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# FISA 2019

9<sup>th</sup> European Commission Conference  
on EURATOM Research and Training  
in Safety of Reactor Systems

4-7 June 2019  
Pitesti, Romania



## Summary of FISA2019



- In a number of EU Member States **nuclear energy plays a significant role as a component of low carbon electricity supply** to address, in particular, the obligations under the Paris Agreement on climate change, also highlighted in the latest 2050 roadmap for a carbon-neutral economy.
- Nuclear energy also contributes to **security of energy supply and competitiveness** of European Industry
- All the EU Member States, including those with no NPPs, have a primary interest to **ensuring nuclear safety throughout the EU**
- Despite different energy policies in EU MSs, Europe produces about 25% of its electricity through the operation of 126 reactors. Maintaining a **high level of safety and competitiveness is a major challenge** and requires the establishment of a coordinated and focused R&D programme at European level, well interconnected with IAEA and OECD-NEA activities

- Most European countries operating NPPs are now considering prolonging the lifetime of their reactors from an originally foreseen 40 years' operation to 60 years. In order to **safely extend the lifetime of these reactors**, the nuclear sector needs to have, in addition to a skilled and well-trained workforce, **reliable tools to assess the ageing and degradation** processes of components and structures, as well as methods and guidelines for their validation. The contribution from the Euratom R&D programme to this top priority must continue and **be focused on the expressed needs of the European industry**
- Industrial scale deployment of so called **Generation IV nuclear energy systems** is expected around the middle of the 21st Century. **European contribution**, above all to **safety, sustainability, non-proliferation resistance, physical protection and competitiveness** aspects of these innovative systems is clearly recognized at the international level. **JRC** remains the implement agent of Euratom in GIF whilst specific **indirect actions** should be aimed at coordinating the contribution from interested Member States

- Limited resources at European level on advanced reactors and related fuels and fuel cycles suggest prioritization on the most promising nuclear systems for Europe
- In the meantime there is the need to **maintain flexibility** within current and future Euratom programmes to consider, at appropriate time, other emerging nuclear technologies, including those given high priority in other regions of the world, like for instance **SMRs, nuclear-renewable hybrid energy systems, etc.**
- **Non-electric applications of NP**, like H2 production, district heating, several industrial applications, desalination, etc. are of increasing interest in many regions of the world including some EU Member States. They have the potential **to decarbonize the whole energy sector**. Synergies with chemical industry should be developed as soon as possible and **related R&D in Europe should be focused on near-term deployment**

- Despite the planned life extension of aging NPPs, a number of NPPs in Europe are expected to be shut-down in coming years. **Decommissioning and dismantling industrial-oriented R&D activities** have to be appropriately supported by forthcoming Euratom programmes
- Many efforts have been devoted during last decades to develop **advanced physical models and computer simulation codes of high fidelity**, including in the very challenging area of severe accident M&S. However new technologies such as **artificial intelligence, on-line monitoring, deep-learning**, etc. are rapidly being introduced in many advanced technology sectors. Forthcoming Euratom programmes should take into account these new trends and foster the **early involvement of European industry and TSOs** which represent the final users
- **Nuclear applications and technologies**, and related competence and expertise, in the fields of medicine, radiation protection and in general **non-power applications** are recognized of great value for a modern society in all the EU Member States. As a consequence **Euratom programme should be seen as an integral part of the broader Horizon Europe** proposal able to capitalise on synergies over a much wider range of research areas. Joint projects between Euratom and Horizon Europe programmes should be pursued whenever possible (mission oriented projects)

- Ensuring a **top-level education & training**, involving basic academic education as well as continuous professional development and capacity building is of paramount importance to create a **new generation of nuclear researchers and experts** able to maintain high levels of safety throughout the sector and address the challenges posed by advanced nuclear power and non-power technologies of European interest
- There is a **strong and urgent need to maintain and strengthen a robust, enduring and efficient infrastructure** base across the EU to underpin all aspects of research and innovation throughout the sector
- There is the need to capitalize on the European Technology Platforms **SNETP- NUGENIA, - ESNII, -NC2I** as well as **ENEN** as for E&T. ETPs are very important to foster and strengthen collaboration between research/academic institutes and industry
- **International cooperation and synergies** with initiatives launched by other international agencies like NI2050 & NEST by OECD-NEA, ICERR and E&T networks by IAEA, GIF task forces on infrastructure and E&T have to be fostered and strengthened as well

- There are significant **cross-cutting benefits and synergies** that can be realised between **fission/fusion/non-nuclear (e.g. materials)** energy research programmes, as fusion evolves from activities focused on basic plasma physics to ones focused more on technology and safety-related aspects