

EU confident over fusion project

ITER - NUCLEAR FUSION PROJECT

The international project is estimated to cost \$12bn over the next 10 years

It will produce the first sustained fusion reactions

Iter is the final stage before a commercial reactor is built

Europe could be about to win the race to host Iter, the world's biggest nuclear fusion reactor.

Some news agency reports say the \$12bn project will be sited at Cadarache in France, following the withdrawal of Japan's bid to be the reactor's home.

But EU officials will say only that they are hopeful the negotiations in Vienna this week will turn out well.

Iter is expected to be the final step that experimenters need to take before commercial fusion power is realised.

After the International Space Station, the reactor would be the largest international research and development collaboration.

In terms of the physics and huge amounts of energy involved, the project would be akin to building a star on Earth.

But the parties to the Iter project - the EU, the US, South Korea, Japan, Russia and China - have been split over where to locate the reactor.

The EU, Russia and China want the reactor to be built at Cadarache in France, but the US, South Korea and Tokyo support a Japanese site, Rokkasho-mura.

A meeting this week in Vienna, headquarters of the International Atomic Energy Authority, aims to break the deadlock.

"The agreement foresees Iter in Cadarache," a source told the Reuters news agency. "They are preparing an agreement under which the Japanese would receive something."

But officials in Brussels will not confirm this. European Commission spokesman Fabio Fabbi told BBC News: "We hope to be able to achieve an agreement and we are optimistic that we will eventually have Iter built in Europe. But it's really too early to say and we are still negotiating."

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

This is quite different to nuclear fission in which atomic nuclei are split to release energy.

But to use controlled fusion reactions on Earth, it is necessary to heat a gas to temperatures exceeding

100 million Celsius - many times hotter than the centre of the Sun.

The engineering challenges this presents are immense. Scientists envisage running the reactions suspended in magnetic fields in a torus-shaped chamber called a tokamak.

The rewards, if this can be made to work on the large scale, are extremely attractive.

One kilogram of fusion fuel would produce the same amount of energy as 10,000,000 kg of fossil fuel. What is more, fusion does not produce long-term high-level radioactive waste that burdens nuclear fission.

Story from BBC NEWS:
<http://news.bbc.co.uk/go/pr/fr/-/1/hi/sci/tech/3993339.stm>

Published: 2004/11/08 17:11:56 GMT

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