



# TradeNetworking

**Capture Business Opportunities in South Africa**  
**One of the most exciting emerging markets in the world**

This Seminar is designed to provide you with current market information as well as high level government introductions in the dynamic province of Limpopo, South Africa.

**Opportunities for Mining Products and Services in South Africa.**

The South African mining industry is a well-developed and sophisticated sector. Many local equipment and service providers are present in the market to facilitate the distribution of foreign goods or services.

The technological demands in the South African mining sector are high due to the prevalence of hard-rock ore and the challenges of deep-level mining. With appropriate partnerships in South Africa and elsewhere in the sub-Saharan African region, Australian goods and services will continue to develop long-term market penetration. The ability to deliver as contracted on extended warranties, performance guarantees, energy consumption and parts availability will be crucial aspects in the Australian.-South Africa value chain.

South Africa serves as a stepping-stone to much of African mining operations. Most mining companies have their regional head offices in South Africa, and supplies are shipped from Johannesburg by rail or freight. Gaining access to this also allows for piggy-backing off established channels of sales, distribution, After-Sales Service (ASS) and project management. Further market analysis in following pages.

**Business Delegation from South Africa**

**Seminar Date and time:**  
**Thursday March 26**  
**1.30pm – 3.30pm**

**Venue:**  
**Rydges Melbourne**  
**186 Exhibition St**  
**Melbourne**

**Mission Leader:**  
**Mr. Julius Mapatha, Acting CEO:**  
**Trade and Investment Limpopo**

**Target Industry Sector :**  
**Mining equipment and services**

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## Summary

There are clear prospects for Australian suppliers of advanced mining technology in areas such as seismic interpretation software, 3D ore modeling, integrated mine planning, communications, IT software and water powered drills, to name but a few. Furthermore, bulk material handling technologies are seen as imperative for increasing the efficiencies of domestic supplies to smelters, power stations, as well as ore export hubs at ports.

## Market Overview

The South African mining industry is a well-developed and sophisticated sector. Many local equipment and service providers are present in the market to facilitate the distribution of foreign goods or services. Anglo American Corporation dominates the industry and is involved in the gold, diamond, platinum, coal, base metals, and ferrous metals and industries. In 2005 - 2006 South Africa was a major supplier of aluminum (world rank 8), antimony (3), coal (6), ferromanganese (3), fluor spar (3), iron ore (4), nickel (11), silicon (7), titanium minerals (2), uranium (9), zirconium (2) and alumina silicates (2) as well as about 50 other minerals.

South African mining operations supply and demand significant amounts of energy. The industry consumed over 35.6 million megawatt hours in 2006. The coal-mining sector provided around 110 million tons of coal for electricity generation, accounting for about 90 percent of the electricity generated in the country in 2004. The production of synthetic fuels consumed almost 41.1 million tons of coal as well as 35 percent of liquid fuel production.

Mining fixed investment grew by 3.7 percent to US\$3.5 billion in 2004 as the impact of multiyear capital projects flowed through the procurement chain. However, the impact of the strong Rand (even in relation to largely robust commodity prices) and rising input cost pressures undermined the viability of both existing mines and new projects thus dampening some investment growth. The insufficient export infrastructure capacity is continuing to be an obstacle to efficient supplies to the global market place. The industry has approved capital projects of about US\$14.12 billion up to 2008; much of this investment is aimed not only at increasing extractive capacities and beneficiation, but also bulk material handling.

South Africa has developed a variety of mining technologies that for various reasons, such as project management control, budget issues and commercialization are not yet ready for implementation. In some cases these technologies are already reliant upon foreign components or patents and hence promise commercial benefit to foreign suppliers either as an export good or an IP royalty. Australian service providers are in a situation to benefit from this situation by offering more appropriate systems and services, by proving the concept and commercializing the product or by implementing systems for technology transfer.

Approximately 80 percent of mining activity in South Africa is done in the relatively labor intensive underground sector; the rest (20 percent) is capital-intensive opencast mining. The technological demands in the South African mining sector are high due to the prevalence of hard-rock ore and the challenges of deep-level mining. With appropriate partnerships in South Africa and elsewhere in the sub-Saharan African region, Australian goods and services will continue to develop long-term market penetration. The ability to deliver as contracted on extended warranties, performance guarantees, energy consumption and parts availability will be crucial aspects in the Australian-South Africa value chain.

South Africa serves as a stepping-stone to much of African mining operations. Most mining companies have their regional head offices in South Africa, and supplies are shipped from Johannesburg by rail or freight. Gaining access to this also allows for piggy-backing off established channels of sales, distribution, After-Sales Service (ASS) and project management.

## Market Trends

The trend in the South African mining sector to use increasingly modern mining technology is fuelled by a variety of concerns ranging from safety, labor health to cost issues.

The South African mining sector is notorious for deaths, injuries and accidents. The sector was plagued by lawsuits, inquiries into occupational health and former workers claiming for illnesses caused by hazardous working conditions. The concerted efforts of organized labor in representing workers' rights have played an important role in this development. While these conditions also reflect extraneous variables such as seismic events, many others are due to lacking management systems and attendant inappropriate mining technology. In the case of environmental issues, findings point to insufficient mechanization applications.

Established South African mining management is convinced as to the need to implement modern mining technologies that will lead to a lower unit cost of output. The technologies that will enable this are listed later. These all aim at the core objective of mining: faster, safer and more cost effective rock breaking, extraction, collection and recovery of ore. Closely linked to these core objectives of modern mining are cooling and ventilation, ore analysis, remote control communication and monitoring etc. The South African mining environment presents the biggest single concentration of hard rock extraction in the world, and also the deepest level mines in the world (up to 4000 meters). Ultra-deep level mines of more than 4,000 meters depth are still rare, but showing the way of the future.

The big growth for capital-intensive technologies will be in the hard rock sector of PGM (platinum group metals). A foreign supplier coming into the market will necessarily have to make use of local sales and ASS agents with a distribution network and spares inventory that can prevent extended downtime in the production process. While foreign suppliers face a cost

disadvantage compared to local suppliers, foreign equipment coming into the country also presupposes local value-added such as assembly, application integration and re-engineering which as part of a turnkey solution allow for more competitive costing.

Three big issues affecting mining in 2005-7 were the continued strength in the Rand exchange rate, the negative impact of rising input costs and logistical constraints that affected export volumes' capacities. The South African mining sector accounted for 6.6 percent of gross domestic product (GDP) in 2004, the same level as 2003. The industry grew by 4.2 percent in 2004 mainly as a result of the 15.9 percent increase in platinum group metals' (pgm) production combined with good growth in diamonds (up 11.9 percent), coal (up 6.2 percent) and iron ore (up 3.6 percent). The non-gold mining sector grew by 7.6 percent.

To maintain and capitalize on the recent increases in mining production and profitability, the industry is searching for ways to better exploit existing mines and expand into new mines. One example of this trend is the development of the Waterberg coalfield, widely seen as the next large new coal project. However, a lack of infrastructure, depth of mining in certain areas, distance from industrial centers/export harbors, and poorer grades of coal throughout that coalfield are all significant cost factors in this development. Some calculations suggest that in twenty years, coal mined in the Waterberg will be too costly to compete with natural gas as a source of cheap electricity in the local market or to produce exports at competitive prices. Experts believe that the one crucial variable that may change this equation is the introduction of latest-generation of bulk-handling and transshipment technologies.

Already, South African concerns are addressing this need. One example is the agreement between Transnet (the South African parastatal transport company) and Kumba Resources (a diversified metals and mining company) for the transport and handling of iron-ore from the Northern Cape through the Sishen-Saldanha export channel. The expansion and refurbishment of the 861-km-long rail line from Sishen to Saldanha and refurbishment and expansion of the iron-export facility at South Africa's deepest port, Saldanha, is currently under way to cater for increased volumes of iron-ore exports through the Sishen-Saldanha export channel. The capacity of the Orex rail line and the port of Saldanha will increase from the current 29-million tons a year to 41-million tons a year by 2010, to cope with Kumba Resources (and others) envisaged expansion plans.

This year marks the 30th anniversary of the initial shipment of Sishen iron-ore through the bulk terminal at Saldanha Bay. The Bulk-Terminal Saldanha currently handles 29-million tons of iron ore a year, though it was only designed for an 18-million-ton capacity. The replacement of the 30-year old equipment is underway. The first phase of the port expansion includes the installation of a second tippler, a third stacker reclaimer, the replacement of the two existing stacker reclaimers, a second parallel conveyor system, the upgrading of the existing conveyor system and the replacement of the two existing ship loaders. Another significant bulk transshipment project is the Sishen Expansion Project (SEP), which partners Sishen-Saldanha railway line and Sishen South mine development. According to reliable sources, the two companies are in discussions about further expansion of the Sishen- Saldanha line that will probably come into fruition after 2010. Currently, the contract is for a 35-million ton expansion by the end of 2008. What is critical to the SEP project is that Kumba is using iron-ore that previously was discarded owing to its low grade, and at the same time, an improved resource-management system is having a very positive effect as far as the environment is concerned. This is attributed to the jigging technology that the mine is beginning to exploit. The use of the new jigging technology benefits the SEP project two-fold. It increases production, which opens up the project's estimated 50-million ton future output by allowing the processing of more lower-grade ore, and it increases the mine's product range.

## **Competition**

Approximately 33 percent of domestically consumed mining equipment is imported; while statistics are lacking, it is thought that approximately one third of US equipment coming into South Africa is also trans-shipped to Africa. The biggest source of mining imports is the US, followed by Germany. Many European companies are also present. South Africa has a strong mining equipment manufacturing, engineering and consulting sector that is an important exporter of goods and services. South African exports of goods and services go into Africa, as well as Latin America and Asia. There is strong competition from Germany, Austria and other European Union member states in the mining equipment sectors.

Foreign suppliers of mining automation technologies are:

- Kennametal
- Voest Alpine
- Mannesmann
- Atlas Copco
- Nordberg
- Humboldt-Wedag
- Hosch-Foerder Technik
- Qualter Hall (in a JV with FFE Minerals, Bethlehem, PA)
- Howden Group
- Freyssinet

- Stackers and reclaimers from Krupp,
- Jigs from Allminerals,
- Crushers from IMS,
- Condra Cranes for lifting equipment,
- Contractor Metso Miner for stacker reclaimers.
- Senet conveyor systems.

An indicative listing of U.S. suppliers is:

- Alco Mining
- Baker Hughes (U.S. operations)
- Carley Lamps
- Caterpillar

- Tau Laser Corp
- Modular Mining Systems
- Ingersoll-Rand
- Fluor Daniel
- Fenner Drives
- Pelican Products Inc
- Joy Mining Machine Co
- FFE Minerals with a South African partner, Vecor.
- P & H Shovels and Draglines
- XMS Equipment Inc

Opencast mining has always been a field where U.S. suppliers have been active: shovels and draglines. With South African mines venturing deeper into the earth's core and, in the case of gold and base metal mining, facing depressed prices, companies are forced to introduce new technologies, educate and empower their people in using these applications optimally. Future technology will be required in deep-level hard-rock narrow-vein mining; while many South African mining equipment and service providers have traditionally been strong in this field, there are also areas where US suppliers can provide value. The South African Government has cut back state-funding of mining research since the 1980's, and South Africa is no longer the global leader in mining technology.

## **New Mining Technology Requirements**

The main challenge presented to gold and platinum mining is the mechanization of operations enabling safer, more affordable mining, with increased production in deep level, hard rock narrow-vein mining in the years to come. Increased mining depth into the earth's core means increasing rock falls and high temperatures, influencing productivity and costs as it becomes more expensive and difficult to mine at depths of 3 000 meters and more. Gold mining deeper than 4 000 meters has already taken place in South Africa. The obvious solution is mechanization that will reduce the number of people at risk, and increase productivity – as operations can be continuous and machines can operate at higher temperatures. In addition, this will lead to a reduction in refrigeration costs.

Mechanization will also enable mine development to advance to 500 m a month, instead of the 80 m achieved currently.

With regard to information technology and communications (ITC) systems, such as leaky feeders and mobile phones are also playing an increasingly significant role, as the ability of personnel underground to contact each other and to make contact with the surface increases the safety of workers.

The University of Pretoria Mining Department's approach to the top ten technologies required for future mining is based on the following question: Can mining companies get to the workface safely and mine there at a profit? The department's list of technologies includes:

- Ore body modeling and evaluation technologies – as a basis for cost-volume and extraction planning – and allied to ore reserve development issues.
- Ore body access – vertical access and shaft systems and horizontal systems allied to rock mechanics, as well as issues of shaft pillar extraction, mine layout, extraction planning and local and regional rock mechanics. This should be integrated with transport issues.
- Mine environmental conditions – heat- and barotrauma (i.e. pressure-related sicknesses; specifically lung and ear damage as a result of rapid pressure changes in shaft or other vertical transport systems), the productivity of the workforce (physiologically and psychologically) and economic and environmental constraints.
- Reducing emissions at source and / or control measures for contributors to air pollution – allied to the optimal use of controlled recirculation.
- Mine transport – workers and materials and logistics of providing access to and extraction of ore and waste.
- Narrow-vein mining technologies – including rock-breaking systems, cleaning, support and their integration with the other key technological issues and solutions.
- IT – including generation of real-time monitoring data and adequate communication systems, integration and application of IT (applied to workers, materials and environment) as a management decision-making tool.
- Work power and training – both for the development of these strategic technologies and, at a later stage, for their application.

The Technikon Witwatersrand School of Mines believes the following are the top ten technologies that will respond to the needs of future deep-level hard-rock narrow-vein mining:

- Rock stability/rock engineering to predict unstable rock masses.
- Better mine ventilation, which will counter heat stress and heat in general.
- Mine planning using information technology in securing optimum productivity in extreme environments.
- The optimal use of resources, including horizontal and vertical transport technologies.
- Psychological stress – the maximizing of human resources in extreme environments.
- Education and training – South Africa does not have sufficient workers to implement the technologies that are or may become available.
- Rock-breaking technologies that allow continuous and non-damaging ore production.
- Supports – the optimization of structural support to ensure rock stability.
- The use of remote and mechanized drilling.
- Cooling using micro-environment technology, including recirculation.

Despite the fact that mining technology has become extremely advanced, basic problems still exist at the rock face. Mine explosive technology allows for big advances, but the infrastructure and systems in place do not allow for the displaced rock to be removed before the next shift of miners comes on duty. The need to improve mechanization in stopes is as relevant today as it was more than 100 years ago, and the last decade has seen a need for an increase in the level of mechanization in mine layout. Optimizing the transportation of people, material and rock in mechanization programs is often neglected, or at least plays only a secondary function – the main focus being the proving and advancement of technology itself. This is despite the fact that increased mechanization of transportation is essential if deep-level operations such as gold mines are to remain competitive. This has initiated research into improving the transportation of people, material and rock. Systems such as monorails, water-jet cleaning, automated winches, continuous scraping and raise climbers are being considered.

In addition to the technologies described above, there is a demand for a large number of other emerging mining related technologies, such as:

- Dust suppression systems for coal mining machines which can handle the dust generation propensity of South African coals,
- Seismic monitoring systems and interpretation software,
- A continually expanding range of yieldable rock burst resistant excavation support systems,
- High quality backfill systems capable of providing local and regional support,
- Numerical models which can simulate rock mass response to mining operations including the modeling of support system rock mass interactions,
- Numerical models of mine ventilation and cooling systems including steady state and transient modeling of heat and airborne pollutants,
- Mine planning and scheduling software for narrow tabular deposits coupled with integrated communications and management information systems,
- Innovative mining layouts suitable for safe and efficient extraction, particularly in high stress mining conditions,
- New codes of practice for hoisting in deep shaft systems,
- Innovative technology for cooling and refrigeration of deep mines and
- Continuous scrapers for ore handling in the stopping horizon.

## **Market Access**

The South African mining equipment sector is a very open and internationally integrated sector. From a non-tariff barrier point of view, South Africa is generally open to imports. South African Health and Safety (H&S) standards are well promulgated, but in certain cases implementation and enforcement is lacking; this is especially the case in the arena of environmental protection. Approximately 90 percent of all mining equipment coming into South Africa is duty free: only Value Added Tax (VAT) at 14 percent is payable on the value of these goods. Those items that are dutiable are assessed for the applicable duty rating and VAT is added to the full value of item. The most common application for mining equipment that is subject to duties is switches and control systems (duty varies between 10 percent and 20 percent). Underground communication devices e.g. walkie-talkie are assessed at ten percent. General spare parts are assessed as being duty-free, but some other spare parts carry an assessment of 10 to 20 percent. Import permits are not required for the importation of new mining equipment.

## **Market Entry**

Because the South African market is sophisticated, entry should be well planned and factor in:

- Distribution is fairly straightforward since end-users are located around the mining heartland of Gauteng Province.
- The entrenched bias of a conservative market that sticks to known suppliers requires sustained market development.
- South Africa is the pre-eminent stepping-stone for developing most sectors in sub-Saharan Africa. The marketing mix should anticipate this medium-term option especially in mining and related sectors.

- A judicious selection of one of three low-risk entry strategies: representation, agency or distributorship is in order.
- Any local partner should be BEE compliant, a pivotal consideration with the government, parastatal and mining houses procurement process. These criteria aim at quantifying the contribution by partners to empower previously disadvantaged individuals (i.e., Black, so-called Coloured, and Indian). Suppliers who do not meet some mix of these criteria have little recourse on other objective technical grounds (price, product, delivery, etc.) to redress perceived irregularities.