## Liquid Fluoride Thorium Reactor:

**Liquid:** The fuel in this reactor is a molten salt. The reason for a liquid fuel form is that the fuel can be continuously circulated through the reactor vessel, allowing complete burnup and continuous processing of the fuel with continuous addition of new fuel.

**Fluoride**: The salts used are Fluoride salts. These Fluoride salts are stable at high temperatures and high radioactivity and can stay in use beyond the life of the reactor. A molten salt reactor could 'crack' water to produce fuel for Hydrogen powered vehicles. Waste heat could be used to desalinate sea water.

**Thorium:** Thorium is a fertile fuel, meaning that it must first be converted into a fissile form before it can produce power. Virtually all the naturally occurring Thorium is able to be used as reactor fuel, as opposed to the 2% of Uranium which is useful as fuel. One ton of Thorium can generate one gigawatt of electricity for a year.

**Reactor:** This device is a nuclear reactor, but not like any reactor you've ever heard of before. This is a non-volatile system, extremely resistant to proliferation and producing a small amount of short lived, low toxicity waste which is completely benign within 350 years. It costs less to build, because it doesn't operate at high pressure and it costs less to run because Thorium is a relatively cheap, plentiful fuel.

LFTR power can provide carbon free energy security cheaper than coal for thousands of years.

## Conclusions:

Thorium is a natural, abundant energy source of extraordinary energy density

The technology to unlock the potential of thorium is real and proven—it needs to be engineered into a commercial product

If done properly, small modular thorium reactors can be built that can be “drop-in” replacements for coal plants, minimizing the cost of transition

Thorium energy can also be used to replace petroleum fuels, desalinate seawater, and provide heating

We need to move quickly to develop this energy source since climate change is steadily growing worse

## Learn More:


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# THORIUM

## A lifetime of power in the palm of your hand.

This much Thorium could provide you with all your energy needs for the whole of your life!

# Thorium, the world's new energy future.

In the face of global warming and mounting pollution, what the world needs is a clean, safe, energy rich fuel to deliver carbon free power cheaper than coal.

Thorium has a million times more energy than coal and is 2-3 times more abundant than uranium. It has so much energy that just 100g could provide you with all the power you need for the whole of your life! And the 'long lived' waste from your golf ball sized energy resource...a pea-sized granule of fission products which is benign within 350 years.

Almost 100% of the Thorium in the earth's crust is suitable for use as fuel, compared with less than 2% of uranium. There is probably more untapped energy available for use from thorium in the earth's crust than from combined uranium and fossil fuel sources.

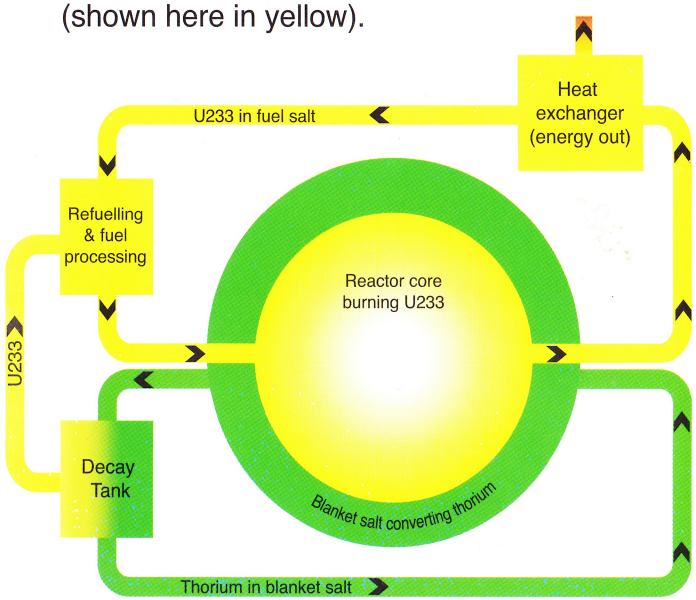
In a traditional reactor, only about 1% of the available fuel can be used before the fuel rod deteriorates and becomes contaminated with waste products. In the right kind of reactor, 100% of thorium's energy can be used.

The only practical way to realise the full potential of Thorium is with a **Liquid Fluoride Thorium Reactor.**

# LIQUID FLUORIDE THORIUM REACTOR (LFTR or LiFTeR)

### Molten Salt Reactor

In 1952, in response to a radical scheme to develop a reactor-powered aircraft, a revolutionary reactor was built using a liquid fuel. This led to the Molten Salt Reactor(MSR), which was designed and built and operated for five years. Capable of burning any nuclear fuel, the MSR forms the fissile, energy producing part of the LFTR (shown here in yellow).




### Thorium conversion.

To convert the Thorium into a reactor fuel, it must be exposed to a neutron source. After absorbing a neutron from the reactor core, the Thorium is removed to a decay tank where it converts to Uranium 233, the primary fuel for the reactor. Due to the withdrawal of funding, the thorium blanket (shown in green) was never added to the MSR.

### What if there is a melt down?

You can't have a meltdown in a molten salt reactor, the core is already molten. In a standard reactor, a meltdown is a potential disaster. In a fluid fueled reactor, its normal operating procedure.

### What if there's a leak?

All the salts are solid at room temperature. If any salt leaks out, it will solidify.

### What if there is an explosion?

There is no internal pressure in the LFTR. In fact, there is a slight negative pressure. If anything were to break open the reactor, the salts would simply solidify.

### What if the reactor overheats?

If the fuel salt overheats, the salt expands, which makes the reaction slow down and eventually stop. If the temperature of the salt rises too high, a solid plug of salt in a drain pipe would melt and the fuel would drain to a dump tank where a nuclear reaction is not possible. This 'freeze plug' can also be used to simply switch the reactor off.

### What about proliferation?

A LFTR is a very poor option for making nuclear weapons. No weapon has ever been made from U233, the LFTR's main fuel. In fact, it could burn up old weapons along with waste from solid fuel reactors.