

ANSALDO

NUCLEARE

Ansaldo Energia Group



Ansaldo Nucleare

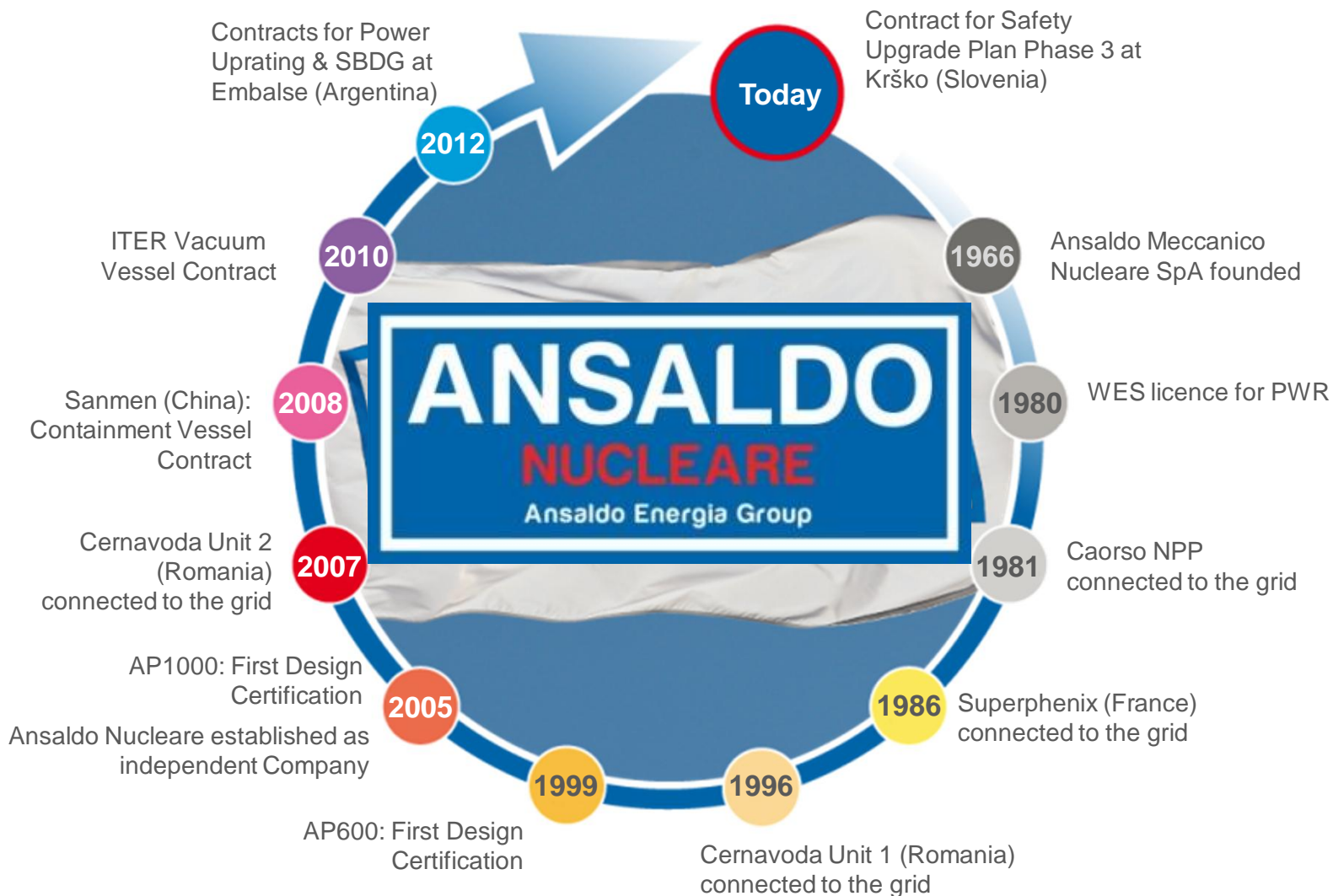
Monica Frogheri
Project Manager



ANSALDO NUCLEARE
GENOVA HEADQUARTERS



Headcount: 403 employees
Italy: 161; UK: 242



Un'Azienda Finmeccanica
Divisione Nucleare



More than 50 Years in the Nuclear Market

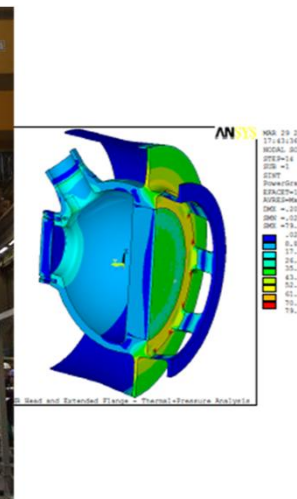
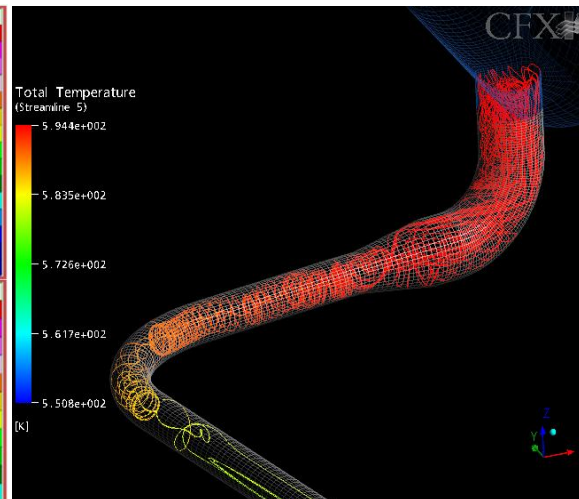
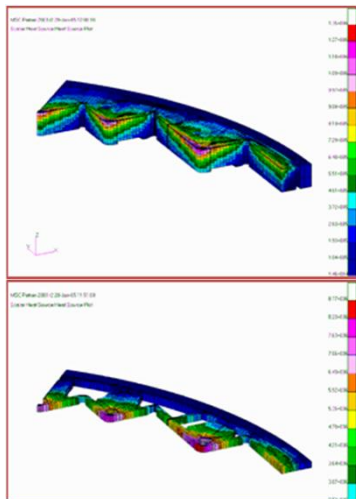
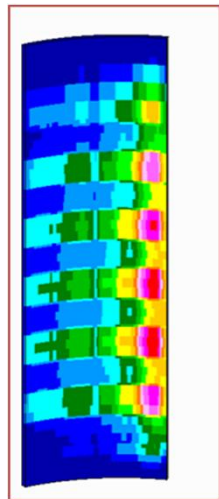
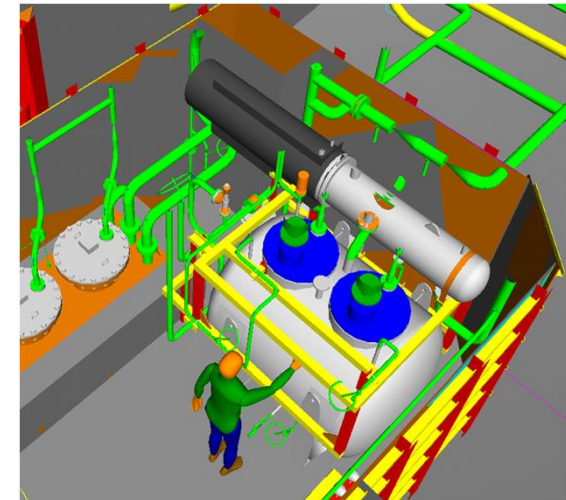
Experience in designing, supporting construction and providing services covers 4 Generations of Nuclear Power Plants :

- MAGNOX and AGR
- PWR & BWR
- CANDU
- Passive Safety Plant
 - ü SBWR
 - ü AP600/AP1000
- Small Modular Reactors
- Generation IV Reactors
- Fusion Reactor (e.g., IGNITOR, ITER)



The familiarity with different technologies provides the capability to address engineering challenges through multidiscipline team including:

- Safety and T/H Analysts (including CFD analysis)
- Shielding & Radiation Engineers
- Fluid System Designers
- Mechanical Designers
- Piping designers and Stress analysts
- Civil Structural Analysts/Designers and Layout Engineers
- Electrical & I&C Designers
- Manufacturing Capabilities





New Nuclear Power Plants

- ✓ Technological Developments for New Nuclear Power Plants
- ✓ EPC for Plants & Systems
- ✓ Components & Equipment Design & Supply



Services to Power Plants

- ✓ Safety Checks & Upgrading
- ✓ Plant Life Assessment & Extension (PLEX)
- ✓ Operational Services



Decommissioning & Waste Management

- ✓ Decommissioning of NPP & Nuclear Facilities
- ✓ Radioactive Waste Management
- ✓ Temporary & National Storage Facilities

Defense (for the UK only)



- ✓ UK Submarine fleet, heat exchangers manufacture, maintenance & refurbishment
- ✓ Submarine de-fuelling equipment
- ✓ Safety critical submarine spares

ANSALDO NUCLEAR: MAIN REFERENCES



Selection of recent projects

PROJECT

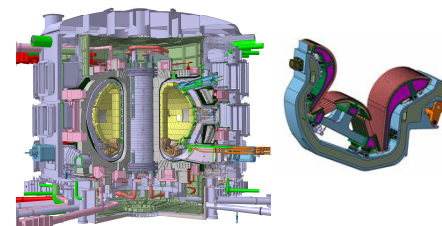
Equipment/Component Design & Supply – SANMEN UNIT 1 (AP1000)



Design & Engineering – MOCHOVCE UNIT 3 & 4 (VVER)



Equipment/Component Design & Supply – ITER PROJECT



COUNTRY

CHINA

SLOVAKIA

FRANCE

CLIENT

WESTINGHOUSE

ENEL/SLOVENSKE ELEKTRARNE

FUSION FOR ENERGY

SCOPE OF WORK

- Design & supply of Containment Vessel and PRHR-HX (Passive Residual Heat Removal – Heat Exchanger)
- Design of structural modules, steel frame modules, shield building roof

- Engineering Services for nuclear and conventional Islands
- Design activities and on-site assistance for:
 - Quality Management, planning, and processes
 - Machinery, Circuits Layout, Electrical, I&C
 - Erection Quality Surveillance

- Supply of sectors of the ITER vacuum vessel
- Manufacturing of the first full-scale Inner-Vertical Target prototype, successfully tested

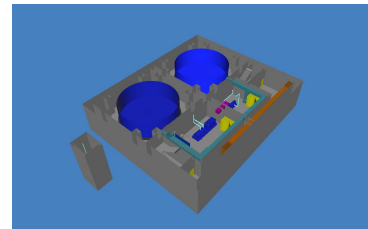
Selection of recent projects

PROJECT

Plant life extension and Repowering and New Stand-by Diesel Gen. Station – (EMBALSE PHWR)



Phase 3 Safety Upgrade– KRSKO NPP



Shelter monitoring – CHERNOBYL (RBMK)



COUNTRY

ARGENTINA

SLOVENIA

UKRAINE

CLIENT

NUCLEOELECTRICA

NEK

STATE SPECIAL ENTERPRISE CHERNOBYL NPP

SCOPE OF WORK

- Condition assessment and residual life evaluation
- Power upgrade of thermal cycle and turbo system
- Supply of new Class III Stand-by Diesel Gen. Station
- Basic and detailed engineering
- Component and system supply
- Management/supervision of installation and commissioning

- Design and realization of a Bunkerized Building (BB2) including auxiliary systems (HVAC, Fire, Lighting etc.)
- Design, procurement, installation and commissioning of
 - Alternate Safety Injection System
 - Alternate Emergency Feedwater system
 - Emergency Electrical System

- Leader of Joint Venture with Thales, CESI and ARS
- Integrated Automated Monitoring systems (IAMS) for the shelter
- Detailed design, procurement, installation, system commissioning
- Safety reports and Authority licensing documentation
- Training of personnel

Selection of recent projects

PROJECT

Decommissioning and Waste Management – VARIOUS SITES

**Waste Management –
IGNALINA NPP (RBMK)**

**Waste Management – SILO
EMPTYING PLANT (SEP)
Mobile Caves**



COUNTRY

ITALY

LITHUANIA

UK

CLIENT

SOGIN

NUKEM

SELLAFIELD LTD

SCOPE OF WORK

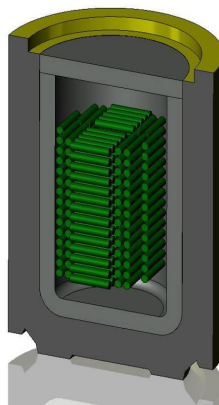
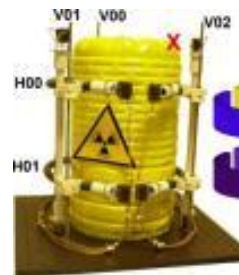
- Treatment of spent resins by wet oxidation technology (Trino NPP)
- Sludges extraction & conditioning (Latina NPP)
- Caorso Resins

- Joint Venture with Babcock Noell
- Design, supply of components, and systems, installation and commissioning assistance for solid radioactive waste retrieval facility
 - Retrieval units
 - Landfill separation facility
 - Control building

- Supply of #3 SEP Mobile Caves for the Remote retrieval of ILW sludges from multiple vertical silos

Radiation monitoring systems:

- Development of an Innovative Detector System for real-time monitoring of Low Intermediate Level Radioactive Waste
- **SPIC (Scintilla Portale Ispezione Container)** – Organic scintillator with gadolinium sheets (instead than He-3) for safeguard purposes, developed in the framework of the EU FP7 SCINTILLA project.

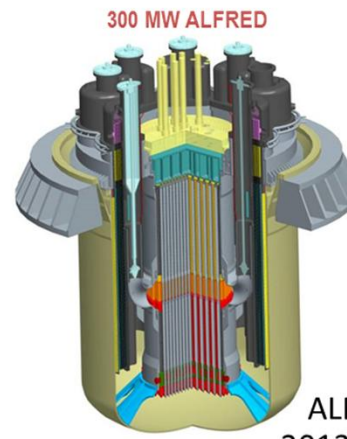
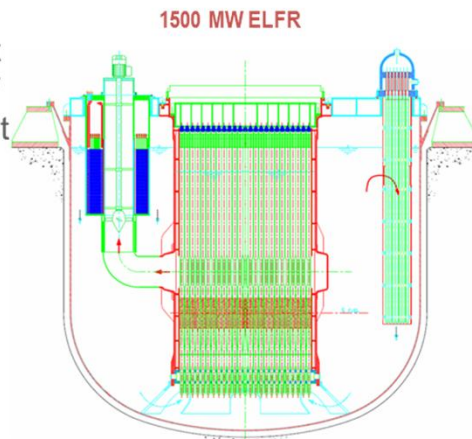


Decontamination and waste containers :

- Development and testing of innovative methods for the vitrification of metal waste coming from decontamination, with phosphoric acid, of nuclear components
- Development of a container for the storage of the final form of the vitrified waste

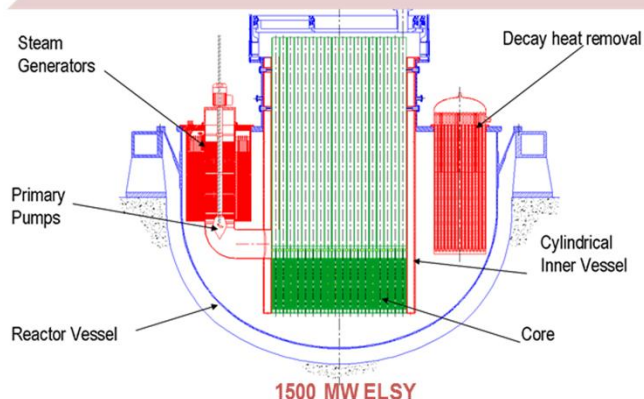
Large effort dedicated to R&D activities on transmutation technology and considerable expertise gained on heavy liquid metal coolants (initially LBE and currently Lead)

- EU FP6 **ELSY** project: first step in the development of a Lead Cooled Critical Fast Reactor in Europe
- A first **reference configuration** of an industrial size (**600 MWe**) LFR was available in February 2010



ELSY
2006-2010 EU FP6

ALFRED Review
2013-2018 FALCON



LEADER
2010-2013 EU FP7

- EU FP7 **LEADER** project: was started in April 2010 with 3 main goals
 - **Integrated strategy** for LFR development
 - New optimized industrial size plant (**ELFR**)
 - Scaled down demonstrator (**ALFRED**)

Italy

Central Services (IT, HR, Accounts and Admin)	12
QHS&E	44
Manufacturing	(*)
Procurement	(*)
Projects	22
Sales, Marketing, Business Development and Tendering	6
Engineering	107

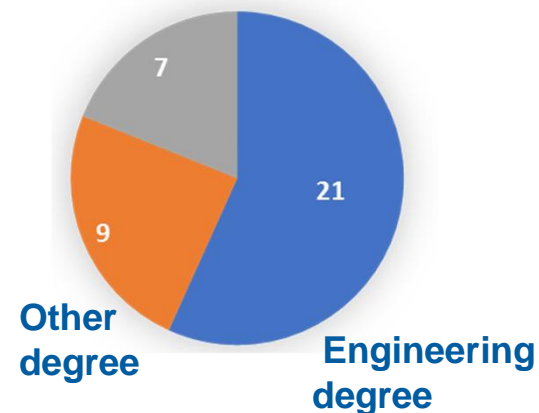
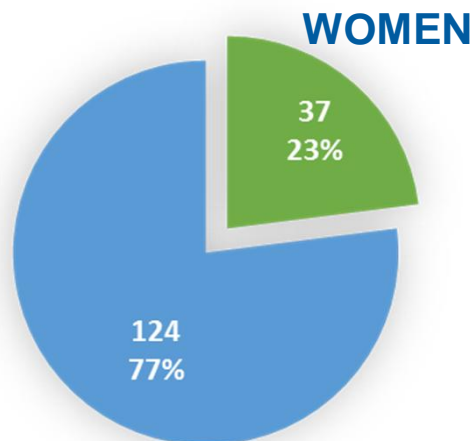
TOTALS
161

Average age : 46,8

w/o upper management : 43,8

Engineering Fields

- Ø Main Components Structural Design
- Ø Remote Handling Equipment Design
- Ø Safety and Reliability Analysis
- Ø Nuclear and Radiation Analysis
- Ø System Design
- Ø Instrumentation and Control
- Ø Electrical Systems
- Ø Integrated Plant Engineering
- Ø Fluid Mechanical and Thermal-hydraulic Analysis
- Ø Plant Simulation



Monica Frogheri
Project Manager

É 010 655 8529
É monicalinda.frogheri@ann.ansaldoenergia.com

