

Advanced Lead Fast Reactor European Demonstrator - ALFRED Project

Summary / Objectives:

The webinar presents the main design features of the ALFRED nuclear reactor demonstrator as developed in the frame of the Collaborative projects funded by the European Community Framework Program. The presentation will provide an overview of specific design solutions, safety approach and safety characteristics of ALFRED, touching the most important aspects of the demonstrator. Latest developments are briefly presented as well. The remaining research challenges are then explained at the light of the present technology understanding to highlight the present status of knowledge and further steps to be pursued.

Meet the Presenter:

Dr. Alessandro Alemberti is the Nuclear Science Development Manager of Ansaldo Nucleare (Italy) and in this position takes care of the Research & Development activities of the company. He coordinated the ELSY and LEADER projects in the frame of the 6th and 7th Framework Programs of the European Community, projects devoted to Lead cooled Fast Reactors development and participated as well to the main EU projects related to Lead and Lead Bismuth Eutectic (LBE) coolant technologies in recent years. Since 2012, he has served as the chairman of the Generation IV International Forum (GIF) Lead Fast Reactor provisional System Steering Committee representing EURATOM.



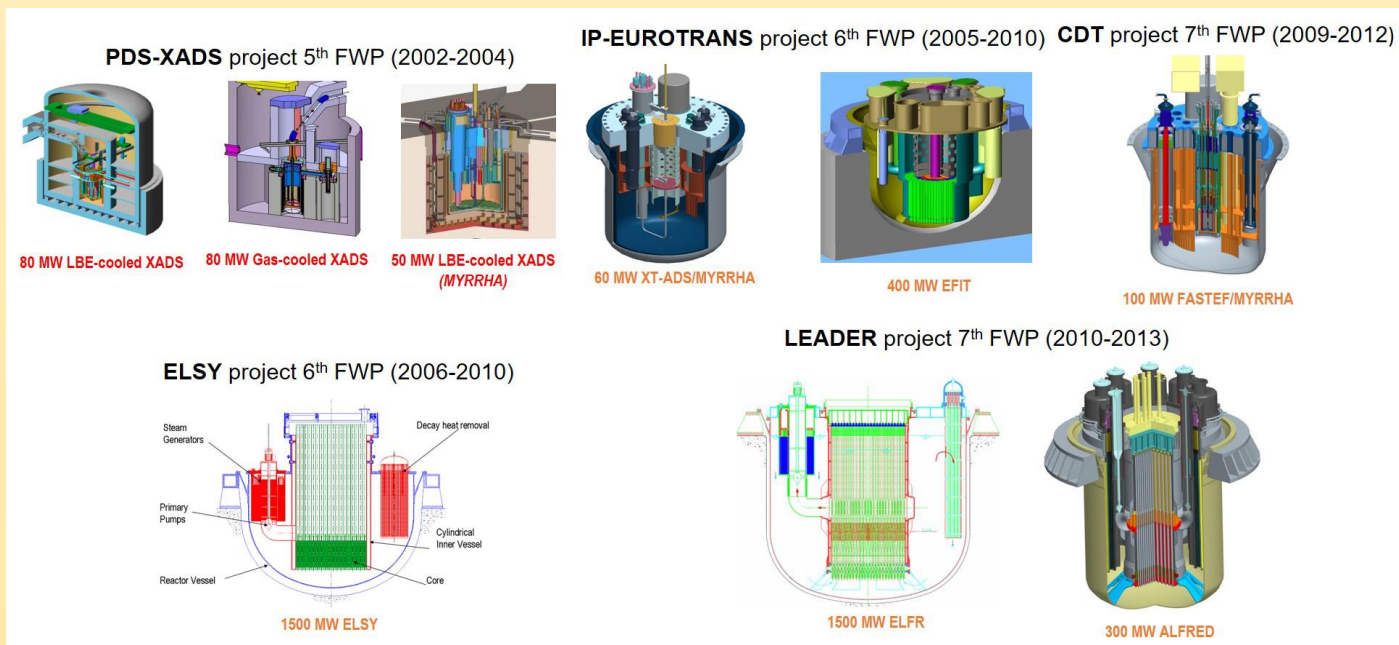
ALFRED Status



- Design review on-going
- Main options confirmed
- Diversification of decay removal systems
- Working on aspects not directly addressed in **LEADER** project
- Construction of facilities and experiments
- Technology developments (chemistry and materials)
- Operation strategy
- Experimental facilities support on going

1. Heavy Liquid Metal Technology Development in Europe

Works on the development of lead-cooled fast reactors are actively carried out in European Union countries (concept projects ELFR, ELSY, LEADER, ALFRED) have been proposed.



2. The European Context: Sustainable Nuclear Energy Technology Platform

- LFR technology can offer a safe, sustainable and competitive alternative to address market opportunities
- More than **200 M€** invested in LFR technology in the last **10 years**



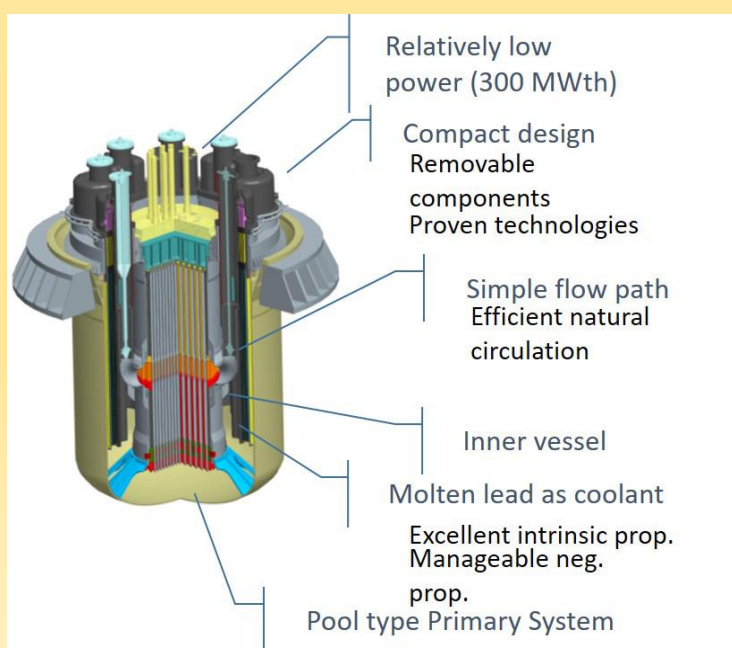
3. ALFRED Support: The FALCON Consortium (FALCON – Fostering Alfred CONstruction)

- FALCON Consortium Agreement was established in 2013 to bring LFR technology to industrial maturity
- FALCON recently evolved to better cope with European context.
- Main objectives are:
 - Firm commitment to ALFRED as a Major Project in Romania
 - Finalization of ALFRED feasibility study
 - Initiation of construction of supporting R&D facilities



4. ALFRED – Design Guidelines

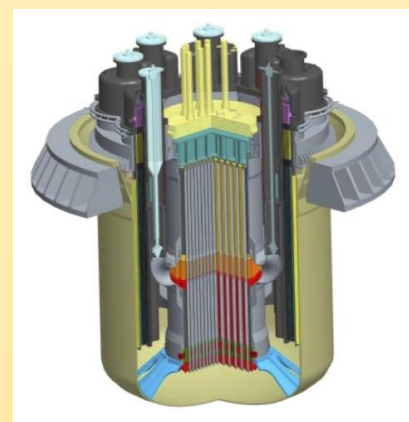
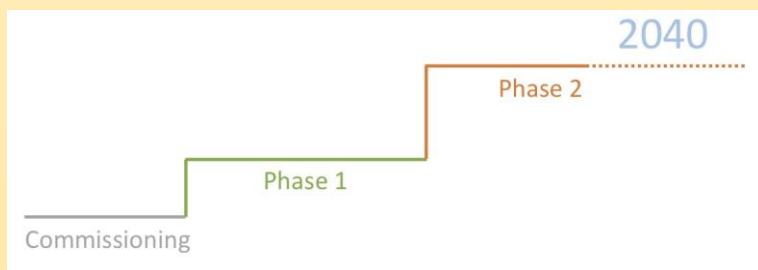
ALFRED design should be based on available technology as much as possible, in order to speed up the construction time.



5. ALFRED DEMONSTRATOR: a way to achieve technology maturity

The operation of ALFRED will be based on a stepwise approach:

- Phase 1: operation at low power in low-temperature range
 - Presently existing proven materials working without corrosion protection
- Phase 2: operation at full power in high-temperature range
 - Coated materials fully qualified during phase 1



6. ALFRED: a LFR Demo with SMR-oriented features

Example of fast neutron reactor cooled by molten lead having SMR-oriented features are:

- SMR derived from the ALFRED concept, FALCON consortium, Europe.

