

# ESKOM

## KUSILE

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# King coal

Biggest doesn't have to be best but the scale of Eskom's Kusile coal-fired power station is of strategic importance to the hard-pressed utility: it has to catch up with ever increasing demand from industry and South Africa's mass electrification programme

**K**usile, located at Mpumalanga and part of Eskom's \$48 billion programme to build a new generation of power stations, is expected to become one of the world's largest coal-fired power plants once it is completed in 2018. Nobody is more attuned to the scale and importance of the project than Abram Masango, executive project manager of the Kusile Power Station Project. "Kusile is unique, not just in terms of its size but because it is incorporating some of the most advanced technology available. This means it will not just be an immensely impressive plant in terms of its extent and technology, but one of the most operationally efficient and environmentally responsible too."



The project is awesome in terms of its capacity, design and complexity. The station will consist of six units each rated at approximately 800 MW of installed capacity, giving a total of 4,800 MW. Compare that with, say, the obsolescent Nanticoke Generating Station in Ontario, Canada, which is the largest coal-fired power plant in North America, delivering a mere 3,640 MW to the Canadian grid. Kusile is being built on a huge greenfield site covering 5,200 hectares of what was once farmland located between the N4 and N12 freeways not far from the existing Kendal station.

Kusile will have a prodigious appetite for fuel and is projected to consume 17 million tons over its 47 year lifetime. To supply this, Eskom has reached an agreement with Anglo Coal South Africa for the coal to be supplied through Anglo's empowerment subsidiary, Anglo Inyosi Coal. The first coal supplies are scheduled to be delivered in 2013 ahead of the commercial operation of the first unit in 2014, to allow the creation of on-site stockpiles.

The coal destined for Kusile is mined from the New Largo and Zondagsfontein open cast deposits; however, these do not currently produce enough coal and each will need to be developed. In particular, the New Largo mine, which produces about 60 per cent of Anglo Coal's annual production of 100 million tons, is due to be massively expanded, at an estimated cost of \$660 million.

Of course the decision to site the power station in Mpumalanga was dictated by the availability of coal in the vicinity. However, one of the greenest and most efficient aspects of the entire project is the ability to deliver the bulk of the 17 million tons by conveyors direct to the power station. This will save an unnecessary burden being placed on the province's stressed road network

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### Clyde Bergemann Africa

Fly ash handling: Clyde Bergemann Africa has been contracted for the design, supply, construction and commissioning of the multi vessel dense phase fly ash handling system for Kusile Power Station. This includes the conveying of fly ash from the bag houses to the storage silos and conditioning of fly ash. The company is part of the Clyde Bergemann Power Group.

have developed an integration plan to ensure that all our different stakeholders work seamlessly together.” The Kusile Civil Works joint venture is led by Stefanutti Stocks, together with Basil Read, Group 5 and WBHO.

The construction phase has already presented some problems that have had to be overcome, says Masango. “One of the technical challenges we have met relates to the geo-technical conditions that exist across this extensive site. Building six units is not just a matter of doing the same thing

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The first 800 MW unit is planned to start commercial operation in December 2014; thereafter, the second unit will follow in 12 months with units three through six following at eight month intervals. “One of the biggest headaches we had was over funding,” Masango admits. Much of the cost is being borne by a group of French banks—and apart from any worries that may have existed over the French economy’s ability to keep its head above water during recent turmoil in the Eurozone, this and other large Eskom capital projects suffered from some uncertainty until the South African government’s announcement that it will inject R20 billion of equity into Eskom over the coming three years. This has been described as the final piece in the group’s long-awaited funding plan puzzle and has allowed the remaining contracts for the Kusile plant to be placed.

These include a \$43 million contract to ABB to supply switchgear, protection, and supervisory control and data acquisition equipment. This is a big relief to the project team, which is now able to make full use of its Primavera software to bring the complex mix of partners together. “Now that the project has been given its full release, all the remaining contractors will mobilise really quickly with the people who have been working since we started work last year. The project is now on track, and the integration between the various contractors that we have been able to achieve has been one of our major successes. Our partners are playing a big role in supplementing the skills we already have within Eskom, and we

six times: for example, on unit one we needed to install piles, but only unit six will reproduce that method for supporting the unit.” Units two to five will use a different technical solution involving shallow foundations.

The project has already had to face challenges connected with its environmental performance. One of the first things that needed to be done was to construct storm management and erosion control infrastructure in accordance with site permits and environmental regulations, Masango explains. He is also particularly proud of the innovative ways this plant limits its environmental impact and points to the wet limestone flue gas desulphurization (FGD) plants that will be installed on each of the six units by Alstom.

Kusile will be the first power station in South Africa to have FGD technology, although many of these units have been installed or are under construction in different parts of the world. The FGD plant is a totally integrated chemical plant using limestone as feedstock and producing gypsum as a by-product, which, being a wet process, will significantly increase the water consumption of the station, says Masango. “In addition to the FGD, we are going to fit the fabric filter plant at Kusile to prevent coal ash contamination. This process is much more efficient than conventional electrostatic precipitators and will play an important part in limiting the plant’s environmental impact.” The boiler furnaces will be fitted with low-NOX coal burners to eliminate nitrous oxide from the flue gases, he adds. [www.eskom.co.za](http://www.eskom.co.za)

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