CEIDEN: La Plataforma Tecnológica de I+D de Energía Nuclear de Fisión

CEIDEN-NNL UK

1-2 February 2016

Topic 4: “Fast Reactors”

EMPRESARIOS AGRUPADOS - Patricia Cuadrado

Topic 4: Fast Reactors

- **Participants from CEIDEN:** EEAA, IDOM**,** CIEMAT**,** UPM

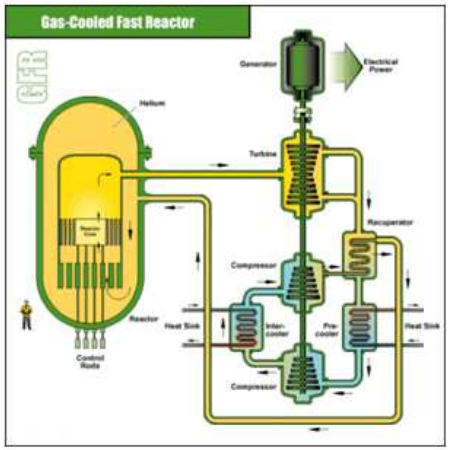
- **Points from NNL presentation taken by CEIDEN**:
  - Phenix – Fast reactor fuel PIE
  - State of the art capability for fast reactor fuel performance modelling

- **Additional points from CEIDEN:**
  - Irradiation and PIE facilities and conditions for FR and transmutation fuels (JHR planning)
  - Fast Reactors developments in Europe under EC's ESNII: Astrid, Allegro, Alfred, Myrrha.
    - Supply Chain and costing
    - Core and primary circuit design activities
    - Licensing documentation
    - Instrumentation & Control
  - FR Design Certification in the USA. Design documentation to obtain GDA (Generic Design Assessment)
  - Licensing process in UK. Systems design, supply chain and costing
  - Nuclear data for advanced nuclear systems (FR in this context)

Topic 4: Fast Reactors

Fission: Innovative Reactors

- Generation IV reactors: Gas and Liquid-Metal cooled

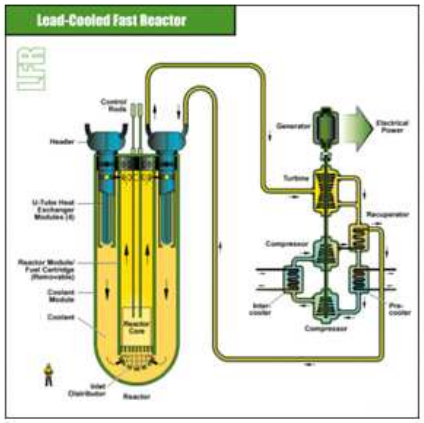


LEAD

"LEADER"

"ELSY"

"SILER"



SODIUM

"EISOFAR"

"ESFR"

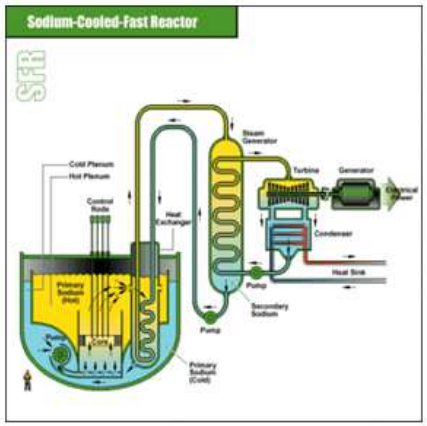
ACCELERATOR

"Eurotrans"

"ADS"

"MAX"

"CDT"



GAS

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"HYTECH"

"ADEL"

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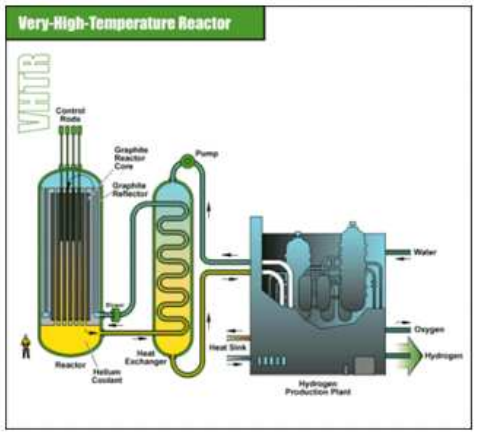
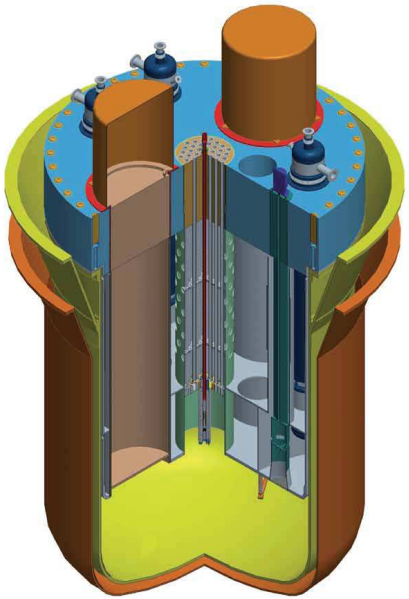
"ARCHER"



Topic 4: Fast Reactors



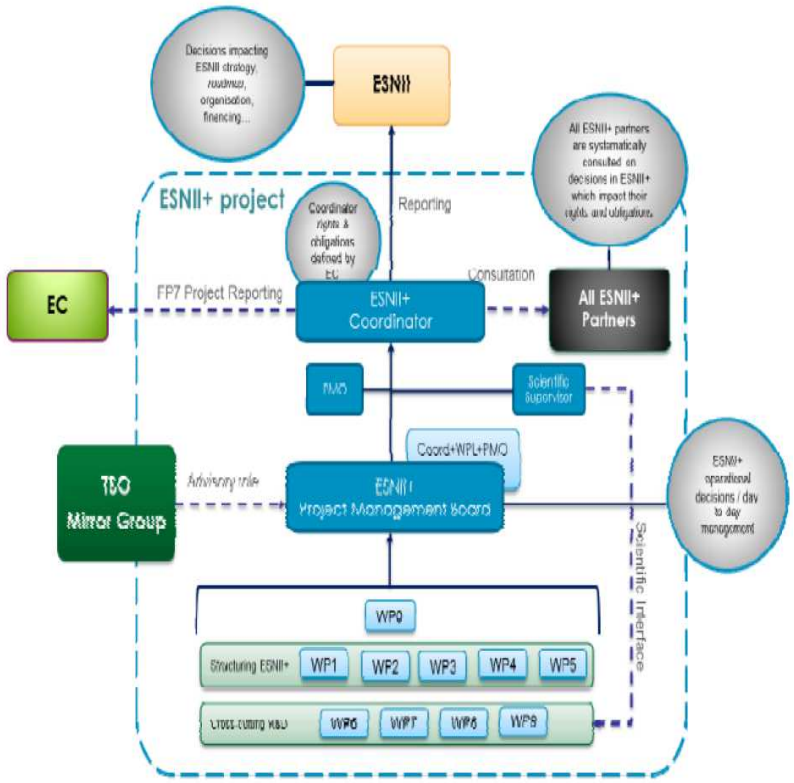
Scope: Front End Engineering Design (FEED)

Multi-purpose hYbrid Research Reactor Applications

- To reduce the nuclear waste by a factor of 100
- To generate radioisotopes for medical applications
- To test innovative materials
- For silicon dopping
- For demonstration of the liquid metals technology

Topic 4: Fast Reactors

Preparing ESNII for Horizon 2020



WP4 Industrial perspectives

- Support the European industrial strategies
- Explore potentialities and industrial perspectives of ESNII reactor concepts (ALFRED, ALLEGRO, ASTRID)
- **Task 4.1**: Prospective analysis of supply chain. Task leader: Empresarios Agrupados
- **Participants**: ANSALDO, LGI, AMEC, AREVA
- **Objectives**:
  - Assessment of the current and planned industrial capacities status (with reference to FR)
  - Identification of critical components related to industrial manufacturing and needed R&D activities
- **Deliverable*:*** D4.11 Status and perspectives of supply chain for Fast Reactors

Topic 4: Fast Reactors

- US NRC status: ongoing Design Definition of the Design Certification Process fro the Liquid Metal Reactors (FR)
- EA experience in Design Certification (LWR) (could be applicable to FR):
  - AP-600 Project (90's)
    - Engineering and design for the Design Certification by the US NRC
  - EPP Project (European Passive Plant)
    - Westinghouse's design for Europe, precursor of the AP-1000
    - Basic Design Development
  - AP-1000 Project

Engineering Support to Westinghouse in the following areas:

- Piping Design and Stress Analysis
- Plant Cost Evaluation

- AP-1000 Design Evaluation

As part of "Technology Assessments" and "Feasibility Studies" performed for Utilities planning the construction of future NPP's in several European countries