

Critics attack new 10-year US fusion plan

Oct 21, 2014 [10 comments](#)



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A new report that seeks to map out US priorities in fusion research over the next 10 years has received scathing reviews from American fusion researchers. The report was commissioned by the US Department of Energy (DOE), which asked its [Fusion Energy Sciences Advisory Committee](#) (FESAC) to come up with a 10-year plan under several very constrained budget scenarios. According to critics, [the report](#) – written by a FESAC subcommittee – lacks vision, does not adequately peer review the proposals that it made, and fails to address the real problems faced by fusion research.

Planning problems

"It seems that the committee was put together to ratify the plan that the DOE had already decided upon," claims [Martin Greenwald](#) of the Plasma Science and Fusion Center at the Massachusetts Institute of Technology (MIT). The report comes in the wake of several years of belt-tightening for the US fusion community, which has suffered from the country's rising financial contributions to the international [ITER](#) fusion project being built in France. Indeed, MIT's own [Alcator C-Mod](#) tokamak device had been earmarked for closure in the 2013 budget and was only saved by Congress following aggressive lobbying by Massachusetts politicians.

The FESAC subcommittee was told to devise a plan that assumes the US remains a member of ITER, with funding ranging from a flat budget to modest growth of about 2% above inflation. Its recommendations involve shifting the emphasis away from plasma science and towards the practical needs of power reactors. It calls for two existing facilities – [DIII-D](#) in San Diego and [NSTX-U](#) at the Princeton Plasma Physics Laboratory (PPPL) – to be upgraded and for C-Mod to be axed. However, it also envisages two new facilities: a simulator to help understand the interaction of plasma with solid surfaces; and a new reactor called the Fusion Nuclear Science Facility.

Written critiques

The report was scheduled to be approved by the full FESAC at a meeting on 22–23 September but was only circulated the day before the meeting. As a result, another Web conference was scheduled for 10 October. Meanwhile, a number of written critiques were sent to the FESAC, including one signed by 50 senior fusion scientists, and several individual submissions. Critics pointed out that the report did not take into account the views of the community and that its facility proposals were not subjected to peer review. "The committee had too little time for such a weighty charge," says [Stewart Prager](#), director of the PPPL.

The make up of the committee itself has also come under fire as the DOE stipulated that it should not contain any members from the major fusion labs. Greenwald points out, however,

that the committee had an unbalanced representation from the Oak Ridge National Laboratory, which is where the report's proposed new facilities would be built. At the 10 October FESAC meeting, the DOE also asked its 23 members to abstain from voting if they had a connection with a lab that either has – or may get – a major facility. The remaining members voted to pass the report on to DOE by six votes to three.

About the author

Daniel Clery is a science writer based in the UK

10 comments

Comments on this article are now closed.

1 M. Asghar
Oct 21, 2014 6:43 PM

Need of the hour

The agitation about the present course of nuclear fusion is timely, because its present "just experimental" situation based on the plasma-based tokamaks and the inertial systems seems to be stuck far away from the desired ignition stage. May be that sadly, one just cannot create the Sun on the Earth!

2 Ragtime
Oct 22, 2014 6:48 AM
Prague, Czech Republic

one just cannot create the Sun on the Earth

Everything is possible, it just may not be economically feasible. After all, at the Sun the fusion runs in very diluted stated, with energy density at range of few watts per cubic meter. The USA should focus to replication of experiments like these ones [1](#), [2](#) - it has twenty years delay already.

Edited by Ragtime on Oct 22, 2014 6:56 AM.

3 MJBridger
Oct 22, 2014 9:28 AM

Time for a re-think

Quote:

Originally posted by M. Asghar ▶

The agitation about the present course of nuclear fusion is timely, because its present "just experimental" situation based on the plasma-based tokamaks and the inertial systems seems to be stuck far away from the desired ignition stage. May be that sadly, one just cannot create the Sun on the Earth!

Agreed that the current courses are going nowhere and slowly. It's time for a major rethink and new theory.... and for all to be open minded about what may be the best path to nuclear fusion energy. It could be cold fusion. Now that would be a shock! But don't forget that consensus viewpoints and assumptions in science tend to be overturned eg the assumption that the expansion of the cosmos should be slowing down. An acceleration was unthinkable only twenty years ago, just as cold fusion seems to be to you now.

I think its the way to go. physicsworld.com...ovel-fusion-research

4 MJBridger
Oct 22, 2014 9:59 AM

'Experts' bad at making progress

Quote:

Originally posted by MJBridger ▶

Quote:

Originally posted by M. Asghar ▶

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Further to my comment I remember reading an article that made the point, in fields where major thinking/problem solving and progress is required, the 'experts' can be worse than useless.

Its not hard to see why. In many fields, the knowledge of experts is incomplete, so what they (think they) know is not sufficient. Outsiders who aren't originally constrained with the requisite knowledge may see things clearer from a broader perspective.

www.newscientist.com...search

5 **twjn**

Oct 22, 2014 11:23 AM
Salt Lake City, United States

colliding beams

In order to achieve net energy gain for realistic electric power production, it would be needed a colliding beam reactor based on multiphase acceleration for isotropic (spherically convergent) dense collisions, within an arrangement of steady-state multipole magnetic fields, so that to get higher fusion rate.

6 **hyperfuzzy**

Oct 23, 2014 11:34 PM

4X4 possibility matrix, simple, proximity and let the atoms marry, we can do that with local clusters, maybe we need less?

7 **dead_naked_drummer**

Oct 24, 2014 11:27 AM
Cartersville, United States

Quote:

Originally posted by **twjn** ▶

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Dr. Bussards Polywell reactor (pb 8) has met all of its projected reaction rates and power density projections... and all of this has been done on a shoe string...the next project is a three meter reactor. Since their power output increases as the 7th power of the radius...I'm sure you see where this is going...

8 **twjn**

Oct 25, 2014 9:25 PM
Salt Lake City, United States

Quote:

Originally posted by **dead_naked_drummer** ▶

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I see where this is going, no more a tabletop reactor, this is going to grow overmuch to become a behemoth, like ITER, DEMO, ... How much will it cost? \$300M? Since the 80s, had not already spent over \$60M?

9 **palf**

Oct 30, 2014 5:36 PM
San Jose, United States

Focus Fusion is the one to watch

They are further along than anyone despite having operated on a shoestring to date. Needs investment.

Edited by palf on Oct 30, 2014 5:37 PM.

10 **zungo123**

Oct 31, 2014 6:38 PM

Alternative approaches - more economically viable

Agree with most comments here. Tokamaks and laser fusion show real promise to prove net gain fusion is possible. However neither will be economically viable anytime soon. The problem is there are alternative approaches that are much more viable economically - the science is probably less proven however. Z-pinch (Sandia). private companies: General Fusion, Tri-alpha, Lockheed Martin, Helion. All four private companies are pursuing non-tokamak/non-laser approaches. The vast majority of DOE funds go to laser/tokamaks, yet these other approaches do have real merit as economic power plants and should be explored further.

