



# SNETP FORWARD

*CALL FOR TENDERS*

Nuclear & Digital Innovation

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The European Council has acknowledged the need to ensure energy security while respecting Member States' right to choose their energy mix and to choose the most appropriate technologies. The EU needs all sectors and possible solutions to enable a transformational change to its economy and make Europe the first climate-neutral continent in the world. The EU's Energy Strategy Plan foresees that nuclear energy will remain an important factor of the EU's energy mix until 2050 – and even beyond. Technological sovereignty will require joint efforts in education, training, research, and innovation efforts. In the nuclear sector, this is crucial for ensuring high-level of safety and radiation protection in Europe, to properly manage radioactive waste and spent fuel, and to develop future technologies of tomorrow including intrinsically safe reactors and closing the nuclear fuel cycle. The objective of SNETP is to develop strategic research and innovation agenda addressing the scientific and technical gaps and needs to ensure that the nuclear sector can play its role in the decarbonization strategy of the union, highlighting the importance of R&D&I facilities and the needed human resources and skills gaps in the EU nuclear sector.

Digitization, artificial intelligence and digital reality tools offer the European nuclear industry a significant opportunity to improve safety, reduce costs and increase efficiency. Digitization involves the application of digital technology to processes, services and products, and can provide the nuclear industry with improved remote monitoring capabilities, predictive maintenance, and automated processes. This can help to reduce operational costs, while also providing more accurate and timely data for decision-making and operations. AI can be used to analyze data and detect anomalies, enabling more efficient operations and better decision-making. Digital reality tools can be used to facilitate training, simulate emergency scenarios, and verify engineering designs. This can help to improve safety, reduce waste, and increase efficiency in the nuclear industry.

Nuclear industry has been at the edge of digital computing to address safety of handling nuclear material and activities with their related radioprotection challenges while keeping trace of compliance to regulatory requirements. Industry, aiming at zero emissions, brings additional and revisited technologies that allow to address the development needs for new nuclear installations that will have to be in operations for more than 50 years. Nuclear industry already started but now needs to execute its transformation from historical document centric methodology towards data centric activities. It also needs to extend the digital continuity across its nuclear energy supply chain, from uranium mining through electricity production up to recycling and dismantling.

This study aims at identifying opportunities of the EU workforce active in the digital activities being within industry, universities, research centers or technical safety organizations being member of SNETP or not that are active in all the fields/topics related to the nuclear sector as described in the Strategic Research and Innovation Agenda of SNETP. The study shall focus in covering the following topics:

- Digitalization of field workers interventions in extended enterprise business model: electronic work report, data collect and operating procedure control with mobile devices and / or augmented reality, connected worker during maintenance in operations or in shutdown phase, and construction works
- Digital for equipment ageing in long lifecycle installations (> 40 to 60 years or more), remote monitoring, predictive maintenance
- Digital for nuclear safety: traceability of safety requirement, periodic safety equipment review
- Digital continuity for engineering, procurement construction but also operation (production and maintenance) within the extended supply chain, up to dismantling:
  - o Data Exchange / Data Hub / Market place platform
  - o Extended Enterprise collaboration platform
- Digital reality tools that can be used to facilitate training and simulate emergency scenarios in the nuclear industry
- Digital for nuclear waste management and decommissioning: collaborative supply chain planning optimization, identification with Radio Frequency Identification (RFID), and traceability
- Digital for radioprotection: connected dosimetry, IoT for radioprotection measure, 3D radioprotection maps of installation, environmental surveillance leveraging geographic information systems)

The expected work is to analyse the opportunities of the nuclear sector in the digital world and to provide a broadladscape of the applications being adopted by the verious stakeholders (utilities, fabricants, suppliers, R&D, TSOs, ...)

Existing works and initiatives of European and international nuclear associations active in digital transformation will be leveraged to initialize the analysis.