

SAFIR2022 – Supplement to the Framework Plan for 2020 Call

Summary based on the minutes of the MB meeting on 17.6.2019 and the related material

General

SAFIR2022 research programme started at the beginning of 2019. The ongoing projects reflect the SAFIR2022 Framework Plan and the long term goals for 2022 and 2026 set in the planning phase. The long term goals are the following:

1. Nuclear safety experimental and laboratory capability building *)
2. Overall safety and systemic approach to safety *)
3. Validated tools for reactor and nuclear power plant analysis
4. Nuclear fuel and its lifecycle from reactor to final disposal *)
5. Ageing phenomena and the integrity of barriers
6. Severe accidents
7. External and internal hazards
8. Nuclear safety in a changing environment.

*) common topic with KYT2022

The long term goals 1, 2 and 4 are common with ongoing nuclear waste management research programme KYT2022. More information about the goals and content of research can be found in the SAFIR2022 Framework Plan. Research issues common to the SAFIR2022 and KYT2022 safety goals can also be found under topics 5 and 7.

The SAFIR2022 project portfolio in 2019 emphasises the development of validated tools for reactor and nuclear power analysis (goal 3) as well as research on the ageing phenomena and the integrity of barriers (goal 5) in line with the set priorities. The volume of goals 4 and 8, for which long term goals were also assigned, represent only a few percent of the total volume of the programme.

The volume of the nuclear fuel research overarching from the SAFIR2022 research programme to the KYT2022 programme is low. The research organizations are encouraged to develop projects supporting research on nuclear fuel and its lifecycle from reactor to final disposal (goal 4). Research on the long term ageing phenomena could also be common for the SAFIR2022 and KYT2022 programmes and the common topics are encouraged.

The allocation of the projects to the longer goals showed that only a small amount of the financing is allocated to nuclear safety in a changing environment (goal 8). The operating environment of energy production has been subjected to changes and the impact of those changes on the use of nuclear energy and nuclear safety should be further studied.

Nuclear safety provisions and assessments for seismic hazards consider event intensities of wide spectrum, up to events expected to occur once per 10 000 000 years. Especially extremely low frequency data is needed for the design extension criteria verification to nuclear facilities and to the final repository of nuclear spent fuel. Therefore, it is natural to combine SAFIR2022 and KYT2022 resources in corresponding research related to the monitoring of seismicity. This has also been found as an important topic by OECD/NEA and IAEA.

In the call 2020, the Management Board of SAFIR2022 emphasises the importance of the following research topics:

1. Needs for a change in the nuclear electricity production modes that support the grid are foreseen. The energy production that is dependent on weather conditions or subject to diurnal or seasonal variations will increase and this may also have effects on the operation of the nuclear power plants. At the same time, the power production based on fossil fuel will decrease and less conventional base load capacity will be available for maintaining the power balance. Therefore, e.g., flexible operation of nuclear power plants requires research to assure its safety.
2. The research organizations are encouraged to look for co-operation between the national SAFIR2022 and KYT2022 research programmes and with international research organizations in relevant topics that are of common interest. Co-operation is also sought with research projects not only concentrating on nuclear safety. Specifically more international co-operation is desired in the area of ageing of the concrete containment and corresponding NDT testing methods for concrete structures including bonding between concrete and steel parts in reinforced as well as in post-tensioned concrete structures. Material ageing of electric and automation cables also requires more co-operative research.