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Funding for nuclear fusion

Expensive Iteration

A huge international fusion-reactor project faces funding difficulties

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VIABLE nuclear fusion has been only 30 years away since the idea was first mooted in the 1950s. Its latest three-decade incarnation is ITER, a joint effort by the European Union (EU), America, China, India, Japan, Russia and South Korea to construct a prototype reactor on a site in Cadarache, France, by 2018. If all goes to plan, in about 30 years it will be reliably producing more energy than is put in.

The International Thermonuclear Experimental Reactor became plain ITER following public anxiety about anything that has "thermonuclear" next to "experimental" in its name. ITER aims to produce energy by fusing together the nuclei of hydrogen atoms, confined in a magnetic field at high temperatures—a process akin to that which powers the sun.

For all its cosmic ambition, ITER has run into the earthiest of difficulties: spiralling costs. The project was never going to be cheap. Initial projections in 2006 put its price at €10 billion (\$13 billion): €5 billion to build and another €5 billion to run and decommission the thing. Since then construction costs alone have tripled.

As the host, the EU is committed to covering some 45% of these, with the other partners contributing about 9% each. In May the European Commission, the EU's executive branch, asked member states to stump up an additional €1.4 billion to tide the project over to 2013. They rejected the request and suggested instead tapping the EU's existing research budget.

On July 20th the commission offered a compromise: one-third of the shortfall would come from cash earmarked for other research, the rest from unspent agricultural funds.

Such a proposal may yet be scuppered by EU governments. Nor has it entirely mollified European scientists who rightly fear that ITER will eat indiscriminately into other programmes. This comes at a time when most European governments are slashing spending on science as part of larger efforts to plug budget deficits.

The proposal also needs approval from the European Parliament. Some Green MEPs have called for ITER to be ditched altogether, and its finances diverted to less grandiose ventures. A decision is unlikely in time for a meeting of ITER's governing body on July 27th and 28th, when the project's scope and cost are to be discussed.

Unfazed by budgetary wobbles, Fusion for Energy, ITER's European arm, has begun in earnest to divvy out construction work. On July 19th a consortium led by Iberdrola, a Spanish engineering giant, signed a €156m contract to build "winding packs"—massive reactor components that each weigh about 110 tonnes, as much as a jumbo jet.

This testifies to the project's technical daring. But the commissioning of these parts also illustrates one of its biggest flaws. The European consortium will build only ten of the planned 19 winding packs; the remaining nine will be forged independently by a Japanese contractor.

Unlike the Large Hadron Collider (LHC), another huge international physics experiment near Geneva, ITER does not pool its funds. Instead, each partner orders bits and bobs, typically from compatriots, hoping that everything will dovetail nicely in Cadarache. Moreover, some parties have not got what they had hoped for out of the project, notably Japan, which had wanted to host the reactor. So it has been promised a sweetener in the form of a smaller reactor and a supercomputer. All this is a recipe for duplication.

Cost overruns are common in projects as complex as ITER or the LHC. Loosening the purse-strings for energy research and development surely makes sense: government spending on energy research has been falling since the early 1980s, both as a share of GDP and as a proportion of total research budgets, according to the International Energy Agency.

That said, it is far from clear whether the best way of countering this trend in energy funding is

to plough yet more money into the fusion project, with its vested political interests, at the expense of less prominent scientific endeavours.

Science and Technology

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