

No future for fusion power, says top scientist

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Nuclear fusion will never be a practical source of electrical power, argues a prominent scientist in the journal *Science*.

Even nuclear fusion's staunchest advocates admit a power-producing fusion plant is still decades away at best, despite forty years of hard work and well over \$20 billion spent on the research. But the new paper, personally backed by the journal's editor, issues a strong challenge to the entire fusion programme, arguing that the whole massive endeavour is never likely to lead to anything practical or useful.

"The history of this dream is as discouraging as it is expensive," wrote William Parkins, a physicist who worked on the Manhattan Project during the second world war, who later became the chief scientist at US engineering firm Rockwell International.

Sadly, Parkins passed away while his lengthy paper, which makes its case on engineering grounds, was being edited. But Donald Kennedy, *Science's* editor considered the paper important enough to run the piece posthumously, in a condensed form, and to stand behind its conclusions personally.

Plasma blanket

The case that Parkins laid out, Kennedy says, shows that "there are some really, really difficult engineering problems that have not been overcome" despite decades of effort, and that some of them may be intractable.

The issues include the potentially prohibitive costs of building, and the difficulties of repairing and maintaining the reaction vessel. This massive "blanket" of lithium and rare metals – that must surround the fusion-generating plasma in order to absorb its emitted neutrons – will degrade and become radioactive over time, requiring regular dismantling and replacement.

Advocates of the technology insist it is too soon to give up, and that great progress has been made. "I was less convinced 30 years ago [that fusion could become practical] but we have made incredible progress," Miklos Porkolab, director of the Plasma Fusion Center at MIT, in Cambridge, Massachusetts, told **New Scientist**. "The science is going to work," he said, "and the rest is economics."

Price of oil

But Porkolab concedes that a functioning power-producing fusion reactor is probably 50 years off, and that is too far in the future for any reasonable conclusions to be drawn on its economic viability. "It depends on what the price of oil is going to be 50 years from now," he says.

The issue may be especially relevant for US policymakers, says Kennedy, because after years of refusing to participate in the international consortium to build the International Thermonuclear Experimental Reactor (ITER), the US is about to join it again.

But Kennedy does not go quite as far as Parkins in rejecting the arguments for fusion research projects. While it is unlikely ever to provide practical power, he told **New Scientist** that "there may be some very good physics going on there". He adds and that science will benefit even if the electricity power grid does not.

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