



**FUSION  
FOR  
ENERGY**

BRINGING  
THE POWER  
OF THE SUN  
TO EARTH

**ITER**

**the way to abundant,  
safe and sustainable  
energy**

# ENERGY – THE CHALLENGE OF THE FUTURE

## How can we secure tomorrow's energy needs?

Energy holds the key to our economic prosperity and social well-being. Today, Europe imports 53% of the energy it consumes at a cost of 1 billion EUR per day. We need to lower our dependency on fossil fuels in order to fight climate change, which is also responsible for economic losses amounting to 433 billion EUR over the last 25 years.

## How can we promote growth and a cleaner planet for all?

A sustainable energy mix is the answer and Europe is at the forefront of developing one of the most promising long-term options: fusion power. Now more than ever, the EU needs to cut down its greenhouse emissions drastically to combat climate change and make the transition to a low-carbon economy.

# NO CO<sub>2</sub>

emissions and no long-lasting radioactive waste are produced with **fusion**



# 60 kg

of fusion fuel generate the equivalent amount of energy of **250 000 tonnes** of oil



# 2050

Europe needs to cut greenhouse emissions by **80-95%**



# €1 billion

is the price we pay in Europe for the energy we import daily



## FUSION IS PART OF THE SOLUTION

Fusion is the process that powers the sun and other stars. Harnessing it on Earth, as an energy source, is a major scientific and technological challenge whose potential rewards are far-reaching:

- **The fuels required are widely available** reducing the risk of any geopolitical tensions and there are enough supplies to last millions of years;
- **Small amounts of fuel can generate plenty of energy:** 60 kg of fusion fuel can provide the same amount of energy as 250 000 tonnes of oil;
- **No greenhouse gas emissions or long-lasting radioactive waste are produced** and fusion power plants would be inherently safe posing no risk to populations in the vicinity;
- Fusion plants would be able to **complement the power generation** with renewables by providing a “baseload” electricity supply, when needed.



## ITER - “THE WAY” TO FUSION ENERGY

ITER is the next major milestone on the path to fusion energy. Europe is the host to the project, currently under construction in Cadarache, France. It will allow scientists to study a ‘burning plasma’ that releases more energy than used to produce it, and will rely on an impressive range of technologies that will be essential to deliver fusion power in the future. ITER is a global scientific partnership of unprecedented scale bringing together half of the world’s population: China, Europe, Japan, India, the Republic of Korea, the Russian Federation and the United States.

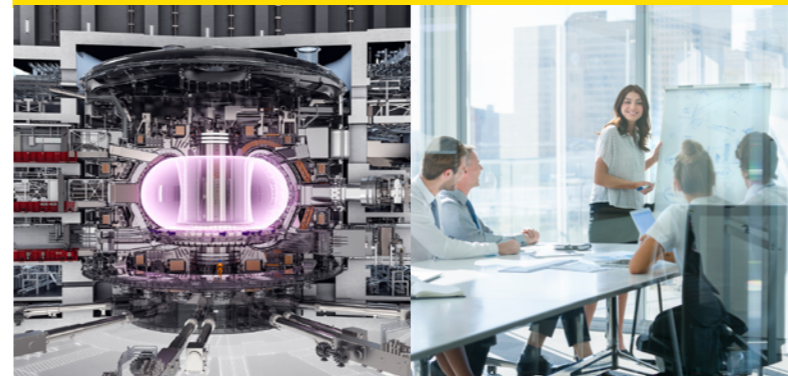
### ITER is now taking shape

In December 2017, ITER reached the halfway construction point and it is now set on track to start first operations (so-called “first plasma”) in December 2025. This is the result of the improvements made in the management of the project and the willingness of the Parties to honour their commitments and pursue the development of fusion energy.



### Fusion for Energy

Fusion for Energy (F4E) is an EU organisation based in Barcelona with the mission to make fusion energy a reality. F4E’s main task is to provide Europe’s contribution to ITER; it also supports the development of fusion through the Broader Approach Agreement with Japan. In the longer term, F4E will use the knowledge and expertise gained from its work on ITER and the Broader Approach to prepare for the construction of industrial fusion power plants.



# 500

Companies

# 1 500

subcontractors collaborating with F4E



in **29** countries

## INVESTING IN EUROPE’S POTENTIAL

Europe is responsible for nearly half of the ITER project, which in itself means many business opportunities. F4E is working together with industry and research organisations to manufacture thousands of components, and build the infrastructure of the biggest fusion machine in history. This work involves many “first-of-a-kind” technology systems and high quality standards that generate knowledge and pave the way for future spin-offs. Investing in this new energy source helps Europe to maintain its leadership in fusion research and be a champion of green growth. Our companies become more competitive and can offer more smart jobs. Fostering commercial partnerships between small and big companies promotes the transfer of know-how.

### Fusion is the energy of the future

To address the energy challenge we face, we must take informed decisions and translate them into a vision. ITER will contribute to the energy scenarios of the future by helping us to understand the potential of fusion energy, its cost and boost Europe’s capability to be a pioneer in this field. This big technology puzzle gives to our industry and scientific community an unparalleled opportunity to become familiar with an emerging market. We need the broadest energy mix to guarantee our citizens safe, sufficient and sustainable power supply.

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## **Fusion for Energy**

The European Joint Undertaking for ITER  
and the Development of Fusion Energy

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Fusion for Energy  
receives funding  
from the European  
Union budget