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### Partnerships Key As SA Tackles World-Class Gamsberg Zinc Project

At Vedanta Resources' Gamsberg mine in the Northern Cape, Zest WEG Group is working closely with lead contractor ELB Engineering Services as a preferred supplier to standardise on its range of transformers and motors across a number of on-site applications.

The Gamsberg project is South Africa's largest current greenfields mining project, and will exploit one of the world's largest zinc deposits. It is being developed at a capital cost of US\$400 million and is expected to produce 250,000 tonnes a year of zinc metal in concentrate.

"This is a very exciting project for South Africa, especially as we haven't seen a new mine being developed in the country for many years," says Dr Stephen Meijers, chief executive at ELB Engineering Services. "Vedanta Resources has shown real intent in terms of investment in South Africa; not only in this project but in others, and we are proud to be building Gamsberg."

ELB Engineering Services' first package of work was the provision of water from the Orange River to the process plant, through an upgraded pump station and a pipeline of about 40 kilometres. The second package is the supply of power from the existing Eskom switching yard via overhead lines to the mine, and the third is the process plant itself covering all aspects from run-of-mine tip through to final product, including process dams and balance of plant.

"First product is expected through the plant by the middle of 2018, with the civil works being largely completed by the end of the second quarter of 2017," says Dr Meijers. "Structural and mechanical construction on the plant is now starting to become the focus of work, and the pace will continue to be intense until middle of 2018."

Extreme temperatures on site – down to minus 10 degrees Celsius at night in winter and up to between 45 and 50 degrees in summer during the day – have affected the design and the construction methodology, he says. This has meant making optimal use of the cooler hours in summer, even pre-manufacturing as much as possible at night before placing during daylight hours.

Dr Meijers is a strong believer in partnerships, with much of the project technology being applied through exclusive partnerships with preferred suppliers.

“We’ve worked with Zest WEG Group for many years, and appreciate their professionalism, quality of service and reliable scheduling,” he says. “We have therefore placed a number of the contracts for this important and fast track venture through Zest WEG Group companies.”

As a group of specialist electrical companies, Zest WEG Group’s scope of supply covers two main spheres - the water-related package which focuses on the upgrading of the municipal supply station providing water to the Gamsberg site, and the package for the mine’s zinc concentration plant and related processes.

In this process, Zest WEG Group supplied a number of non-standard products – providing the mechanical and design engineering necessary to ensure that the non-standard specifications could be met, including the redundancy requirements to ensure optimal plant uptime.

“The Gamsberg plant is a showcase for WEG motors and includes four different MV motor ranges that were fit-for-purpose in their different applications,” says Kirk Moss, manager - medium voltage business at Zest WEG Group company Shaw Controls. “These included our new W50 line, the HGF line, large slip-ring motors from our M line, and our W22 line of low voltage IE3 motors; meeting the range of requirements demonstrated Zest WEG Group’s versatility in terms of the multiple MV and LV motor offering.”

Energy efficiency is a key driver in the project design, with high efficiency W22 WEG IE3 motors being specified across the site. To streamline and facilitate the implementation of this focus, Zest WEG Group was tasked by ELB Engineering Services to coordinate with all the original equipment manufacturers that would use motors to drive their equipment. This is to ensure that the principle of energy efficiency is fully applied across all aspects of the project scope.

“Importantly, we are supplying all the LV motors for the plant, ensuring the project will save considerably on its energy cost by complying with the IE3 energy efficiency standard,” says Moss. “These

motor are also IP66 rated with Class H insulation, which enhances the IE3 specification by providing higher ingress protection and accommodating a higher temperature rise.”

According to Shaw Controls business development manager Tyrone Willemse, the MV Mill package being supplied for the plant comprise two large 6,5 MW WEG motors – MAF 11 kV slip ring units – specified for the ball and semi-autogenous (SAG) mills.

“The jaw crushers will be fitted with proven, robust 11 kV 400 kW motors from WEG’s HGF line,” says Willemse. “We were also requested to supply the distribution transformers on the plant.

Zest WEG Group’s contribution to the upgrading of the water supply facility involved the provision of eight 3,3 kV 550 kW medium voltage (MV) motors as well as its locally designed and manufactured transformers to provide power to the pump stations.

“This included two 2,5 MVA transformers (reducing 11 kV down to 3,3 kV), as well as four 315 KVA (3,3 kV down to 400 V) units,” says Willemse. “Once again, these were not standard transformer designs but were prepared specifically to suit the specifications of the client.”

The package also includes the new WEG W50 motor, which features a compact size and design; through the application of the latest computational analysis techniques, both the scale and the cooling efficiency have been improved – delivering optimised airflow that enhances the unit’s expected lifespan.

“This means that the performance and temperature rise of these motors is not compromised in any way by its smaller dimensions,” says Moss.

Connected to these motors are WEG MVW01 3,3 kV variable speed drives (VSDs), further enhancing energy efficiencies. These are also compact – just 2,315 mm high, 2,600 mm wide and 980 mm deep including the integral phase-shift transformer – together helping reduce the footprint of the substation.

The Variable Speed Drives (VSDs) also boast a low component count – imperative in terms of reliability – of just three power arms that can be changed in two or three minutes, allowing for quick maintenance and low downtime in the case of replacement.

“Helping to meet the short lead-times demanded in this project, Zest WEG Group was able to leverage the global WEG group’s multiple manufacturing facilities around the world, giving us flexibility in terms of where we build and how quickly we can source product,” says Moss.

Willemse adds that an important aspect of the group’s added value has been its five year guarantee covering the hundreds of LV motors on the project.

GAMSBERG PIC 01 : Early stages and overview of Vedanta's Gamsberg Zinc Project in the Northern Cape.

GAMSBERG PIC 02 : Various pole mount and distribution transformers, ranging from 500 kVA to 2 500 kVA, being prepared for transportation to the Gamsberg Project site.

GAMSBERG PIC 03 : WEG Transformers Africa's Wadeville facility where local manufacture of the transformers was undertaken.

GAMSBERG PIC 04 : The WEG Transformers Africa facility where the various transformers for the project were manufactured.

GAMSBERG PIC 05 : One of the WEG medium voltage VSDs manufactured at WEG Brazil for the Gamsberg Project.

GAMSBERG PIC 06 : One of eight 550 kW 2 pole 3 300 V 450 J/H B3 WEG W50 electric motors supplied to the Gamsberg Project.

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