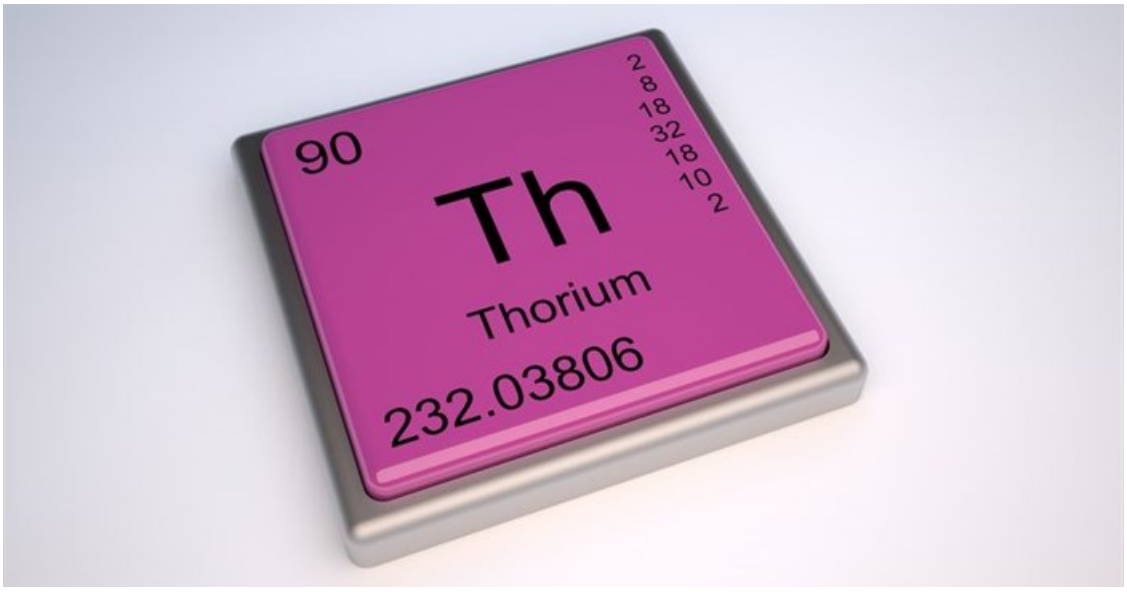
Thorium-based nuclear power stations solution for energy crisis

Unless South Africa's energy crisis is addressed, the country is destined for long-term power and water shortages primarily because power will be need to produce clean water.



According to Trevor Blench, chairman of Steenkampskraal Thorium Limited (STL), the solution lies in developing small thorium-based nuclear power stations, which are far safer than uranium-based power stations and more affordable. Thorium reactors use dry cooling or minimal water, either inland fresh water from rivers and dams or sea water along the coastline to create energy and desalinate water.

Blench said while many parts of Africa are dry, the thorium reactor could desalinate sea-water for human consumption and produce water for irrigation. "Millions of people die every year in Africa from water-borne diseases. Our reactor could produce clean drinking water.

"Thorium represents an emerging and safe technology that is more efficient than uranium, produces significantly less hazardous waste and cannot easily be used for nuclear proliferation purposes. The solution to the energy and future water crisis is to develop small thorium-based nuclear power stations deployed at these strategic locations."

Sufficient reserves

"SA has sufficient thorium reserves to supply all SA's energy needs for the next 100 years, which can also be used for desalination plants and for the safe production of electricity," he said. STL owns the rights to the thorium of the Steenkampskraal mine in the Western Cape. The Steenkampskraal mine has the highest known thorium and rare earth grades in the world.

"Thorium does not produce plutonium in its nuclear waste, neither does it produce trans-uranic actinides. It is therefore a much cleaner fuel than uranium. Our associate company in Norway, Thor Energy, has manufactured thorium fuel and is now qualifying this fuel for use in commercial reactors. We will be able to use thorium fuel in our reactor," he said.

"We are designing a nuclear reactor that is appropriate for Africa. Typically, African countries have a total annual electricity production of between 1,000 and 5,000MW per year. They do not have well-developed grids to distribute electricity and currently generate a lot of their electricity with diesel generators, at very high cost."

"These countries cannot afford to spend billions of dollars buying big expensive reactors, up to ten years building such a reactor or plug a 1,000MW nuclear reactor into their tiny grids," he said.

Suitable for Africa

The reactor being developed will be suitable for African and remote conditions. "The reactor will be small. It will have a rating of 100MWth (35MW electric) and will be the right size for many African countries such as Namibia, Botswana, Ghana, Kenya and many others.

"It will be suitable for distributed generation, so that countries that do not have good grids could build several of these small reactors in different parts of the country. It will produce electricity more cheaply than the diesel generators being used today.

"It will also be affordable for the small countries that make up most of Africa and it will cost a fraction of the cost of large nuclear light water reactors (LWRs). It will be modular and quick to build," he said.

Blench believes that if Africa is going to embark on a nuclear future, it should leap-frog over the Generation 3 reactors and go straight to Generation 4 reactors. "The technology is available. It has been tried and tested over many years. Our reactor is a Gen 4 design which means that our reactor is intrinsically safe and meltdown-proof."

Safe and meltdown-proof

"It cannot melt down under any circumstances. The world over it is agreed that safety is the most important consideration in the nuclear industry. High temperature gas-cooled reactors (HTGRs) have been demonstrated on several occasions, under the supervision of the IAEA, to be intrinsically safe and meltdown-proof. Another big advantage is that they are multi-purpose and capable of co-generation."

"There are many problems in Africa. Three of the biggest problems are food, water and power. Our plant can produce hydrogen in the form of ammonia. This hydrogen could be used to make fertilizers to improve agricultural yields.

"Most parts of Africa suffer from power shortages that retard their rates of economic growth and hold down their living standards. Our small plant could provide electricity for remote towns and villages all over the continent," Blench concluded.