

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, South Africa.

Project Description

The pumped-storage scheme, located in the Drakensberg mountain range, on a site north-east of Van Reenen's Pass, will comprise an upper dam (Bedford) and a lower dam (Braamhoek). 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, which will house four 333 MW pump turbines, with a total capacity of 1 332 MW.

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 of the nearly R17-billion project is expected to be commissioned by 2012, while the remainder of the units will be commissioned in April, July and October, respectively; however, construction of the Bedford dam is expected to be completed by May 10, 2011.

Client

Eskom.

Key Contracts and Suppliers

The Braamhoek Consulting joint venture (JV) consisting of Arcus Gibb, Knight Piésold and Stewart Scott (design monitoring and

supervision); Murray & Roberts (exploratory tunnel); Grinaker-LTA (access roads); CMC Mavundla, a CMC di Ravenna and PG Mavundla JV (main access tunnel); 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); ABB (electrical balance of plant (eBoP) solution).

Latest Developments

September 2010

Power and automation technology group, ABB, has been awarded an order valued at \$23-million, to supply an eBoP solution for the Ingula project. As part of the turnkey eBoP solution, the firm will design, engineer, supply, install and commission the project. Key products to be supplied include the service and auxiliary transformers, dry-type distribution transformers and medium- and low-voltage switchgear.

August 2010

The tailrace tunnel downstream from the construction adit stands at 605 m excavated and from the adit upstream at 499 m.

To date, excavation on surge chambers 3 and 4 amounts to 8 929 m³, with chambers 1 and 2 excavated to 3 028 m³.

Work on the outlet structure is 90% completed, with the installation of trash racks and grids currently under way. Construction on the tower and bridge is also in progress.

Work on the draft tubes, which will be located below the turbines and will handle water flowing at a rate of 85 m³/s, is progressing well.

Meanwhile, Eskom has signed a loan with the Deutsche Bank valued at R1-billion, which will be used to fund 85% of the turbine pump contract for Ingula.

On Budget and on Time?

The project is reportedly on schedule for completion in May 2011.

Contact Details for Project Information

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