Euratom Work Programme 2019-2020

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Types of actions (1/2)

Research and innovation actions

- Basic and applied research, technology development, testing and validation, but limited demonstration or pilot activities
- *Funding rate: maximum 100%*

Coordination and support actions

- Networking, coordination or support services, policy dialogues, dissemination, awareness-raising, communication, studies, etc.
- *Funding rate: maximum 100%*

Types of actions (2/2)

Innovation action

- Activities directly aiming at producing plans and arrangements or designs for new, altered or improved products, processes or services. For this purpose they may include prototyping, testing, demonstrating, piloting, large-scale product validation and market replication. Projects may include limited research and development activities

- *Funding rate: maximum 70% (except for non-profit legal entities, where a rate of 100% applies)*

Call – Nuclear Fission & Radiation Protection Research NFRP 2019-20

A. NUCLEAR SAFETY
B. DECOMMISSIONING AND ENVIRONMENTAL REMEDIATION
C. RADIOACTIVE WASTE MANAGEMENT
D. EDUCATION & TRAINING
E. RADIATION PROTECTION AND MEDICAL APPLICATIONS
F. RESEARCH INFRASTRUCTURE

A. NUCLEAR SAFETY

NFRP-01: Ageing phenomena of components and structures and operational issues

NFRP-02: Safety assessments for LTO upgrades of Generation II and III reactors

NFRP-03: Safety margins determination for design basis-exceeding external hazards

NFRP-04: Innovation for Generation II and III reactors

NFRP-05: Support for safety research of SMRs

NFRP-06: Safety Research and Innovation for advanced nuclear systems

NFRP-07: Safety Research and Innovation for Partitioning and/or Transmutation

NFRP-08: Towards joint European effort in area of nuclear materials

NFRP-01: Ageing phenomena of components and structures and operational issues

Specific Challenges: The European NPPs fleet is currently at the **second half of its designed lifetime**. At the same time, the **Nuclear Safety Directive** (Council Directive 2014/87/Euratom of 8 July 2014) brings the **nuclear safety standards to a higher level**.

Scope: Research actions need to be undertaken to **expand knowledge on ageing phenomena of components and structures** important to safety and develop **predictive or/and remediating tools or operational practices** to support safe Long Term Operation of the existing nuclear fleet in line with the safety objective of the Nuclear Safety Directive

Expected impact: Data development for increased knowledge and **understanding of ageing phenomena**; **development/qualification of tools**, **systems and practices** for the reduction of vulnerabilities of operating plants in particular for foreseen LTO regimes.

Type of Action: Research and Innovation Action

Budget: 16 million (mil.)

NFRP-02: Safety assessments for LTO upgrades of Generation II and III reactors

Specific Challenges: Research actions need to be undertaken to **verify the safe operation** of the existing nuclear fleet currently going through LTO upgrades.

Scope:

- **Improvement of computer codes and models** for comprehensive safety assessments of the response to any potential accident-initiating event.
- **Experimental validation of updated computer codes and models** shall be proposed where particularly relevant for safety.
- **Formulation of guidance** for improved methodologies and recommendations for the assessment of LTO upgrades.

Expected impact: **Development and qualification of tools, systems and practices** for the reduction of vulnerabilities of operating plants under hypothetical severe accident conditions, in particular for foreseen LTO regimes.

Type of Action: Research and Innovation Action

Budget: 12 mil.

NFRP-03: Safety margins determination for design basis-exceeding external hazards

Specific Challenges: EU nuclear plants need to **demonstrate compliance** with evolving and stringent safety requirements.

Scope:

- Further **safety assessments** of the severe accidents scenarios including external hazards such as floods, earthquakes, fires etc.
- Building **improved knowledge** of nuclear plant behaviour by **updated probabilistic safety assessments (PSA)** along those scenarios.
- **Improvement of tools** such as safety monitors for training purposes especially in the field of human factors under accident conditions.

Expected impact: **Increased knowledge and understanding** of severe accidents transients as well as update of simulation tools and PSA methods for the reduction of consequences for accidents with very low probability and external hazards.

Type of Action: Research and Innovation Action

Budget: 8 mil.

NFRP-04: Innovation for Generation II and III reactors

Specific Challenge: to **promote implementation of the currently available innovative technology** knowledge including new **technological possibilities from non-nuclear industry** to the benefit of the safety of the Gen II and Gen III nuclear reactors and to the efficiency and competitiveness of the European industry.

Scope: Projects submitted under this topic are expected to focus on **Technology Readiness Levels (TRL) 5 to 7** and demonstrate European added-value.

Expected impacts: This action is expected to deliver new, innovative products, processes, methods or services, supporting increased nuclear safety for a safe, **efficient and competitive European nuclear industry**.

Type of Action: Innovation Action

Budget: 12 mil.

NFRP-05: Support for safety research of Small Modular Reactors (SMRs)

Specific Challenge: SMRs are considered as a reasonable option to cover future energy needs. **Compliance with the safety objective as established by Article 8a** of the Nuclear Safety Directive may significantly vary depending on the safety options of the proposed design.

Scope: The research should **propose the methodologies for the performing safety evaluations and safety improvements** fostering safety standards, including the experimental validation of essential items for safety demonstrations.

Expected Impact: To **establish a baseline for safety assessments** and verification of existing SMR concepts during the following years.

Type of Action: Research and Innovation Action

Budget: 8 mil.

NFRP-06: Safety Research and Innovation for advanced nuclear systems

Specific Challenge: all Generation-IV concepts will need to **demonstrate compliance with evolving and ever more stringent safety requirements**. In this context, a significant increase in the level of safety is expected to be demonstrated.

Scope: This action is aimed at the development and **technical assessment of safety improvements of Generation-IV** systems and their supporting reactor islands.

Expected Impact: This action is to draw on the unique expertise and operational feedback experience gained by the EU in Generation-IV technologies, to **place the EU at the forefront of the development of safety standards** for this new generation of reactors, thereby helping EU safety standards to be adopted worldwide.

Type of Action: Research and Innovation Action

Budget: 7.6 mil.

NFRP-07: Safety Research and Innovation for Partitioning and/or Transmutation

Specific Challenge: The EU benefits from extensive operational experience in this domain, which is unique in the world. This experience should be exploited and extended in order to **further improve nuclear safety, radiation protection and environmental protection**.

Scope: This action will address **back-end fuel cycle research and innovation needs** in all technical areas of P&T.

Expected Impact: This action will strengthen important Euratom research undertaken in previous programmes and make real advances towards safe realisation of P&T processes. This research will **enhance any efficiency and safety of processes using state-of-the-art P&T technology** towards a closure of the nuclear fuel cycle.

Type of Action: Research and Innovation Action

Budget: 6 mil.

NFRP-08: Towards joint European effort in area of nuclear materials

Specific Challenge: Advanced **materials are the very basis of the technological development** and industrial innovation. In addition to nuclear materials, several European countries, whether nuclear, non-nuclear or in the nuclear phasing-out process, are supporting nuclear materials research in frame of their national research programmes.

Scope: This action should explore the possibility of establishing in the future a joint European programme in area of nuclear materials. The **Strategic Research Agenda (SRA) for nuclear materials** covering short-to-medium term period, i.e. for the period up to 15-20 years, has to be one of the project's deliverables.

Expected Impact: This action should help further **consolidate EU Member States' research programmes** and the Euratom effort in domain of nuclear materials.

Type of Action: Coordination and Support Action

Budget: 1.1 mil.

B. DECOMMISSIONING AND ENVIRONMENTAL REMEDIATION

NFRP-09: Fostering innovation in decommissioning of nuclear facilities

Specific Challenge: Need for improved and efficient decommissioning strategies and technologies is pressing and the challenge is to **capitalize European experience**, make **more effort on innovation** and get in front of technological developments.

Scope: This action focuses on closer-to-the-market activities aiming to capitalise existing technologies for **characterisation and risk assessment, dismantling, on-site waste management and environmental remediation** in order to gain needed efficiencies in the decommissioning of nuclear power reactors, research reactors, mining and processing of radioactive ore and any other nuclear facilities.

Expected Impact: This action is expected to stimulate innovation and **promote a world-leading decommissioning sector based on EU safety culture** and know-how, taking advantage of promising innovative technologies.

Type of Action: Innovation Action

Budget: 8.5 mil.

C. RADIOACTIVE WASTE MANAGEMENT

NFRP-10: Developing pre-disposal activities identified in the scope of the EJP in RWM

Specific Challenge: To improve, innovate and develop **science and technology for the pre-disposal management** of radioactive waste streams and categories for which industrially mature processes currently do not exist or for existing processes which could benefit from improvement and innovation. To advance in the integration of research and development between MSs' national programmes including **transfer of knowledge and competences across MSs' programmes**.

Scope: The objective of this action is to **reinforce implementation of the scope of activities of the JP initiative** in the field of pre-disposal of radioactive waste **other than spent nuclear fuel and high-level RW**.

Expected Impact: The **availability of treatment and conditioning technologies** for radioactive waste streams and categories arising in all MS.

Type of Action: Research and Innovation Action

Budget: 14 mil.

D. EDUCATION & TRAINING

NFRP-11: Advancing nuclear education

Challenge: If the EU is to keep its global position and wants to stay in the forefront of mastering the nuclear technology, then a **new generation of qualified researchers and workforce** needs to be secured.

Scope: The aim is to **bring innovation to nuclear education** by employing and/or developing new methods and tools, in order to make the field more attractive for a younger generation. Rather than developing new programmes and/or courses, the existing ones should be adapted.

Expected Impact: This action should contribute to **increase the number of students and trainees and bring advanced educational technics in the field** of nuclear technology and ionising radiation (including radiation protection) over next 3-5 years.

Type of Action: Coordination and Support

Budget: 5 mil.

E. RADIATION PROTECTION AND MEDICAL APPLICATIONS

NFRP-12: Further integrating Radiation Protection research in the EU

NFRP-13: Research roadmap for medical applications of ionising radiation

NFRP-14: Improving low-dose radiation risk appraisal in medicine

NFRP-12: Further integrating Radiation Protection research in the EU

Specific Challenge: Protecting people and the environment from the **potentially harmful effects of ionising radiation** remains a challenge in the context of expanding practices involving radiation in the EU, notably in the medical sector.

Scope: This action shall dwell on scientific outputs from past programmes in this field and add specific knowledge in areas of most promising research outcome or most significant **contribution to peoples' health and environment protection**. The proposals should focus on lifting key uncertainties about the risks from low-dose radiation and resolving challenges these uncertainties pose for the implementation of Directive Euratom 2013/59.

Expected Impact: The provision of more consolidated and **robust science-based policy recommendations to decision makers** in the area of radiation protection.

Type of action: Research and Innovation Action

Budget: 18 mil.

NFRP-13: Research roadmap for medical applications of ionising radiation

Specific challenge: **Nuclear and ionising radiation technologies** have a central place in modern medicine, **saving lives and improving the quality of life for patients**. In the EU alone, each citizen will undergo on average at least one medical procedure involving ionising radiation each year.

Scope: This action should prepare **a Strategic Research Agenda (SRA) for research on medical applications of ionising radiation**. Inputs and active involvement of European stakeholders from the clinical, industrial, regulatory, scientific and all other relevant fields should be ensured through their inclusion in the project consortium, by organising dedicated events, workshops and by any other relevant ways of involvement.

Expected impact: SRA will provide **guidance to stakeholders and the Commission on the steps needed** in the coming decades for the development of research activities and knowledge in this area.

Type of Action: Coordination and Support Action

Budget: 2 mil.

NFRP-14: Improving low-dose radiation risk appraisal in medicine

Specific challenge: Nowadays medical care extensively uses ionising radiation for diagnostic and therapy. Together with natural radiation, medical applications are the **main contributor to the exposure of the European population to ionising radiation**.

Scope: This action shall **add clarity on detriment from new medical applications** of ionising radiation in view of their fast deployment.

Expected impact: New applications of radiation in medical care will be able to use **fast tract approval procedures** thanks to the better appraisal of their possible health detriment. This action will **improve risk assessment capabilities** of the two main sources of radiation exposure of the European population.

Type of Action: Research and Innovation Action

Budget: 6 mil.

F. RESEARCH INFRASTRUCTURE

NFRP-15: Optimised fuels for production of medical radioisotopes

NFRP-16: Roadmap for use of Euratom access rights to JHR experimental capacity

NFRP 17: Optimised use of European research reactors

NFRP-15: Optimised fuels for production of medical radioisotopes

Specific Challenge: The EU remains the major world operator of research reactors and supplier of medical radioisotopes. Low enriched uranium is key to ensure the secure supply of research reactors' fuel and targets in compliance with the Euratom international commitments on non-proliferation. Much remains to be done in this field, in particular in terms of **fuel qualification, considering the requirements of the entire supply, operation and decommissioning chain**.

Scope: This action should involve a multidisciplinary research consortium able to **tackle technical aspects of production of fuel** for research reactors.

Expected Impact: This action will **sustain the EU's capacity in the production of medical radioisotopes** by ensuring the availability of high-performance research reactors.

Type of Action: Research and Innovation Action

Budget: 7.5 mil.

NFRP-16: Roadmap for use of Euratom access rights to JHR experimental capacity

Specific Challenge: The Jules Horowitz Reactor (JHR) is a new Material Testing Reactor to be used for scientific studies dealing with materials and nuclear fuels behaviour under high neutron flux, which should help to enhance safety of existing and future nuclear installations. **The use of Euratom access rights to the JHR experimental capacity** by the European nuclear materials and fuels research community.

Scope: This action should lead to the **creation of the Roadmap covering short-to-medium term period**, i.e. for the period at least 15 years from the start of the 1st irradiation campaign at JHR, with a goal to assure proper and effective use of the Euratom access rights by research consortia funded through Euratom indirect actions.

Expected Impact: This action should bring together all key actors involved in JHR and **facilitate planning of the JHR irradiation campaigns** while ensuring proper use of the Euratom access rights to the JHR experimental capacity.

Type of Action: Coordination and Support Action

Budget: 1.1 mil.

NFRP 17: Optimised use of European research reactors

Specific Challenge: The **coordination of the exploitation of available research reactors in Europe** is expected to help stable supply of medical radioisotopes and optimise the use of irradiation time in the available reactors thereby reducing disruptions and delays occurring in many experiments.

Scope: This action will network the largest possible number of research reactor operators at EU level in order to facilitate **the exchange of information on the availability of research reactors** against research and radioisotopes production needs across the EU.

Expected Impact: This action will contribute to ensure stable supply of medical radioisotopes and the more effective planning of the exploitation of research reactors in the EU for research on non-power applications of ionising radiation and for nuclear energy research and training.

Type of Action: Coordination and Support Action

Budget: 1.1 mil.

General Annexes to the WP

- List of countries eligible for funding (note: Switzerland and Ukraine are for the moment the only countries associated to Euratom)
- Standard admissibility and elibility conditions
- Types of action: specific provisions and funding rates
- Evaluation criteria, scoring and treshold + procedure for setting a priority order for proposals with the same score
- Actions involving financial support to third parties
- Conditions related to open access to research data
- TRLs etc.

Other conditions (1/4)

Topics NFRP-1, NFRP-2, NFRP-3, NFRP-5, NFRP-6, NFRP-7, NFRP-10, NFRP-12, NFRP-14, NFRP-15:

In order to stimulate training and mobility of researchers (as mandated by Regulation (Euratom) No 2018/1563) in these topics, at least 5% of the total action budget must be dedicated to Education and Training activities for PhD students, postdoctoral researchers and trainees supported through the action. Proposals must indicate how this condition is met by including under "resources to be committed" in Section 3.4c of the Part B of the proposal, the total allocation of budget to the related workpackage(s) or part(s) of work-package.

Other conditions (2/4)

Topic NFRP-16:

Proposals for this action must include participation of the Joint Research Centre (JRC) to ensure that it covers the full use of the Euratom access right while taking into account the JRC planned activities. In such participation JRC staff and operational costs will be covered by JRC budget as appropriate.

Other conditions (3/4)

Topics NFRP-10, NFRP-11, NFRP-12, NFRP-14, NFRP-17:

For grants awarded under this topic beneficiaries may provide support to third parties as described in part J of the General Annexes of the Work Programme. The support to third parties can only be provided in the form of grants. The respective options of Article 15.1 and Article 15.3 of the Model Grant Agreement will be applied.

Other conditions (4/4)

Topic NFRP-10:

Grant awarded under this topic should be complementary to the following action:

Euratom Work Programme 2018 – NFRP-6 – European Joint Research Programme in the management and disposal of radioactive waste.

The respective options of Article 2, Article 31.6 and Article 41.4 2 of the Model Grant Agreement will be applied.

Research and Innovation Actions (RIA)

Topic	Budgets (EUR million)
Nuclear safety - NFRP-01: Ageing phenomena of components and structures and operational issues	16
Nuclear safety - NFRP-02: Safety assessments for LTO upgrades of Generation II and III reactors	12
Nuclear safety - NFRP-03: Safety margins determination for design basis-exceeding external hazards	8
Nuclear safety - NFRP-05: Support for safety research of Small Modular Reactors	8
Nuclear safety - NFRP-06: Safety Research and Innovation for advanced nuclear systems	7.6
Nuclear safety - NFRP-07: Safety Research and Innovation for Partitioning and/or Transmutation	6

Research and Innovation Actions (RIA)

Topic	Budgets (EUR million)
Radioactive Waste management - NFRP-10: Developing pre-disposal activities identified in the scope of the European Joint Programme in Radioactive Waste Management	14
Radiation Protection and medical applications - NFRP-12: Further integrating Radiation Protection research in the EU	18
Radiation Protection and medical applications - NFRP-14: Improving low-dose radiation risk appraisal in medicine	6
Research Infrastructure - NFRP-15: Optimised fuels for production of medical radioisotopes	7.5

Coordination and Support Actions (CSA)

Topic	Budgets (EUR million)
Nuclear safety - NFRP-08: Towards joint European effort in area of nuclear materials	1.1
Education and Training - NFRP-11: Advancing nuclear education	5
Radiation Protection and medical applications - NFRP-13: Research roadmap for medical applications of ionising radiation	2
Research Infrastructure - NFRP-16: Roadmap for use of Euratom access rights to JHR experimental capacity	1.1
Research Infrastructure - NFRP 17: Optimised use of European research reactors	1.1

Innovation Action (IA)

Topic	Budgets (EUR million)
Nuclear safety - NFRP-04: Innovation for Generation II and III reactors	12
Decommissioning and environmental remediation - NFRP-09: Fostering innovation in decommissioning of nuclear facilities	8.5

WP 2019-2020 Calendar

WP Adoption:	*14 December 2018*
Call Open:	*15 May 2019*
Submission deadline:	*25 September 2019, 17.00.00 Brussels local time*
Evaluation:	*November 2019*
Info to the applicants:	*January–February 2020*
Signature of GAs:	*May 2020*