ITALIAN NATIONAL AGENCY FOR NEW TECHNOLOGIES, ENERGY AND SUSTAINABLE ECONOMIC DEVELOPMENT

Accordo di Programma MSE-ENEA

MINISTERO DELLO SVILUPPO ECONOMICO

RICERCA DI SISTEMA ELETTRICO

REATTORI DI IV GENERAZIONE E SICUREZZA NUCLEARE

COLLABORAZIONE INTERNAZIONALE PER IL NUCLEARE DI IV GENERAZIONE

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Contesto Europeo

SNETP

- maintaining the safety and competitiveness of today's technologies (NUGENIA)
- developing a new generation of more sustainable reactor technologies (ESNII)
- developing new applications for nuclear power (NC2I)

ESNII

- addressing the need for demonstration of Generation IV Fast Neutron Reactor technologies, together with supporting research infrastructures, fuel facilities and R&D

SRIA

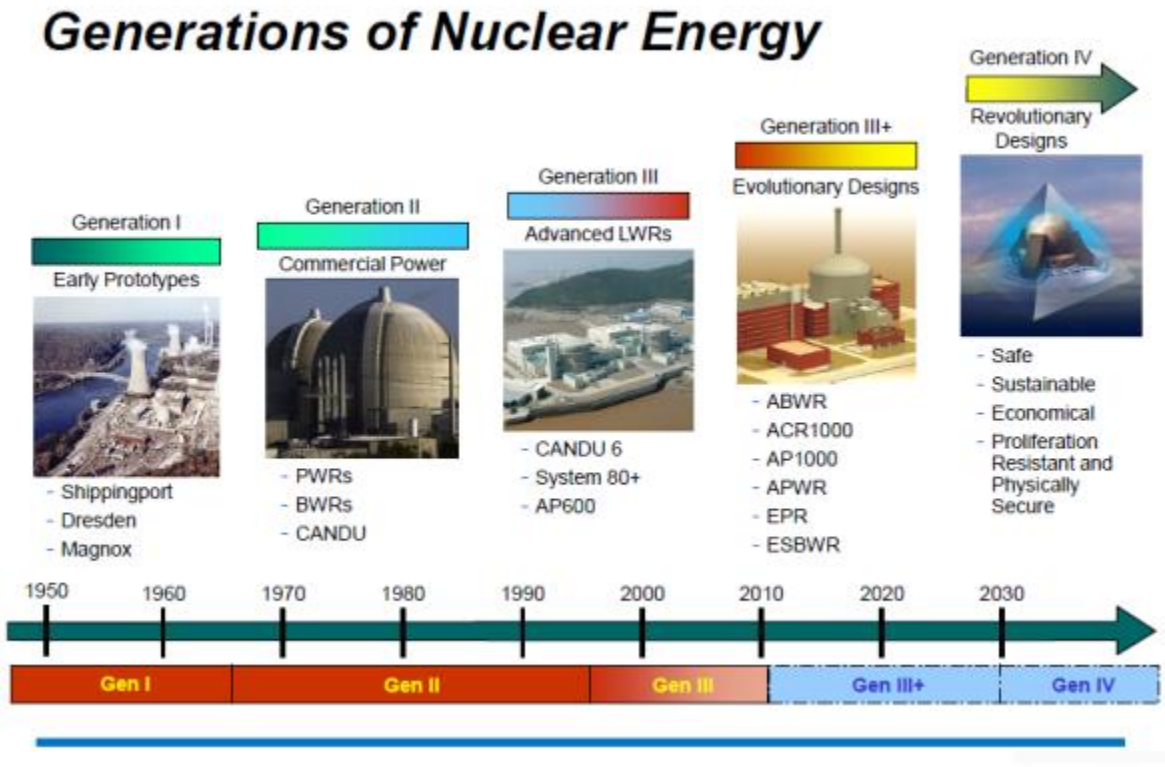
- provides decision-makers and the scientific community at large with research, development and demonstration roadmaps to achieve the short (2015), medium (2020) and long-term (2040-2050) goals of the SET Plan

SNETP – Sustainable Nuclear Energy Technology Platform
ESNII – European Sustainable Nuclear Industrial Initiative
SRIA – Strategic Research Initiative Agenda

Contesto Europeo

"STRATEGIC RESEARCH INITIATIVE AGENDA" (SRIA)

"With respect to the 2010 technologies evaluation....The **Lead Fast Reactor technology has significantly extended its technological base and can be considered as the shorter-term alternative** technology, whereas the **Gas Fast reactor technology has to be considered as a longer-term alternative option."**



Contesto Internazionale

GEN IV International Forum

- Safety and Reliability
- Sustainability
- Economics
- Proliferation resistance

Viability

Basic concepts, technologies and processes are tested under relevant conditions, with all potential technical show-stoppers identified and resolved

Performance

Engineering-scale processes, phenomena and materials capabilities are verified and optimised under prototypical conditions

Demonstration

This phase involves the licensing, construction and operation of a prototype or demonstration system in partnership with industry and perhaps other countries. The detailed design will be completed and licensing of the system will be performed during this phase

Contesto Internazionale

FALCON CONSORTIUM*

PHASE 1

- 18 months
- Unincorporated consortium
- In-kind contributions
- Optimize the cooperation
- Areas: strategic, management, governance, financial and technical

PHASE 2

- Detailed agreement
- Manage the R&D needs
- Engineering design
- Licensing, and
- Commit the construction

* 18th December 2013 – 30th June 2015 extended till 30th June 2016

Contesto Internazionale

EXPLOITING POTENTIAL SYNERGIES IN FUNDS

Synergic Funding Scheme

H2020

- Eligible costs: staff, equipment, travel, sub-contracting
- Budget: 70% EC + 30% in-kind by Partners (no ESIF!)

ESIF

ERDF

- Eligible cost: purchasing R&D equipment and instrastructures

ESF

- Budget: ESIF from different Ops + relevant % of Public Funds (no H2020!)

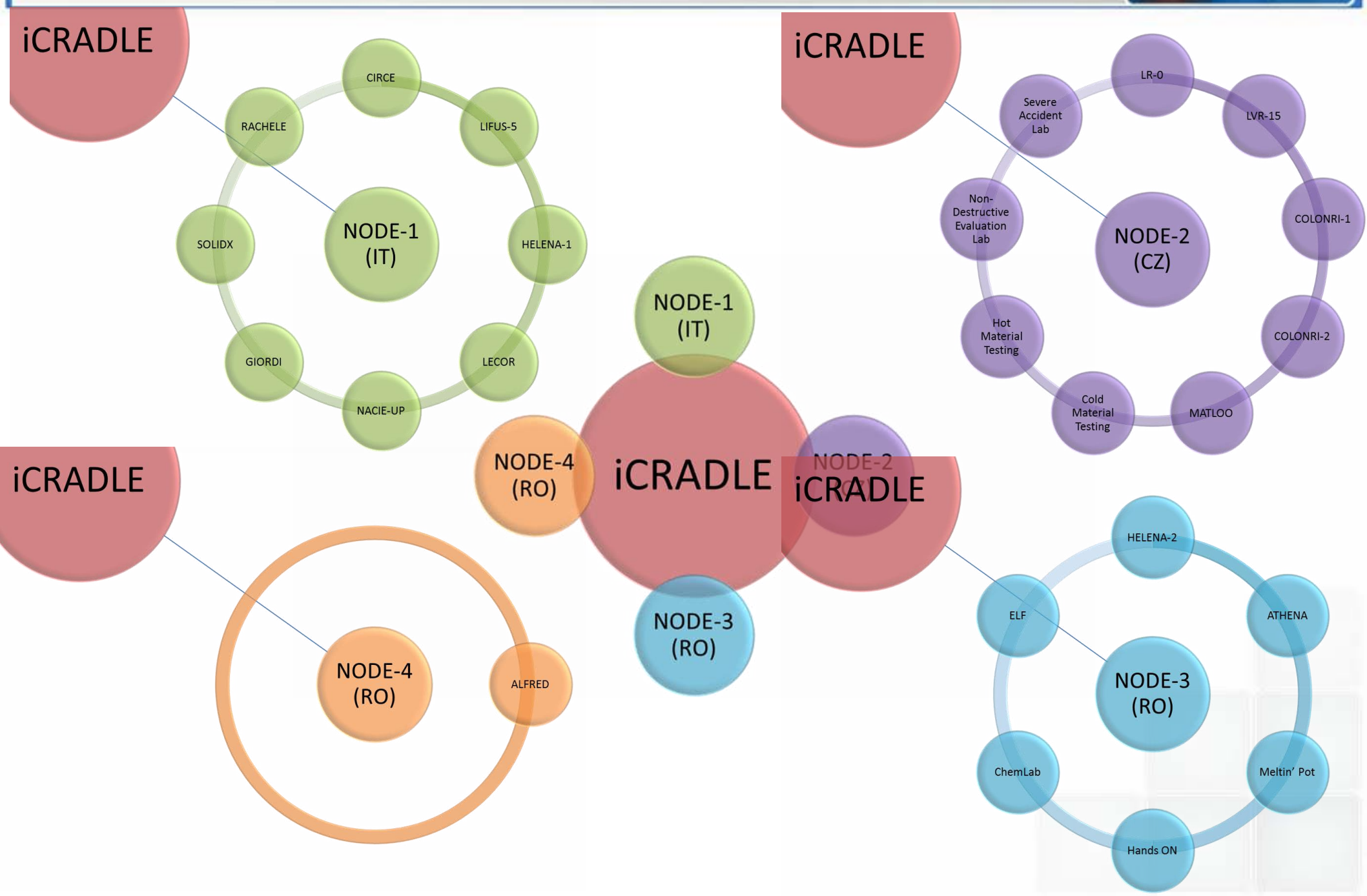
Contesto Internazionale

iCRADLE

Infrastructure for Cooperative Research to Advance up to Demonstration the Lead technology in Europe

The iCRADLE proposal is meant to provide Europe with a Distributed Research Infrastructure (D-RI) for research, development and qualification (R&D&Q) of the Heavy Liquid Metal (HLM) technology for innovative nuclear reactors demonstration and, in a longer term, the safe and sustainable operation of future power plants

Contesto Internazionale



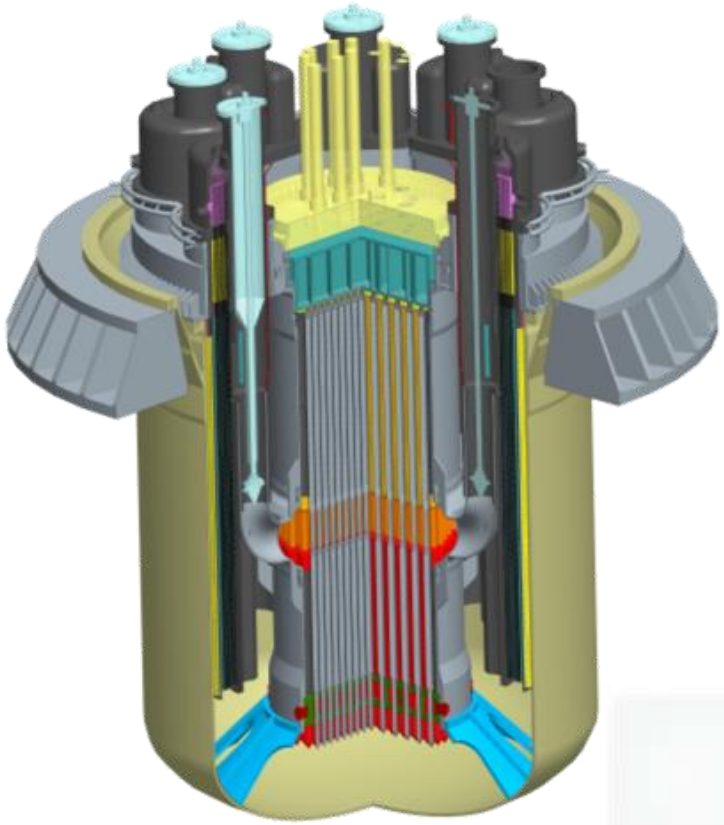
ALFRED

Advanced Lead Fast Reactor European Demonstrator

ALFRED is a Research Reactor, as part of an **pan-European Distributed Research Infrastructure**.

ALFRED is a **demonstrator**, and not a prototype, dedicated to the **development** of the LFR technology.

ALFRED is a 300 MWth **reactor** addressing the concerns on **safety**, **economics** and **sustainability** of nuclear energy.

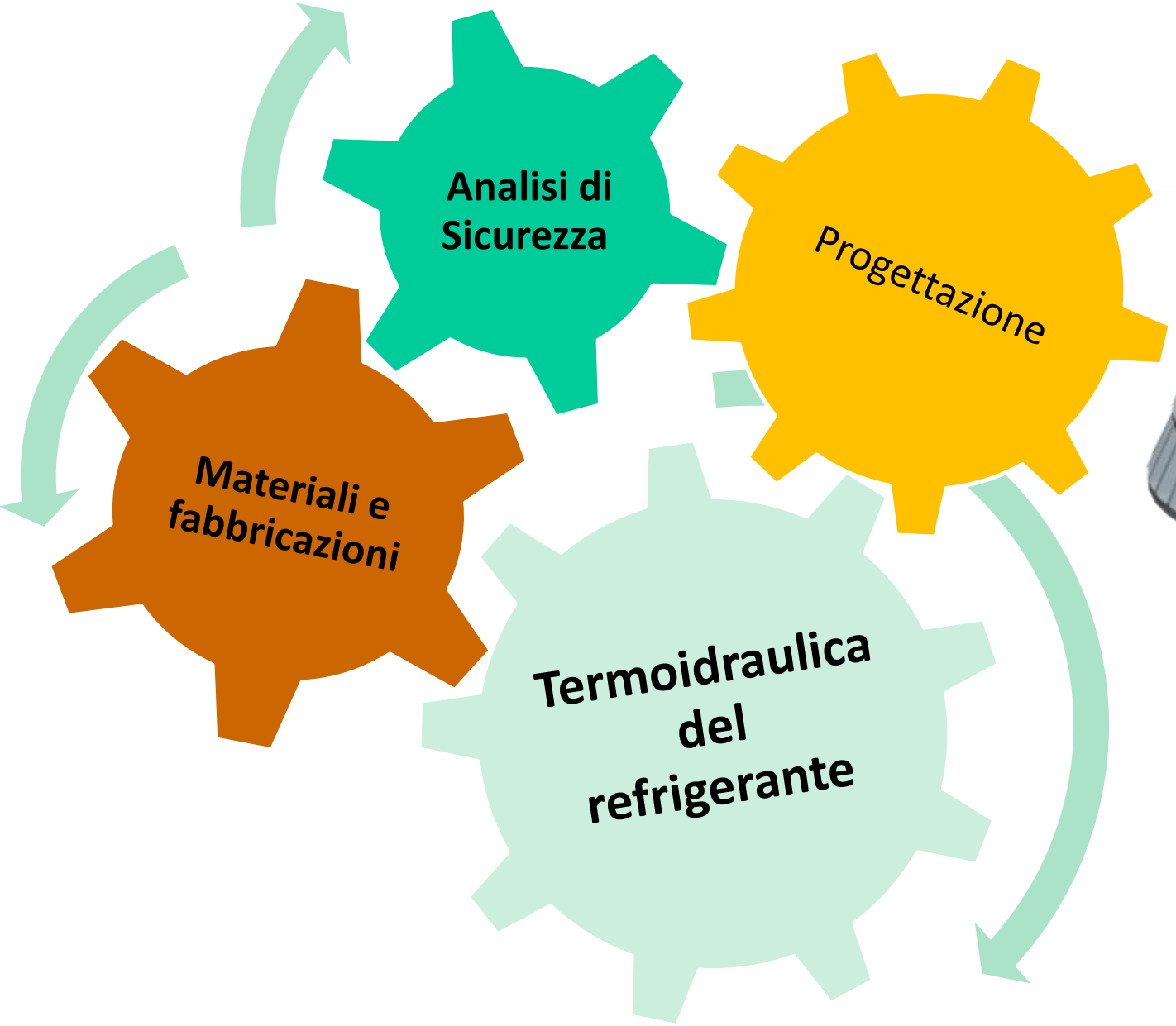


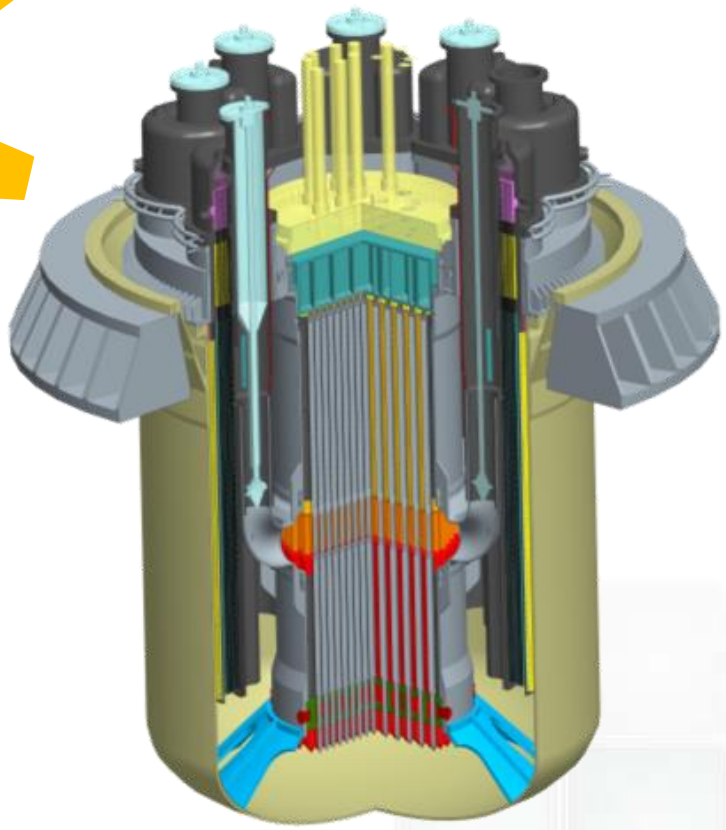
Demonstration of a safer and more sustainable secure energy

Sinergie

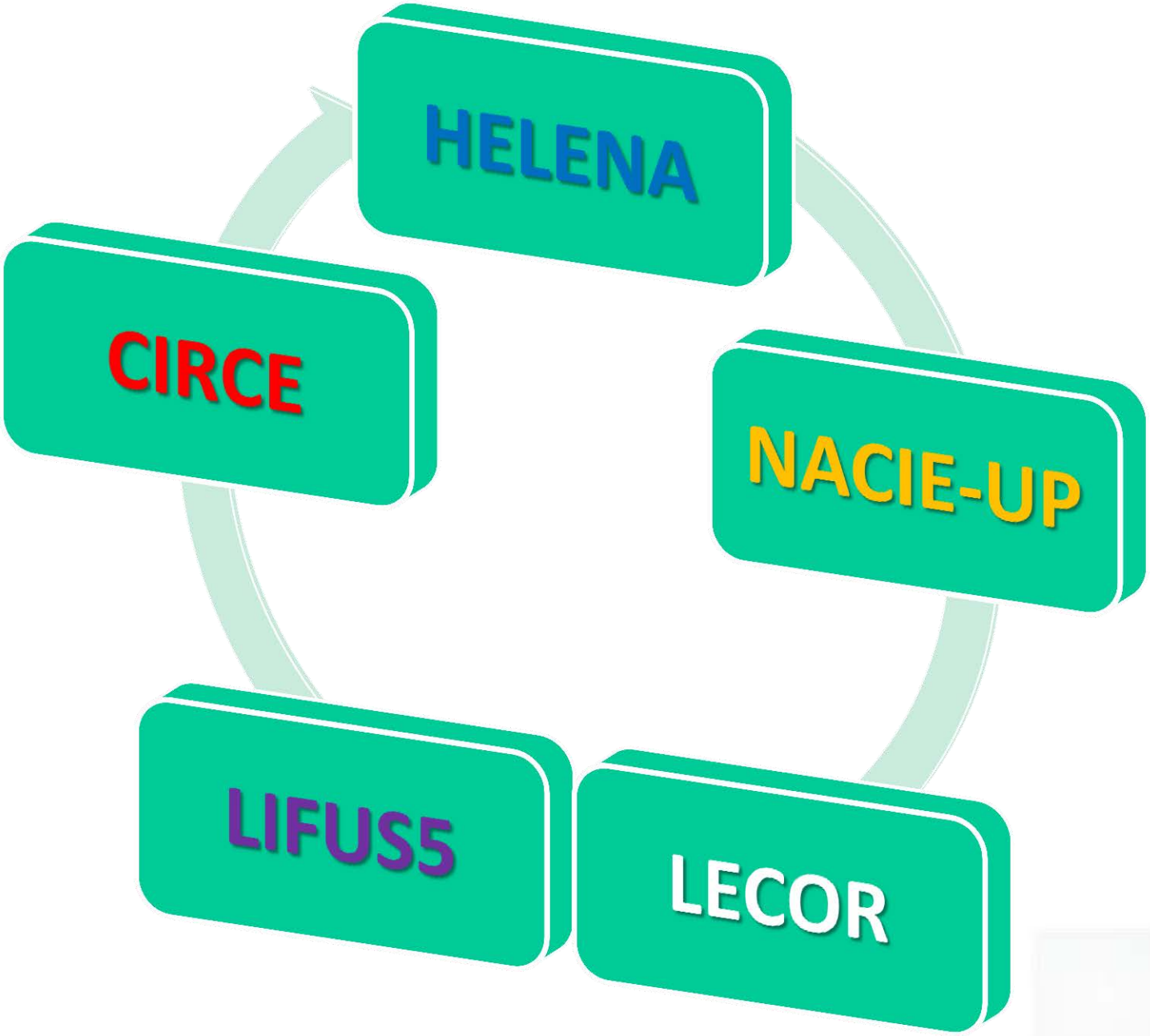
- ☑ **LEADER – Lead cooled European Advanced Demonstrator Reactor**
- ☑ **THINS – Thermal Hydraulic of Innovative Nuclear Systems**
- ☑ **FREYA - Fast Reactor Experiments for hYbrid Applications**
- ☑ **GETMAT – Gen IV and Transmutation Materials**
- ☑ **MATTER – Materials Testing and Rules**
- ☑ **SEARCH – Safe Exploitation Related Chemistry for HLM reactors**
- ☑ **MAXSIMA – Methodology, Analysis and Experiments for the "Safety In MYRRHA Assessment"**
- ☑ **ESNII+ - Preparing ESNII for HORIZON 2020**
- ☑ **MARISA - Myrrha Research Infrastructure Support Action**
- ☑ **MATISSE - Materials' Innovations for a Safe and Sustainable nuclear in Europe**
- ☑ **MYRTE - MYRRHA Research and Transmutation Endeavour**
- ☑ **SESAME - thermal hydraulics Simulations and Experiments for the Safety Assessment of MEtal cooled reactors**

Struttura Generale

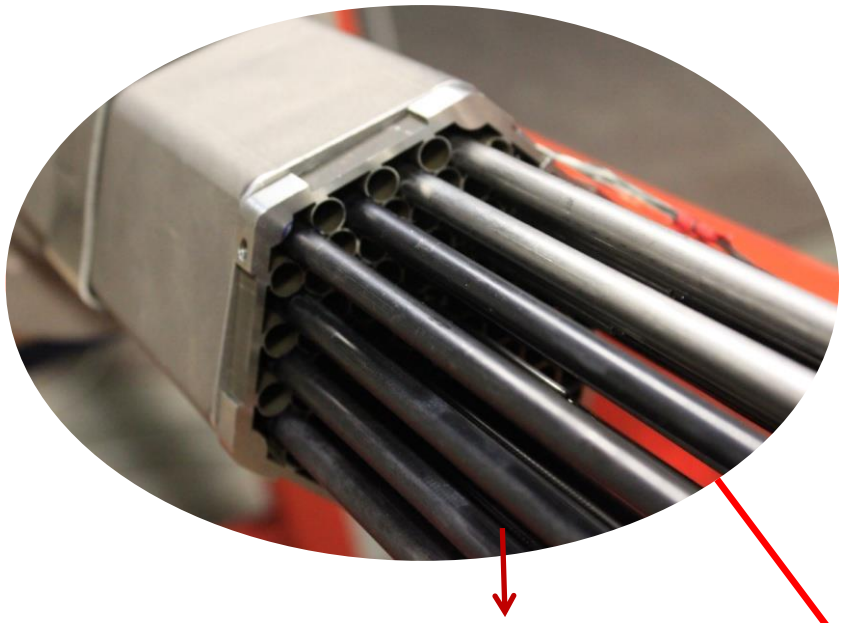


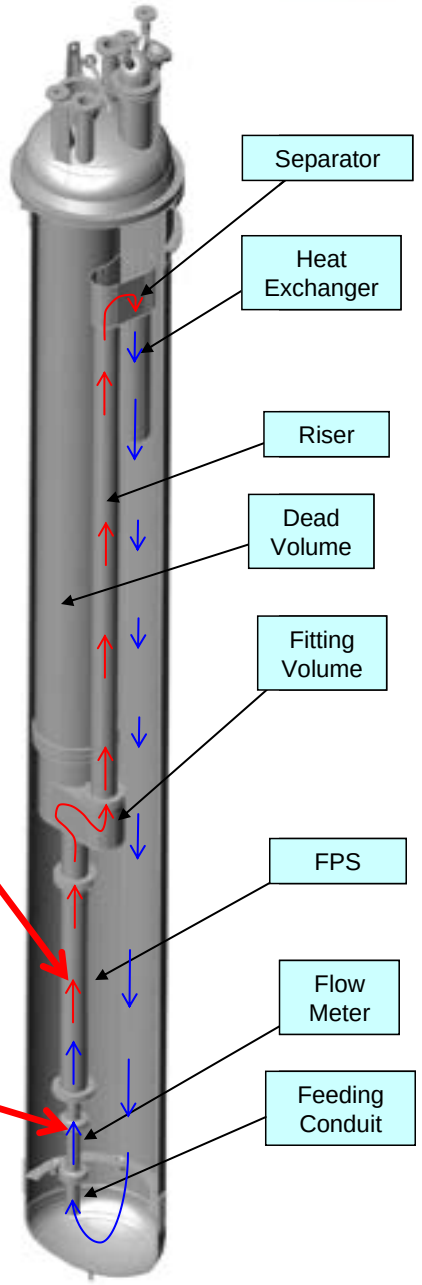


Infrastrutture ENEA

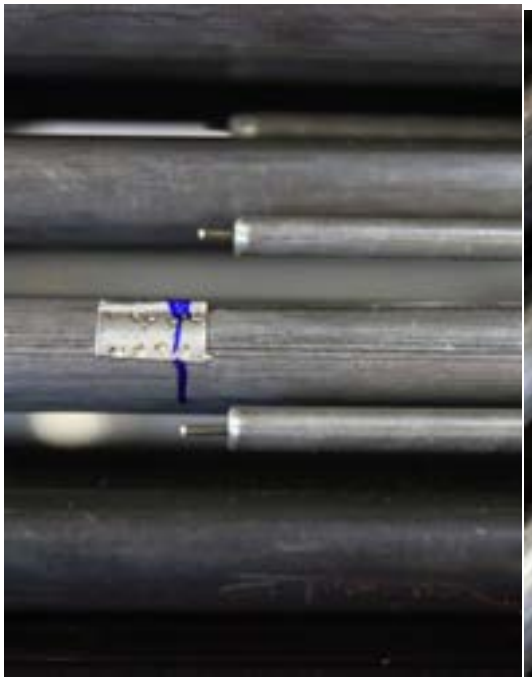


CIRCE

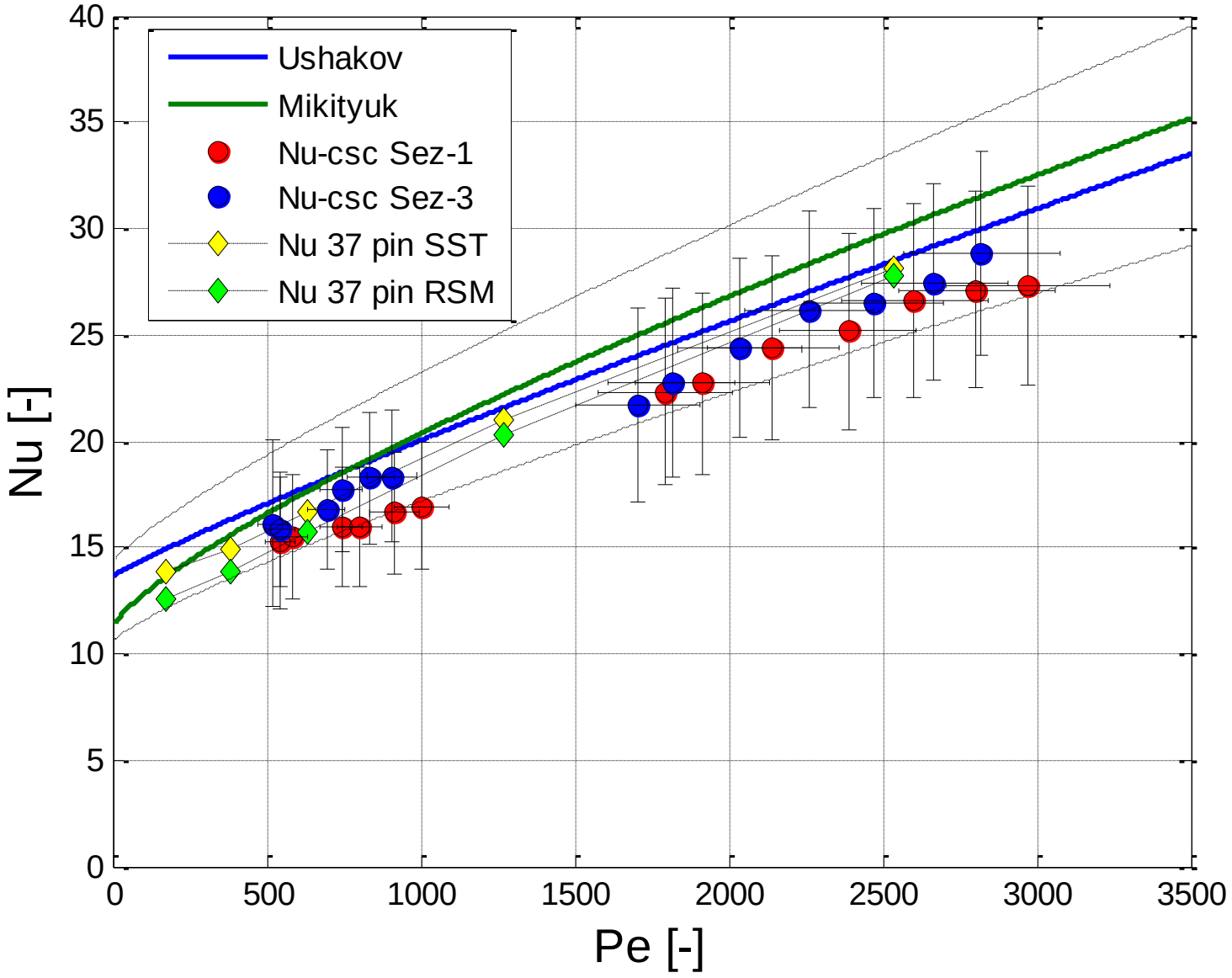



Separator
Heat Exchanger
Riser
Dead Volume
Fitting Volume
FPS
Flow Meter
Feeding Conduit

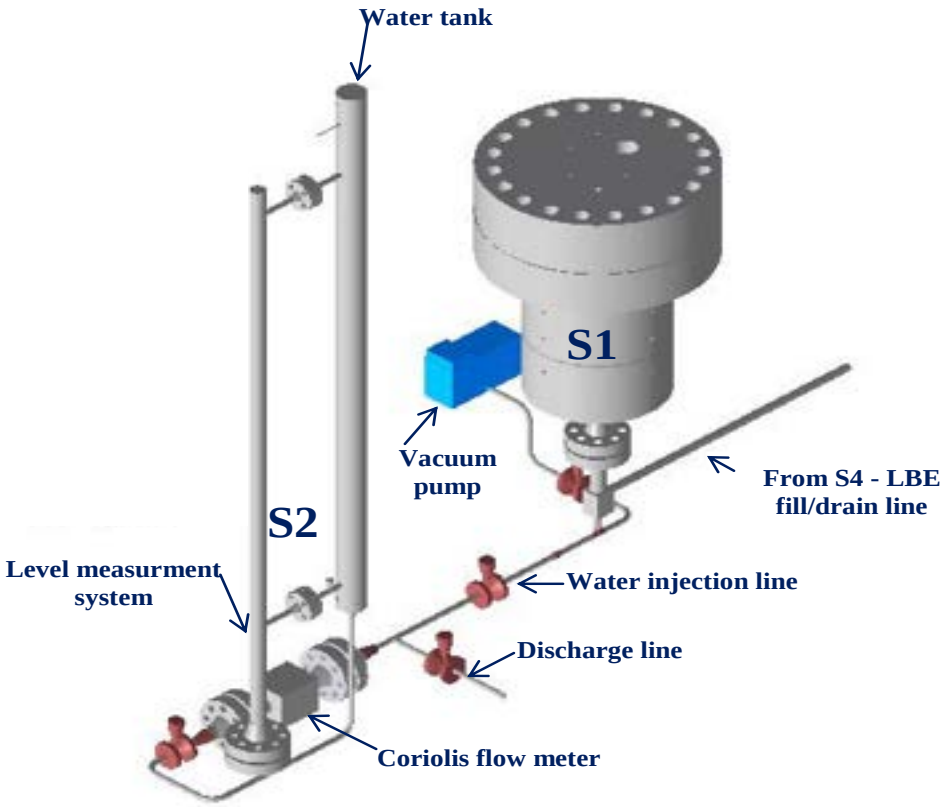
CIRCE - Fuel Pin Simulator



CIRCE - Experimental Results



NACIE-UP


Water tank
S1
Vacuum pump
From S4 - LBE fill/drain line
S2
Level measurment system
Water injection line
Discharge line
Coriolis flow meter


S3
S2
S1
S4

HELENA

LECOR

Grazie !