EUROPEAN
COMMISSION

Brussels, 29.4.2024
COM(2024) 181 final

REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL

on the implementation of the work under the nuclear decommissioning assistance programme to Bulgaria, Slovakia and Lithuania and JRC programme in 2022 and previous years

1. SUMMARY AND HIGHLIGHTS

The nuclear decommissioning programmes co-funded by the European Union in Bulgaria, Slovakia and Lithuania accomplished the main objectives which were set in the previous Multiannual Financial Framework (MFF 2014-2020). For the current MFF 2021-2027 new objectives were set and the decommissioning and radioactive waste management programme of the European Commission Joint Research Centre (JRC) was joined under the same funding regulations. The co-funding provided as of 2021 will lead to completion of the decommissioning in Slovakia and Bulgaria, while it will assist Lithuania in embarking on the actual dismantling of the Ignalina reactors, a first-of-a-kind technological challenge on a global scale. The funding will also ensure steady progress of (pre)decommissioning activities mainly at the JRC site in Italy, as well as waste management and removal of obsolete equipment in the other three JRC sites (Belgium, Germany, Netherlands) with operating nuclear research infrastructure.

During 2022, preparatory activities of key upcoming projects again progressed at a slower rate than planned, in spite of the progress of works on the ground, which was excellent in some particular cases.

Key highlights of the programmes' implementation in 2022 are:

- in Bulgaria, completed decontamination of reactors to prepare the subsequent safe dismantling, and further progress of the construction of the near-surface repository for low- and intermediate-level waste;
- in Slovakia, completed dismantling of the reactors, where all reactor components were fragmented, decontaminated and packaged;
- in Lithuania, finalised removal of spent fuel assemblies from the spent fuel pool, henceforth start of preparations for dismantling of the two reactors;
- recycling of large amounts of materials, in particular metals; for example in Slovakia the rate of release of metals from regulatory control exceeded 95%, and more than 3 500 tonnes have been recycled;
- in JRC-Ispra, the interim storage facility started operations to store unconditioned very-low-level waste, the decommissioning application for the research reactor and hot-cells facility were submitted, and a contract was signed for the alienation of fresh nuclear material;
- for JRC other sites (Petten, Karlsruhe, Geel) the programme continued to focus on reducing the legacy waste inventory and preparatory planning work and financing for final disposal.

The decommissioning of nuclear facilities and the management of the arising waste under a common instrument in the 2021-2027 MFF is taking advantage of synergies and knowledge sharing with a view to ensure dissemination of knowledge and return of experience via a dedicated platform being set up by the JRC. The synergic approach promoted by the European Commission has come to full fruition in Bulgaria, where the decontamination equipment and processes previously used in Slovakia were succesfully deployed with a substantially higher efficiency and cost savings. This positive experience will be replicated across the sites whenever applicable, under the sponsorship of the European Commission.

2. FRAMEWORK OF THE PROGRAMMES

The multiannual financial framework (MFF) 2021-2027 includes funding programmes for decommissioning and radioactive waste management, which are set out in two Regulations ([1]) (hereinafter 'the Regulations') that provide a common framework for the Kozloduy nuclear power plants (units 1 to 4) in Bulgaria, the Bohunice V1 nuclear power plant in Slovakia, the Ignalina nuclear power plant in Lithuania, and the nuclear research installations of the European Commission Joint Research Centre (JRC) in Belgium, Germany, Italy, and the Netherlands.

This report presents the implementation of the work carried out until 2022 under those programmes in accordance with Article 10of the Regulations.

2.1. Nuclear Decommissioning Assistance Programmes

The first set of programmes, also known as the Nuclear Decommissioning Assistance Programmes (NDAP), provides financial assistance for the decommissioning of a specific list of eight nuclear reactors located in Bulgaria, Lithuania, and Slovakia. The programmes originated in the early 2000s and are based on decommissioning plans containing clear provisions on scope, budget and planning. The disposal of spent fuel and radioactive waste in a deep geological repository is excluded from the programmes and is to be handled by each Member State as required by the Council Directive 2011/70/Euratom ([2]).

The European Commission has entrusted the implementation of these programmes to the European Bank for Reconstruction and Development (EBRD) for all three sites (since 2001); the Central Project Management Agency (CPMA) for the Ignalina programme (since 2003); and the Slovak Innovation and Energy Agency (SIEA) for the Bohunice programme (since 2016).

2.2. JRC Decommissioning and Waste Management Programme

The Decommissioning and Waste Management Programme (D&WM) of JRC entails a complex set of specific activities and projects with related objectives. In Ispra (Italy), where most of the nuclear facilities ceased to operate before 1999 and where there is a well-established organisational structure since the launch of the programme, the objectives include safe conservation, pre-decommissioning, decommissioning and waste management targets covering a variety of obsolete large installations and waste batches. For the other JRC sites the objectives are, to a large extent, focused on legacy waste management, the minimisation of the inventory of radioactive waste and nuclear material, dismantling of obsolete equipment and relatively small facilities and on the definition of plans and the organisation of teams to implement future decommissioning and waste management activities.

([1]) Council Regulation (Euratom) No 2021/100 of 25 January 2021 establishing a dedicated financial programme for the decommissioning of nuclear facilities and the management of radioactive waste and repealing Regulation (Euratom) No 1368/2013 (OJ L 34, p. 3–17);
Council Regulation (EU) No 2021/101 of 25 January 2021 establishing the nuclear decommissioning assistance programme of the Ignalina nuclear power plant in Lithuania and repealing Regulation (EU) No 1369/2013 (OJ L 34, 1.2.2021, p. 18–28).

([2]) 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 L199, 2.8.2011, p. 48).

The JRC implements directly the D&WM programme; i.e. JRC staff manages the programme, while activities are outsourced. As part of the objectives of the Regulations, exploring the transfer of the liabilities to host Member States is considered as an option.

3. BUDGETARY IMPLEMENTATION AND CO-FINANCING

The EU financial support provided by the Regulations will enable Bulgaria and Slovakia to complete the decommissioning of the concerned reactors and help Lithuania to proceed safely and steadily with the decommissioning of the Ignalina nuclear power plant, a first-of-a-kind process on an unprecedented scale that involves retrieving and packaging a large amount of irradiated graphite.

Accordingly, the funding of the Kozloduy and Bohunice programmes will be completed within the current MFF 2021-2027 and no additional funding from the European Union will be needed. Conversely, the Ignalina programme is scheduled to last until 2038 and additional funding from the European Union may therefore be needed after the end of the current MFF, hence as of 2028. This however does not prejudge any discussions on the future MFF.

Bulgaria and Slovakia have established dedicated national funds providing financing for decommissioning and radioactive waste management. These are complemented by other national resources, mostly from national budgets. For the Ignalina programme, the Lithuanian government undertook a commitment to provide 14% of the overall budget from national sources until the end of the programme. The Regulations introduced maximum co-financing rates for the EU contribution under the MFF 2021-27; these rates are 50% for the Kozloduy and Bohunice programmes and 86% for the Ignalina programme.

Table 1 displays the shares of funding since the start of the programmes in the early 2000s as well as the 'Budget At Completion', including contingencies and risks. Based on monitoring activities and risk assessments in 2022, the Commission has no indication that the budgets will increase.

Table 1: NDAP funding contributions, EUR million

NDAP	Member State	Other donors	EU	Total	Budget at completion
Kozloduy	35.7%	0.6%	63.7%	100.0%	1 358
Bohunice	40.5%	0.7%	58.8%	100.0%	1 220
Ignalina	14.0%	0.7%	60.5%	75.2% ([3])	3 345

Source: Monitoring reports, annual work programmes, EBRD, CPMA, SIEA.

The timeframe for the decommissioning of JRC facilities will extend until the decade of 2040 for Ispra and 2060 for Karlsruhe and Geel because the programme also covers experimental facilities that are still in operation. The selection of the decommissioning scenario to be implemented will be finalised in the last decade of their operational life.

([3]) The total funding amounts from MFF 2021-27 and previous MFFs do not cover the whole LT programme which is foreseen to continue (unlike for BG and SK) after 2027.

The current estimated budget at the completion of the decommissioning activities in Ispra is EUR 926 million.

4. PROGRESS AND PERFORMANCE

The European Commission monitors progress and performance against the objectives set out in the Regulations, by means of an extended set of performance indicators defined in the Regulations' Annexes, including the earned value management (EVM) system ([4]). In parallel, the programmes' critical path ([5]) is monitored with the utmost attention and, where risks are identified, mitigating actions are proposed.

For NDAP, risks of delay in completing the individual programmes are very high in spite of mitigation measures. While ongoing activities on the ground are carried out safely and do not raise concerns in terms of spending and schedule, the slow roll out of preparatory activities of next stages sheds doubts on the feasibility of the programmes before the set end-dates.

4.1. Bulgaria — Kozloduy programme

Units 1-4 at the Kozloduy plant are VVER ([6]) 440/230 reactors. Units 1 and 2 were shut down in 2002 and Units 3 and 4 in 2006. The units are located in proximity of other two units (Kozloduy 5 and 6), which are in operation.

Under the supervision of the Ministry of Energy, the State Enterprise for Radioactive Waste (SERAW) is the licensed operator in charge of decommissioning as well as of building and operating the national disposal facility for low- and intermediate-level radioactive waste.

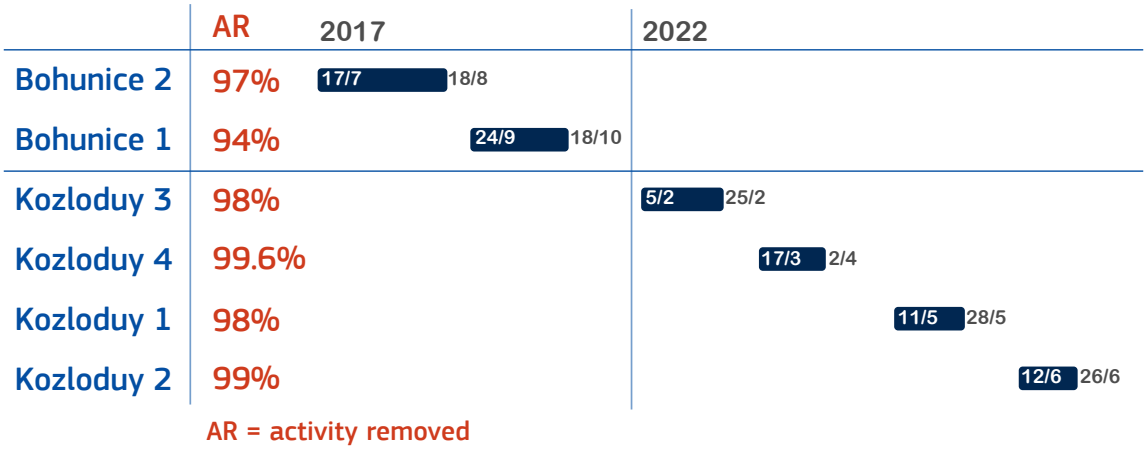
In 2022, SERAW has intensified their decontamination and dismantling activities within the reactor buildings. The similarity of the Bohunice and Kozloduy reactors provided an excellent opportunity to share experience, methods and equipment, thus reducing risks and cost. SERAW benefitted from Slovak know-how and deployed used equipment from Bohunice for the decontamination of the primary circuits. As a consequence the decontamination of four units in Kozloduy was completed with optimal results and in a shorter time. Figure 1 illustrates improvements due to synergies and knowledge sharing.

([4]) ISO 21508:2018 Earned value management in project and programme management.

([5]) In project planning, the critical path is the longest sequence of tasks that must be done to successfully complete the project. Tasks that are in the critical path, if delayed, will delay the whole project.

([6]) *Вводо-водяной энергетический реактор / vodo-vodyanoi energetichesky reaktor* (VVER — water-water power reactor) is a series of pressurised water reactors

Figure 1. Comparison of performance (percentages) and schedule (dates) of the reactors' decontamination at Bohunice V1 and Kozloduy Units 1-4.



Having completed successfully the decontamination, SERAW engaged right after in dismantling reactors' large items, such as main valves and circulation pumps.

The construction of the near-surface repository for low- and intermediate-level waste (National Disposal Facility) started in 2017 and finished in 2023. This milestone will be key to ensure completing the programme by the end of 2030.

The operational campaigns of the plasma melting facility ([7]) continued successfully: between 2019 and 2022, SERAW has carried out five operational campaigns and launched the sixth one, obtaining a volume reduction of the waste by 50 times on average. In the frame of knowledge sharing the main features of this project are presented in a dedicated 'knowledge product' (see section 5) to facilitate business cases of interested waste managers in the European Union.

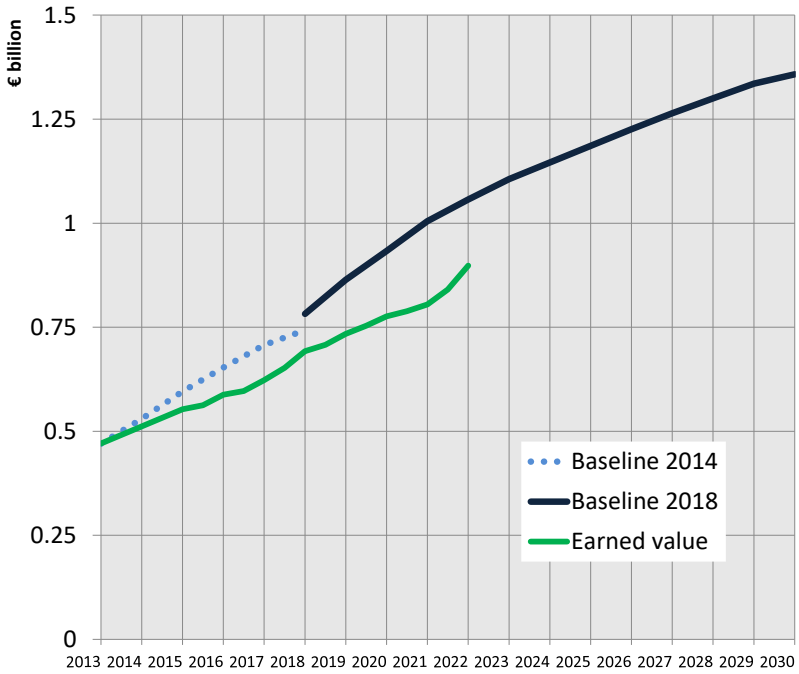
In terms of key monitoring indicators, as of the end of 2022 SERAW has processed 1,568 tonnes of metal (14% of the MFF target) and released 6,527 tonnes of diverse materials for recycling (50% of the MFF target), while the amount of stored radioactive waste is over 5% of the MFF target. ([8])

The programme performance baseline remains unchanged, with the end of execution date set in 2030. Figure 2 shows the amount of work carried out (earned value) against the plan (baseline). The baseline includes contingencies and this explains part of the gap compared with the actual progress.

([7]) The plasma melting facility is a first-of-its-kind installation for reducing the volume of radioactive waste. It employs a very-high temperature thermal treatment that produces a solid waste form which is particularly stable and safe. As per the estimate of the operator, the project will lead to savings around 40% compared to other treatments such as super-compaction techniques, for the processing and disposal of low-level waste.

([8]) More on performance indicators is published at Nuclear Decommissioning - Performance (europa.eu)

Figure 2. Kozloduy programme — progress and performance.



Overall the indicators show that the decommissioning programme in Kozloduy has progressed well in 2022; however, the lessons learnt in Bohunice demonstrated that risk of delays in the upcoming activities are to be tackled well in advance. In 2021 the European Commission had requested the execution of a stress-test on the overall schedule in order to confirm whether the completion date of the programme can be met, and to assess risks and mitigation measures. Preliminary results of this exercise confirmed that the risk of a delayed programme end-date is high, therefore the Commission has requested SERAW to roll out a risk mitigation plan under the supervision of the Ministry of Energy.

4.2. Slovakia — Bohunice programme

The Bohunice V1 plant consists of two VVER 440/230 reactors. Unit 1 was shut down in 2006 and Unit 2 in 2008. The units are located in proximity of two other units (Bohunice V2) which are in operation, and another unit (Bohunice A1) under decommissioning.

Under the administrative supervision of the Ministry of Economy, *Jadrová a vyraďovacia spoločnosť* (JAVYS) is the operator in charge of decommissioning Bohunice V1. Its mission includes the safe decommissioning of the nuclear facilities, spent nuclear fuel and radioactive waste management on Slovak territory.

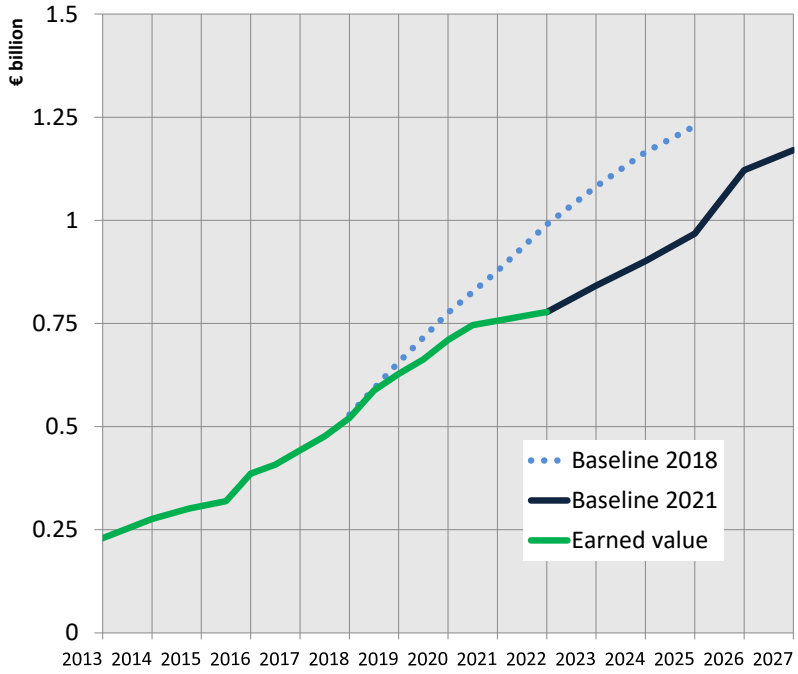
During 2022, JAVYS and their contractors have fragmented, decontaminated and packaged all reactor components, thus meeting a key milestone in the decommissioning process. Field work progressed at a rather satisfactory pace also in dismantling other systems in the reactor building and the focus is currently onto removal of contaminated concrete from the building structures.

The decontamination process achieved a very high level of efficiency up to 99%: from June 2019 until the end of 2022 cumulatively 3,117 tonnes of contaminated metallic materials were decontaminated with an amount of 2,910 tonnes of free-released materials and 173 tonnes for further processing (decay storage or melting) before free–release.

In terms of key monitoring indicators, as of end of 2022 JAVYS had removed 5,155 tonnes of metal (16% of the MFF target) and disposed of very-low- and low-level radioactive waste achieving 16% of the MFF target. ([9])

As reported previously ([10]), JAVYS had to revise the overall programme schedule and postpone the end-date until 2027 without implications on the budget; therefore a new baseline is in place. Figure 3 shows the amount of work carried out (earned value) against the new plan (baseline).

Figure 3. Bohunice programme — progress and performance



The Bohunice programme is the most advanced of the three NDAP and may well become the first completed decommissioning of a VVER-type reactor world-wide. Nonetheless, meeting the 2027 end-date remains very challenging because the procurement of works for the final demolition of the reactor building is yet to be done so that further delays cannot be ruled out at this point in time. With the allocated Union financial support, the programme has accomplished the most relevant milestones of a decommissioning process, has reduced the radiological hazards on site by several orders of magnitude and will soon prepare the building for its demolition under close-to-conventional conditions.

([9]) More on performance indicators is published at Nuclear Decommissioning - Performance (europa.eu)

([10]) Report from the Commission to the European Parliament and the Council on the implementation of the work under the nuclear decommissioning assistance programme to Bulgaria, Slovakia and Lithuania and JRC programme in 2021 and previous years. COM(2022) 663 final

4.3. Lithuania — Ignalina programme

The Ignalina plant consists of two RBMK ([11]) 1500 reactors. Unit 1 was shut down in 2004 and Unit 2 in 2009. Lithuania does not operate other nuclear reactors.

Under the administrative supervision of the Ministry of Energy, the state enterprise Ignalina Nuclear Power Plant (INPP) is the operator in charge of the facilities under decommissioning and, since 2019, also the waste disposal facilities.

As of end 2022, INPP had completed the removal of the spent-fuel assemblies from the reactor buildings and had safely transferred them to the interim dry-storage facility. This was a major milestone in terms of nuclear safety and reduction of the radiological risk, opening the way to the dismantling of the reactor core systems. Meanwhile, INPP completed also the cleaning-up, emptying and decontaminating of the spent fuel pools.

The dismantling of the Ignalina reactors is a technological challenge, because never before has a large reactor graphite core been dismantled. In a first phase, started in 2020 and running up to 2027, INPP will remove all peripheral components from the reactor pit. The design of the subsequent removal of the content of the pits – the graphite, metal structures and filling material and the design of the facility for the temporary storage of the irradiated waste is being preceded by optioneering ([12]) studies, which started in 2022 and is involving internationally recognised expert companies. The delayed start of the optioneering, due to complex procurement preparations between the programme stakeholders, will require a reassessment of the programme end-date at the end of the optioneering stage.

INPP has not completed as planned the procurement procedure for the construction of the near surface repository for low and intermediate-level due to the legal action of an excluded tenderer. However, INPP completed the construction of the landfill facility for very-low-level short-lived waste; the first loading campaign was carried out and the final commissioning is ongoing. Upon the successful completion of these facilities, INPP will have all the tools needed for disposal of the short-lived radioactive waste under the decommissioning plan. A blueprint is under development for the conversion of the bituminised-waste storage vaults into a repository, under the surveillance of the relevant regulatory bodies.

In terms of key monitoring indicators, as of end of 2022 INPP had dismantled 384 tonnes of metal (9% of the MFF target), had disposed of 4,094 m^3 of very-low-level radioactive waste (14% of the MFF target), and had stored 678 m^3 of low-level and intermediate-level radioactive waste (7% of the MFF target). ([13])

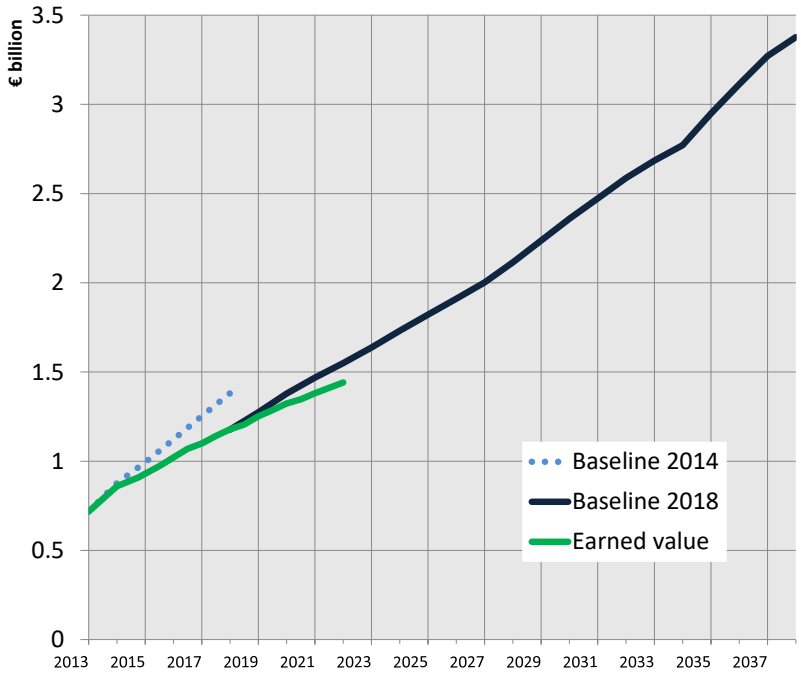
The programme performance baseline remains unchanged and sets the programme completion date for 2038. Figure 4 shows the amount of work carried out (earned value) against the plan (baseline).

([11]) *Реактор Большой Мощности Канальный / reaktor bolshoy moshchnosti kanalnyy* (RBMK — high-power channel-type reactor) is a class of graphite-moderated nuclear power reactor (also installed in Chernobyl).

([12]) Optioneering is an iterative process between options identification, assessment and definition.

([13]) More on performance indicators is published at Nuclear Decommissioning (Lithuania) - Performance (europa.eu)

Figure 4. Ignalina programme — progress and performance



4.4. JRC - D&WM programmes

The JRC owns several research facilities, including research reactors, in Ispra (Italy), Karlsruhe (Germany), Petten (the Netherlands) and Geel (Belgium). While the decommissioning programme started in Italy at beginning of 2000s, the facilities on the other sites are still operational and activities are limited to legacy waste magement and removal of nuclear material.

In Ispra, several pre-disposal waste management activities are under way:

- the design and manufacturing activities for upgrading the waste characterisation system have proceeded and the project is expected to be completed within 2023;
- the supercompaction of radiactive waste has been postponed by about one year, pending reactivation of the external super-compaction facility;
- construction of a facility for retrieving buried bituminised legacy waste showed some delays due to a wide characterisation campaign requested by the Regulator to resume the onsite works;
- the construction of a grouting facility for radiactive waste was delayed due to contractual issues;
- after entry into operation of the interim storage facility, some 1000 drums were transferred for storage;
- processing of radioactive waste progressed faster than planned, with 346 tonnes of waste and material processed against a target of 305 tonnes.

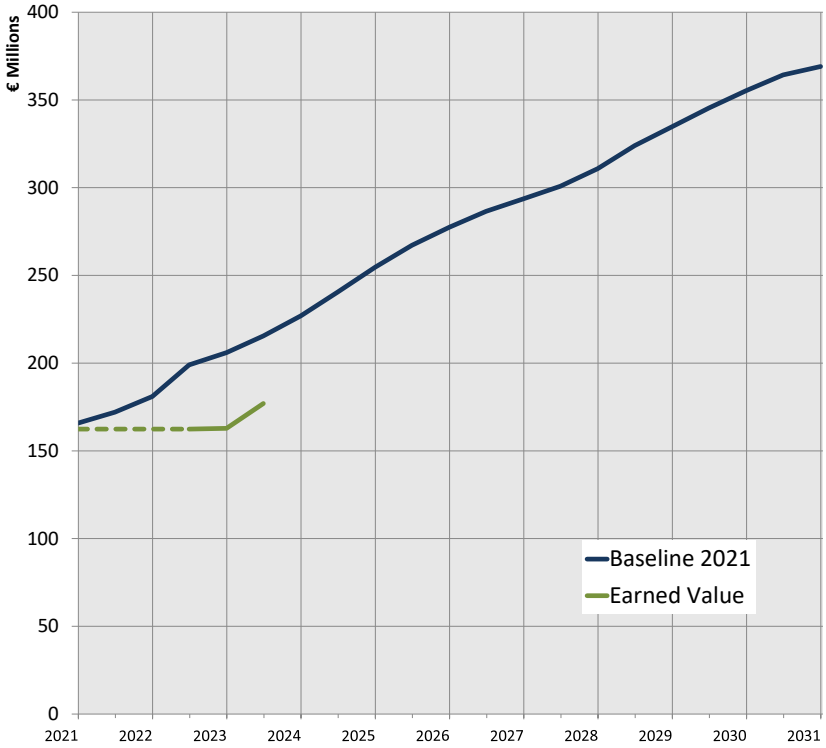
In addition, JRC proceeded to the management of nuclear materials:

- the feasibility studies for off-site storage of irradiated nuclear material were completed;
- alienation of part of the inventory of non-irradiated nuclear material is on-going with the design of repackaging activities and preparation of licensing documentation.

As part of the process for authorisation of the decommissioning of the research reactor, the Environmental Impact Assessment has been accepted by the Italian authorities. Licensing documentation necessary to obtain the update of all the nuclear licenses according to the new Italian nuclear law 101/2020 was prepared and submitted according to the deadlines.

Figure 5 ([14]) shows the amount of work carried out (earned value) against the plan (baseline) that is still unchanged with respect to the beginning of the programme. Schedule and cost indicators show that the programme is behind schedule and is costing less than planned.

Figure 5. JRC progress and performance – Ispra site in Italy.



In Geel activities concern both waste management and characterisation operation and some small decommissioning projects. To reduce the inventory of fissile materials, three options are being pursued: return to the country of origin, handover to member states,

([14]) During 2022 a rebalancing of the budget assigned to the tasks of several project has been performed, assigning more value to tasks to be performed during the operational phases and less to the design, licensing and procurement phases. For this reason the earned value curve (green) shows a downward trend, recovered at the beginning of 2023.

and disposal. Contracts were signed to return some materials to the country of origin in 2023.

In Petten, the decommissioning and waste management programme concerns the High Flux Reactor of which JRC is the owner and the Dutch company NRG is the operator and license holder. The date of its shut-down is still uncertain, however it is tightly connected to the commissioning of the PALLAS reactor, which will replace its medical radioisotope production capacity. PALLAS has been recognised as a high priority and is being built, however the schedule for start of operations has not yet been settled and an overlap transition period will have to be considered. JRC anticipates a final decision in the present decade at the latest. NRG has submitted to the Regulator an update of the decommissioning plan which is now the object of a thorough attention and discussions between JRC and NRG to better define the most efficient approach (organisation, scenarios and evaluation of related costs).

A new Framework contract to remove JRC-Petten's historical waste has been finalised and first batches of waste will be handled from 2023 on.

In Karlsruhe, the decommissioning and waste management programme runs in parallel with the scientific operations of the facilities and no major infrastructure decommissioning project has been considered until now. The reduction of the nuclear material inventory remains a priority, as well as dismantling and disposal of historical disused glove boxes and equipment, including hot cells' components, waste characterisation of backlog waste drums and removal to an external German facility. In 2022 the campaign of dismantling obsolete glove-boxes, as established in the planning, reached the target milestone of above 70%. Huge efforts have been invested in clearance procedures of waste coming from the facilities, which allowed disposing as conventional waste of more than over 20 tonnes/year averaged over the last 10 years, leading to significant financial savings. This would justify further efforts and investment of resources in clearance processes and waste characterisation set-ups.

5. KNOWLEDGE DISSEMINATION

In line with the objectives of the Regulations, knowledge created in the implementation process of the programmes has to be disseminated at EU level.

Knowledge is gathered in the form of 'knowledge products', which are tangible outputs (such as documents, reports, services, events, media) of prepared information/data that enables action of selected users. Specific key projects were the source of such knowledge.

In 2022, the following knowledge products were generated and made available:

- Bulgaria, Kozloduy Plasma Melting Facility: An overview of the lessons learned, and best practices acquired by SERAW in the treatment of low- and intermediate-level radioactive waste using plasma melting process;
- Slovakia, Experience of Bohunice V1 NPP in risk management of decommissioning projects and application of Monte Carlo simulations for schedule analysis and cost estimation;

- Lithuania, Lessons Learned at INPP in the Project 'Installation of Radioactive Metal Waste Treatment Facility'.

Knowledge production is progressing as planned, but it is expected that, as experience is gathered, additional knowledge products will be available in the next years. The knowledge products generated so far are stored in newly created website on the Science Hub ([15]). The Science Hub site serves to promote the initiative and to make the knowledge products generated so far publicly available.

6. ACTIVITIES RESULTING FROM CALLS FOR TENDERS

The Regulations (Article 10(3)) require the European Commission to report annually on the rate of activities resulting from calls for tenders.

Table 2 displays the funding committed by the entrusted entities and the JRC via contracts or grants. The table differentiates the activities resulting from call for tenders and those not open to competition, such as direct grants to the decommissioning operators for salaries, small procurements and radioactive waste management.

Table 2: Breakdown of activities – 2014-2022 (EUR million)

Programme	Competitive procedures		Not open to competition		Total
	Contracts	Contract Amendments	Contracts	Grants	
Kozloduy	66%	22%	4%	9%	409.5
Bohunice	59%	33%	8%	-	395.1
Ignalina	32%	8%	3%	57%	428.6
JRC (*)	99.3%	0.7%	-	-	63.1

Source: Information submitted by the NDAP entrusted entities (CPMA, EBRD, SIEA) and JRC.
(*) For the period 2021-2022.

7. CONCLUSIONS

The NDAP continued to make effective progress in 2022, progressively reducing the radiological risks for the EU citizens. However, delays in preparatory activities for future projects are increasing so that the programmes will not be completed by the initially planned dates. The co-funding provided as of 2021 will lead to completion of the decommissioning in Slovakia and Bulgaria, while it will assist Lithuania in embarking the actual dismantling of the Ignalina reactors.

([15]) https://joint-research-centre.ec.europa.eu/scientific-activities-z/eu-nuclear-decommissioning-knowledge-management_en

The stress-test of the Kozloduy programme schedule, which has been underpinned also by an assessment of SERAW's organisational adequacy for the next stages of decommissioning, indicates that mitigation measures must be set out to continue delivering success stories. In Slovakia, the slow roll out of procuring the last significant contract for demolitions hinders visibility of the finish line, in spite of significant accomplishments on the ground. In Ignalina, the selection of the technical solution for the dismantling of the reactors will be decisive for the confirmation of the programme end-date and overall funding needs after 2027.

Despite those setbacks, the adequateness of the EU financial support to the programmes during the 2021-2027 MFF is not in question.

The delays reported above and in previous sections have been appearing in a lower-than-planned funding absorption ratio. Should this trend continue, the Commission may consider adjustments in the financial programming of those programmes, in the context of the annual budgetary procedure.

The JRC programme, despite some delays in some areas, has almost completed the licensing effort to obtain the necessary decommissioning authorisations, with decommissioning licenses expected between 2023 and 2025. Delays were experienced in the completion of the waste management routes, due to the failure of the construction contract of the grouting station and delays in the construction of the retrieval facility.

The funding will also ensure steady progress of (pre)decommissioning activities mainly at the JRC site in Italy, as well as waste management and removal of obsolete equipment in the other three JRC sites (Belgium, Germany, Netherlands) with operating nuclear research infrastructure.

In 2024 the Commission will prepare the interim evaluation of the programmes, which will report also about further major developments achieved in 2023:

Kozloduy programme

- completed construction of the national disposal facility;

Bohunice programme

- decontamination of concrete structures to enable quasi-conventional building demolition;

Ignalina programme

- follow up of the optioneering studies for the dismantling of the graphite cores.

JRC

In Ispra, progress in managing legacy radioactive waste; authorisation to the treatment of metallic waste, to carry out shipments of supercompactable waste, and to start the treatment of bituminised drums. Furthermore, update of licenses for all facilities ([16]), as well as decommissioning authorisation for a hot cell complex; work on the evacuation of fresh nuclear material.

([16]) According to the new Italian Nuclear Law 101/2020

In Petten, the new Framework Contract with the Dutch NRG for the handling and conditioning of JRC's historical wastes in view of disposal at the COVRA facility has been finalised and first projects to be executed from 2023 on. The major concern remains the decommissioning of the High Flux Reactor which timing is still uncertain as closely linked to the start operation of the PALLAS reactor within this decade. A thorough decommissioning plan, its structure, organisation and scenarios of implementation and their costs are being studied and discussed with the Netherlands.

In Karlsruhe and Geel, major activities are the removal of obsolete equipment; minimisation of the inventory of radioactive waste and nuclear material; conditioning or disposal of historical waste liabilities as well as preparatory phases of the dismantling, phasing out or decommissioning of building parts.