ABC Online

PM - World's most expensive science experiment

[This is the print version of story http://www.abc.net.au/pm/content/2006/s1646650.htm]

PM - Wednesday, 24 May , 2006 18:35:20

Reporter: Sabra Lane

MARK COLVIN: An unlikely collection of nuclear powers will sign a deal today to build the world's first nuclear fusion reactor.

At $AU 16 billion, you could say it's the world's most expensive science experiment.

Australian supporters of the program say Australia should be involved in building the plant to benefit from the technology.

They say it will be money well spent, with the prospect of limitless, clean energy.

Sceptics recall similar promises being made about nuclear fission in the 1950s.

Sabra Lane reports.

SABRA LANE: Nuclear fusion's long been the dream of scientists around the world.

It promises centuries of clean, waste-free energy, produced from water and tritium, which the earth has plenty of.

John O'Connor, Professor of Physics and Head of Mathematics and Science at Newcastle University, explains its significance.

JOHN O'CONNOR: It's a holy grail for civilisation in the sense that it gives us about 100 million years energy reserves and it's greenhouse free. And that's assuming that everyone on the planet uses energy as abundantly and as freely as the most wasteful countries in the world at present.

SABRA LANE: Australia's Sir Mark Oliphant discovered nuclear fusion in 1932.

Just half a bath full of water combined with the lithium found in one laptop battery could provide enough energy for one person for 30 years.

Conventional nuclear fission plants tear atomic nuclei apart to release energy. Unfortunately, they also produce waste that's radioactive for millions of years.

The problem with nuclear fusion has been finding a way to push the minuscule nuclei together so they fuse and release their energy.

JOHN O'CONNOR: The only trick now is really an engineering one, and that is to get it to run continuously, you know, day after day. And that's not a huge hurdle. I mean actually getting to this point has been the huge hurdle.

We've probably overcome 95 per cent of all the problems you could ever conceive of, and we're within 10 or 20 years of actually having this as a proven commercial reality.

SABRA LANE: The prototype fusion plant is called ITER, which stands for the International Thermonuclear Experimental Reactor.

Former nuclear foes China, India and the United States will today join forces with the European Union, Japan and South Korea to build it. Construction will start in 2008. The location's already selected - in southern France.

JOHN O'CONNOR: This is the prototype device that allows us to test out new ideas, to fine tune everything.

But whilst it's happening there will be in parallel a development of the first power station, which will come on line shortly afterwards.

SABRA LANE: Dr Matthew Hole from the Australian National University's Plasma Research Laboratory says fusing the elements together is a bit like creating the power of the sun here on earth.

MATTHEW HOLE: And in the case of ITER, for example, it's going to approach nearly 10 times the core of the sun in terms of its central temperature.

And in achieving that configuration, I guess, in a sustained and confined fashion, and in a controlled fashion, has proven to be very difficult. But it's not impossible.

SABRA LANE: Dr Hole heads the Australian ITER Forum, a group of 100 scientists and engineers who believe Australia should be part of the international project.

MATTHEW HOLE: It's a once in a, I guess, once in a generation opportunity to be involved in a very large-scale science problem, arguably one of the largest on the planet.

Australia has been involved in this from the very beginning. Australia's had an active science program ever since, trying to research fusion energy and trying to develop it. And I guess now is not the opportune time to discontinue engagement in that process.

SABRA LANE: The forum's holding a conference in October where ITER representatives will meet with Australian scientists and Federal Government officials to talk about how we might be involved.

Professor O'Connor says Australia has be part of it.

JOHN O'CONNOR: If we're part of the project, we get to see how we can ultimately build our own.

We don't want to be in a position of waiting 20 or 30 years and then asking someone else to build a power station for us.

Let's be in the business of building them ourselves.

MARK COLVIN: Newcastle University's Professor John O'Connor, ending that report by Sabra Lane.