THEMATIC WORKSHOP

Technology transfer

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She oversees the ITER library, scientific publications
and knowledge management activities.

Benjamin PERIER
F4E Head of Market Analysis, IP & Technology Transfer

He has an extensive experience in procurement, business
relationship management and financial analysis.

Carmen CASTERAS
F4E Intellectual Property & Tech Transfer Officer

She has 25 years of professional experience in the
management of IP and creation of intangible assets

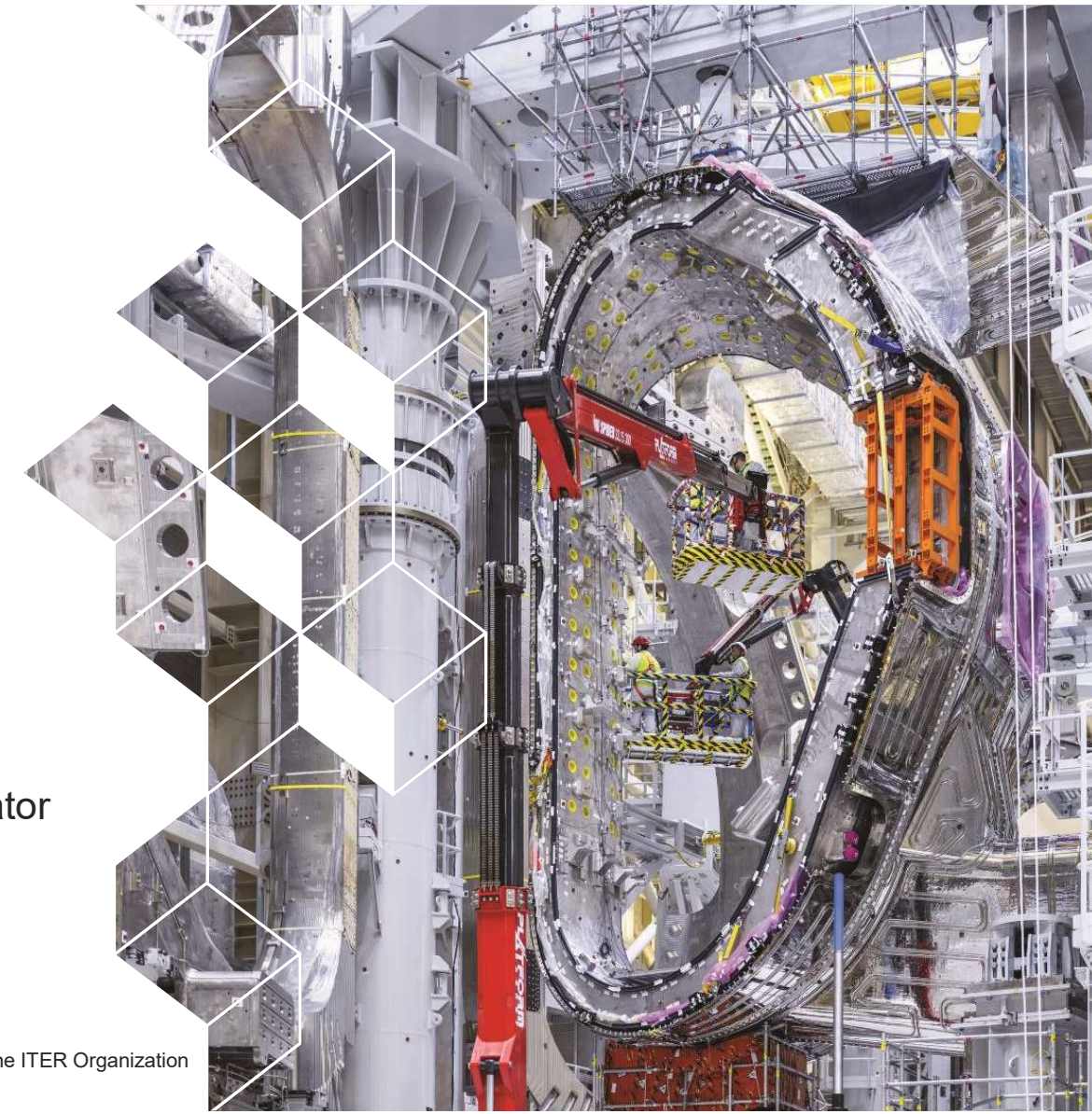
Moderator:

Paolo Acunzo
Head of Service ILO Network
Italia, ENEA

IBF/25

INTERNATIONAL ITER BUSINESS FORUM

Technology Transfer: ITER's way forward



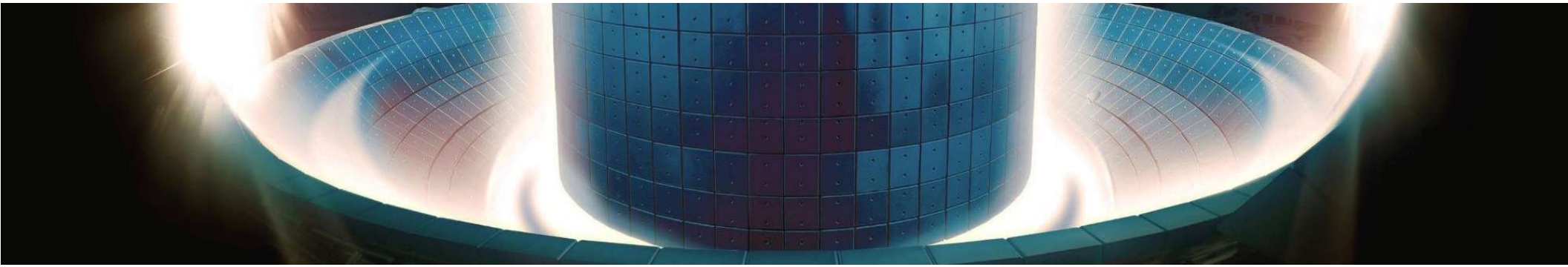
Esmeralda Moscatelli

Information Management Administrator

Friday APRIL 28rd

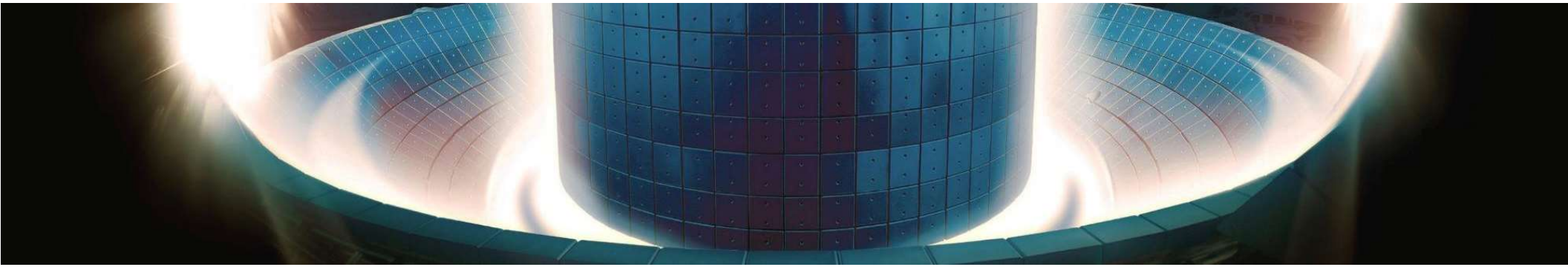
Disclaimer: the views and opinions expressed herein do not necessarily reflect those of the ITER Organization

"Technology transfer involves the sharing, development, or transmission of ideas, data, information, and technology between different entities, including government agencies, industry, and academia".



ITER's Technology Transfer Program is presently being developed.

- Identify knowledge, documentation, know-how and technologies
- Match them to relevant societal challenges
- Communicate ITER's impact to all relevant stakeholders



- The IO's approach with respect to KT focusses on the dissemination of IO's information and intellectual property (documentation, know-how & technologies), under the conditions of the ITER Agreement and its Annex on Information and IP, through several tools ranging from documentation sharing of information, licensing of IP to collaborative R&D.

- Given the rise in fusion activities in the private sector in member states, there is substantial potential for ITER KT.

1. FUSION ENGINEERING DESIGN HANDBOOK

FUSION ENGINEERING DESIGN HANDBOOK:

The Fusion Engineering Design Handbook aims at:

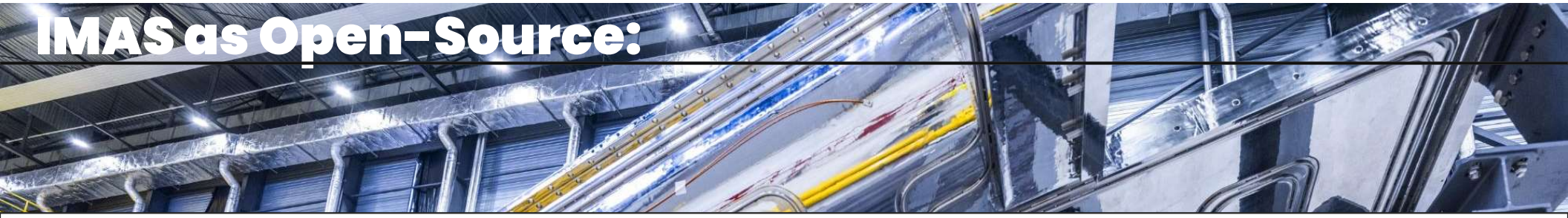
- Preserving the project's knowledge as well as its challenges.
- Consolidating the information into a succinct publication that can facilitate accessibility and understanding both for stakeholders involved in ITER today and the wider fusion community.

The goal is full transparency—so that the Design Handbook can:

- Serve as a valuable tool for all ITER stakeholders.
- Be a useful reference across the private sector.
- Be a global educational resource for those studying within the nuclear fusion domain.

2. IMAS – OPEN SOURCE SOFTWARE

IMAS as Open-Source:



The ITER Organization is developing the Integrated Modelling & Analysis Suite (IMAS), a collection of physics software, to support Plasma Operations and Plasma Research in ITER.

To lower the barrier to developing, validating and applying this software, including by commercial entities, the IO is releasing its Generated Intellectual Property in IMAS as Open-Source software.

Central objectives of IMAS:

- to define a data standard for the MFE (Magnetic Fusion Energy) community.
- to follow the FAIR data principles (Findable Accessible Interoperable Reusable) by providing an openly accessible metadata schema.

Releasing IMAS as open source enables frictionless collaborations and allows it to benefit from a huge portfolio of resources (documentation, recipes, tools, platforms) to facilitate development, maintenance, packaging and distribution.

3. COOPERATION AGREEMENTS

COOPERATION AGREEMENTS:

Under Article 19 of the ITER Agreement," […] upon a unanimous decision of the ITER Council, the ITER Organization may, in furtherance of its purpose, cooperate with other international organizations and institutions, non-Parties and with organizations and institutions of non-Parties, and conclude agreements or arrangements with them to this effect".

As of December 2023, ITER has signed 109 Agreements with:

- International Organizations - 5
- Universities – 53
- National Laboratories – 28
- National Schools – 3
- Others – 20

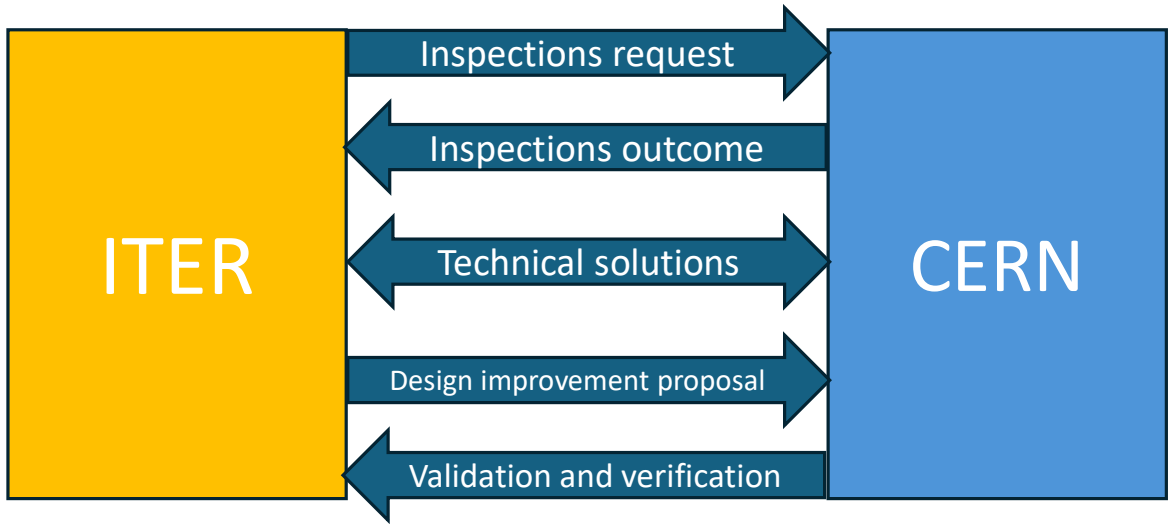
As of December 2024, ITER has signed 186 Agreements

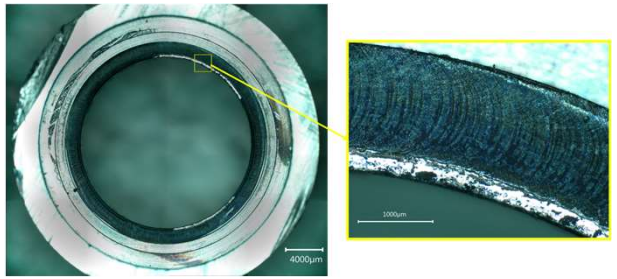
Materials engineering and welding inspections

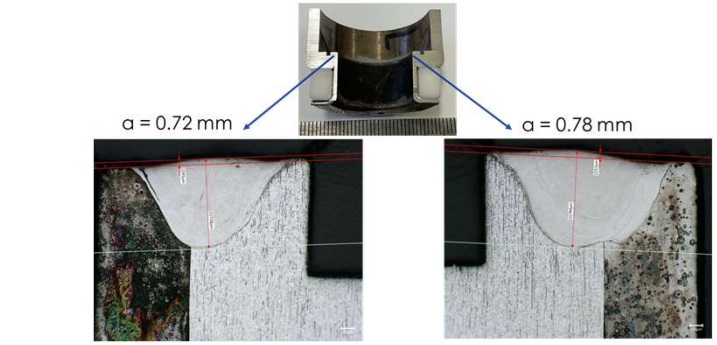
Case study: In-Vessel Coils' insulating breaks - structural failure while under test (erosion-corrosion test) – design does not meet requirements. Why?

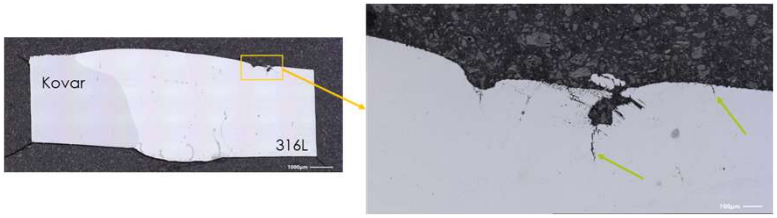
- Non-destructive examinations of ceramic vacuum-brazed joints (micro-Computed Tomography)
- In-depth visual testing and metallographic analyses of welds (post-mortem analysis and assessment of nonconformities)
- Root cause analysis
- Evaluation of technical solutions (two-way communication)
- Validation and verification of implemented design/manufacturing (solutions, improvement)

https://cernbox.cern.ch/s/I5q03Txaa2e4ECC









4. Private Sector Fusion Engagement Project (PSFE)

Private Sector Fusion Engagement Project:

The PSFE project consolidates a year of listening, brainstorming and planning that followed the ITER Council's November 2023 request for the IO to engage with private sector fusion initiatives, at a pace that will not compromise its core tasks, and in line with the ITER Agreement.

The driver has been a series of questions, asked and answered repeatedly:

- How can the IO help?
- How can we effectively match the pace of private-sector demand, in line with the rules of the ITER Agreement and within resource constraints?
- And what are the structures, platforms and channels best suited to delivering?

The PSFE Help Desk serves as the central coordination point for requests to access ITER documents, connections to ITER experts, and technical questions. Documents requested will be screened for defined criteria (e.g., export control restraints, protection of intellectual property), and the requesting entity will be asked to sign a-user agreement if the IO agrees to share the requested documents.

Technical visits by fusion startup companies can be requested through psfe@iter.org, or as before through visit@iter.org, and will be referred to specific ITER divisions or experts, depending on the technical scope of the request. The results of these activities will be tracked for efficiency and value delivered.

5. ITPA International Tokamak Physics Activity

ITPA:

The International Tokamak Physics Activity provides a framework for internationally coordinated fusion research activities.

This has resulted in the achievement of a broad physics basis essential for the ITER design and useful for all fusion programs and for progress toward fusion.

In the fall of each year, the ITPA, through its Topical Groups, prepares a report on the previous year's joint experiments and a proposal for a set of joint experiments for the coming year.

Discussions are progressing on how to enable private sector participation in the International Tokamak Physics Activity and its associated subgroups, including those focused on engineering topics.

6. ITER TECHNICAL REPORTS

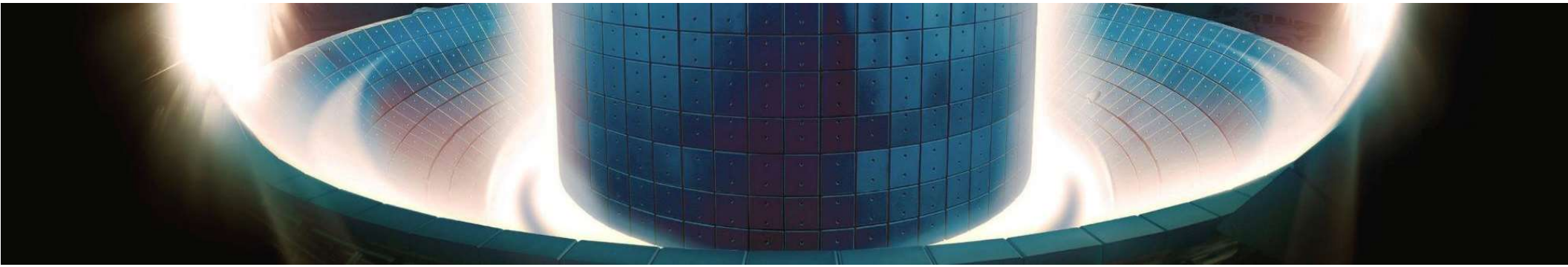
ITER TECHNICAL REPORTS:

ITER technical reports aim to make results of scientific and technical activities carried out under the ITER Agreement available to the public. Typically, they are versions of internal reports that have been deemed of interest for the wider scientific and technical community, but that have not been submitted for conventional publication in scientific journals, books, etc.

ITER has published 13 ITRs. In 2024, we published the following:

- *ITER Vacuum Handbook*
- *ITER Vacuum Handbook Appendices*
- *ITER Research Plan with Staged Approach*
- *Initial evaluation in support of the new ITER baseline and Research Plan*
- *Plant Control Design Handbook*

ITER Technical reports carry the following licence: CC BY-NC-ND 3.0 IGO

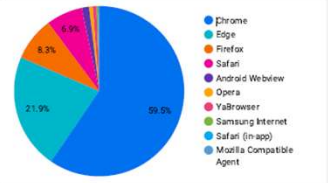


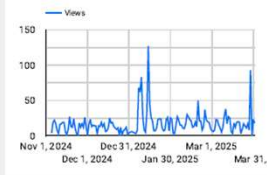
ITER Website - Technical reports

NEW Website

Nov 1, 2024 - Apr 1, 2025

Total users	Sessions	Views
1,678	2,480	2,535





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5.	Japan	134
6.	Italy	118
7.	India	116
8.	Spain	106
9.	Romania	89
10.	Germany	74

1 - 67 / 67

	Session source	Views
1.	google	1,001
2.	(direct)	980
3.	bing	191
4.	cn.bing.com	90
5.	iaea.org	57
6.	chatgpt.com	28
7.	(not set)	21
8.	duckduckgo	15
9.	sciencedirect.com	12
10.	baidu	11

1 - 69 / 69

ITER Website - Technical reports

OLD Website

Jan 1, 2024 - Sep 30, 2024

Total users	Sessions	Views
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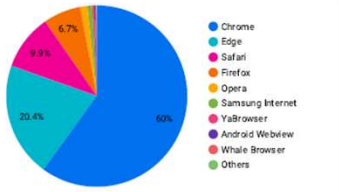

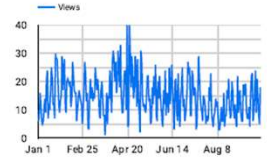

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4.	cn.bing.com	96
5.	iaea.org	79
6.	ipr.res.in	31
7.	baidu	28
8.	duckduckgo	24
9.	euro-fusion.org	17

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INTERNATIONAL ITER BUSINESS FORUM

THANKS

TO BE PART OF THE WORLDWIDE **FUSION** NETWORK

PLATINIUM SPONSOR SILVER SPONSOR SILVER SPONSOR BRONZE SPONSOR

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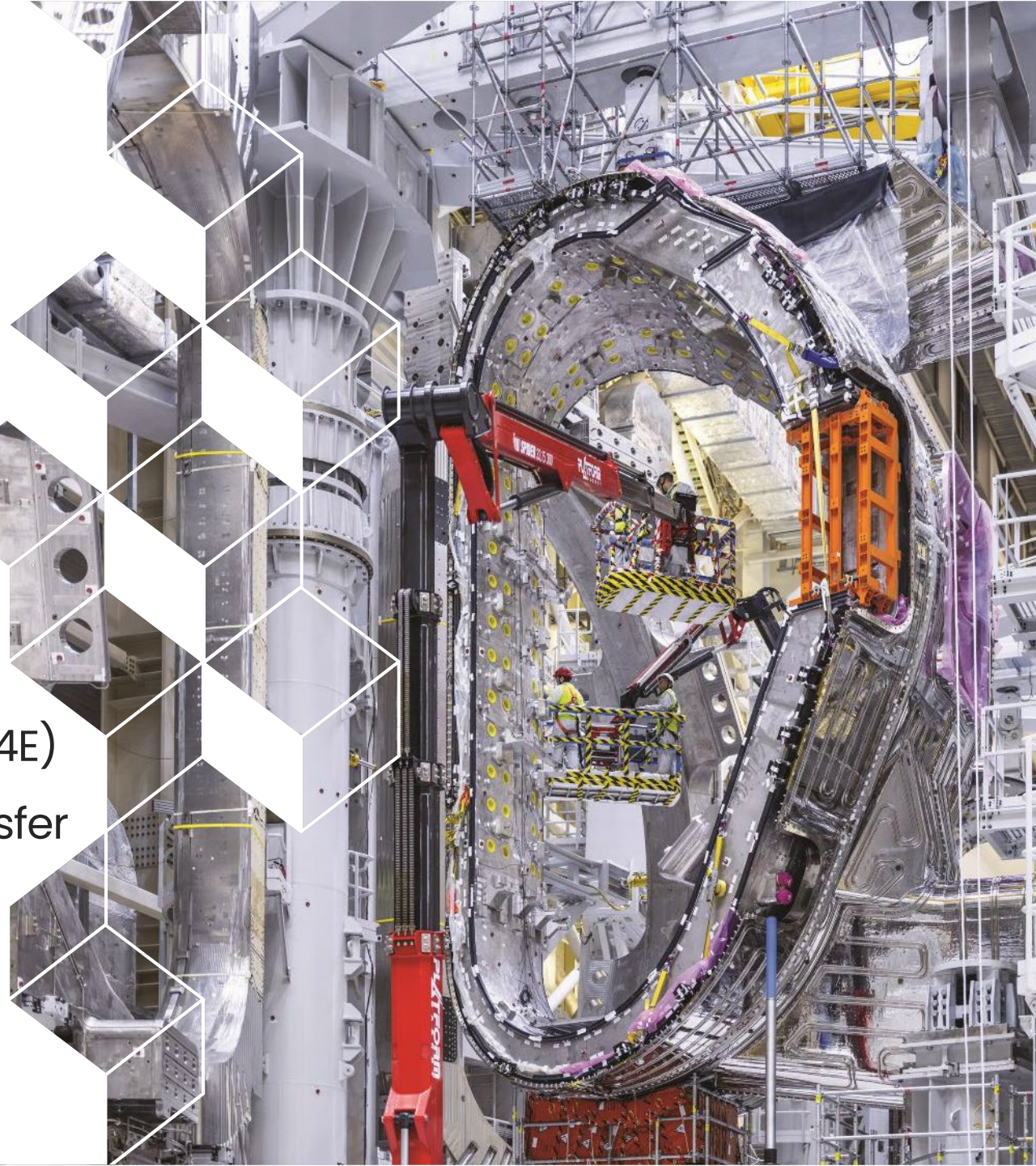
INTERNATIONAL ITER BUSINESS FORUM

Technology Transfer & EU Fusion Supply Chain



FUSION FOR ENERGY

Carmen Casteras, Benjamin Perier (F4E)

Market Analysis IP & Technology Transfer

FRIDAY APRIL 25th

F4E: Key Contributor to ITER & EU Strategy on Fusion

- EU Joint Undertaking based in Barcelona with Offices also in France, Germany and Japan
- Staff: ~465 highly competent team of engineers, project managers, legal, procurement, IP and specialized administrative staff
- Budget: €5.6 billion 2021-2027
- F4E Director: Marc Lachaise
- Main role is to provide the European contribution to ITER, but also involved in other projects to develop fusion and to promote European Industry

Strategic Vision

F4E Strategic Vision: Looking to the future

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

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

We help create a competitive European Fusion Industry

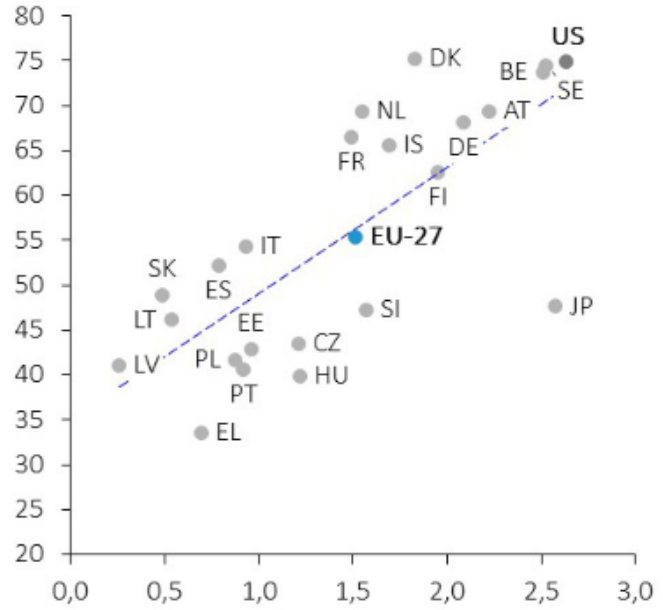
Draghi report on innovation

"Nuclear fusion is a disruptive technology that holds the potential to revolutionize the energy landscape in the second half of this century."

The impact of research and innovation

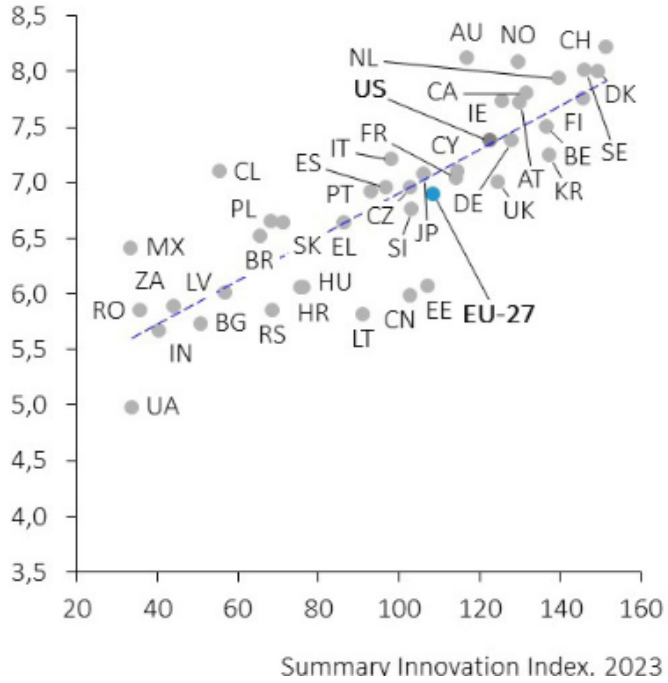
R&I investment and productivity

Labour productivity, 2021



Innovation capacity and well-being

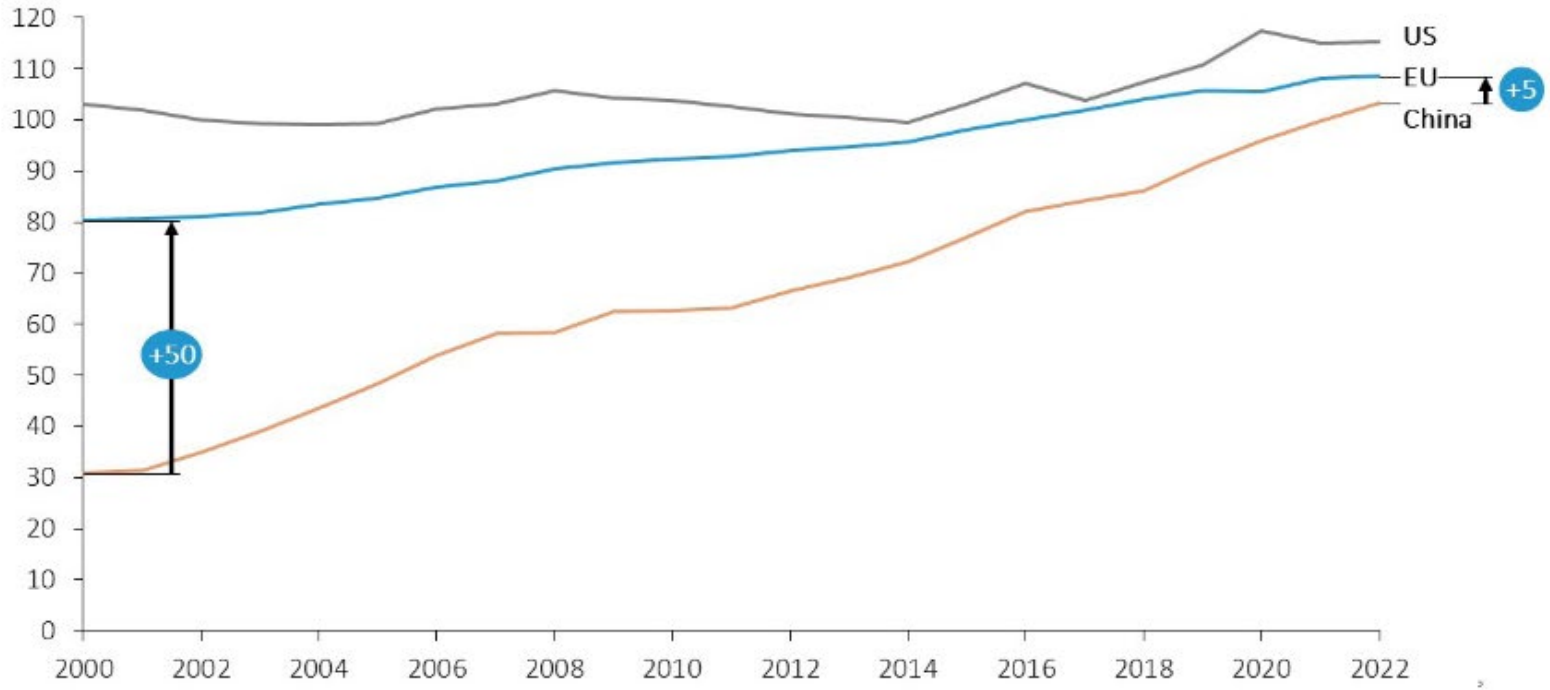
Where-to-Be-Born Index, 2023



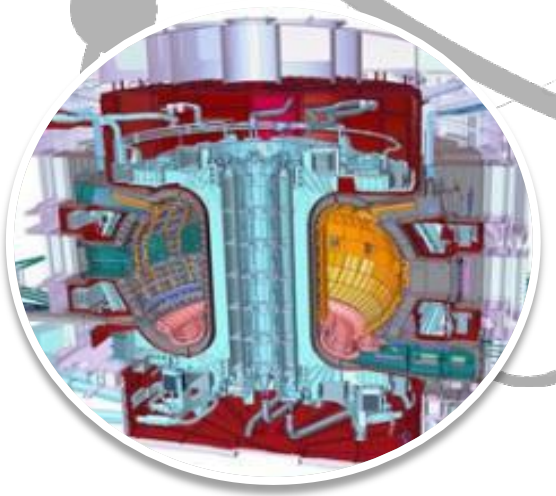
Draghi report on innovation

Evolution of the innovation performance of the EU and its main competitors

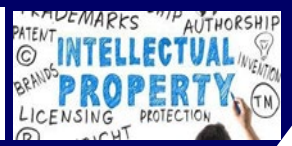
European Innovation Scoreboard



Market Analysis
IP & Technology Transfer



Pre-procurement



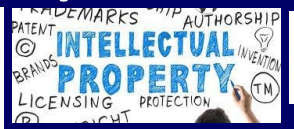
Procurement strategy

Call For Tender

Contract

Post-procurement

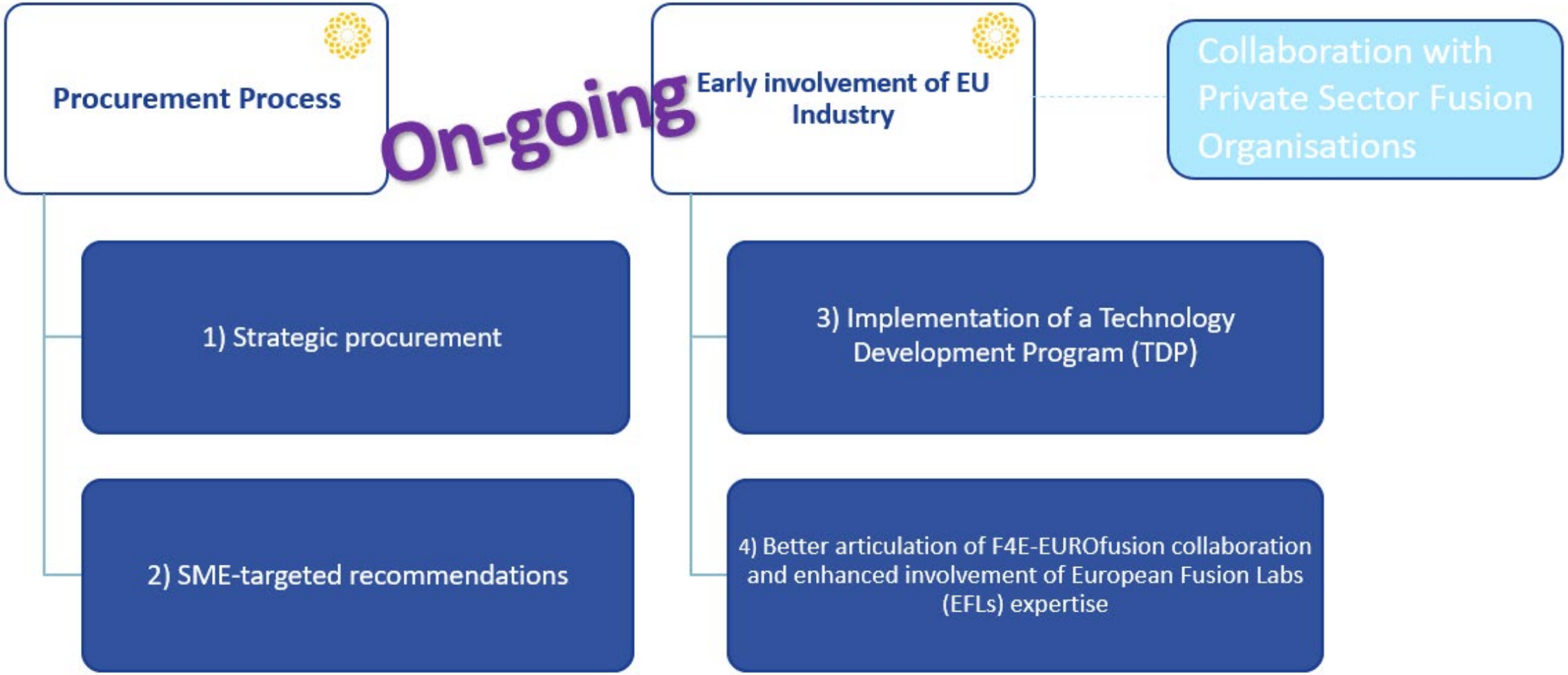
F4E CONTRACTORS' ASSESSMENT
Market Intelligence Group



FUSION FOR ENERGY | TECHNOLOGY TRANSFER MARKETPLACE

F4E SUPPLY CHAIN
Fusion industry
Market Intelligence Group

Industrial Policy Implementation Plan

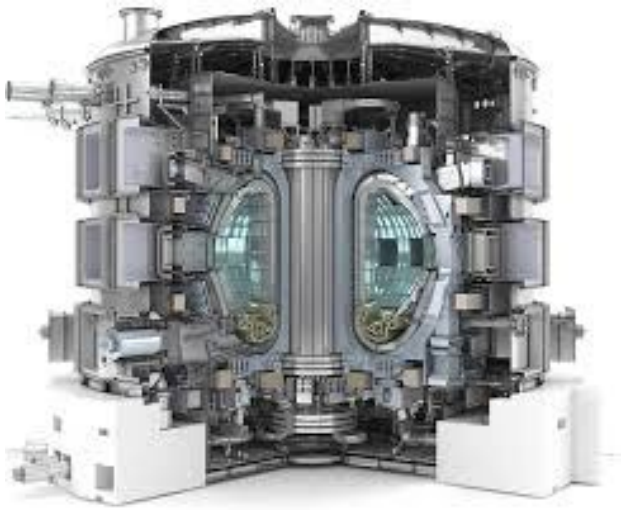


EU Fusion Industry – more than essential

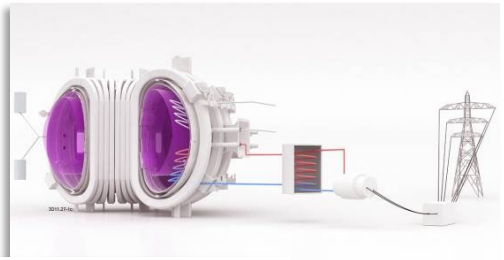
Contract
ITER - F4E

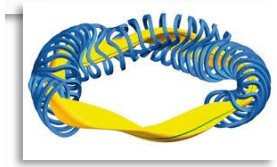
Market Analysis & IP

Contract
F4E – EU Industry



F4E SUPPLY CHAIN
Fusion industry
Market Intelligence Group

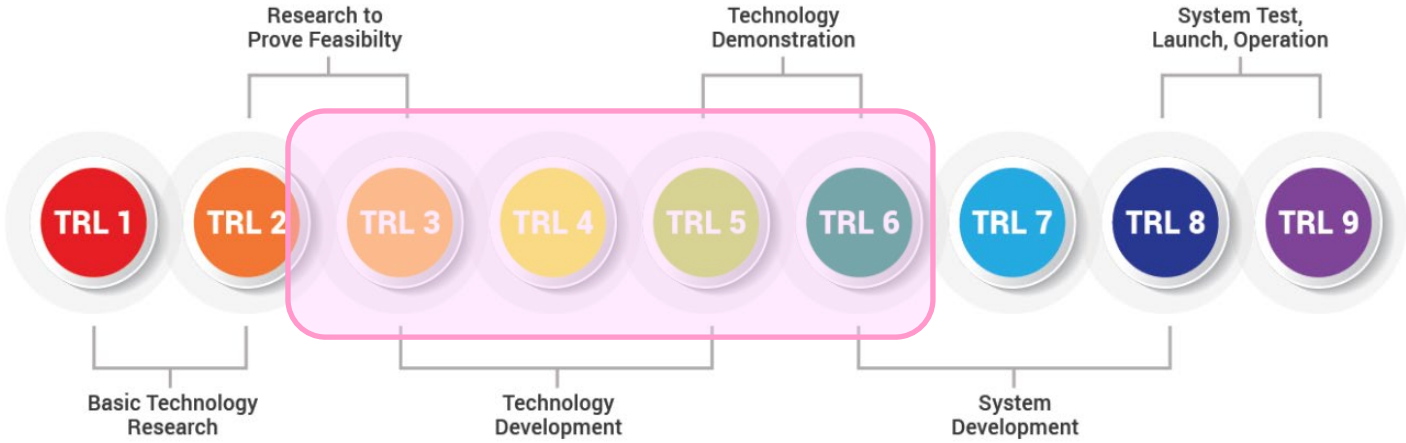




Innovation: F4E Technology Development Program

- **Eases availability of fusion key enabling technologies** (right technologies at the right time)
- Promotes strategical technology actions for future-proofing **competitiveness of European industry**
- Addresses critical technologies gaps for European fusion technology **non-dependence**
- Contractor becomes owner of the IP in exchange for **commercial exploitation of the technology**

Inspired by ESA



Innovation: Collaboration with Private Sector

- Meetings and on-site visits are under preparation

NOVATRON

Proxima Fusion

Eni

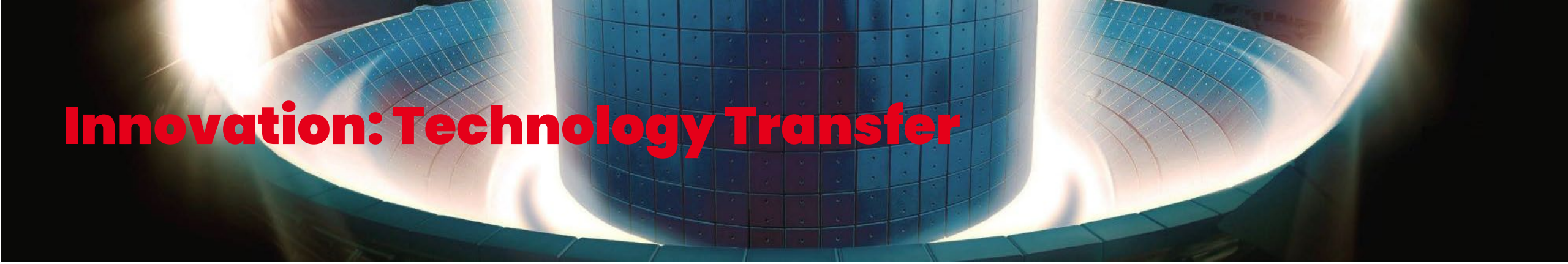
KYOTO FUSIONEERING

SICA nucléaire
Inspection , Conseil , Audit , Formation

Oliphant Fusion

IBERIA

TVP



Innovation: Technology Transfer

INNOVATION TO BOOST COMPETITIVENESS:

EUROPE SHOULD BECOME THE PLACE WHERE TECHNOLOGIES ARE:

- **INVENTED,**
- **MANUFACTURED,**
- **AND PUT ON THE MARKET**

EUROPEAN COMMISSION

Brussels, 29.1.2025
COM(2025) 30 final

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE EUROPEAN COUNCIL, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

A Competitiveness Compass for the EU

F4E Technology Transfer Programme

Commercial use of our fusion technologies by the Industry in the market
→ *to foster European Innovation and Competitiveness in key emerging technologies*.

- Budget 2024-2027: 680K

- KPI:
  - **Success Stories** portraying the creation of spin-offs, the increase of competitiveness, growth, business, and creation of jobs resulting from the use of F4E Technologies in non-fusion applications.

  = **Positive IMPACT of the ITER/BA/DONES projects on Society, ROI today**

Tech Transfer – What is it about?

Doing the match between Technology Offers & Market Needs

Developers of F4E technologies looking for new markets

FUSION FOR ENERGY | TECHNOLOGY TRANSFER

Connecting fusion & non-fusion ecosystems

Proactive support from Technology Transfer Brokers

Industry looking for innovation (new technologies, new products)

Tech Transfer – the team

Teamwork

- F4E staff members (IP, Technical colleagues, Communication, IT)
- F4E Industrial Partners
- F4E Brokers Viromii
- F4E Industrial Liaison Officers

- EUROfusion →Joint efforts F4E-EUROfusion to offer to the Industry a unified European source of fusion technologies

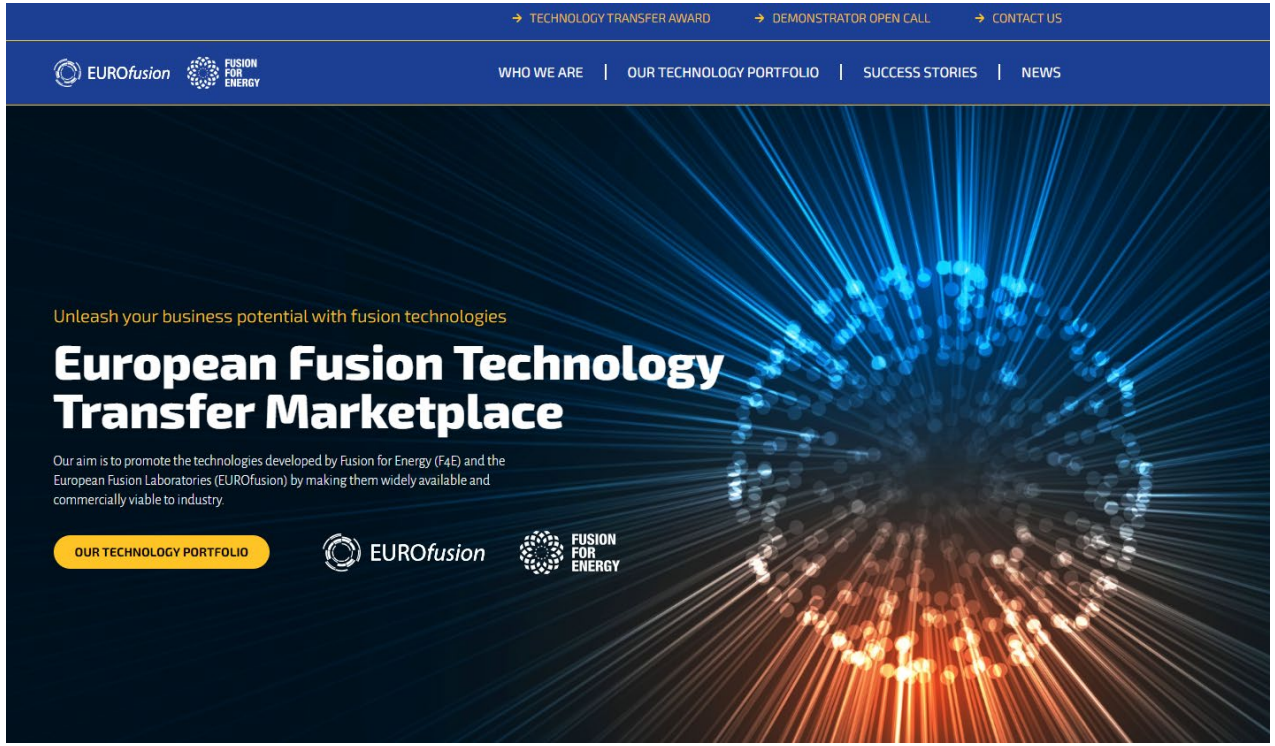
- EIROforum →Exchange of best practices

Common Stakeholders: European Industry and Society

Tech Transfer – the Sales & Marketing Tool

The Fusion Marketplace

https://fusion-technology-transfer.europa.eu/



869 visits since September 2024

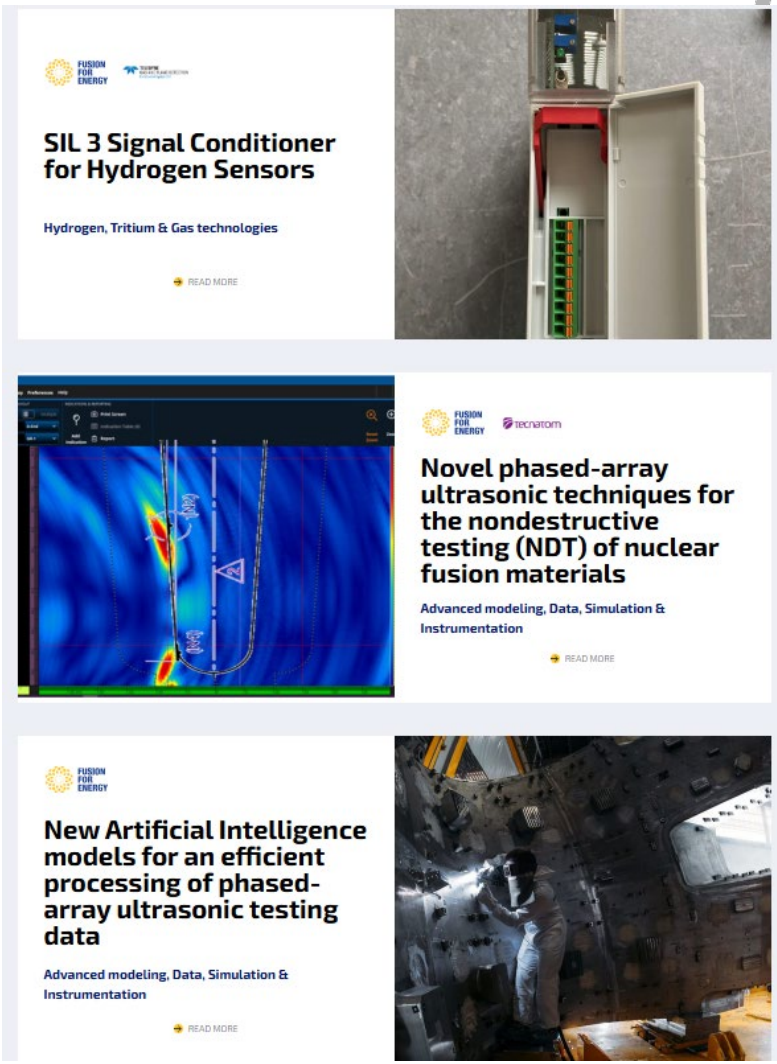
Tech Transfer – the Joint Portfolio

European Fusion Joint Portfolio

Industry & Laboratories

EUROfusion

FUSION FOR ENERGY



Tech Transfer –Joint Portfolio (EUROfusion and F4E)

Technologies in Portfolio

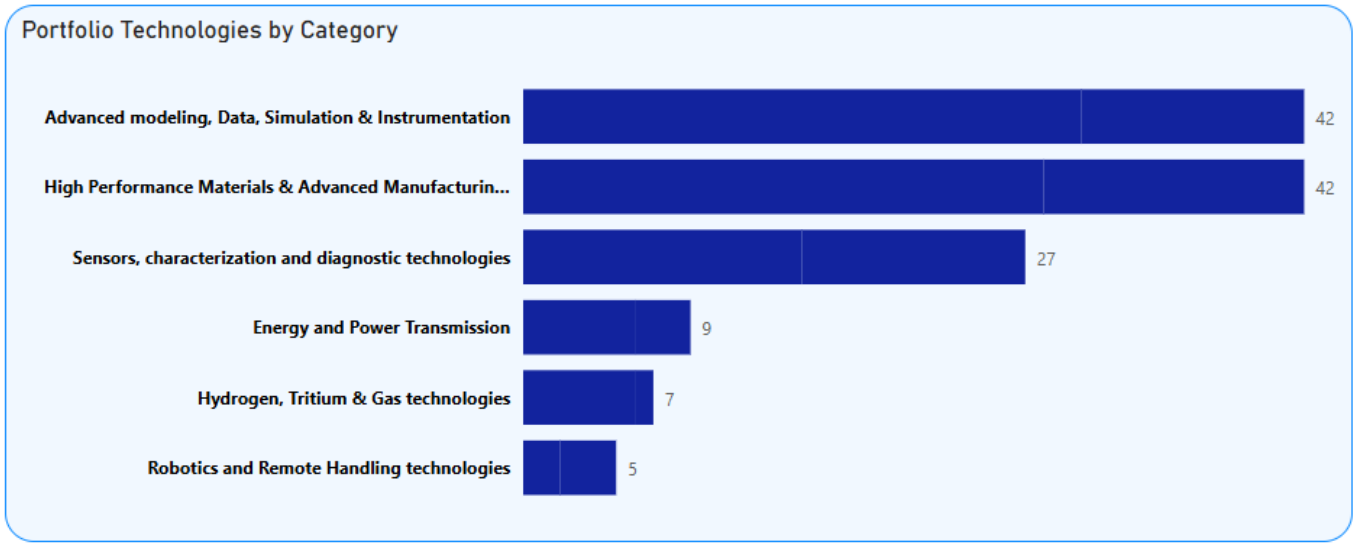
125

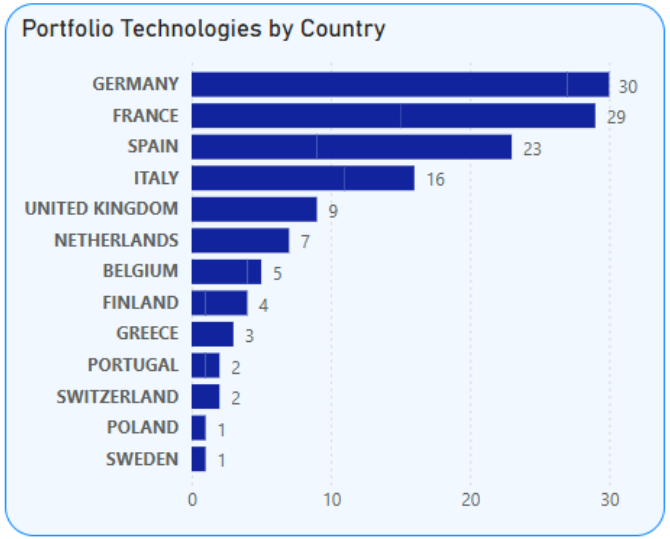
Companies

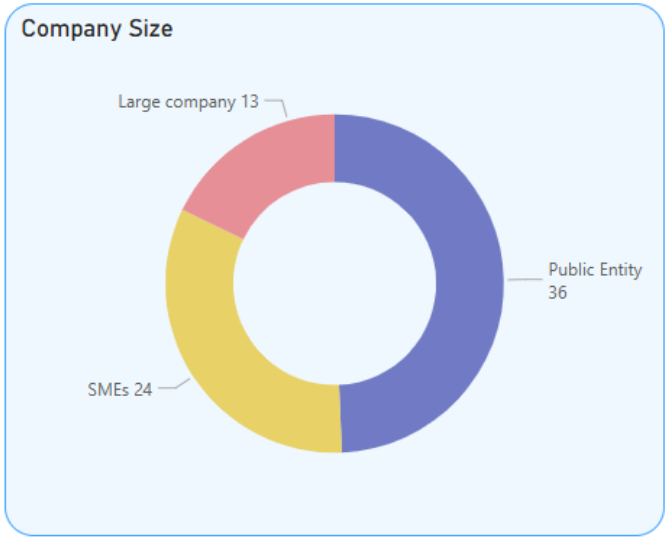
73

Countries

13







Tech Transfer – Technologies coming from F4E activities

Technologies in Portfolio

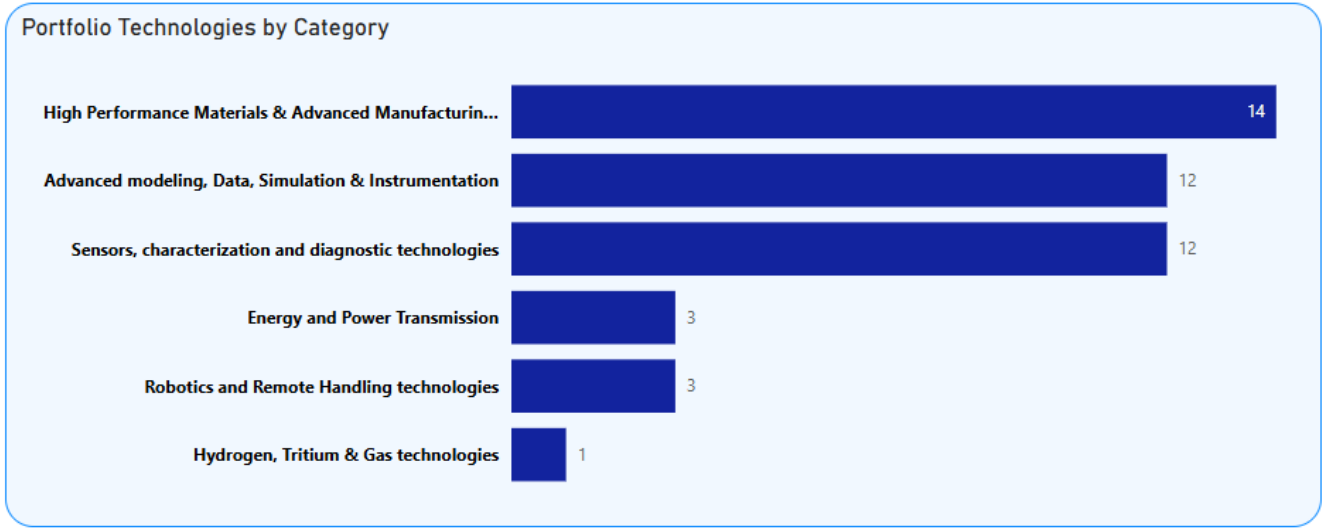
44

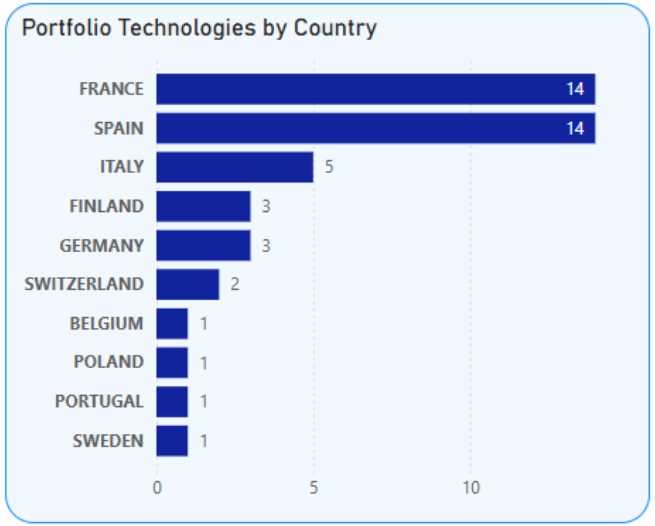
Companies

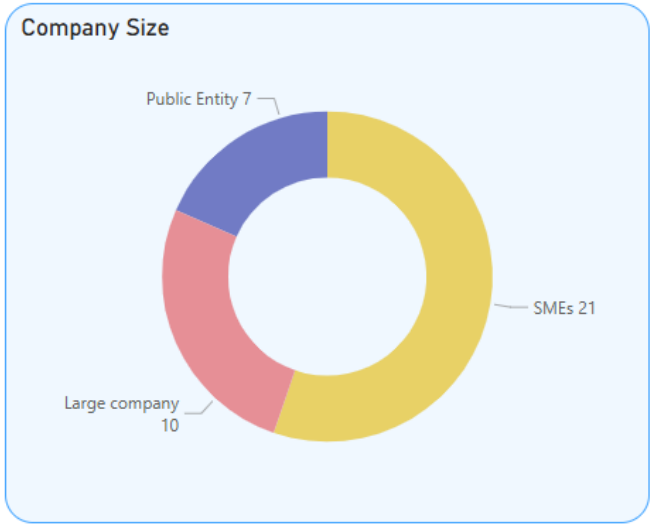
38

Countries

10







Tech Transfer – the Process

Identification of the Technology and its developer (F4E's Contractor)

- F4E identifies a Technology and talks to the company that developed it.

The company decides if it wants to exploit the Technology

- The company is willing or not to use the Technology outside ITER/BA/DONES.

A Technology Offer is prepared and uploaded on the Marketplace

- F4E + Brokers (+ F4E Contractor) prepare and publish a 'Technology Description'.

Commercialization Plan for the Technology

- Specific promotion and brokerage actions to facilitate the exploitation of the Technology.

An IP Licence Agreement may be needed

- F4E IPO may have to grant an IP Licence agreement.

Brokerage activities

- Brokers to find companies that could incorporate the Technology in their products/processes or may need the services offered by the F4E Contractor based or may want to collaborate with the F4E Contractor.
- Brokers to support F4E Contractor to open a new business line based on the Technology.
- F4E Demonstrator Call; Investors.

Visibility, marketing tool.

- Visibility of the Success Story through social media, Marketplace, press.

Tech Transfer – the Funding initiatives to support innovation

Funding that fosters Success Stories

Fusion Technology Transfer Award 2024

This is a call for companies and research organisations that use fusion technologies in other markets, with a financial reward for the best project. Seize this opportunity to showcase your innovation and join a community pushing the frontiers of technology.

APPLY NOW

Demonstrator Open Call

We invite innovative companies to transform fusion technologies into market-ready solutions. This open call offers you funding to make the transition. Submit your project proposal and let us help you make an impact!

APPLY NOW

Demonstrator Call 2025

Accelerating technology transfer by funding promising projects

Demonstrator Call 2025

Open Call for Fusion for Energy Tech Transfer Demonstrator Project Proposals

Application period: From the 10th April to 30th June

Webinar
3rd June at 11:00 am

Call for Expression of Interest Invitation for EUROfusion Tech Transfer Demonstrator initiatives

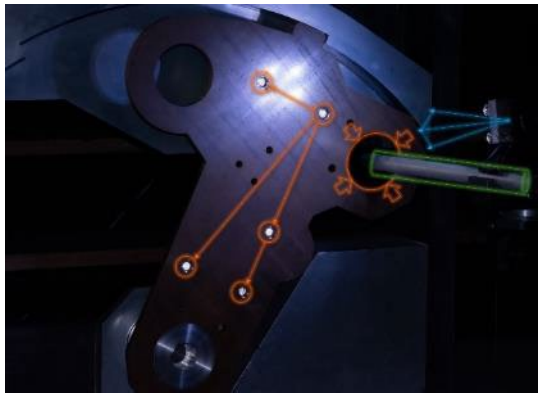
Application period: From the 10th April to 30th June

Demonstrator Call – Winners

Operview

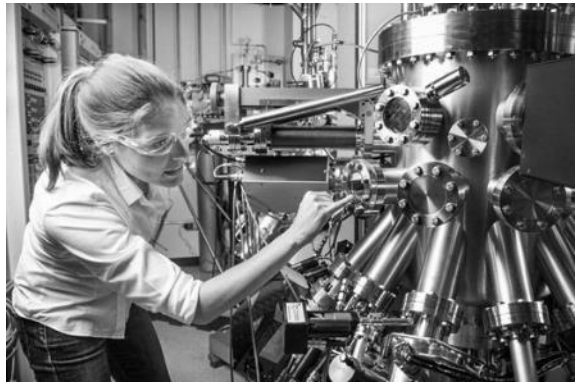
2024 winner

Operview is adapting the 3D Node system (an ITER remote vision system) to teleoperate mobile work machines (tractors, excavators, etc.)



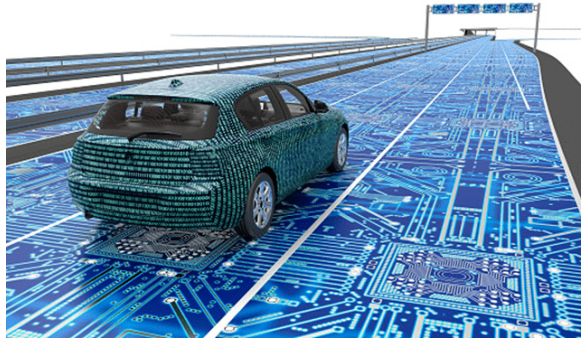
2023 winner

DAES adapted a software developed for ITER to open new business perspectives in conventional fission nuclear power plants



2022 winner

VIA Electronic adapted an interconnection technology applicable to high temperature peaks (700°C) to offer new competitive products for power electronics, LED and sensor applications



Technology Transfer Award

Rewarding the commercial use of fusion technologies in non-fusion markets

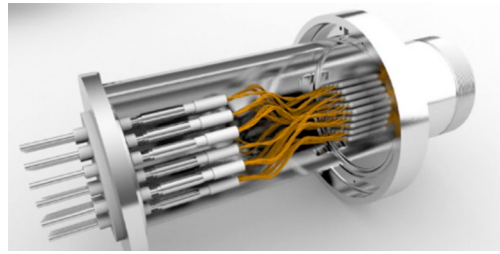
Technology Transfer Award – Winners

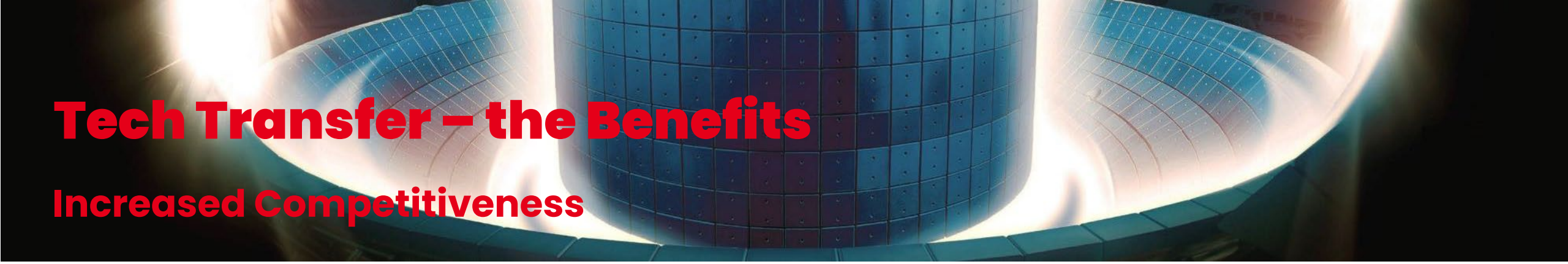
2024 winner
ICAS wins Fusion Technology Transfer Award for their superconductor cables

2023 winner
CEA wins Fusion Technology Transfer Award for a contribution to safer hydrogen-powered aircrafts

2022 winner
Tampere University for its efforts to address blind spots issues in mobile machinery with a novel 3D machine vision system developed for ITER

2021 winner
ITER electrical connectors open a new market for VAC-TRON in the Oil and Gas industry





Tech Transfer – the Benefits

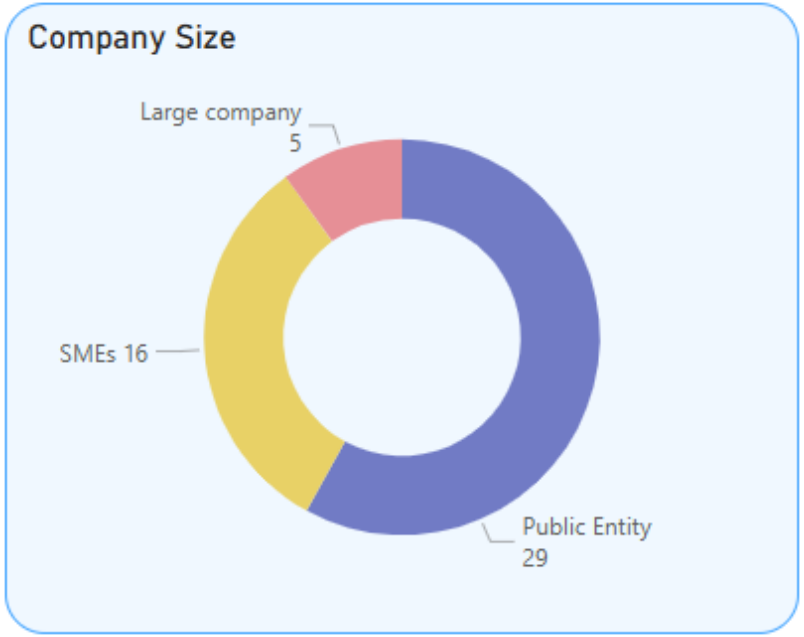
Increased Competitiveness

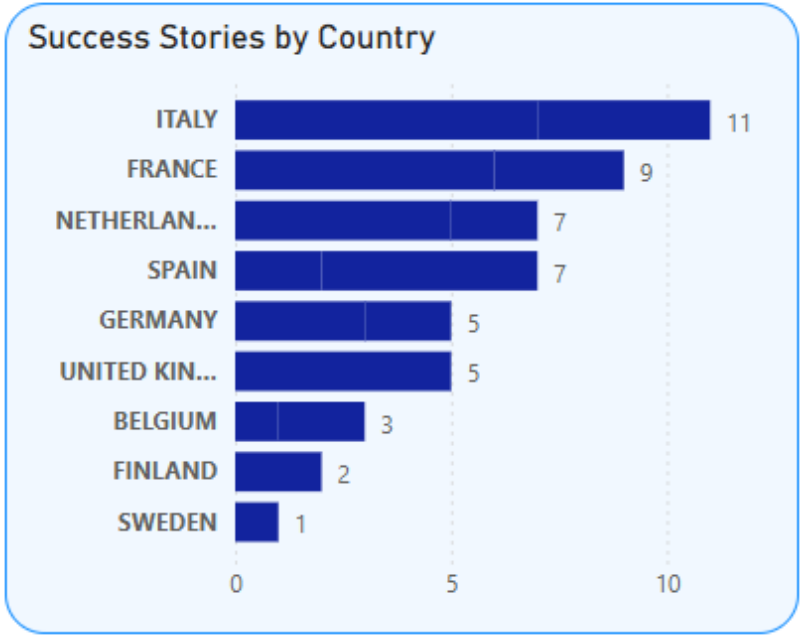
- new business (outside ITER/BA/DONES): new partnerships, new contracts
- new companies: spin offs/ start ups
- competitive advantage to enter a market
- competitive advantage to keep their market share:
  - → innovation of products and services
  - → improved quality
  - → improved project management skills
- creation of new jobs
- positive image (marketing): greater visibility, 'innovative company stamp'

Tech Transfer – the Results

European (EUROfusion and **F4E)** Success Stories

Success Stories	Companies	Countries
50	37	9

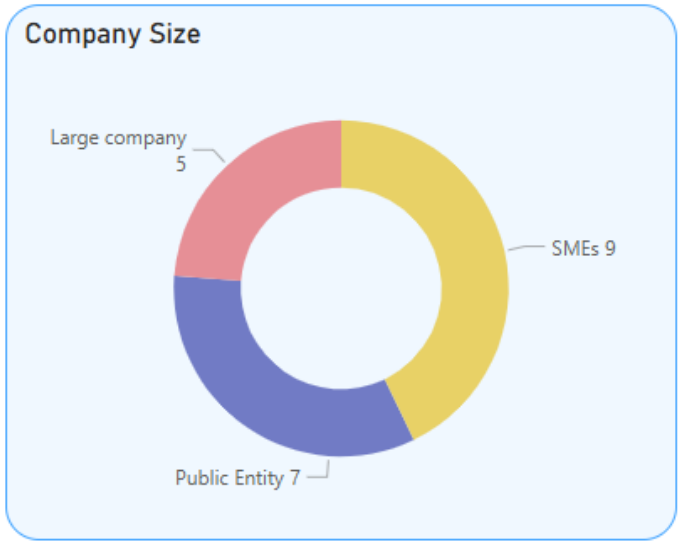


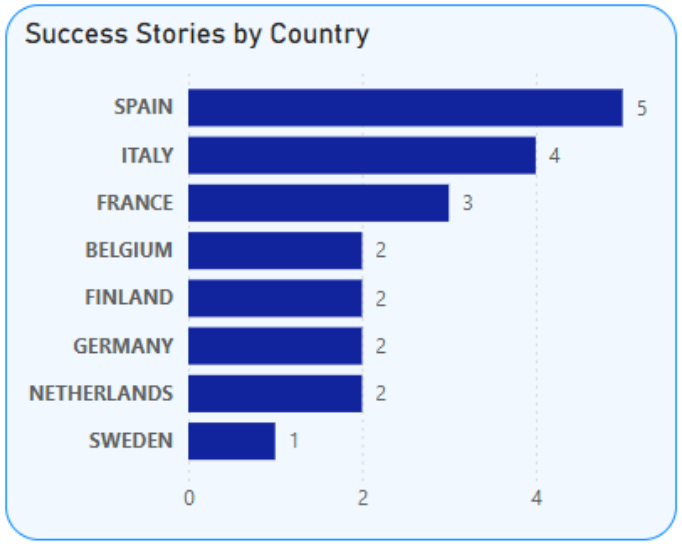


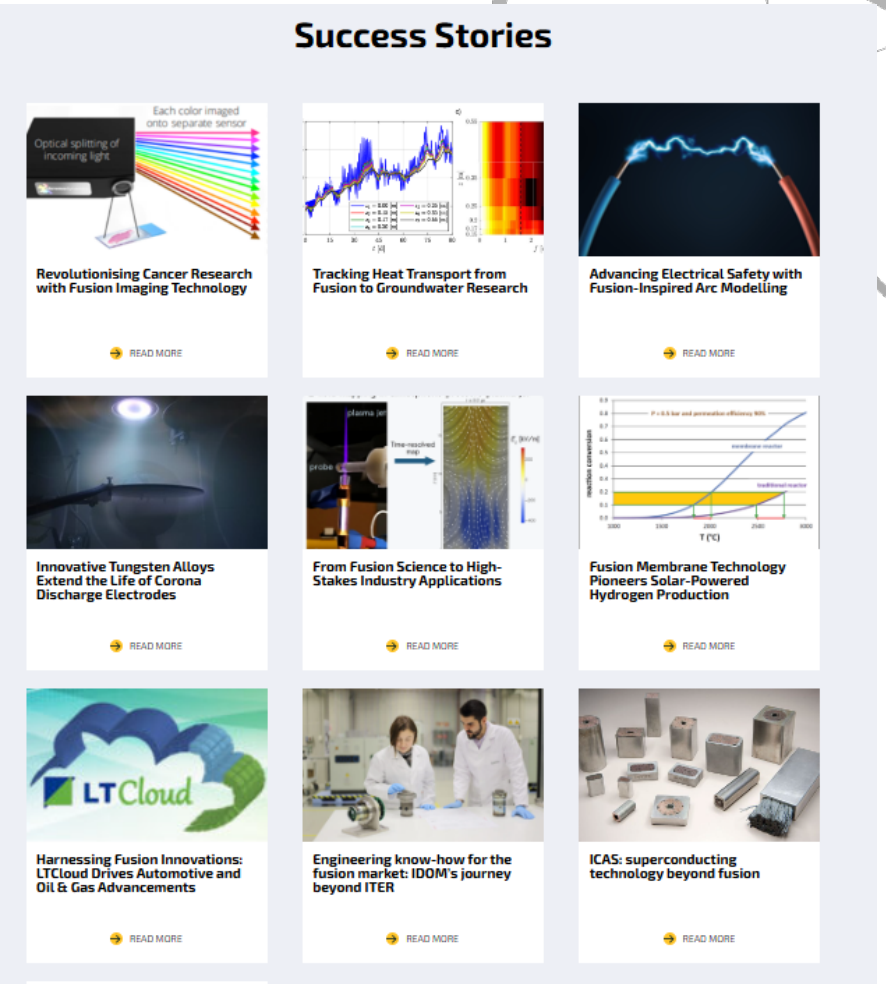
Tech Transfer – F4E Success Stories

How Fusion brings concrete benefits to the Industry

Success Stories	Companies	Countries
21	21	8







3 Success Stories per year

IBF/25
INTERNATIONAL ITER BUSINESS FORUM

THANKS

TO BE PART OF THE WORLDWIDE **FUSION** NETWORK

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Useful links:

Technology Transfer Portal
F4E Industry Portal
Partnership opportunities
Offer or Request a Partnership
F4E Supply Chain Registration