America Finally Makes Plans for Its Own Nuclear Fusion Power Plant

It's happening at last. Popular Mechanics magazine

BY CAROLINE DELBERT
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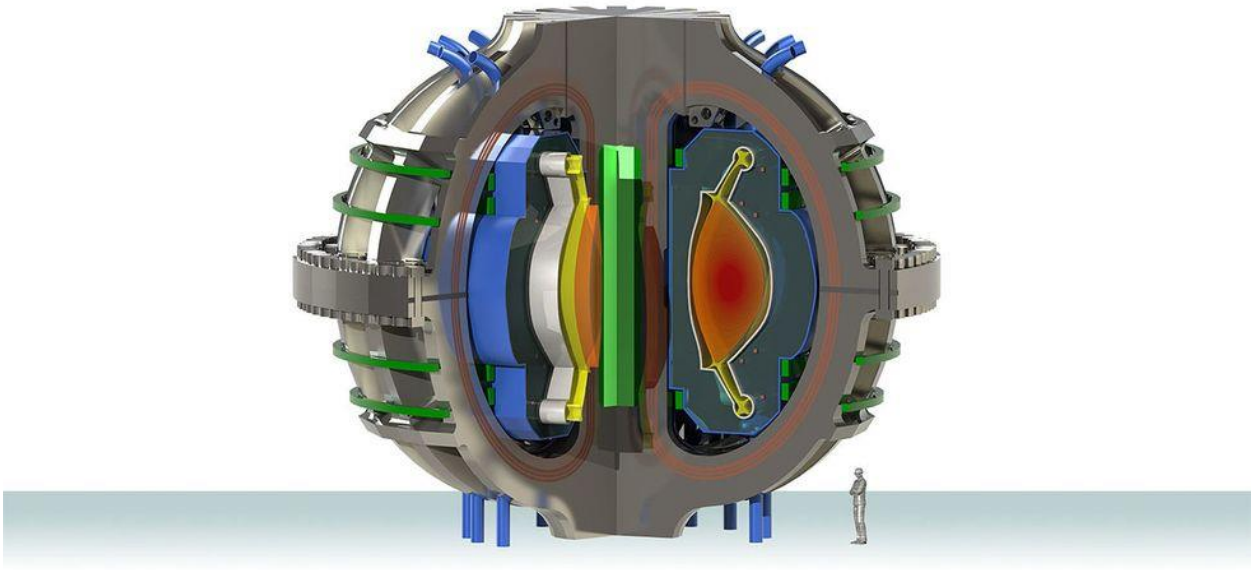
https://www.popularmechanics.com/science/energy/a34933512/us-scientists-plan-nuclear-fusion-power-plant



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- **Scientists and the U.S. Department of Energy (DoE) have collaborated on a comprehensive new nuclear fusion plan.**
- **This is the first agreement of its kind in the U.S., representing years of work and cooperation.**
- **ITER's success or failure in the 2030s will make a huge difference in our plans.**

For the first time, a major group of American scientists has agreed to work toward opening a nuclear fusion plant by the 2040s. The timeframe is intentional, letting scientists work on and learn from giant projects like Europe's ITER and China's EAST before designing a prototype of a fusion plant for the United States.

☢ You love nuclear. So do we. Let's nerd out over nuclear together.

The most impressive part could be that just six years have passed since the last effort to make this plan ended in *serious* in-fighting by researchers.

ITER: EVERYTHING YOU NEED TO KNOW

World's Largest Fusion Reactor Begins Assembly

So what's in the new plan, and what's changed since 2014?

This plan coalesced around goals put out by the U.S. Department of Energy's (DOE) Fusion Energy Sciences (FES) department. Their strategic goals explicitly include fusion energy: "Advance the fundamental science of magnetically confined plasmas to develop the predictive capability needed for a sustainable fusion energy source."

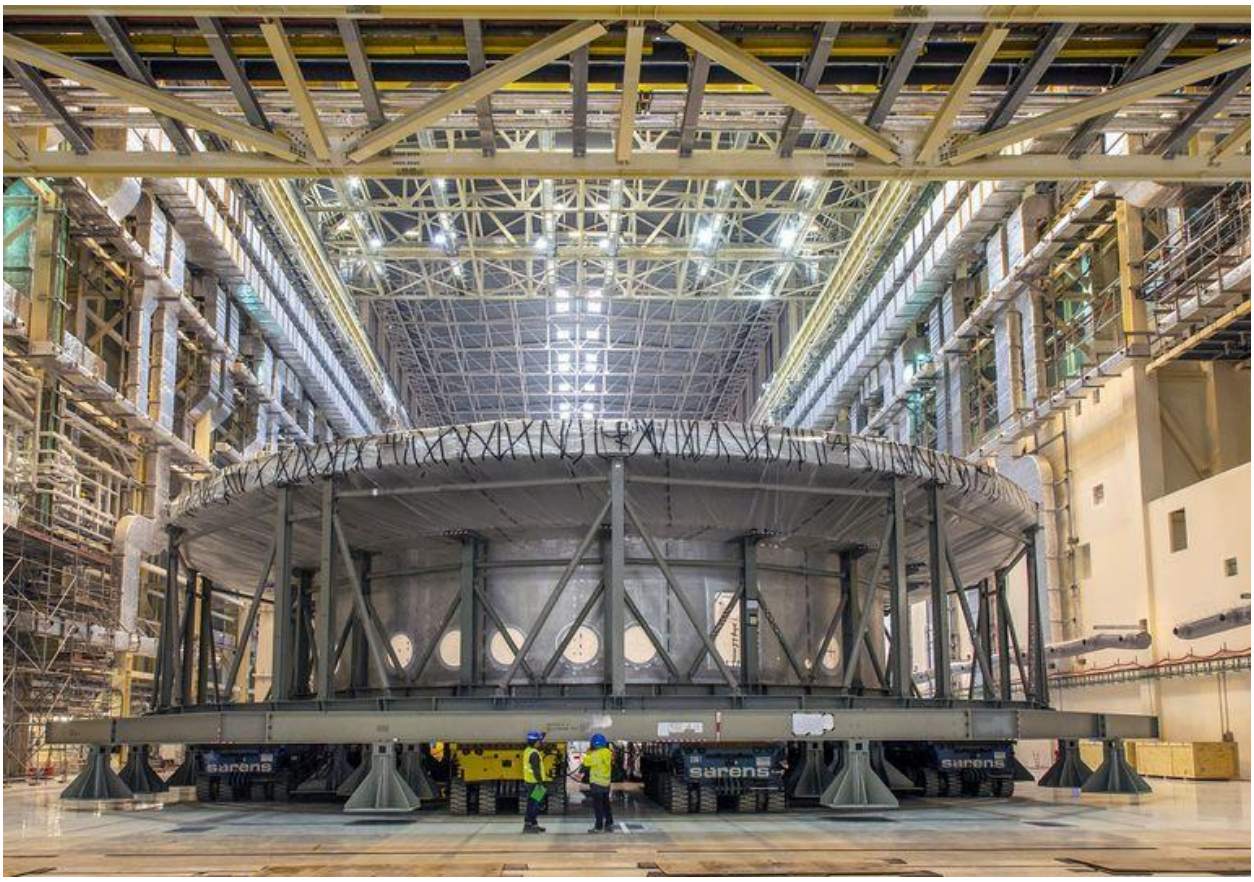
While there's no marquee fusion project in the U.S., the country is a key contributor to ITER, for example, continuing to participate even when other areas of international cooperation have broken down. In fact, the U.S. deal with ITER trades funding for knowledge in what the DoE says is "among the most highly leveraged [project] in the DoE portfolio."

Six years ago, planning failed because one FES official basically wrote it himself and tried to impose it. Now, *Science* reports, the DoE avoided "infighting" by including a period of open meetings and processes where researchers could voice their goals and concerns.

A lot of U.S. fusion luminaries are already really involved in global fusion projects, because projects like ITER are like Olympic teams: they recruit the best from around the world. *Science* explains where the U.S. plan kicks off:

ITER will teach valuable lessons about a "burning plasma," researchers say. But they add that its cost of more than $20 billion is far too steep for an actual power plant. So, after ITER, U.S. fusion researchers want to build a much smaller, cheaper power plant, leveraging recent advances such as supercomputer simulations of entire tokamaks, 3D printing, and magnet coils made of high-temperature superconductors.

U.S. scientists have already been able to use growing fusion knowledge to help identify gaps in our near-future technology, too. That means this plan includes detailed projections about how much we can and should learn, and more importantly, how much the DoE FES budget can affect that timeline.



The International Thermonuclear Experimental Reactor (ITER).
ITER

And, researchers say, this is the first combined FES plan to include more than just the most popular kind of fusion research, embodied by tokamaks. The FES goals list includes incredibly powerful lasers and solar wind simulators for sun-like plasma research, among other lower-profile plasma approaches.

Budget decisions made today will affect the next 20 years, and that time could be critical for the development of productive nuclear fusion for energy. Some projects will have to wait until the upcoming major milestones for ITER, but other knowledge can accelerate inasmuch as we're willing to spend on them. And when it comes to the energy landscape after fossil fuels, the sooner, the better.

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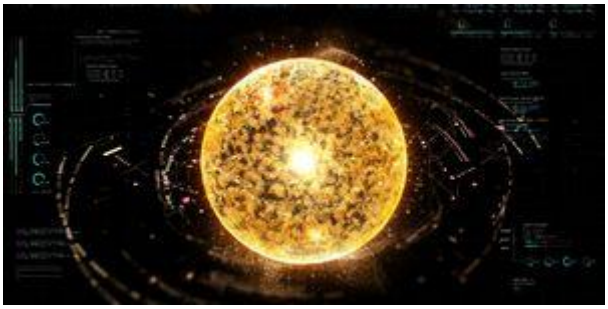

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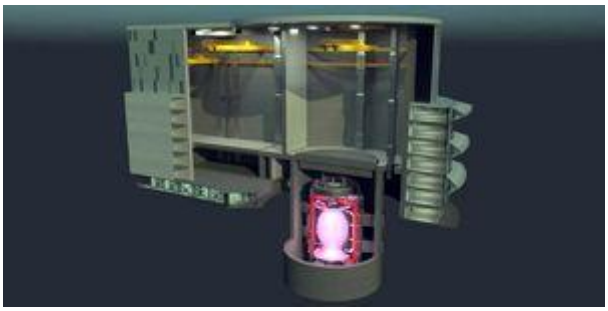

World's First Nuclear Fusion Power Plant Is Coming

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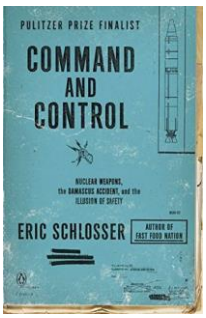

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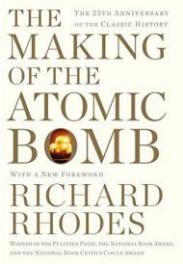

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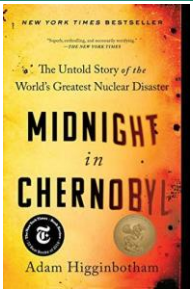

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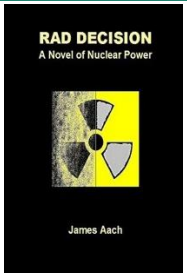

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