



ITER

Hideyuki Takatsu ITER Council Chair

ITER

- The Latin word for “the way”
- The largest and most powerful fusion device ever built

A unique international collaboration to demonstrate the feasibility of fusion energy

The IO has a total of 501 staff members; an equal number of contractors, experts and consultants directly work for the ITER Organization in Saint-Paul-lez-Durance, France.

The energy challenge

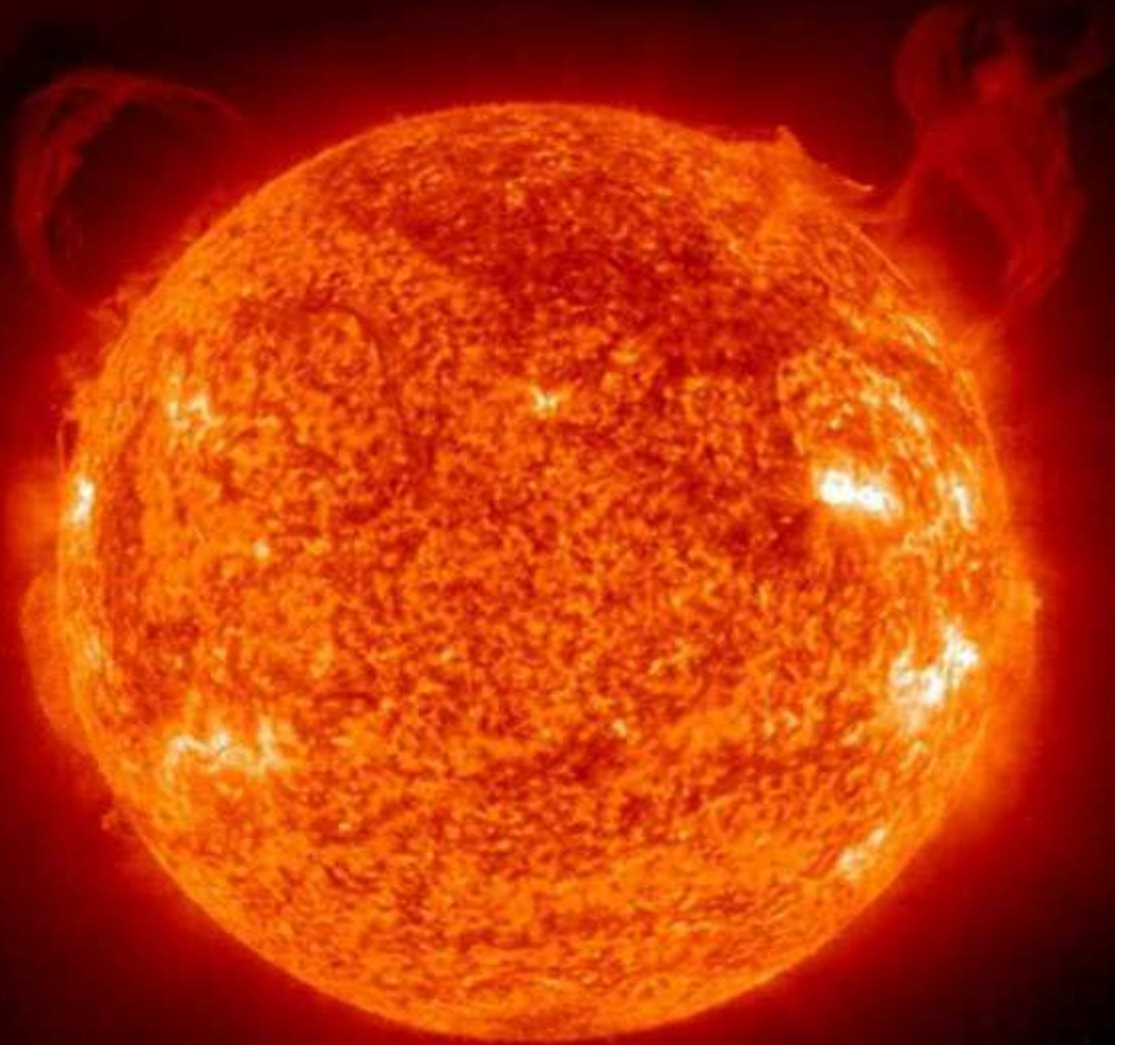


World energy consumption has increased more than 50% since 1973. It is set to triple by the end of this century.

We need to massively produce energy without upsetting the environmental balance

Fusion in the Universe

- **Fusion powers the Sun and stars.**
- **In a fusion reaction, two light atomic nuclei combine, form a heavier nucleus and release energy.**
- **Magnetic fusion aims at reproducing a similar reaction on Earth.**

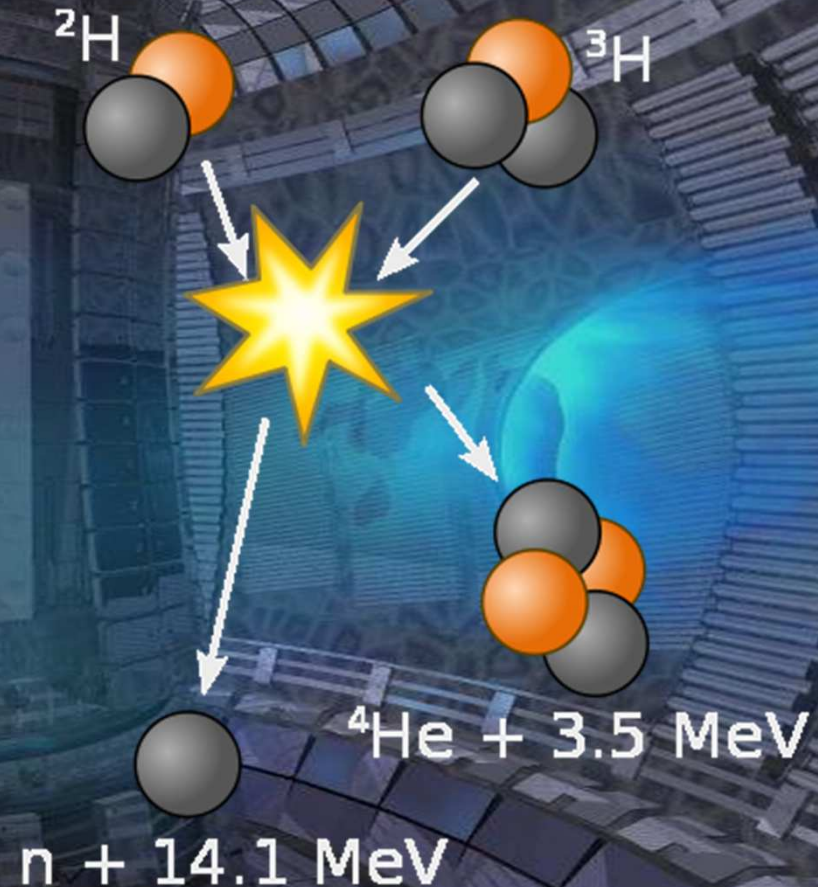


Fusion on Earth

1 gram of fusion fuels = 8 tons of oil

- Heat Deuterium + Tritium* (DT) plasma to more than 100 million °C
- Keep hot plasma away from walls by strong magnetic fields.
- "High energy" helium nuclei sustain burning plasma.
- Neutrons transfer their energy to the Blanket .
- In a fusion power plant, conventional steam generator, turbine and alternator will transform the heat into electricity.

** Neutrons impacting Lithium generate Tritium*



Fusion's attractions

- **A new energy source of unlimited scale**
- **Safe, environmentally responsible**
- **Almost limitless supply of fuel, widely distributed**
- **No CO₂ or other greenhouse gases**
- **No fissile materials such as uranium or plutonium**
- **No long-lasting radioactive waste**

ITER

Global challenge, global response



28 June 2005: The ITER Members unanimously agreed to build ITER at Cadarache

21 November 2006: The ITER Agreement was signed at the Élysée Palace, in Paris.

The seven ITER Members represent more than 50% of the world's population and about 80% of the global GDP

China EU India Japan Korea Russia USA

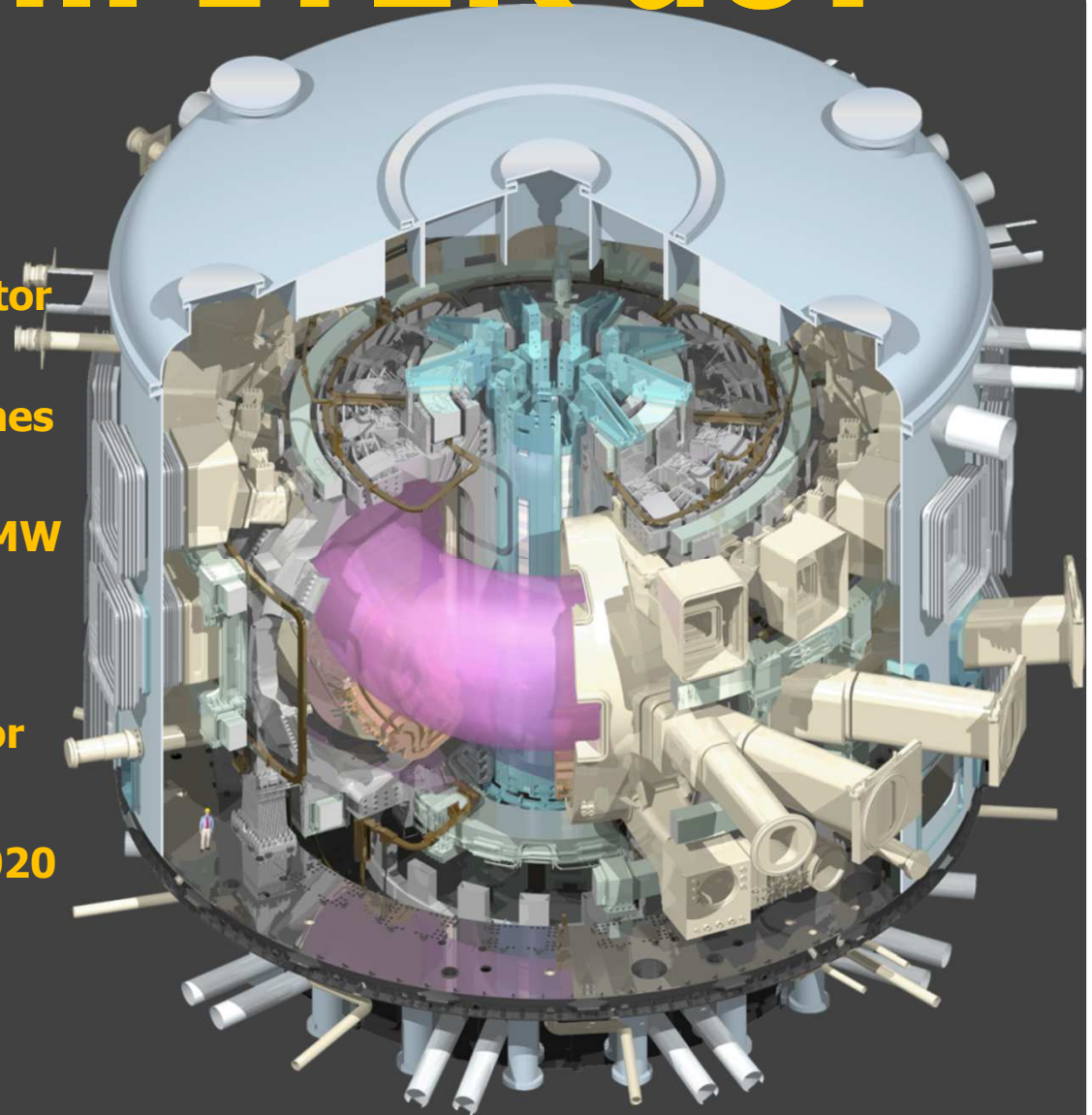
A renewed commitment



At the initiative of European commissioner for Energy Günther H. Oettinger, the ministerial representatives of the seven ITER Members held a Council meeting at ITER on 6 September. In the presence of French minister of Higher Education and Research Geneviève Fioraso, they all reaffirmed their strong support for the ITER project.

What will ITER do?

- ITER will demonstrate the availability and integration of science and technologies, and safety features for a fusion reactor
- The self-sustained D-T burning plasma in ITER generates 10 times more power than it receives
- Input 50 MW > Output 500 MW
- ITER is a power amplifier
- ITER is a necessary step on the way to commercial fusion reactor
- Schedule
 - Construction: 2010-2020
 - First Plasma: 2020
 - DT Operations: 2027



The ITER Project:

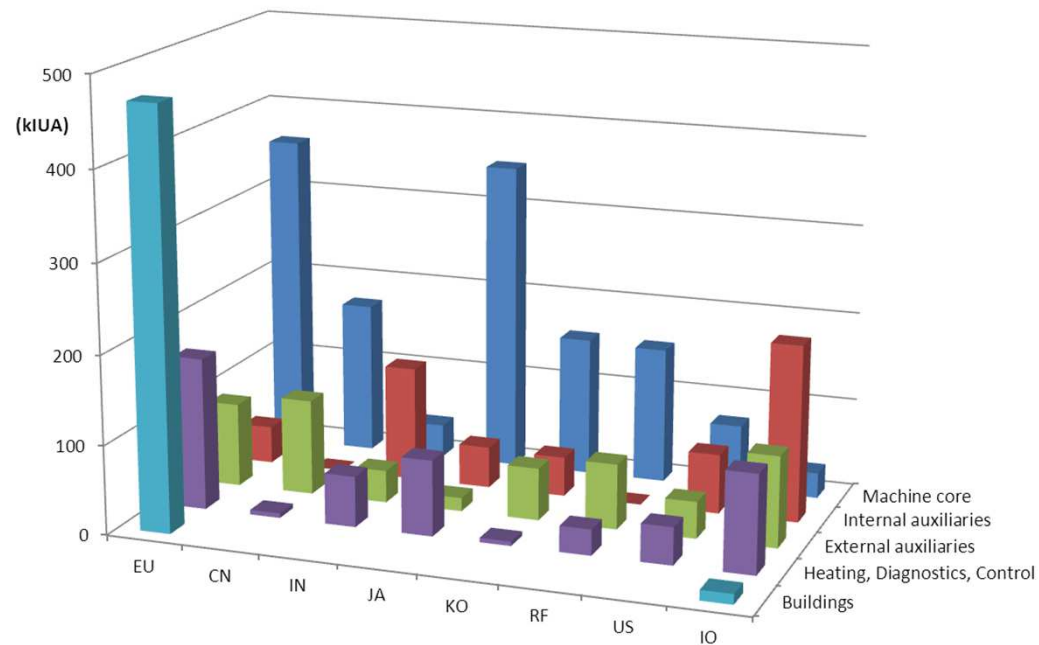
ITER Organization & Seven ITER Members

- The 7 ITER Members make cash and in-kind contributions to the ITER Project. They have established Domestic Agencies
- The ITER Organization manages the ITER Project in close collaboration with the 7 Domestic Agencies
- The ITER Members share the intellectual Property



A unique formula

ITER is being built largely through in-kind contribution by the seven Members of the ITER Organization.

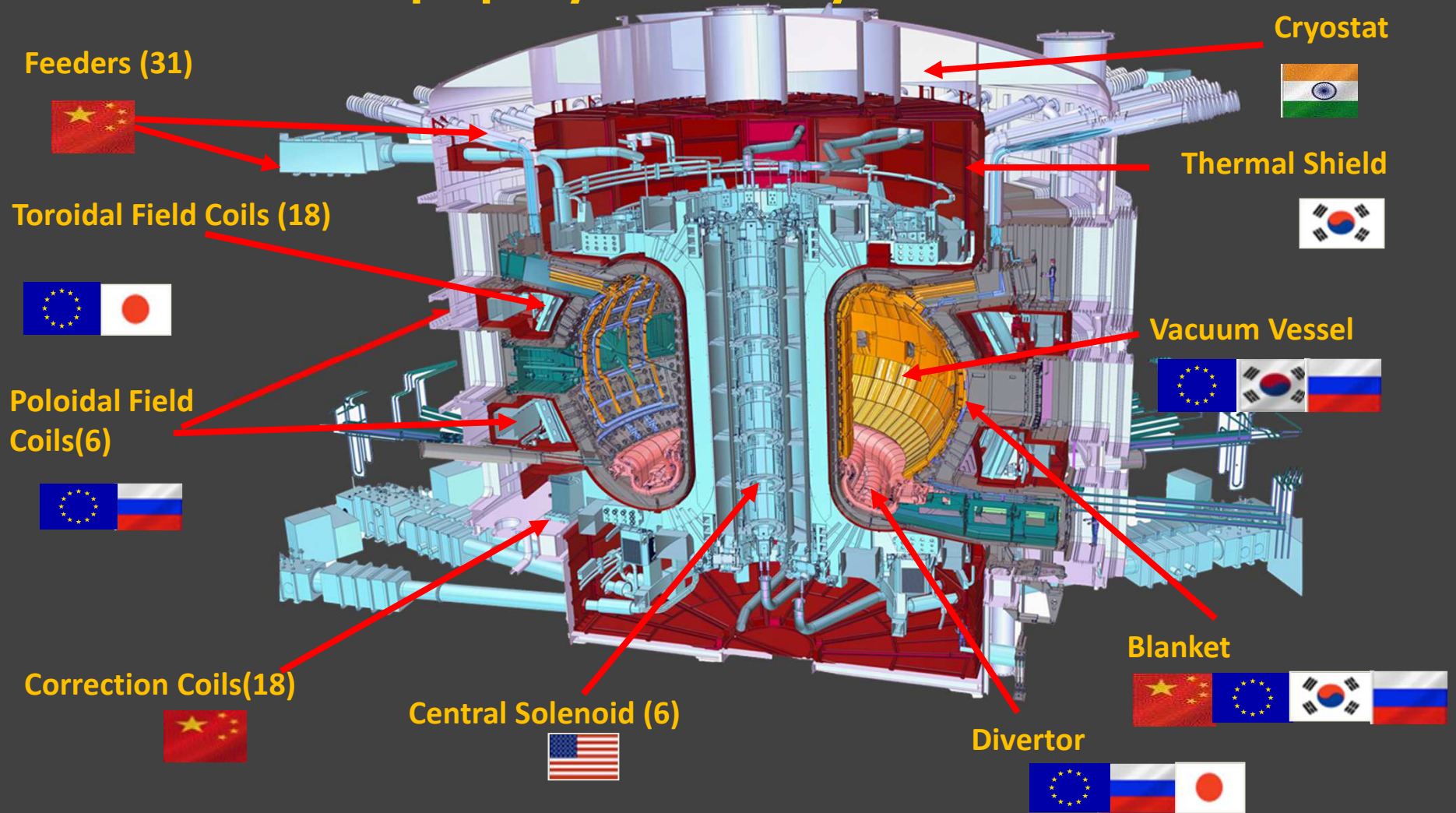


Procurement packages are shared between China, India, Japan, Korea, Russia and the United States (~ 9%).

Europe's share, as Host Member, is ~ 45%.

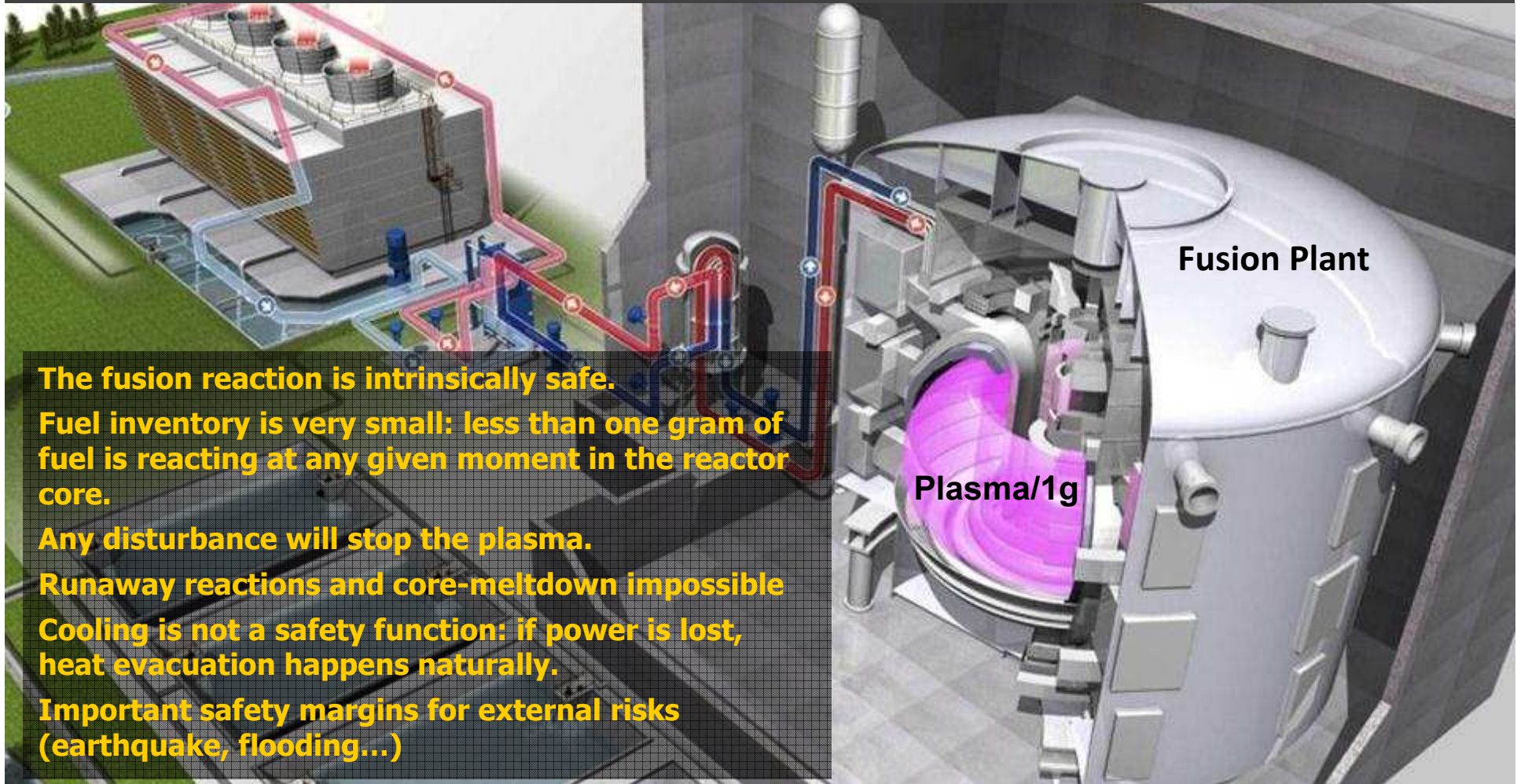
Who manufactures what?

All intellectual property is shared by the seven members



How safe is ITER?

A Fukushima-like accident is impossible in ITER
ITER is safe for workers, people and the environment

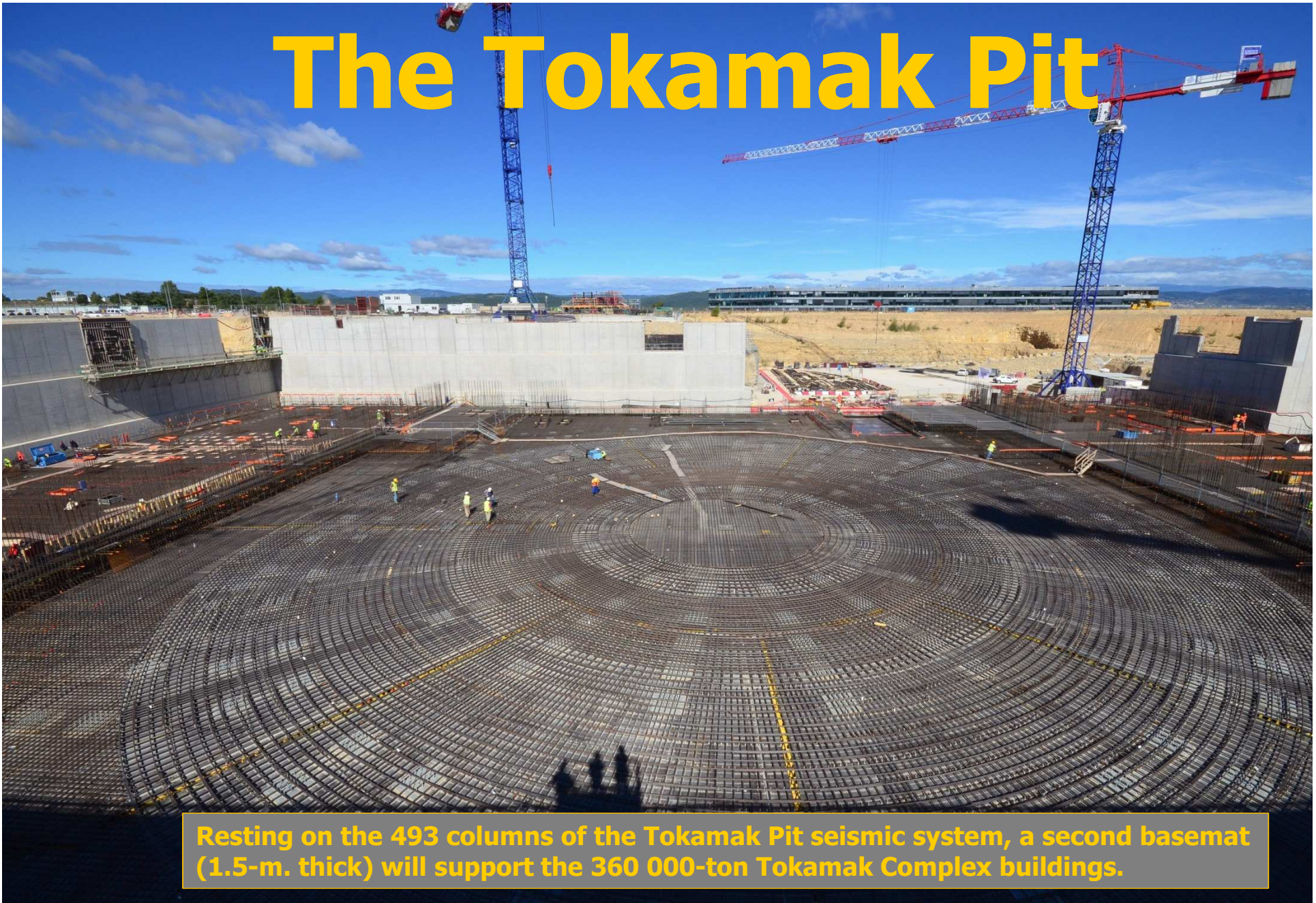


The fusion reaction is intrinsically safe.
Fuel inventory is very small: less than one gram of fuel is reacting at any given moment in the reactor core.
Any disturbance will stop the plasma.
Runaway reactions and core-meltdown impossible
Cooling is not a safety function: if power is lost, heat evacuation happens naturally.
Important safety margins for external risks (earthquake, flooding...)

Progress on the ITER platform

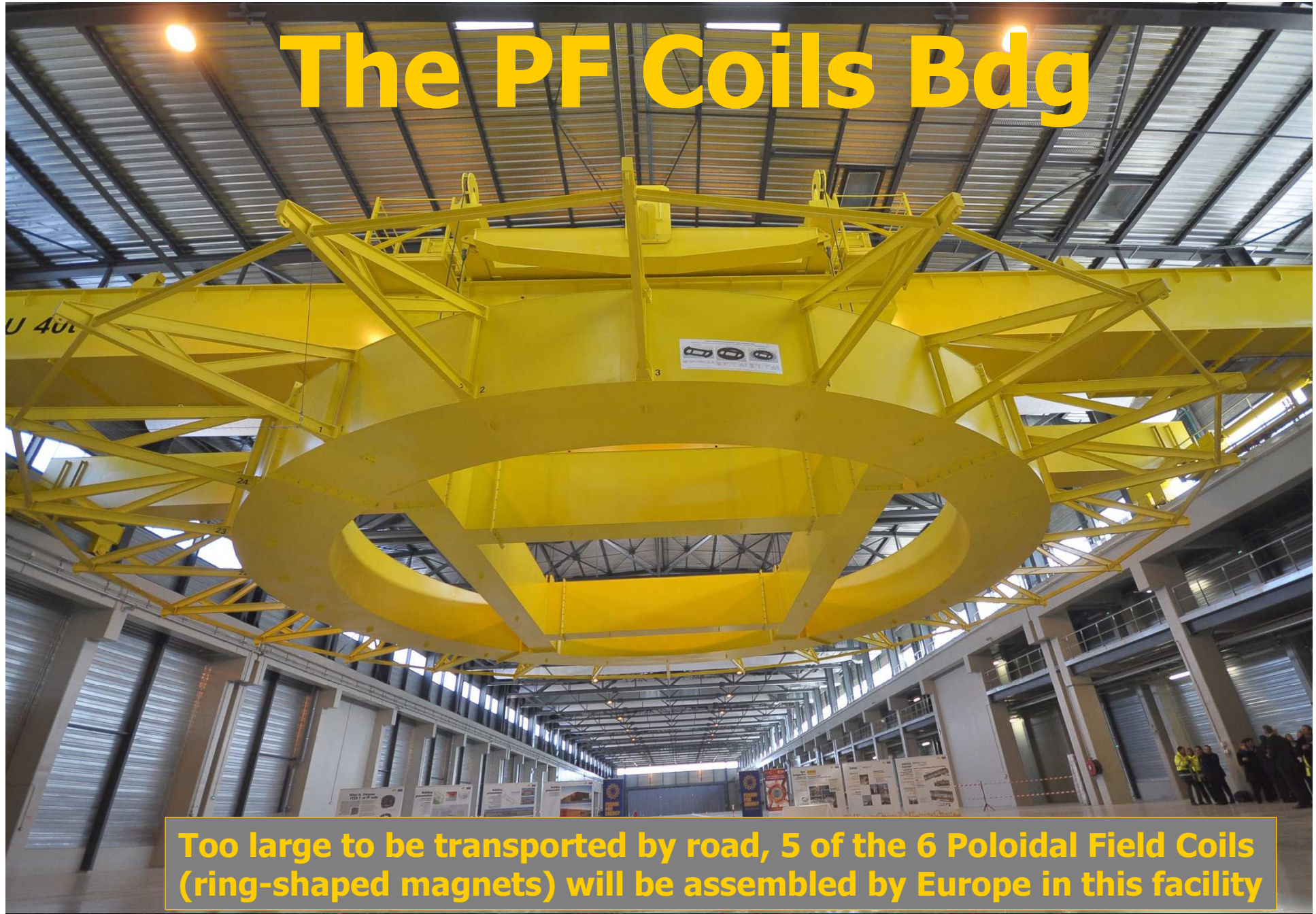


The Tokamak Pit



Resting on the 493 columns of the Tokamak Pit seismic system, a second basemat (1.5-m. thick) will support the 360 000-ton Tokamak Complex buildings.

The PF Coils Bdg



Too large to be transported by road, 5 of the 6 Poloidal Field Coils (ring-shaped magnets) will be assembled by Europe in this facility

Production is launched...

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Conductors destined to the ITER TF Coils are being produced and tested in Russia



At Korea's Hyundai Heavy Industries, fabrication of 2 vacuum vessel sectors is ongoing.



Dummy conductor fabrication at Nippon Steel in Japan.

...throughout the world



First test convoy successful (16-20 Sept. 2013)



The ITER Itinerary test convoy, featuring an 800-metric-ton trailer replicating the weight and dimensions of ITER's most exceptional loads, has successfully completed its four-night journey, arriving at the ITER construction site at 4:45 a.m. on Friday 20 September.

13th ITER Council meeting



The ITER Council, composed of senior representatives from the seven ITER Members, convened in the ITER Headquarters for two days (20-21 November) to discuss Project progress. The Council noted that all major contracts for on-site civil works, a crucial milestone for the Project, have now been signed. The seven Members reported that the pace of manufacturing of key components is also progressing steadily within their respective industries.

On to DEMO



After ITER comes DEMO, the pre-industrial demonstrator that will lead fusion into its industrial era. The ITER Members have engaged the conceptual designs for different DEMO projects. By 2040-2050 feeding electricity to the grid could be demonstrated.



Thank you for your attention

**More information at:
<http://www.iter.org>**