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NUMBERS 1,940MW

Koeberg's contribution to the national grid, meeting about half of Western Cape's electricity requirements

OCTOBER 11, 2026 Sunday Times

SA's nuclear ambitions hinge on local skills

Koeberg has nurtured generations of SA engineers, but a new nuclear programme will need to stem the loss of talent

By KABELO KHUMALO

● A walk through the intricate workings of Koeberg, Africa's only nuclear power station, is a sober reminder of what African hands and minds can achieve as Eskom considers extending the plant's life to 80 years.

Although unassuming from the outside, Koeberg is one of South Africa's greatest engineering feats – and could serve as a blueprint for the country's next nuclear build, which is targeting 5,200MW, with the possibility of expanding this to 10,000MW.

Nuclear power construction in South Africa is not without its critics. They point to the costs and delays associated with building such plants, while more extreme opponents cite disasters such as Chernobyl, Three Mile Island and Fukushima to highlight the catastrophic potential of human error, natural disasters and security vulnerabilities.

However, Eskom's chief nuclear officer, Velaphi Ntuli, said people needed to move beyond isolated nuclear incidents and consider the technology in its entirety. "Eskom has operated Koeberg safely and reliably for more than 40 years. Nuclear is a fantastic technology that has a key role to play in South Africa's energy mix," he said.

BIG READ

"As Eskom, we have committed to dialogue about nuclear with both its proponents and detractors. Most of the criticism levelled at nuclear is based on fear, and the more we talk to each other rather than past each other, the more we will understand the benefits of nuclear as a stable source of energy."

Ntuli was appointed last year and is expected to play a leading role as South Africa prepares for its new nuclear build, the first since the Koeberg project, construction of which began in 1976.

But Eskom is not willing to shut the door on Koeberg, believing it can extract more value from the asset. The power producer last year secured a 20-year extension to the plant's operating life, taking it to 2045.

Looking even further ahead, the utility has already begun laying the groundwork for a business case to extend the plant's life for a further 20 years beyond 2045.

The plant supplies 1,940MW (total capacity) to the national grid and meets about half of the Western Cape's electricity requirements. The decision to build it near Cape Town was finalised in the mid-1970s because transporting coal across the country to the region was too expensive and inefficient.

Other African countries are now looking to nuclear power, with Koeberg offering lessons for their own programmes.

Egypt is constructing its first nuclear power station at El Dabaa, comprising four large Russian reactors with a combined capacity of 4,800MW. Upon completion, the plant will be Africa's largest, eclipsing

Protect the core

Other African countries looking at nuclear power

- Egypt
- Nigeria
- Kenya
- Zambia

- Construction of Koeberg began in 1976
- In December 1982, Koeberg was bombed while it was still under construction
- Umkhonto we Sizwe, the armed wing of the African National Congress (ANC), claimed responsibility for the attack
- The bombing itself was carried out by a single individual: Rodney Wilkinson
- Unit 1 was synchronised to the grid on April 4 1984
- Unit 2 was synchronised on July 25 1985
- Built by a French consortium led by Framatome

Nobu Motoma / Sunday Times Source: Eskom



Eskom's chief nuclear officer, Velaphi Ntuli.

Koeberg. "We will always be known as Africa's first nuclear power station," Ntuli quipped, reflecting on developments elsewhere on the continent.

East Africa's largest economy, Kenya, has also announced its intention to develop nuclear power capacity, as has Nigeria, West Africa's economic powerhouse and the continent's most populous nation.

The establishment of Koeberg gave South Africa deep technical expertise, passed down from one generation to the next. The roughly

- (now Aрева)
- First power station manager: Paul Semark
- Koeberg, the only nuclear power station in Africa
- It has a pressurised water reactor (PWR) design
- It boasts the largest turbine generators in the Southern Hemisphere
- It has operated safely and efficiently for 42 years
- Produces 4.2% of South Africa's electricity
- Life extended by 20 years in 2025 (up to 2045)

KEY PEOPLE

- Bheki Ntshumalo
head of generation
- Velaphi Ntuli
chief nuclear officer
- Bravance Mashale
power station general manager

“Eskom has operated Koeberg safely for more than 40 years. Nuclear is a fantastic technology with a key role to play in SA”

Velaphi Ntuli, chief nuclear officer

1,500 people who work at Koeberg represent some of the country's finest engineering and scientific talent.

The demographics of Koeberg today are a far cry from those of the early construction years, with more women and people of colour taking up leadership roles.

The senior officials whom Business Times met during its tour of the facility this week include people who were not even born when construction began in 1976, such as acting station manager Nicolene Boyes.

The deep skills developed by Eskom at considerable expense have not gone unnoticed, with international firms poaching South African talent. Eskom's nuclear new-build senior manager Sadika Touffie said the exodus of talent to overseas markets

was a natural consequence of the global competition for skilled professionals.

"We produce some of the world's best nuclear scientists and engineers."

"It is a credit to South Africa that our homegrown skills are internationally recognised."

It is this talent pool and expertise that Touffie will have to draw on as South Africa plans to build 5,200MW of new nuclear capacity by 2039, in line with the integrated resource plan outlined last year.

Prof Bismark Tyobeka, principal and vice-chancellor of North-West University, said if nuclear construction was to help rebuild South African engineering capacity, then localisation, skills transfer, supplier development and industrial capacity would have to be deliberately built into the programme.

"South Africa once had deep capability around ambitious nuclear engineering. The pebble bed modular reactor programme showed some of what we were capable of. We had engineers, scientists, technicians and manufacturers who could handle demanding work. Then much of that broader capability dissipated," he said.

"A new nuclear programme gives us a reason to rebuild. Nuclear construction needs civil, mechanical, electrical and nuclear engineers. It needs materials specialists, technicians, welders, artisans, inspectors and manufacturers working to exacting standards."

"It creates difficult work – the kind of work on which engineers grow. At Koeberg, South African teams and their partners have undertaken highly complex nuclear work, including replacing enormous steam generators. It reminds us that South Africans can do difficult things."

A study commissioned by Eskom has recommended Thyspunt – a stretch of coast about 14km west of Cape St Francis in the Eastern Cape – as the site for the proposed new nuclear plant. The other option is Cape Town.

However, environmental groups are mobilising resources for a legal battle to block the 5,200MW nuclear plant, a challenge that could delay the project for years. These groups include the Thyspunt Alliance – a broad coalition of civic, conservation and other organisations – which argues that the environmental impact of the proposed nuclear facility outweighs its economic benefits.

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