



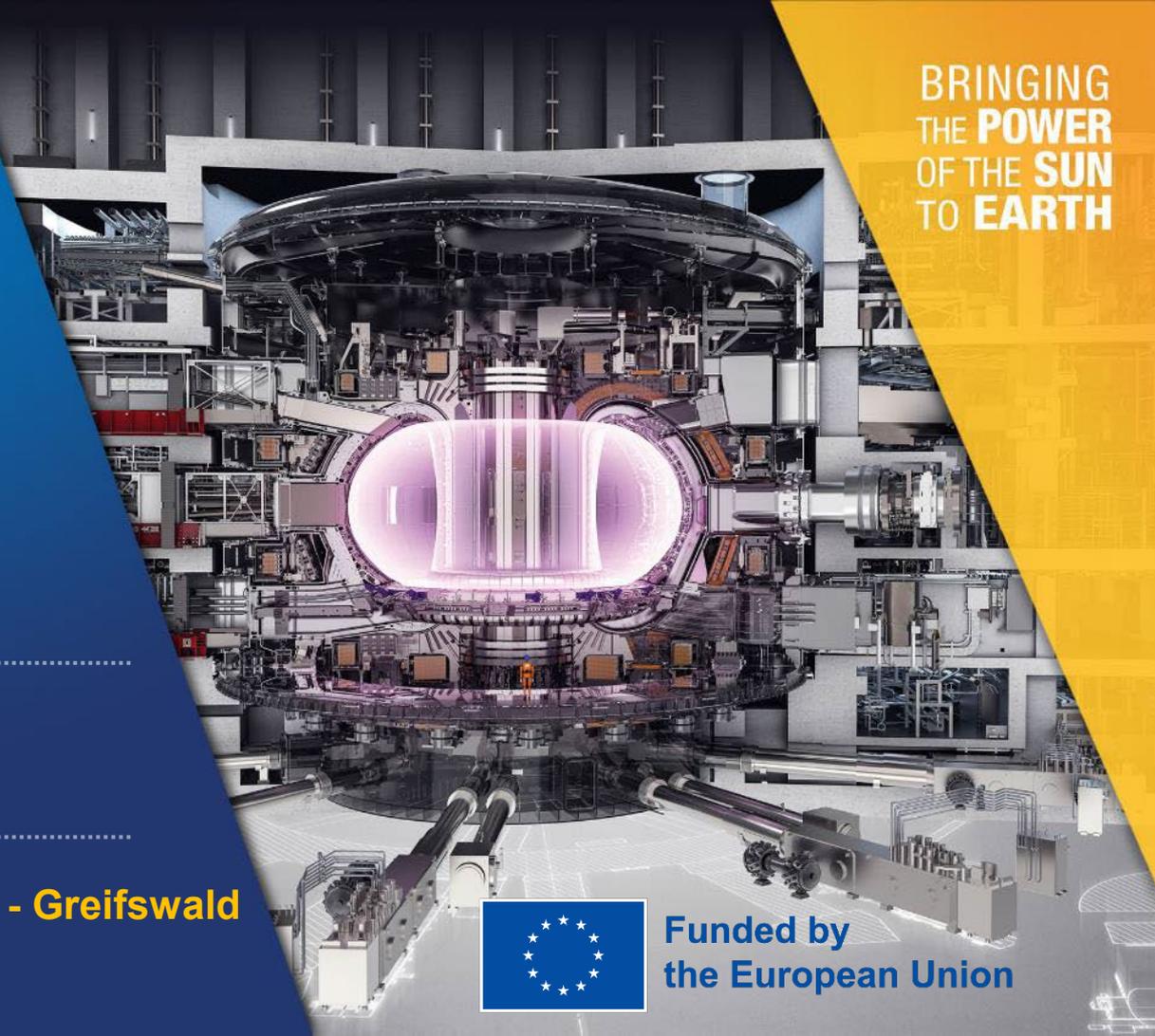
**FUSION
FOR
ENERGY**

Building ITER and Fusion industry in Europe

Marc Lachaise
Director

6th Forum FUSION Germany - Greifswald
14 January 2025

BRINGING
THE **POWER**
OF THE **SUN**
TO **EARTH**



Funded by
the European Union

Fusion for Energy (F4E) key contributor to ITER and EU strategy on fusion

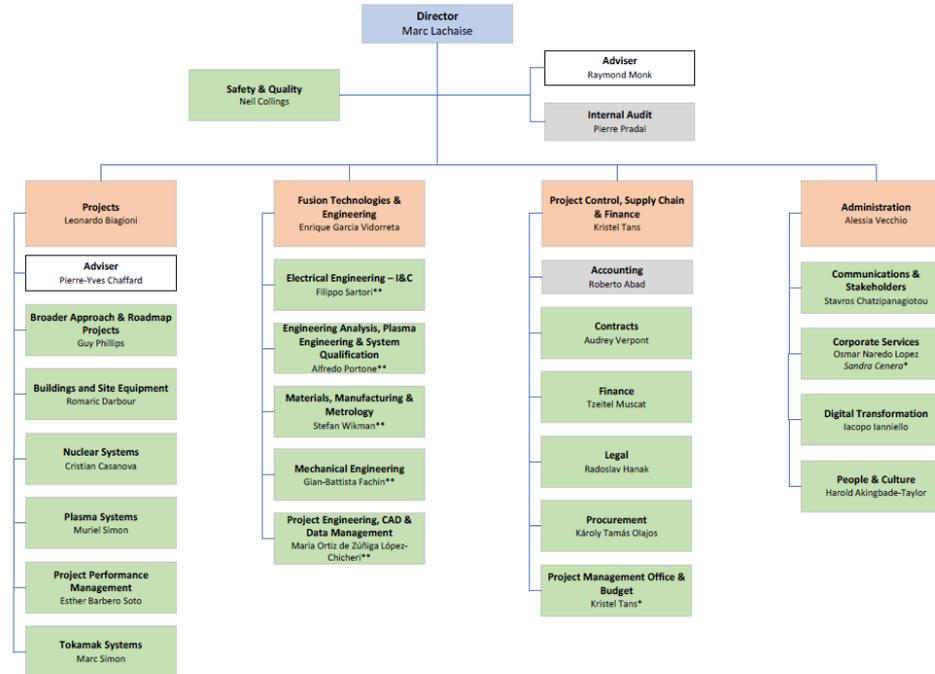


- ▶ **F4E is EU Joint Undertaking based in Barcelona**
Offices also in Cadarache & Garching (Munich)
- ▶ Staff: ~465 highly competent team of engineers, project managers, legal, procurement and administration officers
- ▶ Budget: €5.6 billion 2021-2027
- ▶ F4E Director: Marc Lachaise
- ▶ **Main role is to provide the European contribution to ITER as its European “Domestic Agency”, but also involved in other projects to develop fusion**
- ▶ **F4E is a European public body capitalizing on a diversity of skills and talent, while attaching importance on inclusion and wellbeing**



New Organisation as of 1st January 2025

F4E regrouped around 4 Departments in a reinforced engineering matrix



Legend



Fusion for Energy (F4E) – New Strategic Vision



We develop talent and knowledge for the future fusion power plants in Europe



F4E Strategic Vision: Looking to the future

We focus on the construction and operation of ITER and other fusion projects



We help create a competitive European Fusion Industry

Project Delivery Highlights 2024 – A Year of Remarkable Achievements



**Final Poloidal
Field Coil
Delivered**



**First Neutral
Beam Power
Deliveries**



**Completion of
Toroidal Field
Coils Celebration**



**First Vacuum
Vessel Sector
Completed**

Jan

Feb

March

April

May

June

July

Aug

Sept

Oct

Nov

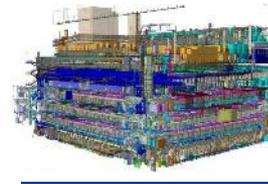
Dec



**Tritium Building
Civil Engineering
Complete**



**Delivery of First
Cryopump**

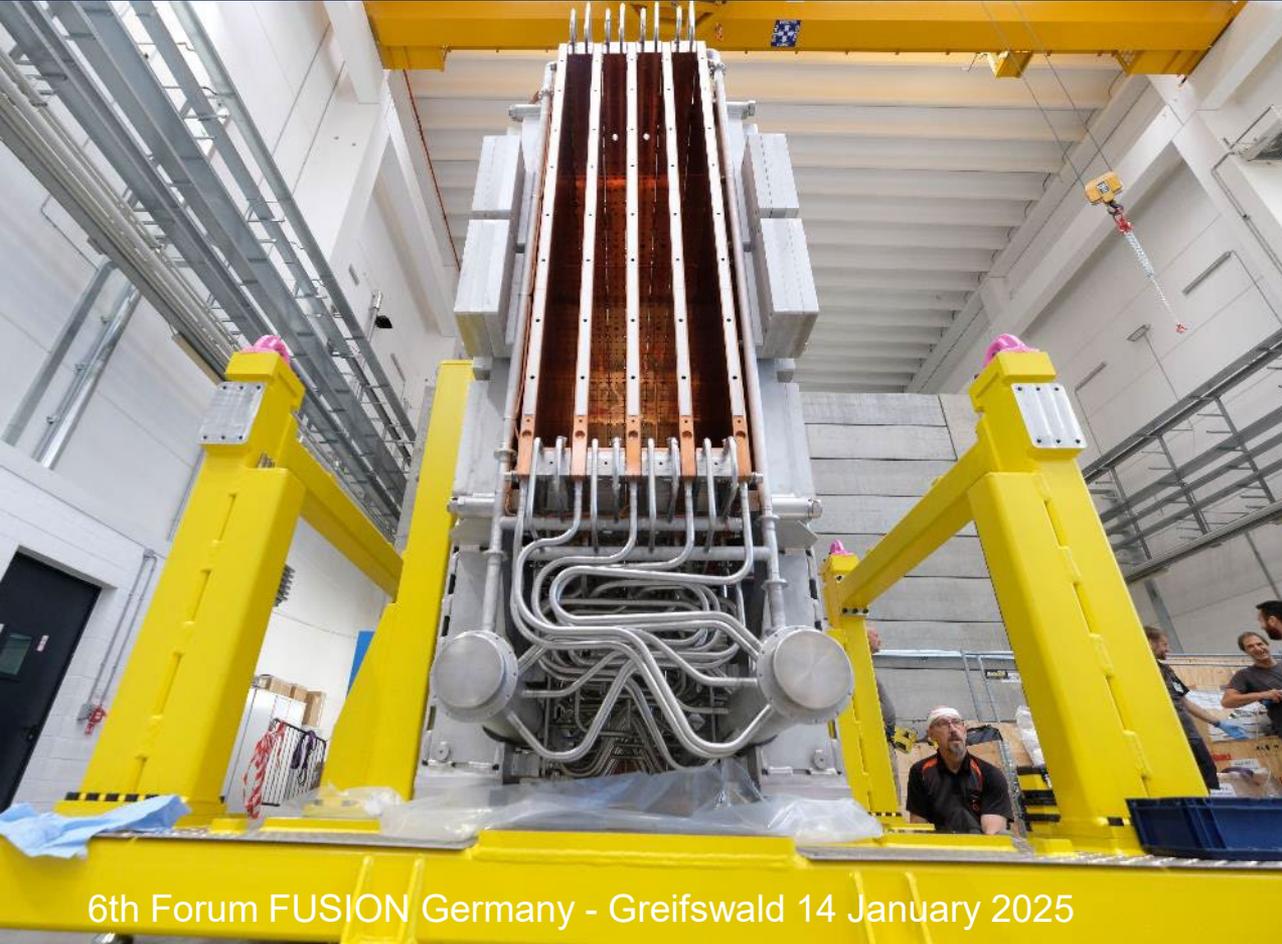


**Conclusion of
Building
Services Works**



**Radio Frequency
Building
Completed**

AVS-Tecnalia deliver beam line components for MITICA

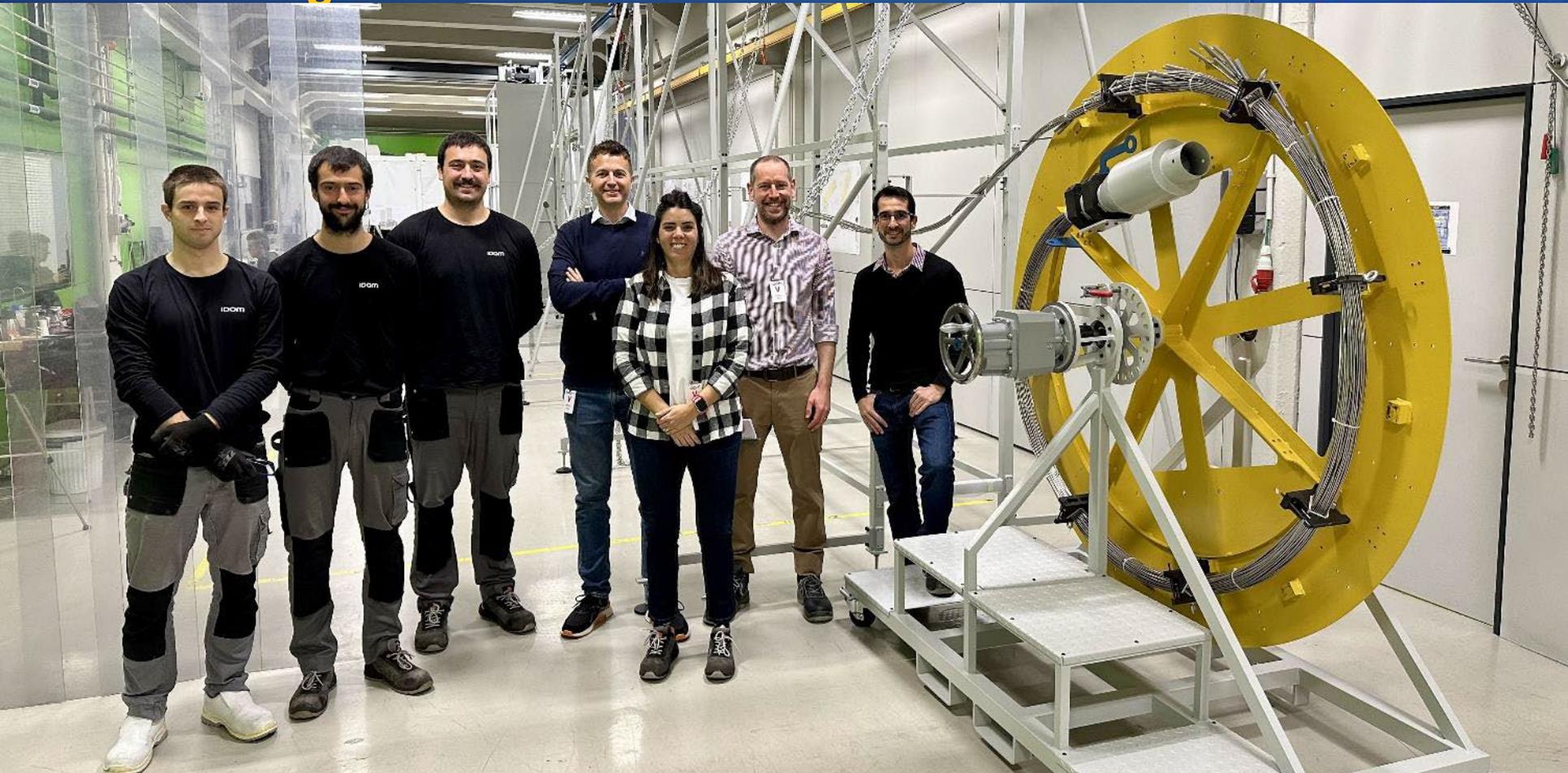


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Clean room assembly completed to Upgrade LIPAc by RI Research Instruments GmbH



IDOM delivers alignment tools for ITER Feedthroughs



Focus on Knowledge Management: Key Lessons from First Vacuum Vessel Sector

- Align expectations at all levels of the consortium
- Build trust through common achievable goals and transparent commercial management.
- Work with a realistic schedule
- Incentives scheme with clear measurable KPIs.
- Define with supplier common metrics to measure performance, agree on visual dashboards
- F4E Senior Production Managers - staff based at factories proved indispensable and operationally impactful
- Communication - weekly meetings with CEOs, and Project Managers



- ▶ **588 M€ estimated return via F4E contracts**
- ▶ **Success rate of German entities at 46% (vs. average EU entities 33%)**
- ▶ **Positive collaboration so far**
- ▶ **Capabilities identified in key technologies**
- ▶ **More opportunities to come ! (cf. tomorrow session)**
- ▶ **A greater involvement in pre-procurement is key => connect with ILO**



Top comments for German Contractors

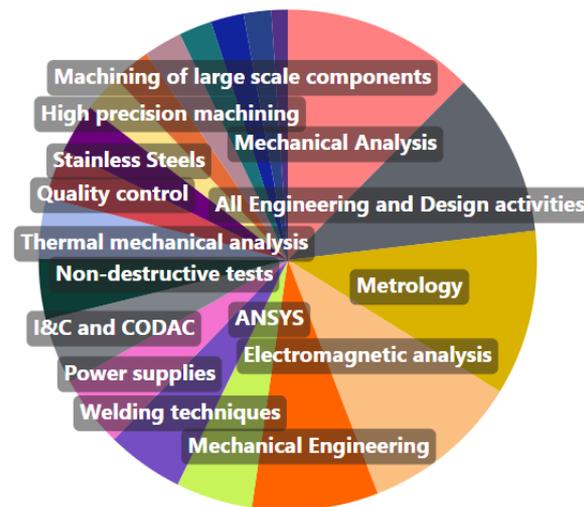
Deliver as expected schedule quality price

Collaborative

Good technical skills

Good project management

Reactive and flexible



Where are the main German entities located?

Cryotherm GmbH & Co KG:
Cryogenics



Rolf Kind GmbH:
Steel.



Research Instruments GmbH:
Divertor vertical inner target



ATLAS COPCO ENERGAS, :
Compressor stations for cryogenic materials



Wilhelm Schulz GmbH, Krefeld:
Pipes and fittings for tokamak cooling water system



Forschungszentrum Jülich:
R&D on laser-induced desorption of beryllium co-deposits



Karlsruhe Institute for Technology:
Design of electron cyclotron upper Launcher
Material characterization at cryogenic temperatures



Saarschmiede GmbH, Völklingen:
EUROFER-97 plates for test blanket modules



Diamond Material, Freiburg:
Diamond disks for electron cyclotron heating system



Exyte (M+W Group):
Civil engineering, nuclear buildings



Bruker:
Superconductivity and superconductor magnets



Dockweiler AG, Neustadt-Glewe:
Prototype of blanket cooling manifold



Witzenmann GmbH, Pforzheim:
Contributes to tokamak cooling water system



NKM Noell Special Cranes, Veitshöchheim
(together with REEL S.A.S., France):
Overhead cranes to assemble tokamak



Himmelwerk GmbH, Tübingen:
Four radio frequency generators



Max-Planck-Institute for Plasma Physics, Garching:
Final design of plasma control systems for First Plasma operations
Experiment for the development of the neutral beam heating systems (ELISE)



Sommer Fassadensysteme-Stahlbau-Sicherheitstechnik GmbH:
Heavy Nuclear Doors that surround the tokamak on three levels and each of them closes an access cell



Acentrix GmbH, München:
Customization of 3D engineering and design software



Siemens AG, München:
High voltage power supply units for neutral beam injector



Kraftanlagen Heidelberg GmbH
Engineering, nuclear buildings



Procurement Process

Tomorrow' Session
K.Tans, AK.Preis

1) Strategic procurement

2) SME-targeted recommendations

Early involvement of EU Industry

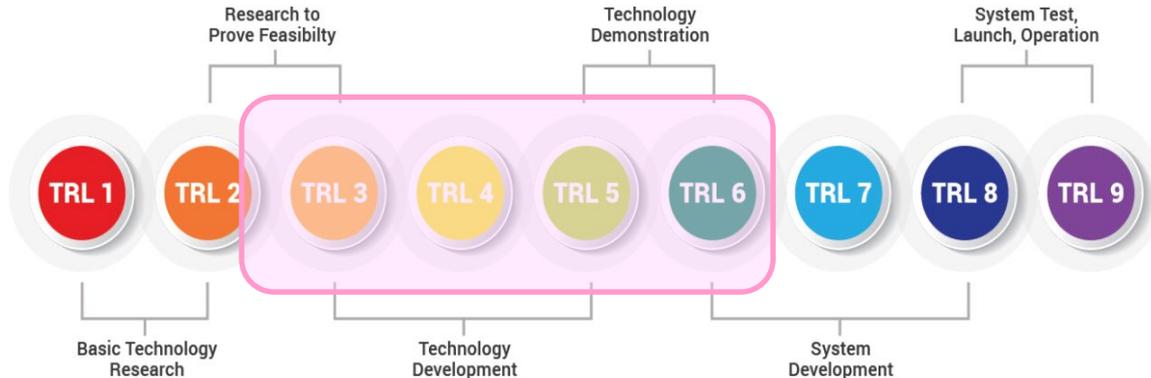
3) Implementation of a Technology Development Program (TDP)

4) Better articulation of F4E-EUROfusion collaboration and enhanced involvement of European Fusion Labs (EFLs) expertise

Collaboration with Private Sector Fusion

F4E Technology Development Programme

- Support **R&D activities** to build and develop advanced technological capabilities
- Explore feasibility & suitability of **cutting-edge technologies** opening new design, manufacturing, qualification, etc. routes.
- Facilitate **technological readiness** limiting showstoppers in the path to commercial fusion
- Promote technology actions to future-proofing the **competitiveness** of European industry
- Address European supply chains vulnerabilities targeting technological **non-dependence**



Inspired by ESA
Programmes
shown to have
strong added
value



We launched two pilots of the new Technology Development Programme

- **F4E is rolling out the Technology Development Programme (TDP) to help early-stage technologies mature**
- **Partners retain IP provided they commit to exploiting them & converting them into operational technologies**
- **F4E will be mapping technologies, in consultation with industry and researchers for various fusion domains**



Two Pilots via Pre-Commercial procurement-based tool



TDP Pilot Action 1 **CLOSED**, under evaluation

Characterization of Gradient joints on Tungsten/CuCrZr materials



TDP Pilot Action 2 **ON-GOING** Expression of Interest, deadline 20 January 2025

Real-time personal monitor for Tritiated water vapor in air

Identification of TDP topics

TDP Call For Abstracts **ON-GOING** on [F4E Industry Portal](#) deadline 14 February 2025

Collecting proposals of critical technologies to be supported during 2025 campaign

Nine Responses to Call for Expression of Interest from Private Sector Fusion Entities

- Meetings and on-site visits are under preparation



**Promoting
innovation
in fusion**

—
Call for expression
of interest



- **IFERC** - EUROfusion provides most EU contributions to the Computational Simulation Centre (CSC) activities, and 100% EU contributions to DEMO Design and R&D activities
- **IFMIF/EVEDA/DONES** – Collaboration on all the Fusion Neutron Source activities
- **JT60SA** - Enhancements ongoing in full collaboration EUROfusion/F4E
- **KM** - Collaboration on knowledge sharing and joint initiatives (ECRH), joint KM workshop in Barcelona, International Conference on Nuclear KM and Human Resources
- **TBM** - EUROfusion and F4E joint work on TBM/BB design & manufacturing activities
- **TDP** - Collaboration on Fusion Technologies Roadmap Proposals
- **TECHNOLOGY TRANSFER** – Joint Technology Transfer Platform [Marketplace](#).

- **Fusion for Energy (F4E) is a European organisation for the development of fusion energy with ~500 staff & offices in Spain, France, Japan & Germany**
- **With a new vision, organization, and strong focus on Delivery, People and Industrial Policy**
- **F4E has partnered with over 700 companies & R&D organisations with over €7bn of contracts in key areas of fusion technologies**
- **588 M€ in a satisfactory relation with Germany, in key technological areas**
- **F4E is driving several actions including a new Technology Development Programme (TDP) & Technology Transfer initiatives**
- **F4E also proposing to collaborate with private sector fusion enterprises & is supporting initiatives to address legal aspects of fusion development**
- **F4E plays a key role in the European fusion landscape in full synergy with national initiatives**



Danke !