



The Lead Fast Reactor in Generation IV

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The Generation IV international Forum (GIF)

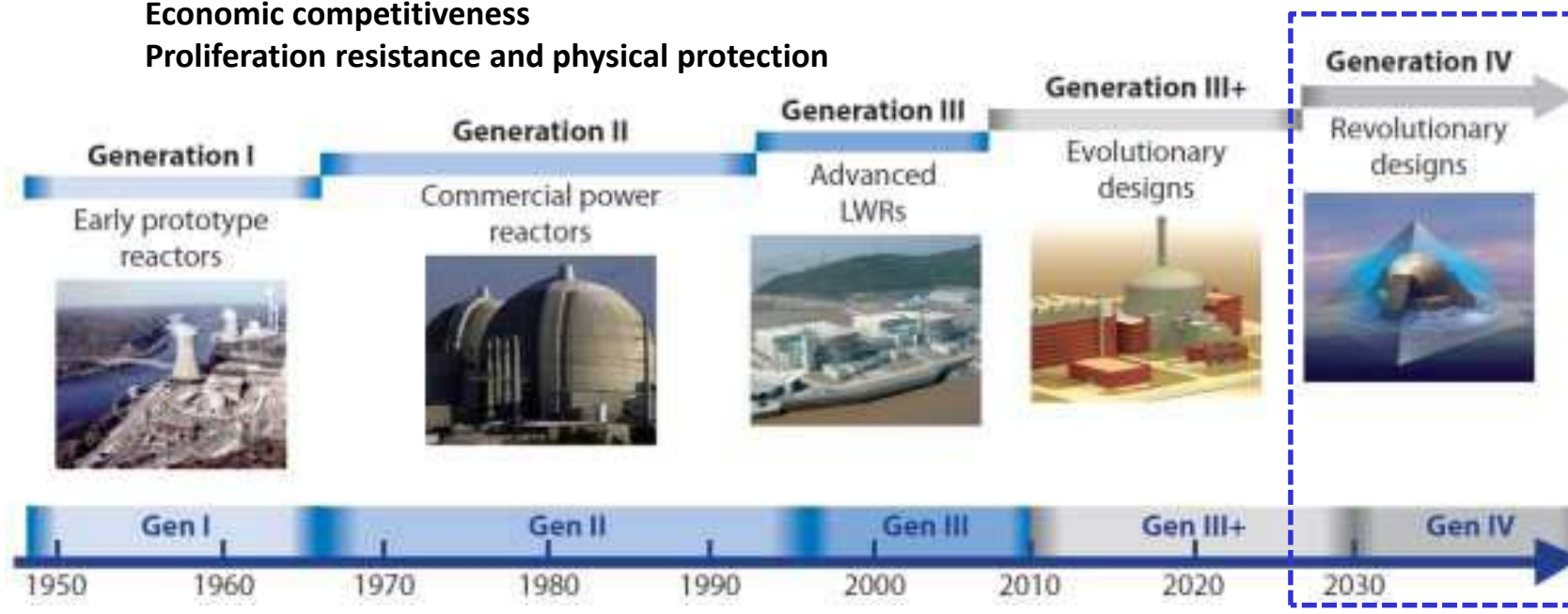
Started in January 2000

12 members (signatories of the *GIF Charter*)

6 concepts
 SCWR SFR
 MSR LFR
 VHTR GFR

LFR is among the most promising technologies to meet the future energy needs

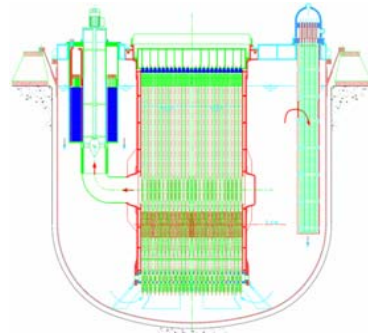
4 Goals
 Sustainability
 Safety & reliability
 Economic competitiveness
 Proliferation resistance and physical protection



The LFR International dimension

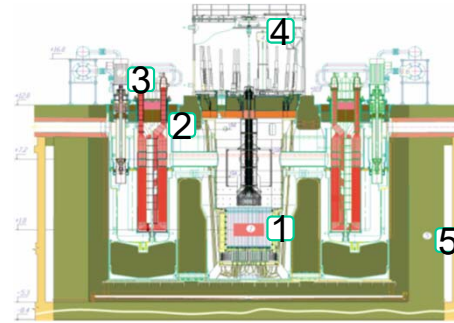
4 Members: EURATOM, RUSSIA, JAPAN, KOREA
2 Observers: USA, CHINA

3 LFR reference systems



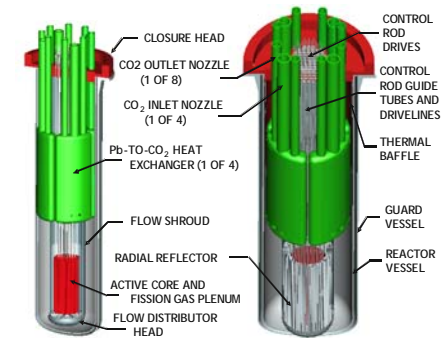
ELFR

system for central station power generation



BREST

system of intermediate size



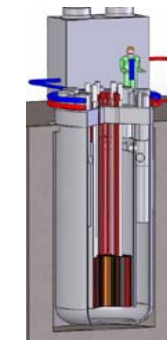
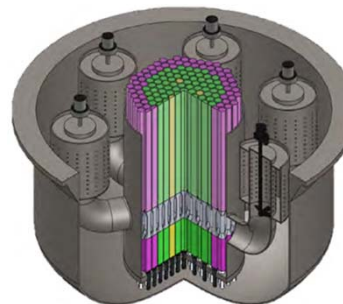
SSTAR

system of small size with long core life

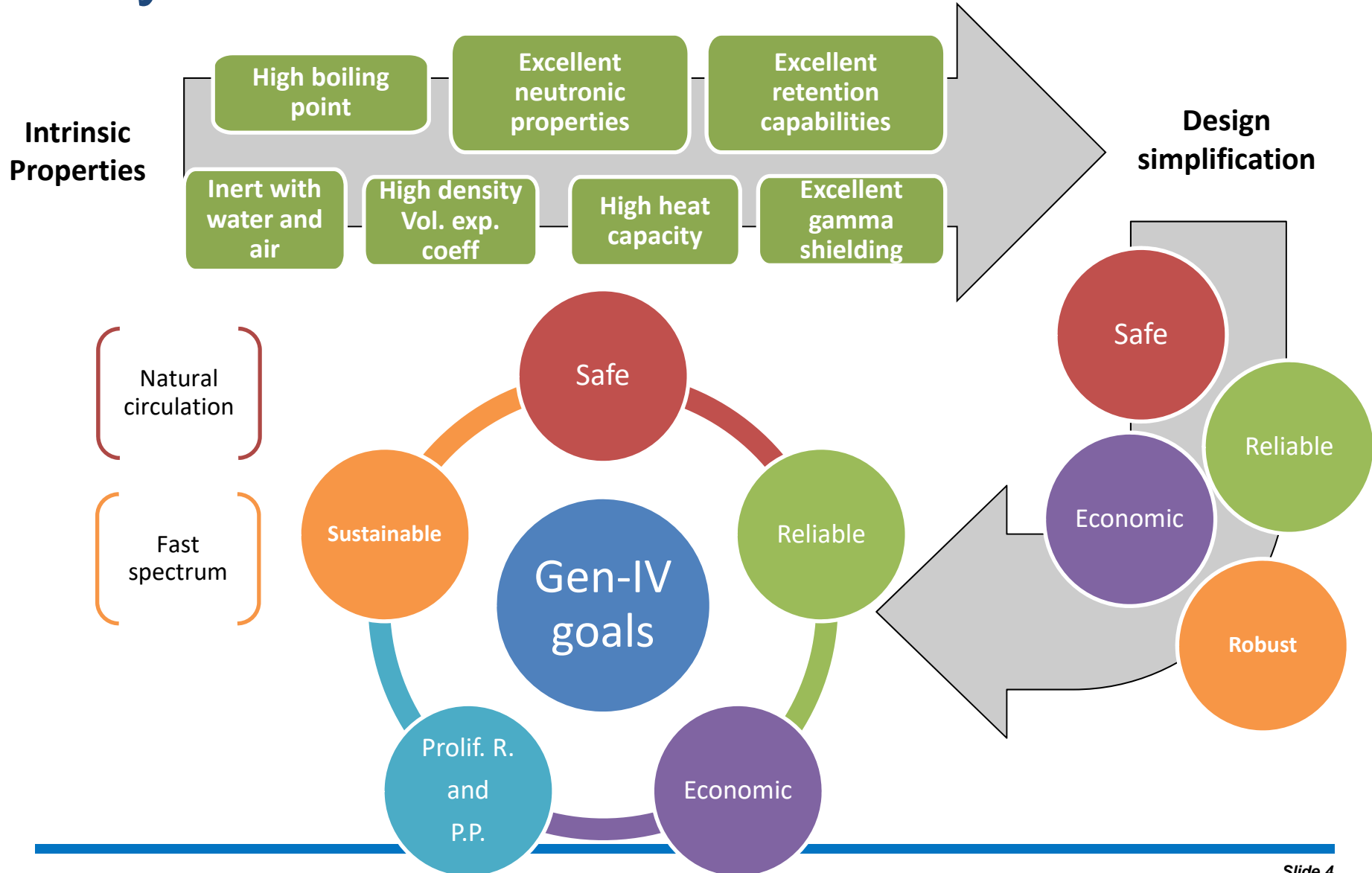
GIF - LFR White Paper on safety based on ALFRED design

https://www.gen-4.org/gif/upload/docs/application/pdf/2014-11/rswg_lfr_white_paper_final_8.0.pdf

LFR is gaining growing interest of industrial initiatives at international level...

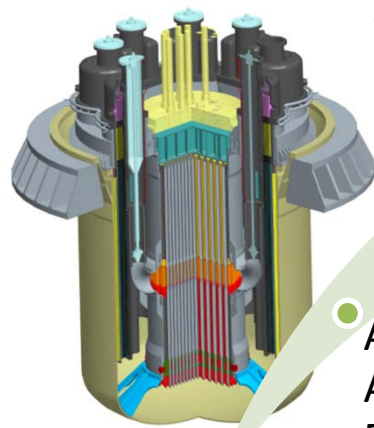


Key features of Lead as coolant



The LEADER project traced the European LFR development strategy

- Deployment of a *Lead-cooled Fast Reactor Demonstrator*, having
 - *SMR-oriented features*, aimed at being a competitive option for the future Nuclear Power Plants
 - *longer-term potentialities* to demonstrate that the LFR technology can meet the goals set out by GIF for Generation-IV reactors



Gen-IV LFR:
safe, secure, economical, sustainable

Lead-cooled SMFR:
deployable, safe, competitive

ALFRED:
Advanced Lead-cooled Fast Reactor European Demonstrator

- Leverage on LFR attractive features
 - Intrinsic and passive safety
 - Highest level of safety
 - Potential exclusion of domino effects
 - Optimum candidate for multi-unit sites

Socio-economic benefits from ALFRED implementation in Romania

National Level

An opportunity for Romania to become the focal point of the LFR technology in Europe

Regional Level

ALFRED included in the Smart Specialization Strategy of South Muntenia, as a key factor for economic and social growth

Local Level

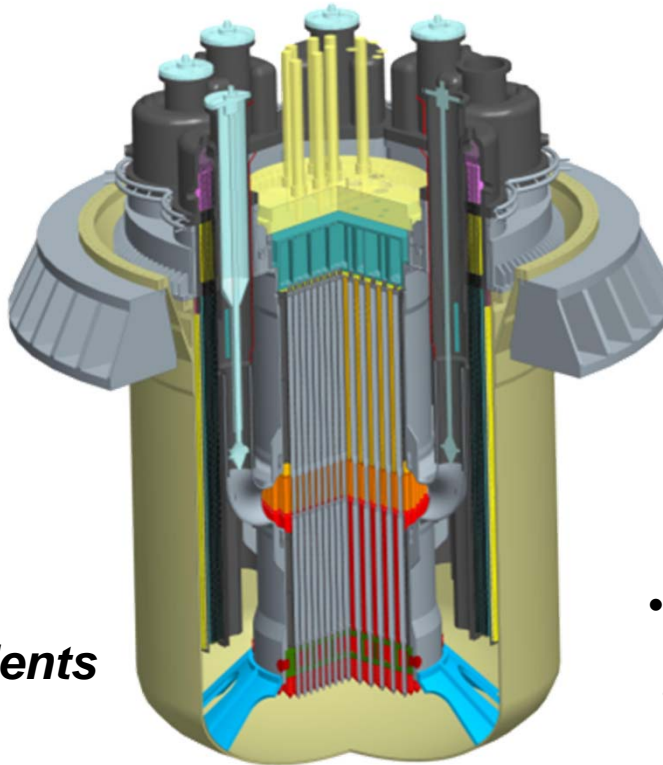
Local Council and ALFRED Local Group considering it strategic a stimulus for young talents



RATEN-ICN

an asset for ALFRED:

- *to leverage on the scientific skills*
- *to exploit the sound safety culture*
- *to take profit of the operation expertise*
- *to catalyze the contribution of the Romanian industry*
- *to enjoy the fresh talents*



ALFRED

an asset for Romania:

- *to enhance energy independence*
- *to facilitate managing the spent fuel*
- *to assume a leading position*
- *to stimulate industry, research and university*
- *to preserve the talents*
- *to boost the economy*

A **WIN-WIN** synergy!

[Please register for this webinar \(around 15:00 on June 12\)](https://www.gen-4.org/gif/jcms/c_82831/webinars)
https://www.gen-4.org/gif/jcms/c_82831/webinars



LEAD-COOLED FAST REACTOR (LFR)

Prof. Craig F. Smith
Naval Postgraduate School
June 12, 2017



Canadian Nuclear
Laboratories
Laboratoires Nucléaires
Canadiens

NATIONAL NUCLEAR
LABORATORY

