

# CEIDEN: R&D SPANISH NUCLEAR PLATFORM



## ¿What is CEIDEN?

¿What is?

- **CEIDEN is a Spanish Organization for the coordination of the efforts and needs of Nuclear Fission Technology R&D.**

¿What does?

- **Definition and development of joint projects, and the presentation of a common position for national and international commitments and proposals in the Nuclear Fission R&D field.**

¿Who?

- **CEIDEN includes all sectors related to R&D Nuclear Fission in Spain.**

# CEIDEN ORGANIZATION

## Consejo Gestor CEIDEN: Executive Committee

- President: Rosario Velasco (CSN)
- Secretary: Pablo T. León (ENDESA)

| <b>SECTOR</b>                   | <b>ENTIDAD</b> | <b>SUPLENTE</b> |
|---------------------------------|----------------|-----------------|
| Utilities(3 rep):               | ENDESA         |                 |
|                                 | IBERDROLA      |                 |
|                                 | GNF            |                 |
| Fuel Cycle(2 rep):              | ENUSA          |                 |
|                                 | ENRESA         |                 |
| R&D Institutions(2 rep):        | TECNALIA       | GDES            |
|                                 | CIEMAT         |                 |
| Universities (1 rep):           | UPM            | UPC             |
| Eng & Const. Companies (1 rep): | GNF ENG        | IBERD.ING.      |
| Equipment Companies(1 rep):     | ENSA           |                 |
| Services Companies(1 rep):      | TECNATOM       | ENWESA          |
| REGULATOR(2 rep):               | CSN            |                 |
| ADMINISTRATION (1 rep):         | MINETUR        |                 |
| ADMINISTRATION (1 rep):         | MINECO         |                 |

**General Assembly**



- N° Ceiden Members: 93
- N° Contributors: 10

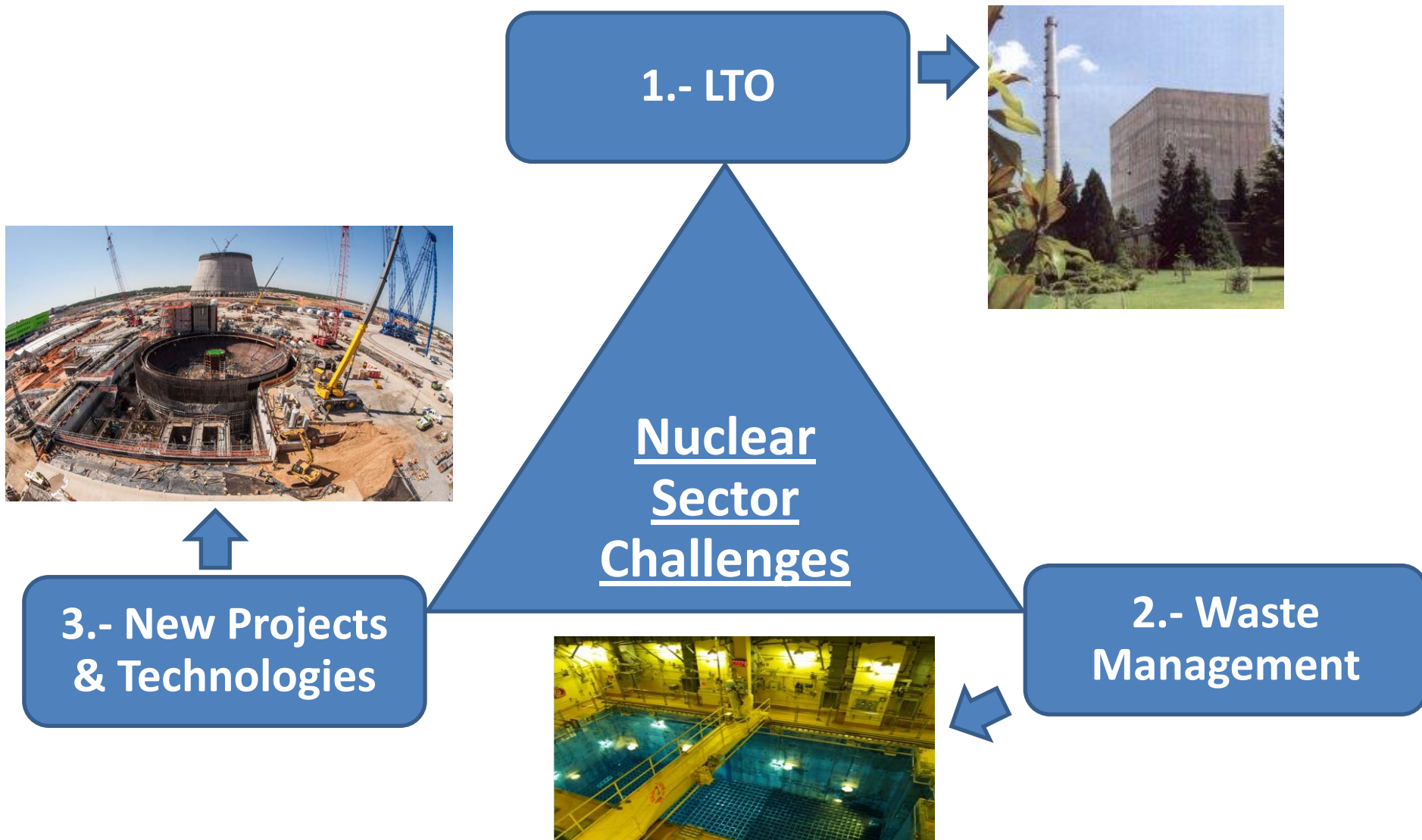
## **VISION of CEIDEN Technology Platform**

**Develop R&D activities focused on the safe, reliable and competitive operation of actual nuclear installations and the fuel cycle, and the development of new nuclear projects**

### **Objectives**

- **Boosting growth of scientific and technological basis of nuclear fission**
- **Promote and coordinate nuclear R&D initiatives between Companies, Government Agencies, Research Centers and Universities**
- **Suggest the National Plan of R&D priority technology lines in the Nuclear Fission Sector.**
- **Advise and coordinate the participation in international projects**
- **Promote the Spanish nuclear technology in appropriate forums.**

# STRATEGIC AGENDA



# MATERIALS DEGRADATION

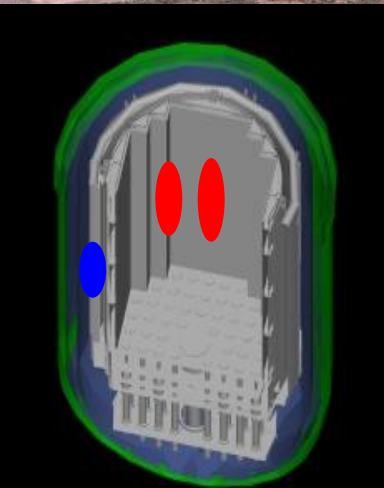
## Materials Studies from Jose Cabrera (Zorita) NPP, currently beign dismantled

### ZIRP Project

- ❖ **Objetive:** Cut and remove part of the Internal Reactor Vessel, for laboratory testing, and evaluating the extracted materials degradation and aging properties
- ❖ **Participants:** CSN, ENRESA, Gas Natural, UNESA/CCNN, CIEMAT, GNF Engineering, ENSA and TECNATOM
- ❖ **2nd Phase:** Lead by EPRI, with Westinghouse, Studsvik, US NRC participation

### Concrete Project

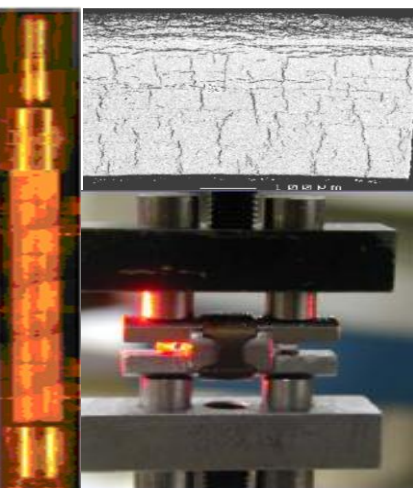
- ❖ **Objective:** Cut and remove some of the concrete structures of the plant, to experimentally study the variation of the characteristics of these materials
- ❖ **Participants:** CSN, ENDESA, ENRESA, GNF-GNF Engineering, IBERDROLA, and IETcc (CSIC)



# NUCLEAR FUEL

## Storage and Transport of Spent Fuel Program

- ❖ **Objective:** Forum to promote and coordinate research projects on used nuclear fuel, to improve its management
- ❖ **Participants:** CSN, ENRESA, ENUSA, UNESA/CCNN, CIEMAT, GNF Engineering, ENSA, TECNATOM, ETSICM  
EPRI, W, DOE, ORNL; IRSN and EDF; Vattenfall and NEA/OECD



## Projects:

- ❖ **Fuel Rod Creep with PWR high burnup ZIRLO: Completed**
- ❖ **Fuel Rod Creep of Zircaloy BWR pod 2: Completed**
- ❖ **Isotopy of fuel with high burnup PWR: Completed**
- ❖ **Isotopy of BWR fuel: Completed**
- ❖ **Fracture criteria fuel rod material: Completed**
- ❖ **Break through low-speed impacts: Completed**

- Spanish participation in the "Extended Storage Collaboration Program (ESCP)" promoted by the American nuclear industry
- New Project: "Integrity fuel rod hydridation in irradiated severe conditions of storage and transport"

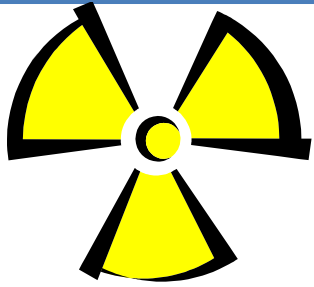
Almacenamiento temporal centralizado de residuos de alta actividad



Bóvedas (en diseño preliminar)



# RADIATION PROTECTION AND DOSIMETRY



## Development of in vitro dosimetry

- ❖ **Objective:** Increase national capacity assessment of internal doses from alpha emitters through biological samples
- ❖ **Participants:** CIEMAT, UNESA, ENUSA, ENRESA, CSN, Tecnatom, Geocisa, Medidas Ambientales, Iberdrola Ingeniería y GNF Engineering

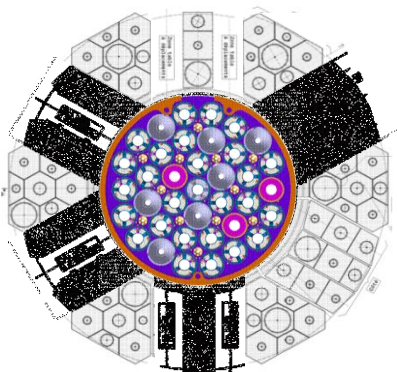
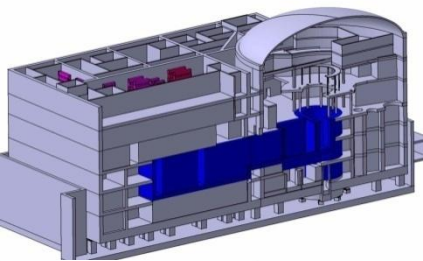


## Laboratory for calibration of neutron patterns

- ❖ **Objective:** Help specify the intended applications for existing and future laboratories and promote possible industrial applications and research
- ❖ **Participants:** CIEMAT, ETSIIM, UAB, CC.NN/UNESA, SEPR, CSN, ENRESA and ENUSA

# NEW NUCLEAR PROJECTS

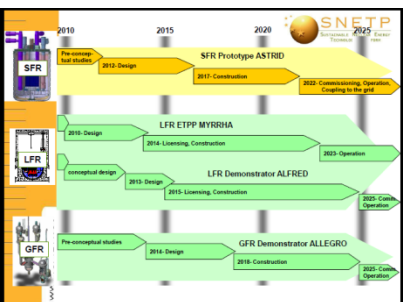
## JULES HOROWITZ REACTOR PROJECT



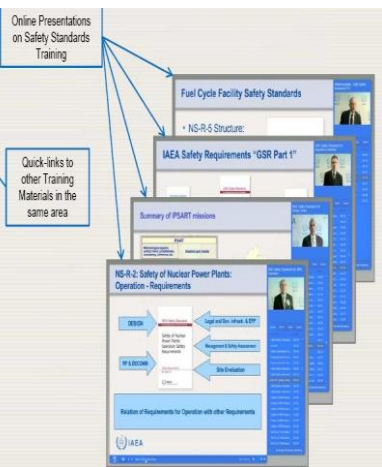
- ❖ **Objective:** Participate in the design, construction and operation of experimental fission reactor Jules Horowitz (JHR)
- ❖ **Participants:** Spanish consortium: CIEMAT, CSN, EnuSA, TECNATOM, Employers Grouped, ENSA and GNF Engineering
- ❖ **Spanish contribution:** € 8.6 M, gives the consortium a 2% of the rights of use of the facility for future R&D projects that require irradiation of samples

## ESNII PROGRAM

- ❖ **Objective:** Participation in the European Sustainable Nuclear Industrial Initiative program (ESNII)
- ❖ **Participants:** CIEMAT, Iberdrola, Tecnatom, Empresarios Agrupados, ENSA, GNF Engineering, UPM and UPV



# CROSS-CUTTING TOPICS (1/2)



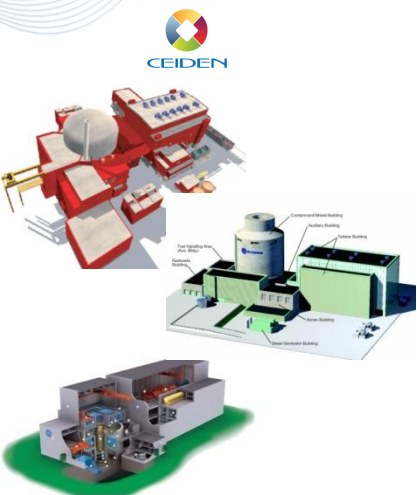
## EDUCATION/TRAINING GROUP: FORMACION +

- ❖ **Objective:** Promote coordination of education and training nationally, and Spanish participation in international programs and networks (EU EUROSAFE, IAEA, Latin America)
- ❖ **Participants:** CIEMAT, TECNATOM, CSN, UPM, UAB, UPV/EHU, UPV, UPC, Titania, ENUSA, Foro Nuclear, Thunder, INDRA and ENDESA

CAPACIDADES  
ESPAÑOLAS PARA  
AFRONTAR UN NUEVO  
PROYECTO NUCLEAR

## CAPABILITIES PROJECT

- ❖ **Objectives:**
  - Phase 1: Analyze the current capabilities of the Spanish industry to face a new nuclear project
  - Phase 2: Promote that the Spanish suppliers have the necessary skills to participate in new nuclear projects
- ❖ **Participants:** Endesa, Iberdrola, GNF, Foro Nuclear W, GE, AREVA



## CROSS-CUTTING TOPICS (2/2)



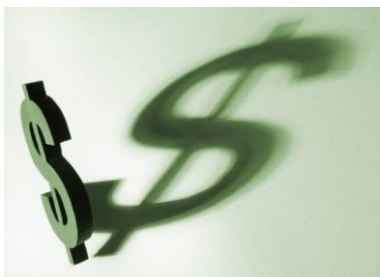
### HORIZON 2020

- ❖ **Monitoring** European Euratom programs within the Horizon 2020 program, in order to inform CEIDEN members of opportunities for R&D in Europe, and promote a coordinated Spanish participation



### SNE-TP

- ❖ **Monitoring** of activities of the European Technology Platform for Sustainable Nuclear Energy, which define the strategic lines of support for R&D in Europe Nuclear Fission



### NATIONAL R&D BUDGET

- ❖ **Analysis** of the annual budget for Nuclear R&D in Spain

**45 M€**

# Conclusions

- ❖ The CEIDEN technology platform is an entity coordinating the needs and efforts of R&D in the field of nuclear fission technology, nationwide
- ❖ Nearly 100 public and private entities participate in CEIDEN, which represents the majority of the players in this field in Spain
- ❖ CEIDEN develops 8 lines of specific work, with 25 entities involved. The majority of CEIDEN programs have relationships with equivalent international programs, being highly valued in this environment
- ❖ CEIDEN has established cooperative ties with Latin American institutions with similar objectives, especially in the field of education & training
- ❖ CEIDEN objective is to transmit to the Administration and to the Spanish companies the idea that the promotion of R&D supports nuclear Spanish industrial exports, and the safe operation of short, medium and long term of our nuclear power plants

# Thanks for your Attention

