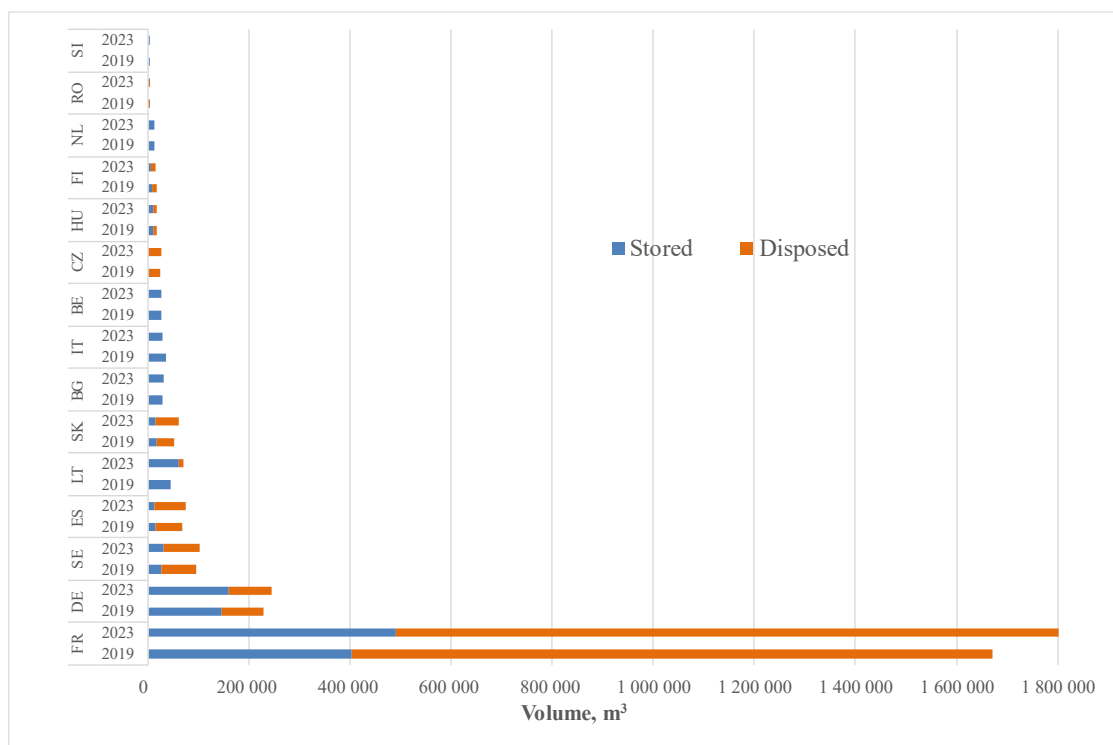


* Hungary, The Netherlands, Finland, Romania, and Slovenia account for 2% together

Having the largest fleet of nuclear power plants, France clearly dominates with the largest volumes of radioactive waste (72% of the total radioactive waste in Member States with nuclear power programme). The Member State with the next-highest share is Germany, with 9.5%. The total volume of radioactive waste in those Member States is shown individually in Figure 7 (with indicated stored and disposed amounts in 2019 and 2023).

¹³ Member States' (MS) abbreviations in this report are as follows: Austria (AT), Belgium (BE), Bulgaria (BG), Croatia (HR), Cyprus (CY), Czechia (CZ), Denmark (DK), Estonia (EE), Finland (FI), France (FR), Germany (DE), Greece (EL), Hungary (HU), Ireland (IE), Italy (IT), Latvia (LV), Lithuania (LT), Luxembourg (LU), Malta (MT), The Netherlands (NL), Poland (PL), Portugal (PT), Romania (RO), Slovakia (SK), Slovenia (SI), Spain (ES) and Sweden (SE).

Figure 7: Volumes of RAW waste in the 15 Member States with nuclear power programmes, end of 2019 and 2023.



Twelve Member States have no nuclear programme¹⁴, although six of them are operating or have operated research, training or demonstration nuclear reactors. The distribution of the total volume of radioactive waste among the Member States without nuclear power programme is shown in Figure 8 and Figure 9 with information on stored and disposed amounts for 2019 and 2023.

¹⁴ Croatia is co-owner of the Krško nuclear power plant, but in the context of this report it is considered as not having a nuclear power programme.

Figure 8: Distribution of total volumes of RAW in Member States without nuclear power programmes, end of 2023 (HR, LU, CY, IE and MT have together 0.1%).

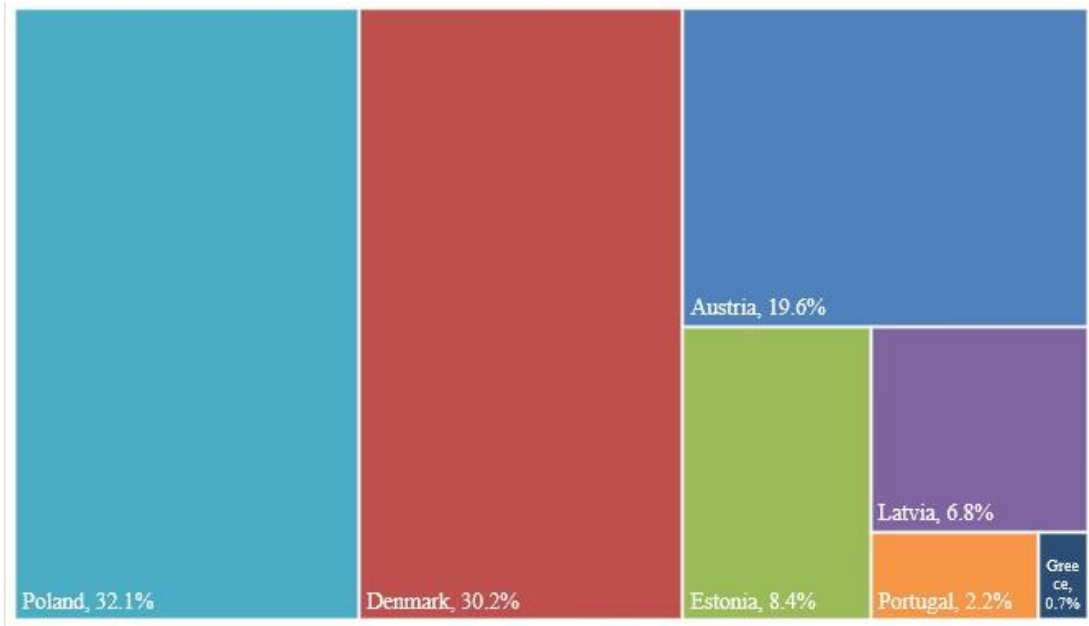
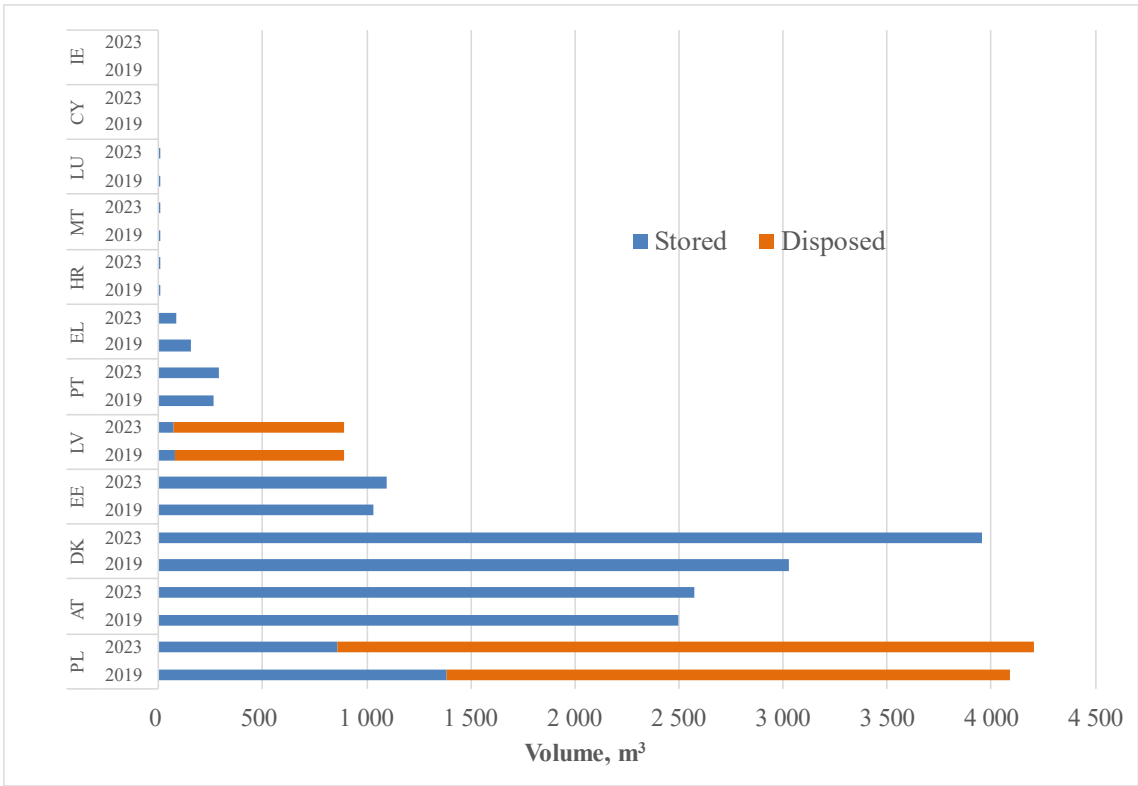
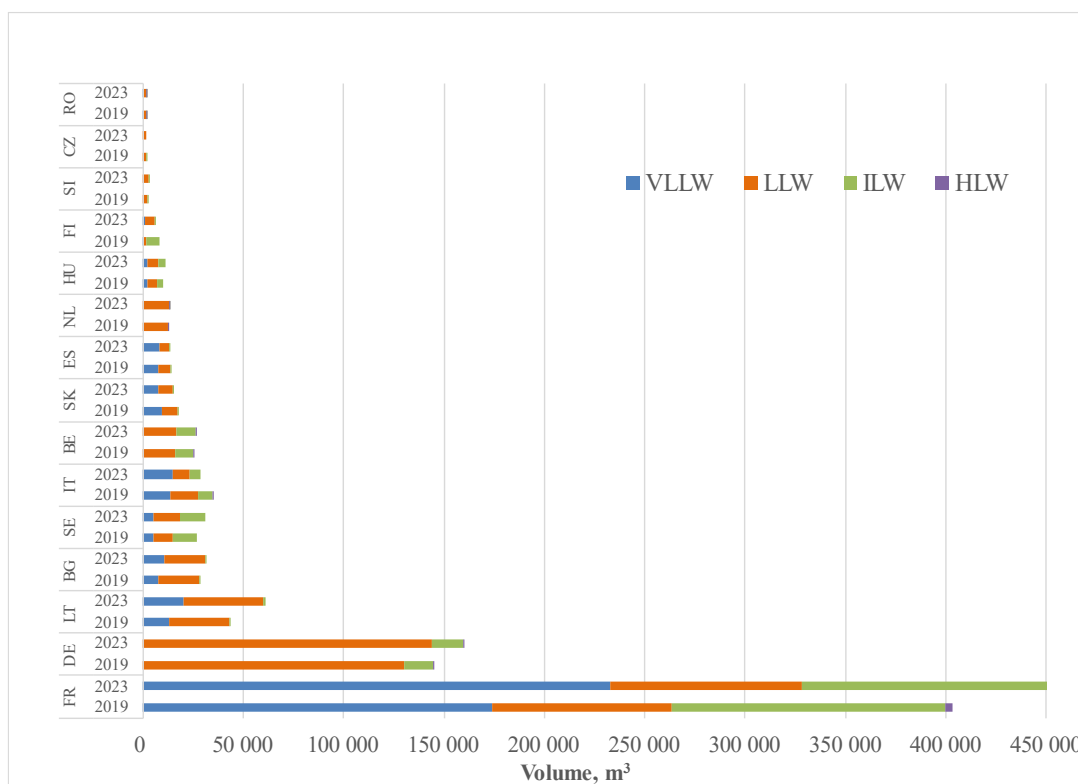


Figure 9: Volume of RAW waste in Member States without nuclear power programmes, end of 2019 and 2023.



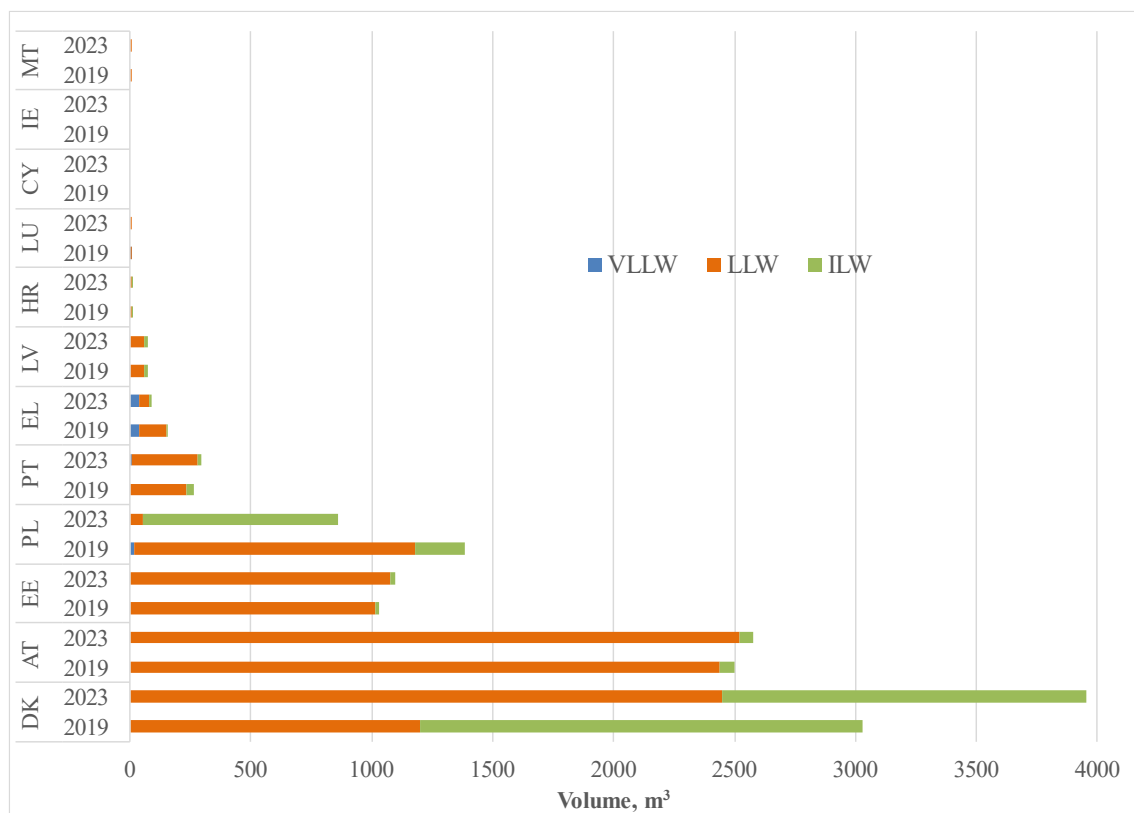
Member States with nuclear power programmes are primary contributors to the overall radioactive waste inventory of the European Union. The radioactive waste amounts are in line with the size of their respective nuclear programmes. The amounts of stored radioactive waste in Member States with nuclear power programmes are shown in Figure 10 for 2019 and 2023 with information on amounts of all RAW waste classes.

Figure 10: Volumes of stored RAW waste by class in Member States with nuclear power programmes, end of 2019 and 2023.



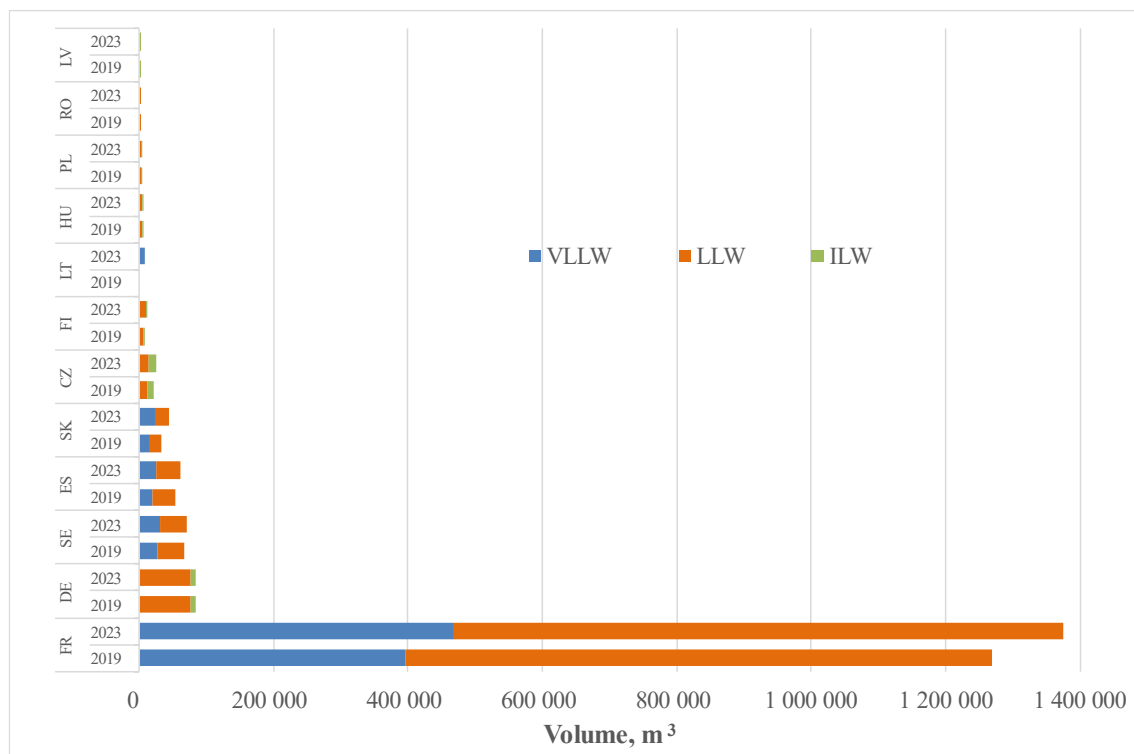
The amounts of stored radioactive waste for Member States without nuclear power programmes are shown in Figure 11 for 2019 and 2023 with information on the amounts of all RAW waste classes.

Figure 11: Volumes of stored RAW by class in MSs without nuclear power programmes, end of 2019 and 2023.



The distribution of the disposed radioactive waste is presented in Figure 12 for all 27 Member States regardless of whether they have nuclear power programme or not, with information on the amounts of all RAW waste classes for 2019 and 2023 for comparison. No HLW waste was disposed of in any Member State until this reporting period.

Figure 12: Volumes of radioactive waste disposed of in the European Union, end of 2019 and 2023.

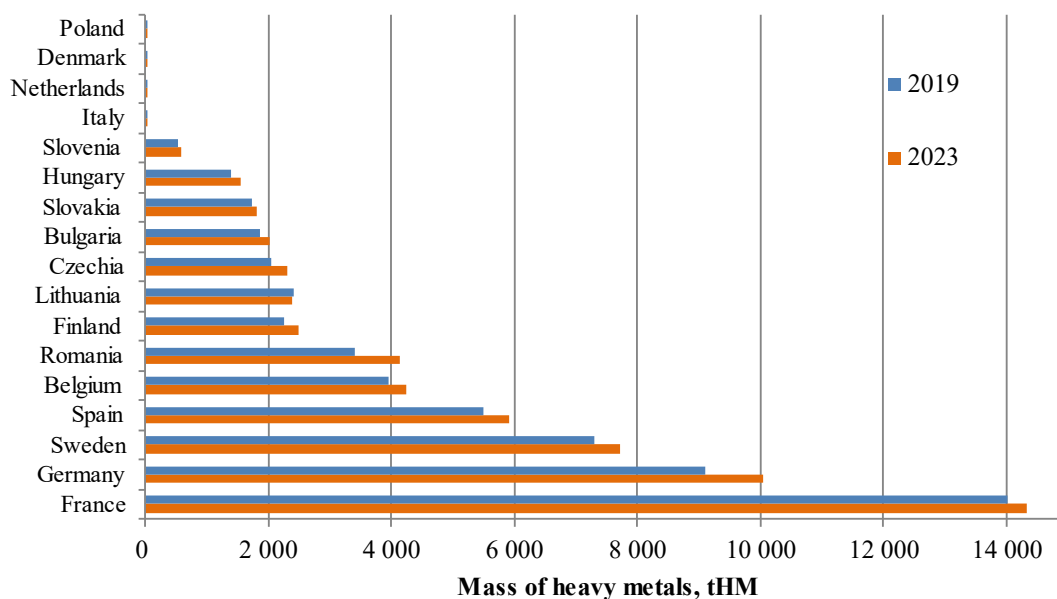


Spent fuel inventory

Based on the Member State strategy, spent fuel (from power and non-power reactors) is stored pending either disposal or reprocessing. During reprocessing, uranium and plutonium are recovered, with additional generation of radioactive waste (mainly HLW and ILW). As there are no operational disposal facilities for spent fuel, it is currently stored until disposal facilities become available.

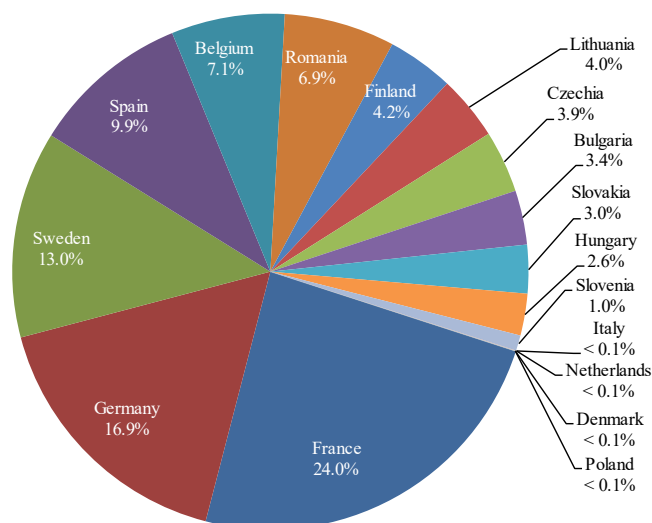
At the end of 2023, approximately 58 600 tHM of spent fuel was stored in European Union territory (an increase of about 5% since 2019 and 17% since 2013) and slightly more than 1000 tHM of spent fuel (about 1.7%) was sent for reprocessing outside the European Union and is currently there in storage with the expected returns of resulting radioactive waste from reprocessing. In total this results in approximately 59 600 tHM of spent fuel.

Figure 13: Spent fuel in storage at the end of 2019 and 2023.



The most recent reported amounts of spent fuel stored at each Member States are shown in Figure 13, together with values from 2019 for comparison. Some Member States have smaller inventories of spent fuel (or none) in storage than that generated by the nuclear power plants because part of it or all of it has been reprocessed. On the other end, countries with neither past nor current reprocessing have comparably high spent fuel inventories. An increase in the spent fuel mass is visible in all Member States. The percentage share of spent fuel between Member States is presented in Figure 14.

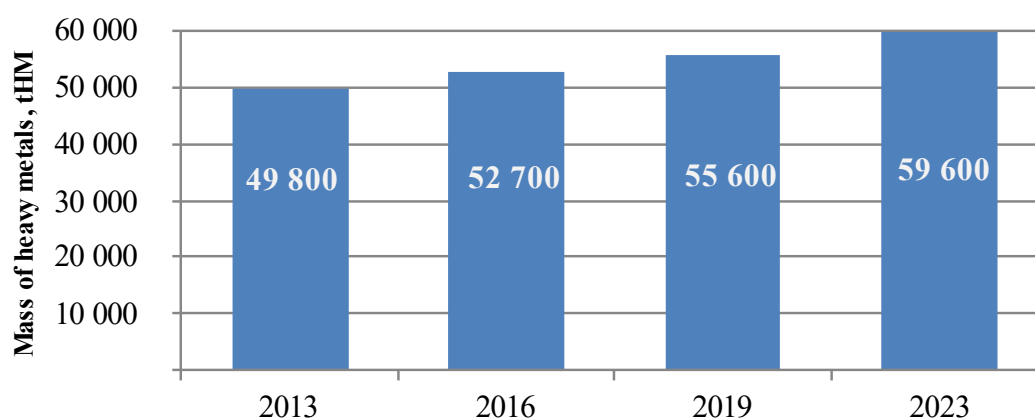
Figure 14: Member States' contribution to the overall spent fuel inventory in the European Union at the end of 2023.



France accounts for nearly 24% of all spent fuel in the EU, followed by Germany at approximately 17%. The third and fourth countries by volume are Sweden (13%) and Spain (10%). There is a gradual but smaller difference among the rest of Member States. Figure 15 presents the development of the total spent fuel mass for all Member States since 2013.

Given that no disposal route is currently available for spent fuel (the first disposal facility is expected to become operational soon) and that not all Member States are reprocessing their spent fuel, there is a continual increase in the amount of spent fuel in storage (see Figure 15).

Figure 15: Development of spent fuel in storage owned by the Member States from 2013 up to 2023.



6. Projections of radioactive waste and spent fuel

The Staff Working Document on the EU Inventory (SWD(2017)161) reported that projections of radioactive waste inventories in Member States differed in the level of detail and time frames provided. Several Member States did not provide any or sufficiently detailed estimates of their future inventory of spent fuel and/or radioactive waste, particularly for new builds and decommissioning. Therefore, at that time, it was not possible for the Commission to forecast future total EU inventories.

Starting from the second national reports, Member States significantly improved their reporting of future projections, allowing the Commission to prepare an EU radioactive waste and spent fuel forecast for 2030.

It must be stressed that all uncertainties previously mentioned are significantly larger for future predictions, and the indicated future EU radioactive waste volumes are indicative only. Due to limitations in the reported inventory data, only an estimation of short-term radioactive waste and spent fuel projections for 2030 was possible. The majority of Member States provided estimates of their future inventories for 2050. However, due to the unavailability of 2050 inventory forecast data from some large Member States, it is still not possible to produce an overall EU long-term inventory forecast.

The Commission's estimate of the EU's radioactive waste and spent fuel inventory for 2030 is presented in Table 5. Data reported by individual Member States are provided in Annex I of this document.

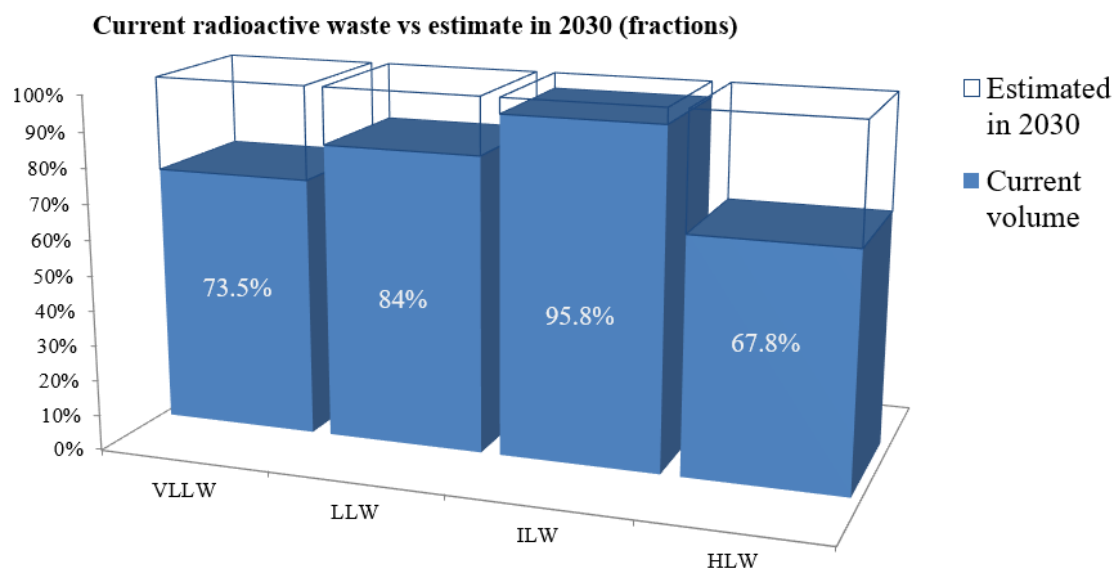
Decommissioning of nuclear power plants is becoming an increasingly important activity for the European nuclear industry due to the ageing of the reactor fleet. This has a significant impact on the amounts of radioactive waste generated, particularly VLLW and low-level waste, and should therefore be considered when planning disposal and storage facilities. As shown in Figure 16 and 17, total VLLW volumes are expected to increase by one-third by 2030 compared to current levels, and a significant increase in LLW is also anticipated. The current VLLW volumes represent 73.5% of the projected VLLW amounts in 2030 (a 36% increase from current levels). For LLW, current amounts account for 84% of the projected LLW amounts in 2030 (a 19% increase from current levels). The primary contributors to this growth are the Member States with the largest nuclear programmes.

For intermediate-level waste and high-level waste, safe and responsible management remains challenging due to the limited availability of long-term storage capacity and the need to develop sustainable disposal solutions. It is projected that ILW volumes will increase by approximately 5% by 2030, with the majority of this growth stemming from decommissioning activities. The HLW increase of about 48% will primarily result from the reprocessing of spent fuel, particularly in France.

Table 5: Estimated future amounts of RAW in the EU MSs for 2030.

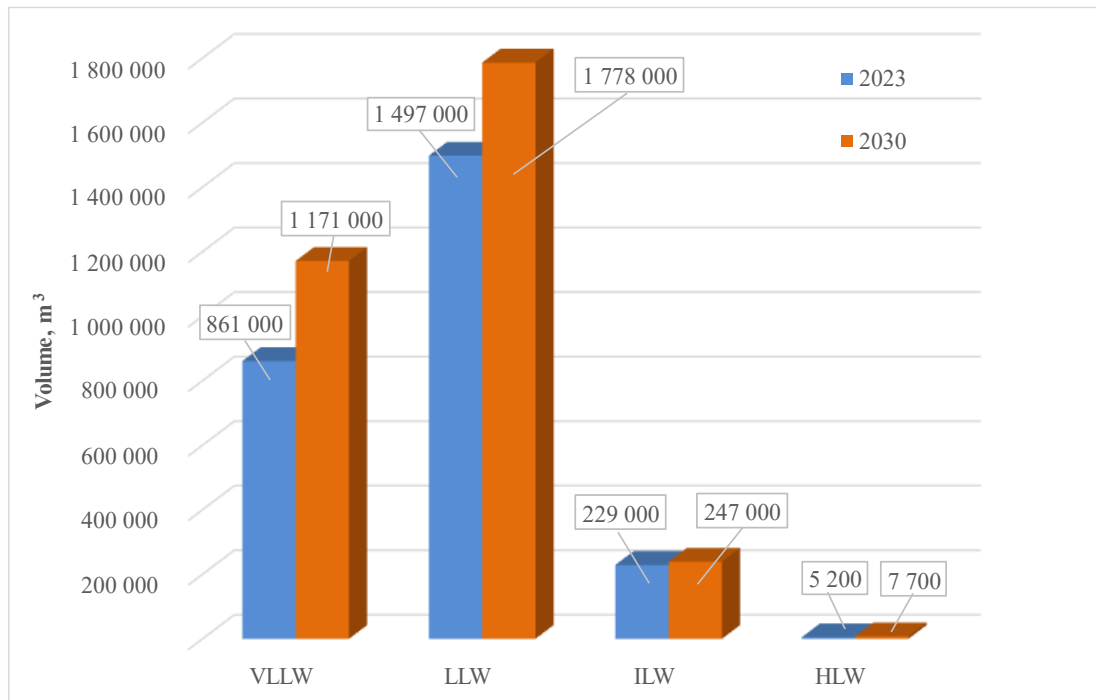
	Future RAW and SF amount estimates (m ³ , rounded to thousands) ¹⁵				
	VLLW	LLW	ILW	HLW	SF
2023	861 000	1 491 000	236 000	5 200	59 600
2030	1 171 000	1 778 000	247 000	7 700	66 900

Figure 16: Estimation of radioactive waste generation by 2030 compared to current inventory.



¹⁵ Except for HLW, which is rounded to hundreds.

Figure 17: Volumes of total radioactive waste in the European Union, end of 2023 and forecast for 2030.



The **spent fuel** inventory is expected to increase from 59 600 tHM to 66 900 tHM by 2030, representing a 12% rise. It should be noted that the majority of Member States have not yet reported inventories from new builds. However, as some Member States proceed with spent fuel reprocessing, this projected increase does not fully represent the actual amount of spent fuel discharged from reactors. Part of the spent fuel is sent for reprocessing outside the European Union, and it is expected that approximately 1100 m³ of radioactive waste from spent fuel reprocessing will be returned to the EU by 2030.

Annex I: Radioactive waste and spent fuel inventory data

‘-’ in the tables below means no data were received from the Member State or no such practice exists

‘0’ in the table means that data with value ‘0’ was received from the Member State

Table I.1. Overall European Union radioactive waste inventory and future prospects as at the end of 2023

Total RAW		2023		2030		2050		Other date	
MS	Category	Volume, m ³	Decom. Share, m ³	Volume, m ³	Decom. Share, m ³	Volume, m ³	Decom. Share, m ³	Volume, m ³ [Date, year]	Decom. Share, m ³
Austria	VLLW	-	-	-	-	-	-	-	-
	LLW	2 523	1 030	3 130	1 750	3 510	1 930	3 500 [2045]	1 930 [2045]
	ILW	52	30	67	50	100	50	100 [2045]	50 [2045]
	HLW	-	-	-	-	-	-	-	-
Belgium	VLLW	-	-	-	-	-	-	-	-
	LLW	16 880	-	-	-	-	-	57 600 [2130]	-
	ILW	9 351	-	-	-	-	-	10 100 [2130]	-
	HLW	70	-	-	-	-	-	70 [2130]	-
Bulgaria	VLLW	10 364	-	42 000	-	-	-	-	-
	LLW	20 767	-	90 200	-	-	-	-	-
	ILW	10	-	10	-	-	-	-	-
	HLW	0	-	1 100	-	-	-	-	-
Croatia	VLLW	-	-	-	-	-	-	-	-
	LLW	7.53	0	-	-	-	-	-	-
	ILW	3.81	0	-	-	-	-	-	-
	HLW	0	0	-	-	-	-	-	-
Cyprus	VLLW	-	-	-	-	-	-	-	-
	LLW	-	-	<1	-	<1	-	-	-
	ILW	-	-	-	-	-	-	-	-
	HLW	-	-	-	-	-	-	-	-
Czechia	VLLW	-	-	-	-	-	-	-	-
	LLW	15 966	-	-	-	-	-	-	-
	ILW	10 332	-	-	-	-	-	-	-
	HLW	-	-	-	-	-	-	-	-
Denmark	VLLW	-	-	-	-	-	-	-	-
	LLW	5 709	-	-	-	-	-	-	-
	ILW		-	-	-	-	-	-	-
	HLW	-	-	-	-	-	-	-	-
Estonia	VLLW	-	-	-	-	-	-	-	-
	LLW	1 077	-	-	-	-	-	-	-

Total RAW		2023		2030		2050		Other date	
MS	Category	Volume, m ³	Decom. Share, m ³	Volume, m ³	Decom. Share, m ³	Volume, m ³	Decom. Share, m ³	Volume, m ³ [Date, year]	Decom. Share, m ³
	ILW	21	-	-	-	-	-	-	-
	HLW	-	-	-	-	-	-	-	-
Finland	VLLW	869	0	-	-	-	-	-	-
	LLW	12 479.3	38	-	-	-	-	-	-
	ILW	46.7	22	-	-	-	-	-	-
	HLW	0	0	-	-	-	-	-	-
France	VLLW	702 000	-	926 000	-	-	-	-	-
	LLW	1 001 100	-	1 100 000	-	-	-	-	-
	ILW	156 800	-	157 500	-	-	-	-	-
	HLW	4 550	-	5 630	-	-	-	-	-
Germany	VLLW	-	-	-	-	-	-	-	-
	LLW	219 592*	-	-	-	-	-	-	-
	ILW	24 399*	-	-	-	-	-	-	-
	HLW	507	-	-	-	-	-	-	-
Greece	VLLW	27.84	-	-	-	-	-	-	-
	LLW	299.53**	-	-	-	-	-	-	-
	ILW	0.93	-	-	-	-	-	-	-
	HLW	-	-	-	-	-	-	-	-
Hungary	VLLW	3 354	-	4 023	-	4 499	-	-	-
	LLW	8 386	-	10 057	-	11 247	-	-	-
	ILW	5 512	-	6 566	-	7 455	-	-	-
	HLW	-	-	-	-	-	-	-	-
Ireland	VLLW	-	-	-	-	-	-	-	-
	LLW	-	-	-	-	-	-	-	-
	ILW	-	-	-	-	-	-	-	-
	HLW	-	-	-	-	-	-	-	-
Italy	VLLW	14 642	2 674	34 395	12 034	48 787	26 427	48 787 [2065]	26 427 [2065]
	LLW	8 781	2 436	22 973	10 960	34 432	22 419	34 432 [2065]	22 419 [2065]
	ILW	5 261	675	9 911	3 039	13 748	6 876	13 748 [2065]	6 876 [2065]
	HLW	0	-	369	-	369	-	369 [2065]	-
Latvia	VLLW	-	-	-	-	-	-	-	-
	LLW	839	-	2 017	-	2 032	-	-	-
	ILW	54	-	68	-	71	-	-	-
	HLW	0	-	-	-	-	-	-	-
Lithuania	VLLW	27 987	-	33 200	-	53 500	-	-	-
	LLW	39 546	-	30 530	-	114 417	-	-	-
	ILW	1 287	-	2 562	-	7 500	-	-	-
	HLW	-	-	-	-	-	-	-	-
Luxembourg	VLLW	-	-	-	-	-	-	-	-
	LLW	0.1	-	-	-	0.1	-	-	-
	ILW	-	-	-	-	-	-	-	-
	HLW	-	-	-	-	-	-	-	-

Total RAW		2023		2030		2050		Other date	
MS	Category	Volume, m ³	Decom. Share, m ³	Volume, m ³	Decom. Share, m ³	Volume, m ³	Decom. Share, m ³	Volume, m ³ [Date, year]	Decom. Share, m ³
Malta	VLLW	-	-	-	-	-	-	-	-
	LLW	-	-	-	-	-	-	-	-
	ILW	-	-	-	-	-	-	-	-
	HLW	-	-	-	-	-	-	-	-
The Netherlands	VLLW	- ***	-	-	-	-	-	-	-
	LLW	12 876	-	14 548	-	20 615	-	31 461 [2130]	-
	ILW		-		-		-		-
	HLW	100.2	-	173	-	201	-	227 [2130]	-
Poland	VLLW	-	-	-	-	-	-	-	-
	LLW	2819.41	-	-	-	-	-	-	-
	ILW	1 385	-	-	-	-	-	-	-
	HLW	-	-	-	-	-	-	-	-
Portugal	VLLW	5.2	-	-	-	-	-	-	-
	LLW	271.8	-	-	-	-	-	-	-
	ILW	15.9	-	-	-	-	-	-	-
	HLW	-	-	-	-	-	-	-	-
Romania	VLLW	270	-	200	-	100	-	-	-
	LLW	3 630.1	-	3 733.7	-	7 395.92	-	-	-
	ILW	105.48	-	228.6	-	509.98	-	-	-
	HLW	0.13	-	0.02	-	0.02	-	-	-
Slovakia	VLLW	31 813.8	-	-	-	-	-	-	-
	LLW	28 119	-	-	-	-	-	-	-
	ILW	45.57	-	-	-	-	-	-	-
	HLW	-	-	-	-	-	-	-	-
Slovenia	VLLW	-	-	-	-	-	-	-	-
	LLW	2 382	-	2 972	-	3 467	-	3 342 [2040]	-
	ILW		-		-		-		-
	HLW	-	-	-	-	-	-	-	-
Spain	VLLW	33 759	21 682	51 300	30 000	121 300	94 100	125 000 [2100]	98 700 [2100]
	LLW	41 142	3 997	56 000	10 000	93 900	46 700	94 200 [2100]	46 700 [2100]
	ILW	201	185	300	200	2 700	700	3 900 [2100]	700 [2100]
	HLW	13	0	13	0	13	0	13 [2100]	0 [2100]
Sweden	VLLW	36 050	-	55 000	-	64 000	-	-	-
	LLW	53 300	-	90 000	-	145 000	-	-	-
	ILW	12 600	-	15 000	-	15 000	-	-	-
	HLW	0	-	-	-	-	-	-	-

* Indicated LLW and ILW amounts include 19 503t of unconditioned non-heat generating waste. For aggregation purposes Commission Services assumed 1t = 1m³ (numbers not verified by Germany)

** Including uncharacterised radioactive waste at NCSR 'D' and other facilities.

*** Information on VLLW inventory as well as origin of waste amounts is not registered in the Netherlands.

Table I.2. Spent fuel stored on Member States' territory

SF in storage on MS territory, tHM				
Country	2023	2030	2050	Other date (Mass/date)
Austria	-	-	-	-
Belgium	4 234.4	-	-	4 500 [2130]
Bulgaria*	996	1 286	-	-
Croatia**	-	-	-	-
Cyprus	-	-	-	-
Czechia	2 321	-	-	-
Denmark	0.238	-	-	-
Estonia	-	-	-	-
Finland	2 488	3 154	4 169	-
France	14 328	15 125	-	-
Germany	10 045	10 049	10 049	-
Greece	-	-	-	-
Hungary	1 563	2 144	3 351	-
Ireland	-	-	-	-
Italy	15.819	2.95	2.95	2.95 [2040]
Latvia	-	-	-	-
Lithuania	2 397.528	2 397.528	2 397.528	-
Luxembourg	-	-	-	-
Malta	-	-	-	-
The Netherlands***	11.4 m ³	-	-	-
Poland	0.341	-	-	-
Portugal	-	-	-	-
Romania	4 138	5 795	14 383	-
Slovakia	1 813	-	-	-
Slovenia**	574	685	913	842 [2040]
Spain	5 924	7 467	-	-
Sweden	7 726	9 500	4 000	-

* Excluding spent fuel shipped to the Russian Federation

** Spent fuel reported by Slovenia to be shared equally by Croatia and Slovenia.

*** Spent fuel stored in COVRA is accounted in m³.

Table I.3. Conditioned radioactive waste stored on Member States' territory

Stored conditioned RAW (Estimated volume for disposal, m³)					
Country	RAW	2023	2030	2050	Volume [Date]
Austria	VLLW	-	-	-	-
	LLW	2 523	3 130	3 510	3 500 [2045]
	ILW	52	67	100	100 [2045]
	HLW	-	-	-	-
Belgium	VLLW	-	-	-	-
	LLW	16 880	-	-	57 600 [2130]
	ILW	9 351	-	-	10 100 [2130]
	HLW	70	-	-	70 [2130]
Bulgaria	VLLW	5 772	42 000	-	-
	LLW	13 786	90 200	-	-
	ILW	0	10	-	-
	HLW	0	1 100	-	-
Croatia	VLLW	-	-	-	-
	LLW	7.53	-	-	-
	ILW	3.81	-	-	-
	HLW	-	-	-	-
Cyprus	VLLW	-	-	-	-
	LLW	-	-	-	-
	ILW	-	-	-	-
	HLW	-	-	-	-
Czechia	VLLW	-	-	-	-
	LLW	-	-	-	-
	ILW	-	-	-	-
	HLW	-	-	-	-
Denmark	VLLW	-	-	-	-
	LLW	-	-	-	-
	ILW	-	-	-	-
	HLW	-	-	-	-
Estonia	VLLW	-	-	-	-
	LLW	1 077	-	-	-
	ILW	21	-	-	-
	HLW	-	-	-	-
Finland	VLLW	869	-	-	-
	LLW	1 285.95	-	-	-
	ILW	1.05	-	-	-
	HLW	-	-	-	-
France	VLLW	233 000	-	-	-
	LLW	95 100	-	-	-
	ILW	156 800	-	-	-

Stored conditioned RAW (Estimated volume for disposal, m ³)					
Country	RAW	2023	2030	2050	Volume [Date]
	HLW	4 550	-	-	-
Germany	VLLW	-	-	-	-
	LLW	120 861	-	-	-
	ILW	13 429	-	-	-
	HLW	-	-	-	-
Greece	VLLW	-	-	-	-
	LLW	-	-	-	-
	ILW	-	-	-	-
	HLW	-	-	-	-
Hungary	VLLW	-	118	131	-
	LLW	-	295	328	-
	ILW	-	182	222	-
	HLW	-	-	-	-
Ireland	VLLW	-	-	-	-
	LLW	-	-	-	-
	ILW	-	-	-	-
	HLW	-	-	-	-
Italy	VLLW	4 614.9	-	-	-
	LLW	4 070.6	-	-	-
	ILW	529.6	-	-	-
	HLW	-	-	-	-
Latvia	VLLW	-	-	-	-
	LLW	56	78	93	-
	ILW	19	14	17	-
	HLW	-	-	-	-
Lithuania	VLLW	20 335	12 200	0	-
	LLW	39 546	30 530	0	-
	ILW	1 287	2 562	7 500	-
	HLW		-	-	-
Luxembourg	VLLW	-	-	-	-
	LLW	-	-	-	-
	ILW	-	-	-	-
	HLW	-	-	-	-
Malta	VLLW	-	-	-	-
	LLW	-	-	-	-
	ILW	-	-	-	-
	HLW	-	-	-	-
The Netherlands	VLLW	-	-	-	-
	LLW	12 876	14 548	20 615	31 461 [2130]
	ILW				
	HLW	100.2	173	201	227 [2130]

Stored conditioned RAW (Estimated volume for disposal, m ³)					
Country	RAW	2023	2030	2050	Volume [Date]
Poland	VLLW	-	-	-	-
	LLW	50.7	-	-	-
	ILW	807.9	-	-	-
	HLW	-	-	-	-
Portugal	VLLW	5.2	-	-	-
	LLW	271.8	-	-	-
	ILW	15.9	-	-	-
	HLW	-	-	-	-
Romania	VLLW	-	-	-	-
	LLW	13	-	-	-
	ILW	0.44	0.44	0.66	-
	HLW	-	-	-	-
Slovakia	VLLW	-	-	-	-
	LLW	-	-	-	-
	ILW	-	-	-	-
	HLW	-	-	-	-
Slovenia	VLLW	-	-	-	-
	LLW	2 419.2	-	-	-
	ILW		-	-	-
	HLW	-	-	-	-
Spain	VLLW	8 089	6 300	11 300	0 [2100]
	LLW	4 985	10 000	1 200	0 [2100]
	ILW	201	300	2 700	0 [2100]
	HLW	0	13	13	0 [2100]
Sweden	VLLW	5 500	3 000	1 000	-
	LLW	12 700	30 000	5 000	-
	ILW	12 600	15 000	10 000	-
	HLW	-	-	-	-

Table I.4. Unconditioned radioactive waste stored on Member States' territory

Stored unconditioned RAW (volume, m³ / or mass, t)¹⁶						
Country	Volume RAW	2023 Storage	Estimated disposal volume	2030	2050	Volume [Date]
Austria	VLLW	-	-	-	-	-
	LLW	-	-	-	-	-
	ILW	-	-	-	-	-
	HLW	-	-	-	-	-
Belgium	VLLW	-	-	-	-	-
	LLW	-	-	-	-	-
	ILW	-	-	-	-	-
	HLW	-	-	-	-	-
Bulgaria	VLLW	4 592	4 592	-	-	-
	LLW	6 981	6 981	-	-	-
	ILW	3	10	-	-	-
	HLW	0	-	-	-	-
Croatia	VLLW	-	-	-	-	-
	LLW	-	-	-	-	-
	ILW	-	-	-	-	-
	HLW	-	-	-	-	-
Cyprus	VLLW	-	-	-	-	-
	LLW	-	-	-	-	-
	ILW	-	-	-	-	-
	HLW	-	-	-	-	-
Czechia	VLLW	-	-	-	-	-
	LLW	1 366.4 m ³ 339 t	-	-	-	-
	ILW		-	-	-	-
	HLW	-	-	-	-	-
Denmark	VLLW	-	-	-	-	-
	LLW	5 709	-	-	-	-
	ILW		-	-	-	-
	HLW	-	-	-	-	-
Estonia	VLLW	-	-	-	-	-
	LLW	-	-	-	-	-
	ILW	-	-	-	-	-
	HLW	-	-	-	-	-
Finland	VLLW	-	-	-	-	-
	LLW	-	38	-	-	-
	ILW	1 275	3 558.8	-	-	-
	HLW	-	-	-	-	-

¹⁶ Unless otherwise indicated, amounts without units are volumes in m³.

Stored unconditioned RAW (volume, m³ / or mass, t)¹⁶						
Country	Volume RAW	2023 Storage	Estimated disposal volume	2030	2050	Volume [Date]
France	VLLW	-	-	-	-	-
	LLW	-	-	-	-	-
	ILW	-	-	-	-	-
	HLW	-	-	-	-	-
Germany	VLLW	-	-	-	-	-
	LLW	22 914 t	-	-	-	-
	ILW	2 546 t	-	-	-	-
	HLW	-	-	-	-	-
Greece	VLLW	27.84	-	-	-	-
	LLW	299.53*	-	-	-	-
	ILW	0.93	-	-	-	-
	HLW	-	-	-	-	-
Hungary	VLLW	2 012	2 107	1 574	0	-
	LLW	5 031	5 268	3 936	0	-
	ILW	3 360	3 641	2 509	182	-
	HLW	-	-	-	-	-
Ireland	VLLW	-	-	-	-	-
	LLW	-	-	-	-	-
	ILW	-	-	-	-	-
	HLW	-	-	-	-	-
Italy	VLLW	13 424.8	10 027.3	-	-	-
	LLW	5 160	4 710.1	-	-	-
	ILW	2 990	4 731.7	-	-	-
	HLW	-	-	-	-	-
Latvia	VLLW	-	-	-	-	-
	LLW	-	-	-	-	-
	ILW	-	-	-	-	-
	HLW	-	-	-	-	-
Lithuania	VLLW	-	-	-	-	-
	LLW	-	-	-	-	-
	ILW	-	-	-	-	-
	HLW	-	-	-	-	-
Luxembourg	VLLW	-	-	-	-	-
	LLW	-	-	-	-	-
	ILW	-	-	-	-	-
	HLW	-	-	-	-	-
Malta	VLLW	-	-	-	-	-
	LLW	-	-	-	-	-
	ILW	-	-	-	-	-

Stored unconditioned RAW (volume, m³ / or mass, t)¹⁶						
Country	Volume RAW	2023 Storage	Estimated disposal volume	2030	2050	Volume [Date]
	HLW	-	-	-	-	-
The Netherlands	VLLW	-	-	-	-	-
	LLW	-	-	-	-	-
	ILW	-	-	-	-	-
	HLW	-	-	-	-	-
Poland	VLLW	-	-	-	-	-
	LLW	-	-	-	-	-
	ILW	-	-	-	-	-
	HLW	-	-	-	-	-
Portugal	VLLW	-	-	-	-	-
	LLW	-	-	-	-	-
	ILW	-	-	-	-	-
	HLW	-	-	-	-	-
Romania	VLLW	270 m ³	-	-	-	-
	LLW	1 374 m ³	-	2 846.7	7 320.92	-
	ILW	107.38 m ³	-	226.6	506.98	-
	HLW	0.13 m ³	-	-	-	-
Slovakia	VLLW	9 445.4 t	7 871	-	-	-
	LLW	582.2 m ³ 5 291.4 t	7 256.6	-	-	-
	ILW	0.85 m ³ 344.460 t	45.57	-	-	-
	HLW	-	-	-	-	-
Slovenia	VLLW	-	-	-	-	-
	LLW	31	-	-	-	-
	ILW	20.7	-	-	-	-
	HLW	-	-	-	-	-
Spain	VLLW	-	-	-	-	-
	LLW	-	-	-	-	-
	ILW	-	-	-	-	-
	HLW	-	-	-	-	-
Sweden	VLLW	-	-	-	-	-
	LLW	-	-	-	-	-
	ILW	-	-	-	-	-
	HLW	-	-	-	-	-

* Including uncharacterised radioactive waste at NCSR 'D' and other facilities.

Table I.5. Disposed of radioactive waste on Member States' territory

Disposed RAW (Volume as disposed, m ³)					
Country	RAW	2023	2030	2050	Other date
Austria	VLLW	-	-	-	-
	LLW	-	-	-	-
	ILW	-	-	-	-
	HLW	-	-	-	-
Belgium	VLLW	-	-	-	-
	LLW	-	-	-	-
	ILW	-	-	-	-
	HLW	-	-	-	-
Bulgaria	VLLW	-	-	-	-
	LLW	-	-	-	-
	ILW	-	-	-	-
	HLW	-	-	-	-
Croatia	VLLW	-	-	-	-
	LLW	-	-	-	-
	ILW	-	-	-	-
	HLW	-	-	-	-
Cyprus	VLLW	-	-	-	-
	LLW	-	-	-	-
	ILW	-	-	-	-
	HLW	-	-	-	-
Czechia	VLLW	-	-	-	-
	LLW	14 260.8	-	-	-
	ILW	10 332	-	-	-
	HLW	-	-	-	-
Denmark	VLLW	-	-	-	-
	LLW	-	-	-	-
	ILW	-	-	-	-
	HLW	-	-	-	-
Estonia	VLLW	-	-	-	-
	LLW	-	-	-	-
	ILW	-	-	-	-
	HLW	-	-	-	-
Finland	VLLW	0	1 400	4 600	-
	LLW	9 893	16 857	19 648	-
	ILW	33	82	91	-
	HLW	0	-	-	-
France	VLLW	469 000	-	-	-

Disposed RAW (Volume as disposed, m³)					
Country	RAW	2023	2030	2050	Other date
	LLW	906 000	-	-	-
	ILW	-	-	-	-
	HLW	-	-	-	-
Germany	VLLW	-	-	-	-
	LLW	76 311	-	-	-
	ILW	8 479	-	-	-
	HLW	-	-	-	-
Greece	VLLW	-	-	-	-
	LLW	-	-	-	-
	ILW	-	-	-	-
	HLW	-	-	-	-
Hungary	VLLW	1 247	2 330	4 368	-
	LLW	3 119	5 826	10 920	-
	ILW	1 871	3 495	6 552	-
	HLW	-	-	-	-
Ireland	VLLW	-	-	-	-
	LLW	-	-	-	-
	ILW	-	-	-	-
	HLW	-	-	-	-
Italy	VLLW	-	-	37 073	43 385 [2065]
	LLW	-	-	33 327	39 000 [2065]
	ILW	-	-	-	-
	HLW	-	-	-	-
Latvia	VLLW	0	0	-	-
	LLW	783	1 883	1 883	-
	ILW	35	35	35	-
	HLW	-	-	-	-
Lithuania	VLLW	7 651.6	21 000	53 500	-
	LLW	-	-	114 417	-
	ILW	-	-	-	-
	HLW	-	-	-	-
Luxembourg	VLLW	-	-	-	-
	LLW	-	-	-	-
	ILW	-	-	-	-
	HLW	-	-	-	-
Malta	VLLW	-	-	-	-
	LLW	-	-	-	-
	ILW	-	-	-	-

Disposed RAW (Volume as disposed, m ³)					
Country	RAW	2023	2030	2050	Other date
	HLW	-	-	-	-
The Netherlands	VLLW	- *	-	-	-
	LLW	-	-	-	-
	ILW	-	-	-	-
	HLW	-	-	-	-
Poland	VLLW	-	-	-	-
	LLW	2 768.4	-	-	-
	ILW	577.5	-	-	-
	HLW	-	-	-	-
Portugal	VLLW	-	-	-	-
	LLW	-	-	-	-
	ILW	-	-	-	-
	HLW	-	-	-	-
Romania	VLLW	-	-	-	-
	LLW	2 461	-	-	-
	ILW	-	-	-	-
	HLW	-	-	-	-
Slovakia	VLLW	23 941.76	-	-	-
	LLW	20 862.36	-	-	-
	ILW	-	-	-	-
	HLW	-	-	-	-
Slovenia	VLLW	-	-	-	-
	LLW	-	-	-	-
	ILW	-	-	-	-
	HLW	-	-	-	-
Spain	VLLW	25 670	45 000	110 000	125 000 [2100]
	LLW	36 157	46 000	90 000	94 200 [2100]
	ILW	-	-	-	3 900 [2100]
	HLW	-	-	-	13 [2100]
Sweden	VLLW	30 500	52 000	63 000	-
	LLW	40 600	60 000	140 000	-
	ILW	0	0	5 000	-
	HLW	-	-	-	-

* No information on VLLW inventory is registered in the Netherlands.

**Table I.6. Comparison of global European Union radioactive waste in disposal
(m³, rounded to thousands)¹⁷**

Disposed	2013	2016	2019	2023	2030*
Total waste	1 279 000*	1 420 000	1 552 000	1 692 000	-
VLLW	279 000	369 000	462 000	558 000	-
LLW	987 000	1 039 000	1 067 000	1 113 000	-
ILW	12 000	12 000	22 000	21 000	-
HLW	0	0	0	0	-

* The Commission estimate is primarily based on the information reported by Member States and on the other sources when information was not available in the fourth national reports.

¹⁷ Except for HLW, which is rounded to hundreds.

Table I.7. Comparison of global European Union radioactive waste and spent fuel in storage (m³, rounded to thousands)¹⁸

Stored	2013	2016	2019	2023	2030*
Total SF	49 800	52 700	55 600	59 600	66 900
Total waste	771 000	796 000	783 000	901 000	-
VLLW	236 000	233 000	233 000	303 000	-
LLW	358 000	381 000	353 000	385 000	-
ILW	173 000	178 000	191 000	208 000	-
HLW	4 300	4 500	4 800	5 200	-

* The Commission estimate is primarily based on the information reported by Member States and on the other sources when information was not available in the fourth national reports.

¹⁸ Except for HLW, which is rounded to hundreds.

**Table I.8. Comparison of global European Union radioactive waste and spent fuel –
Total (m³, rounded to thousands)¹⁹**

Total	2013	2016	2019	2023	2030*
Total SF	49 800	52 700	55 600	59 600	66 900
Total waste	2 050 000	2 216 000	2 334 000	2 593 000	3 204 000
VLLW	515 000	601 000	695 000	861 000	1 171 000
LLW	1 345 000	1 420 000	1 421 000	1 497 000	1 778 000
ILW	185 000	190 000	213 000	229 000	247 000
HLW	4 300	4 500	4 800	5 200	7 700

* The Commission estimate is primarily based on the information reported by Member States and on the other sources when information was not available in the fourth national reports.

¹⁹ Except for HLW, which is rounded to hundreds.