



## INGULA PUMPED STORAGE SCHEME

### Introduction

To build a pumped storage scheme you need a specific combination of factors to be just right, they are: the right geology, enough available water, two sites to build dams – close enough together, but with at least 400 meters difference in altitude, it needs to be close to the National Grid and close to existing infrastructure. Eskom started looking for such sites in the 1980's. Initially more than 90 potential sites were investigated, resulting in the short-listing of only three. The best site was selected north-east of Van Reenen's Pass, spanning the escarpment of the Little Drakensberg, and straddling the provincial boundary of the Free State and KwaZulu-Natal.

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This is also the continental watershed between the Vaal River catchment, flowing into the Atlantic Ocean, and the Tugela River catchment, flowing into the Indian Ocean.

### History behind the name Ingula

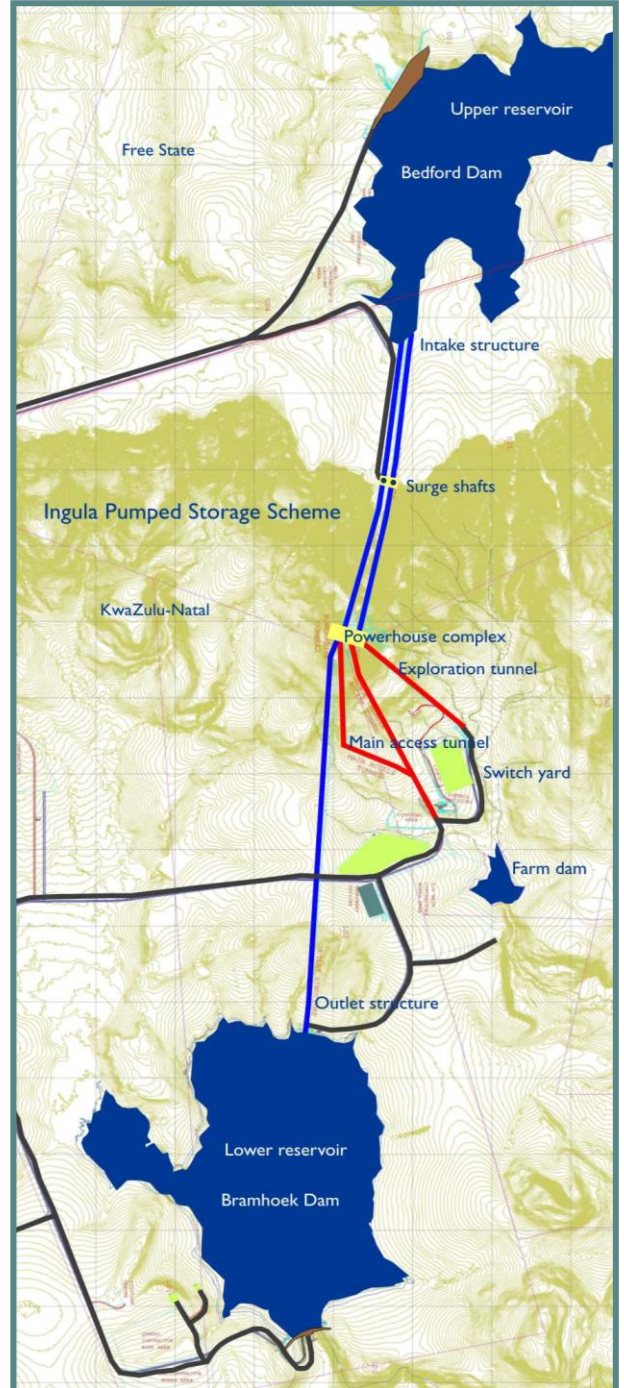
Initially known as 'Braamhoek', the name was officially changed to 'Ingula' in March 2007. The name 'Ingula' alludes to the creamy contents at the top of a milk calabash. The quest to find an appropriate name for Ingula Power Station was inspired by the mountains and foamy river-waters, and the rich cultural symbols and traditions of the indigenous people on both sides of the border.

### The scheme

The pumped storage scheme consists of an upper and a lower dam, each capable of holding approximately 22 million cubic metres of water. The dams, 4.6km apart, are connected by underground waterways passing through a subterranean powerhouse with four 333 MW generators.

To generate electricity during times of peak demand, water is released from the upper dam, passing through the pump/turbines, into the lower dam.

During times of low energy demand, the pump/turbines are used to pump the water from the lower dam, back to the upper dam.

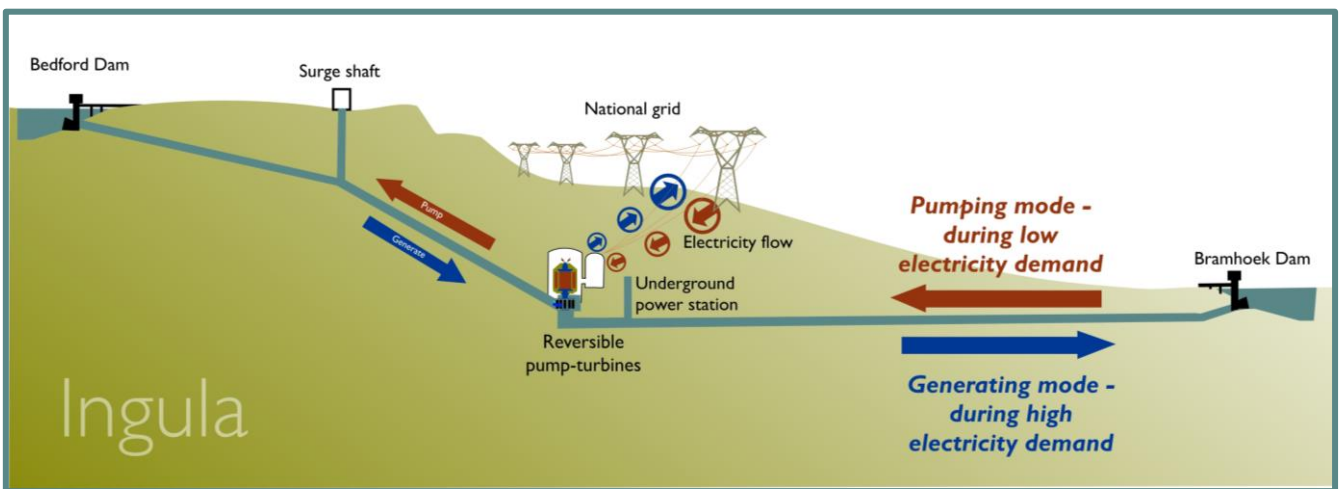




**Rotor being lowered into stator**



**Intake canal and headrace**



**Operation of a pumped storage scheme**

**The environment**

Eskom took the decision to manage the area surrounding the dams and construction sites as a conservation area. This area, located in both the Free State and KwaZulu-Natal, is of significant value as a source of water for the Highveld and serves as a habitat for a variety of plants, birds, and animals. A team of full-time, professional environmentalists monitored all construction activities and ensured that all legal requirements were complied with.

**Conservation**

In 2018, eight thousand hectares around the power station was formerly declared as a nature reserve. The Ingula Nature Reserve is Eskom's the third nature reserve following the Koeberg Nature Reserve and the Majubu Nature Reserve, all declared in terms of the National Environmental Management Protected Areas Act, Act 57 of 2003. With the cooperation of surrounding landowners, the Ingula Nature Reserve may form the core of a larger conservation area protecting the moist, high altitude grasslands of the eastern Free State and northern KwaZulu-Natal.

In March 2004 a partnership was formed between Eskom, BirdLife South Africa, and Middelpunt Wetland Trust. The Ingula Partnership, as it is known, is directly involved in the management of the nature reserve. It aims to expand awareness on an international, national, regional, and local level. The partnership's vision is for Ingula to become a world renowned, sustainable conservation area.



**Grassland at Ingula's upper site**

## Birdlife



*Malachite Kingfisher*



*Wattled Crane*

More than 300 bird species have already been sighted at Ingula. One of these, the Wattled Crane, is among the three critically endangered birds in terms of regulations issued in the National Biodiversity Act. The Bedford/Chatsworth wetland is recognised by BirdLife South Africa as an 'Important Birding Area' (IBA).

## Wildlife

The threatened oribi occurs on site, grey rhebok and steenbok are also present. Historically, the site was heavily utilised by livestock which resulted degradation of habitat including large tracts of erosion. Livestock numbers have been reduced and eroded areas have been rehabilitated or stabilised. In the past the area was subjected to poaching and illegal plant harvesting. Through the development the nature reserve, it is hoped to increase numbers of animals on site and, in a secure environment, establish viable populations. A reduction in unsustainable activities has improved general conditions on site.

## Wetlands

Wetlands comprise around 1 000 hectares and supplies the water to the Wilge River throughout the year. Biodiversity in the wetland system is high and several species needs protection following years of overgrazing and inappropriate burning. The pristine status of the wetland gained it Ramsar certification in 2021. Ramsar is the world convention for the protection of wetlands and this means that our wetland and the reserve is globally recognised

## Grasslands

Grassland ecosystems are most in need of conservation in South Africa. The conservation of the Ingula area will contribute towards increasing grassland areas under protection.

The cooperation of landowners, through the development of a nature reserve, will ensure an improved environment and has helped in the development of communities in the area, both from a social and economic perspective.

## Rehabilitation

In addition to the wetlands, there are a variety of habitats on the property, including grassland slopes and mountain forests, with large numbers of plant species. Harvesting opportunities will be explored and, if appropriate, sustainable programmes implemented.

Programmes to remove indigenous vegetation in the construction areas were implemented before construction and they were also used during rehabilitation.

## Ecotourism

As part of the conservation programme, birding has been the most successful. Camping, walking, and hiking trails are still being tested and improved on. Other ecotourism opportunities are being investigated and will be implemented as and when opportunities arise.

## Sustainability

The site aims to be an internationally renowned sustainable nature reserve and all activities on site are carried out with this long-term objective in mind. Due to the sophisticated Environmental Management Plan that governs all activities on site, Ingula was the first Eskom construction site to receive ISO14001 certification in March 2011.

All Ingula's four units are commercially operating, including the last unit that went on-line on 30 January 2017. The power station provides electricity for the peak demand to the National Network, primarily during morning and evening peaks.



*Endemic Drakensberg Sugarbush at Ingula's upper site*

## Visitors Centre

Interested in our World of Generation? Guided tours are conducted from the Visitors Centre during weekdays. Presentations can also be given off-site and on-line via MS Teams. Booking in advance is essential.

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Select the "About electricity" and "Visitors Centres"  
(<http://www.eskom.co.za/c/article/54/ingula-pumped-storage-scheme/>)