

#innovacion  
#ayudascdti  
#asesoramiento  
#internacionalizacion



# Spanish industry involvement in fusion and R&D

## Tools

### DONES Business Infoday

Belén del Cerro

*SP Industrial Liaison Officer for nuclear fusion projects  
Large Scientific Facilities and Dual Programmes Dpt/  
December 4th, 2023, Tokyo (Japan)*

*Embassy of Spain*

Email: [anabelen.delcerro@cdti.es](mailto:anabelen.delcerro@cdti.es)

# Index

1. **CDTI**
2. **Big Science in Spain**
3. **Spanish industry involvement in fusion**
4. **CDTI R&D Tools**
5. **Cooperation with Japan**
6. **Conclusions**

# CDTI – Spanish Innovation Agency

**Public Entity (Ministry of Science, Innovation and Universities). Since 1977**

Objectives:

- To foster the Spanish industrial competitiveness by funding national R&D projects
- To support to the creation and consolidation of technology-based companies
- To encourage the Spanish participation in international cooperation programs.
- To support technology transfer

**Enhance Spanish companies' competitiveness and internationalization through innovation**



GOBIERNO  
DE ESPAÑA

MINISTERIO  
DE CIENCIA, INNOVACIÓN  
Y UNIVERSIDADES



# CDTI in Big Science

ASTRONOMY

PARTICLE PHYSICS

FUSION

## • TOWARDS THE RESEARCH INFRASTRUCTURE (RI)

- **Nominated ILO for the Member State**
- Regular meetings between ILO-RI Procurement Office
- Advising Research Infrastructures on the national industrial capacities

## • TOWARDS THE NATIONAL INDUSTRY

- Main point of contact for announcements of tenders & medium term plans
- Organisation of Industry Days, visits to the RI, etc.
- Supporting R&D projects
- Assisting companies in their understanding of the technical, contractual and financial requirement become a supplier and helping them to form consortium
- Following up of awarding contracts

## • TOWARDS THE SPANISH ADMINISTRATION

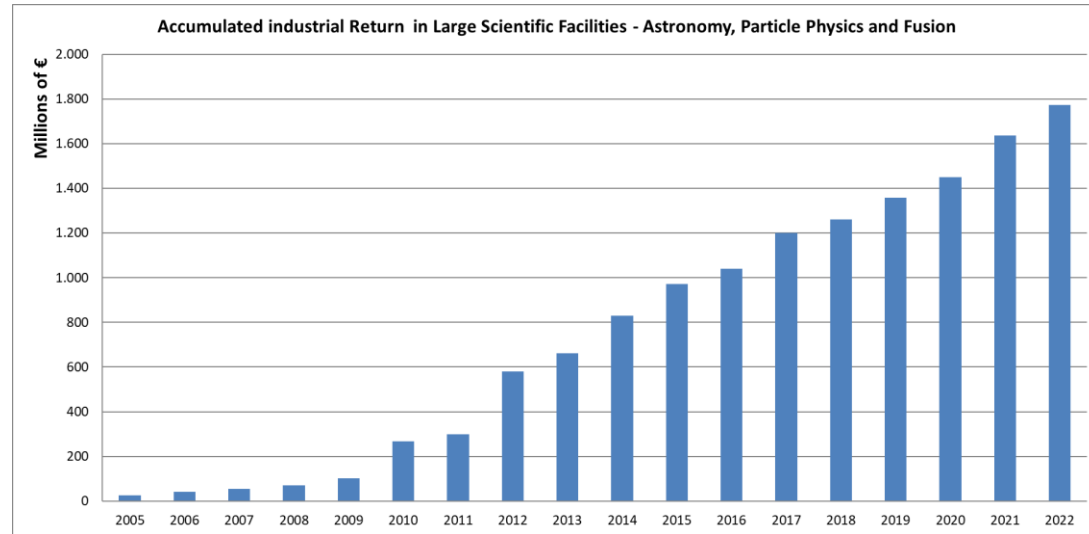
- Advise the Spanish Delegation on industry-related matters
- Participation at the RI Finance Committees
- Advising national funding agencies in the definition of in-kind contributions
- Analysis of industrial capacities for Spanish Research Infrastructure candidacies



# Big Science in Spain

During the last 16 years, the Spanish industry has been awarded with more than 1600M€ in a very challenging and competitive market


- CDTI hosts the Spanish Industrial Liason Officer network in Big Science (Astronomy, Particle Physics and Fusion energy)
- CDTI supports the Spanish industrial R&D in Big Science
- CDTI encourages the international cooperation



MINISTERIO  
DE CIENCIA, INNOVACIÓN  
Y UNIVERSIDADES



# Big Science in Spain



**IFMIF-DONES ESPAÑA**

**HOSTING ORGANIZATION** IFMIF-DONES España  
**ADDRESS** Gran Vía 48, 18006, Granada.  
**WEB** [www.ifmif-dones.es](http://www.ifmif-dones.es)  
**CONTACT PERSON** Jose Aguilár  
**POSITION** Project Office Coordinator  
**PHONE** +34 665 97 75 11  
**EMAIL** [joa.aguilar@ifmif-dones.es](mailto:joa.aguilar@ifmif-dones.es)

**IFMIF-DONES, A KEY INFRASTRUCTURE IN THE ROADMAP TOWARDS FUSION ENERGY**

The need of a fusion-like neutron source for the qualification of the materials to be used in a fusion power plant has been widely recognized since the beginning of the Fusion Programme. This Fusion Programme is based in three main pillars, ITER, DEMO and IFMIF-DONES, being this last one the fusion neutron source facility for materials development and qualification. This fusion relevant neutron source facility ("the Facility") will provide to DEMO the necessary data for material testing under similar irradiating conditions. Therefore, the Facility should be constructed and operated soon enough to obtain material information to meet DEMO and future power plants planned schedules in compliance with fusion roadmaps.

The Roadmap for the Fusion electricity production is summarized in the figure 1.

**WHAT IS IFMIF-DONES?**

The International Fusion Materials Irradiation Facility – Demo Oriented Neutron Source (IFMIF-DONES) is a single-sited novel research infrastructure for testing, validation and qualification of the materials to be used in future fusion power plants like DEMO (a demonstration fusion reactor prototype). In relation to this international project, in December 2017, Fusion for Energy (F4E) evaluated positively the joint Spain-Croatia proposal to site the IFMIF-DONES in Granada.


The DONES Facility will be a Plant containing all the necessary buildings and systems to house and run an accelerator-based D-Li neutron source to produce high-energy neutrons at sufficient intensity and irradiation volume to simulate as closely as possible the first wall neutron flux and spectrum of future nuclear fusion reactors.

The facility will produce a 125 mA deuteron beam, accelerated up to 40 MeV and shaped to have a nominal cross section in the range from 100 mm x 50 mm to 200 mm x 50 mm, impinging on a liquid lithium target 25 mm thick cross-flowing at about 15 m/s in front of it. The stripping reactions generate a large number of neutrons that interact with the materials samples located immediately behind the Lithium Target, in the Test Modules.

**AND IFMIF-DONES IS FINALLY BECOMING A REALITY IN GRANADA...**

In 2018, promoted by Spanish and Croatian governments as well as F4E and EUROfusion, the IFMIF-DONES facility has been included in the European Strategy Forum on Research Infrastructures (ESFRI) Roadmap showing up the strategic interest of the facility for the EU scientific community.

**SPANISH CAPACITIES IN LARGE SCIENTIFIC FACILITIES**



-104 companies currently working in Big Science

-Capacities roadmaps in Astronomy, Particle Physics and Fusion

-The most relevant research entities also included

<https://www.cdti.es/publicaciones/spanish-capacities-large-scientific-facilities>



MINISTERIO DE CIENCIA, INNOVACIÓN Y UNIVERSIDADES

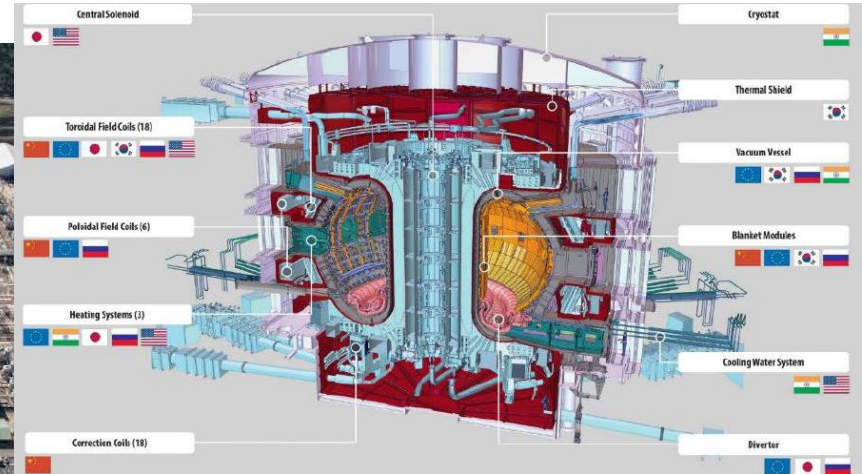




# SP industry involvement in fusion-ITER



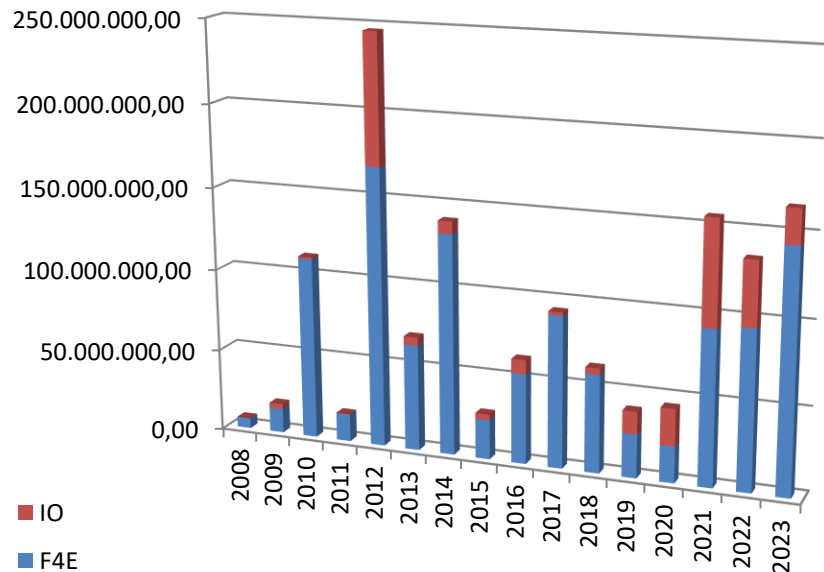
ITER is the largest cooperation programme in fusion energy. Budget ~ 25.000MEuros



# SP industry involvement in fusion-ITER



~650 contracts awarded to SP companies worth 1468 M€  
 2nd position in F4E and IO awarding ranking



**Buildings**



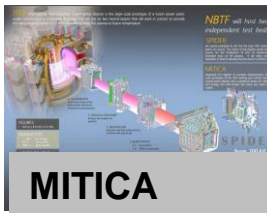
**Superconducting Magnets**



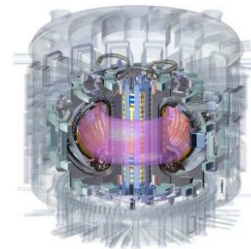
**FW Panels**



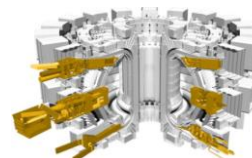
**Vacuum Vessel**



**MITICA**



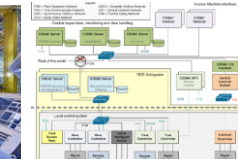
**Upper Launchers**



**Diagnostics**



**Assembly**



**I&C**



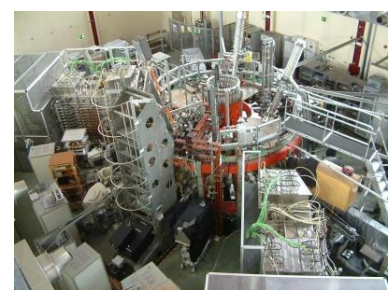
**Power Supplies**



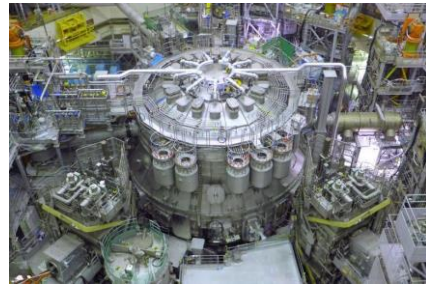
# SP industry involvement in fusion-Others

Successful cooperation programmes with Japan in fusion technologies and projects

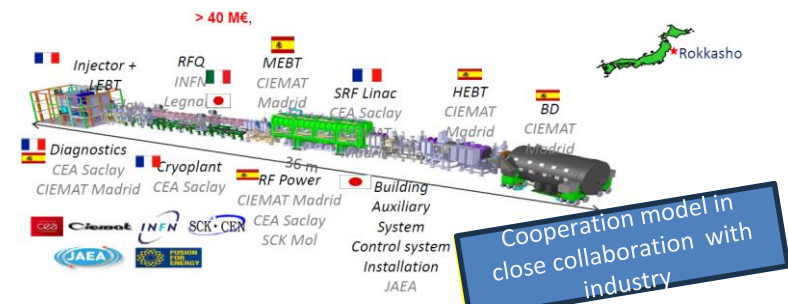
Spanish companies are also contributing to other fusion facilities such as the European tokamak JET, TJ-II (CIEMAT) and W7X (Germany), EU-DEMO... and have taken on significant challenges in the supply of components for the Spanish in-kind contributions to the Broader Approach projects IFMIF-EVEDA and JT-60.



TJ-II



JT-60



BA- IFMIF Eveda

# CDTI R&D Tools

CDTI supports the technological development of Spanish companies participating in Large Scientific Facilities

Contracts for the acquisition of technology -100% publicly funded activities

- Agreements with R+D agencies PRISMAC with CIEMAT/CERN
- Innovation Public procurement

International Co-operation Programmes



Risk Capital

Loans with 33% non-refundable  
NEOTEC, CIEN, MISIONES,



GOBIERNO  
DE ESPAÑA

MINISTERIO  
DE CIENCIA, INNOVACIÓN  
Y UNIVERSIDADES



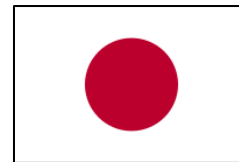
# Cooperation with Japan

- CDTI can help you to find a Spanish partner in fusion
- SP companies are well positioned on ITER and willing to cooperate with Japan
- Already we´ve successful cooperation programmes with a permanent delegate in Tokyo
- Spanish companies are open to collaborate in R&D fusion projects for IFMIF-DONES
- Fusion Industrial events/webinars jointly organized



## • Next steps....

- ✓ Q1 - 2024 Japanese-Spanish industrial webinar focused on fusion technologies
- ✓ Technological missions visiting Spanish companies
- ✓ ....



[info@cdti.es](mailto:info@cdti.es)

[www.cdti.es](http://www.cdti.es)

GOBIERNO  
DE ESPAÑA

MINISTERIO  
DE CIENCIA, INNOVACIÓN  
Y UNIVERSIDADES



# Conclusions

- CDTI hosts the Spanish ILOs network and has accumulated experience for over 25 years as ILOs for Big Science
- Spanish industry is developing very challenging and added value technologies in fusion
- CDTI can help you to cooperate with Spanish industry in fusion field



# ¡ありがとうございます!.

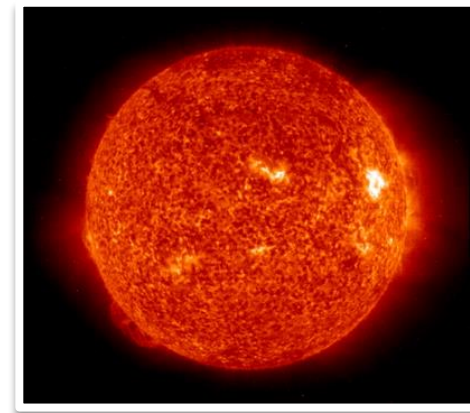
+info sobre programas y ayudas CDTI

para

proyectos de I+D empresarial e innovación



@CDTI\_innovacion



GOBIERNO  
DE ESPAÑA

MINISTERIO  
DE CIENCIA, INNOVACIÓN  
Y UNIVERSIDADES

