

IOD – INDUSTRIAL OPPORTUNITY DAYS

Torino, 12 – 13 giugno 2025

**A Global Perspective on
Fusion Development**
Leonardo Biagioni – F4E



A Global Perspective on Fusion Development

Leonardo Biagioni

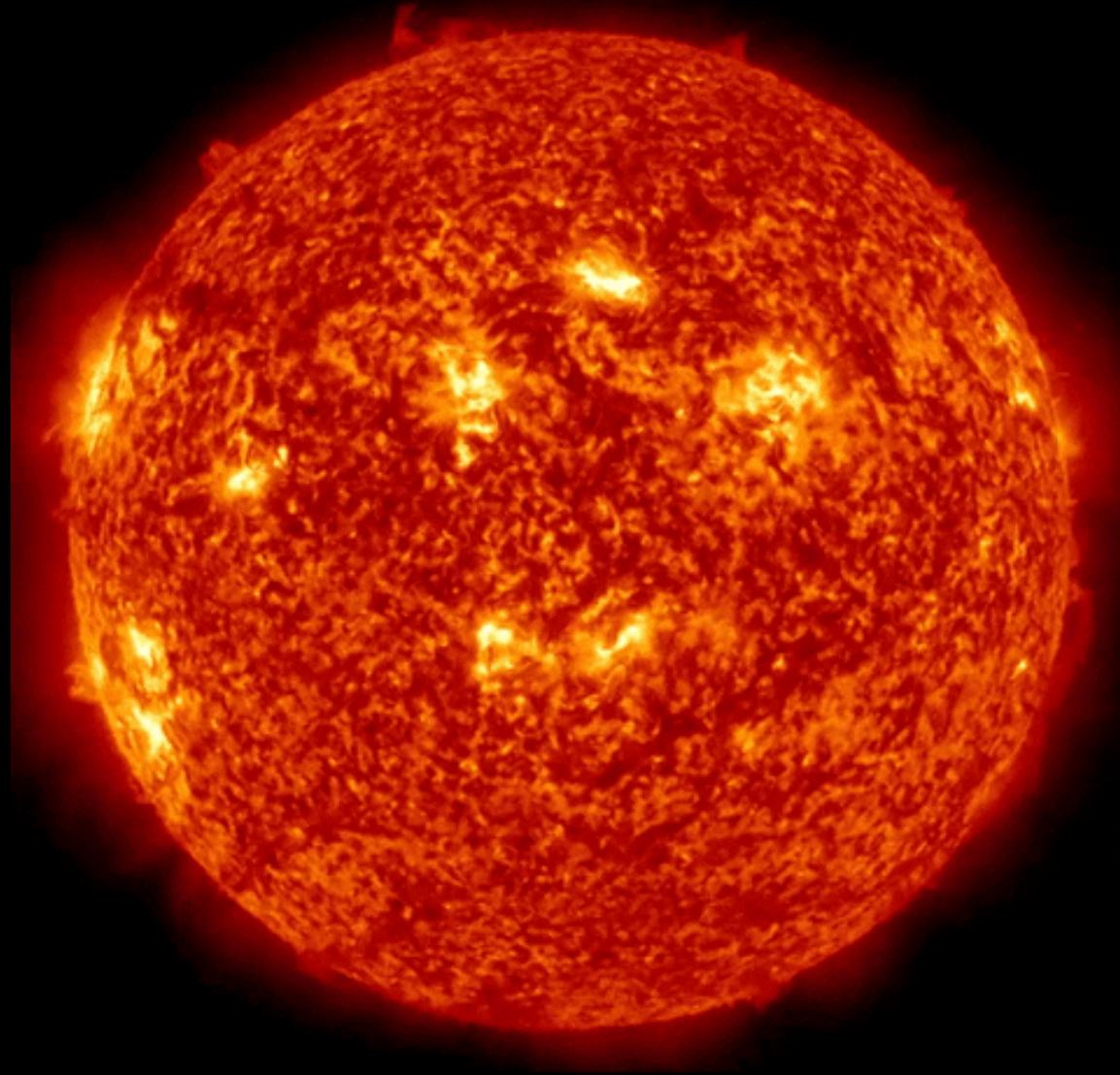
Head of Projects
Fusion for Energy

Torino, June 13 2025



Bringing
the power
of the sun
to earth

Fusion is the ultimate energy resource

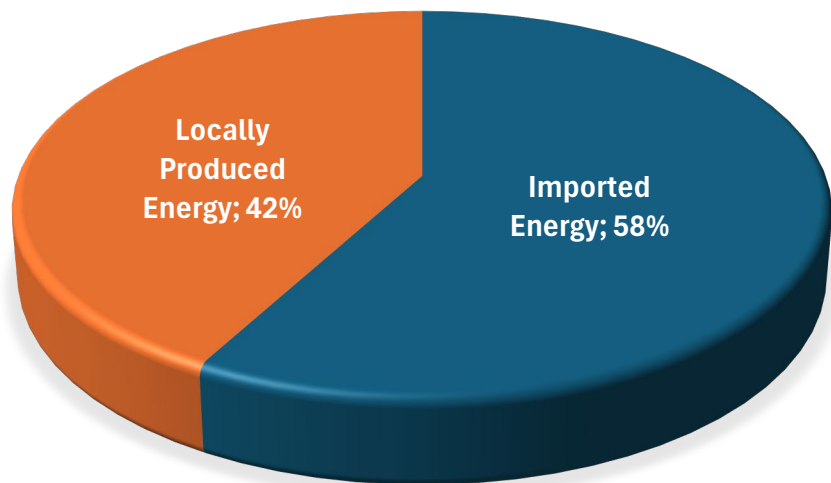


EU energy challenge

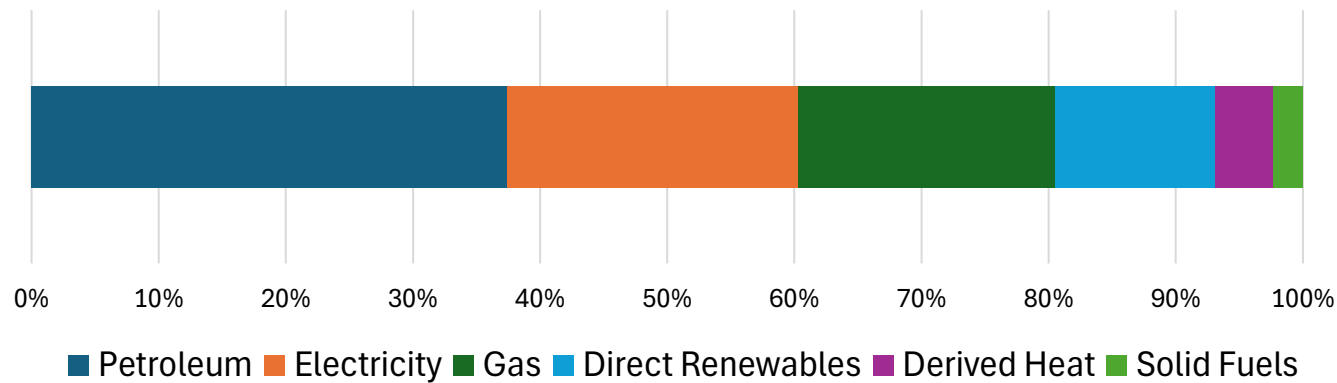
Our Reliance on Imported Fossil Fuels



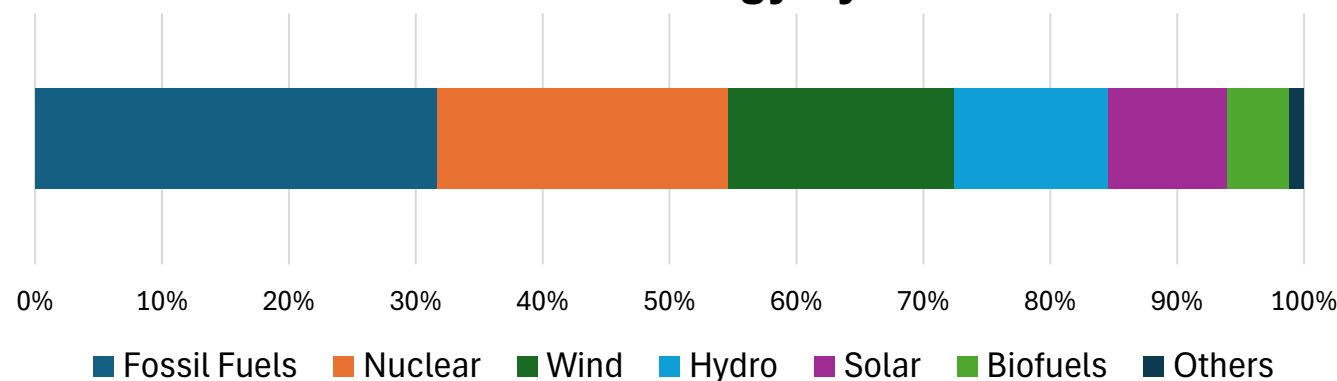
Energy Import Dependency



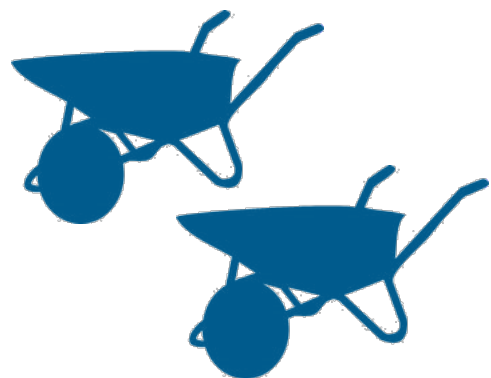
Share of Energy Products in Final Consumption



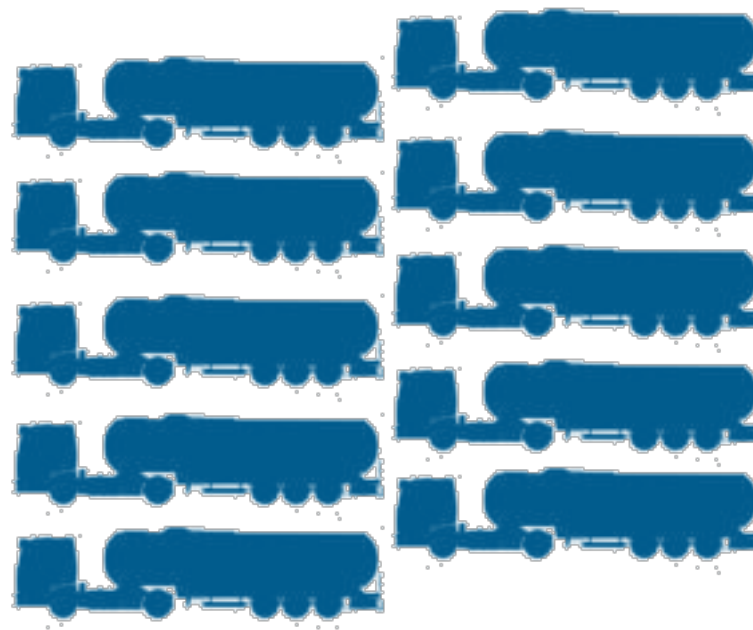
Production of Energy by Source



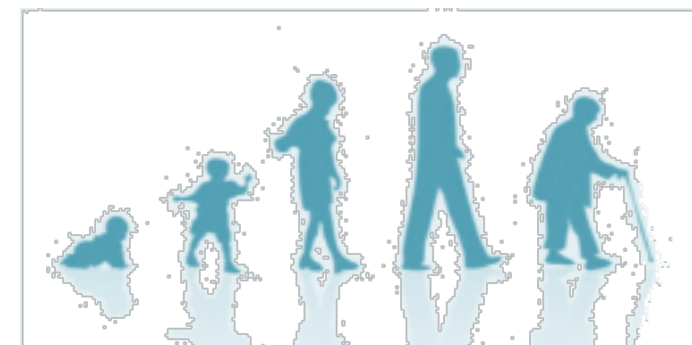
Why fusion will be an attractive energy source?



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280 liters of Earth crust
(50 g lithium)

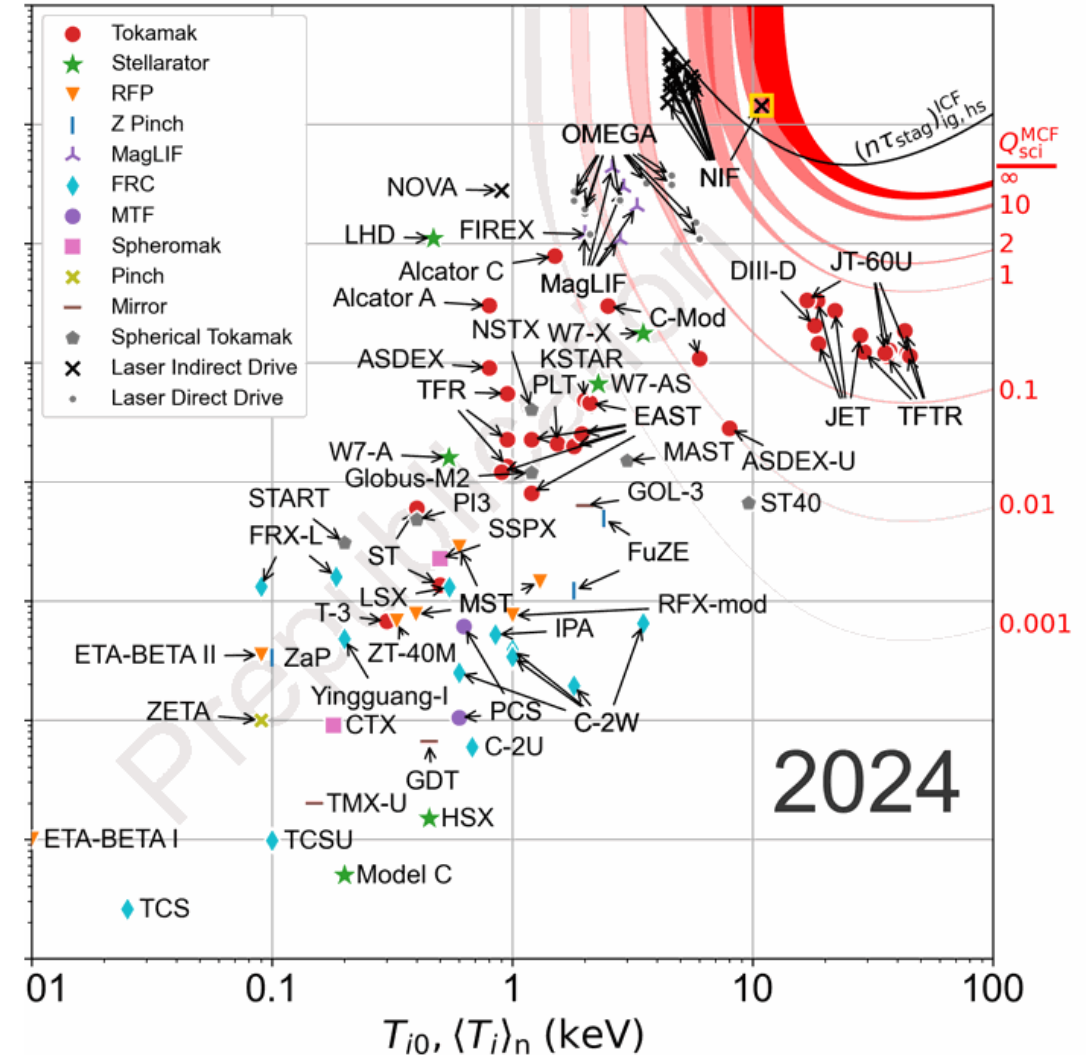
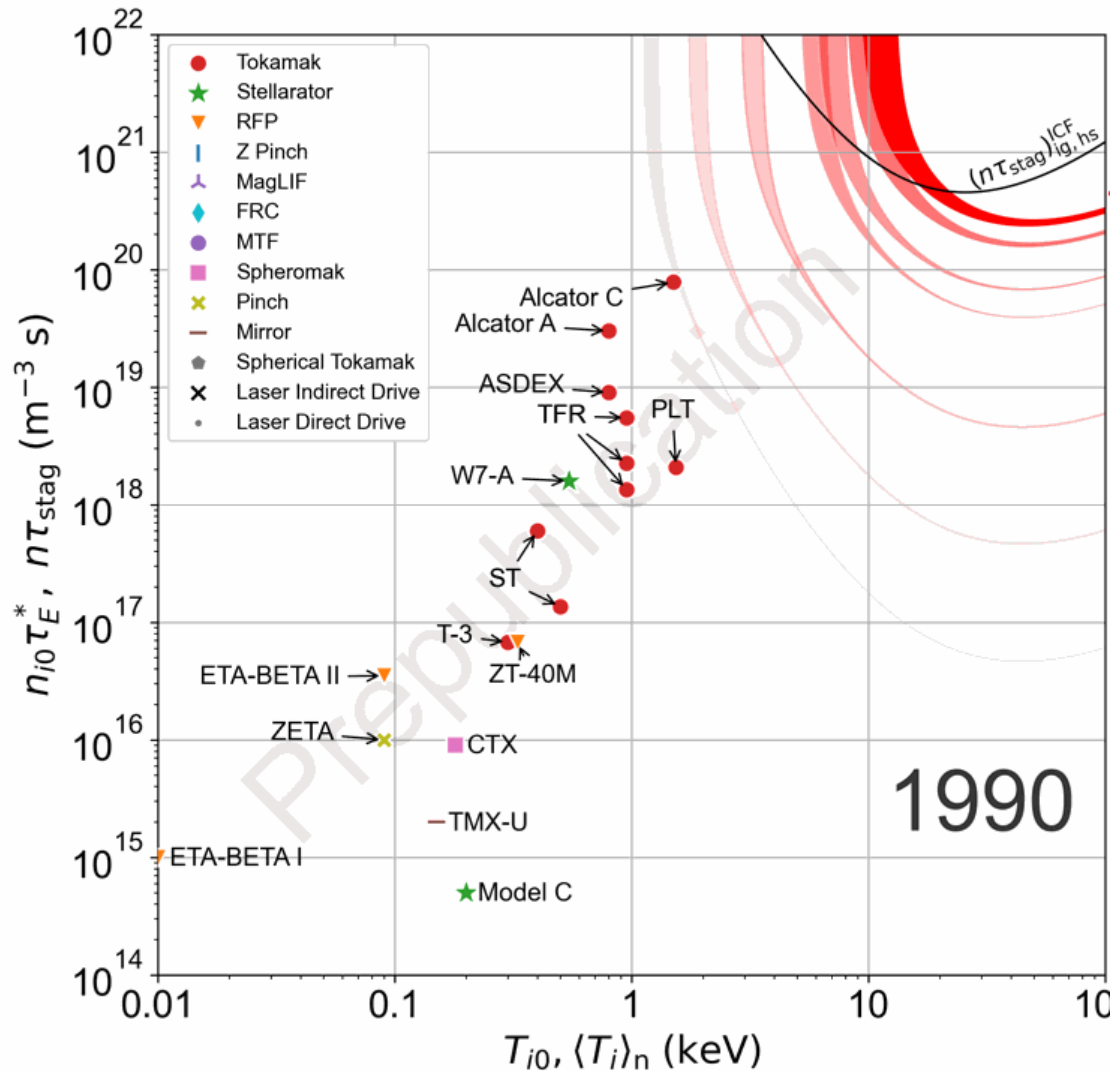
+ 400 liters of water
(12 g deuterium)

300 t of oil

**Total energy consumed
by average EU citizen
during whole life**

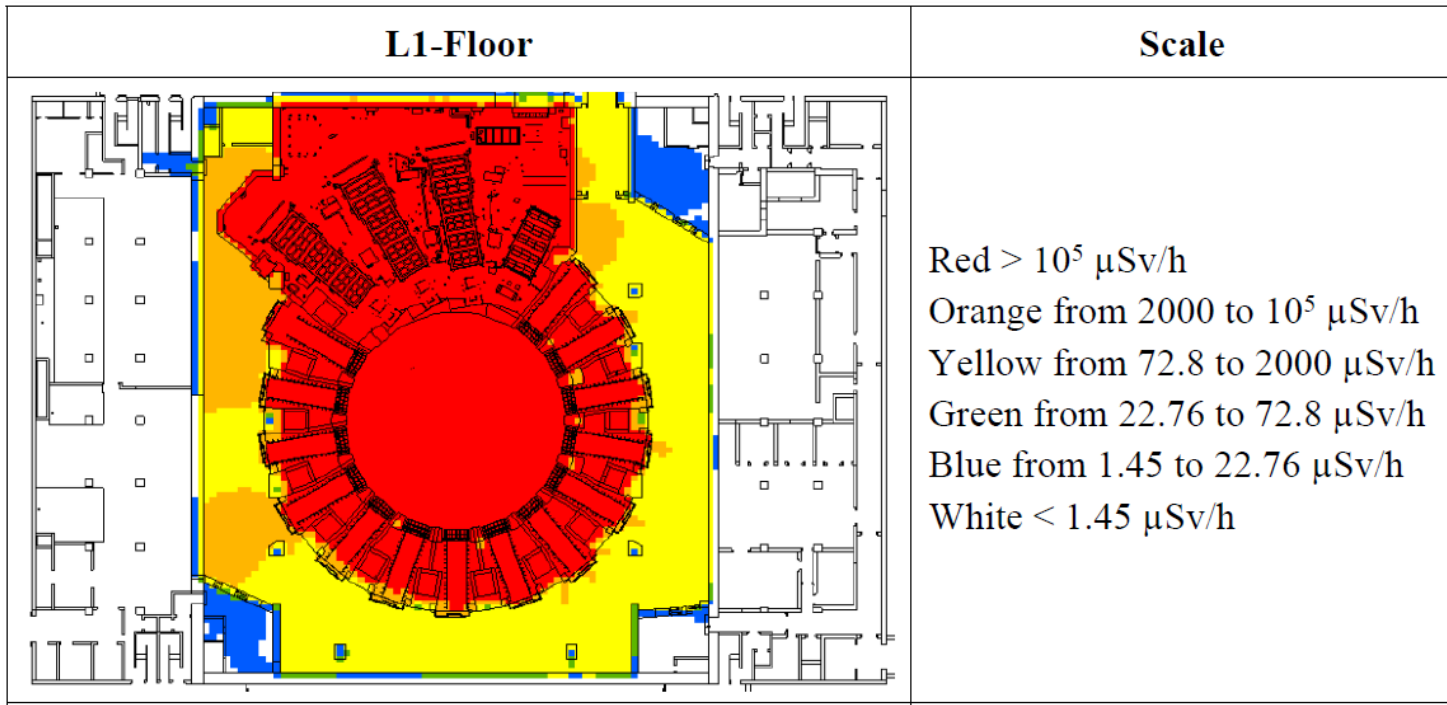
Where are we on the path to fusion energy?

Product of Density, Temperature & Confinement Time



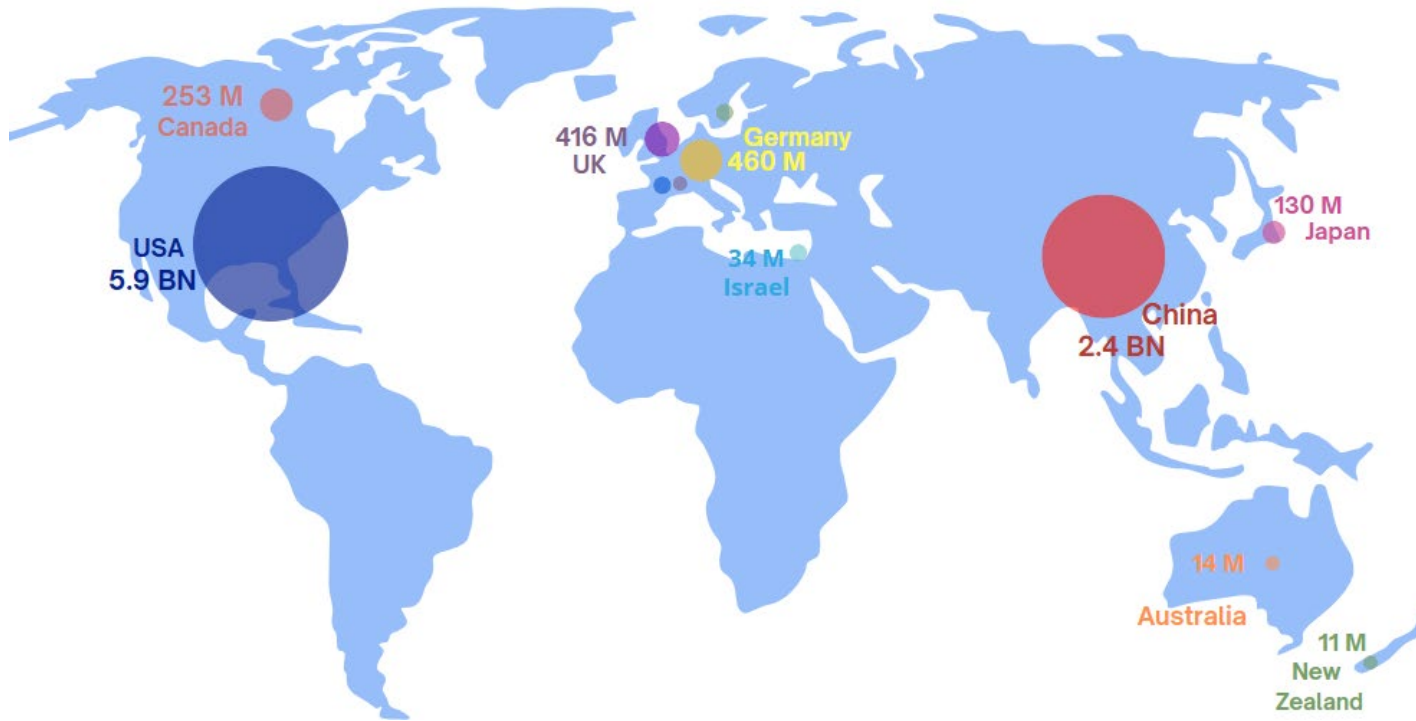
Progress toward fusion energy breakeven and gain as measured against the Lawson criterion, Papers from the 63rd Annual Meeting of the APS Division of Plasma Physics, June 2022

Gen-1 Fusion plants will be nuclear

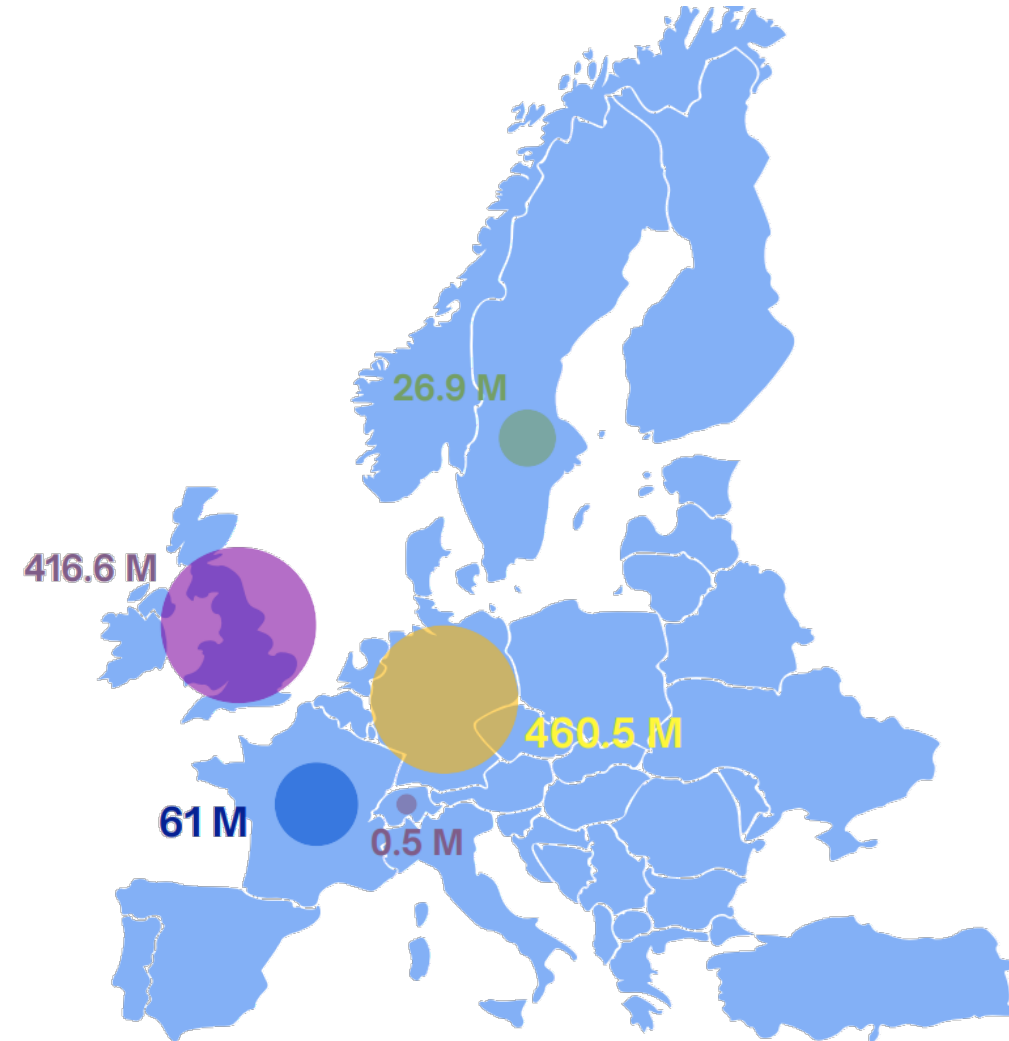


- Neutron flux during operation
- Tritium inventory management
- Operation, maintenance of irradiated/tritiated components
- Decommissioning, deactivation, disposal

Private sector fusion investment in recent years



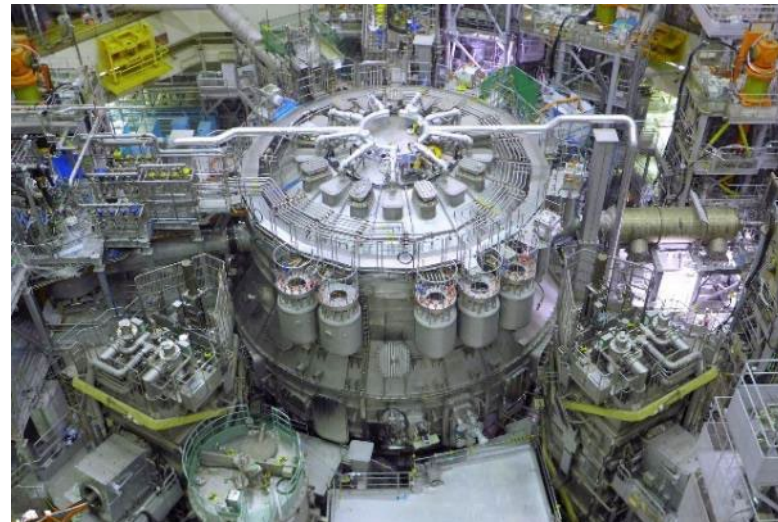
- Very fast growth of private investment
- Mostly US – is Europe desperately late?



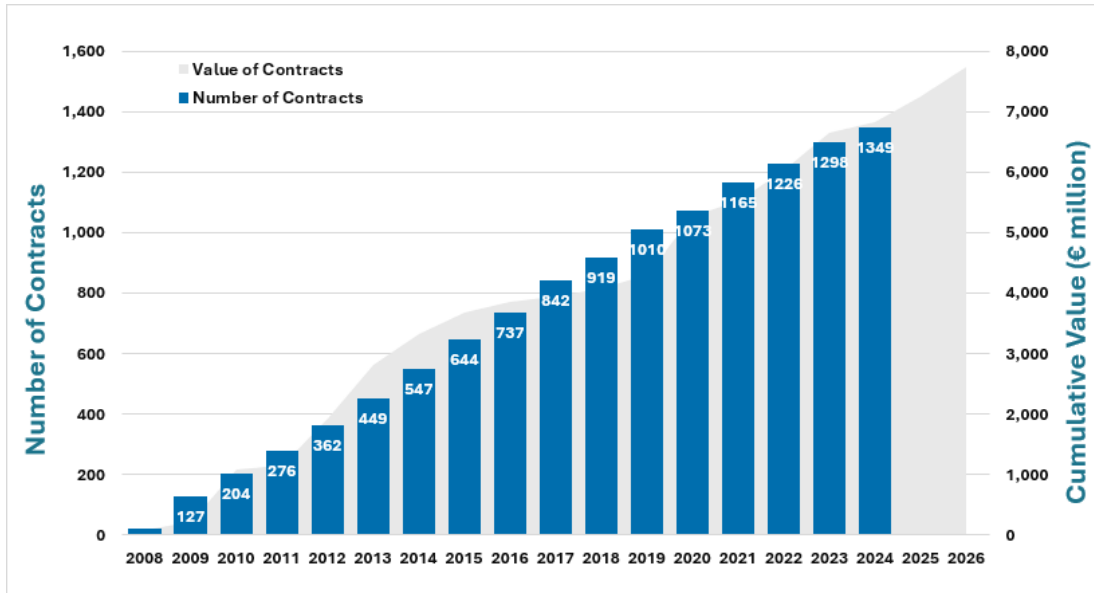
A different funding model – through ITER



European fusion supply chain is leading

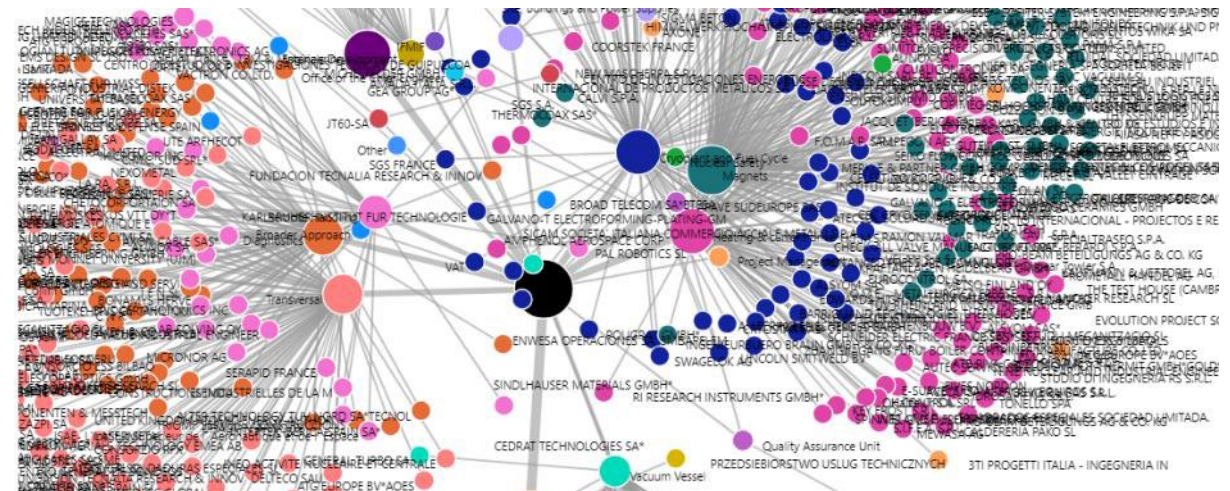


EU fusion industry for ITER



- Over € 10bn signed
- >1200 contracts
- >75 research organisations

- 2500 companies
- 200+ technologies
- 25 EU Countries
- ... and growing



- Fusion industry is rich in knowledge, technology & components providers

... but is poor in Systems Integrators

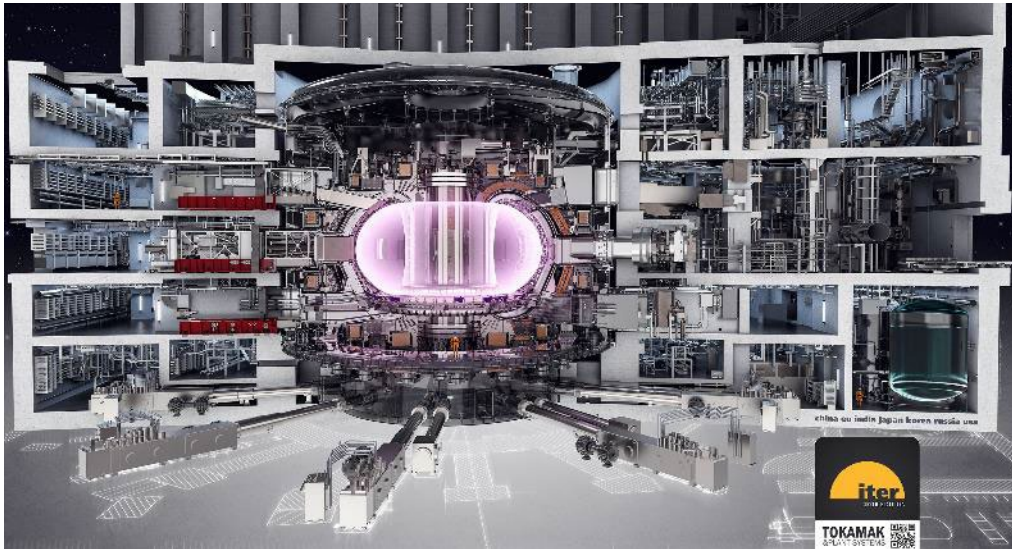
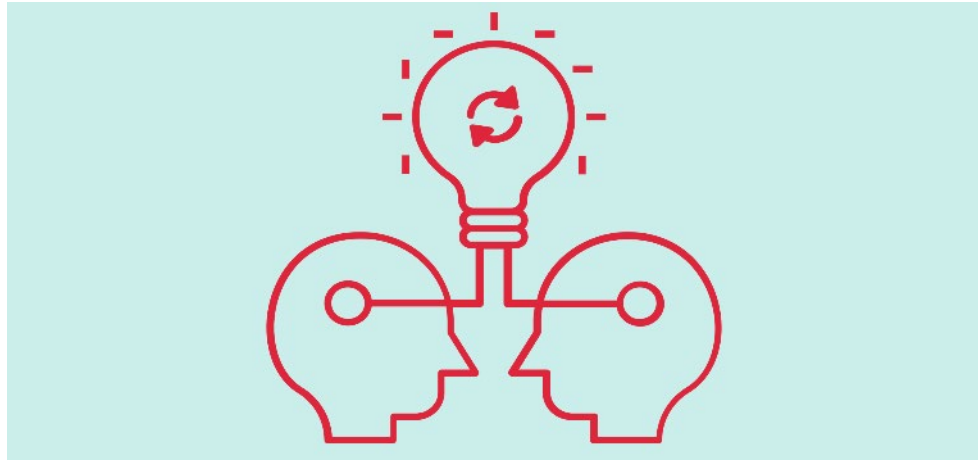


Who is the European “Fusion Industry”?



Type	Examples	Role
Utilities	ENI, EDF, Siemens, Total, ENEL ...	Investing, supporting, watching...
Supply Chain	ASG, Vinci, RI, Alsymex, Fincantieri, Leonardo, SIMIC, ...	Manufacturing fusion systems and components (mostly for ITER)
Start-Ups	Proxima, Novatron, Renaissance, Gauss...	Developing fusion technologies, reactors & spin-offs
Institutes	CEA, KIT, ENEA, RFX, INFN, IPP, CIEMAT...	Basic R&D, technology development & experiments

- Learn by doing
 - ✓ *Nuclear*
 - ✓ *Complex*
 - ✓ *Disruptive*



- Through present opportunities in EU
 - ✓ *ITER (until 2040+)*
 - ✓ *DTT*
 - ✓ *DONES*
 - ✓ *New initiatives*

VIDEO

