

France to win huge nuclear fusion project

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A long and bitter dispute about where to site the world's largest nuclear fusion reactor looks all but certain to end in favour of France.

Countries have been arguing since 2003 over whether to site the International Thermonuclear Experimental Reactor (ITER) at Rokkashomura in Japan or at Cadarache in France. The French bid has been backed by the European Union, China and Russia, while Japan has been supported by the US and South Korea.

Recent reports that Japan has accepted that the reactor will be built in France are accurate, UK government sources have told **New Scientist**. But officials are nervous about publicly confirming the agreement in case it falls apart at the last minute.

The European Union stressed that no final decision would be taken until ministers from all six parties meet in Moscow, Russia, on Tuesday 28 June. "We are optimistic that we will reach a decision on the site then," said the EU's science spokeswoman, Antonia Mochan.

High-energy bombardment

ITER is expected to cost up to \$10 billion and is the next step towards tapping the inexhaustible power that could be released by fusing together atoms of hydrogen. Scientists have been pursuing the idea, which mimics the reaction inside the sun, for 50 years.

The Japanese government was persuaded to concede to France by the promise of several sweeteners. Over \$500 million worth of contracts for constructing ITER could go to Japanese companies, and Japan could provide 20% of the 200 researchers in return for meeting just 10% of the total cost.

Japanese newspapers have also reported that the EU might help fund the building of a related facility in Japan to test how various materials stand up to bombardment by the high-energy neutrons produced in fusion reactions. That could cost up to \$2 billion.

"I am excited about the possibility of a site decision, and believe it will be a very important and positive step," says Raymond Fonck, an expert on nuclear fusion from the University of Wisconsin-Madison. "Of course there remains much to be done after that."

Collide and fuse

The earliest ITER could be up and running is 2015. It would work by heating isotopes of hydrogen to hundreds of millions of degrees, creating a plasma of charged particles.

The particles would be confined by magnetic fields in a doughnut-shaped machine called a tokamak. There they would collide and fuse, producing high-energy helium nuclei and neutrons.

The uncharged neutrons would escape the tokamak, creating heat that could be used to generate electricity. But the positively charged helium nuclei would be trapped by the magnetic fields and would help sustain further fusion reactions.

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International Thermonuclear Experimental Reactor

<http://www.ofes.fusion.doe.gov/iter.html>

ITER at Cadarache

<http://www.itercad.org/>

Raymond Fonck, University of Wisconsin-Madison

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