

Fusion reactor work gets go-ahead

Seven international parties involved in an experimental nuclear fusion reactor project have initialed a 10bn-euro (£682m) agreement on the plan.

The International Thermonuclear Experimental Reactor (Iter) will be the most expensive joint scientific project after the International Space Station. Wednesday's agreement in Brussels gives the go-ahead for practical work on the project to start.

Nuclear fusion taps energy from reactions like those that heat the Sun.

The seven-party consortium, which includes the European Union, the US, Japan, China, Russia and others, agreed last year to build Iter in Cadarache, in the southern French region of Provence.



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Cleaner energy

The parties say fusion will lead to a cheaper, safer, cleaner and endless energy resource in the years ahead.

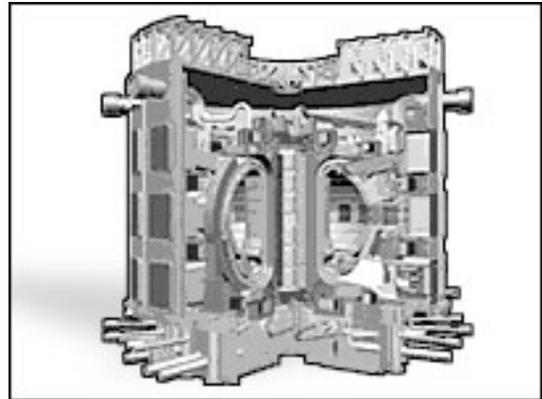
"We represent more than half of the world's population, and recognize that by working together today we stand a much better chance of tackling the challenges of tomorrow, so energy is an issue of concern for all of us," said EU science and research commissioner Janez Potocnik after the ceremony.

He said that the participants will aim to ratify their agreement before the end of the year so construction on the facility can start in 2007. Officials said the experimental reactor will take around eight years to build. The EU is to foot about 50% of the cost to build the experimental reactor, with the six other parties contributing 10% each.

If all goes well with the experimental reactor, officials hope to set up a demonstration power plant at Cadarache by 2040.

In a fusion reaction, energy is produced when light atoms - the hydrogen isotopes deuterium and tritium - are fused together to form heavier atoms.

To use controlled fusion reactions on Earth as an energy source, it is necessary to heat a gas to temperatures exceeding 100 million Celsius - many times hotter than the centre of the Sun.



Project estimated to cost 10bn euros and will run for 35 years
It will produce the first sustained fusion reactions
Final stage before full prototype of commercial reactor is built

The technical requirements to do this, which scientists have spent decades developing, are immense. But the rewards, if Iter can be made to work successfully, are extremely attractive.

Investment costs

One kilogram of fusion fuel would produce the same amount of energy as 10,000,000kg of fossil fuel.

Fusion does produce radioactive waste but not the volumes of long-term high-level radiotoxic materials that have so burdened nuclear fission.

Officials project that 10% to 20% of the world's energy could come from fusion by the end of the century. However environmental groups have criticised the project, saying there was no guarantee that the billions of euros would result in a commercially viable energy source.

"Investment in energy efficiency and renewables is the only reliable way to guarantee energy security," said Silvia Hermann, from Friends of the Earth Europe. "Giving billions of euros to a single nuclear project that is so far from reality is ill judged and irresponsible."

The European Commission said the investment costs were justified, explaining that the technology used in fusion reactor plants would be "inherently safe, with no possibility of meltdown, or runaway reactions."

The Cadarache site is also expected to boost Europe's role in developing new technologies and is likely to create about 10,000 jobs.

The consortium had been divided over where to put the test reactor, and competition was intense. Russia, China and the European Union wanted it at Cadarache, while Japan, the US and South Korea wanted the facility built at Rokkasho in northern Japan.



Japan withdrew its bid after agreeing to a bigger role in research and operations.

The Cadarache site lies about 60km (37 miles) inland from Marseille, and has been a nuclear research centre ever since president Charles de Gaulle launched France's atomic energy programme in 1959.

<http://news.bbc.co.uk/1/hi/sci/tech/5012638.stm>