

The Australian

Thorium a strong rival

Uranium may be tainted by politics, but an alternative has no such stigma

By Robin Bromby

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BULGARIA is building a 1000 megawatt nuclear power station. Last month, Egypt announced it was opening international bidding for a 1200MW nuclear plant on its Mediterranean coast.

The connection between these two events -- apart from the fact that they are new nuclear plants -- is that the head office of the company providing the engineering expertise is based in North Sydney.

WorleyParsons has been involved in the design and construction of 18 nuclear generating plants and has a large nuclear branch in Sofia to work on such projects anywhere in the world. However, not in Australia.

Egypt plans to build four such plants by 2025, adding another 4000MW to the country's generating capacity, at breaking point in the hottest months of the year.

But, in Australia, nuclear power is a dead issue.

It was not featured in the recent federal election campaign, although other aspects of energy and climate were.

Yet while the Greens abhor it (and uranium mining), the British climate lobbyist Lord Stern told the National Press Club in Canberra last month that Australia should not rule out nuclear power while addressing the question of greenhouse gas emissions.

The use of nuclear power for power generation has grown worldwide. Even the German government, which had been planning to phase out its old nuclear plants, is now talking about extending their operating lives by a further 15 years.

So, too, has the case for nuclear being a very low greenhouse gas emitter.

But the ground is also changing, with new technologies possibly leading to a reassessment of nuclear as a clean and efficient form of electricity generation.

In a recent issue of the Washington-based journal *Science*, two British academics proposed that concerns about climate change, security of supply, and depleting fossil fuel reserves have spurred a revival of interest in nuclear power generation in Europe and North America, while other regions continue or initiate an expansion.

They argued this would be a two-staged process. Robin Grimes, materials researcher at Imperial College London and William Nuttall, senior lecturer in technology policy at the University of Cambridge, said the first stage would include replacing or extending the life of existing power plants.

But, from 2030, "a large-scale second period of construction would allow nuclear energy to contribute substantially to the decarbonisation of electricity generation".

And there would be ways to avoid expanding power grids. Grimes and Nuttall said that floating plants near large cities could be one such development, already a significant factor in developing countries that had inadequate national grid systems.

By 2030, too, it may be possible to use uranium as much as 15 times

more efficiently, the authors said.

And there's an alternative to uranium - it's called thorium.

Its use for power generation is now being proposed by Nobel laureate Carlo Rubbia, of the European Organisation for Nuclear Research.

Rubbia was reported saying that a tonne of the silvery metal produces as much energy as 200 tonnes of uranium, or 3.5 million tonnes of coal.

Back in 2007, the House of Representatives industry and resources committee published a report much talked about at the time but quickly forgotten. It was called Australia's Uranium: Greenhouse Friendly Fuel.

Apart from recommending an end to bans on new uranium mines, the committee of six Coalition and three Labor MPs along with independent Bob Katter drew attention to the country's thorium capacity.

It reported that Australia then possessed the world's largest quantity of economically recoverable thorium resources, more than the US and Canada combined.

However, the committee report said the official figures for world thorium resources are considered conservative. Geoscience Australia had separately stressed that the Australian figure was based on assumptions rather than direct geological data. The parliamentary report noted that, like uranium, thorium can be used as a nuclear fuel (which is why the former West Australian Labor government banned mining of thorium as well as uranium) but, from an efficiency point of view, almost all the mineable thorium is usable

in a reactor compared with only 0.7 per cent of natural uranium. "Thus, thorium may contain some 40 times the amount of energy per unit mass than uranium without recourse to fast breeders," the report continued.

Prescient - if ignored - words in light of the Rubbia comments.

But thorium also has another advantage for those worried about nuclear proliferation.

According to another scientist at the Geneva-based nuclear research organisation, it's difficult to make nuclear weapons using thorium because it emits too many gamma rays.

India is in the forefront of work on building thorium-fuelled reactors for generating electricity.

Last month the Brookings Institution in Washington D.C. released a paper on India's future issues with nuclear power.

It concluded that nuclear offered the country long-term energy security, but this entailed tapping into the country's vast thorium resource, one of the biggest in the world and not far behind Australia's.

The problem identified by the Brookings paper is that India is forced to use uranium mined at grades as low as 0.1 per cent, making it two to three times more costly than uranium mined elsewhere.

Hence the appeal of thorium - using far less for the same output would constitute a significant cost saving. India is addressing the issue. But in Australia?

Silence.

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