

ELECTRICITY

Eskom's Ingula pumped-storage scheme

Name and Location

Ingula pumped-storage scheme project, on the border between the Free State and KwaZulu-Natal (KZN), South Africa.

Project Description

The Ingula pumped-storage scheme, located within the Little Drakensberg mountain range, 23 km north-east of Van Reenen's Pass, will comprise an upper dam (Bedford) and a lower dam (Braamhoek). The upper reservoir site is located in the Free State and the lower in KZN. The escarpment forms the border between the two provinces.

The distance between the upper and lower reservoirs will be 4.6 km, with an elevation difference of about 470 m.

The dams will be connected by underground waterways, through an underground powerhouse complex, which will house four 333 MW pump turbines with a total capacity of 1 332 MW, a machine hall, a transformer hall and associated tunnels, shafts and caverns.

The twin waterways, consisting of part concrete and part steel-lined headrace tunnels, pressure tunnels and shafts, will link the upper reservoir with the pump/turbines. Steel-lined extended draft tubes and a single concrete-lined tailrace tunnel will connect the pump/turbines to the lower reservoir.

The upper reservoir will be a concrete-faced rockfill embankment dam 41 m high, with total capacity of 22.6-million cubic metres and an active water storage volume of 19.3-million cubic metres. The lower dam will be of roller-compacted concrete, 39 m high, with total capacity of 26.3-million cubic metres and an active storage volume of 21.9-million cubic metres.

The upper reservoir will store enough water to generate electricity continuously, using all four units for 16 hours. Pumping the water back from the lower reservoir will take about 21 hours, giving an overall efficiency of 76% for the scheme.

Value

R16.6-billion.

Duration

The first 333 MW unit is expected to be commissioned in the first quarter of 2014, while the remainder of the units will start commercial operation in 2014.

Client

Eskom.

Key Contracts and Suppliers

The Braamhoek Consultants joint venture (JV) consisting of Arcus Gibb, Knight Piésold and Stewart Scott (civil engineering, mechanical engineering, electrical engineering, detailed design, tender documentation, design monitoring and construction supervision); Murray & Roberts (exploratory tunnel); Grinaker-LTA (access roads); CMI JV, comprising CMC di Ravenna, PG Mavundla and Impregilo (underground civil works); Afriscan

(water supply, sewage treatment, small access roads and building of temporary Eskom offices); B&E Quanza Group (aggregate quarry); Acer (Africa) (environmental consultants); Braamhoek Dam JV, comprising Concor Roads & Earthworks, Wilson Bayly Holmes-Ovcon (WBHO), Edwin Construction and Silver Rock (dam contract); Voith Siemens Hydro Power Generation (electromechanical equipment contract); Atlantis Drill (ventilation shaft) and Sandvik Mining & Construction (raiseboring manager); Deutsche Bank (R1-billion loan); and ABB (electrical balance of plant, or eBoP, solution).

Latest Developments

August 2011

Eskom is seeking expressions of interest (Eoi) for the possible installation of a suspended monorail transport system at the Ingula pumped-storage scheme.

The Eoi has been issued to test market interest ahead of a possible formal request for proposals, which could be issued by the end of October.

Currently envisaged is a monorail operating in the 1 640-m-long main access tunnel to transport personnel from the surface buildings to the main underground cavern.

Eskom wants a solution with a minimum capacity to transport 16 people simultaneously in one direction.

Once the tender and the returns are evaluated, a contract could be awarded by May 2012. It is anticipated that the design phase will take place during 2012 and that construction should begin in 2014.

On Budget and on Time?

The first 333 MW unit will now only be commissioned in the first quarter of 2014.

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