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To:	Ms Thérèse BLANCHET, Secretary-General of the Council of the European Union

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Subject:	COMMISSION STAFF WORKING DOCUMENT EXECUTIVE SUMMARY OF THE EVALUATION Ex-post evaluation of indirect actions under the Euratom Research and Training Programme 2014-2020 Accompanying the document REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL AND THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE Ex-post evaluation of the Euratom Research and Training Programme 2014-2020

Delegations will find attached document SWD(2024) 272 final - Part 2/2.

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PART 2/2

COMMISSION STAFF WORKING DOCUMENT
EXECUTIVE SUMMARY OF THE EVALUATION

**Ex-post evaluation of indirect actions under the Euratom Research and Training
Programme 2014-2020**

Accompanying the document

**REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE
COUNCIL AND THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE**

Ex-post evaluation of the Euratom Research and Training Programme 2014-2020

{COM(2024) 549 final} - {SWD(2024) 271 final}

EXECUTIVE SUMMARY

This Staff Working Document provides support and evidence for the Commission's report on the ex-post evaluation of indirect actions under the Euratom Research and Training Programmes 2014-2018 and 2019-2020 ('the Programme').

The evaluation concludes that the Programme significantly supported nuclear safety, security and radiation protection in the EU, helping to ensure that Europe meets the highest standards in these fields. At the same time, the Programme contributed to the long-term decarbonisation of the EU energy system by providing a knowledge base and solutions for the long-term operation of existing nuclear power plants (NPPs). The Programme also helped to advance the knowledge and technologies necessary for the development of fusion energy and the safety case for advanced nuclear systems.

The evaluation shows that the Programme was relevant across the full scope of indirect actions: nuclear safety, radioactive waste management, radiation protection and fusion energy. The intervention logic was to develop the scientific base for fusion energy and to ensure the safe use of fission and fusion technologies, striking the right balance between the safety of existing nuclear technology and that of future technologies. The Programme also helped Member States and stakeholders implement the Nuclear Safety, the Radioactive Waste and the Basic Safety Standards Directives.

Euratom-funded research activities in fusion were centred around the Fusion Roadmap, aimed at demonstrating the feasibility of magnetic confinement fusion as a future energy source. Though fusion energy remains a long-term endeavour, the evaluation shows that during 2014-2020, the EUROfusion consortium made incremental progress along this Roadmap, achieving 90% of the milestones established for 2014-2020.

EUROfusion's research has substantially reduced risks and enhanced projected ITER performance. Progress has also been made on technologies for future fusion power plants and the DEMO design effort. The engineering work behind the DEMO pre-conceptual design has clarified several critical design issues and the overall integration challenge. Altogether, fusion research supported by the Programme ensured that the EU has the know-how and competences for operating ITER once it is completed.

In fission research funded by the Programme, nuclear safety projects have provided relevant results. In some cases, it made significant progress concerning the original state-of-the-art in the main areas of safety of existing NPPs, future concepts and decommissioning. Projects resulted in advanced computer models for safety analysis, strategies for severe accident management, safety demonstration of future reactor designs and testing and qualification of safety-relevant components.

In radiation protection, the Programme succeeded in bringing together several key players in developing a joint roadmap for radiation protection. The experience gained was used in developing more specific research agendas in the medical field. The research projects also contributed to radiation risk assessment, optimisation of radiation protection and in the management of radon. In radioactive waste management, a significant achievement was the progress made in the construction of geological disposal facilities across Europe. Uncertainties on disposal performances and safety margins were progressively identified and addressed.

Through cooperative research, the Programme enabled a Europe-wide approach to both the improvement of nuclear safety and radiation protection in all areas of application and the challenge

of developing fusion as an energy source. The Programme significantly increased the EU's ability to mobilise a wider pool of excellence, expertise and multidisciplinary in nuclear research, achieving impacts that extend far beyond what would have been achieved at national or regional level. This is of particular benefit to smaller Member States, which were able to take advantage of economies of scale afforded by the Europe-wide pooling effect and open access to JRC facilities.

The Programme played a significant role in maintaining critical skills and capacities in the nuclear sector. Euratom projects involved around 13 700 researchers (7 900 in fission and 5 800 in fusion), providing a supporting environment for the exchange of ideas and for training a new generation of researchers.

The evaluation by experts produced several recommendations. In fusion research, the Euratom Programme should now focus on addressing the critical issues and risks to proceed with the engineering design of a future fusion power plant. In fission research, the Commission should favour larger, integrated projects, encompassing all issues and aspects of a particular topic. The funds for education and training, knowledge management, skills and capacity development should be increased. Euratom should also streamline support and concentrate efforts and resources on the advanced nuclear systems and applications in which European industries have an interest.