

Not nuclear fusion but thorium fission power

Forget NUCLEAR FUSION Thorium nuclear power delivers

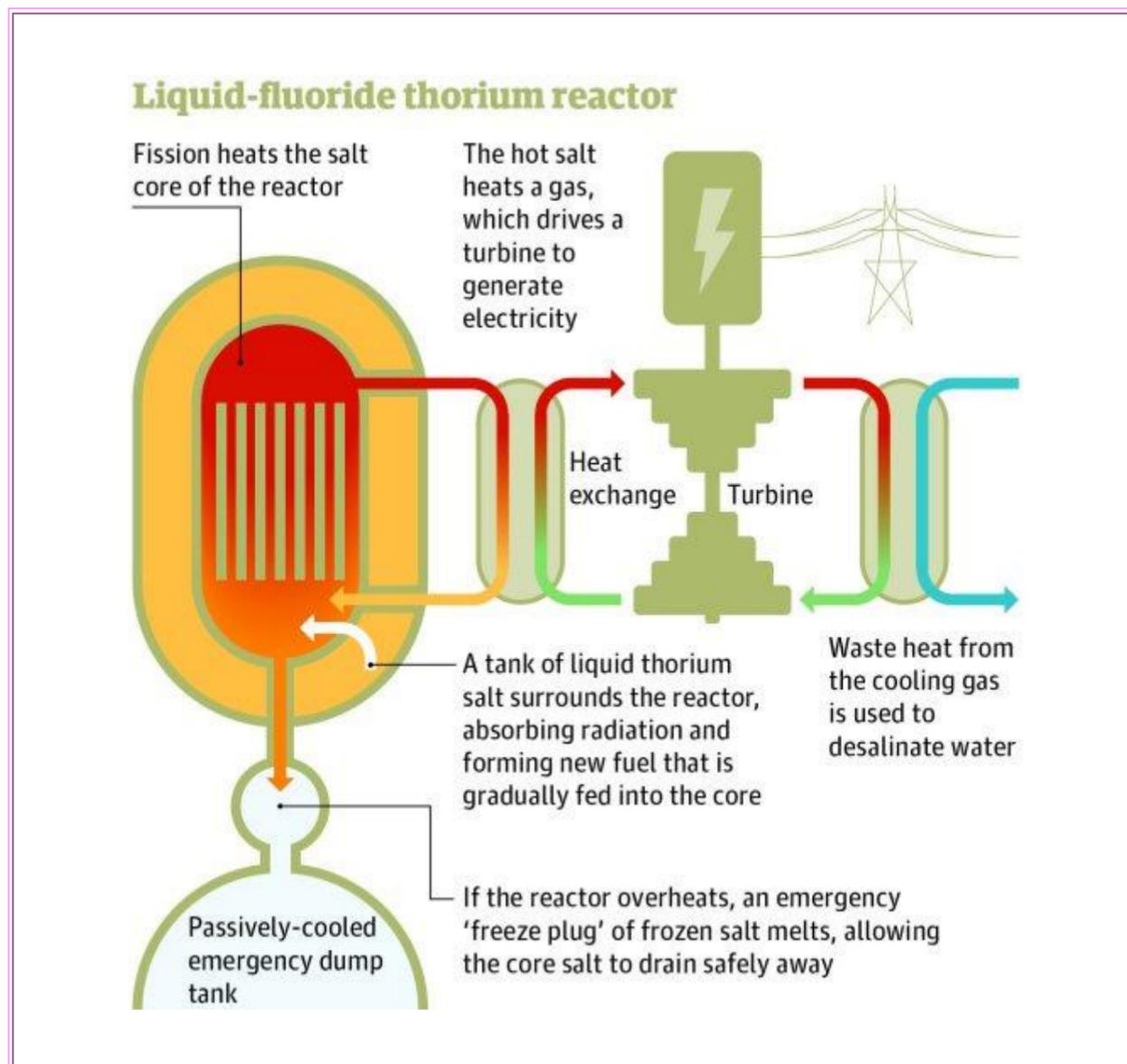


Illustration by Singapore public information

With that we can prepare for the New Ice Age ahead

With natural processes the sky is no limit

Nuclear fission power, involves the utilization of a natural process that is constantly happening in the crust of the earth. It didn't have to be invented. Roughly 80% of the earth's internal heat is produced by radioactive decay, and only 20% is residual heat from the planet-forming process. The major heat-producing isotopes in the Earth are potassium-40, uranium-238, uranium-235, and thorium-232, which together make up most of the heat-loss of the planet that is estimated to be in the order of 42 million Mega-Watts (the equivalent output of 42,000 large nuclear power plants). With the few hundred nuclear power plants that have been built so far, we are beginning to utilize a tiny bit of the potential that the Universe is using on the gigantic scale. In contrast with that, our nuclear-fusion power development isn't getting us anywhere, but to a dead end, because we aim to utilize a principle that evidently doesn't exist.

The Liquid Fluoride Thorium Reactor (LFTR) also called the Molten Salt Reactor (MSR)

We've got thorium fission-power, fully developed, ready to go. Thorium becomes fissionable when activated,

and it is soluble in molten salt.

The LFTR (MSR) is presently the cleanest, safest, and most efficient nuclear power reactor ever developed. It operates at high temperatures and at ambient air pressures, and can be scaled to any size required. India expects to supply 1/3rd of its entire electricity needs with thorium reactors in the near future.

Here is how the Molten Salt or Liquid Fluoride Thorium Reactor (MSR/LFTR) works.

- 1) One starts with a fluoride salt. In this reactor the salt will be heated so much that it melts.
- 2) Then one dissolves thorium fluoride in the liquid salt.
- 3) Some of the thorium-232 is irradiated and absorbs neutrons, whereby it turns into Uranium-233.
- 4) The Uranium-233 fissions and produces heat plus more neutrons, some of which charge 232 up to 233, and so on.

The resulting fission products are relatively benign and short-lived compared to those of a traditional fission reactor.

Advantages include:

- 1) There is no pressure in the reactor system, so that it cannot explode - unlike traditional nuclear reactors which operate as a high pressure steam boiler.
- 2) The fuel fabrication is easier. The thorium fuel does not need to be shaped into pellets, it is dissolved into a liquid
- 3) The reactor can have fuel added and waste removed at any time online with normal operations
- 4) There are no weapons-grade materials involved
- 5) And best of all, thorium is abundant, and 97% of it gets converted to power in the reaction, (with uranium only 5% gets used)

In comparison, the current coal energy technology throws away over 10 times the energy it produces as electricity. This is not the result of poor thermodynamic efficiency. It is the result of a failure to recognize and use the energy value of the thorium that is thrown away as a waste product in this process. The amount of thorium that is present in surface mining coal waste is enormous. It, all by itself, would provide all the power human society needs for thousands of years, without resorting to any special mining for thorium, or resort to the use of any other form or energy recovery. An average coal-burning 1 GW power plant produces about 13 tons of thorium per year. The thorium is recoverable from the power plant's ash pile. And since one ton of thorium will produce 1 GW of electricity for a year in an efficient thorium cycle reactor, a coal plant wastes 13 times more than it produces. Stopping this waste, all by itself, would usher in a new renaissance.

<http://blogs.howstuffworks.com/2009/12/01/how-a-liquid-fluoride-thorium-reactor-lftr-works/> (videos on LFTR)

As an added bonus, one does not need to go to the moon to obtain the needed fuel. As I said before, for thorium-based nuclear power, there exists over two million tons of fuel on earth in known deposits, and this without major efforts having been made to find more. And thorium is efficient. A single ton can provide a gigawatt of electricity for a year. One would require only 400 tons per year to meet the entire electricity needs of the USA. The known deposits in the USA (917,000 tons) would be sufficient to meet America's needs for 2000 years, or forever once galactic electricity also becomes utilized.

Of course, there is also plenty more thorium on the moon and on mars, and so on, in case anybody is worried.

It looks like that the age of nuclear fission power isn't over, but has barely begun, which, with thorium now coming online, delivers what fusion had only promised, but has so far put farther and farther out of sight. As I said, the promised 'utopia' is possible, because nuclear fission is a naturally occurring process. A fission reactor does not need to be powered, but powers itself and produces power. Thorium power is presently the leading edge nuclear power process for the immediate future, and on this line, the Liquid Fluoride Thorium Reactor (LFTR) is the leading edge technology.

(see: http://en.wikipedia.org/wiki/Molten_salt_reactor)

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