

Futuregrowth's position on nuclear**Authors: Bongile James (Investment Analyst) and Paul Semple (Portfolio Manager) @ Futuregrowth****Date: March 2022**

Nuclear power as a long-term solution to our energy woes is a sensitive topic, partly due to the ramifications for our country of the substandard design and poor build quality of Medupi and Kusile, the last mega-power plants constructed in South Africa. There are also concerns about Eskom's ability to procure, build and operate a new nuclear power project.

Notwithstanding these, and other vented concerns, we believe that the nuclear option should not be dismissed outright and that we should keep an open mind. Our reasons for this stance include the following:

- South Africa is seismically stable (i.e. earthquakes are negligible) in most areas, which would mitigate the risk that nuclear reactors pose in other parts of the world.
- Nuclear has an extremely low carbon footprint on a lifecycle basis, and is an efficient base load energy provider.
- South Africa has gained experience in running the Koeberg nuclear plant over the past 40 years. Our technical expertise and lived experience add to the case for including nuclear technology in the discussion about potential long-term energy solutions.
- There is an established and highly successful track record of public-private partnership of new energy procurement over the past ten years, as demonstrated by the REIPPP Programme.
- In order to achieve net-zero carbon emissions by 2050, consideration has to be given to nuclear technology alongside other clean technologies in the country's energy mix.

Procurement, price and reliability are critical components

Against this backdrop, our view is that South Africa cannot rely on Eskom to *procure, build and operate* nuclear power alone, and that any nuclear project would need to be done on a public-private partnership basis.

We need to emphasize, though, that the price of any technology (including nuclear) is critical, as this is normally transferred to the consumer. It is important that decisions are made based on the least cost to the consumer in terms of price per unit of electricity, and the reliability and consistency of its supply over the long term. If the nuclear option is explored, this should be done on a competitive bid basis and in an open and transparent manner.

A notable drawback of nuclear power plants is that they take a long time to design, build and decommission (around 5 years to do regulatory preparations, 7 to 10 years to construct and more than 5 years to de-commission). However, while upfront capital costs are high, over the long-term life cycle of a nuclear plant (on average 50+ years), the average unit cost of the electricity produced could be closer to the other forms of base load energy currently available, especially when considering the environmental costs of coal and gas-fired energy.

Given the rapid pace at which new energy technologies are advancing (particularly in the renewable energy space) there is the argument that it is not sensible to lock ourselves, as a country, into the long-term programmes, technologies, or financial commitments that nuclear projects would require. Current large pressurised water nuclear reactors are typically large upfront cost procurements, can take at least 15 years to be operational, and require commitment to a single vendor country, vendor technology, design, and vendor company.

At the moment, small modular reactors are not commercially available. There is uncertainty in respect of the costs of these, as small modular reactors haven't been deployed on a commercial scale to generate electricity. The Department of Mineral Resources and Energy Chief Director for Nuclear Safety and Technology, Katse Maphoto, was quoted by Denene Erasmus in the Business Day article of 17 March

2022 as having said at the Nuclear Technology Imbizo that while the average capital cost of conventional nuclear plants was about \$5,000/kW, the cost of new solutions such as small modular reactors is much lower at about \$2,800/kW, making the technology more cost competitive with other types of power generation such as fossil fuels.

Chris Yelland mentioned at the [recent Energy Webinar](#) that we should apply a “watch and wait” strategy in respect of small modular reactors, to see how the technology develops over the next 10 to 15 years.

Because technologies are constantly changing, giving rise to a risk of committing to a potentially obsolete nuclear reactor technology, a “watch and wait” strategy seems reasonable, as we do not know what developments may occur in the next 15 years. Small modular reactors of 300MW or less, in tandem with the planned decentralisation and reform of the power sector, could be a solution.

In the interim, we should expand our renewable energy investments and explore partnering the renewables with battery energy storage system solutions to help increase our base load supply. Nuclear is one long-term solution and small modular reactors might be preferable to large pressurised water reactors, subject to cost and safety considerations. Any nuclear build programme must be at a modular scale that the country can afford.

That said, we should not be *forced* into any decision to commit to nuclear power: if it does not make sense from a consumer price perspective after exploring the options, we should not take it any further. We should just be open to considering it as one of the many energy sources available to us, as we strive to find a solution to our ongoing power problems.

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