The Association

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Photo of the Month

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Fusion Energy

world_energy_demand_transparent.gif

Source: International Energy Agency (IEA)

Fusion is widely researched because it could be a clean, safe and virtually unlimited source of energy. Currently the world mostly depends on fossil fuels for its energy. Fossil fuels are set to be in short supply in the future and with the world's energy needs increasing rapidly (see picture), an alternative method of producing energy on a large scale is needed.

Most design studies for fusion power plants involve using the fusion reactions to create heat, which is then used to operate a steam turbine, which drives generators to produce electricity. Except for the use of fusion as the heat source, this is similar to most coal, oil, and gas-fired power stations as well as fission-driven nuclear power stations. The production of net electrical power from fusion is planned for DEMO, the next generation reactor after ITER.

Although the point of breakeven - where more energy comes out of the reaction than is put into the reaction - has almost been reached (the JET experiment reached 65% of scientific breakeven in 1997), there is still more work to do. Scientists have to overcome engineering challenges they face in construction of the reactor and in operating it with a high reliability and availability. And last, but not least - they have to find ways to reduce the costs of construction and operation so that the energy does not become too expensive.

fusion_power_plant_transparent_2.img_assist_custom-400x330.gif

To reach the goal of a clean, safe source of energy and overcome the challenges, we need bright engineers that dive into the field and help solve the problems at hand. Years of research have already shown huge progress in taming fusion. We can now capture plasmas in magnetic bottles that we call tokamaks. We managed to reach temperatures hotter than the sun. We have obtained substantial control over the confinement, and increased the output power.

Whereas ITER is the most advanced reactor to date, researchers are also looking at other concepts for fusion devices. Most designs are based on magnetic confinement, such as tokamaks, fusors and stellarators. Inertial confinement is a different concept that is actively pursued. With inertial confinement, high-energy laser beams slam hydrogen ions together in a small target hard enough to let them fuse.

Read more on safety and the environment...

Fusion Info

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- Fusion Books

All Upcoming Fusion Related Events

Below you can find a list of upcoming events by Fusenet Members.

Start	Event
03/12/2018	Engineering Advanced Course - Fusion Technology
21/01/2019	10th ITER International School 2019
21/01/2019	Polytechnic Energy Winter School
11/02/2019	Course: regulation and its application in Nuclear Projects
06/05/2019	3rd European Conference on Plasma Diagnostics
08/07/2019	46th EPS Conference on Plasma Physics
22/07/2019	Polytechnic Energy Summer School

To add your own event to this list, send an email to admin@fusenet.eu or, in case you are a Fusenet member, login to the Fusenet website and use the option "Add event" in the members panel on the left.

Recent blog posts

- An ending and a beginning
- Homemade cross section plotter for nuclear data
- Academic Year++
- “Go big or go home” in the world of fusion
- The Mad Scientist
- 1 year has passed; a retrospect!
- The Queen of the Sea - Report of Lisbon, 2014 Fusenet PhD event

More

FuseNet and You

Editor's Fusion News Selection

- NSTX upgraded to the world's most powerful Spherical tokamak
- On-line talk on Stellarators and the W7-X experiment
- LENR keeps drawing investors
- MIT proposes ARC reactor
- Highlights of 5 year solar observation

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