



EN

Annex

Euratom Research and Training Programme

Work Programme 2023-2025

*(European Commission implementing Decision C(2025)8411 of 9
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Introduction

This work programme implements indirect actions under the Euratom Research and Training Programme 2021–2025 (‘the Euratom Programme’ or ‘the Programme’), in accordance with Article 11(1) of Council Regulation (Euratom) 2021/765¹. It constitutes a financing decision for 2023-2025², defines the scope of actions and provides information on the implementation arrangements.

The first chapter explains the multiannual approach and strategic orientations for the duration of the Euratom Programme.

The second chapter is divided into three calls for proposals consisting 14 topics. They describe specific research and training actions that the Commission intends to fund in 2023-2025.

The third chapter describes actions funded through other means than calls for proposals, such as grants to identified beneficiaries, procurement and prizes.

The General Annexes to the work programme set out the general conditions applicable to calls and topics for grants and other forms of funding. They also describe the evaluation and award procedures and other conditions for Euratom funding.

¹ Council Regulation (Euratom) 2021/765 of 10 May 2021 establishing the Research and Training Programme of the European Atomic Energy Community for the period 2021-2025 complementing Horizon Europe – the Framework Programme for Research and Innovation and repealing Regulation (Euratom) 2018/1563 (OJ L 1671, 12.05.2021, p. 81).

² In addition to actions decided in Commission Decision C(2022)4240, in particular the co-funded European partnerships EUROfusion and PIANOFORTE.

Actions to be launched in 2025

Call for expanding the European Nuclear Skills Initiative towards the European Nuclear Skills Academy

In 2025, a new call for proposals will be launched to provide funding for the action building on the European Nuclear Skills Initiative which was launched under call HORIZON-EURATOM-2024-NRT-01. This funding should enable the expansion of the Initiative by establishing a European Nuclear Skills Academy to attract and retain talent, particularly in light of newly built installations based on current or new technologies.

Actions to be launched in 2024

Call for new actions in fusion energy and for capacity building of a workforce with specialised skills in the nuclear and radiological field

In 2024 a new call for proposals will be launched to fund two coordination and support actions (CSAs).

The first action, in fusion energy, will seek to keep the EU's leadership position in fusion by bringing together stakeholders in the public and private sectors with a view to the creation of a European Fusion Industry Platform. The action will also prepare for a Public-Private Partnership (PPP) on Fusion Energy to address bottlenecks in the process to design and build a fusion power plant.

The second action will address shortages in the EU's nuclear workforce with specialised skills in the nuclear technology and radiological field. It shall prepare and test a strategy, drawing on approaches from different industries, the European Human Resources Observatory for the Nuclear Sector (EHRO-N) and Member States.

Multiannual approach and strategic orientations for Euratom indirect actions during 2021-2025

The Euratom Programme Regulation requires that work programmes take a multiannual approach and include strategic orientations³. This chapter will address that requirement, establishing a framework for research actions for the period covered by the Programme.

The general objective of the Programme⁴ is to pursue nuclear research and training activities, with an emphasis on the continuous improvement of nuclear safety, security and safeguards, radioactive waste management and radiation protection, as well as to complement the achievement of Horizon Europe's objectives. It should ensure continuity between short- and long-term research and competences, *inter alia* in the context of the energy transition and decarbonisation of the EU economy by 2050⁵, thus increasing Member States' and the EU's energy security, according to and respecting the technology neutrality principle. The Programme is a crucial part of the Union's efforts to further develop technological leadership and promote excellence in nuclear research and innovation, in particular to ensure the highest standards of nuclear safety⁶.

The Euratom Programme indirect actions provide research grants through competitive calls for proposals and to named beneficiaries. It also funds research carried out by the European Commission's Joint Research Centre (JRC) through direct actions, subject to a separate work programme. The Programme uses the instruments and rules of participation of the Horizon Europe Framework Programme for Research and Innovation⁷.

To this end, the Community will support, in the interests of all Member States and the third countries associated to the Euratom Programme⁸, joint research to maintain strong competences in nuclear research and innovation in both fission and fusion. All Member States stand to benefit from the development of a sound scientific and technical basis for the safe operation of reactors throughout these reactors' entire life cycle; secure management of radioactive waste; robust systems to protect humans and the environment from the effects of ionising radiation and progress in fusion science and technologies that will help remove barriers to the realisation of fusion energy within the 2050 timeframe.

³ Art. 11(2)(d) of the Council Regulation.

⁴ Art. 3(1) of the Council Regulation.

⁵ https://ec.europa.eu/info/energy-climate-change-environment_en and
https://ec.europa.eu/info/policies/energy_en

⁶ In accordance with recital 7 of the Council Regulation.

⁷ Horizon Europe rules for participation and dissemination <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32021R0695>

⁸ Please refer to General Annexes, section B, for information on the eligibility of entities from countries associated to the Euratom Programme 2023-25.

Thanks to the Programme's stakeholders, Euratom is a global leader in fusion research. Through its participation in the construction and exploitation of ITER⁹, Euratom aims to consolidate this position in the current decade.

The Programme strengthens the European Research Area in the nuclear and cross-cutting fields of science and engineering. It also supports the coordination of Member States' research efforts to avoid duplication, to retain critical mass of research capacities in fission and fusion and to ensure that public funds provide EU added value. By supporting nuclear safety research, waste management and radiation protection, the Work Programme's actions are in line with and support the implementation of Council Directives 2009/71/Euratom¹⁰ (and its latest amendment 2014/87/Euratom¹¹) on nuclear safety, 2011/70/Euratom¹² on radioactive waste management and 2013/59/Euratom¹³ on basic safety standards. In this respect, the European Nuclear Safety Regulators Group (ENSREG), should be consulted, as appropriate, to provide guidance on action relevant to regulatory opinions.

The Commission acknowledges that Member States have different views on the role of nuclear energy. While making every effort to respect these differences when drafting this work programme, the Commission underlines that it implements provisions of the Council Regulation establishing the Euratom Programme. As underlined in the Council Regulation¹⁴, in full respect of the Member States' right to decide on their energy mix, the Programme's research results can be used by Member States to potentially contribute towards a climate-neutral energy system in a safe, efficient and secure way.

The objectives of the 2021-2025 Programme represent an evolution compared to previous Euratom programmes. Some priorities are changing with the evolving needs of the Union and its Member States. For example, the intensified fight against cancer and the greater importance accorded to health since the COVID-19 crisis mean a bigger role for the Programme in researching the non-power application of nuclear science in the health and medical sectors.

Moreover, other cross-sectoral synergies are unlocked (e.g. digitalisation and deployment of artificial intelligence, robotics, internet of things, big data and novel manufacturing methods). Where relevant, applicants are encouraged to take advantage of synergies with the Mission on

⁹ ITER ('the way' in Latin) is an international project (<https://www.iter.org/>) to build the world's largest tokamak, a magnetic fusion device that has been designed to prove the feasibility of thermonuclear fusion as a potential large-scale and carbon-free source of energy based on the same principle that powers the sun and stars.

¹⁰ Council Directive 2009/71/Euratom of 25 June 2009 establishing a Community framework for the nuclear safety of nuclear installations (OJ L 172, 2.7.2009, p. 18).

¹¹ Council Directive 2014/87/Euratom of 8 July 2014 amending Directive 2009/71/Euratom establishing a Community framework for the nuclear safety of nuclear installations, OJ L 219, 25.7.2014, p. 42-52

¹² Council Directive 2011/70/Euratom of 19 July 2011 establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste (OJ L 199, 2.8.2011, p. 48).

¹³ Council Directive 2013/59/Euratom of 5 December 2013 laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation, and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom (OJ L 13, 17.1.2014, p. 1).

¹⁴ Recital (3) of the Council Regulation (Euratom) 2021/765. Some Member States submitted statements on the Euratom Programme (Germany, Luxembourg and Austria).

Cancer¹⁵ and the relevant Horizon Europe clusters 1. ‘Health’ and 4. ‘Digital, Industry and Space’.

Fission and fusion research under SET Plan Action 10¹⁶ are supported through interested Member States’ individual and combined research & development programmes, by industry and various research and university stakeholders. Euratom’s support is limited to actions fulfilling the objectives set out in Council Regulation (Euratom) 2021/765 and may be granted only if appropriate proposals, addressing one of the topics listed in this Work Programme, succeed in the call.

Most of the Programme, particularly research and innovation in fusion energy, nuclear materials, radioactive waste management and radiation protection, will be carried out through co-funded European Partnerships¹⁷. A new generation of co-funded European Partnerships should achieve a greater impact, involving a wide range of public and private partners. This new approach capitalises on a decade of Commission, Member State and stakeholder efforts in ensuring more sustainable and inclusive research, creating stronger links between EU and national policies.

The success of the European Partnerships requires strong financial and in-kind commitments from Member States and implementation through their mandated (and associated) actors. Euratom will provide at least 55% co-funding for new Partnerships, with the budget being committed in instalments where appropriate.

The rest of the Programme, including nuclear safety, education and training, infrastructures or cross-cutting components, will be supported by collaborative research and innovation projects and accompanying CSAs. To achieve greater consolidation of research efforts, priority will be given to substantial projects and more generic call topics, allowing potential beneficiaries to choose how they deliver the expected outcomes.

Horizon Europe provides a framework¹⁸ for synergies with the Euratom Programme *inter alia* in education and training and for joint research actions. The latter will focus on ways in which non-power applications of ionising radiation can be used safely and securely in sectors such as medicine, industry, agriculture and space. The inclusion of researchers in the field of Social Sciences and Humanities will be encouraged.

In particular, the Euratom Programme will seek synergies in medical applications of ionising radiation, including improvements in the quality and safety of such applications as outlined in

¹⁵ https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/eu-missions-horizon-europe/eu-mission-cancer_en

¹⁶ SET-Plan Information System https://setis.ec.europa.eu/index_en

¹⁷ Subject to the conditions set out in Article 7 of the Euratom Regulation and Annex III to the Horizon Europe Framework Programme Regulation. https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/european-partnerships-horizon-europe_en#documents

¹⁸ In Annex IV (point 17) to the Regulation (EU) 695/2021 of the European Parliament and of the Council of 28 April 2021 establishing Horizon Europe – the Framework Programme for research and innovation, laying down its rules for participation and dissemination, and repealing Regulations (EU) No 1290/2013 and (EU) No 1291/2013 (OJ L 170, 12.5.2021, p. 1).

the SAMIRA action plan¹⁹. Whenever possible, there should be interactions with other Horizon Europe activities and Commission initiatives²⁰ (Europe's Beating Cancer Plan²¹ and the Cancer Mission²²).

This Euratom Programme also represents an opportunity for synergies between direct and indirect actions. The basic act now has a single set of specific objectives permitting closer coordination and co-design of work programme priorities.

The JRC will complement activities by the consortia receiving Euratom grants in areas where it has the necessary competences, expertise and dedicated infrastructure. As a member of such consortia, the JRC will no longer receive funding from the indirect actions budget. Details on the JRC's participation in the call for proposals are provided in Section 6 of this chapter.

All areas supported by the Euratom Programme apply an open science approach, based on cooperation and diffusion of knowledge (including FAIR principles). This is done in accordance with the Horizon Europe rules, as specified in the General Annexes.

The preparation and implementation of this Work Programme was, and will be, based on openness and transparency. Its priorities were set by the Commission, taking into account the opinions of the Programme Committee and the Euratom Scientific and Technical Committee (STC), results from the stakeholder consultation²³ (more than 360 replies), inputs and documents published by national public authorities, European Joint Programmes in fusion (EUROfusion), radiation protection (CONCERT) and radioactive waste management (EURAD) and the academia and nuclear research stakeholders, including European technology platforms or fora²⁴.

¹⁹ See Commission Staff Working Document on a Strategic Agenda for Medical Ionising Radiation Applications (SAMIRA), SWD(2021) 14
https://ec.europa.eu/energy/sites/default/files/swd_strategic_agenda_for_medical_ionising_radiation_applications_samira.pdf

²⁰ EU programmes and funds financed from the EU budget and NextGenerationEU
https://ec.europa.eu/info/funding-tenders/find-funding/eu-funding-programmes_en

²¹ https://ec.europa.eu/health/sites/health/files/non_communicable_diseases/docs/eu_cancer-plan_en.pdf

²² https://ec.europa.eu/info/horizon-europe/missions-horizon-europe/cancer_en

²³ The stakeholder consultation was open between 18 December 2020 and 17 January 2021.

²⁴ Among others from Sustainable Nuclear Energy Technology Platform (SNETP and its pillars NUGENIA, ESNII, NC2I), the Implementing Geological Disposal Technology Platform (IGD-TP) and the Multidisciplinary European Low-Dose Initiative (MELODI), the Consortium of European Radiation Research Platforms (MEENAS, MELODI, EURADOS, EURAMED, NERIS, ALLIANCE and SHARE) and other European forums such as the European Nuclear Energy Forum (ENEF), the European Nuclear Safety Regulators Group (ENSREG), the European Technical Safety Organisations Network (ETSON), the Nuclear Europe Industrial Association (ex- European Atomic Forum (FORATOM)), the European Energy Research Alliance Joint Programme on Nuclear Materials (EERA JPNM), the Generation IV International Forum (GIF), the Heads of the European Radiological Protection Competent Authorities (HERCA), as well as international organisations including the International Commission on Radiological Protection (ICRP), the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), the Nuclear Energy Agency (OECD/NEA) and the International Atomic Energy Agency (IAEA).

This Work Programme and the calls for proposals linked to it are published on the EU ‘Funding and tender opportunities’ portal²⁵.

The following sections provide an indicative overview of actions already launched in 2021-2022 or planned for 2023-2025.

Overview of the main indirect actions in the Euratom Research and Training Programme 2021-2025		
Research areas	2021-22 Work Programme	2023-2025 Work Programme
Fusion research	<u>Co-funded European Partnership in fusion research</u>	
	Supplementary actions providing industrial expertise to the European Partnership	
		Supplementary actions supporting development of research infrastructure
Nuclear safety <i>(50% of the fission budget over the duration of the Programme)</i>	<u>Collaborative research projects focused on:</u> ²⁶ - Follow-up actions on stress tests, Euratom-level peer reviews according to Article 8e(2) and (3) of the Nuclear Safety Directive (‘Topical Peer Reviews’), safety of current technology (Generation II Long Term Operation) and Generation III and III+ new-build, including continuous advances in understanding plant ageing, integrity of materials and components and extended operation, e.g. enhanced designs, containments, innovative accident-tolerant fuels, passive systems, core and plant advanced surveillance, monitoring, diagnostics and prognostics and emerging technologies. - Safety of advanced and innovative nuclear designs, fuel multi-recycling, Partitioning & Transmutation, including cogeneration and licensing of Small and Medium Reactors (SMRs and ASMRs). - Cross-cutting actions on materials, modelling and simulation using High Performance Computing, artificial intelligence, nuclear data, digitalisation, harmonisation of licensing rules, certification, codes and standards²⁷.	

²⁵ <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/programmes/horizon>

²⁶ Call topics will evolve from one Work Programme to another to ensure coverage of different research areas over the duration of the Programme.

²⁷ Cross-cutting actions on fission and fusion research are funded from the fission and fusion budgets.

		<u>Co-funded European Partnership in nuclear materials</u>
Radioactive waste and spent fuel management <i>(20% of the fission budget)</i>	Research actions supplementing EURAD European Joint Programme	<u>Co-funded European Partnership in radioactive waste management</u>
		Supplementary research in areas not covered by the European Partnership in radioactive waste management (e.g. decommissioning).
Radiation protection and ionising radiation applications <i>(20% of the fission budget)</i>	<u>Co-funded European Partnership in radiation protection research and detection of ionising radiation</u>	
	Research for secure and safe supply and use of radioisotopes	Supplementary research into other applications of ionising radiation and secure supply of radioisotopes
Competences and cross-cutting issues <i>(10% of the fission budget)</i>	European facility for nuclear research, promoting transnational access to infrastructure	
	Education and training support schemes for the next generation of scientists and engineers in fission research (BSc, MSc and PhD)	
	MSCA Postdoctoral Fellowships in fission and fusion research (<i>funded equally from the fission and fusion budget lines</i>)	

1. Nuclear safety

The Nuclear Safety Directive²⁸ highlights the need to use research results²⁹ in implementing its safety objectives, to prevent accidents and radioactive releases outside nuclear installations. For operating nuclear power plants, research reactors or nuclear installations, this should lead to ‘reasonably practicable’ safety improvements. For future reactors, the Directive envisages significant safety improvements, based on the latest science and technology.

²⁸ Council Directive 2009/71/Euratom of 25 June 2009 establishing a Community framework for the nuclear safety of nuclear installations ((OJ L 172, 2.7.2009, p.18), as amended by Council Directive 2014/87/Euratom of 8 July 2014 amending Directive 2009/71/Euratom establishing a Community framework for the nuclear safety of nuclear installations (OJ L 219, 25.7.2014, p. 42).

²⁹ The Nuclear Safety Directive highlights the need to use research results in implementing its safety objective of preventing accidents and, should an accident occur, mitigating its consequences and avoiding early radioactive releases and large radioactive releases. Whilst the objective applies fully to ‘new’ installations, it is also to be used as a reference for existing installations for the timely implementation of reasonably practicable safety improvements. The Directive’s preamble explains that this objective calls for significant safety enhancements in the design of new reactors for which the state of the art knowledge and technology should be used, taking into account the latest international safety requirements.

Besides supporting safety research, the Euratom Programme also takes advantage of Member States' experience in the nuclear field and helps develop a Euratom safety policy benefitting from the best Euratom expertise available. The Programme also contributes to the efforts by all Member States to build consensus around the highest standards of safety, security, and non-proliferation.

Outline of Euratom-funded actions for 2021-2025

In its lifetime, the Programme aims to support long-term and exploratory safety research through collaborative projects. Each Work Programme will emphasise the safety of operating nuclear power plants, research reactors and other nuclear installations, where appropriate, and of advanced nuclear concepts, fuels and materials, in line, among others, with the requirements of the Nuclear Safety Directive³⁰ and IAEA safety standards³¹, feedback from ongoing Euratom projects, and the updated strategic agendas of different research stakeholders.

In the context of planned long-term operation (LTO) of existing power reactors, the Work Programme supports research addressing the known challenges in ageing management and the monitoring of installations, including those raised in Topical Peer Reviews under the Nuclear Safety Directive (Article 8e(1) and (2)).

Euratom research will also aim to facilitate cooperation among safety regulators and Technical and Scientific Support Organisations and to encourage the industry to work more closely together to improve standards. A more shared approach to stringent safety requirements and standardisation of reactor designs and licensing, including for the SMRs, could further improve safety across the whole Community. In this framework, the European Nuclear Safety Regulators Group (ENSREG) could be consulted as appropriate.

Euratom is also launching a co-funded European Partnership bringing together European entities having a national mandate for research in materials science and dealing with nuclear materials. It builds upon the success of the Euratom project (ORIENT-NM) on the 'Organisation of the European Research Community on Nuclear Materials', and takes into account feedback received from research stakeholders, end-users and Member States at a FISA2022 workshop held in Lyon, in France, in June 2022. Subject to the provisions of the future Work Programme, Euratom co-funding of the ORIENT-NM Partnership could be extended for the 2 years (2026-2027), in line with other Partnerships, following Council's approval of a Regulation on the Euratom Programme for 2026-2027³².

Expected impact of research funded during 2021-2025

Research results will support Member States', safety authorities' and industry's efforts to ensure that nuclear installations in the Community are designed, sited, constructed,

³⁰ See footnote 21.

³¹ IAEA safety standards: <https://www.iaea.org/resources/safety-standards>

³² In line with Article 7 of the Euratom Treaty, the Euratom Programme covers 5 years (2021-25). To match the duration of Horizon Europe and the Multiannual Financial Framework, 2026 and 2027 will be covered by a separate Commission proposal.

commissioned, operated and decommissioned applying the highest standards of safety, security, radioactive waste management and non-proliferation, while taking into account socio-economic issues. In particular, at a time when the EU is seeking to guarantee its strategic autonomy in critical sectors, these capabilities will contribute to securing the EU's supply chains, including those for medical radioisotopes, with the conversion of Research Reactors' fuels from HEU to LEU, and High-Assay Low-Enriched Uranium (HALEU) from 2030-35 onwards.

2. Spent fuel and radioactive waste management, decommissioning

The Radioactive Waste and Spent Fuel Management Directive (RWM Directive) highlights the need to use research results³³ to ensure a responsible and safe management of spent fuel and radioactive waste, and avoid imposing undue burdens on future generations.

All Member States generate radioactive waste through activities ranging from non-power applications to electricity generation and research. Owing to the potential radiological hazards it poses to workers, the public and the environment, radioactive waste and spent fuel must be safely managed through characterisation, minimisation of the amount of radioactive waste generated, containment and isolation from humans and the living environment over the long term. Research helps to improve the safe management of spent fuel and radioactive waste and reduces the risks.

Outline of Euratom-funded actions for 2021-2025

Until 2024, research in this area will be organised mainly through the ongoing European Joint Programme on Radioactive Waste Management (EURAD)³⁴, with parallel actions in predisposal (PREDIS)³⁵ and decommissioning research. The 2021-22 Work Programme launched a supplementary research action to assess the advantages and disadvantages for harmonised application of the regulatory framework for radioactive waste management.

The 2022 review of EURAD included a comprehensive assessment of this Joint Programme and considered the scope and ambition of a follow-up co-funded European Partnership, EURAD-2, in this area, taking into account feedback received from research stakeholders, end-users and Member States. Subject to the provision of the future Work Programme, Euratom co-funding of the EURAD-2 Partnership could be extended for the 2 years (2026-2027), in line with other Partnerships, following Council's approval of a Regulation on the Euratom Programme for 2026-2027³⁶.

Research on decommissioning is organised mainly through ongoing Euratom projects launched under the 2014-2020 Programme or the latest Work Programme 2021-22. The Work

³³ Obligations of Member States and licence holders are mentioned in Recitals 38-39, Article 5, Article 8 and Article 12 of the Council Directive 2011/70/Euratom of 19 July 2011 establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste.

³⁴ <https://www.ejp-eurad.eu/>

³⁵ <https://predis-h2020.eu/>

³⁶ In line with Article 7 of the Euratom Treaty, the Euratom Programme covers 5 years (2021-25). To match the duration of Horizon Europe and the Multiannual Financial Framework, 2026 and 2027 will be covered by a separate Commission proposal.

Programme 2023-25 should support recommendations from the roadmap for research and innovation in decommissioning published in the framework of the Euratom project SHARE³⁷. The roadmap highlights the direct actions in this area implemented by the JRC³⁸ which has a specific mandate to facilitate the coordinated dissemination of knowledge among Union stakeholders. In addition, the Commission monitors and ensures the follow up of Member States' decommissioning reports in line with RWM Directive.

Expected impact of research funded during 2021-2025

Through European Joint Programmes and European Partnerships, the Euratom Programme supports technical cooperation between various stakeholders and the development of scientific knowledge and technologies supporting the implementation of the Radioactive Waste Management Directive³⁹ in Euratom Member States, taking into account their respective national programmes.

Euratom helps to consolidate knowledge about the safe entry into operation of the first geological disposal facilities for spent fuel and high-level waste, including the safety of their decommissioning and predisposal activities and management of other long-lived radioactive waste. The Programme also improves knowledge management in this area and knowledge transfer.

3. Nuclear science and ionising radiation applications, radiation protection, and emergency preparedness

Well-directed research is fundamental for adequate risk assessment of ionising radiation and risk management of its applications in line with the Basic Safety Standards Directive⁴⁰. A multidisciplinary approach is needed to provide more detail on radiation benefits but also risks and effects, including their interaction with other risk factors. This will pave the way for better recommendations and new solutions for health and environmental protection against the dangers arising from ionising radiation; it will also provide insights into innovative and optimised medical procedures and their effective transfer into clinical practice.

Outline of Euratom-funded actions for 2021-2025

The Commission launched in 2022 a co-funded European Partnership for research in radiation protection, improved use of ionising radiation in medical applications and radiation detection (PIANOFORTE). The Partnership builds on and further develop the research priorities of the roadmap prepared by the previous 2015-2020 European Joint Programme (CONCERT). The

³⁷ Euratom SHARE project (2019-22) <https://share-h2020.eu/> and <https://cordis.europa.eu/project/id/847626>

³⁸ Council Regulation (Euratom) 2021/100 of 25 January 2021, covering the period 2021-27, establishing a dedicated financial programme for the decommissioning of nuclear facilities and RWM <https://eur-lex.europa.eu/eli/reg/2021/100/oj>

³⁹ Council Directive 2011/70/Euratom of 19 July 2011 establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste (OJ L 199, 2.8.2011, p. 48).

⁴⁰ Council Directive 2013/59/Euratom of 5 December 2013 laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation, and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom.

Partnership should have a clear impact for the Community and its citizens, and demonstrate strong commitment on the part of partners mandated by Member States. It must also achieve synergies with Horizon Europe's Cancer Mission, which contributes to the Commission's 'Europe's Beating Cancer Plan'.

Euratom provides 65% co-funding, with the budget committed in instalments over the 5 years of the Programme. This funding rate reflects the high impact of radiation research on health policies and the need to involve a wider research community. Subject to the provisions of the future Work Programme, the Partnership could be prolonged for 2 years (2026-2027) with Euratom co-funding in line with other Partnerships, following Council's approval of a Regulation on the Euratom Programme for 2026-2027⁴¹.

In addition to the European Partnership, in 2022 the Commission launched a supplementary research action to develop innovative production routes and safe and secure supply of radioisotopes for medical applications.

Under the 2023-2025 Work Programme, proposed actions aim at ensuring further security of supply of medical radioisotopes, the development of new applications of nuclear technologies, and nuclear and radiation techniques for EU strategic autonomy, circular economy and climate change policies. PIANOFORTE Partnership will be further strengthened by a linked action focused on bringing a breakthrough innovation in radiation protection and emergency preparedness, using where appropriate cross-cutting technologies, like digitalisation, modelling or simulation, and Artificial Intelligence.

Expected impact of research funded during 2021-2025

The co-funded European Partnership PIANOFORTE should substantially expand scientific knowledge that supports implementation of the Basic Safety Standards Directive and helps to harmonise radiation protection practices throughout Europe. It should also lead to advances in integrative radiobiology and in developing tools, methods and best practices to cope with issues related to radiation exposure.

In other areas, developing the scientific basis for new recommendations and procedures should also improve potential for synergies with Horizon Europe mentioned above, including secure supply of radioisotopes for medical applications. Actions should also develop EU capacity for innovative exploration and production of secondary raw materials and/or recovery/recycling of raw materials from spent nuclear fuel, supporting EU strategic autonomy and circular economy.

4. Maintaining and further developing expertise and competence in the nuclear field within the Community

Use of nuclear and radiological technologies in all areas of application, in line with high Euratom standards for nuclear safety, security, radiation protection and responsible

⁴¹ In line with Article 7 of the Euratom Treaty, the Euratom Programme covers 5 years (2021-25). To match the duration of Horizon Europe and the Multiannual Financial Framework, 2026 and 2027 will be covered by a separate Commission proposal.

radioactive waste management, requires a highly specialised and qualified workforce within the EU. In addition, knowledge management and transfer between generations and Member States is essential to maintain nuclear competencies in Euratom and uphold Euratom's highest safety standards. Due to an ageing research community and slow increase in students in scientific and engineering subjects, maintaining nuclear as well as radiation protection competencies is a growing concern for Member States, research stakeholders, academia, industry and the whole workforce supply chain.

For this reason, a strategy will be designed and tested through an initiative led by industry and the research and training sector, and supported through a Euratom-funded CSA, to attract new people to nuclear work and train and retain the workforce in the skills necessary. The strategy will focus on mobility, transferability and digital skills and promote diversity, inclusion and gender balance.

Outline of Euratom-funded actions for 2021-2025

The Commission aims to establish long-term actions in nuclear and radiological education and training and access to infrastructures, offering direct support to students and researchers and bringing stability and predictability for stakeholders and users.

As a first step, the 2021-2022 Work Programme launched the European facility OFFERR for nuclear research in all areas (except for fusion, as it is already included in EUROfusion) covered in Annex I of the Council Regulation establishing Euratom Programme. This will promote access to infrastructures that provide essential and unique services to the European research community and which are typically beyond the reach of individual laboratories. The facility will be accompanied by ENEN2PLUS, a support scheme for mobility, building on the positive experience of several Euratom projects, such as ENEN+, and actions by technology platforms. Subject to the provisions of the future Work Programme, Euratom co-funding for OFFERR and ENEN2PLUS could be extended for the 2 years (2026-2027), in line with other Partnerships, following Council's approval of a Regulation on the Euratom Programme for 2026-2027.

For 2021 and 2022, thanks to synergies established with Horizon Europe and allocation of a dedicated Euratom budget, nuclear researchers in both fission and fusion are eligible to apply for MSCA Postdoctoral Fellowships⁴². The action will be renewed for 2023-2025.

These actions will be supplemented by specific education, training and dissemination activities within the European Partnerships in radiation protection and radioactive waste management, as well as collaborative projects in other areas. In the latter case, the Commission recommends allocating 5% of the project's budget for this purpose.

As in 2014-2020, support for mobility, PhDs and fellowships/training in fusion research will be provided within the EUROfusion, the European Partnership in fusion research.

⁴² In accordance with Council Regulation 2021/765 of 10 May 2021 (OJ L 167I, 12.05.2021, p. 81). (Article 10(2)), the Euratom Programme may provide a financial contribution to the Marie Skłodowska-Curie Actions to support activities relevant for nuclear research.

Expected impact of research funded during 2021-2025

Euratom actions should improve specialised education and training by providing mobility and access to state-of-the-art nuclear research infrastructure. Detailed insights into the evolution of human resources in the nuclear field in terms of supply (academia) and demand (NPP operators, TSOs, regulators, medical and other non-power applications) will enable better and a more sustainable coordination of nuclear education and training. This is of particular benefit to smaller Member States, which can take advantage of economies of scale afforded by the Europe-wide pooling effect.

5. Development of fusion energy

Fusion energy represents a possible long-term option for large-scale, low-carbon electricity production, which could help address a growing energy demand towards the end of this century. Before deployment of fusion power plants, fusion research will enable Europe to create high-tech innovations and, with them, a more competitive high-tech industry.

Fusion research also pushes many of the cutting-edge technologies to new limits⁴³ and, in many cases⁴⁴, innovative solutions to challenging problems have found applications beyond the bounds of fusion research. The European research roadmap to the realisation of fusion energy⁴⁵ envisages electricity generation from this new low-emission source of energy within the 2050 timeframe. At this point, a full evaluation of the commercialisation of fusion may be possible.

Outline of Euratom-funded actions for 2021-2025

During 2021-2025, the co-funded European Partnership in fusion will build on the progress made by the EUROfusion consortium. It will focus further on helping to ensure that ITER enters successfully into operation and, working hand in hand with industry, step up efforts to design a fusion power plant.

In addition, the Partnership will work with the Italian Divertor Test Tokamak and the IFMIF/DONES fusion materials test projects to deliver important design and materials data. At this stage, further development and optimisation of the ‘stellarator’ concept will play an important role as an alternative to the ‘tokamak’ concept. To ensure that there are no further gaps in fusion infrastructures, a ‘Facilities Review’ will be carried out in 2023.

Education and training will remain an important element of the Partnership, which will set ambitious targets for the training of scientists and engineers, addressing issues of excellence. To enhance the added value that fusion research may provide to the economy and society, the current technology transfer programme will be continued and expanded to complement

⁴³ The development of low and high temperature Superconducting magnets thereby increasing magnetic fields to beyond 20 Tesla

⁴⁴ Low temperature superconducting technology has been used in Nuclear Magnetic Resonance spectroscopy instruments creating European world market leadership in this sector.

⁴⁵ <https://www.euro-fusion.org/eurofusion/roadmap/>

similar national activities. It will also link to technology transfer networks in the framework of the EIROforum initiative⁴⁶.

Preparations will be made, through a coordination and support action, for an envisaged PPP on fusion energy as a co-programmed European Partnership. This action will bring together the European fusion industry and fusion-related technology centres and research organisations to tackle bottlenecks on the way to designing a fusion power plant, inter alia building on the experience from the construction, commissioning and operation of ITER. The action also aims, amongst other things, to leverage commitments of in-kind contributions by the private partners and develop a Strategic Research and Innovation Agenda on Fusion Energy.

Expected impact of research funded during 2021-2025

In fusion research, the Programme can be expected to have a significant impact. The obvious main priority will be supporting the successful entry into operation of ITER by addressing ITER's specific needs. This will be done by, for example, providing solutions for the control mechanisms required for optimal plasma performance and delivering diagnostics and heating systems.

In addition, one of the most important elements will be the supply of experienced scientists and engineers and, using all relevant facilities, the training of the next ITER generation. To achieve this, and to make use of experience from ITER in the European fusion programme and the design of DEMO, the Programme will have to become more integrated and coordinated between the main stakeholders, namely the Commission, the European Joint Undertaking 'Fusion for Energy' and the European research community represented by the EUROfusion consortium.

Beyond this main priority of ITER, the Programme is also expected to have an impact on many other areas of fusion development. A significant risk of delays in fusion energy production comes from the licensing of nuclear and radiological facilities. Although ITER has been measured against the traditional nuclear power plant codes, it is clear from the assessment that many technological differences exist that have to be taken duly into account in the context of regulation, standards and licensing requirements, while maintaining high safety standards.

Addressing this topic at the start of DEMO's conceptual design activities should mitigate this risk and remove a significant barrier to the timely demonstration of electricity from fusion energy. Tritium management is also an integral element of this assessment, with the conclusions from the proposed activities feeding directly into the definition of the regulatory and licensing requirements for a fusion power plant, building on the experience gained from ITER.

Another barrier that must be addressed to accelerate the realisation of fusion energy is the provision of fusion-related materials data. This requires that a specific facility for irradiating

⁴⁶ <https://www.eiroforum.org/wp-content/uploads/brochure-eiroforum-imktt.pdf>

fusion materials is available. The Programme's support for the definition and design of such a facility will help to achieve this aim.

This, in turn, will provide the necessary materials data for a construction decision on DEMO, to be taken within the timeline envisaged in the European research roadmap to the realisation of fusion energy. As with the support for ITER, this also depends on the successful prototyping of the accelerator under the 'Broader Approach' activities in Japan, which this Programme will also underpin.

Continued participation in the three Broader Approach projects (Satellite Tokamak Programme, IFMIF and IFERC) will ensure best use of previous and present investments.

Finally, looking beyond ITER, the Programme will advance on the conceptual design of a demonstration fusion power plant that will produce, for the first time, electricity for the grid. All the main design integration issues, such as a stable power plasma scenario, power exhaust, closed fuel cycles and balance of plant, will be addressed in order for the engineering design activities to proceed in subsequent Euratom programmes.

6. Role of the Joint Research Centre

Achieving the Euratom Programme's objectives requires synergies between indirect actions and direct actions, the latter managed by the European Commission Joint Research Centre (JRC). The JRC also plays an important role in knowledge management, including the results of Euratom-funded collaborative projects. It has a specific mandate in the field of decommissioning⁴⁷, where it should facilitate the coordinated dissemination of knowledge among Union stakeholders.

Where appropriate, the Commission recommends the inclusion of the JRC in bidding consortia for Euratom calls for proposals. The JRC may participate in the preparation and submission of proposals; when participating in such consortia, the JRC will not receive funding from indirect actions but will bear its own staff and research infrastructure operational costs⁴⁸.

For bidding consortia, the JRC (contact: JRC-EURATOM-IA@ec.europa.eu) offers its expertise, capacities and infrastructure free of charge in key areas of fission and radiation protection research and education and training. The JRC's facilities and expertise are listed in General Annex H of this Work Programme.

7. International Cooperation

The international and global dimension in Euratom-funded research activities is important in obtaining mutual benefits and knowledge sharing. The Euratom Programme is open to the participation of countries having concluded association agreements to this effect, and is also

⁴⁷ Council Regulation (Euratom) 2021/100 of 25 January 2021, covering the period 2021-27, establishing a dedicated financial programme for the decommissioning of nuclear facilities and RWM <https://eur-lex.europa.eu/eli/reg/2021/100/oj>

⁴⁸ For more information on the JRC participation, please refer to the General Annexes (section on Entities eligible to participate/Specific cases).

open, at the project level and on the basis of mutual benefit and subject to acceptance by the consortium, to the participation of entities from third countries and of international organisations for scientific cooperation.

8. Gender balance

The European Commission is committed to promoting gender equality in research and innovation. Euratom research pays attention to gender equality and participation of women is actively encouraged. Legal entities from Member States and Associated Countries that are public bodies, research organisations or higher education establishments (including private research organisations and higher education establishments) must have a gender equality plan.

Call - New actions for skills and competences for safe use of current and future nuclear technologies

HORIZON-EURATOM-2026-NRT-01

Conditions for the Call

Indicative budget(s)⁴⁹

Topics	Type of Action	Budgets (EUR million)	Expected EU contribution per project (EUR million) ⁵⁰	Indicative number of projects expected to be funded
		2025		
Opening: 10 Mar 2026 Deadline(s): 15 Sep 2026				
HORIZON-EURATOM-2026-NRT-01-01	EURATOM-CSA	1.60	Around 1.60	1
Overall indicative budget		1.60		

General conditions relating to this call

⁴⁹

The Director-General responsible for the call may decide to open the call up to one month prior to or after the envisaged date(s) of opening.

The Director-General responsible may delay the deadline(s) by up to two months.

All deadlines are at 17.00.00 Brussels local time.

The budget amounts are subject to the availability of the appropriations provided for in the general budget of the Union for years 2023, 2024 and 2025.

⁵⁰

Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.

<i>Admissibility conditions</i>	The conditions are described in General Annex A.
<i>Eligibility conditions</i>	The conditions are described in General Annex B.
<i>Financial and operational capacity and exclusion</i>	The criteria are described in General Annex C.
<i>Award criteria</i>	The criteria are described in General Annex D.
<i>Documents</i>	The documents are described in General Annex E.
<i>Procedure</i>	The procedure is described in General Annex F.
<i>Legal and financial set-up of the Grant Agreements</i>	The rules are described in General Annex G.

Proposals are invited against the following topic(s):

HORIZON-EURATOM-2026-NRT-01-01: European Nuclear Skills Initiative – towards European Nuclear Skills Academy

Specific conditions	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 1.60 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 1.60 million.
<i>Type of Action</i>	Coordination and Support Actions

<i>Eligibility conditions</i>	The conditions are described in General Annex B. The following exceptions apply: The Joint Research Centre (JRC) may participate as member of the consortium selected for funding.
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Expected Outcome: Project results are expected to complement and expand the outcomes of HORIZON-EURATOM-2024-NRT-01-02 by contributing to the following:

- Design and implement an action for establishing a European Nuclear Skills Academy, unifying the strategic direction and promoting standardised curricula across all qualification levels (from vocational to academic), thereby contributing to a more coordinated, EU-wide response to the skills shortage. The project will include a demonstration of recognition of learning outcomes and/or acquired skills between organisations in different Member States.
- Launch targeted training programmes, building on existing ones, specifically for critical areas such as Small Modular Reactors (SMRs) and advanced reactors. This includes building specialised expertise within national regulatory authorities for independent safety assessment of facilities and design concepts, enabling rigorous, efficient licensing, and ensuring rapid deployment and the highest safety standards.
- Complement existing mobility schemes with targeted actions for the most critical professions, tailored to regulatory and industry needs, generating evidence and good practices that can feed into future, larger-scale mobility and skills initiatives.
- The European Nuclear Skills Academy should serve as preparation and as a basis for the possible Net Zero Industry Academy, and for other future related initiatives that may follow the review announced in the Communication on the Union for Skills.

Scope: This topic builds upon the Skills for Nuclear action and contributes to the expected outcomes specified in topic HORIZON-EURATOM-2024-NRT-01-02. The demand for workers is increasing across all levels and sub-sectors of the nuclear ecosystem – construction workers, technicians, nuclear engineers and scientists, skilled power plant operators, nuclear-aware generalists, and regulatory staff to assess and license new projects.

The recent policy documents, in particular the Communication on the Nuclear Illustrative Programme PINC ⁽⁵¹⁾, the Net Zero Industry Act ⁽⁵²⁾, and the Draghi report ⁽⁵³⁾, underline the need for EU action on nuclear skills. These documents emphasise that delivering Member States' plans for lifetime extensions and new nuclear build-up to 2050 will require substantial investments and a rapid strengthening of nuclear skills and regulatory staffing across the EU to safely implement nuclear plans. This, combined with long lead times to train highly

⁵¹ COM/2025/315, https://energy.ec.europa.eu/topics/nuclear-energy/nuclear-investment-needs_en

⁵³ https://commission.europa.eu/topics/eu-competitiveness/draghi-report_en

specialised nuclear professionals and regulators, makes early, coordinated EU action on nuclear skills both justified and urgent.

The Nuclear Skills Strategy planned within the Skills for Nuclear project should be complemented by a European Nuclear Skills Academy for attracting, developing and retaining talent, particularly considering existing installations and plans for new build with both current and emerging technologies. Together, the strategy and the preparatory action for the Academy funded under this topic will inform future EU measures on nuclear skills and will also ensure that the EU nuclear sector is well organised and ready to contribute to the future architecture of EU skills-related actions from the outset. The establishment and implementation of the Academy should be informed, as necessary and appropriate, by the outcomes of the review of existing Skills Academies announced in the Communication on the Union for Skills⁵⁴.

The Academy will serve as an EU umbrella initiative bridging education, research and industry, that builds upon all ongoing EU activities, develops complementary training actions, and offers strategic advice to support future initiatives. It will make use of the European Qualification Framework (EQF), the European Credit Transfer and Accumulation System (ECTS) and (micro-)credentials to support harmonisation and recognition of skills acquired in the Academy. It should cover all relevant EQF levels, ranging from 3 to 8, including the Academic (University or equivalent - EQF 6, 7, 8), as well as Vocational Bachelor and Advanced Vocational programmes (Higher VET – EQF, 5, 6, 7), and Upper Secondary programmes (Lower VET - EQF 3, 4). The activities should lead to the development of a unified EU framework for validating and certifying nuclear skills, demonstrating recognition between organisations in different Member States. This framework aims to break down national barriers to facilitate cross-border workforce mobility, thereby ensuring a resilient, integrated labour market.

The action should explore the possibilities of joint activities involving regulatory bodies and plan specific measures when appropriate, as the assessment of advanced reactors will require different expertise that needs to be built up. European safety authorities should have human resources that are appropriately proportionate and tailored to the tasks they are assigned. These human resources are essential for addressing current challenges in the areas of reactor lifetime extension, small modular reactor (SMR) projects, radioactive waste management, and nuclear fusion. These human resources need to enable safety authorities to carry out their missions with the necessary rigour and independence, based on robust scientific data and in accordance with guidelines set by public authorities.

In this respect, the action shall seek synergies and avoid duplications with the on-going Commission's support to national nuclear safety regulatory authorities for collaborative and coordinated approaches to emerging challenges in the nuclear sector⁵⁵.

⁵⁴ COM(2025)90, see also https://commission.europa.eu/topics/competitiveness/union-skills_en

⁵⁵ Granted under decision C(2024)8345 published on https://energy.ec.europa.eu/topics/funding-and-financing/financing-decisions_en

In a spirit of promoting the EU's strategic leadership on nuclear safety, coordinated action will also be sought with the training activities financed under the European Instrument for International Nuclear Safety Cooperation.

The consortium will include a variety of stakeholders from industry, research and training organisations, academia, and professionals in the fields of education and human resources management. Regulatory bodies shall also be represented.

Where appropriate, the Commission recommends that consortia use the services of the JRC. The JRC may participate in the preparation and submission of the proposal. The JRC would bear the operational costs for its own staff and the research infrastructure operational costs. The JRC facilities and expertise are listed in General Annex H of this Work Programme.

Call - New actions in fusion energy and for capacity building of a workforce with specialised skills in the nuclear and radiological field

HORIZON-EURATOM-2024-NRT-01

Conditions for the Call

Indicative budget(s)⁵⁶

Topics	Type of Action	Budgets (EUR million)	Expected EU contribution per project (EUR million) ⁵⁷	Indicative number of projects expected to be funded
		2024		
Opening: 28 May 2024 Deadline(s): 17 Sep 2024				
HORIZON-EURATOM-2024-NRT-01-01	EURATOM-CSA	1.50	Around 1.50	1
HORIZON-EURATOM-2024-NRT-	EURATOM-	1.50	Around	1

⁵⁶

The Director-General responsible for the call may decide to open the call up to one month prior to or after the envisaged date(s) of opening.

The Director-General responsible may delay the deadline(s) by up to two months.

All deadlines are at 17.00.00 Brussels local time.

The budget amounts are subject to the availability of the appropriations provided for in the general budget of the Union for years 2023, 2024 and 2025.

⁵⁷

Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.

Euratom Research and Training Programme - Work Programme 2023-2025
Euratom Work Programme 2023-2025 for nuclear research and training

01-02	CSA		1.50	
Overall indicative budget		3.00		

General conditions relating to this call	
<i>Admissibility conditions</i>	The conditions are described in General Annex A.
<i>Eligibility conditions</i>	The conditions are described in General Annex B.
<i>Financial and operational capacity and exclusion</i>	The criteria are described in General Annex C.
<i>Award criteria</i>	The criteria are described in General Annex D.
<i>Documents</i>	The documents are described in General Annex E.
<i>Procedure</i>	The procedure is described in General Annex F.
<i>Legal and financial set-up of the Grant Agreements</i>	The rules are described in General Annex G.

Proposals are invited against the following topic(s):

HORIZON-EURATOM-2024-NRT-01-01: European Fusion Industry Platform and preparation for a Public-Private Partnership on Fusion Energy

Specific conditions	
<i>Expected EU contribution per</i>	The Commission estimates that an EU contribution of around EUR 1.50 million would allow these outcomes to be addressed appropriately.

<i>project</i>	Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 1.50 million.
<i>Type of Action</i>	Coordination and Support Actions
<i>Procedure</i>	The procedure is described in General Annex F. The following exceptions apply: The evaluation committee will be partially composed of representatives of the EU institutions.

Expected Outcome: the action is expected to prepare for a potential future Public-Private Partnership (PPP) on Fusion Energy, in the form of a European co-programmed partnership, by:

- establishing an industry-led European association, representing the European fusion industry and relevant fusion-related technology centres and research organisations, which could possibly evolve into a long-term European Technology and Innovation Platform;
- laying down a Strategic Research and Innovation Agenda on Fusion Energy,
- meeting other relevant requirements, such as drafting a memorandum of understanding with provision for managing intellectual property and technology transfer.

Scope: The Commission aims to support and incentivise the European fusion community and industry and to act decisively to strengthen and deploy the EU's technological leadership and expertise in this field. This will ensure the EU's strategic autonomy and competitiveness for the future commercial deployment of fusion energy.

The EU has a world-leading industrial capability in mainstream magnetic confinement fusion (MCF). The know-how in the construction and assembly of tokamaks and stellarators has primarily been developed through involvement in ITER and other publicly funded devices either via F4E or EUROfusion.

However, large-size EU industries have been mainly involved as suppliers rather than R&D partners. There is also a significant risk that the engineering fusion know-how and industrial potential could be lost and migrate to other countries with a more favourable economic and regulatory landscape.

In this context, the Commission aims to engage the EU fusion industry to tackle the critical bottlenecks that need to be addressed to design a first viable and cost-effective fusion power plant. This will ensure that EU industry masters and exploits the relevant technologies and consolidates the range of components and processes needed to establish a competitive EU

value supply chain, also in connection to the completion of ITER construction and its operation. At the same time, in addition to the current mainstream MCF approach, the Commission intends to support innovation in alternative fusion concepts and in the development of key enabling technologies to address specific technical and industrial challenges.

Fusion is one of the most ambitious engineering feats and will require the integration of knowledge and expertise from several different fields and stakeholders. Neither the public nor the private sector acting alone will be able to successfully tackle this challenge. For this reason, it is necessary to create a new collaborative environment in the form of a PPP.

This action will provide key support to a representative stakeholder consortium. This consortium will act as a single-entry point managing activities towards the development of a potential future PPP. The action will, in particular:

- identify and create, in an inclusive manner, a stakeholder network bringing together industry (including supply chain, startups, energy providers and investors), technology centres, academia and research organisations (including EUROfusion and the Joint Undertaking ‘Fusion for Energy’);
- support the creation of an organisation (entity with legal personality) which is expected to become the lead organisation in the potential future PPP;
- put in place the legal and financial arrangements required to ensure the sustainability of this organisation beyond the duration of this action and throughout the duration of the PPP, with a view to the organisation possibly evolving into a long-term European Technology and Innovation Platform in the field of fusion, integrating wider R&I efforts across the EU;
- define a suitable governance structure for the PPP in the form of a co-programmed European partnership;
- develop a Strategic Research and Innovation Agenda on Fusion Energy in coordination with the Commission, industry and the EU fusion community;
- coordinate and leverage commitments, expected in the form of in-kind contributions, from the private partners;
- undertake preparatory work for the possible establishment of a separate trade association representing the EU fusion industry.

Among the objectives mentioned above, priority should be given to those required to launch the PPP within the period covered by the extension of the Euratom Research and Training Programme (2026-2027), subject to the Council’s adoption of a Regulation on this extension.

The duration of the action is expected to be 2 years.

HORIZON-EURATOM-2024-NRT-01-02: European Nuclear Skills Initiative

Specific conditions	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 1.50 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 1.50 million.
<i>Type of Action</i>	Coordination and Support Actions
<i>Eligibility conditions</i>	The conditions are described in General Annex B. The following exceptions apply: The Joint Research Centre (JRC) may participate as member of the consortium selected for funding.

Expected Outcome: Project results are expected to contribute to the following outcomes:

- establishment of a long-term, industry-, research- and training-led European initiative to address workforce and skill shortages in nuclear fission and fusion at EU-level, for ensuring safe use of current and future nuclear technologies (including SMRs), and to strengthen capacity-building for nuclear safety, waste management, decommissioning and radiation protection (including medical applications).
- design and testing of a strategy to attract new people to the EU's nuclear and radiation protection workforce and train and retain this workforce to acquire the necessary skills with a focus on cross-sector and EU-wide mobility, skills transferability and digital skills while promoting diversity, inclusion and gender balance.
- maintain the highest levels of nuclear safety and radiation protection while ensuring EU's strategic autonomy and competitiveness in nuclear technologies.

Scope: Scope: The nuclear and radiation protection sector demands a consistently high level of diverse skills⁵⁸, and is experiencing challenges to attract the younger generation. Possible gaps in human resources and skills could become critical when considering the importance of the sector in EU Member States.

In this context, the Commission is offering funding through a coordination and support action for a long-term, industry-, research- and training-led public & private initiative to maintain and further develop the skills necessary to ensure the availability of high-level expertise for the safe use of current and future nuclear technologies in the EU.

⁵⁸

[World Energy Employment 2023](#)

This initiative will prepare a strategy to identify and quantify nuclear skills shortages across the EU, drawing on approaches from different industries (such as the MATCH programme⁵⁹), the European Human Resources Observatory for the Nuclear Sector (EHRO-N) and Member States, in particular building upon the work already initiated in job taxonomy and national workforce assessments under EHRO-N.

Overall, the proposed strategy should contribute to maintaining the highest levels of nuclear safety and radiation protection. Achieving this objective requires the strategy to also cover aspects relevant to the recently established SMR Industrial Alliance.

The initiative's strategy and multi-annual action plan should consider increasing (i) activities across sectors and Member States, (ii) collaboration and transnational mobility and (iii) vocational training programmes and should identify the reskilling and upskilling needs of job holders in the sector (identification, validation and certification of skills), including access to nuclear research facilities.

Additionally, the strategy should identify ways to promote nuclear and radiation protection careers and job paths among young people and with teachers, instructors and professors. At the same time it should improve diversity, inclusion and gender representation in the nuclear sector (fission and fusion), including by sustaining in its current form the existing European Masters in the nuclear and engineering field (i.e. organised and delivered by academics in at least three Member States).

The proposed project will benefit from past and current education and training efforts under various programmes and instruments (cf. Euratom Research and Training Programme, Erasmus+, EIT, Instrument for Nuclear Safety, Pact for Skills⁶⁰, SAMIRA Action Plan⁶¹), carried out by national service providers, the JRC and the European Nuclear Education Network (ENEN). It will also draw on best practice from various industries and countries.

The consortium will involve a wide variety of stakeholders, from industry, research and training organisations, as well as academia, regulatory bodies and professionals from the fields of education and human resources management.

The initiative should leverage existing EU instruments where appropriate, including the Pact for Skills. The feasibility of the proposed strategy should be demonstrated by a pilot action implemented by the consortium during the lifetime of the project.

⁵⁹ <https://www.conseil-national-industrie.gouv.fr/actualites/comites-strategiques-de-filiere/nucleaire/gifen-presente-programme-match-pour-la-reliance-du-nucleaire-france>

⁶⁰ https://pact-for-skills.ec.europa.eu/index_en

⁶¹ https://energy.ec.europa.eu/topics/nuclear-energy/radiological-and-nuclear-technology-health/samira-action-plan_en

Call - Nuclear Research and Training⁶²

HORIZON-EURATOM-2023-NRT-01

Conditions for the Call

Indicative budget(s)⁶³

Topics	Type of Action	Budgets (EUR million)			Expected EU contribution per project (EUR million) ⁶⁴	Indicative number of projects expected to be funded
		2023	2024	2025		
Opening: 04 Apr 2023 Deadline(s): 08 Nov 2023						
HORIZON-EURATOM-2023-NRT-01-01	EURATOM-RIA	5.30	5.34	5.92	Around 5.00	4
HORIZON-EURATOM-2023-NRT-01-02	EURATOM-IA	4.00	4.00	5.14	Around 15.00	1
HORIZON-EURATOM-2023-NRT-01-03	EURATOM-RIA	3.20	3.20	4.12	Around 4.00	3
HORIZON-EURATOM-2023-NRT-01-04	EURATOM-COFUND	10.59	6.88	12.12	Around 20.00	1

⁶² The call for proposals HORIZON-EURATOM-2023-NRT-01 shall be financed by commitments in annual instalments, in accordance with Article 4(5) of the Euratom Research and Training Programme 2021-2025, from the appropriations entered in the following line of the general budget of the Union: Budget line 01.030200: EUR 33 164 500 for 2023, EUR 29 445 500 for 2024, EUR 39 390 000 for 2025.

⁶³ The Director-General responsible for the call may decide to open the call up to one month prior to or after the envisaged date(s) of opening.
The Director-General responsible may delay the deadline(s) by up to two months.
All deadlines are at 17.00.00 Brussels local time.
The budget amounts are subject to the availability of the appropriations provided for in the general budget of the Union for years 2023, 2024 and 2025.

⁶⁴ Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.

Euratom Research and Training Programme - Work Programme 2023-2025
Euratom Work Programme 2023-2025 for nuclear research and training

HORIZON- EURATOM-2023- NRT-01-05	EURATOM- RIA	1.33	1.33	1.83	Around 5.00	1
HORIZON- EURATOM-2023- NRT-01-06	EURATOM- RIA	1.07	1.06	1.37	Around 4.00	1
HORIZON- EURATOM-2023- NRT-01-07	EURATOM-IA	1.66	1.66	0.22	Around 2.00	2
HORIZON- EURATOM-2023- NRT-01-08	EURATOM-IA	1.87	1.86	2.62	Around 7.00	1
HORIZON- EURATOM-2023- NRT-01-09	EURATOM- RIA	1.87	1.86	1.90	Around 2.33	3
HORIZON- EURATOM-2023- NRT-01-10	EURATOM-IA	1.87	1.86	3.60	Around 3.50	2
HORIZON- EURATOM-2023- NRT-01-11	EURATOM- CSA	0.40	0.40	0.01	Around 1.00	1
Overall indicative budget		33.16	29.45	38.86		

General conditions relating to this call	
<i>Admissibility conditions</i>	The conditions are described in General Annex A.
<i>Eligibility conditions</i>	The conditions are described in General Annex B.
<i>Financial and operational capacity and exclusion</i>	The criteria are described in General Annex C.

<i>Award criteria</i>	The criteria are described in General Annex D.
<i>Documents</i>	The documents are described in General Annex E.
<i>Procedure</i>	The procedure is described in General Annex F.
<i>Legal and financial set-up of the Grant Agreements</i>	The rules are described in General Annex G.

Nuclear safety

Proposals are invited against the following topic(s):

HORIZON-EURATOM-2023-NRT-01-01: Safety of operating nuclear power plants and research reactors

Specific conditions	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 5.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 16.56 million.
<i>Type of Action</i>	Research and Innovation Actions
<i>Eligibility conditions</i>	The conditions are described in General Annex B. The following exceptions apply: The Joint Research Centre (JRC) may participate as member of the consortium selected for funding.
<i>Legal and financial set-up of the Grant Agreements</i>	The rules are described in General Annex G. The following exceptions apply:

	Beneficiaries may provide financial support to third parties. The maximum amount to be granted to each third party is EUR 60 000.
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Expected Outcome: Project results are expected to contribute to some of the following expected outcomes:

- Make substantial progress in implementing, on the part of licence holders and regulators, the requirements of the Nuclear Safety Directive⁶⁵, Basic Safety Standards Directive⁶⁶ and Radioactive Waste Management Directive⁶⁷, and topical peer reviews⁶⁸ for the current and planned nuclear power plants and research reactors.
- Develop and/or deploy solutions for ageing management and/or the evaluation of reactors' safety margins using, where appropriate, cross-cutting technologies like digitalisation, modelling and simulation.
- Further develop and validate advanced structural integrity assessment methods and evaluate defect tolerance and safety margins in aged and potentially degraded plants.
- Quantify the safety margin in state-of-the-art integrity assessment methodologies on key nuclear components under real loading conditions.
- Draw up best practice guidance for developed assessment methods, disseminate the project outputs, and provide appropriate training in the use of developed assessment methods.
- Establish, for example through regular exchanges with regulatory bodies and/or their technical support organisations, a shared and coherent approach among regulators to safety requirements for different nuclear technologies, further improving safety across the Community.
- Develop competences and ensure continuity in short- to long-term research. This will allow some Member States to contribute to the decarbonisation of energy production according to and respecting the EU technology neutrality principle and thus increase Member State and EU energy security.

Scope: Euratom research will be driven by the increasing importance of long-term operation (LTO), and the fact that the current and planned innovative fleet will consist mainly of Light Water-cooled Reactors.

⁶⁵ Council Directive 2009/71/Euratom of 25 June 2009 establishing a Community framework for the nuclear safety of nuclear installations (OJ L 219, 25.7.2014, p. 42) as amended by Council Directive 2014/87/Euratom of 8 July 2014.

⁶⁶ Council Directive 2013/59/Euratom of 5 December 2013 laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation, and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom OJ L13, 17.1.2014, pp. 1-73.

⁶⁷ Council Directive 2011/70/Euratom of 19 July 2011 on establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste, OJ L199, 2.8.2011, pp. 48-56.

⁶⁸ <https://www.ensreg.eu/>

Proposals should address challenges related to ageing management and/or the evaluation of safety margins of the reactors' fleet. Such challenges relate, among other things, to the development of methods and tools to increase safety, the availability of systems, structures and components needed for reliable and safe management, core physics and thermal hydraulics, monitoring, digital including artificial intelligence, internet of things and digital twins, modelling and simulation, as well as prevention and mitigation strategies for long-term operation.

Adequate safety margins, the early detection of degradation and prevention of failures in pressure boundary components is of high priority to ensure the important third physical barrier in light water reactors. During the long operating life of nuclear power plants (40-80 years), the steel pressure boundary components are subjected to threats from non-linear processes such as ageing, different degradation mechanisms and load history effects. This highlights the importance of research activities to ensure proper analysis of damage tolerance, degradation, loads and safety margins, and to ensure appropriate programmes for inspections, repairs and the replacement of components.

HORIZON-EURATOM-2023-NRT-01-02: Safety of light water small modular reactors (LW-SMRs)

Specific conditions	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 15.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 13.14 million.
<i>Type of Action</i>	Innovation Actions
<i>Eligibility conditions</i>	The conditions are described in General Annex B. The following exceptions apply: The Joint Research Centre (JRC) may participate as member of the consortium selected for funding.
<i>Legal and financial set-up of the Grant Agreements</i>	The rules are described in General Annex G. The following exceptions apply: Beneficiaries may provide financial support to third parties. The maximum amount to be granted to each third party is EUR 60 000.

Expected Outcome: Project results are expected to contribute to some of the following expected outcomes:

- Ensure that LW-SMRs are designed, sited, constructed, commissioned, operated and decommissioned in line with the requirements of the Nuclear Safety Directive, Basic Safety Standards Directive and Radioactive Waste Management Directive, with particular focus on their safety features and passive safety systems.
- Establish, for example through regular exchanges, a shared and coherent approach among regulators to safety requirements for LW-SMRs, further improving safety across the Community.
- Support safety innovation and competencies in LW-SMRs while allowing some Member States to contribute to the energy transition according to and respecting the EU technology neutrality principle and thus increase Member State and EU energy security.

Scope: There is growing interest in some EU Member States in using small modular reactors (SMRs) for flexible power generation. This provides the opportunity of cogeneration and enables hybrid energy systems that integrate nuclear and renewables.

SMRs are defined as power reactors up to 300 MWe, whose components can be factory-made and transported as modules for installation. There is consensus within the international expert community that SMRs, when compared to large power plants, offer potential advantages in terms of design simplification and inherent safety features, while posing some new challenges with regard to safety, security and safeguards.

Research proposals should address safety aspects on integration of LW-SMRs in the hybrid energy system, including the evaluation of optimal electric grid management and safety by design.

Research proposals should also address some LW-SMR safety specificities such as:

- core/fuel (including fuel qualification);
- nuclear steam supply system integrated vessel and its internals;
- demonstration of natural circulation passive safety systems also in transient conditions;
- streamlined harmonised licensing;
- severe accident analysis;
- emergency preparedness and response;
- human and environmental radiation protection;
- safety, security and safeguard interfaces from the early design stage;
- modularity, human factors and hybridisation/(co)generation of heat/H₂ production/desalination.

These research proposals should also address the minimisation of and management options for radioactive waste arising from LW-SMRs; to that end, links should be established with relevant initiatives within the EURAD-2 partnership.

These relate among others to the development of methods and tools to increase safety, the availability of systems, structures and components needed for reliable and safe operation, core physics and thermal hydraulics, radiation protection specificities, monitoring, artificial intelligence, digital twins, modelling or simulation, and probabilistic safety assessment, including multi-unit effects.

HORIZON-EURATOM-2023-NRT-01-03: Safety of advanced and innovative nuclear designs

Specific conditions	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 4.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 10.52 million.
<i>Type of Action</i>	Research and Innovation Actions
<i>Eligibility conditions</i>	The conditions are described in General Annex B. The following exceptions apply: The Joint Research Centre (JRC) may participate as member of the consortium selected for funding.
<i>Legal and financial set-up of the Grant Agreements</i>	The rules are described in General Annex G. The following exceptions apply: Beneficiaries may provide financial support to third parties. The maximum amount to be granted to each third party is EUR 60 000.

Expected Outcome: Project results are expected to contribute to some of the following expected outcomes:

- Demonstrate that advanced systems can be designed, sited, constructed, commissioned, operated and decommissioned in line with the requirements of the Nuclear Safety Directive, Basic Safety Standards Directive and Radioactive Waste Management Directive, with particular focus on their safety features and passive safety systems.

- Establish, for example through regular exchanges, a shared and coherent approach among regulators to safety requirements for different advanced systems, further improving safety across the Community.
- Innovate in all safety aspects of advanced systems, including their key features (generation of less high-level waste, improved use of resources, and higher thermal efficiencies), allowing some Member States to contribute to the energy transition according to and respecting the EU technology neutrality principle and thus increase Member State and EU energy security.

Scope: Further research and innovation is needed to demonstrate the safety of advanced systems that offer increased sustainability, new non-electricity applications and flexibility in terms of adaptation to the energy mix with intermittent/variable sources. These advanced reactor technologies could also be deployed as small modular reactors, combining their specific properties and advanced coolant technologies.

Research proposals should:

- Keep the focus on safety by design, aiming at achieving a scientific consensus to ease the understanding and appropriation by the regulators of any innovative reactor concepts and their associated fuel cycles.
- Cover the viability phase of advanced technologies, when basic concepts are tested under relevant conditions. For example, proof of concept of better safety features, confirmation of safety improvements during the performance phase when engineering-scale processes are verified and optimised under prototypical conditions, and the demonstration phase when detailed design is completed and licensing is carried out.
- Further investigate safety aspects of selected advanced reactor systems and the use of non-water coolants and fluid fuel designs, higher operational temperatures also related to the option of industrial process heat production and H₂ generation and higher reactor power density in order to assess their potential, proliferation resistance, radioactive waste management (waste minimisation ‘by design’, decommissioning ‘by design’), emergency management and response, human and environmental impact, safeguards, social perception and their effects on the long-term sustainability of fuel cycles. On waste aspects, appropriate links should be established with relevant initiatives within the EURAD-2 partnership.
- Further investigate safety aspects of operational flexibility in an integrated energy system, for example by design and safety demonstration of intermediate heat storage facilities or other means.

HORIZON-EURATOM-2023-NRT-01-04: Co-funded European partnership for research in nuclear materials

Specific conditions

<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 20.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 29.59 million.
<i>Type of Action</i>	Cofund Actions
<i>Admissibility conditions</i>	The conditions are described in General Annex A. The following exceptions apply: The page limit of the application is 150 pages.
<i>Eligibility conditions</i>	The conditions are described in General Annex B. The following exceptions apply: The Joint Research Centre (JRC) may participate as member of the consortium selected for funding.
<i>Legal and financial set-up of the Grant Agreements</i>	The rules are described in General Annex G. The following exceptions apply: The funding rate is 55 % of the eligible costs as it reflects the need to establish a fully integrated research Partnership for nuclear materials that makes use of the assets of laboratories and industries all around Europe. Beneficiaries may provide financial support to third parties. The maximum amount to be granted to each third party is EUR 300 000. Financial support provided by the participants to third parties, to support e.g. access to and securing availability of research infrastructures, is one of the primary activities of the action in order to be able to achieve its objectives.

Expected Outcome: In line with the objectives of the Nuclear Safety Directive, this European partnership should contribute to the safe operation of existing and future advanced nuclear installations, including small modular reactors. Implementation of the partnership on nuclear materials will improve interaction and cross-fertilisation between national players in the relevant key areas and ensure improved knowledge management at European and Member State level.

Project results are expected to contribute to all of the following expected outcomes:

1. Boost knowledge about the durability of the main structural materials used in the nuclear island, such as low alloy, austenitic and ferritic-martensitic steels, as well as other metallic alloys and materials for fuel elements and fuel. This helps ensure that existing and future nuclear plants are operated safely in the long term.
2. Improve knowledge about advanced nuclear fuels with optimised performance for different reactor cores, increased safety and lower spent fuel long-term toxicity.
3. Develop and qualify materials and materials solutions (e.g. coatings) for core applications, advanced fuel elements, including enhanced accident tolerant fuels and/or enhanced performance fuels.
4. Improve knowledge about the degradation of secondary structural materials such as concrete or polymers that are subjected to degrading conditions typical for nuclear installations.
5. Improve knowledge about how nuclear materials behave at high temperatures and in conditions of strong degradation (e.g. high irradiation doses, strong corrosive environment), typical in advanced nuclear systems.
6. Develop methodologies for identifying innovative materials solutions that are applicable to both nuclear fission and fusion domains.
7. Improve research collaboration on materials of common interest with other domains beyond nuclear; this is needed to improve the efficiency of other energy generating technologies (e.g. increased working temperatures of electricity generating turbines) or advanced ones (e.g. concentrated solar power).
8. Improve knowledge about advanced nuclear fuels with optimised performance for different reactor cores, increased safety and lower spent fuel long-term toxicity. Determine quality assured data like nuclear cross sections with low uncertainties.
9. Further develop and optimise modern non-destructive examination techniques needed for the accurate health monitoring of relevant structures during operation, including online and automated strategies.
10. Develop and improve predictive methodologies for materials behaviour that should be applicable under an increasingly wide range of operational conditions and help transfer experimental results achieved under different irradiation conditions (for example ion irradiation vs neutron irradiation).
11. Develop enhanced standardised experimental techniques necessary to streamline experimental approaches for irradiated materials based on a traceability chain that provides access to valid uncertainties, producing nuclear materials databases that respond to FAIR principles.
12. Better understand the transferability of experimental results achieved by different irradiation techniques (for example ion irradiation vs neutron irradiation).

13. Improve nuclear data/reference data, design codes and standards relevant for nuclear materials and fuel performance codes, developed in close agreement with standardisation bodies and in interaction with nuclear regulators and their technical support organisations.
14. Improve the transfer of knowledge within the respective research community to European industry and nuclear regulators.
15. Improve the quality of modern education methods and the training of scientists and nuclear industry specialists in connection with nuclear materials.
16. Consolidate, at European level, the exploitation of unique relevant experimental facilities and infrastructures aimed at rationalising their use and avoiding the unnecessary repetition and duplication of costly experiments.

By achieving these outcomes, a European partnership on nuclear materials is expected to have the following impacts:

1. Structured consolidation of the European research community on nuclear materials.
2. Contribute to maintaining the high level of safety of nuclear installations for current and future fleets, in full compliance with relevant European regulations.
3. Develop scientific knowledge and technological expertise applicable to the nuclear materials domain, including the coordinated use of infrastructures for materials qualification with sustainable quality assurance, and the production of reliable nuclear databases that meet FAIR principles⁶⁹.
4. Improved interaction of the nuclear materials research community with European nuclear regulatory bodies and their technical support organisations.
5. Improved exchange of knowledge across the respective research communities, including for example fusion and non-nuclear energy generating technologies.
6. Improved quality of education and training of nuclear materials specialists, achieved in a coordinated manner across the EU in collaboration with existing nuclear education networks.

These impacts are expected to be achieved in a concerted manner across EU Member States and Associated Countries to the Euratom Programme 2021-2025 and would be otherwise difficult to achieve through national programmes.

Scope: Materials science is one of the main drivers for technological development and industrial innovation. In the nuclear domain, materials research plays a crucial role in improving the safety, efficiency and economy of nuclear installations. It supports

⁶⁹ https://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-data-mgt_en.pdf

technological and safety improvements in existing nuclear reactors and in new builds, and enables the development of advanced reactor concepts, including small modular reactors.

It covers several classes of materials of various types. This includes those essential to nuclear reactors – ranging from metallic alloys, ceramics and concrete to fuel cladding and fuels, substances for neutron control and even polymers. Innovative solutions for the development, manufacturing and qualification of nuclear materials are a must if the European nuclear sector is to maintain the highest safety standards and, at the same time, be competitive with other energy generating technologies as well as with a range of international players in this domain.

This action should contribute significantly to the development of materials for ensuring the highest safety standards and reducing the time-to-market for the various types of materials and related advanced manufacturing techniques. This is thanks to a shift from the traditional ‘observe and qualify’ materials science approach to the modern ‘design and control’ one. An accurate materials health monitoring method to be applied during the operation is needed, as well as advanced predictive methodologies that blend modern digital techniques. Physics-based models should also be developed.

The research effort in the nuclear materials area is resource-intensive and extremely costly. Only a fully integrated research programme that makes use of the assets of laboratories and industries all over Europe can be able to properly handle R&D in this domain.

Several European countries support nuclear materials research as part of their national research programmes. To avoid duplication and improve complementarity, the consolidation of R&I efforts in Europe in the nuclear materials domain is needed as a means to gather the necessary dedicated resources and pursue a common research agenda.

As an exploratory phase leading to a possible European partnership on nuclear materials, a special action was launched in the Euratom Work Programme 2019-2020⁷⁰, namely ‘NFRP-08: Towards joint European effort in area of nuclear materials’.

As a result of a competitive call, the Commission decided to support the project ‘Organisation of the European Research Community on Nuclear Materials’ (899997 ORIENT-NM)⁷¹. Its main goals are to develop a vision and convincing strategic research agenda for a possible partnership on nuclear materials consistent with national programmes and industrial needs, as well as draw up efficient governance of this partnership and define its interaction with external stakeholders. The ORIENT-NM project is expected to deliver the above-mentioned strategic documents before the launch of a possible partnership on nuclear materials in the current work programme⁷².

The scope of a partnership on nuclear materials should cover the research interests of all Member States and Associated Countries dealing with nuclear materials research and not be limited to nuclear power generating countries.

⁷⁰ https://ec.europa.eu/research/participants/data/ref/h2020/wp/2018-2020/euratom/h2020-wp1920-euratom_en.pdf

⁷¹ <https://cordis.europa.eu/project/id/899997>

⁷² The strategic research area is expected to be published at <http://www.eera-jpnm.eu/orient-nm/>

The proposal should also pay due consideration to the criteria for selecting and implementing European partnerships, their monitoring, evaluation, phasing out or renewal as set out in Annex III of the Horizon Europe Regulation⁷³.

The aim of this action is to launch a co-funded European partnership, bringing together European entities that have a national mandate for research in materials science and deal with nuclear materials. They are willing to pool their resources in a concerted manner in order to achieve critical mass and improve safety as well as efficiency and effectiveness in implementing respective materials solutions in the nuclear domain across Europe.

The consortium should be composed of nationally mandated actors for financing and/or implementing R&I on nuclear materials. The proposed partnership should follow on from the exploratory activities carried out by the ORIENT-NM project, with extensive consultation of Member States' national agencies and the research community. Nuclear regulatory bodies and their technical support organisations are expected to interact with the partnership, providing strategic orientations on the work to be accomplished, without compromising their independence. In the case of Member States where organisations act both as technical support organisations and as independent research organisations, these organisations are considered eligible for participation, normally as mandated actors or affiliated entities.

Proposals should provide for the establishment of an innovation group formed by members that belong to industrial bodies and other relevant institutions, and have expertise in innovation and result exploitation. Its role should be clearly defined. An independent international scientific advisory board established by the partnership would be seen as beneficial for the partnership's activities.

The vision, strategic research agenda and other strategic documents produced by the ORIENT-NM project should form an essential basis for defining the scientific orientation, structure and governance of the partnership on nuclear materials, in full compliance with the rules laid down in the Euratom Research and Training Programme 2021-2025⁷⁴ and in Regulation (EU) 2021/695 on Horizon Europe⁷.

The partnership should be goal-oriented, with well-defined major milestones to enable proper monitoring. Its scope should include all the scientific and technical areas as well as all the horizontal activities related to knowledge management described above (also defined by the ORIENT-NM project results).

Research lines should be proposed with specific projects covering the scientific and technical priorities identified in the strategic research agenda. Projects should cover areas of interest for the relevant national actors and should allow new partners to be included later on whenever

⁷³ Regulation (EU) 2021/695 of the European Parliament and of the Council of 28 April 2021 establishing Horizon Europe – the Framework Programme for Research and Innovation, laying down its rules for participation and dissemination, and repealing Regulations (EU) No 1290/2013 and (EU) No 1291/2013, OJ L 170, 12.5.2021, p. 1–68.

⁷⁴ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32021R0765>

relevant. The projects should be defined by technical scope and should not be reserved for just one type of participant.

An internal governance structure should be established in the consortium agreement. It should include an executive board and a management support office with a strategic role in ensuring that the partnership is implemented and day-to-day activities are managed. An appropriate means of allocation of project tasks and funding among the partners will need to be revised on a yearly basis. Emerging research priorities relevant for the Euratom programme should be taken into account during this yearly revision of the partnership.

This action aims at establishing a partnership that implements research based on proposed research lines and/or through calls for proposals. The partnership should cover all relevant activities: common research and strategic studies, the sharing of facilities, knowledge management, mobility and training of researchers, in collaboration and complementarity with existing initiatives dedicated to coordinating and managing the use of existing nuclear materials research infrastructures.

To maximise knowledge management and especially the impact on smaller and less advanced national programmes, a set of horizontal activities on knowledge transfer and on education and training have to be designed and implemented within the partnership. The partnership should be open to international R&D cooperation, with the managers expected to represent it in areas of competence in international events and forums.

Subject to adoption by the Council of a regulation establishing the Euratom Research and Training Programme 2026-2027 and adoption of the Euratom Work Programme 2026-2027, the Commission envisages providing the partnership with top-up funding, which will be determined later.

Commitments by the partners on their financial and/or in-kind contributions to the European partnership are expected to be provided in the governance structure, the joint calls and other dedicated implementation actions and efforts for national coordination. Proposals should pool the necessary financial and/or in-kind resources from the participating national (or regional) research programmes with a view to implementing joint research activities based on proposed research lines and/or joint calls for transnational proposals resulting in grants to third parties.

HORIZON-EURATOM-2023-NRT-01-05: Partitioning and transmutation of minor actinides towards industrial applications

Specific conditions	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 5.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 4.49 million.

<i>Type of Action</i>	Research and Innovation Actions
<i>Eligibility conditions</i>	The conditions are described in General Annex B. The following exceptions apply: The Joint Research Centre (JRC) may participate as member of the consortium selected for funding.
<i>Legal and financial set-up of the Grant Agreements</i>	The rules are described in General Annex G. The following exceptions apply: Beneficiaries may provide financial support to third parties. The maximum amount to be granted to each third party is EUR 60 000.

Expected Outcome: Project results are expected to contribute to all of the following expected outcomes:

- Reduce the long-lived components of radioactive waste and ease its management by developing EU competencies and expertise in partitioning and transmutation (P&T) and actinide fuel fabrication processes.
- Address the Nuclear Safety Directive⁷⁵, Basic Safety Standards Directive⁷⁶ and Radioactive Waste Management Directive⁷⁷ requirements on P&T and improve the sharing of best practices between the European nuclear industry, research organisations, universities, technical support organisations, the European Nuclear Safety Regulators Group and the Western European Nuclear Regulators Association.
- Address the safety aspects of optimising fuel cycles regarding the use of resources and reducing radioactive waste with a direct impact on fuel composition, fuel treatment and recycling.

Scope: This action aims to strengthen important Euratom research undertaken in previous programmes and make real advances towards demonstration of P&T processes – a key component of future fuel cycle strategies to some Member States, whether critical or sub-critical ADS advanced and innovative reactor systems. This research will improve the safety of processes by using state-of-the-art P&T technology towards a closure of the nuclear fuel cycle.

⁷⁵ Council Directive 2009/71/Euratom of 25 June 2009 establishing a Community framework for the nuclear safety of nuclear installations ((OJ L 172, 2.7.2009, p.18), as amended by Council Directive 2014/87/Euratom of 8 July 2014 amending Directive 2009/71/Euratom establishing a Community framework for the nuclear safety of nuclear installations (OJ L 219, 25.7.2014, p. 42).

⁷⁶ Council Directive 2013/59/Euratom of 5 December 2013 laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation, and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom.

⁷⁷ Council Directive 2011/70/Euratom of 19 July 2011 establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste (OJ L 199, 2.8.2011, pp. 48–56).

Even if a final repository would still be needed, P&T would drastically reduce the radiotoxicity, heat production and package volume of high-level radioactive waste, thereby easing the long-term safety of a final repository as stated by some Member States. It will strengthen EU/Euratom leadership in this domain and open new avenues towards increased energy security of supply and industrial competitiveness.

Although R&D on advanced fuel cycle technologies has been carried out for decades, there is consensus within the international community that a complete programme is needed with the aim of (i) industrial maturity to demonstrate the feasibility of a closed fuel cycle; (ii) minimisation of high-level radioactive waste; and (iii) increased safety. Indeed, most technologies for advanced transuranic management strategies (e.g. Pu multi-recycling and minor actinide (MA) transmutation) need to achieve a higher level of technological and economic development before they can be deployed on an industrial scale. As such, further efforts are needed among other things in the following areas:

- separation technologies;
- fuel fabrication;
- transmutation systems;
- fuel reprocessing;
- fuel technological aspects (particularly for MA-loaded fuels), including transportation, cooling and handling.

Developing advanced experiments, digital and High Performance Computing numerical simulation tools, taking full advantage of existing knowledge, competence and expertise and international cooperation should be highly beneficial.

On the radioactive waste management aspects, appropriate links should be established with the relevant initiatives within the EURAD-2 partnership.

HORIZON-EURATOM-2023-NRT-01-06: Improved nuclear data for the safety of energy and non-energy applications of ionising radiation

Specific conditions	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 4.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 3.50 million.
<i>Type of Action</i>	Research and Innovation Actions
<i>Eligibility</i>	

<i>conditions</i>	The conditions are described in General Annex B. The following exceptions apply: The Joint Research Centre (JRC) may participate as member of the consortium selected for funding.
<i>Legal and financial set-up of the Grant Agreements</i>	The rules are described in General Annex G. The following exceptions apply: Beneficiaries may provide financial support to third parties. The maximum amount to be granted to each third party is EUR 300 000. Financial support provided by the participants to third parties, to support e.g. access to and securing availability of research infrastructures, is one of the primary activities of the action in order to be able to achieve its objectives.

Expected Outcome: Project results are expected to contribute to all of the following expected outcomes:

- Assess the state of nuclear data libraries and computer simulation tools to advise on strategic actions in order to preserve and develop Euratom capacities;
- Provide reliable nuclear data for neutron or charged particles induced reactions cross-sections, decay and structure data, and computer simulation tools for different nuclear energy and non-energy applications, mainly applied to the fields of fission and fusion safety, radiation protection, waste management, innovative nuclear systems and sustainable fuel cycles;
- Support access to key experimental infrastructures that address specific measurement capabilities and methodologies to preserve know-how in computer applications, nuclear data evaluation, validation of data and models, and to improve education & training and knowledge sharing.

Scope: Nuclear data are critical inputs – and a major source of uncertainty – in predictive modelling and simulations of energy and non-energy applications. The combination of high-power computing capabilities with the availability of advanced simulation models (and related data libraries) and more accurate nuclear data measurements enable nuclear data evaluation programmes. The evaluated nuclear data libraries are a combination of:

- experimental measurements of the interactions of interest and estimation of their uncertainties and (cross-)correlations;
- the evaluation of available experimental data and the creation of evaluated nuclear data libraries (including uncertainties and covariance matrices);

- the validation of these (updated) evaluated nuclear data libraries by means of available differential and integral experimental data;
- the dissemination of these (updated) evaluated nuclear data libraries according to the standards of ‘reproducible science’ – including all the information needed to reconstruct the evaluation process.

Beyond the needs for advanced and innovative nuclear designs and fuels, the use and needs of nuclear data for accelerator-related applications and for the production and use of isotopes (in fission, fusion, health, environmental monitoring, etc.) keeps growing.

Proposals should:

- Demonstrate how state-of-the-art simulation, experimental and multidisciplinary approaches will be used to produce nuclear data libraries, capitalising on previous Euratom projects and on the international expert community.
- Build upon new nuclear data measurements using innovative instrumentation and detectors, reactor and accelerator-based neutron sources, improved evaluation, validation and modelling in order to achieve the required accuracies to better assess uncertainties and correlations in their evaluation.
- Demonstrate that proposed activities will be applied to the demonstration facilities in the energy and non-energy fields, for example innovative design improvements, implementation of advanced fuel cycles, innovative light water reactors and small modular reactors, accident tolerant fuels, optimisation of radioactive waste management and geological disposal, production and use of radioisotopes (e.g. high precision nuclear data, for the major actinides present in advanced reactor fuels, to reduce uncertainties on isotopes with new relevance for applications; closing fuel cycles with minimisation of radioactive waste).
- Provide tangible contributions in the field of evaluated nuclear data, their testing and validation; develop and validate computer tools in the nuclear data pipeline; contribute to the Joint Evaluated Fission and Fusion (JEFF) evaluated nuclear data file and its production, and as such strengthen Euratom’s nuclear simulation capacities to support the identified High Priority Request List (HPRL) of the international evaluation cooperation working parties that monitor priority nuclear data needs for nuclear applications, e.g. OECD Nuclear Energy Agency Working Party on International Nuclear Data Evaluation Cooperation, JEFF and the International Atomic Energy Agency.

Safe spent fuel and radioactive waste management, decommissioning

A co-funded European partnership on radioactive waste management (EURAD-2) is proposed within this work programme, ‘Other actions not subject to calls for proposals, grants to identified beneficiaries’ section, as a follow-up to EURAD.

Proposals are invited against the following topic(s):

HORIZON-EURATOM-2023-NRT-01-07: Innovative technologies for safety and excellence in decommissioning, including robotics and artificial intelligence

Specific conditions	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 2.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 3.54 million.
<i>Type of Action</i>	Innovation Actions
<i>Eligibility conditions</i>	The conditions are described in General Annex B. The following exceptions apply: The Joint Research Centre (JRC) may participate as member of the consortium selected for funding.
<i>Legal and financial set-up of the Grant Agreements</i>	The rules are described in General Annex G. The following exceptions apply: Beneficiaries may provide financial support to third parties. The maximum amount to be granted to each third party is EUR 60 000.

Expected Outcome: Project results are expected to contribute to all of the following expected outcomes:

- improve safety in the decommissioning of nuclear systems, minimising operational waste, dismantling waste and improving the environmental remediation of nuclear facilities;
- fulfil decommissioning requirements of the Nuclear Safety Directive⁷⁸, Basic Safety Standards Directive⁷⁹ and Radioactive Waste Management Directive⁸⁰;

⁷⁸ Council Directive 2009/71/Euratom of 25 June 2009 establishing a Community framework for the nuclear safety of nuclear installations ((OJ L 172, 2.7.2009, p.18), as amended by Council Directive 2014/87/Euratom of 8 July 2014 amending Directive 2009/71/Euratom establishing a Community framework for the nuclear safety of nuclear installations (OJ L 219, 25.7.2014, p. 42).

⁷⁹ Council Directive 2013/59/Euratom of 5 December 2013 laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation, and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom.

⁸⁰ Council Directive 2011/70/Euratom of 19 July 2011 establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste (OJ L 199, 2.8.2011, p. 48–56)

- contribute to excellence in decommissioning, while developing cutting-edge technological innovation, competitive and resilient industry initiatives, future-proof jobs and skills for a fair transition.

Scope: Decommissioning is currently recognised as a fixed part of the nuclear facilities' life cycle. This cannot be neglected when implementing a sustainable energy future. This also reflects the public interest and the contemporary principle of environmental sustainability related to any industrial activity. Though various dismantling techniques are at the level of industrial maturity, there are still specific challenges to achieving high safety standards, efficiency and cost-effectiveness of dismantling operations.

As identified in the Euratom project portfolio and the SHARE project⁸¹, a roadmap for research and innovation in decommissioning has been published based on the needs and gaps identified across the whole decommissioning value chain and built on the input of the international stakeholder community,. The thematic areas that should be prioritised are in situ waste characterisation and segregation, robotics and remote systems, difficult to measure radionuclides, clearance of surfaces and structures, cost estimation and knowledge management. In particular, specific needs include developing remote, integrated and automatic technologies for waste characterisation and segregation, but also modular and mobile systems and robotic solutions to address the hard-to-access areas in a new and cost-effective way and developing data collection protocols and a global cost estimation methodology.

Decommissioning is a multidisciplinary process and experts anticipate that 'open innovation beyond technology' and digital and robotics' technologies can provide crucial insights for the overall planning and implementation of decommissioning projects. Establishing guidelines and sharing best practices on the implementation of digital technologies like Building Information Modelling, digital twins and artificial intelligence is also expected to improve key decommissioning tasks. International cooperation will result in a relative harmonisation of decommissioning waste management systems, including its packaging, transport and storage. Harmonisation of clearance criteria for radioactive materials from decommissioning will also improve recycling in and out of the nuclear sector.

In addition, Euratom research supported here will also benefit from JRC support as the EU-mandated actor in helping create knowledge, share experience and spread knowledge among different EU stakeholders in a coordinated way⁸². As a result, it should build regulators' trust in introducing innovative and modern techniques by boosting safety and efficiency and improving the evaluation of safety margins and licensing procedures.

⁸¹ Euratom SHARE project (2019-22): <https://share-h2020.eu/> and <https://cordis.europa.eu/project/id/847626>

⁸² Council Regulation (Euratom) 2021/100 of 25 January 2021, covering the period 2021-27, establishing a dedicated financial programme for the decommissioning of nuclear facilities and the management of radioactive waste: <https://eur-lex.europa.eu/eli/reg/2021/100/oj>

Nuclear science and ionising radiation applications, radiation protection, and emergency preparedness

Proposals are invited against the following topic(s):

HORIZON-EURATOM-2023-NRT-01-08: Safety of low enriched fuel for research reactors - securing the supply of medical radioisotopes

Specific conditions	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 7.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 6.35 million.
<i>Type of Action</i>	Innovation Actions
<i>Eligibility conditions</i>	The conditions are described in General Annex B. The following exceptions apply: The Joint Research Centre (JRC) may participate as member of the consortium selected for funding.
<i>Legal and financial set-up of the Grant Agreements</i>	The rules are described in General Annex G. The following exceptions apply: Beneficiaries may provide financial support to third parties. The maximum amount to be granted to each third party is EUR 60 000.

Expected Outcome: Project results are expected to contribute to all of the following expected outcomes:

- Develop competencies and ensure continuity in the EU's excellence in research reactors while contributing to Europe's Beating Cancer Plan and implementing the Strategic Agenda for Medical Ionising Radiation Applications (SAMIRA).
- Support the future of European high-performance research reactors (HPRRs) and medium power research reactors (MPRRs) as world-leading neutron sources and reliable production facilities for medical radioisotopes by ensuring knowledge and technologies for an adequate supply of high-assay low-enriched uranium (HALEU) fuel and targets.
- Address the relevant requirements of the Nuclear Safety Directive, Basic Safety Standards Directive and Radioactive Waste Management Directive, and improve the sharing of best practices between the European nuclear industry, research and other

relevant organisations (e.g. for metrology), universities, technical support organisations, the European Nuclear Safety Regulators Group and the Western European Nuclear Regulators Association, thereby maintaining the high safety standards for research reactors in the EU.

Scope: Europe has a unique portfolio of HPRRs and MPRRs. They are vital to a number of scientific areas, from basic research and materials research, nuclear physics, medical and life sciences to the education and training of highly qualified experts. These are essential for implementing the highest nuclear safety standards in Europe.

These first-class research reactors are mostly used for irradiation testing of existing and future materials. This enables scientific advances crucial to the development of applied technologies, production of homogeneously doped silicon for high-performance semiconductors and production of radioisotopes for industry and nuclear medicine. This enables a stronger European Health Union and a more secure, better-prepared and more resilient EU.

Euratom research will be driven by further development and qualification work by European HPRR and MPRR operators to enable their research reactors to be converted from highly enriched uranium to low-enriched uranium, and/or to ensure the supply of alternative fuels, including reactor-specific prototype demonstrations. Challenges relate among others to innovative manufacturing technologies for nuclear components and metallic nuclear fuel using HALEU, specifically in the domain of monolithic UMo-based fuel production in the EU as the highest density HALEU fuel possible to improve uranium economy in the conversion of current research reactors and the design of future research reactors, without excluding other alloys and metals.

To secure the supply of HALEU, it is necessary to carry out R&D on the metallisation of low-enriched uranium by alternative methods to provide options to potential future EU manufacturers of HALEU. Advanced post-irradiation examinations and thermal conductivity measurements to support the qualification of high-density fuels and reactor-specific licensing are also necessary.

Action should improve HPRR and MPRR operational safety and serve for state-of-art licensing procedures by developing, verifying and validating advanced modelling and simulation tools in relation to neutronics, thermal hydraulics and the mechanical stability of reactor cores using codes developed in Europe, e.g. SERPENT 2, but also by introducing digital technologies and artificial intelligence to reactor design. As a result, the action should increase regulators' trust in introducing modern quality assured techniques into the licensing procedures of nuclear facilities and the evaluation of reactor safety margins.

HORIZON-EURATOM-2023-NRT-01-09: Nuclear and radiation techniques for EU strategic autonomy, circular economy and climate change policies

Specific conditions	
<i>Expected EU</i>	The Commission estimates that an EU contribution of around EUR

<i>contribution per project</i>	2.33 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 5.63 million.
<i>Type of Action</i>	Research and Innovation Actions
<i>Eligibility conditions</i>	The conditions are described in General Annex B. The following exceptions apply: The Joint Research Centre (JRC) may participate as member of the consortium selected for funding.
<i>Legal and financial set-up of the Grant Agreements</i>	The rules are described in General Annex G. The following exceptions apply: Beneficiaries may provide financial support to third parties. The maximum amount to be granted to each third party is EUR 60 000.

Expected Outcome: Project results are expected to contribute to some of the following expected outcomes:

- Contribute to the EU's strategic autonomy by demonstrating concepts and solutions using nuclear and radiation techniques for producing critical raw materials, recovering rare-earth metals (lanthanides) from any waste, including radioactive waste and spent fuel, and exploring their market potential.
- Contribute to the EU's circular economy by demonstrating concepts and solutions using nuclear and radiation techniques to reduce, recycle and reuse non-radioactive waste from domestic and industrial sources and explore their market potential.
- Contribute to climate change adaptation by demonstrating concepts and quality assured services for applications of nuclear and radiation techniques to monitor climate change and pollution of ecosystems and explore their market potential.

Scope: The potential for innovative ionising radiation applications is enormous and should support the EU's strategic autonomy, circular economy and climate change policies. The areas are extensive and concern applications of charged particle beams (accelerators), x-rays, radioisotopes (alpha, beta and gamma emitters) and neutrons. For example, radiometric techniques and radioisotopes as tracers allow for monitoring climate change effects on ecosystems and soil, water and air pollution. Irradiation processes offer advantages over typical thermal and chemical processes, including higher throughput rates, reduced energy consumption, lower environmental pollution, more precise process control and products with superior qualities.

The development of nuclear and radiation techniques can help diversify the supply of secondary critical raw materials from non-EU countries and within Europe. Action in this area should develop EU capacity for innovative exploration and production of secondary raw materials and/or recovery/recycling of raw materials from spent nuclear fuel, e.g. rare-earth metals (lanthanides).

In environmental protection and monitoring, an action should modify existing quality assured nuclear techniques and develop new ones to provide complementary solutions for conventional climate adaptation and climate science technologies. These solutions should help build EU resilience and reduce EU vulnerabilities in land use and management, smart climate agriculture, food production systems, analysis of greenhouse gas emissions, management of water resources, and ocean and coastal protection.

On pollution, the development of radiation technologies and isotopic tracing techniques offer solutions, for instance, to waste water treatment or to characterising and assessing microplastic pollution while allowing for recycling and transforming waste into reusable resources. Action in this area could cover sorting challenges, waste treatment and transformation into secondary products, cleaner production and recycling processes, reducing the use of potentially harmful additives and solvents and delivering energy savings.

All potential solutions using nuclear techniques are expected to:

- Improve radiation protection of personnel, expertise in radiation protection, safety and security of radioactive sources, waste management, and reduce contamination risk, loss or theft.
- Be combined with newly emerging technologies such as artificial intelligence, big data or metamaterials, thereby stimulating innovation and promoting a robust, world-leading nuclear technologies sector based on EU safety culture and know-how.
- Aim at ‘open innovation’, involving a broad range of actors from research and academic communities, industry, entrepreneurs and users. It should bring together multidisciplinary teams to generate ideas and solutions in an open innovation environment by increasing investment and bringing more companies and regions into the knowledge economy.
- Provide valid data from experiments, with the full chain of traceability with smallest reachable uncertainties as the best input for decision-makers.

This action could focus on closer-to-the-market activities, including prototyping, testing, demonstrating, piloting and scaling up new or improved products, processes or services. Proposals may include limited R&D activities and demonstrate European added value. Activities are expected to focus on Technology Readiness Levels 5 to 7 (indicative but not mandatory, depending on the innovative potential field).

HORIZON-EURATOM-2023-NRT-01-10: Harnessing innovation in nuclear science, technology and radiation protection

Specific conditions	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 3.50 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 7.33 million.
<i>Type of Action</i>	Innovation Actions
<i>Eligibility conditions</i>	The conditions are described in General Annex B. The following exceptions apply: The Joint Research Centre (JRC) may participate as member of the consortium selected for funding.
<i>Legal and financial set-up of the Grant Agreements</i>	The rules are described in General Annex G. The following exceptions apply: Beneficiaries may provide financial support to third parties. The maximum amount to be granted to each third party is EUR 60 000.

Expected Outcome: Project results are expected to contribute to some of the following expected outcomes:

- Bring a breakthrough innovation in radiation protection and emergency preparedness to improve protection against ionising radiation, bringing benefits to society using cross-cutting technologies like digitalisation, modelling or simulation, and artificial intelligence where appropriate.
- Address safety aspects of alternative applications of nuclear energy (e.g. hydrogen production, process heat for energy-intensive industries, district heating and desalinisation), allowing some Member States to contribute to the energy transition according to and respecting the EU technology neutrality principle and thus increase Member State and EU security of supply.
- Develop new nuclear techniques or optimise existing ones in the medical field, addressing in particular safety and radiation protection aspects.
- Support the development of European production of stable isotopes used in novel nuclear medicine therapies.

- Bring innovation in communication about nuclear applications and their risks to ensure informed decisions by stakeholders, civil society and decision-makers.

Scope: This action aims to bring innovation, including via cross-fertilisation with other scientific and technical sectors, to radiation protection. This complements the PIANOFORTE European partnership in medical applications and emergency preparedness, alternative applications of nuclear energy, and risk communication with civil society and decision-makers.

In terms of radiation protection and emergency preparedness, the PIANOFORTE partnership will be the main driving force for research for the coming 5 years, consolidating an EU-wide research and innovation community. The purpose of this action is to complement the PIANOFORTE partnership by fostering frontier research and testing novel ideas that can bring about a breakthrough innovation in the field. The proposals should complement, without duplicating, the research challenges addressed in the PIANOFORTE research roadmap.

In the context of the energy transition and complementing Horizon Europe's objectives, nuclear energy and innovative nuclear technology applications can provide some Member States with solutions to support climate change mitigation. Nuclear technologies could provide solutions that enable energy-intensive industries to develop and reduce their environmental footprint while remaining competitive. Nuclear has the potential to supply heat to homes, businesses and industrial processes, and produce hydrogen and synthetic fuels or non-electric commodities such as purified water or fertilisers. Some non-electric applications for nuclear energy have been demonstrated and implemented by industry, but their full potential still needs to be demonstrated. The Euratom-funded action should address the safety challenges related to developing and implementing non-electric applications for nuclear energy.

Concerning human health, there are many technologies in various fields of medical applications of ionising radiation. These include targeted radionuclide therapy, targeted therapies based on ion or proton therapy, new technologies for interventional imaging procedures and molecular imaging approaches, and the development of vaccines using irradiation techniques. The rapidly developing medical radiation technologies are becoming more complex and increasingly rely on automation, computerised decision support and AI-based systems. The Euratom-funded action should address the development of new quality assured nuclear techniques or optimisation of existing ones in the medical field. This includes data processing methodologies using artificial intelligence, optimisation of the medical use of ionising radiation and corresponding optimisation of radiation protection.

Each year, patients in Europe benefit from nuclear medicine in diagnosing and treating illnesses such as cancer, cardiovascular or neurological disorders. The EU supply of novel radiopharmaceuticals for cancer therapy is at risk due to the growing uncertainties over imports of enriched stable isotopes from Russia. Ensuring European know-how and the EU's strategic capabilities in this field is essential for the decades to come.

When communicating about nuclear applications and their risks, proposals are expected to bring about and test novel ideas for risk communication to ensure informed decisions by stakeholders, civil society and decision-makers.

HORIZON-EURATOM-2023-NRT-01-11: Preparatory phase for a European production capability to secure a supply of high-assay low-enriched uranium (HALEU) fuel

Specific conditions	
<i>Expected EU contribution per project</i>	The Commission estimates that an EU contribution of around EUR 1.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
<i>Indicative budget</i>	The total indicative budget for the topic is EUR 0.81 million.
<i>Type of Action</i>	Coordination and Support Actions

Expected Outcome: Project results are expected to contribute to some of the following expected outcomes:

- Security of supply, long-term availability, accessibility and strategic autonomy from 2030-35 onwards of High Assay Low Enriched Uranium (HALEU) fuel and targets⁸³, in metallic form, which are at an increasing risk due to the current geopolitical circumstances and the growing uncertainties over delivery capacities from outside the EU beyond 2030.
- To support the EU's production capability and long-term supply of HALEU for European research reactors and the production of medical radioisotopes⁸⁴.
- To contribute to addressing key challenges of Horizon Europe missions and EU priorities in the energy and health sectors and recommendations from the Advisory Committee of the Euratom Supply Agency among others on Europe's Beating Cancer Plan, the implementation of the Strategic Agenda for Medical Ionising Radiation Applications (SAMIRA) and REPowerEU⁸⁵ for a more affordable, secure and sustainable energy supply.

⁸³ Euratom Supply Agency HALEU report, dated May 2019: https://euratom-supply.ec.europa.eu/document/download/12807835-097f-4f85-806e-f155722ffedc_en?filename=ESA_HALEU_report_2019.pdf, Euratom Supply Agency HALEU report dated May 2022, ESA HALEU report dated May 2022, ESA HALEU report dated May 2022: https://euratom-supply.ec.europa.eu/document/download/f639d7d8-1447-4834-bf27-861b860662c1_en?filename=HALEU%20report%20May%202022%20print.pdf

⁸⁴ European Observatory on the Supply of Medical Radioisotopes: https://euratom-supply.ec.europa.eu/index_en

⁸⁵ REPowerEU press release https://ec.europa.eu/commission/presscorner/detail/en/ip_22_1511 and https://ec.europa.eu/commission/presscorner/detail/en/STATEMENT_22_3176 and COM/2022/230

- Implementing the requirements of the Nuclear Safety Directive and improving the sharing of short- to long-term best practices between the European nuclear industry, research organisations, universities, technical support organisations, the European Nuclear Safety Regulators Group and the Western European Nuclear Regulators Association to one day build a metal HALEU production facility; thereby committing to maintaining and developing critical competencies in relevant technologies influenced by an uncertain geopolitical context, industrial know-how and competitiveness, and the high safety standards already achieved within the EU.

Scope: To reduce the risk of nuclear proliferation, EU Member States are strongly committed to the principle of minimisation of highly enriched uranium, with the objective of converting research reactors and radioisotope production targets to high-assay low-enriched (19.75%) uranium (HALEU).

HALEU is currently exclusively supplied from outside the EU, with Russia one of the main suppliers. Apart from its use in research reactors and for the production of radioisotopes, HALEU is also attracting interest in the development of fuel systems for advanced and innovative reactor systems, including small modular reactors, and nuclear-powered space exploration. With higher enrichment, longer fuel cycles become possible and fast reactor systems are more readily deployable.

In line with this political commitment, EU research reactors have been actively working towards this conversion as soon as technically and economically feasible. Several EU research reactors and radioisotope production facilities have already successfully made the transition to HALEU, while others have ongoing conversion projects.

Maintaining sovereign know-how and rebuilding some strategic capabilities in the production of HALEU metal will be essential for the EU for the decades to come, given the scale of the associated challenges in the geostrategic, climate and resource management fields. In particular, at a time when the EU is seeking to guarantee its strategic autonomy in critical sectors, these capabilities will help secure the EU's supply chains, including for medical radioisotopes. The EU must therefore explore alternatives to ensure the future availability of HALEU for its needs. Without any new initiative, the security of supply of this critically important material will be at risk after 2035.

This action should provide catalytic and leveraging support for a preparatory phase aiming at bringing the project to a level of maturity required to potentially enable construction work to start on the EU's production capability. It should therefore cover all relevant outstanding issues in strategic planning, technical work, financial arrangements and financing mechanisms, project logistics and legal aspects.

The preparatory phase should aim at optimal coordination, cross-border operation and possible integration of national research actions of trans-European interest in the field. This might lead to the possible setting up or reinforcement of legal entities to achieve optimal

cooperation and joint programming. The preparatory phase should aim to bring the initiatives emerging today in different fields to the level of managerial, legal and financial maturity required to implement them. Project consortia should involve all the stakeholders necessary to move the project forward, take decisions and make financial commitments before joint programmes can start (e.g. national or regional ministries or governments, research councils, funding agencies). Operators of research facilities, research centres, universities, industry and regulatory authorities should be involved where appropriate. During these activities, the Commission will act as a facilitator.

The preparatory phase should include:

- Strategic work
 - o *ex ante* analysis of the socio-economic impact of the initiatives, taking the limits and long term benefits into account;
 - o plans to integrate the different national research initiatives in accordance with the EU objective of balanced territorial development whenever appropriate;
 - o creation or consolidation of centres of excellence or regional partner facilities.
- Management work
 - o planning in terms of coordination and integration of national efforts for a period of at least 10 years;
 - o recruitment plan (timing, resources) to manage the initiatives;
 - o organisation of logistic support for European research teams, including the setting up of the required e-infrastructure.
- Governance work: preparation of adequate decision-making and (separated) management structures, advisory bodies, intellectual property rights, access rules for researchers, etc.
- Financial work
 - o financial arrangements, possibly step by step, for the coordination and integration of national efforts following EU principles and the Financial Regulation;
 - o studying new mechanisms, for example pre-commercial procurement processes or support from EU structural funds or Important Projects of Common European Interest (IPCEI), by which public authorities may develop new research & innovation approaches.
- Legal work
 - o identification of adequate legal structures for the setting up, construction and operation of the integrated or joint research programmes;

- o drafting of intergovernmental agreements in the form of a ‘signature-ready’ document for the setting up and actual implementation of the initiatives.
- Technical work, whenever needed, such as:
 - o planning for the transfer of knowledge from existing prototypes or key enabling technologies developed at national level to the Euratom Community;
 - o adaptation of national research facilities ensuring their optimal exploitation by the beneficiary scientific communities at European level; additional research work can also be proposed, provided it helps meet the above objectives.

After 2 years, a successful preparatory phase should lead to the implementation of joint programmes based on public-public and public-private partnerships, with increased efficiency and consistency as well as better visibility and attractiveness at global level.

Other actions not subject to calls for proposals

Grants to identified beneficiaries

1. Support for the consolidation phase of the International Fusion Materials Irradiation Facility – DEMO Oriented Early Neutron Source (IFMIF-DONES)

This action should support:

- IFMIF-DONES programme partners in the decision-making process, especially in planning, costing and risk evaluation.
- Consolidation of the IFMIF-DONES programme governance rules and documents to complete a framework for effective and efficient collaboration between all stakeholders.
- Partners in the early phase of project team implementation and in the transition period up to the moment when government funds are made available.
- The further definition and design of complementary experimental areas outside of fusion research.
- Further work on planning the operation and exploitation phase, with special emphasis on implementing the relevant conclusions of the DONES preparatory phase and on involving other EU facilities in the programme (including detailed measures for the transport of irradiated materials to external facilities).
- Further preparation of the licensing of the facility and its components, building upon the work performed under the DONES preparatory phase and the Framework Contract for the provision of expert industrial competences for the conceptual design activities of the European fusion demonstration reactor⁸⁶.

Scope:

The Euratom programme has the specific objective of supporting the development of fusion energy as a potential future energy source for electricity production and helping implement the EUROfusion roadmap. This roadmap⁸⁷ has identified the IFMIF-DONES materials test facility as a high priority requirement for the design and construction of a demonstration fusion power plant. The IFMIF-DONES facility was also included in the 2018 update of the European Strategy Forum on Research Infrastructures roadmap. It was subsequently awarded Euratom funding for a preparatory phase, which was concluded in December 2021.

The preparatory phase brought the project to a level of legal, financial and, where applicable, technical maturity required for its implementation⁸⁸. However, the early stages of the research

⁸⁶ RTD/2019/OP/D4/FWC/010

⁸⁷ <https://www.euro-fusion.org/eurofusion/roadmap/>

⁸⁸ The general objective of the DONES preparatory phase was to prepare for the international implementation of the DONES programme, whose purpose was the construction of the IFMIF-DONES

infrastructure life cycle are particularly challenging, also considering additional difficulties linked to the COVID-19 pandemic. Similar to Horizon Europe's actions that support the development and consolidation of the European research infrastructure landscape, it is necessary to award a consolidation grant to IFMIF-DONES to resolve any remaining issues that prevent this project being developed as a fully-fledged pan-European research infrastructure.

Expected impacts of the IFMIF-DONES facility include:

- achieving a major milestone in the EUROfusion roadmap;
- providing first-of-a-kind structural materials data for a fusion demonstration power plant;
- providing a flexible facility that can be upgraded to support materials testing for a commercial fusion power plant;
- providing a facility with neutron spectrum and flux for materials testing in other sectors such as health and environment.

This grant will be awarded without a call for proposals in accordance with Article 195(e) of the Financial Regulation and the relevant provisions of the Regulation establishing the Euratom Research and Training Programme 2021-2025.

The general conditions, including admissibility conditions, eligibility conditions, award criteria, the evaluation and award procedure, the legal and financial set-up for grants, financial and operational capacity and exclusion are provided in Parts A to G of the General Annexes.

Legal entities:

CONSORCIO PARA EL IMPULSO DE LA CONSTRUCCIÓN EN ESPAÑA DE LA INFRAESTRUCTURA CIENTÍFICO-TÉCNICA IFMIF-DONES (Consortio IFMIF-DONES), Gran Via de Colon 48, Granada, Spain

Form of Funding: Grants not subject to calls for proposals

Type of Action: Grant to identified beneficiary according to Financial Regulation Article 195(e) - Coordination and support action

Indicative timetable: Q1-2023 – Q2-2024.

facility and its use for the testing, validation and qualification of the materials to be used in fusion power plants. Main results achieved include the proposal for an agreed governance and management model for DONES and related legal frameworks, including aspects such as intellectual property rights, user access strategy, HR strategy as well as a draft proposal for the rules of operation of the DONES Steering Committee. Financial planning for IFMIF-DONES construction has also been carried out, including cost estimates, cost book, project schedule, project plan, risk analysis, possible contributions from the partners as well as use of EU funds. Other (non-fusion related) complementary experiments at IFMIF-DONES have also been identified and assessed, together with a network of support facilities already available in Europe of interest during the construction and operation of IFMIF-DONES and for the exploitation of its results.

Indicative budget: EUR 1.25 million from the 2023 budget

2. FISA 2025 – EURADWASTE’25 conferences on Euratom fission research and training (Presidency event)

Support will be provided for the organisation of FISA 2025 – EURADWASTE’25 conferences on the outcomes and perspectives for the Euratom Research and Training Programme. They are organised every 3 to 4 years, with the last conferences having taken place in Lyon in 2022.

The next conferences should take place in 2025 during the Polish EU Presidency. The objectives will be:

- to take part in discussions on the state of play of R&D and key challenges addressed at national, European and international level, synergies and partnerships, and future perspectives;
- to share updated information on the achievements of some 60 projects carried out since the previous edition in 2022 (as part of the Euratom Research and Training Programme 2021-2025);
- to interact within dedicated parallel and poster sessions, workshops or forums, exhibitions, business and Young Generation nuclear researchers’ matchmaking, e.g. ENS YGN, SNETP, IGDTP or MELODI;
- to reward relevance and excellence performed in nuclear research and innovation: ENEN PhD Event & Prize, calls for PhD and MSc posters, R&D topics and Nuclear Innovation Prize;
- to learn more about the latest European Framework Programme for Research and Innovation for the period 2021-27, Horizon Europe and Euratom Research and Training programmes, and forward-looking key policy recommendations from all stakeholders and policymakers.

FISA 2025 – EURADWASTE’25 conferences will address and engage with all relevant stakeholders involved: research and training organisations, academia, industry, European technology platforms, European forums, European civil society, and international organisations. There will also be many opportunities for interaction in dedicated parallel and poster sessions, thematic workshops, R&D awards, and nuclear innovation prizes.

This grant will be awarded without a call for proposals in accordance with Article 195(e) of the Financial Regulation and the relevant provisions of the Regulation establishing the Euratom Research and Training Programme 2021-2025.

The general conditions, including admissibility conditions, eligibility conditions, award criteria, the evaluation and award procedure, the legal and financial set-up for grants, financial and operational capacity and exclusion, are provided in Parts A to G of the General Annexes.

Legal entities:

National Centre for Nuclear Research (NCBJ, NARODOWE CENTRUM BADAN JADROWYCH), ULICA ANDRZEJA SOLTANA 7, 05-400, OTWOCK, Poland

Form of Funding: Grants not subject to calls for proposals

Type of Action: Grant to identified beneficiary according to Financial Regulation Article 195(e) - Coordination and support action

Indicative timetable: Q2-2024 – Q2-2025

Indicative budget: EUR 0.30 million from the 2024 budget

3. Education, training, capacity building and networking actions to strengthen Ukrainian and EU nuclear research

This action should support:

- further cooperation with Ukrainian research entities and academia to improve the participation of their researchers in co-funded Euratom research and training activities, thereby enabling broader, more efficient and inclusive collaboration in the field that is mutually beneficial;
- nuclear education and training programmes to ensure that adequate nuclear knowledge and capabilities are maintained so that nuclear installations can be operated safely in Ukraine;
- realisation of the full potential of Ukrainian research entities and infrastructures, and research programmes in a European framework that covers specific areas of the Euratom Research and Training Programme.

Scope:

Nuclear expertise is key to mastering nuclear technology and to operating nuclear installations safely. With 15 nuclear power plants, Ukraine is one of the biggest operators in Europe, and also uses a wide range of other nuclear research installations.

The ongoing Russian invasion of Ukraine puts the safe operation of Ukrainian nuclear installations at serious risk. Damage was caused to the overall education and training academic framework in addition to infrastructures and loss of human capacity, as many people have to seek refuge in non-occupied parts of Ukraine or even abroad. To counter these negative tendencies, the EU is supporting high-level nuclear education and training, knowledge management and competences in Ukraine.

To preserve the pre-invasion level of nuclear education and training in the country and cover the country's human capital needs with adequate knowledge, the major nuclear education and training providers in Ukraine will take part in this action. Nuclear operators and regulatory

technical support organisations are also expected to participate, including EU Member State institutions experienced in implementing technical assistance programmes.

This action should also benefit from close interactions with the Ukrainian National Contact Point to Euratom. This should result in a better integration of Ukrainian research entities into EU/Euratom nuclear research networks and vice versa. Supported activities should be tailored by the area and the priorities of the organisations concerned, such as promoting and continuously delivering university teaching and courses, joint workshops, better cross-border brokerage events or specific training linked to this field.

Special attention should be given to boosting competences and high-level safety standards of Ukrainian entities. This includes MSc/PhD students, researchers, the availability of teachers, all actors helping to acquire the know-how accumulated in other countries, facilitating transnational cooperation to identify and share good practices, and raising the general standards, including support to programme applicants.

This grant will be awarded without a call for proposals in accordance with Article 195(e) of the Financial Regulation and the relevant provisions of the Regulation establishing the Euratom Research and Training Programme 2021-2025.

The general conditions, including admissibility conditions, eligibility conditions, award criteria, the evaluation and award procedure, the legal and financial set-up for grants, financial and operational capacity and exclusion are provided in Parts A to G of the General Annexes.

An exception applies in that beneficiaries may provide financial support to third parties with the maximum amount that may be granted to each third-party being EUR 60 000.

Legal entities:

National Science Centre Kharkov Institute of Physics and Technology, 1 Akademichna St., Kharkiv, 61108, Ukraine

V. N. Karazin Kharkiv National University, 4 Svobody Sq., Kharkiv, 61022, Ukraine

National Technical University "Kharkiv Polytechnic Institute, 2 Kyrpychova St., Kharkiv, 61002, Ukraine

National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute", 37 Peremohy Av., Kyiv, 03056, Ukraine

Taras Shevchenko National University of Kyiv, 64/13 Volodymyrska St., Kyiv, 01601, Ukraine

Odessa Polytechnic National University, 1 Shevchenko Av., Odessa, 65044, Ukraine

Form of Funding: Grants not subject to calls for proposals

Type of Action: Grant to identified beneficiary according to Financial Regulation Article 195(e) - Coordination and support action

Indicative timetable: Q3-2023 – Q4-2025.

Indicative budget: EUR 0.75 million from the 2023 budget

4. Co-funded European partnership on radioactive waste management

Introduction

The first European Joint Programme on Radioactive Waste Management (EURAD) will end in May 2024 and has delivered substantial results over the past 5 years. The detailed roadmap drawn up by EURAD enables waste management organisations and other stakeholders to access existing knowledge and ongoing work or future plans in EURAD and elsewhere. The content is focused on what knowledge and competencies (including infrastructure) are considered most critical for the implementation of radioactive waste management.

While the Finnish and Swedish national programmes focus on the construction and operational phases of their respective geological disposal repositories, other Member States are yet to define/implement their national programmes for spent fuel and radioactive waste management. The challenges in this field for the next decade include:

- Build on the structure, network and tools that EURAD has established to maintain a sound and efficient knowledge management system. This ensures that information and competences are retained over time, and promotes knowledge transfer and the sharing of best practices between the advanced Member States and those at an early stage.
- Improve, innovate and develop science and technology for the management and disposal of radioactive waste and address the different radioactive waste streams when appropriate.
- Consolidate the knowledge for a safe start to operating the first geological disposal facilities and support all Member States' national programmes in line with the requirements under Directive 2011/70/Euratom and Commission report COM(2017) 236.
- Provide input to the next set of Member States with mature site selection programmes, and thus with construction and operation in sight, in order to promote broadly accepted industrialisation of nuclear waste disposal in the EU.

In view of the shared goals and clear scope for synergies in this field, the Commission invites the radioactive waste management community to submit a proposal for a co-funded European partnership on radioactive waste management for 5 years (2024-29)⁸⁹ (EURAD-2). The proposal should take into account the recommendations of the mid-term expert review of the ongoing EURAD.

⁸⁹ Subject to adoption by the Council of a Regulation establishing the Euratom Research and Training Programme 2026-2027, and adoption of the Euratom Work Programme 2026-2027, the Commission envisages providing top-up funding to the partnership, which will be determined later.

Additionally, EURAD-2 needs to be more inclusive and reach out to the Member States that did not participate in EURAD, as the scope of the partnership covers all Member States with radioactive waste inventories and is not limited to nuclear power generating countries. Actors representing new topics will also be needed. Participating Member States and Associated Countries will need to formally designate the mandated actors accordingly that will be able to be part of EURAD-2.

To make the future partnership comprehensive, EURAD-2 will also have to reach out to the regulatory bodies in order to establish regular interactions with them without compromising their independence. In addition to the regulators, the partnership should reach out to the waste owners/generators/processors when relevant, in particular on topics related to predisposal activities.

Expected impacts

The European partnership on radioactive waste management should set out a credible pathway to contributing to all of the following impacts⁹⁰:

1. Support compliance with European Directives;
2. Support the long-term passive safety features of radioactive waste disposal facilities/repositories;
3. Help build or maintain public confidence and awareness in radioactive waste management;
4. Support radioactive waste management innovation and optimisation;
5. Contribute to addressing scientific/technical challenges;
6. Contribute to addressing the evolving regulatory concerns;
7. Boost knowledge transfer to early-stage programmes;
8. Encourage the efficient use of R&D resources at EU level;
9. Encourage a better transfer of knowledge across generations of experts and between experts from different fields of expertise.

While EURAD's expected impacts are similar to the ones listed above, the new partnership will build on the lessons learned from it. In particular, it will focus on making the established knowledge management system on radioactive waste management more efficient and robust, which in return will help achieve impacts 3, 7 and 9. Strategic issues are addressed by bringing together implementers, the R&D scientific technical community, technical support organisations, waste generators, regulators and civil society, all through their different roles as

⁹⁰ In 2018, as part of the JOPRAD project and in preparation of the EURAD programme, a Vision was established explaining how the European Joint Programme will impact radioactive waste management in Europe. This Vision is still valid today and the second partnership, EURAD-2, will build up on the strategic expected impacts of EURAD.

mandated actors or as end-user group members. As pointed out by the experts in charge of the mid-term review and during the workshop that took place on 30 May 2022 in the presence of Member State and Associated Country representatives, a global funding rate of 60% is strongly recommended so that knowledge management and strategic study work packages can be funded at 100% (against 70% in EURAD) without compromising the funding rate of R&D work packages (50%). Moreover, the inclusion of the predisposal activities in the partnership will also enlarge the scope of the expected impacts. Such inclusion should encourage early consideration of interdependences between the various management steps and ensure that we focus on the conformity of the waste in terms of waste acceptance criteria and disposability.

Expected outcomes

In line with the objectives of Directive 2011/70/Euratom, this COFUND action should support, within the next decade and across Europe, the safe start of operations of the first geological disposal facilities. It should also pave the way for more Member States to reach the stage of site selection and implementation, and make geological disposal a more broadly applied activity. Implementation of the action should result in greater cross-fertilisation and interaction between national programmes in key areas of general interest, improved knowledge management and transfer between actors. In particular, the European partnership is a unique opportunity for less advanced programmes to benefit from the integration process in the area of radioactive waste management.

The partnership results are expected to contribute to all of the following outcomes, linked to the impacts described above:

1. Support the definition and implementation of a radioactive waste management research programme in the Member States by developing competences and solutions for their radioactive waste (see Waste Directive Articles 8 and 12.1(f)).
2. Deliver science and technology-based, socially robust solutions for the safe management of spent fuel and radioactive waste in Europe, building among other things on the lessons learned during the safe implementation of the first geological disposal facilities for high-level and long-lived radioactive waste/spent nuclear fuel as well as improving, innovating and developing science and technology for the management and disposal of other radioactive waste categories.
3. Share and develop best practices and methodologies in all matters related to radioactive waste management – from generation to disposal – improve operational excellence and minimise operational, dismantling and induced secondary waste.
4. Improve the safe management of radioactive waste from generation to final disposal. An integrated approach to waste management would for instance address the different steps from start to finish and identify the needs and prerequisites for waste disposal from when the waste is generated. Applying such an approach would help target the key technological obstacles and improve the safe management of waste. In particular, it

would help evaluate the potential impacts of advanced fuel types and deployment of innovative types of reactors on waste management strategies.

5. Develop elements for a strategy for predisposal operations (including treatment solutions and interim storage) and the disposal of challenging radioactive waste streams.
6. Establish an inclusive collaborative framework that feeds and keeps up to date the EURAD roadmap, enabling users to access existing information and knowledge and active work or future plans related to all phases of a radioactive waste management programme. Ultimately, the partnership should provide an opportunity for less advanced radioactive waste management national programmes, and in particular those in an early stage of geological disposal programme implementation, to benefit from cross-European integration in radioactive waste management.
7. Consolidate knowledge transfer between Member States and across generations by providing a platform and network for training, mobility and available facilities in radioactive waste management. This allows existing knowledge, facilities and infrastructure to be shared rather than repeating and duplicating efforts. Knowledge management should allow the scientific technical community to conclude that from a scientific-technical point of view, processes are sufficiently well known for judging potential system evolutions with a high degree of certainty (and therefore promote the technical readiness for licensing). Furthermore, a thorough reflection should be launched on creating, at European level, a sustainable network of labs that could be used by all European partners in support of their programme needs.
8. Promote public debate and interactions with civil society to increase public confidence in the national radioactive waste management programmes by encouraging transparency, credibility and scientific excellence (see Article 10 of the Radioactive Waste Directive).

Scope

The aim is to implement a follow-up partnership, EURAD-2, in the safe management and disposal of radioactive waste. It will bring together a broad range of parties with scientific and technical responsibilities and a national mandate for research in radioactive waste management that are willing to pool resources in order to improve critical mass, efficiency and effectiveness in implementing solutions across Europe.

Mandated actors include: (i) waste management organisations tasked with managing and disposing of radioactive waste and represented by the Implementing Geological Disposal Technology Platform; (ii) technical support organisations that carry out activities to provide the technical and scientific basis for supporting the decisions made by a national regulatory body and are represented by the Sustainable network for independent technical expertise on radioactive waste management (SITEX); and (iii) nationally funded research entities involved in the R&D of radioactive waste management that established EURADSCIENCE during the European Joint Programme.

As with EURAD, the three colleges should continue to work together to pursue their shared interests while insuring their independence. Additionally, EURAD-2 should involve more the regulatory bodies from the Member States (potentially the European Nuclear Safety Regulators Group) who are potential end users. An end user group and its roles should be clearly defined. In addition to the regulatory bodies, industrial stakeholders such as waste generators should also be consulted as potential end users.

The proposed partnership should follow on from the development work carried out by EURAD, with extensive consultation of Member States' national programmes and the research community. The EURAD roadmap⁹¹ should form the basis for defining EURAD-2. It covers seven key themes in radioactive waste management over the six different phases of a radioactive waste management programme (as defined by the International Atomic Energy Agency). EURAD has identified the priorities related to each and the key challenges that should be addressed.

The partnership should be goal-driven, with clear and agreed high-level milestones in order to easily monitor progress. Its scope should include all scientific and technical areas and all horizontal activities related to knowledge management covered in the roadmap drawn up by EURAD (to which the PREDIS (pre-disposal management of radioactive waste) project has also contributed). The roadmap should enable joint research activities in management domains (including predisposal, which was covered by PREDIS during the European Joint Programme) and disposal of radioactive waste as laid down in Directive 2011/70/Euratom.

Work packages should be proposed with specific projects covering the scientific and technical priorities identified in the roadmap. The selection process of these packages should benefit from the experience of EURAD and should involve the mandated actors mentioned above.

Projects should cover areas of interest for small and large, advanced and less advanced waste management programmes. They should be defined by technical scope and should not be reserved for just one type of participant. Similar to what was done during the first EURAD, appropriate internal governance should be established in the consortium agreement and include a programme office, to which staff from the partners can be seconded on a full-time basis. The programme office should have a strategic role in ensuring implementation of the co-funded partnership as well as managing day-to-day activities.

An appropriate means of allocating project tasks and funding among the partners should be established on a yearly basis and take into account emerging science and technology as well as Euratom research priorities. This action aims to establish the partnership, and open calls for proposals for third party grants are not necessary. The partnership should cover all related activities: common research and strategic studies, the sharing of facilities, knowledge management, and the mobility and training of researchers. The management structure will ensure that the project 'owners' (the three types of mandated actors) drive the strategy. The involvement of external stakeholder groups should be incorporated into the governance

⁹¹ <https://www.ejp-eurad.eu/roadmap>

mechanism, for example to enable civil society organisations to advise and comment on activities.

To maximise knowledge management and especially the impact on smaller and less advanced national programmes, horizontal activities should be prioritised, including (i) the development of state-of-the-art documentation (e.g. textbooks), guidance documents for planning and implementing research; (ii) organisation of training courses, as appropriate, with European forums and activities on education and international organisations; (iii) hands-on training via mobility measures; and (iv) financial support for access to infrastructures. In addition, the partnership should be open to international R&D cooperation, and managers would be expected to represent it in areas of competence at international events and on forums.

Total indicative budget for the duration of the partnership and co-financing rate: the table below provides an overview of the 2023-2025 appropriations that will be committed for the co-funded grant to support the European partnership. EUR 20 million will be committed in instalments over the 3 years (2023-2025). The Euratom funding rate will be limited to a maximum of 60% of the total eligible costs of the action.

Budget year (EUR million)	2023	2024	2025	Total 2023-25
Co-funded European partnership for radioactive waste management research EURAD-2	10.59	6.88	2.53	20

Commitments of the partners in terms of their financial and/or in-kind contributions are expected to be provided for the governance structure, the joint calls and other dedicated implementation actions and efforts for national coordination. Proposals should pool the necessary financial resources from the participating national (or regional) research programmes with a view to implementing joint calls for transnational proposals that result in grants to third parties.

The following **specific conditions** apply to the co-funded European partnership for radioactive waste Management research:

The general conditions, including admissibility conditions, eligibility conditions, award criteria, the evaluation and award procedure, the legal and financial set-up for grants, financial and operational capacity and exclusion are provided in Parts A to G of the General Annexes. The specific conditions are as follows:

- Beneficiaries may provide financial support to third parties. The maximum amount to be granted to each third party is EUR 300 000. Financial support provided by the participants to third parties to implement joint research activities in the domains of management and disposal of radioactive waste as defined in Directive 2011/70/Euratom is one of the primary activities of the action in order to be able to achieve its objectives.

- The starting date of grants awarded under this topic may be retroactive provided that the applicant can demonstrate the need for starting the action prior to signing the grant agreement.

Legal entities:

List of legal entities nominated by Member States or Associated Countries (on Associated Countries, please refer to the General Annexes, section on eligibility) to participate in the co-funded European partnership on radioactive waste management.

AGENCE NATIONALE POUR LA GESTION DES DECHETS RADIOACTIFS (ANDRA),
1-7 rue Jean Monnet - Parc de la Croix Blanche, CHATENAY MALABRY 92298, France

AGENZIA NAZIONALE PER LE NUOVE TECNOLOGIE, L'ENERGIA E LO SVILUPPO
ECONOMICO SOSTENIBILE (ENEA), LUNGOTEVERE GRANDE AMMIRAGLIO
THAON DI REVEL 76, ROME 000196, Italy

ARAO-AGENCIJA ZA RADIOAKTIVNE ODPADKE LJUBLJANA ZAVOD (ARAO),
CELOVSKA C. 182, LJUBLJANA 1000, Slovenia

ASSOCIACAO DO INSTITUTO SUPERIOR TECNICO PARA A INVESTIGACAO E
DESENVOLVIMENTO (IST ID), AVENIDA ROVISCO PAIS 1, LISBON 1049 001,
Portugal

BEL V (BEL V), RUE WALCOURT 148, 1070 BRUSSELS, Belgium

BUNDESAMT FÜR DIE SICHERHEIT DER NUKLEAREN ENTSORGUNG (BASE),
WEGELYSTRASSE 8, 10623 BERLIN, Germany

BUNDESGESELLSCHAFT FÜR ENDLAGERUNG MBH (BGE), ESCHENSTRASSE 55,
PEINE 31224, Germany

CENTRALE ORGANISATIE VOOR RADIOACTIEF AFVAL NV (COVRA),
SPANJEWEG 1 HAVEN 8601, NIEUWDORP ZLD 4455 TW, Netherlands

CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE CNRS (CNRS), RUE
MICHEL ANGE 3, PARIS 75794, France

CENTRO DE INVESTIGACIONES ENERGETICAS, MEDIOAMBIENTALES Y
TECNOLOGICAS-CIEMAT (CIEMAT), Avenida Complutense 40, MADRID 28040, Spain

CENTRUM VYZKUMU REZ S.R.O. (CV REZ), HUSINEC-REZ 130, HUSINEC-REZ 250
68, Czechia

COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES
(CEA), RUE LEBLANC 25, PARIS 15 75015, France

DANSK DEKOMMISSIONERING (Dekom), FREDERIKSBORGVEJ 399, Roskilde 4000,
Denmark

EKOTEH DOSIMETRY RADIATION PROTECTION CO., VLADIMIRA RUŽDJAKA 21,
HR-10000 ZAGREB, REPUBLIC OF CROATIA

ELLINIKI EPITROPI ATOMIKIS ENERGEIAS (EEAE), NEAPOLEOS 4 PATRIARCHOU
GRIGORIOU, AGHIA PARASKEVI 15310, Greece

EMPRESA NACIONAL DE RESIDUOS RADIATIVOS S.A. (ENRESA), Calle Emilio
Vargas 7, MADRID 28043, Spain

ENERGIATUDOMANYI KUTATOKOZPONT (EK-CER), KONKOLY THEGE MIKLOS
UT 29-33, Budapest 1121, Hungary

EURADSCIENCE, AVENUE HERRMANN DEBROUX 40, 1160 BRUSSELS, Belgium

FORSCHUNGSZENTRUM JULICH GMBH (JUELICH), WILHELM JOHNEN STRASSE,
JULICH 52428, Germany

FUND FOR FINANCING THE DECOMMISSIONING OF THE KRŠKO NUCLEAR
POWER PLANT AND THE DISPOSAL OF KRŠKO NPP RADIOACTIVE WASTE AND
SPENT NUCLEAR FUEL, ULICA VJEKOSLAVA HEINZELA 70A 10000 ZAGREB,
REPUBLIC OF CROATIA

GEOLOGICHESKI INSTITUT PRI BAN ST.DIMITROV (GI-BAS), ACAD. GEORGI
BONCHEV STR., BLOCK 24, SOFIA 1113, Bulgaria

GESELLSCHAFT FUR ANLAGEN UND REAKTORSICHERHEIT (GRS) GmbH,
SCHWERTNERGASSE 1, COLOGNE 50667, Germany

HELSINGIN YLIOPISTO (UHelsinki), FABIANINKATU 33, HELSINGIN YLIOPISTO
00014, Finland

INSTITUT DE RADIOPROTECTION ET DE SURETE NUCLEAIRE (IRSN), AV DE LA
DIVISION LECLERC 31, FONTENAY AUX ROSES 92260, France

INSTITUT JOZEF STEFAN (JSI), Jamova 39, LJUBLJANA 1000, Slovenia, VAT number:
SI55560822

INSTITUTE FOR MEDICAL RESERCH AND OCCUPATIONAL HEALTH,
KSAVERSKA CESTA 2, HR10000 ZAGREB, REPUBLIC OF CROATIA

INSTITUTE OF ENVIRONMENTAL GEOCHEMISTRY OF THE NATIONAL
ACADEMY OF SCIENCES OF UKRAINE (SIIEG NASU), ACADEMICIAN PALLADIN
AVENUE, 34A, KYIV-142, 03142 Ukraine

INSTITUTO SUPERIOR TECNICO (IST), AVENIDA ROVISCO PAIS 1, LISBON 1049-
001, Portugal

INSTYTUT CHEMII I TECHNIKI JADROWEJ (INCT), ul. Dorodna 16, WARSAW 03-
195, Poland

JOINT RESEARCH CENTRE (JRC) , Rue de la Loi 200, 1049 BRUSSELS, Belgium

KARLSRUHER INSTITUT FUER TECHNOLOGIE (KIT), KAISERSTRASSE 12,
KARLSRUHE 76131, Germany

KIT/PROJEKTTRAEGER KARLSRUHE, HERMANN VON HELMHOLTZ PLATZ 1,
76344 EGGENSTEIN LEOPOLDSHAFEN, Germany

KUNGLIGA TEKNISKA HÖGSKOLAN (KTH), SE-100 44 STOCKHOLM, Sweden

LIETUVOS ENERGETIKOS INSTITUTAS (LEI), Breslaujos g. 3, KAUNAS LT-44403,
Lithuania

MINISTRY OF THE INTERIOR OF CROATIA - CIVIL PROTECTION DIRECTORATE –
DIVISION OF RADIOLOGICAL AND NUCLEAR SAFETY, NEHAJSKA 15, HR 10000
ZAGREB, REPUBLIC OF CROATIA

NARODNY JADROVY FOND (NJF), MIEROVA 19, BRATISLAVA 821 05, Slovakia

NATIONAL CENTER FOR SCIENTIFIC RESEARCH "DEMOKRITOS" (NCSR), END
OF PATRIARCHOU GRIGORIOU E AND 27 NEAPOLEOS STREET, AGIA
PARASKEVI 15341, Greece

NATIONAL SCIENCE CENTER KHARKOV INSTITUTE OF PHYSICS AND
TECHNOLOGY (KIPT), 1, AKADEMICHESKAYA ST., KHARKOV, 61108, Ukraine

NATIONAL TECHNICAL UNIVERSITY OF ATHENS (NTUA), 106 82, GREECE

NATIONALE GENOSSENSCHAFT FUER DIE LAGERUNG RADIOAKTIVER
ABFAELLE (NAGRA), WETTINGEN 5430, Switzerland

NATIONALE INSTELLING VOOR RADIOACTIEF AFVAL EN VERRIJKTE
SPLIJSTOFFEN (ONDRAF/NIRAS), KUNSTLAAN 14, 1210 SAINT-JOSSE-TEN-
NOODE, Belgium

NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK
ONDERZOEK TNO (TNO), ANNA VAN BUERENPLEIN 1, THE HAGUE 2595 DA,
Netherlands

NUCLEAR ENGINEERING SEIBERSDORF GMBH (NES), FORSCHUNGSZENTRUM,
SEIBERSDORF 2444, Austria

NUCLEAR RESEARCH AND CONSULTANCY GROUP (NRG), WESTERDUINWEG 3,
PETTEN 1755 LE, Netherlands

NUCLEAR WASTE SERVICES, HERDUS HOUSE INGWELL DRIVE WESTLAKES
SCIENCE AND TECHNOLOGY PARK MOOR ROW, CUMBRIA CA24 3HU, United
Kingdom

ÖSTERREICHISCHE AGENTUR FÜR GESUNDHEIT UND
ERNÄHRUNGSSICHERHEIT GMBH (AGES), 1220 WIEN, SPARGELFELDSTRAßE
191, Austria

PAUL SCHERRER INSTITUT (PSI), FORSCHUNGSTRASSE 111, VILLIGEN PSI 5232,
Switzerland

POSIVA OY (POSIVA), OLKILUOTO, EURAJOKI 27160, Finland

PUBLIC UNION CHORNOBYL RESEARCH AND DEVELOPMENT INSTITUTE
(ChRDI), PECHERSKIY DISTRICT, STARONAVODNITSKA ST. 6B OFFICE 272, KYIV
01015, Ukraine

RADIOACTIVE WASTE REPOSITORY AUTHORITY (SÚRAO), DLAZDENA 6,
PRAGUE 110 00, CZECHIA

RADIOAKTIV HULLADEKOKAT KEZELO KOZHASZNU NONPROFIT KORLATOLT
FELELOSSEGU TARSASAG (PURAM), PUSKAS TIVADAR UTCA 11, BUDAPEST
2040, Hungary

REGIA AUTONOMA TEHNOLOGII PENTRU ENERGIA NUCLEARA – RATEN
(RATEN), STRADA CAMPULUI 1, MIOVENI 115400, Romania

SLOVENSKA TECHNICKA UNIVERZITA V BRATISLAVE (STUBA), VAZOVOVA 5,
BRATISLAVA 81243, Slovakia

SOCIETA' GESTIONE IMPIANTI NUCLEARI PER AZIONI (SOGIN), VIA MARSALA
51C, ROME 00185, Italy

STATE ENTERPRISE STATE SCIENTIFIC AND TECHNICAL CENTER FOR
NUCLEAR AND RADIATION SAFETY (SSTC NRS), VASYLYA STUSA STREET 35 -
37, KYIV 03142, Ukraine

STATNI USTAV RADIACNI OCHRANY v.v.i. (SURO), BARTOSKOVA 28, PRAGUE
14000, Czechia

STRÅLSÄKERHETSMYNDIGHETEN (SSM), 171 16 STOCKHOLM, SWEDEN

STUDIECENTRUM VOOR KERNENERGIE / CENTRE D'ETUDE DE L'ENERGIE
NUCLEAIRE (SCK•CEN), AVENUE HERRMANN DEBROUX 40, 1160 BRUSSELS,
Belgium

SVENSK KARNBRANSLEHANTERING AKTIEBOLAG (SKB), BOX 3091, SOLNA 169
03, Sweden

TECHNICAL UNIVERSITY OF SOFIA (TUS), Kliment Ohridsky Bd 8, SOFIA 1000,
Bulgaria

TEKNOLOGIAN TUTKIMUSKESKUS VTT Oy (VTT), P.O. Box 1000, FI-02044 VTT, Finland

TS ENERCON MERNOKIRODA KFT (TS Enercon), CSALOGANY UTCA 23-33, BUDAPEST 1027, Hungary

UNITED KINGDOM RESEARCH AND INNOVATION (UKRI), POLARIS HOUSE NORTH STAR AVENUE, SWINDON SN2 1FL, United Kingdom

UNIVERSITY OF CYPRUS (UCyprus), KALLIPOLEOS STREET 75, NICOSIA 1678, Cyprus

UNIVERSITY OF TARTU (UT), ÜLIKOOLI 18, 50090 TARTU, Estonia

VALSTYBES IMONE IGNALINOS ATOMINE ELEKTRINE (IAE), ELEKTRINES G. 4, K47, DRUKSINIŲ, VISAGINAS 31152, Lithuania

VALSTYBINIS MOKSLINIŲ TYRIMŲ INSTITUTAS FIZINIŲ IR TECHNOLOGIJOS MOKSLŲ CENTRAS (FTMC), Savanorių 231, VILNIUS 02300, Lithuania

VUJE AS (VUJE), Okružna 5, TRNAVA 91864, Slovakia

Form of Funding: Grants not subject to calls for proposals

Type of Action: Grant to identified beneficiary according to Financial Regulation Article 195(e) - Programme co-fund action

Indicative timetable: Q4-2023 – Q4 2024

Indicative budget: EUR 10.59 million from the 2023 budget (Annual instalments) and EUR 6.88 million from the 2024 budget (Annual instalments) and EUR 2.53 million from the 2025 budget (Annual instalments)

Prizes

1. SOFT Innovation Prize 2024

Fusion research encompasses innovation in the domains of physics and technology over a wide range of specialisations. Fusion researchers are constantly challenging the scientific state of the art and improving the technology. This in turn creates the conditions for innovation, much of which can be exploited in other science and industrial sectors for the benefit of society. The fundamental basis of the Euratom programme is the drive and support for innovation across the product development chain, from research to market. In this context, the researcher plays a critical role.

The SOFT Innovation Prize⁹² highlights and rewards excellence in innovation in fusion research as well as the quality of the researchers and industries involved. Following the

⁹² The prize is named after the biennial Symposium on Fusion Technology (SOFT), where the recipients of the prize are unveiled.

success of the 2022 edition, the European Commission is holding the contest again in association with the next Symposium on Fusion Technology in 2024.

There are no specific categories for this prize. Participants are free to submit an application on any physics or technology innovation that has been developed in magnetic confinement fusion research and that has market potential or has been taken up (or recognised) by industry to be further developed for the market.

The European Commission will publish the specific rules of the contest in 2023⁹³. It will launch and manage the contest and award the prizes based on the decision of independent experts.

The complete application should include:

- a technical description of the innovation;
- a state-of-the-art assessment of the innovation;
- an account, in general terms, of the market potential for exploiting the innovation.

The Funding and Tenders Portal contains the Model Rules of Contest for prizes.

Essential award criteria: The prizes will be awarded, after the contest has closed, to the applicants who, in the opinion of the jury, best address the following cumulative criteria⁹⁴:

1. Originality and replicability: The extent to which the idea is innovative, original and a first-of-a-kind use of the technology in industry or in the domain of application. The description should be clear, logically presented and well-illustrated.
2. Technical excellence: The extent to which the innovation is demonstrably state-of-the-art and based on excellent science and engineering.
3. Economic impact and exploitation of the innovation: The extent to which the submission demonstrates understanding and awareness of the relevant innovation aspects, including market potential, needs and business opportunities.

Eligibility criteria:

1. The contest is open to researchers, research teams or industrial participants eligible for funding under the Euratom Research and Training Programme 2021-2025, to researchers or research teams working for a national programme in an ITER partner country⁹⁵ or in any non-EU country that has a bilateral fusion cooperation agreement with Euratom in force and to

⁹³ On the Funding & Tenders Portal (<https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/programmes/horizon>), but also actively publicised elsewhere to maximise participation.

⁹⁴ These criteria may be clarified further in the Rules of Contest.

⁹⁵ Except for Russia, see exceptions in General Annex B.

industrial participants taking part in ITER⁹⁶. Example of proof: substantiating documents such as contracts, etc.

2. The researcher, research team or industrial participant must obtain permission from the owner of the intellectual property rights to submit an application and provide supporting documentation.

Expected results:

By awarding the SOFT Innovation Prize, the Commission will showcase innovations in the fusion research sector. This will give visibility to the most dynamic, forward-looking and innovative researchers, research teams or industrial participants. This visibility will provide greater potential for valorising fusion research. Furthermore, the contest will stimulate the EU and international partners to develop a stronger innovation and entrepreneurial culture in fusion research.

The Commission applies an equal opportunities policy. With a view to promoting gender balance in the nuclear field, the Commission would particularly welcome applications from women.

Prize amounts: 1st prize: EUR 50 000, 2nd prize: 30 000, 3rd prize: EUR 20 000.

Indicative timetable of contest(s):

Stages	Date and time or indicative period
Opening of the contest	Q3 - 2023
Deadline for submission of application	Q1 - 2024
Award of the prize	Q3 - 2024

Form of Funding: Prizes

Type of Action: Recognition Prize

Indicative timetable: Q3-2023 – Q3-2024.

Indicative budget: EUR 0.10 million from the 2024 budget

2. SOFT Innovation Prize 2026

Fusion research encompasses innovation in the domains of physics and technology over a wide range of specialisations. Fusion researchers are constantly challenging the scientific state-of-the-art and improving the technology thereby creating the conditions for innovation, much of which can be exploited in other science and industrial sectors for the benefit of society. The fundamental basis of the Euratom Programme is the drive and support for

⁹⁶ Except for Russia, see exceptions in General Annex B.

innovation across the product development chain from research to market. In this context the researcher plays a critical role.

The SOFT Innovation Prize⁹⁷ is being offered to highlight and reward excellence in innovation that can be found in fusion research as well as the quality of the researchers and industries involved. Following the success of 2022 and 2024 editions of the SOFT Innovation Prize, the European Commission is holding the contest again in association with the next Symposium on Fusion Technology (SOFT) in 2026.

There are no specific categories for this prize. Contestants are free to submit an application concerning any physics or technology innovation that has been developed in magnetic confinement fusion research and that has market potential or has been taken up (or recognised) by industry to be further developed for the market.

The specific rules of the contest will be published in 2025 by the European Commission⁹⁸, which will launch and manage the contest and award the prize based on the judgement of independent experts.

The complete application for the 'SOFT Innovation Prize' should include:

- a technical description of the innovation
- a state-of-the-art assessment of the innovation
- an account, in general terms, of the market potential for the exploitation of the innovation

For the Model Rules of Contest for Prizes please see the Funding and Tenders Portal.

Essential award criteria: The prize will be awarded, after closure of the contest, to the applicant(s) who in the opinion of the jury best addresses the following cumulative criteria⁹⁹:

1. Originality and replicability: The extent to which the idea is innovative, original and a first-of-a-kind use of the technology in industry or in the domain of application. The description should be clear, logically presented and well-illustrated.
2. Technical excellence: The extent to which the innovation is demonstrably state-of-the-art and based on excellent science and engineering.
3. Economic impact and exploitation of the innovation: The extent to which the submission demonstrates understanding and awareness of the relevant innovation aspects, including market potential, needs and business opportunities.

⁹⁷ The Prize is named after the biennial Symposium on Fusion Technology (SOFT) during which the recipients of the prize are presented

⁹⁸ On the Funding & Tenders Portal (<https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/programmes/horizon>) but also actively publicised elsewhere to maximise participation.

⁹⁹ Further clarification of these criteria might be published in the Rules of Contest.

Eligibility criteria:

1. The contest is open to researchers, research teams, or industrial participants eligible for funding under the Euratom Research and Training Programme 2021-2025, to researchers or research teams working for a national programme in an ITER partner country¹⁰⁰ or in any third country that has a bilateral fusion cooperation agreement with Euratom in force and to industrial participants participating in the ITER¹⁰¹. Example of proof: the Commission may request substantiating document such as contracts, etc.
2. The researcher, research team or industrial participant must obtain permission from the owner of the Intellectual Property Rights (IPR) to submit an application and provide supporting documentation.

Expected results:

By awarding the ‘SOFT Innovation Prize’, the Commission will showcase innovations in fusion research sector giving visibility to the most dynamic, forward-looking and innovative researchers, research teams or industrial contestants. This visibility will provide greater potential for valorisation of the fusion research. Furthermore, the contest will stimulate the EU and international partners to develop a stronger innovation and entrepreneurial culture in fusion research.

The Commission applies an equal opportunities policy. With a view to promoting gender balance in nuclear field, the Commission would particularly welcome applications from women.

Prize amounts: 1st Prize: EUR 50 000, 2nd Prize: 30 000, 3rd Prize: EUR 20 000.

Indicative timetable of contest(s):

Stages	Date and time or indicative period
Opening of the contest	3rd Quarter 2025
Deadline for submission of application	1st Quarter 2026
Award of the prize	3rd Quarter 2026

Form of Funding: Prizes

Type of Action: Recognition Prize

Indicative timetable: 3rd Quarter 2025 - 3rd Quarter 2026

Indicative budget: EUR 0.10 million from the 2025 budget

¹⁰⁰ Except for Russia, see exceptions indicated in the General Annex B.

¹⁰¹ Except for Russia, see exceptions indicated in the General Annex B.

3. Nuclear Innovation Prize 2025

Euratom-funded research in fission that encompasses radioactive waste management, safety of reactor systems and radiation protection benefits from consistent success in pursuing excellence across a broad range of nuclear science and technologies. Researchers and engineers are constantly challenging state of the art in the field and improving evolving technologies. This creates conditions for innovations beyond technologies and scientific breakthroughs, leading to a more dynamic and competitive European industry for the benefit of all citizens and society as a whole.

The Euratom programme, together with Member States' actions, has continuously helped maintain a high level of competences, underpinned by sound and advanced research. The Commission, in its efforts to further engage with the public and private sectors and all relevant stakeholders in the nuclear field, is seeking to identify potential disruptive innovations across product developments and their supply chain – from research to market, where researchers and engineers play a critical role.

Objectives:

The Nuclear Innovation Prize highlights and rewards excellence in nuclear innovation in this field of research as well as the quality of the talented researchers and companies involved. The second contest will be organised at the next Euratom Research and Training Conference(s) in Safety of Reactor Systems and Radioactive Waste Management (FISA 2025 – EURADWASTE'25).

There are three specific categories:

1. Nuclear Innovation Prize in safety of reactor systems.
2. Nuclear Innovation Prize in safety of radioactive waste management.
3. Nuclear Innovation Prize in radiation protection.

Participants are free to submit an application(s) on any technological innovation in the areas of application of fission safety that encompass radioactive waste management, reactor systems and radiation protection science and technology and have been developed within fields covered in Annex I of the Euratom Research and Training Programme 2021-2025. A separate application must be submitted for each category. These applications should have a market potential or should have been taken up (or recognised) by industry, safety or radiation protection stakeholders to be further developed for the market or for use by regulators.

The European Commission will publish the specific rules of the contest in 2024¹⁰². It will launch and manage the contest and award the prizes based on the decision of independent experts.

¹⁰² On the Funding & Tenders Portal (<https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/programmes/horizon>), but also actively publicised elsewhere to maximise participation.

The complete application should include:

- a technical description of the innovation;
- a state-of-the-art assessment of the innovation;
- an account, in general terms, of the market potential for exploiting the innovation.

The Funding and Tenders Portal contains the Model Rules of Contest for prizes.

Essential award criteria: The prizes will be awarded, after the contest has closed, to the participants(s) who, in the opinion of the jury, best address the following cumulative criteria:

1. Originality and replicability: The extent to which the idea is innovative, original and a first-of-a-kind use of the technology in industry or in the domain of application. The description should be clear, logically presented and well-illustrated.
2. Technical excellence: The extent to which the innovation is demonstrably state-of-the-art and based on excellent science and engineering.
3. Economic impact and exploitation of the innovation: The extent to which the submission demonstrates understanding and awareness of the relevant innovation aspects, including market potential, needs and business opportunities.

Eligibility criteria:

1. The contest is open to researchers, research teams or industrial participants eligible for funding under the Euratom Research and Training Programme 2021-2025.
2. The researcher, research team or industrial participant must obtain permission from the owner of the intellectual property rights to submit an application and provide supporting documentation.

Expected results:

By awarding the Nuclear Innovation Prize, the Commission will showcase at both FISA and EURADWASTE conferences innovations in this research sector. This will give visibility to the most dynamic, forward-looking and innovative researchers, research teams or industrial participants. This visibility will provide greater potential for valorising research, and the contest will stimulate nuclear research in the EU to develop a stronger innovation and entrepreneurial culture in line with the Commission's industrial strategy.

The Commission applies an equal opportunities policy. With a view to promoting gender balance in the nuclear field, the Commission would particularly welcome applications from women.

Prize amounts:

- (1) Nuclear Innovation Prize in safety of reactor systems.

1st prize: EUR 50 000, 2nd prize: 30 000, 3rd prize: EUR 20 000.

(2) Nuclear Innovation Prize in safety of radioactive waste management.

1st prize: EUR 50 000, 2nd prize: 30 000, 3rd prize: EUR 20 000.

(3) Nuclear Innovation Prize in radiation protection.

1st prize: EUR 50 000, 2nd prize: 30 000, 3rd prize: EUR 20 000.

Indicative timetable of contest(s):

Stages	Date and time or indicative period
Opening of the contest	Q2 2024
Deadline for submission of application	Q4 2024
Award of the prize	Q2 2025

Form of Funding: Prizes

Type of Action: Recognition Prize

Indicative timetable: Q2 2024 - Q2 2025

Indicative budget: EUR 0.25 million from the 2025 budget

Public procurement

1. Provision of expert industrial competences for the conceptual design activities of the European fusion demonstration reactor (specific contracts under the framework contract (RTD/2019/OP/D4/FWC/010))

The objective of this procurement action is to support the conceptual design activities on power plant physics and technology defined in the annual work plan of the EUROfusion consortium implementing the European partnership for fusion research. This support will be implemented through specific contracts under the ongoing framework contract RTD/2019/OP/D4/FWC/010.

Support for these conceptual design activities will include an assessment, based on industry best practice, of the system architecture, overall configuration and system engineering processes. The focus is on design and technology options and feasibility, manufacturing options as well as risk identification, evaluation and mitigation.

An evaluation of the impact on cost for the suggested solutions will also be included. Given the nuclear nature of the power plant physics and technology system and its impact on social acceptance, nuclear safety compliance assessments (and demonstration, where required) are included in the scope to cover the plant life cycle.

The scope will also include industry support for IFMIF-DONES's specific component design and control system as well as backing for the IFMIF-DONES site preparation activities in view of Spain hosting the facility. The IFMIF-DONES facility is a priority for the programme for the qualification of DEMO materials.

Main areas and topics:

1. Industry best practice

- a. plant design compliance: constructability, operability, licensing;
- b. plant configuration;
- c. establishment and implementation of system engineering processes;
- d. cost sensitivity studies, cost vs performance;
- e. risk analysis and management;
- f. knowledge management.

2. Nuclear safety

- a. plant nuclear safety analysis and compliance verification;
- b. pre-licensing processes – interaction with the licensing authorities, including decommissioning;
- c. radioactive materials management.

3. Technology

- a. plant control system;
- b. maintenance and inspection;
- c. new materials and material qualification;
- d. magnet manufacturing demonstration.

4. Plant operations

- a. ROX (Return of Experience).

Form of Funding: Procurement

Type of Action: Public procurement

Indicative timetable: Q2-2023 – Q4-2024.

Indicative budget: EUR 3.00 million from the 2023 budget

2. Communication actions - Euratom Research and Training Programme

Support will be provided for communication actions to improve the outreach of the Euratom programme and the dissemination of its research results. Actions will improve the visibility of the Euratom programme by means of promoting recognition prizes and participating in exhibitions, publications and social media, including the production of videos.

Form of Funding: Procurement

Type of Action: Public procurement

Indicative timetable: Q3 2023 – Q4 2025

Indicative budget: EUR 0.10 million from the 2023 budget and EUR 0.10 million from the 2024 budget

Support for Marie Skłodowska-Curie Actions (MSCA) in nuclear research and training

1. MSCA postdoctoral fellowships in research fields covered by the Euratom Research and Training Programme 2021-2025

Researchers in the fields covered by the Euratom programme will be eligible to apply for Marie Skłodowska-Curie Actions (MSCA) postdoctoral fellowships given the reference to possible synergies between Horizon Europe and the Euratom programme in Annex IV, paragraph 17(a) of the Regulation establishing the Horizon Europe Framework Programme (Regulation (EU) 2021/695) and Article 10(2) of the Regulation establishing the Euratom Programme 2021-2025 (Regulation (Euratom) 2021/765).

Applicants must comply with all conditions defined in the MSCA Postdoctoral Fellowships 2023 (HORIZON-MSCA-2023-PF-01), MSCA Postdoctoral Fellowships 2024 (HORIZON-MSCA-2024-PF-01) and MSCA Postdoctoral Fellowships 2025 (HORIZON-MSCA-2025-PF-01) calls as set by the revised Horizon Europe MSCA Work Programmes 2023-2025, including specific eligibility conditions that apply to MSCA postdoctoral fellowships in the research areas covered by the Euratom Research and Training Programme 2021-2025. For detailed information on countries associated to the Euratom Research and Training Programme 2021-2025, see General Annex B. This action will be financed through a budgetary transfer from Euratom programme budget lines 01.030100 fusion and 01.030200 fission to MSCA budget line 01 02 01 02. Provisions in Horizon Europe MSCA Work Programmes on the award of the Seal of Excellence certificate also apply to applications in the fields covered by the Euratom Treaty.

Form of Funding: Budget transfer

Type of Action: Contribution to MSCA

Indicative timetable: Q2 2023 to Q4 2026

Indicative budget: EUR 1.00 million from the 2023 budget and EUR 1.00 million from the 2024 budget and EUR 0.85 million from the 2025 budget

Subscription actions

1. Contribution to the Organisation for Economic Co-operation and Development (Nuclear Energy Agency) / Secretariat for the Generation-IV International Forum (GIF)

This action will provide a Euratom subscription for the operations of the Generation-IV International Forum (GIF) Secretariat for 2023, 2024 and 2025 in accordance with Article 239 of the Financial Regulation.

The GIF was signed by nine countries in 2001 to address nuclear safety radioactive waste management, proliferation and public perception concerns. Euratom signed the Charter on 30 July 2003. A framework agreement (FA) for multilateral international collaboration on research and development, setting the conditions for subsequent system and project arrangements, was concluded in 2005.

The Charter was signed originally for 10 years, and in 2011 the signatories unanimously agreed to extend its duration indefinitely. The present FA signatories are Australia, Canada, China, Euratom, France, Japan, Russia, South Africa, South Korea, Switzerland, the UK and the USA. The FA depository is the OECD Secretary-General.

The Council of the EU approved Euratom joining the FA in Decision 14929/05 of 20 December 2005. Euratom formally joined in May 2006 and renewed its commitment in November 2016 on the basis of Council Decision 2016/2116.

Euratom GIF membership brings certain obligations, including a financial contribution to GIF's technical secretariat provided by the Nuclear Energy Agency (NEA – OECD). The level of this funding from each signatory is established by the GIF Policy Group at its annual policy meetings.

Type of Action: Subscription action

Indicative timetable: Q1-2023 – Q4-2025.

Indicative budget: EUR 0.15 million from the 2023 budget and EUR 0.15 million from the 2024 budget and EUR 0.15 million from the 2025 budget

Expert contract actions

1. External expertise

This action will support:

1. The use of appointed independent experts for the evaluation of grant proposals and prize applications (including the ethics review) for the call and prize contests.

2. The use of appointed independent experts for the monitoring of actions (grant agreement, grant decision, public procurement actions, financial instruments), including mid-term reviews, and where appropriate ethics checks.
3. The use of appointed, independent experts to advise on or support the design and implementation of Euratom Research and Training Programmes. The activities carried out by the experts will be essential to the development, monitoring and evaluation of the policy and actions in this area. Advice on and support for the programme's design may include the preparation of inputs to the *ex ante* impact assessment of the Commission's proposals. The evaluation will look into the Euratom programme's effectiveness, efficiency, relevance, coherence and Community added value. It will cover the rationale, implementation and achievements, as well as the longer-term impacts and sustainability of the measures, and will contribute to a decision on whether to renew the programme. The experts' tasks will include attending meetings, remote drafting and possible preparatory work.
4. The use of appointed, independent experts for preparing inputs to opinions of the Euratom Scientific and Technical Committee, including the opinion to be delivered as part of the consultation on a proposal for a Euratom Research and Training Programme 2026-2027 as required by the first paragraph of Article 7 of the Euratom Treaty.

For all four categories mentioned above, the experts will be highly qualified, specialised, independent experts selected on the basis of their competence and knowledge of the nuclear field. A special allowance of EUR 450 per day will be paid to the experts appointed in their personal capacity who act independently and in the public interest. This amount is considered to be proportionate to the specific tasks to be assigned to them, including the number of meetings to be attended and possible preparatory work.

Form of Funding: Other budget implementation instruments

Type of Action: Expert contract action

Indicative timetable: Q1-2023 – Q4-2025

Indicative budget: EUR 0.35 million from the 2023 budget and EUR 0.20 million from the 2024 budget and EUR 0.02 million from the 2025 budget

Budget¹⁰³

	Budget line(s)	2023 Budget (EUR million)	2024 Budget (EUR million)	2025 Budget (EUR million)
Calls				
HORIZON-EURATOM-2026-NRT-01				1.60
	<i>from 01.030200</i>			<i>1.60</i>
HORIZON-EURATOM-2024-NRT-01			3.00	
	<i>from 01.030200</i>		<i>3.00</i>	
HORIZON-EURATOM-2023-NRT-01		33.16	29.45	38.86
	<i>from 01.030200</i>	<i>33.16</i>	<i>29.45</i>	<i>38.86</i>
Other actions				
Grant to identified beneficiary according to Financial Regulation Article 195(e)		12.59	7.18	2.53
	<i>from 01.030200</i>	<i>12.59</i>	<i>7.18</i>	<i>2.53</i>
Prize			0.10	0.35
	<i>from 01.030200</i>		<i>0.10</i>	<i>0.35</i>
Public procurement		3.10	0.10	
	<i>from 01.030200</i>	<i>3.10</i>	<i>0.10</i>	
Contribution to MSCA		1.00	1.00	0.85
	<i>from 01.030200</i>	<i>1.00</i>	<i>1.00</i>	<i>0.85</i>

¹⁰³

The budget figures given in this table are rounded to two decimal places.
The budget amounts are subject to the availability of the appropriations provided for in the general budget of the Union for years 2023, 2024 and 2025.

Euratom Research and Training Programme - Work Programme 2023-2025
Euratom Work Programme 2023-2025 for nuclear research and training

Subscription action		0.15	0.15	0.15
	<i>from 01.030200</i>	<i>0.15</i>	<i>0.15</i>	<i>0.15</i>
Expert contract action		0.35	0.20	0.02
	<i>from 01.030200</i>	<i>0.35</i>	<i>0.20</i>	<i>0.02</i>
Estimated total budget		50.35	41.18	44.36

General Annexes to the Euratom Work Programme 2023-2025

Introduction

These General Annexes set out the general conditions applicable to calls and topics for grants and other forms of funding under this Euratom work programme. They also describe the evaluation and award procedures and other criteria for Euratom funding. In particular, the General Annexes outline the:

- admissibility and eligibility criteria for participation and for receiving funding, the criteria for having the financial and operational capacity and for exclusion (Annexes A-C);
- award criteria, mandatory documents and evaluation procedure (Annexes D-F);
- legal and financial set-up of the grant agreements (Annex G);
- JRC infrastructure and expertise in nuclear safety, radiation protection and education & training available to applicants for grants (Annex H).
- The Work Programme’s chapter on multiannual approach and strategic orientations for Euratom indirect actions during 2021-2025 outlines the guidance on the structure and priorities of the Euratom Research and Training Programme (‘Euratom Programme’).

If a topic deviates from the general conditions or includes additional conditions, this is explicitly stated under the specific conditions for the topic.

Applicants are invited to read the call documentation on the topic page of the Funding & Tenders Portal (‘Portal’) carefully, and particularly these General Annexes, the Work Programme’s chapter on multiannual approach and strategic orientations for Euratom indirect actions during 2021-2025, the [Horizon Europe Programme Guide](#)¹⁰⁴, the [EU Funding & Tenders Portal Online Manual](#)¹⁰⁵ and the [EU Grants AGA — Annotated Grant Agreement](#)¹⁰⁶. These documents provide clarifications and answers to questions on preparing the application.

¹⁰⁴ The Horizon Europe Programme Guide outlines the detailed guidance on the structure, budget and political priorities of Horizon Europe.

¹⁰⁵ The Online Manual outlines the procedures to register and submit applications online via the EU Funding & Tenders Portal and recommendations on preparing the application.

¹⁰⁶ The AGA — Annotated Grant Agreement contains detailed annotations on all the provisions in the grant agreement that must be signed to obtain the grant.

General conditions

A — Admissibility

Admissibility

Applications must be submitted before the **call deadline**.

Applications must be submitted **electronically** via the Funding & Tenders Portal electronic submission system (accessible via the topic page in the [Search Funding & Tenders](#) section). Paper submissions are NOT possible.

Applications must be submitted using the forms provided *inside* the electronic submission system (not the templates available on the topic page, which are only for information). The structure and presentation must correspond to the instructions given in the forms.

Applications must be **complete** and contain all parts and mandatory Annexes and supporting documents (*see Annex E below*).

Applications must be **readable, accessible** and **printable**.

Applications must include **a plan for the exploitation and dissemination of results including communication activities**, unless provided otherwise in the specific call/topic conditions. If the expected exploitation of the results entails developing, creating, manufacturing and marketing a product or process, or in creating and providing a service, the plan must include a strategy for such exploitation. If the plan provides for exploitation of the results primarily in non-associated third countries, the applicants must explain how that exploitation is to be considered in the EU's interest.

Applicants submitting a proposal under the blind evaluation pilot (*see Annex F below*) must not disclose their organisation names, acronyms, logos nor names of personnel in Part B of their first-stage application (*see Annex E below*).

Page limits

In addition to the above admissibility conditions, page limits will apply to parts of applications. The page limits, and sections subject to limits, will be clearly shown in the application templates in the Funding & Tenders Portal electronic submission system.

Unless provided otherwise in the specific call/topic conditions, **the limit for a full application is 45 pages** (except for 'Coordination and support' actions, where the limit is 30 pages, and for 'Programme co-fund' actions, where the limit is 70 pages). For topics using lump sum funding, the limit for 'Research and Innovation' actions and 'Innovation' actions is 50 pages and the limit for 'Coordination and support' action is 33 pages.

If an application exceeds the limits, there will be an automatic warning and invitation to re-submit a version that conforms to these limits. After the call deadline, excess pages will be automatically made invisible, and will not be taken into consideration by the evaluators.

B — Eligibility

Entities eligible to participate

Any legal entity, regardless of its place of establishment, including legal entities from non-associated third countries or international organisations (including international European research organisations¹⁰⁷) is eligible to participate (whether it is eligible for funding or not), provided that the conditions laid down in the Horizon Europe Regulation¹⁰⁸ have been met, along with any other conditions laid down in the specific call/topic.

A ‘legal entity’ means any natural or legal person created and recognised as such under national law, EU law or international law, which has legal personality and which may, acting in its own name, exercise rights and be subject to obligations, or an entity without legal personality¹⁰⁹.

Beneficiaries and affiliated entities must register in the [Participant Register](#) before submitting their application, in order to get a participant identification code (PIC) and be validated by the Central Validation Service before signing the grant agreement. For the validation, they will be asked to upload the necessary documents showing their legal status and origin during the grant preparation stage. A validated PIC is not a prerequisite for submitting an application.

 For more information, see [Rules for Legal Entity Validation, LEAR Appointment and Financial Capacity Assessment](#).

Specific cases:

Affiliated entities — Affiliated entities (i.e. entities with a legal or capital link to a beneficiary¹¹⁰ which participate in the action with similar rights and obligations to the beneficiaries, but which do not sign the grant agreement and therefore do not become beneficiaries themselves) are allowed, if they are eligible for participation and funding.

Associated partners — Associated partners (i.e. entities which participate in the action without signing the grant agreement, and without the right to charge costs or claim contributions) are allowed, subject to any specific call/topic conditions.

Entities without legal personality — Entities which do not have legal personality under their national law may exceptionally participate, provided that their representatives have the capacity to undertake legal obligations on their behalf, and offer guarantees to protect the EU’s financial interests equivalent to those offered by legal persons¹¹¹.

¹⁰⁷ ‘International European research organisation’ means an international organisation, the majority of whose members are Member States or Associated Countries, and whose principal objective is to promote scientific and technological cooperation in Europe.

¹⁰⁸ Regulation (EU) 2021/695 of the European Parliament and of the Council of 28 April 2021 establishing Horizon Europe (OJ L 170 , 12.5.2021, p. 1).

¹⁰⁹ See Article 200(2)(c) EU Financial Regulation [2024/2509](#).

¹¹⁰ See Article 190 EU Financial Regulation [2024/2509](#).

¹¹¹ See Article 200(2)(c) EU Financial Regulation [2024/2509](#).

EU bodies — Legal entities created under EU law including decentralised agencies may be part of the consortium, unless provided for otherwise in their basic act.

Joint Research Centre ('JRC')— Where provided for in the specific call/topic conditions, the Commission recommends that consortia make use of the services of the JRC. The JRC may participate in the preparation and submission of the proposal. If the proposal is selected for funding, the JRC would bear the operational costs for its own staff and research infrastructure operational costs. The JRC would accede to the grant agreement as beneficiary requesting zero funding or would participate as an associated partner, and would accede to the consortium as a member. The JRC facilities and expertise offered to applicants are listed in *Annex H* below.

Associations and interest groupings — Entities composed of members (e.g. European research infrastructure consortia (ERICs)) may participate as 'sole beneficiaries' or 'beneficiaries without legal personality'¹¹². However, if the action is in practice implemented by the individual members, those members should also participate either as beneficiaries or as affiliated entities (otherwise their costs will NOT be eligible).

Restrictions on participation in Innovation Actions — In accordance with the 2019 "EU-China - A Strategic outlook" communication, the 2021 "Global Approach to Research and Innovation" communication, and the joint conclusions of the 4th EU-China Innovation Cooperation Dialogue of 2019, an exercise to develop a Joint Roadmap for the future of EU-China cooperation in science, technology, and innovation (Roadmap) has been established between the EU and China. It has the objective to develop a level playing field for engagement between the EU and China in the areas of science, technology, and innovation (STI) that is respectful of fundamental research and innovation values and principles. This endeavor is to be achieved through an agreement on the framework conditions contained in the Roadmap and their monitoring and evaluation. As progress so far has mainly taken place on the framework conditions linked to research rather than on those related to innovation, and taking into account the nature and objectives in particular of Innovation Actions, cooperation with entities established in China needs to be calibrated accordingly.

Legal entities established in China are therefore not eligible to participate in Euratom Innovation Actions in any capacity. This includes participation as beneficiaries, affiliated entities, associated partners, third parties giving in-kind contributions, subcontractors or recipients of financial support to third parties (if any). Exceptions may be granted on a case-by-case basis for justified reasons. The above eligibility criteria may be reviewed in the future in accordance with policy developments. This exclusion is justified under Article 22(6) of the Horizon Europe Regulation given the substantive concerns regarding the use of intellectual property generated under this publicly funded programme, and the ongoing discussions between China and the EU on the Joint Roadmap for the future of EU-China cooperation in science, technology, and innovation.

¹¹² See Articles 190(2) and 200(2)(c) EU Financial Regulation [2024/2509](#).

Restrictions on participation or control — For actions related to EU strategic assets, interests, autonomy or security, the specific topic conditions may limit participation to legal entities established only in EU Member States or in EU Member States and specific associated or non-associated third countries. In this case, the eligible countries will be identified in the specific call/topic conditions. In addition, for duly justified and exceptional reasons, to guarantee protection of the strategic interests of the EU and its Member States, the specific call/topic conditions may also exclude the participation of legal entities directly or indirectly controlled by non-eligible third countries or by legal entities of non-eligible third countries (or make their participation subject to specific conditions), in line with Article 22(5) of the Horizon Europe Regulation.

EU restrictive measures — Entities subject to [EU restrictive measures](#) under Article 29 of the Treaty on the European Union (TEU) and Article 215 of the Treaty on the Functioning of the EU (TFEU)¹¹³ as well as Article 75 TFEU¹¹⁴, are not eligible to participate in any capacity, including as beneficiaries, affiliated entities, associated partners, third parties giving in-kind contributions, subcontractors or recipients of financial support to third parties (if any).

Special rules also apply to entities covered by Commission Guidelines No 2013/C 205/05¹¹⁵.

Legal entities established in Russia, Belarus, or in non-government controlled territories of Ukraine — Given the illegal invasion of Ukraine by Russia and the involvement of Belarus, there is currently no appropriate context allowing the implementation of the actions foreseen in this programme with legal entities established in Russia, Belarus, or in non-government controlled territories of Ukraine. Therefore, even where such entities are not subject to EU restrictive measures, such legal entities are not eligible to participate in any capacity. This includes participation as beneficiaries, affiliated entities, associated partners, third parties giving in-kind contributions, subcontractors or recipients of financial support to third parties (if any). Exceptions may be granted on a case-by-case basis for justified reasons.

Measures for the protection of the Union budget against breaches of the principles of the rule of law in Hungary — Following the [Council Implementing Decision \(EU\) 2022/2506](#), as of 16 December 2022, no legal commitments can be entered into with Hungarian public interest trusts established under the Hungarian Act IX of 2021 or any entity they maintain. Affected entities may continue to apply to calls for proposals. However, as long as the Council measures are not lifted, such entities are not eligible to participate in any funded role (beneficiaries, affiliated entities, subcontractors, recipients of financial support to third parties, etc). In case of multi-beneficiary grant calls, applicants will be invited to remove or replace that entity and/or to change its status into associated partner. Tasks and budget may be redistributed accordingly.

¹¹³ Please note that the EU Official Journal contains the official list and, in case of conflict, its content prevails over that of the [EU Sanctions Map](#).

¹¹⁴ Please note that the EU Official Journal contains the official list and, in case of conflict, its content prevails over that of the [EU Sanctions Map](#).

¹¹⁵ Commission guidelines No [2013/C 205/05](#) on the eligibility of Israeli entities and their activities in the territories occupied by Israel since June 1967 for grants, prizes and financial instruments funded by the EU from 2014 onwards (OJEU C 205 of 19.07.2013, pp. 9-11).

Entities eligible for funding

To become a beneficiary, legal entities must be eligible for funding.

To be eligible for funding, applicants must be established in one of the following countries:

- the Member States of the European Atomic Energy Community (Euratom), including their outermost regions:

Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden.

- the Overseas Countries and Territories (OCTs) linked to the Member States:

Aruba (NL), Bonaire (NL), Curaçao (NL), French Polynesia (FR), French Southern and Antarctic Territories (FR), Greenland (DK), New Caledonia (FR), Saba (NL), Saint Barthélemy (FR), Sint Eustatius (NL), Sint Maarten (NL), St. Pierre and Miquelon (FR), Wallis and Futuna Islands (FR).

countries associated to the Euratom Programme¹¹⁶: Switzerland, Ukraine,

Legal entities which are established in countries not listed above will be eligible for funding if provided for in the specific call/topic conditions, or if their participation is considered essential for implementing the action by the granting authority.

Specific cases:

Affiliated entities — Affiliated entities are eligible for funding if they are established in one of the countries listed above, or in a country identified in the specific call/topic conditions.

Associated partners — Entities not eligible for funding (and therefore not able to participate as beneficiaries) may participate as associated partners, unless specified otherwise in the specific call/topic conditions.

Coordination and Support Actions – To be eligible to participate as beneficiaries (or affiliated entities) in ‘Coordination and support’ actions, legal entities must be established in a Member State or Associated Country, unless the specific call/topic conditions provide otherwise (in which case the general rules for eligibility for funding apply). Legal entities established in a non-associated third country may, however, participate in ‘Coordination and support’ actions as associated partners, unless this is explicitly excluded by the specific call/topic conditions.

EU bodies — Legal entities created under EU law may also be eligible to receive funding, unless their basic act states otherwise.

International organisations — International European research organisations are eligible to receive funding. International organisations with headquarters in a Member State or Associated Country are eligible to receive funding for ‘Training and mobility’ actions or when provided for in the specific call/topic conditions. Other international organisations are not eligible to receive funding, unless provided for in the specific call/topic conditions, or if their participation is considered essential for implementing the action by the granting authority.

Consortium composition

Unless otherwise provided for in the specific call/topic conditions, only legal entities forming a consortium are eligible to participate in actions provided that the consortium includes, as beneficiaries, three legal entities independent from each other and each established in a different country as follows:

- at least one independent legal entity established in a Member State; and
- at least two other independent legal entities, each established in different Member States or Associated Countries.

As affiliated entities do not sign the grant agreement, they do not count towards the minimum eligibility criteria for consortium composition (if any).

The Joint Research Centre, international European research organisations and legal entities created under EU law are deemed to be established in a Member State other than those in which the other legal entities participating in the action are established.

Applications for ‘Programme co-fund’ actions may be submitted by one or more legal entities, provided that one of those legal entities is established in a Member State or an Associated Country.

Applications for ‘Coordination and support’ actions may be submitted by one or more legal entities, which may be established in a Member State, Associated Country or, in exceptional cases and if provided for in the specific call/topic conditions, in another third country.

Eligible activities

Eligible activities are the ones described in the call conditions. Applications will only be considered eligible if their content corresponds, wholly or in part, to the topic description for which it is submitted.

Projects must focus exclusively on civil applications and must not:

- aim at human cloning for reproductive purposes;
- intend to modify the genetic heritage of human beings which could make such changes heritable (except for research relating to cancer treatment of the gonads, which may be financed);

- intend to create human embryos solely for the purpose of research, or for the purpose of stem cell procurement, including by means of somatic cell nuclear transfer.

Projects must, moreover, comply with EU policy interests and priorities (environment, social, security, industrial policy, etc.).

The following activities are generally eligible for grants under Euratom Programme:

Research and innovation actions (RIA) — Activities that aim primarily to establish new knowledge or to explore the feasibility of a new or improved technology, product, process, service or solution. This may include basic and applied research, technology development and integration, testing, demonstration and validation of a small-scale prototype in a laboratory or simulated environment.

Innovation actions (IA) — Activities that aim directly to produce plans and arrangements or designs for new, altered or improved products, processes or services. These activities may include prototyping, testing, demonstrating, piloting, large-scale product validation and market replication.

Coordination and support actions (CSA) — Activities that contribute to the objectives of the Euratom Programme, excluding R&I activities.

Programme co-fund actions (CoFund) — A programme of activities established or implemented by legal entities managing or funding R&I programmes, other than EU funding bodies. Such a programme of activities may support: networking and coordination; research; innovation; pilot actions; innovation and market deployment; training and mobility; awareness raising and communication; and dissemination and exploitation. It may also provide any relevant financial support, such as grants, prizes and procurement, as well as blended finance¹¹⁷ or a combination thereof. The actions may be implemented by the beneficiaries directly or by providing financial support to third parties. In addition to the minimum conditions, other legal entities may participate in programme co-fund actions (CoFund) if this is justified by the nature of the action, in particular entities created to coordinate or integrate transnational research efforts, grouping funding from both national and private sources.

Technology Readiness Levels

Where the specific call/topic conditions require a Technology Readiness Level (TRL), the following definitions apply, unless otherwise specified:

- TRL 1 — Basic principles observed
- TRL 2 — Technology concept formulated
- TRL 3 — Experimental proof of concept

¹¹⁷ “Blended finance” means financial support to a programme implementing innovation and market deployment activities, consisting of a specific combination of a grant or reimbursable advance and an investment in equity or any other repayable form of support.

- TRL 4 — Technology validated in a lab
- TRL 5 — Technology validated in a relevant environment (industrially relevant environment in the case of key enabling technologies)
- TRL 6 — Technology demonstrated in a relevant environment (industrially relevant environment in the case of key enabling technologies)
- TRL 7 — System prototype demonstration in an operational environment
- TRL 8 — System complete and qualified
- TRL 9 — Actual system proven in an operational environment (competitive manufacturing in the case of key enabling technologies, or in space)

Ethics

Projects must comply with ethical principles (including the highest standards of research integrity) and applicable EU, international and national law.

Applicants must have completed the ethics self-assessment as part of their application.

 For more information, see [How to complete your ethics self-assessment](#).

Projects involving ethics issues will have to undergo an ethics review to authorise funding and may be made subject to specific ethics requirements. These requirements become part of the grant agreement as ethics deliverables, e.g. ethics committee opinions/authorisations required under national or EU law.

Security — EU classified and sensitive information

Projects involving classified and/or sensitive information will have to go through the security appraisal process to authorise funding and may be made subject to specific security rules (detailed in the Security Section, which is annexed to the grant agreement). Specific provisions for EU classified information (EUCI) and sensitive information (SEN) will be included in the grant agreement, as necessary and appropriate.

The rules for protecting EU classified information (governed by Commission Decision (EU, Euratom) [2015/444](#)¹¹⁸ and/or national rules) provide for instance that:

- projects involving information classified as TRES SECRET UE/EU TOP SECRET (or equivalent) can NOT be funded;
- EU classified information must be marked in accordance with the applicable security instructions in the Security Classification Guide appendix of the Security Aspects Letter (SAL), which is contained in the Security Section of the grant agreement;

¹¹⁸ See Commission Decision (EU, Euratom) 2015/444 of 13 March 2015 on the security rules for protecting EU classified information (OJ L 72, 17.3.2015, p. 53).

- generation of, or access to, information with classification levels CONFIDENTIEL UE/EU CONFIDENTIAL or above (and RESTREINT UE/EU RESTRICTED, if required by national rules) may take place only on the premises of entities which have been granted a facility security clearance (FSC) issued by the competent national security authority (NSA);
- handling of information classified CONFIDENTIEL UE/EU CONFIDENTIAL or above (and RESTREINT UE/EU RESTRICTED, if required by national rules) may take place only in a secured area accredited by the competent NSA;
- access to and handling of information classified CONFIDENTIEL UE/EU CONFIDENTIAL or above may be granted only to individuals with a valid personnel security clearance (PSC) and an established need-to-know, who have been briefed on the applicable security rules;
- access to, and handling of, information classified RESTREINT UE/EU RESTRICTED may be granted only to individuals who have a need-to-know and have been briefed on the applicable security rules;
- at the end of the grant, the classified information must either be returned or continue to be protected according to the applicable rules;
- subcontracting of tasks involving EU classified information is subject to prior written approval by the European Commission, which is the originator of EU classified information. It is only possible to subcontract these tasks to entities established in an EU Member State or in a non-EU country with a security of information agreement with the EU (or an administrative arrangement with the Commission);
- disclosure of EU classified information is subject to prior written approval by the European Commission.

Depending on the type of activity, FSCs may have to be provided before the grant is signed. The granting authority will assess this for each case and fix the delivery date during the grant preparation stage. It is not possible to sign any grant agreement before at least one of the beneficiaries in the consortium has an FSC.

In certain cases, the project results might not require classification, but they might be sensitive and require restricted disclosure or limited dissemination for security reasons, according to the applicable instructions in the Security Section. This means that, in principle, third parties should have no access to results subject to this type of restriction. Disclosure of this information is subject to prior written approval by the European Commission.

Further security recommendations may be added to the grant agreement in the form of security deliverables (e.g. establishing a security advisory board, appointing a project security officer, limiting the level of detail, using a fake scenario, etc.).

In addition, beneficiaries must ensure that their projects are not subject to national/third-country security requirements that could affect implementation or put into question the award of the grants (e.g. technology restrictions, national security classification, etc.). Any potential security issues must be notified immediately to the granting authority.

Gender equality plans and gender mainstreaming

Beneficiaries must take all measures to promote equal opportunities between men and women in implementing the action and, where applicable, in line with their gender equality plan. They must aim to achieve, to the extent possible, a gender balance at all levels of personnel assigned to the action, including at supervisory and managerial level.

In addition, to be eligible, legal entities from Member States and Associated Countries that are public bodies, research organisations or higher education establishments (including private research organisations and higher education establishments) must have a gender equality plan, covering the following minimum process-related requirements:

- publication: a formal document published on the institution's website and signed by the top management;
- dedicated resources: commitment of resources and expertise in gender equality to implement the plan;
- data collection and monitoring: sex/gender disaggregated data on personnel (and students, for the establishments concerned) and annual reporting based on indicators;
- training: awareness raising/training on gender equality and unconscious gender biases for staff and decision-makers.

Content-wise, it is recommended that the gender equality plan addresses the following areas, using concrete measures and targets:

- work-life balance and organisational culture;
- gender balance in leadership and decision-making;
- gender equality in recruitment and career progression;
- integration of the gender dimension into research and teaching content;
- measures against gender-based violence, including sexual harassment.

A self-declaration will be requested at proposal stage. If all the above-mentioned mandatory requirements are met through another strategic document, such as a development plan or an inclusion or diversity strategy, it can be considered as an equivalent. This eligibility criterion does not apply to other categories of legal entities, such as private for-profit organisations, including SMEs, non-governmental or civil society organisations.

Financial support to third parties

Where the specific call/topic conditions allow for financial support to third parties, the applicants must clearly describe in their proposal the objectives and the expected results, including the elements listed in the application template. The following conditions must also be fulfilled:

- projects must publish their open calls widely and adhere to EU standards of transparency, equal treatment, conflict of interest and confidentiality;
- all calls for third parties and all calls that are implemented by third parties must be published on the Funding & Tenders Portal, and on the beneficiaries' websites;
- the calls must remain open for at least 2 months;
- if submission deadlines are changed, this must immediately be announced and registered applicants must be informed of the change;
- projects must publish the outcome of the calls without delay, including a description of third-party projects, the date of the award, the duration, and the legal name of the third party and country of establishment;
- the calls must have a clear European dimension.

Further conditions may be stipulated in the specific conditions for the topic.

-  For more information, see AGA — *Annotated Model Grant Agreement*, Articles 6.2.D.1 and 9.4.

OTHER TYPES OF ACTIONS AND FORMS OF FUNDING

In addition to the eligible activities described in Annex B above, the following types of action and forms of funding are used in Euratom. They are usually placed in the ‘Other Actions’ section of the work programme parts and are not all subject to calls for proposals.

- **Grants to identified beneficiaries** — Exceptionally, a grant may be awarded to legal entities explicitly named in the work programme without a prior call for proposals. The identified beneficiaries must nevertheless submit a proposal to benefit from funding. This proposal will be evaluated and must meet the required threshold. The funding rates will correspond to the type of action indicated.
- **Prizes** — *Inducement prizes*: a prize to stimulate investment in a given area, by specifying a goal prior to the work being performed. Contests for inducement prizes must address technological and/or societal challenges. The award criteria will define a goal, but without prescribing how to achieve it. Contests for inducement prizes are split into awards for the contestant that first meets the specific goal defined in the rules of the contest, and awards for the best contestant within a given period. *Recognition prizes*: a prize to reward past achievements and outstanding work after it has been performed. Recognition prizes must help to raise public awareness of EU policies, create role models and support best practice exchange. The rules of the contest of a specific prize describe the eligibility and award criteria, the evaluation procedure, the indicative timetable and the reward. The rules are found on the call topic page on the Funding & Tenders Portal.
- **Public procurement** — In a public procurement action, the contracting authority purchases works, supplies or services, or acquires or rents land, buildings or other immovable property. This is done by entering into a contract with an economic operators chosen by the contracting authority. Before the contracting authority enters into a procurement contract, a call for tenders is published on the Funding & Tenders Portal.
- **Expert contract actions** — Expert contracts are used to appoint independent expert(s) to advise or assist us. Experts are used for evaluating proposals, for evaluating the programme, for ethics screenings and assessments, for advisory bodies, and for expertise related to the objectives of Euratom Programme.
- **Subscription actions** — Subscription actions are used to pay contributions to bodies in which the EU is a member or an observer.
- **Scientific and technical services by the Joint Research Centre** — Scientific and technical services cover research and innovation activities undertaken by the Commission through its Joint Research Centre. These activities are direct actions generating high-quality scientific evidence to support efficient and affordable public policies. The Horizon Europe’s Rules for Participation do not apply to these actions.

C — Financial and operational capacity and exclusion

Financial capacity

Applicants must have **stable and sufficient resources** to successfully implement the projects and contribute their share. Organisations participating in several projects must have sufficient capacity to implement all these projects.

The financial capacity check will be done on the basis of the documents uploaded in the [Participant Register](#) during the grant preparation stage (e.g. profit and loss account and balance sheet, business plan, audit report produced by an approved external auditor, certifying the accounts for the last closed financial year, etc.). The analysis will be based on neutral financial indicators, but will also take into account other aspects, such as dependency on EU funding and deficit and revenue in previous years.

The check will normally be done for the coordinator if the requested grant amount is equal to or greater than EUR 500 000, except for:

- public bodies (entities established as a public body under national law, including local, regional or national authorities) or international organisations; and
- cases where the individual requested grant amount is not more than EUR 60 000 (low-value grant).

If needed, it may also be done for the other applicants, including affiliated entities. If the financial capacity is structurally guaranteed by another legal entity, the financial capacity of that legal entity will be verified.

If the granting authority considers that the financial capacity is not satisfactory, they may require:

- further information;
 - an enhanced financial responsibility regime, i.e. joint and several responsibility of affiliated entities (*see Annex G below*); and
 - prefinancing paid in instalments;
- or
- propose no prefinancing;
 - request that the applicant concerned is replaced or, if needed, reject the entire proposal.

 For more information, see [Rules on Legal Entity Validation, LEAR Appointment and Financial Capacity Assessment](#).

Operational capacity

Applicants must have the **know-how, qualifications** and **resources** to successfully implement their tasks in the project and contribute their share (including, when appropriate, sufficient experience in EU/transnational projects of comparable size).

This assessment of operational capacity will be carried out during the evaluation of the award criterion ‘Quality and efficiency of the implementation’. It will be based on the competence and experience of the applicants and their project teams, including their operational resources (human, technical and other) or, exceptionally, the measures proposed to obtain the necessary competence and experience by the time the tasks are implemented.

If the evaluation of this award criterion leads to a score above the applicable threshold, then the applicants are considered to have sufficient operational capacity.

For this assessment, applicants will be required to provide the following information in the application form:

- description of the consortium participants; and
- for each participant:
 - identity of researchers involved in the proposal (through the researchers table);
 - up to five most relevant publications, widely-used datasets, software, goods, services, or any other achievements relevant to the call content;
 - up to five most relevant previous projects or activities, connected to the subject of this proposal; and
 - description of any significant infrastructure and/or any major items of technical equipment, relevant to the proposed work.

Additional supporting documents may be requested if they are needed to confirm the operational capacity of any applicant.

Public bodies, Member State organisations and international organisations are exempted from the operational capacity check.

Exclusion

Applicants that are subject to **EU administrative sanctions** (i.e. exclusion)¹¹⁹ or are in one of the following **exclusion situations**¹²⁰ that bar them from receiving EU grants can NOT participate:

¹¹⁹ See Article 138 EU Financial Regulation [2024/2509](#).

¹²⁰ See Articles 138 and 143 EU Financial Regulation [2024/2509](#).

- bankruptcy, winding up, affairs administered by the courts, arrangement with creditors, suspended business activities or other similar procedures (including procedures for persons with unlimited liability for the applicant's debts);
- they are in breach of social security or tax obligations (including if done by persons with unlimited liability for the applicant's debts);
- they are guilty of grave professional misconduct (including if done by persons having powers of representation, decision-making or control, beneficial owners or persons who are essential for the award/implementation of the grant);
- they are guilty of fraud, corruption, having links to a criminal organisation, money laundering, terrorism-related crimes (including terrorism financing), child labour or human trafficking (including if done by persons having powers of representation, decision-making or control, beneficial owners or persons who are essential for the award/implementation of the grant);
- they have shown significant deficiencies in complying with their main obligations under an EU procurement contract, grant agreement, prize, expert contract, or similar (including if done by persons having powers of representation, decision-making or control, beneficial owners or persons who are essential for the award/implementation of the grant);
- they are guilty of irregularities within the meaning of Article 1(2) of Regulation No [2988/95](#)¹²¹ (including if done by persons having powers of representation, decision-making or control, beneficial owners or persons who are essential for the award/implementation of the grant); or
- they have created under a different jurisdiction an entity with the intent to circumvent fiscal, social or other legal obligations in the country of origin or created another entity with this purpose (including if done by persons having powers of representation, decision-making or control, beneficial owners or persons who are essential for the award/implementation of the grant).

Applicants will also be refused if they¹²²:

- have misrepresented the information required as a condition for participating in the procedure or have failed to supply that information; or
- were previously involved in the preparation of documents used in the award procedure where this entails a breach of the principle of equality of treatment, including distortion of competition, that cannot be remedied otherwise.

¹²¹ Council Regulation (EC, Euratom) No 2988/95 of 18 December 1995 on the protection of the European Communities financial interests, (OJ L 312, 23.12.1995, p. 1).

¹²² See Article 143 EU Financial Regulation [2024/2509](#).

D — Award criteria

Award criteria

If admissible and eligible, the proposals will be evaluated and ranked against the following **award criteria**, depending on the type of action:

	Excellence (The following aspects will be taken into account, to the extent that the proposed work corresponds to the description in the work programme)	Impact	Quality and efficiency of the implementation
Research and innovation actions (RIA) Innovation actions (IA)	- Clarity and pertinence of the project's objectives, and the extent to which the proposed work is ambitious and goes beyond the state of the art. - Soundness of the proposed methodology, including the underlying concepts, models, assumptions, inter-disciplinary approaches, appropriate consideration of the gender dimension in research and innovation content, and the quality of open science practices, including sharing and management of research outputs and engagement of citizens, civil society and end-users where appropriate.	- Credibility of the pathways to achieve the expected outcomes and impacts specified in the work programme, and the likely scale and significance of the contributions from the project. - Suitability and quality of the measures to maximise expected outcomes and impacts, as set out in the dissemination and exploitation plan, including communication activities.	- Quality and effectiveness of the work plan, assessment of risks, and appropriateness of the effort assigned to work packages, and the resources overall. - Capacity and role of each participant, and the extent to which the consortium as a whole brings together the necessary expertise.
Coordination and support	- Clarity and pertinence of the	- Credibility of the pathways to achieve	- Quality and effectiveness of the

actions (CSA)	project's objectives. - Quality of the proposed coordination and/or support measures, including soundness of methodology.	the expected outcomes and impacts specified in the work programme, and the likely scale and significance of the contributions from the project. - Suitability and quality of the measures to maximise expected outcomes and impacts, as set out in the dissemination and exploitation plan, including communication activities.	work plan, assessment of risks, and appropriateness of the effort assigned to work packages, and the resources overall. - Capacity and role of each participant, and the extent to which the consortium as a whole brings together the necessary expertise.
Programme co-fund actions (CoFund)	- Clarity and pertinence of the project's objectives, and the extent to which the proposed work is ambitious, and goes beyond the state of the art. - Soundness of the proposed methodology, including the underlying concepts, models, assumptions, inter-disciplinary approaches, appropriate consideration of the gender dimension in research and innovation content, and the quality of open science practices, including sharing and	- Credibility of the pathways to achieve the expected outcomes and impacts specified in the work programme, and the likely scale and significance of the contributions from the project. - Suitability and quality of the measures to maximise expected outcomes and impacts, as set out in the dissemination and exploitation plan, including communication activities.	Quality and effectiveness of the work plan, assessment of risks, and appropriateness of the effort assigned to work packages, and the resources overall. - Capacity and role of each participant, and the extent to which the consortium as a whole brings together the necessary expertise.

	management of research outputs and engagement of citizens, civil society and end-users where appropriate.		
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Scores and weighting

Evaluation scores will be awarded for the criteria, and not for the different aspects listed in the table. For full applications, each criterion will be scored out of 5. The threshold for individual criteria will be 3. The overall threshold, applying to the sum of the three individual scores, will be 10.

To determine the ranking for ‘Innovation actions’, the score for ‘Impact’ will be given a weight of 1.5.

Proposals that pass the individual threshold AND the overall threshold will be considered for funding, within the limits of the available call budget. Other proposals will be rejected.

The evaluation procedure is explained further in *Annex F below*.

E — Documents

Submission

All proposals must be submitted **electronically** via the Funders & Tenders Portal electronic submission system (accessible via the topic page in the [Search Funding & Tenders](#) section). Paper submissions are NOT possible.

Proposals must be **complete** and contain all parts and mandatory annexes and supporting documents.

The application form will have two parts:

- **Part A** (to be filled in directly online) contains administrative information about the applicant organisations (future coordinator and beneficiaries and affiliated entities), the summarised budget for the proposal and call-specific questions;
- **Part B** (to be downloaded from the Portal submission system, completed and then assembled and re-uploaded as a PDF in the system) contains the technical description of the project.

Annexes and supporting documents will be directly available in the submission system and must be uploaded as PDF files (or other formats allowed by the system).

Proposals should be designed to stay as close as possible to the award criteria (*see Annex D above*). The application form will help to achieve this.

When submitting the proposal, the coordinator will have to confirm that they have the mandate to act for all applicants. Moreover, they will have to confirm that the information in the application is correct and complete and that all participants comply with the conditions for receiving Euratom funding (especially eligibility, financial and operational capacity, exclusion, etc.). Proposals not complying with these requirements will be rejected. Before signing the grant, each participant will have to confirm this again by signing a declaration of honour.

For lump sum grants proposals, the estimated budget must be described in a detailed budget table. This will be used as a basis for justifying and/or fixing the lump sum amount. As the lump sum must be an approximation of the costs actually incurred, the costs included in this detailed budget table must comply with the basic eligibility conditions for EU actual cost grants (*see AGA — Annotated Grant Agreement, Article 6*). This is particularly important for purchases and subcontracting, which must ensure best value for money (or, if appropriate, the lowest price) and be free from any conflicts of interest. If the budget table contains ineligible costs, the grants may be reduced (even later on during implementation of the project or after they end). Exceptionally, the Decision authorising the use of lump sum funding for a specific action might specify that a detailed budget table is not required.

 Applicants may be asked at a later stage for further documents (for legal entity validation, financial capacity check, bank account validation, etc.).

F — Procedure

Evaluation procedure and ranking

Calls are be subject to a **single-stage submission procedure**. The **evaluation procedure** may be organised in one (standard) or several steps.

Proposals will be checked for formal requirements (admissibility and eligibility) and then evaluated (for each topic separately) by an **evaluation committee** composed of independent external experts for operational capacity and award criteria (*see Annexes C and D above*) and then ranked according to their quality score.

For lump sum grants proposals, comments on the detailed lump sum budget table will be provided in the Evaluation Summary Report only for proposals invited to grant agreement preparation (or placed in the reserve list) and ones rejected (in part) due to significant overestimation or underestimation of costs.

Exceptionally, where indicated in the specific call/topic conditions, the evaluation committee may be composed partially or, in the case of ‘Coordination and support actions’, partially or fully of representatives of EU institutions.

For proposals with the same score within a single budget envelope a method to establish the **priority order** will be determined, taking into consideration the objectives of the specific topic. In the absence of special arrangements in the specific call/topic conditions, the following method will apply:

For each group of proposals with the same score, starting with the group achieving the highest score and continuing in descending order:

- 1) Proposals that address aspects of the call that have not otherwise been covered by more highly ranked proposals will be considered to have the highest priority.
- 2) The proposals identified under 1), if any, will themselves be prioritised according to the scores they have been awarded for ‘Excellence’. When these scores are equal, priority will be based on scores for ‘Impact’. In the case of ‘Innovation actions’, priority will be given to the score for ‘Impact’, followed by that for ‘Excellence’.
- 3) If necessary, the gender balance among the researchers named in the researchers table in the proposal, will be used as a factor for prioritisation.
- 4) If necessary, any further prioritisation will be based on geographical diversity, defined as the number of Member States or Associated Countries represented in the proposal, not otherwise receiving funds from projects higher up the ranking list (and if equal in number, then by budget).
- 5) If a distinction still cannot be made, the panel may decide to further prioritise by considering other factors related to the objectives of the call, or to Euratom in general. These may include, for example, enhancing the quality of the project portfolio through

synergies between projects or, where relevant and feasible, involving SMEs. These factors will be documented in the panel report.

- 6) The method described in 1), 2), 3) and 4) will then be applied to the remaining equally ranked proposals in the group.

At the end of the evaluation, all applicants will be informed of the result in an evaluation result letter. Successful proposals will be invited to the next stage, ‘grant preparation’; the other proposals will be put on the reserve list or rejected.

 No commitment to provide funding — Invitation to the grant preparation stage does NOT constitute a formal commitment to funding. Various legal checks are still needed before the grant can be awarded, such as legal entity validation, financial capacity verification, exclusion check, etc.

 If indicated in the specific call/topic conditions, proposals which were judged to deserve funding but did not succeed because of budget limits will receive a **Seal of Excellence**¹²³. With prior authorisation from the applicant, the granting authority may share information concerning the proposal and the evaluation with interested financing authorities, subject to the conclusion of confidentiality agreements.

 Budget flexibility — The budgets set out in the calls and topics are indicative. Unless otherwise stated, final budgets may change following evaluation. The final figures may change by up to 20% compared to the total budget indicated in this work programme. Changes within these limits will not be considered substantial within the meaning of Article 110(5) of Regulation (EU, Euratom) No [2024/2509](#).

Evaluation review procedure

If the consortium believes that the evaluation procedure was flawed, the coordinator can submit a **complaint** (following the deadlines and procedures also set out in the evaluation result letter).

Only the procedural aspects of an evaluation may be the subject of a request for an evaluation review. The evaluation of the merits of a proposal will not be the subject of an evaluation review.

A request for an evaluation review must relate to a specific proposal and must be submitted within 30 days after the beneficiary accesses the evaluation results. The deadlines will be counted from the date of opening/access. The maximum size limit of the request is 7 000 characters. Notifications of evaluation results which have not been opened in the Funding & Tenders Portal within 10 days after sending are considered to have been accessed (*see also [Funding & Tenders Portal Terms and Conditions](#)*).

An evaluation review committee will provide an opinion on the procedural aspects of the evaluation. The evaluation review committee may recommend a re-evaluation of the proposal,

¹²³ https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/seal-excellence_en.

to be carried out primarily by evaluators who were not involved in the previous evaluation, or a confirmation of the initial evaluation.

Indicative timetable for evaluation and for signature of the grant agreement

Unless otherwise stated in the specific call/topic conditions, the timing for evaluation and grant preparation is as follows:

- information on the outcome of the evaluation: around 5 months from the deadline for submission;
- indicative date for the signing of grant agreements: around 8 months from the deadline for submission.

G — Legal and financial set-up of the grant agreements

During the grant preparation stage, the consortium will be asked to prepare the [grant agreement](#), together with the Commission project officer.

This grant agreement will set out the framework for the grant and its terms and conditions, particularly concerning deliverables, reporting and payments. The applicable model with the complete text of the provisions is available on the topic page, together with the other call documentation.

Starting date & project duration

The project starting date and duration will be fixed in the grant agreement (*see Data Sheet, point 1*). Normally, the starting date will be after the grant has been signed. A starting date before the date the grant is signed (retroactive) can be granted exceptionally for duly justified reasons, if agreed with the granting authority¹²⁴.

The project duration is provided in months (extensions will be possible only exceptionally, for duly justified reasons and if the granting authority agrees).

Milestones and deliverables

The milestones and deliverables for each project will be managed through the grant management system in the Portal and are reflected in Annex 1 of the grant agreement.

The standard deliverables will be set out in the specific call/topic conditions.

Form of grant, funding rate and maximum grant amount

The grant parameters (maximum grant amount, funding rate, total eligible costs, etc.) will be fixed in the grant agreement (*Data Sheet, point 3 and Article 5*).

The project budget is provided in EUR. The amount of the grant awarded may be lower than the amount requested.

For **actual cost grants**, the grant will be a budget-based, mixed actual cost grant. This means that it will reimburse ONLY certain types of costs (eligible costs) and ONLY those costs *actually* incurred for the project (NOT the *budgeted* costs).

The costs will be reimbursed at the funding rate fixed in the specific call/topic conditions and in the grant agreement.

Such grants may NOT produce a profit. If there is a profit (i.e. surplus of revenues + EU grant over costs), it will be deducted from the final grant amount.

Moreover, the final grant amount may be reduced in case of non-compliance (e.g. improper implementation, breach of obligations, etc.).

¹²⁴ See Article 196 EU Financial Regulation [2024/2509](#).

The maximum Euratom funding rates are as follows:

- Research and innovation action: 100%
- Innovation action: 70% (except for non-profit legal entities, where a rate of up to 100% applies)
- Coordination and support action: 100%
- Programme co-fund action: between 30% and 70%

Other funding rates may be set out in the specific call/topic conditions.

For **lump sum and unit grants**, the funding rate is already applied as part of the methodology for fixing the amounts and is therefore not shown in the grant agreement.

Budget categories and cost eligibility rules

The budget categories and cost eligibility rules are fixed in the grant agreement (*see Data Sheet, point 3 and Article 6*).

Budget categories:

- actual costs (i.e. costs which are real and not estimated or budgeted) for:
 - personnel costs (unless declared as a unit cost; see below);
 - subcontracting costs;
 - purchase costs (unless declared as a unit cost; see below); and
 - costs of providing financial support to third parties (if provided for in the specific call conditions);
- units (i.e. an amount per unit) for:
 - personnel costs of SME owners/natural persons not receiving a salary;
 - personnel costs calculated by the beneficiaries according to their usual cost accounting practices (average personnel costs);
 - costs of internally invoiced goods and services calculated by the beneficiaries according to their usual cost accounting practices; and
 - specific unit costs (if provided for in the specific call/topic conditions; see also Annex 2a of the grant agreement);
- flat-rate (i.e. costs calculated by applying a percentage fixed in advance to other types of eligible costs) for:

- indirect costs (25% flat-rate of the total eligible direct costs, excluding eligible direct costs for subcontracting, financial support to third parties and any unit costs or lump sums which include indirect costs);
- lump sum (i.e. a global amount deemed to cover all costs of the action or a specific category of costs, if provided for in the specific call/topic conditions).

Within a grant, different forms of costs can be used.

Costs can also be declared under several EU Synergy grants, if the cumulative funding under the grants does not exceed 100% of the eligible costs and the contributions declared to them.

Reporting & payment arrangements

The reporting and payment arrangements are fixed in the grant agreement (*Data Sheet, point 4 and Articles 21 and 22*).

After the grant has been signed, the consortium will normally receive a float to start working on the project (normally, pre-financing of 160% of the average EU funding per reporting period (i.e. maximum grant amount/number of periods); exceptionally, less or no pre-financing). For actions with only one reporting period, it will be less, since 100% would mean the totality of the grant amount.

Programme co-fund actions may receive additional pre-financing payments.

Payments will be automatically lowered if one of the consortium members has outstanding debts towards the EU (granting authority or other EU bodies). Such debts will be offset by the granting authority, in line with the conditions set out in the grant agreement (*see Article 22*).

At the moment of the prefinancing payment, an amount ranging from 5% to 8% of the maximum grant amount will be deducted from the prefinancing payment and transferred to the mutual insurance mechanism. This mechanism covers the risks associated with non-recovery of sums due from the beneficiaries.

There will be one or several interim payments linked to a periodic report, depending on the duration of the project.

At the end of the project, the consortium will be invited to submit a report on the basis of which the final grant amount will be calculated. If the total of earlier payments is higher than the final grant amount, the beneficiaries concerned (or the coordinator) will be asked to pay back the difference (recovery).

Certificates

Depending on the size of the grant amount and on the type of beneficiaries, beneficiaries may be required to submit a certificate on the financial statements. The thresholds for this certificate are fixed in the grant agreement (*Data Sheet, point 4 and Article 24*).

Liability regime for recoveries

The liability regime for recoveries is that of individual financial responsibility. Each beneficiary is liable only for their own debt (and those of its affiliated entities, if any) (*Data Sheet point 4.4 and Article 22*).

Provisions concerning project implementation

- Proper implementation of the action (*Article 11*).
- Conflict of interest (*Article 12*).
- Confidentiality and security (EU classified information) (*Article 13 and Annex 5*).
- Ethics (research integrity) and values (gender mainstreaming) (*Article 14 and Annex 5*).
- Data protection (*Article 15*).
- Intellectual Property Rights (IPR), background and results, access rights and rights of use (*Article 16 and Annex 5*). In addition to the standard provisions, the following specific provisions in the model grant agreement will apply to all grants awarded under this work programme:

Additional exploitation obligations in case of a public emergency: If requested by the granting authority, beneficiaries must grant non-exclusive licences to their results – for a limited period of time specified in the request and on fair and reasonable conditions – to legal entities that need the results to address the public emergency. These legal entities must commit to rapidly and broadly exploiting the resulting products and services on fair and reasonable conditions. This provision will apply up to 4 years after the end of the action.

Additional information obligation relating to standards: Unless stated otherwise in the specific call conditions, beneficiaries must, up to 4 years after the end of the action, inform the granting authority if the results could reasonably be expected to contribute to European or international standards.

Granting authority right to object to transfers or licensing — Euratom actions: The granting authority may, up to 4 years after the end of the action, object to a transfer of ownership or to the exclusive or non-exclusive licensing of results, as set out in the specific provision of Annex 5.

- Communication, dissemination, open science and visibility (*Article 17 and Annex 5*). In addition to the standard provisions, the following specific provisions in the model grant agreement will apply to all grants awarded under this work programme:

Open science - additional practices, validation of scientific publications: Beneficiaries must provide (digital or physical) access to data or other results needed to validate the conclusions of scientific publications, to the extent that

their legitimate interests or constraints are safeguarded (and unless they already provided the (open) access at publication).

Open science - additional practices, public emergency: In case of a public emergency, if requested by the granting authority, beneficiaries must immediately deposit any research output in a repository and provide open access to it under a CC BY licence, a public domain dedication (CC 0) or equivalent.

As an exception, if providing open access would be against the beneficiaries' legitimate interests, the beneficiaries must grant non-exclusive licences, on fair and reasonable conditions, to legal entities that need the research output to address the public emergency. These legal entities must commit to rapidly and broadly exploiting the resulting products and services on fair and reasonable conditions. This exception is limited to 4 years after the end of the action.

- Specific rules for carrying out the action (*Article 18 and Annex 5*).

Other provisions may be set out in the specific call/topic conditions.

Non-compliance and breach of contract

The grant agreement (*Chapter 5*) provides for the measures that may be taken in case of breach of contract (and other violations of law).

 For more information, see the [AGA — Annotated Grant Agreement](#).



IMPORTANT

- **Do not wait until the end** — Complete the application sufficiently in advance of the deadline to avoid any last minute **technical problems**. Problems due to last-minute submissions (*e.g. congestion, etc.*) will be entirely at applicants' own risk. Call deadlines can NOT be extended at the request of applicants.
- **Consult** the topic page on the Portal regularly. The granting authority will use it to publish updates and additional information on the call (call updates).
- **Funding & Tenders Portal electronic exchange system** — By submitting the application, all applicants **accept** to use the electronic exchange system in accordance with the [Portal Terms & Conditions](#).
- **Registration** — Before submitting the application, all beneficiaries and affiliated entities must be registered in the [Participant Register](#). The participant identification code (PIC) (one per participant) is mandatory for the application form. Associated partners can register later on (at the latest during the grant preparation stage). For validation, beneficiaries and affiliated entities will be requested to upload the necessary documents showing their legal status and origin during the grant preparation stage.
- **Consortium roles** — When setting up the consortium, applicants should think of organisations that can help them reach objectives and solve problems.

The roles should be attributed according to the degree of participation of each participant in the project. Main participants should participate as beneficiaries or affiliated entities; other entities can participate as associated partners, subcontractors, or third parties giving in-kind contributions. Associated partners and third parties giving in-kind contributions should bear their own costs (they will not become formal recipients of EU funding). Subcontracting should normally constitute a limited part and must be performed by third parties (not by one of the beneficiaries/affiliated entities, *see Annex G*).

- **Coordinator** — In multi-beneficiary grants, the beneficiaries participate as a consortium (group of beneficiaries). They will have to choose a coordinator, who will manage and coordinate the project and will represent the consortium towards the granting authority. In mono-beneficiary grants, the single beneficiary will automatically be the coordinator.
- **Affiliated entities** — Applicants may participate with affiliated entities. Affiliated entities will get a part of the EU funding and must therefore comply with all the call conditions (just like beneficiaries). But they do not sign the grant agreement and do not count towards the minimum eligibility criteria for consortium composition (if any).
- **Associated partners** — Applicants may participate with associated partners. They participate without funding and without signing the grant agreement and therefore do not need to be validated.
- **Consortium agreement** — For practical and legal reasons, participants must conclude a written consortium agreement to ensure the smooth and successful implementation of the action and to deal with exceptional or unforeseen circumstances, unless otherwise provided for in the specific call conditions. The consortium agreement also gives the possibility to redistribute the EU funding according to internal consortium principles and arrangements (for instance, one beneficiary can reattribute their grant share to another beneficiary). The consortium agreement thus allows the grant to be customised to the needs of the consortium and can also help to protect the members in case of disputes. Consortium agreements are not required for mono-beneficiary projects.
- **Completed/ongoing projects** — Applications for projects that have already been completed will be rejected. Applications for projects that have already started will be assessed on a case-by-case basis (in such cases, no costs can normally be reimbursed for activities that took place before the application was submitted).

- **No-profit rule** — Grants may NOT give a profit (i.e. surplus of revenues + EU grant over costs). This will be checked by the granting authority at the end of the project.
- **No double funding** — There is strict prohibition of double funding from the EU budget. Any given action may receive only ONE grant from the EU budget (except for EU Synergy grants) and costs may under NO circumstances be declared to two different EU actions.
- **Combination with EU operating grants** — Combination with EU operating grants is possible, if the project remains outside the operating grant work programme and the beneficiary makes sure that cost items are clearly separated in its accounting and NOT declared twice (see [AGA — Annotated Model Grant Agreement, Article 6.2.E](#)).
- **Multiple applications** — Applicants may submit more than one application for *different* projects under the same call (and be awarded funding for them).

Organisations may participate in several applications.

BUT: if there are several applications for the *same/very similar* project, only one application will be accepted and evaluated.

- **Language** — Applicants can submit their application in any official EU language. However, for reasons of efficiency, it is strongly advised to use English. If applicants need the call documentation in another official EU language, they must submit a request within 10 days after publication of the call (for the contact information, see *topic page*).
- **Rejection** — By submitting the application, all applicants accept the general call conditions set out in the General Annexes and the specific call conditions set out in the topics. Applications that do not comply with all the call conditions will be **rejected**. This applies also to applicants: all applicants need to fulfil the criteria; if any one of them does not, they must be replaced or the entire application will be rejected.
- **Cancellation** — There may be circumstances which may require the cancellation of the call or topic. In this case, applicants will be informed via a call or topic update. Cancellations are without entitlement to compensation.
- **Transparency** — In accordance with Article 38 of the [EU Financial Regulation 2024/2509](#), information about EU grants awarded is published each year on the [Europa website](#).

This includes:

- beneficiaries' names;
- beneficiaries' addresses;
- the purpose for which the grant was awarded;
- the maximum amount awarded.

Publication can exceptionally be waived (following a reasoned and duly substantiated request), if there is a risk that disclosure could jeopardise applicants' rights and freedoms under the EU Charter of Fundamental Rights or harm its commercial interests.

- **Data protection** — The submission of an application under this call involves the collection, use and processing of personal data. This data will be processed in accordance with Regulation [2018/1725](#). It will be processed solely for the purpose of evaluating the application (and subsequent management of the grant and, if needed, programme monitoring, evaluation and communication). Details are explained in the Funding & Tenders Portal privacy statement.

H — JRC infrastructure and expertise in nuclear safety, radiation protection and education & training available to applicants for grants from the Euratom Programme

For applicant consortia the JRC is offering (contact: JRC-EURATOM-IA@ec.europa.eu), free of charge, its expertise, capacities and infrastructure in key areas of fission and radiation protection research and education and training. The JRC's most relevant know-how and infrastructures in the different domains are the following:

Safety of existing and future nuclear power plants including SMRs, fuel cycle and cogeneration

- Tools for Safety systems and defence in-depth assessment, including severe accident modelling.
- Supply chain of systems, structures and components.
- Modelling of fuel behaviour during irradiation, under normal and off-normal conditions
- Nuclear fuel properties and in-pile and post-irradiation behaviour and micro-characterisation
- Nuclear data to support advanced systems modelling and safety assessments
- Safety aspects of innovative fuels and non-conventional fuel cycles
- Safety and safeguards by design in generic concepts and design analysis in specific concepts
- Materials and fuel studies in relevant environments
- Safe non-energy applications of nuclear science and ionising radiation
- Research on safety, security and safeguards assessment of different concepts of SMR Recycling of Pu in light water reactors (multi-recycling)
- Molten salt systems for recycling of Pu and Am and pyro-chemical separation methods
- Behaviour of transmutation fuel during irradiation, closed fuel cycles incorporating minor actinides
- Basic physical properties of actinide elements, oxides, compounds and complexes to underpin the improvement and development of theoretical models with predictive capabilities.

JRC also offers specific capacities and know how in cogeneration issues.

Advanced materials for nuclear applications

- Structural materials at high thermo-mechanical loads, and exposure to coolants to evaluate stress corrosion cracking.
- Advanced mechanical test methods, including the use of miniaturized samples and validation of accelerated testing methods
- Characterization and testing (including irradiation) of advanced materials (including new irradiation resistant materials, claddings, fuels, etc.)
- Emulation of high dose neutron irradiation damage in structural materials by ion irradiation and associated modelling and validation

Harmonisation of licensing procedures, codes and standards for future fission and fusion plants

JRC offers specific research infrastructures and expertise in this domain such as reference measurements and data, basic and pre-normative research and inter-laboratory comparisons.

Radioactive waste management, decommissioning and geological disposal

- Determination of the inventory of radioisotopes in the spent fuel (destructive and non-destructive analysis), characterisation of legacy waste, proficiency testing of clearance and characterisation measurements and provision of reference materials for methodology validation
- Laboratory simulation of spent fuel ageing
- Research in materials for radioactive waste management
- Model estimates of source term and decay heat by improved data and verification with non-destructive analysis
- Corrosion phenomena and potential mobility of radionuclides in the near-field environment (disposal in deep geological repository)
- Very long term storage of spent fuel and licensing requirements for extended interim storage
- Specific aspects of management of spent fuel and high-level waste forms from advanced nuclear systems or closed systems, and back-end issues of non-conventional fuels
- post-accident clean-up and remediation

Radiation protection and non-power applications

- Emergency preparedness and response including dispersion modelling.
- Radiation environmental monitoring approaches and techniquesRadio-ecological analysis
- Novel isotopes production methods, accelerator-based nuclear measurements, generator calibration, target development, isolation and characterisation (GELINA and MONNET accelerators)
- Radionuclide therapy research
- Basic properties of radionuclides and associated applications, including supporting the authentication and preservation of cultural heritage and archaeological studies
- Use of radioactive tracers for climate modelling, food fraud detection,
- Space applications

Research Infrastructures, Education, Training and Mobility

JRC offers specific capacities and know-how contributing to develop and optimise a network of European research facilities.

JRC will also continue providing open access to its own nuclear research infrastructure, for more details please visit <https://ec.europa.eu/jrc/en/research-facility/open-access>

In the field of education and training, JRC can support development of appropriate programmes and promote opportunities in specific fields.

For more information on the JRC activities in nuclear safety and security, please visit EU Science Hub <https://ec.europa.eu/jrc/en/science-area/nuclear-safety-and-security>