

- The risk that Zincor will not be able to source zinc concentrate at competitive prices once operations at Rosh Pinah and Black Mountain are discontinued;
- The risk of higher closure costs at Zincor and Glen Douglas. Both operations have no closure plan; and
- The risk that Eyesizwe's Material Properties will not meet production targets.

The following **operational specific opportunities** have been identified:

- The potential to increase iron ore exports should the capacity of the Sishen–Saldanha line be expanded;
- The potential to increase iron ore resources by 2.9 billion tonnes by including SEP <60%Fe material and iron ore reserves by 1.0 billion tonnes by re-optimising pits to include SEP material <60%Fe;
- The potential to increase iron ore resources and reserves by completing pre-feasibility and feasibility studies on Phoenix Project (+60Mt) and Sishen South Phase II (+103Mt);
- The potential to reduce operating expenditure by considering synergies between Sishen Mine and Sishen South Project and the potential to reduce capital expenditure by maximising synergy between Sishen South Project and SEP infrastructure;
- The potential for Grootegeluk Mine to realise significant productivity improvements from the addition of the Sintel Char Plant;
- The potential for Grootegeluk Mine to increase export sales due to an increased allocation from the Richards Bay Coal Terminal;
- The potential for Grootegeluk Mine to increase efficiencies by changing haul routes and making waste disposal more efficient;
- The potential for Leeuwpaan Mine to reduce costs and washing plant yields further by optimising the use of the jig during processing;
- The potential for Leeuwpaan Mine to realise improved efficiencies in mining from replacing old trucks/loaders, productivity improvement initiatives and optimising the haul road layout;
- The potential for Tshikondeni Mine to share cost and productivity gains with Mittal Steel;
- The potential for Grootegeluk Mine, Arnot Colliery and Matla Colliery to increase their respective LoMs by extending the lives of the The Matimba Power Station, Arnot and Matla power stations;
- The potential for Arnot Colliery to increase revenue by reducing contamination;
- The potential for North Block Complex to exploit the contiguous underground reserves (2Mt);
- The potential for North Block Complex to increase coal resources and reserves from Belfast, Eerstelingsfontein and Strathrae;
- The potential for Rosh Pinah to prove up a 10-year Mineral Reserve; and
- The potential for Zincor to import zinc concentrate.

13. MACRO-ECONOMICS AND COMMODITY PRICES

13.1 Introduction

This section includes discussion and comment on the commodity market analyses for the Iron Ore, Coal, Heavy Minerals, Zinc and Industrial Minerals markets. Specifically, comments are given on the macro-economic environment, commodity supply and demand and long-term price projections.

13.2 Macro-economic Environment

13.2.1 Short-term Outlook – twelve months

Following on strong world GDP growth of 4% in 2004, economic expansion proved to be remarkably resilient in 2005, growing at about 3.5%. This, despite record-high oil prices and the impact of major natural disasters, such as the December 2004 Asian tsunamis and some of the worst hurricanes on record in the USA during the second half of the year.

The US and China remained the engines of growth of the world economy, but global growth has broadened significantly since the middle of 2005, with, for example, economic expansion increasing in Japan and Europe due to greater domestic demand strength. Despite significant monetary tightening by some of the major central banks, global monetary conditions remained accommodative, with relatively low real interest rates.

Given the broader base of economic expansion, together with the fact that the pace of growth in the USA and China is expected to decline only moderately, above-trend global economic growth of some 3.4% can again be expected in 2006. Leading economic indicators and surveys of purchasing managers from around the world confirm the view that the global growth momentum will continue in 2006.

Economic expansion in the USA is expected to remain solid in 2006, at about 3.3%, compared to the 3.5% of 2005. Growth in Europe is forecast to be higher in 2006 than in 2005, accelerating from some 1.4% to about 1.9% in the Eurozone. Expectations of economic growth in Japan are similar to those for the Eurozone. In China, the strong growth experienced during the last few years is expected to continue in 2006.

Although the value of the dollar strengthened against the euro in 2005, based on a rising interest rate differential in favour of US assets, it is expected to weaken again in 2006 due to the anticipated increasing US fiscal deficit and trade gap. Oil prices are expected to decline only slowly and to remain well above real long-term historical averages, primarily due to robust demand from China.

The major risks to the global economy remain high oil prices, the world economy's overdependence on American household spending and the continued reliance of the USA on massive foreign inflows to finance its twin deficits.

13.2.2 The Role of China

The industrialisation and urbanisation of China is fuelling an extremely rapid pace of economic growth. In 2005 China's GDP rose by 9.9%, marginally lower than the growth of 10.1% recorded in 2004. The rise in industrial production was even more pronounced, increasing by 16.2% in 2005. This explosive growth is causing considerable strain on China's infrastructure and has raised concerns surrounding its sustainability. To this end the Chinese Government embarked on a series of measures in 2004 and 2005 designed to slow economic growth to a more manageable pace. These measures primarily focused on limiting investment in fixed assets, notably in the property market and in the steel, cement and aluminium sectors.

The moves to slow China's booming economy have been successful in part. Nevertheless, GDP, industrial production and fixed asset investment growth remain at elevated levels, with GDP growth above 9% again being forecast for 2006. A major platform for the high investment rate is the fact that China has the capacity to build industrial plants at capital cost estimated to be 30% – 40% lower than western counterparts.

Looking forward, China's role in the global economy will become increasingly important. The industrialisation and urbanisation of the country will continue at a rapid pace and its export-led growth will be increasingly supplemented with that stemming from consumption by the burgeoning middle-class in the country's coastal provinces. However, it will also have a negative impact. The attractive low-cost environment provided by China will cause the replacement of considerable amounts of manufacturing capacity in the mature economies and elsewhere in the developing world.

Consumption in China is an increasingly important driver of many commodity markets, fueled by strong materials intensive growth over the last decade or more. In 2004, its share of world market demand for individual commodities such as steel was 27%, iron ore 32%, zinc 23% and copper 20%. Due to the fact that the country is deficient in local resources of many of the commodities which it consumes, it is a major importer of raw materials, to such an extent that demand from China played a major role in the skyrocketing of global dry bulk freight rates in 2003 and 2004.

The dependence of China on imported raw materials has resulted in the Government encouraging large Chinese companies to invest in foreign resource concerns in order to secure a steady supply of natural resources.

The intensity of use of metals and minerals in China lags far behind those of the developed economies of the world and, especially, those of the newly industrialised economies, such as Korea and Taiwan. It is, therefore, possible that strong growth in commodity consumption could continue in the medium to long term. However, it is widely expected that, over time, the commodity intensity of China's GDP will fall. Nevertheless, even a halving of consumption growth from rates of more than 20% p.a. would still leave a healthy, and more sustainable, rate of expansion in commodity demand.

13.2.3 Long-term Outlook – ten years

In the longer term, the developed economies of North America, Europe and Asia will remain important consumers of commodities. Economic and commodity demand growth in these countries will, however, be limited by structural problems in their economies and to the relocation of manufacturing industries to China and other developing countries.

In contrast, it is expected that China and other developing economies will play a similar role to that which the USA and Japan did from the early 1930s to the late 1970s in terms of rapid commodity-intensive economic growth, which led to increasing real commodity prices during this period. This was followed by a period of declining real prices from the early 1980s, initiated by the oil price shocks of the 1970s. Obviously, persistently high energy prices could again put a brake on economic expansion world-wide.

Due to the impact of China on raw materials demand, analysts generally expect average real commodity prices to be higher during the next 10 years than those prevailing during the last 10 years. However, the current extremely high prices of, especially, bulk commodities are not expected to be sustainable.

13.3 Iron Ore Market Analysis

13.3.1 Introduction

The iron ore sector is a global industry with 2004 revenues of over USD34 billion, of which USD17 billion derived from the seaborne market. Australia and Brazil are the key suppliers of seaborne iron ore; Asian (in developed Asia and China) and European steel producers are the major customers.

In the production of steel, scrap metal is the only substitute for iron ore. Most of the iron ore is used in blast furnaces (sintered, or as pellets/lump) using coke as primary reductant, but alternative reduction routes (direct reduction or even smelting reduction) are gaining importance.

Economic development and population growth drive steel demand, and thus demand for its raw materials. Scrap availability and technology choices determine the final demand for the various iron ore products. Demand for seaborne ore tends to grow at a faster rate than total ore demand, due to quality and availability issues of local ores, particularly in China.

In the last decade, the industry consolidation in the seaborne iron ore market has increased significantly. As a result, real prices have been constant, as opposed to average real annual price declines of 2% – 3% during most of the eighties and early nineties.

13.3.2 Iron Ore Demand Analysis

Demand for Steel: Steady growth of steel demand is expected until 2025. Critical assumptions are:

No major “world-wide” crisis that would either destabilise the economy of the developed regions or induce a ‘hard landing’ for the Chinese economy.

The Chinese economy continuing to grow (but slower than currently) at a healthy rate until 2008 – 2010. Post-2010 growth rates in the 4% – 6% range were assumed, similar to those observed in Japan, after its phase of rapid economic expansion. The urbanisation rate in China of 1% p.a. is foreseen to be sustained for the next 20 – 25 years.

Relatively slow economic growth in the developed world is anticipated, with negative implications for steel consumption, due to delocation of manufacturing capacities to emerging markets.

No immediate ‘boom’ of the Indian economy is expected, but a rather moderate short- and medium-term growth path, only taking off beyond 2015.

Continued moderate growth in CIS and South America, not assuming any major setbacks in these regions, was assumed.

Demand for Iron Ore: The iron ore market is expected to remain attractive in the next two decades, based on positive underlying fundamentals. These include steady growth of iron ore demand at least up to 2020 (about 30% increase from today’s levels), particularly in the seaborne market (growth of more than 45%). China will represent close to 50% of total iron ore demand in 2025 (up from 31% in 2004). In 2004, China accounted for 34% of the 600Mt seaborne demand. Eventually, the market becomes predominantly Chinese, representing close to 80% of total seaborne demand of 880Mt in 2025.

One of the key factors boosting the iron ore market is a developing scrap shortage. The ratio of scrap to finished steel has reduced over the last years to a low of 46% versus historical levels of 50% – 55%. These lower levels should prevail until 2015 – 2020. This long period of relative scrap shortage will help to fuel an iron ore boom. As of 2015 – 2020, more scrap is expected to become available again which will limit further iron ore growth.

13.3.3 Iron Ore Supply Analysis

What had been mostly the terrain of relatively cheap brownfields expansion for two decades, now demands significant greenfields expansions. This capacity expansion is expected to be led by the three largest producers (CVRD, Rio Tinto and BHP-Billiton), who will continue to use the modularity and flexibility of their production systems to avoid overcapacity coming in and putting undue pressure on prices. The largest producers are also uniquely involved in price setting and have long-term volume contracts with major customers, creating entry barriers for newcomers.

The combined (controlled or influenced) market share of the three dominant producers is projected at approximately 75% to 2025; today they also control over 80% of the relevant port capacity, as well as 6 out of 7 major railway systems. The CIS is also expected to play a major role in the supply of iron ore/metallics. As far as iron ore exports are concerned, the CIS is expected to focus only on pellets for the European market. In order to fully capture this market, and at the same time satisfy growing local demand (CIS steel consumption and steel exports), CIS will need to increase iron ore production by 30 – 50Mt between 2004 and 2025, without increasing its deep-sea exports.

India could increase iron ore production in the medium term from 135Mt in 2004 to around 160Mt in 2010. As a result, seaborne exports will increase to 80Mt in 2010 (up from 65Mt in 2004). Beyond 2010, seaborne exports are expected to strongly decrease, as the Indian Government wants to preserve iron ore to the maximum for the domestic steel industry, serving local and export demand. This decline could come even earlier if the Government starts enforcing environmental and other mining-related legislation.

The current high iron ore prices might lead to short term increases in Chinese domestic iron ore production (and hence reduce Chinese seaborne demand). In the longer run, a decline in domestic ore production is projected. China will become more and more dependent on seaborne iron ore due to the increase in iron ore needs on one hand and limited economically viable domestic reserves on the other hand. As a result, overall share of domestic ore over total ore consumption in China is expected to drop from about 50% in 2004 to some 20% in 2025.

Increasing vertical integration by major steel makers (e.g. Mittal), leading to somewhat reduced seaborne demand, is forecast in the longer term.

13.3.4 Iron Ore Supply and Demand Balance

The currently announced and fully committed expansion plans should be sufficient to satisfy the expected increase in demand up to 2010 – 2012. Longer term, there is a need for new greenfields iron ore systems. From a logistics, operational cost and quality point of view, projects in Australia, Brazil and Africa (both South and West) are most likely. None of these “second expansion wave” projects are likely to be realised before 2012, due to infrastructure limitations or geo-political risks.

13.3.5 Iron Ore Price Forecasts

In the 1960s and early 1970s, under the impetus of materials-intensive Japanese economic expansion, iron ore prices increased well above inflation rates, as new capacities were required to satisfy Japanese iron ore demand. Most likely, a similar scenario will develop, now driven by Chinese demand.

Historically, iron ore price levels correspond to ‘incentive pricing’ levels with regard to industry cost curves, allowing existing players to earn attractive returns on brownfield expansion projects. Given the highly consolidated nature of the market, the history of incentive-based pricing and the need for over 350Mt new capacity, it is anticipated that incentive-based pricing will persist for the foreseeable future.

Recently, both spot and contract prices have ‘detached’ from the cost curves, which is considered a short-term anomaly. Current high price levels, driven by short-term supply constraints, should be short lived (1 – 2 years) and should come down in the near term to more economic price levels, to avoid overcapacity build-up. The full greenfield cost of new potential iron ore systems (e.g. West Africa and Australia) has increased recently due to the current commodity price boom and the consequent equipment and skill shortages (at least for the short and medium term).

Given the need for significant greenfield capacity additions in the medium term, it is expected that greenfield incentive pricing (at full cost) will prevail until at least 2015, resulting in medium term price levels of US\$40 – 42/dmtu for Hammersley fines, FOB Australia. In the longer term, i.e. 2020 – 2025, a brownfield incentive pricing logic – where prices are set at levels to allow for new pits to be opened within existing mining systems – is considered appropriate. This translates into an US\$34 – 37/dmtu long-term price band for Hammersley fines. These price forecasts are made based on the assumption that the large producers will cede volume to new entrants to avoid overcapacity in the market, rather than defend market share through price adjustments.

Value-in-use considerations of lump versus fines are used to calculate lump premiums. The use of lump results in higher coke consumption than what is required for pellets and sinter, but saves agglomeration costs. In the longer term (i.e. beyond 2010), with assumed coke prices of USD145 – 175t, this results in an US\$6 – 9/dmtu lump premium. In view of the relative shortage of supply of quality lump, the high end of this range, i.e. US\$9/dmtu, is used, in line with historical lump premiums.

13.4 Coal Market Analysis

13.4.1 Introduction

It is estimated that world hard coal production in 2004 was 4.3 billion tons and the tonnage of internationally traded coal 754Mt. Some 82% of coal is therefore still consumed in its country of origin. The reason for this is that four of the world's most populous countries consume predominantly indigenous coal, namely the USA, China, India and Russia.

Whereas traded coal represents only 18% of the total it represents a significant proportion of the coal consumed in Japan, the developing Asian economies and North-west Europe.

During the last decade, with the price of coal weak, there has been a tendency for the resource majors to invest in existing properties rather than develop new greenfield projects. From this process we have seen the emergence of three major players in the Atlantic sea borne coal trade, namely BHP-Billiton, Anglo Coal and Xstrata. In the Asian region, exports by these three players are augmented by those from Rio Tinto and Bumi Resources of Indonesia.

An inevitable result of this has been the exercise of greater market discipline in the industry and a tendency to optimise their export portfolios to meet the demands of the market. This is very different behaviour to that practiced in the past where coal companies faced with low pricing would try to maintain or even increase production to lower their cost base in order to live with lower market prices.

Nearly 70% of coal use currently occurs in power generation, 12% in steel making and 12% in industry, with the balance going to domestic and residential use. However, virtually all of the future increase will be directed into the power generation sector, which is expected to use 79% by 2030. The market for coking coal is expected to grow only very slowly, as improvements in technology enhance efficiency or result in greater use of thermal coals.

13.4.2 The World Steam Coal Market

The trade in steam coal can be split into two distinct regions, namely the Atlantic and the Pacific. Both regions have predominant suppliers although coal does move between the two different regions. The predominant suppliers into the Asian region are Australia, Indonesia, China and Russia. In the Atlantic region these are South Africa, Colombia and Russia.

On the back of increased imports of commodities by the Chinese to support economic growth, sea freight rates have risen dramatically effectively blocking exports of steam coal from the Pacific producers Australia, China and Indonesia into the Atlantic region.

The traded market for steam coal has been growing steadily year on year and in the last five years has been supported by growing exports of steam coal from, predominantly, Australia, China, Indonesia, Colombia and Russia. In 2005, exports of steam coal stood at 567Mt.

The export steam coal market has experienced an unprecedented surge in prices since the end of 2003. The primary reason for this was the good recovery in world economic growth during this period and stagnant exports from China and South Africa. Although spot prices have declined from the highs experienced in 2004, they are still at levels significantly above average historical prices.

During this time, demand for coal in the Atlantic region has been high, *inter alia*, as a consequence of high gas prices. The growing markets were, principally, the United Kingdom and North America. The main beneficiary into the United Kingdom was Russia where it has been able, in addition to picking up the increase in demand, to displace South American coal. South African coal has marked time in terms of tonnage and hasn't been able to benefit from the upsurge in demand, primarily due to logistical bottlenecks.

The South American producers have probably not been too concerned about losing market share in Europe, since they have been able to benefit from the growth in North American imports. In the USA imports have continued to grow as Central Appalachian production of lower sulphur compliance coal has declined. Virtually all this growth has been met with imports from South America since this coal has a tremendous geographical advantage.

Currently, there are signs that supply and demand in the Atlantic region are in closer balance, but although prices might ease they are not expected to fall rapidly in the short term. Gas prices are still high, giving coal, in spite of its own increase in price, advantages over gas in major markets such as the United Kingdom and North America.

In the longer run, it is believed that there will not be a basic shortage of coal. There is evidence that the major suppliers are restricting supplies, but overall there are enough plans already in existence or capable of being

implemented to meet the likely demand for internationally traded steam coal to 2010. By 2015, the need for major greenfield development, in addition to expansion of existing mines, will become more important to meet both the increasing demand and the exhaustion of existing mines.

13.4.3 The World Metallurgical Coal Market

Metallurgical coal quality requirements are more stringent than those for thermal coal, with the result that there are fewer supply sources for this material. The degree of coking characteristics differentiates the coal between hard, semi-hard and semi-soft.

There is increasing overlap between the thermal and metallurgical coal sectors as steelmakers attempt to redress coke shortages or to reduce costs by introducing semi-soft or non-coking coal into their production processes, including the growing application of blast furnace coal injection ("PCI"), with low volatile PCI coal being the most popular fuel adopted as an injectant.

The steel industry has shown only modest growth in the last two decades, with output declining in the developed countries and growth occurring mainly in the economies of northern Asia, specifically South Korea and Taiwan. Following the currency crisis of the late 1990s, even these economies slowed. Now, evidence of growth in steelmaking across the world is being seen, very much led by the expansion of steel demand and production in China. Other developing countries, like India and Brazil, are expected to follow in the footsteps of China.

Until 2003, the market for metallurgical coal supplies into the steel industry has shown only modest growth and has been constrained in its price aspirations by a steel industry that was suffering from low profit margins.

This has forced a degree of consolidation on both the steel industry and the coal producers. The latter had relatively little impact until the last two years when the emergence of China as a major producer and consumer of steel and growing importer of coking coal, combined with an improving world economy, has exposed a shortage of prime coking coal across the world. This led to historically record price levels.

Based upon projected good quality coking coal production increases on a worldwide basis, the tightness in the supply/demand balance will last for the next two years before easing and coming back into potential oversupply in 2008 or 2009. Currently, in Asia a significant proportion of the coal used for injection is semi-soft coking coal. This coal will probably be displaced by ultra low volatile coal, thereby forcing the semi-soft grades into the coking and steam coal sectors.

In Europe, high volatile PCI coal has a strong place in the market and can be priced to be competitive with ultra low volatile PCI coal, primarily due to lower freight costs. In some cases producers will have to accept a reduced price to compensate for its lower value in use. Supplies of USA high volatile coking coal are declining and steel producers in Europe and South America are looking for alternatives.

In India, a high proportion of the new coking capacity that is coming on stream uses heat recovery technology that it is claimed can employ high levels of semi-soft and semi-hard coals in the blend. South African semi-soft coking coal should be well suited to this technology.

13.4.4 South African Coal Exports

Most of the South African coal exported is classified as thermal coal. The greatest proportion of metallurgical coal is semi-soft and PCI coal. A small amount of anthracite is also exported to the domestic and industrial markets in Europe. By far the most important single steam coal market for South African coal is Europe, the Mediterranean and North Africa, although the Indian sub-continent will become increasingly important as the economies of India and Pakistan grow. South African coal exports having risen steadily from a level of 45Mt in 1985, but have stagnated at a level of about 69Mt since 2000. From the mid-1990s the focus of exports has shifted towards Europe and Southern Asia away from Northern Asia. South Africa's main problems in terms of export volumes centre on infrastructure bottlenecks. Richards Bay, which is the major export channel, has a potential throughput of 72Mtpa but has been held back from achieving this by railgate problems. These are being addressed.

13.4.5 The Richards Bay Coal Terminal (Source: Richards Bay Coal Terminal Company Limited)

Background and History: Richards Bay Coal Terminal Company Limited is situated in the deepwater port of Richards Bay and is the largest single export coal terminal in the world. It was established in the early 1970s and has been expanded from an initial 12Mtpa to its existing export capacity of 72Mtpa. Richards Bay Coal Terminal is owned by Anglo Coal, Xstrata Coal, Eyesizwe, Ingwe, Kangra Coal, Sasol and Total Coal SA.

Expansion: Richards Bay Coal Terminal will expand from its existing capacity to 92Mtpa. This includes the original Phase V expansion, which has been underway for some time. The total cost will be approximately ZAR1 billion and the expansion is expected to be completed by July 2008. The precise phasing of the incremental export tonnage is subject to colliery and rail infrastructure developments and will be determined once the projects that will utilise the increase in terminal capacity have been identified. Initial estimates, however, indicate that the full rail and mine capacity will only be available after 2009. Key highlights of the expansion are:

- Special provision will be made to encourage a new generation of coal exporters by earmarking up to 4Mtpa by April 2006 for emerging BEE exporters.
- South Dunes Coal Terminal, which will be a two-thirds BEE controlled company, will take up 6Mtpa of the expansion.
- 10Mtpa of the expansion capacity will be opened up for subscription to all with an emphasis on empowerment to facilitate the transformation of Richards Bay Coal Terminal, in line with the continuing transformation of South Africa's coal industry under the Mining Charter.

The subscription capacity of 10Mtpa will be made available through new shareholding or through commercial usage arrangements at internationally competitive rates, as this expansion is in line with the lowest cost coal port expansions globally. This has been made possible by the Richards Bay Coal Terminal shareholders, who are underwriting the expansion and relinquishing their pre-emptive rights to the expansion capacity.

13.4.6 The Markets for Kumba Coal

Kumba operates two export coal mines. Grootegeluk produces steam coal for the nearby Matimba Power Station as well as export-quality steam, semi-soft coking and PCI coal, for both the domestic and export markets. The expected expansion of the electricity generation capacity at the Matimba Power Station will require increased output of steam coal and will result in the concomitant expansion of export steam and metallurgical coal production. Leeuwpan produces both thermal and metallurgical coal for the local and export markets.

Kumba's export products are primarily exported to Europe, South America and the Indian sub-continent. In the Atlantic basin, it competes primarily with coal exported from Columbia, Venezuela and Russia and in the Indian markets it would compete predominantly with coal exported from Australia, Indonesia and China.

Tsikondeni Mine is a captive operation, producing metallurgical coal exclusively for the Mittal steel plants in South Africa.

13.4.7 The Markets for Eyesizwe Coal

Matla and Arnot are mine mouth operations tied in with Eskom's Arnot and Matla Power Stations. The North Block Complex, comprising Glisa and Strathrae and New Clydesdale Colliery supply coal to the domestic market. New Clydesdale Colliery also exports coal to the international market.

Exports:

Eyesizwe Coal has an entitlement of 1.2% at the Richards Bay Coal Terminal equating to 864ktpa based on the current RBCT capacity. Furthermore, Eyesizwe has been able to secure an additional export entitlement under the BEE/Common User programme. It has also signed a MOU to enable it to participate in South Dunes Coal Terminal, which would result in the company obtaining a further 500ktpa entitlement. In addition, Eyesizwe intends to apply for part of the 10 Mt subscription tonnage under the recently announced RBCT expansion programme.

Eyesizwe's main export markets are Israel, Germany and the UK. The company also sells to coal traders who export to other markets.

Inland:

New Clydesdale Colliery was established as an export mine with a small amount of 180ktpa being targeted for the inland market. However, due to the Eskom's increased coal requirements, New Clydesdale Colliery has also been supplying coal to Eskom. Glisa Colliery has been producing for the domestic industrial market and only commenced supplying Eskom in 2003, as does Strathrae Colliery. Eskom has become a very important contributor to North Block Complex's growth prospects. This Complex has recently signed a new three-year agreement to supply approximately 1.4Mtpa to Eskom's Majuba power station commencing 1 January 2006.

13.4.8 Coal Pricing Forecast

The models employed to arrive at the coal demand forecasts took account of factors such as expansion in facilities utilising coal (especially power plants), inter-fuel competition, economic growth projections, the levels of energy and competing fuel prices and environmental and technological considerations.

On the supply side the impact of industry restructuring, market prices, exchange rates, transport infrastructure and industry production costs were taken into account.

The forecasting models indicate that prices will decline in all markets from the current inflated levels in the short to medium term as greater supply and demand balance is achieved, resulting from increased production spurred by the high prices.

In the longer term, real prices will have average levels that will exceed the average seen in the last decade. Important factors that have an impact on the expected higher long-term prices include industry consolidation, generally higher energy prices, increased environmental pressures and the need for infrastructure and greenfield mine expansions. Real prices are also expected to decline at a much slower rate than has been the case historically during the last two or three decades.

Price premia for the different metallurgical coal grades are expected to moderate from current inflated levels as prices return to their forecasted long-term average levels.

13.5 Heavy Minerals Market Analysis

13.5.1 The Titanium Minerals Industry

Approximately 94% of titanium mineral feedstock production (comprising ilmenite, rutile, leucosene, titania slag and synthetic rutile) is consumed in the production of titanium dioxide (TiO₂) pigment, primarily for use in the coatings, plastics and paper industries. The chloride process for titanium dioxide pigment production now accounts for nearly 60% of total production and, with the exception of China and its current emphasis on the sulphate process, all future net production capacity increments are expected to be of the chloride process.

Slag is the largest single feedstock for the chloride process while ilmenite is the largest feedstock for the sulphate process. Major feedstock sources are Australia and South Africa, which together account for 44% of total feedstock supply. The largest five pigment producers controlled 70% of capacity at the end of 2005. All products are reliant on penetrating export markets, primarily in the USA, Europe and Asia.

Zircon (zirconium silicate) is a significant co-product of titanium minerals. The US\$0.7 billion zircon industry is smaller, more fragmented and less sophisticated than the titanium minerals industry. Collectively, Australia and South Africa provide 70% of world production. By far the dominant end use for zircon is as an opacifier in ceramic glazes.

The other significant co-product is low manganese pig iron, from titania slag production.

13.5.2 Supply/Demand Analysis – TiO₂ Pigment

The TiO₂ pigment industry experienced more subdued demand during 2005 after the 7.7% growth achieved in 2004. Production in 2005 increased by 1.1% to an estimated 4.71Mt, resulting in a closely balanced market. Over the medium term, global consumption growth is forecast to average around 2.8% p.a., allowing for continued strong demand from China.

Since 1999 there has been explosive growth in both the consumption and production of TiO₂ pigment in China, which became the largest importing country for TiO₂ pigment in 2004. Chinese pigment demand growth for 2005 remained robust at an estimated 10% and there is still an expectation that Chinese TiO₂ pigment consumption will grow at over 8% per annum at least until 2008, mirroring GDP growth.

In real terms, pigment prices still remain at levels below that required by the industry to justify major greenfield investment. Strong price initiatives by the major pigment producers in late 2004 continued in 2005. In the dominant USA domestic market, prices are now over US\$2300/t CIF, but prices in other regions are considerably lower.

13.5.3 Supply/Demand Analysis – Titanium Feedstocks

Global titanium feedstock production increased by 6.7% in 2005 to an estimated 5.54 million TiO₂ units, due to higher output of most titanium feedstock products. Titanium slag showed by far the largest volume gains, up 13% over 2004 levels, due to higher production of both chloride slag and upgraded slag. Australia remains the largest producer of feedstocks, providing an estimated 24% of total supply. South African production rose

some 19% in 2005 to an estimated 1.2 million TiO₂ units, representing 22% of the global total. Global consumption of feedstocks remained basically static at 5.45 million TiO₂ units.

Global feedstock production is forecast to increase by approximately 0.8 million TiO₂ units during the period to 2008, predominantly as a result of the commissioning and ramp-up of several approved new projects and capacity expansions. Chloride grade feedstocks, specifically high TiO₂ products, are projected to account for a substantial portion of the overall production increase. Beyond 2008, there is significant potential for further additional supply from a number of other titanium feedstock projects currently at advanced stages of investigation.

In the category of projects that have been approved but not yet commissioned, there are seven projects having capacity of 1.32 million TiO₂ units and 244kt of zircon. Seven projects having combined capacity of just over 1 million TiO₂ units and 215ktpa zircon have completed technical feasibility studies, while a further 10 projects with a total stated capacity of 0.8 million TiO₂ units and 245ktpa of zircon are under active investigation.

Over the medium to long term, average annual feedstock consumption growth of 2.8% is anticipated, in line with the forecast production performance of the global TiO₂ pigment industry. The supply/demand outlook therefore shows a propensity for the overall market to move from current tight supply conditions to a position of oversupply through to early in the next decade, particularly for high TiO₂ chloride feedstocks.

13.5.4 Supply/Demand Analysis – Zircon

Following two consecutive years of market deficits, global zircon inventory levels have fallen to critically low levels that are well below the normal working stock for the industry. With new zircon supply only set to enter the market from later in 2006, tight market conditions are forecast over the next two years, with supply continuing to constrain underlying demand growth. Over the medium to long term, additional zircon supply from new projects is expected to keep the market closer to balance.

13.5.5 Supply/Demand Analysis – Low Manganese Pig Iron

Global production of low manganese pig iron increased by an estimated 12% in 2005 to 1.6Mt. Strong demand for pig iron in the production of steel, particularly in China, continued to place pressure on pig iron supplies during 2005. After the tight market conditions in 2004 when low manganese pig iron prices increased to US\$340/t CIF, the price levels abated to around US\$245/t CIF at the end of 2005.

13.5.6 Price Forecasts

Titanium feedstocks: In nominal US dollar terms, the general pricing trend in 2005 was flat, although in real terms most titanium feedstock prices continued the downward trend evident over the last few years. Prices for USA imports of chloride slag in 2005 remained flat at an average price of US\$380/t FOB. The price of rutile recovered further in 2005, with the average 2005 price for US bulk imports increasing by more than 6% to approximately US\$460/t FOB, due to short-term rutile supply tightness. The 2005 average price of synthetic rutile imports to the USA increased by 10% to US\$410/t FOB.

The overall outlook for titanium feedstock pricing is for relatively stable future prices, in real terms, for the major product types in the period to 2010. However, there could be some downside pricing pressure for selected products during the forecast period, given the looming market surplus positions currently forecast.

Zircon: The development of persistent zircon supply deficits since 2002 has had a pronounced effect on zircon pricing, with prices increasing rapidly throughout the period to early 2005 and further price increases already negotiated for 2006. However the current trend of constantly increasing prices is not forecast to be sustainable beyond the end of 2007, as higher prices are attracting additional market supply and could soon promote reduced zircon offtake in selected end use markets. The forecast long-term real trend price for zircon is US\$465/t FOB to be reached after 2010.

Low manganese pig iron: The trends in the price for low manganese pig iron are closely related to pricing trends for high quality steel scrap, which can be quite volatile. Prices have increased in recent years due to strong Chinese demand and while they are expected to remain high in the short term, are forecast to progressively decline to a longer-term sustainable price of US\$180/t FOB.

TiO₂ pigment: Pigment prices tend to exhibit cyclical behaviour and show marked regional differences. Average realised prices are forecast to have peaked in 2005 and then to decline until 2007 before peaking again in 2010.

13.6 Zinc Market Analysis

13.6.1 Introduction

The primary use of zinc is in the galvanising of steel, which in 2005 accounted for 46% of zinc usage. The next largest use is brass (17% of total demand) followed by die-casting. It is anticipated that by 2017 galvanising will account for about 54% of global zinc usage. In terms of end use sectors, zinc consumption is dominated by the construction sector, which accounted for 45% of zinc usage in 2004; the next largest end use is in the transport sector. It is expected that zinc end usage will continue to be dominated by these sectors. The zinc mining and refining industries are relatively fragmented, with the top five producers contributing only about 26% and 28%, respectively, to the world total in 2004.

13.6.2 Zinc Demand Analysis

In 2005 global zinc consumption grew by an estimated 3.5%, to reach 10.7Mt, following on from growth of 7.3% in 2004. The area of fastest growth was China, where offtake increased by 22%, while consumption in the world's mature economies contracted by 1.6 per cent.

Based on an outlook for industrial production and anticipated trends in the intensity of zinc consumption in coming years, it is forecast that global zinc consumption will grow at an average annual rate of 2.5% between 2006 and 2017.

There is little evidence that there will be a significant slowdown in Chinese economic growth in the near term. According to latest estimates, China accounted for around 2.7Mt of refined consumption in 2005, equivalent to just over 25% of global demand, compared to 14% in 1990. Chinese consumption is forecast to grow by 8% to 2.9 Mt in 2006 and continue to grow at an average rate of 4.3% p.a. between 2006 and 2009, slowing to 3.8% p.a. between 2009 and 2017.

The weakness of the European economy over the past few years has resulted in moribund zinc consumption growth. In 2004 Western European zinc consumption grew by a paltry 0.5% to 2.36Mt. In 2005 over-production, weak demand and the resulting low prices in the galvanized sheet and brass sectors triggered a period of production cuts and de-stocking. This, together with the generally disappointing performance of the economies of Western Europe, caused zinc demand to contract by almost 2% to 2.3Mt in 2005. It is anticipated that in 2006 Western European zinc consumption will grow by 1.6% to 2.4Mt. Longer term zinc consumption growth for Western Europe will expectedly average just 0.9%; however, for Europe as a whole it will be 1.6%, a reflection of the stronger growth in the emergent Eastern European economies.

In recent years, USA zinc consumption has been volatile. Since 1999 there have not been two consecutive years of growth. The 8% growth rate seen in 2004, which lifted consumption to 1.25Mt, was preceded by a 6% contraction and succeeded by a 2% contraction that took USA consumption to 1.2Mt in 2005. It is anticipated that USA zinc demand will recover in 2006 and that growth of 2.7% will lift USA zinc consumption to 1.25Mt. Annual consumption growth is forecast to remain strong at an average of 2.1% for the longer term.

13.6.3 Zinc Supply Analysis

Over the most recent zinc price cycle (1993 to 2002) global mine production grew by an average trend growth rate of 3.6%, lifting output from 6.63 Mtpa in 1993 to 9.1Mtpa in 2002. Growth was particularly strong in China where it grew by an average of 10% per annum. Average growth in the rest of the world was 2.4% p.a. over the same period. In 2005 global zinc mine production had grown to 9.95Mt per annum.

Given the current and forecast high zinc price environment, it is forecast that output from existing mines and committed projects (production capability) will grow steadily over the next four years to peak at 11.64Mtpa in 2008. Production capability will subsequently decline to 11.2Mtpa by 2010 and no more than 7.5Mtpa by 2017. To offset forecast mine closures and to meet rising demand for concentrate there is a requirement for additional mine output of 2.1Mtpa in 2010 rising to 7.5Mtpa in 2017, which will be met from expansions, mine life extensions and new mine projects.

Mine production growth is forecast to average 3.3% p.a. from 2002 to 2012 and 3.2% p.a. from 2006 to 2017.

During the 1993 to 2002 price cycle, global average smelter production trend growth was 3.3% p.a., lifting output from 7.21Mtpa in 1993 to 9.67Mtpa in 2002. China's smelter production grew at an average rate of 10% p.a., initially driven by Government edict and then by the liberalised private sector. By 2001 Chinese smelter demand outstripped the production capability of its domestic mines and the country became a significant importer of zinc concentrates. In the rest of the world output grew at an average rate of 1.6% p.a., increasing from 6.4Mtpa in 1993 to 7.5Mtpa in 2002.

The growth in Chinese smelter capacity has contributed to an excess of smelter capacity compared to the supply of concentrate. As a consequence, it is estimated that over the next two years actual smelter output will be some 0.15Mtpa below the global capability forecast. In 2007 there will be the need to reactivate some of the idled capacity but it is only from 2008 that the market will require new capacity over and above that included in the base case capability forecast. In 2008, this is estimated to be 0.5Mtpa rising to 2.65Mtpa by 2017.

13.6.4 Zinc Market Balance and Price Forecasts

The restriction on refined metal output stemming from a tight concentrate market and ongoing positive demand, delivered a substantial deficit of 510kt in 2005. This situation will continue to prevail for the next two years with an annual deficit of 400kt forecast for 2006 and a balanced market for 2007. Overall implied stocks will be drawn down to critical levels of about fifty days equivalent in 2006 and even lower than that in 2007. Stock days approaching forty-five days are considered to represent extremely tight conditions. It is likely that visible LME stocks will be reduced to less than five-days equivalent sometime in 2006 and below that in 2007. The market is forecast to return to surplus in 2008 but even then, low inventory levels will continue to provide support for a relatively high zinc price in that year.

However, zinc prices are already at record levels, and it is argued that they have become dislocated from market fundamentals owing to the weight of new money that is entering commodity markets from sources such as pension funds. For the prevailing market conditions, it is judged that a price somewhere between USD1500/t and USD1700/t can be justified from a fundamental and historical perspective. As such, the speculative activity on the London Metal Exchange means that forecasting the zinc price for the near term is now moving into uncharted waters.

Annual average prices of USD2157/t and USD2235/t is forecast for 2006 and 2007 respectively. High prices will encourage investment in new mine production and by 2008 the market is foreseen to move to surplus and to remain in surplus for the following three years. Prices over this period will ease, falling to a low of USD1,121/t (nominal) in 2012. The subsequent peak is expected in 2016. In 2006USD terms, the average real long-term price in the period after 2017 is expected to be some USD1125t.

The extremely tight market conditions in the concentrate market are anticipated to last until 2008, after which greater balance will expectedly be achieved. The low base TCs that is currently being experienced is, therefore, foreseen to persist and to worsen during this time. However, due to the price participation mechanism, the high zinc prices forecast for this period will compensate for the low base TC levels. In the longer term a more balanced concentrate market is anticipated.

13.7 Industrial Minerals Market Analysis

13.7.1 Dolomite Market Analysis

The performance in the dolomite market is highly linked to both the international and domestic steel cycle. The steel producing plants of Mittal Steel, being Vanderbijlpark Steel Works and Newcastle Steel Works are the largest consumers of metallurgical dolomite from Glen Douglas Mine. The growth rate in this market has been fairly low due to the limited number of expansions of steel-making capacity in South Africa. Competition in this market comes mainly from the PPC Mooiplaas Dolomite Mine in Pretoria, Lyttelton Quarries from Pretoria and Holcim Olifantsfontein Quarry from Midrand.

13.7.2 Aggregate Market Analysis

Aggregate materials constitute the major raw material in the road building and construction industries. For reasonable construction and maintenance costs, aggregates should be available in large quantities and at a reasonable cost in any major urban area. Glen Douglas Dolomite Mine is favourably positioned to exploit current and future demand for aggregate materials due to its location in one of the major areas accounting for a significant consumption of such materials – the Gauteng Province. The growth in the construction sector in the past five years – in terms of residential, non-residential and infrastructure development – has led to Glen Douglas increasing its market share in the aggregate industry in Gauteng from 8% in 2000 to 10% currently. In this respect, the economic value of a dolomite deposit is a function of its proximity to its markets, as well as its quality and size. In the latter context – Glen Douglas has a mine life estimated at 30 years at the current production rate and is positioned to be a long-term player in the Gauteng aggregate market. The increasing population densities in the Gauteng Province is likely to exert increasing pressure on the existing physical infrastructure such as the road network, water treatment plants and sewage systems. The maintenance of existing infrastructure and Government's commitment to increase expenditure on extending the capacity of infrastructure will be positive for Glen Douglas Dolomite Mine.

13.8 Base Case Commodity Projections

The information with respect to commodity prices and macro-economic forecasts are based on:

- The CPI for South Africa, Namibia, Australia, China and the United States;
- South African, Australian and Chinese exchange rates quoted against a denomination of one United States dollar;
- * Projected Commodity Prices.

These commodity prices and macro-economic forecasts have been prepared under the direction of each individual or organisation named below:

- Iron Ore, Coal, Base Metals and Industrial Minerals

Mr Eddie Fourie, Manager Strategic Services and commodity analyst at Kumba, who will serve as competent person in this regard. Mr Fourie has 30 years' mining industry experience, nine of which have been at Kumba.

- Heavy Minerals

The heavy minerals price forecasts and market outlook was provided by TZ Minerals International (Proprietary) Limited ("TZMI") on a nominal and real 2005USD basis: TZMI specialises in the collection, analysis and distribution of data on the titanium minerals, zircon and TiO₂ pigment industries. David Moore of TZMI agreed to act as the competent person in this regard.

The information provided from Table 13.1 to Table 13.4 is non-confidential information. No commodity price information on industrial minerals is provided as this information is considered confidential by Kumba.

Table 13.1 Base-case Spot Contract Price Projections for Iron Ore^{(1), (2)} (2006 – 2025)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Unit	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Lump (Australia – Japan)																				
(US\$/dmtu ⁽³⁾)	88.4	77.8	60.9	50.0	50.0	50.0	50.0	50.0	50.0	50.0	48.9	47.8	46.7	45.6	44.5	44.5	44.5	44.5	44.5	44.5
Fine (Australia – Japan)																				
(US\$/dmtu ⁽³⁾)	69.3	61.0	47.7	41.0	41.0	41.0	41.0	41.0	41.0	41.0	39.9	38.8	37.7	36.6	35.5	35.5	35.5	35.5	35.5	35.5
Fine Premium																				
(US\$/dmtu ⁽³⁾)	19.1	16.9	13.2	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0

⁽¹⁾ All commodity prices are quoted at the closing period of 31 December (real 2005 \$ prices).

⁽²⁾ Sources: Industry estimates.

⁽³⁾ US cents per dry metric tonne unit.

Table 13.2 Base-case Commodity Projections for Coal^{(1), (2)} (2006 – 2025)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Unit	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Kumba Coal																				
Grootegeluk Steam (FOB)	45.6	44.6	39.5	33.8	34.3	34.2	34.1	34.0	33.8	33.7	33.6	33.5	33.4	33.4	33.3	33.2	33.1	33.1	33.0	33.0
Leeuwpan Steam (FOB)	45.0	44.0	38.0	33.4	33.9	33.8	33.7	33.6	33.4	33.3	33.2	33.1	33.0	32.9	32.9	32.8	32.7	32.7	32.6	32.5
Grootegeluk PCI (FOB)	49.2	45.5	42.4	40.1	40.7	40.6	40.4	40.3	40.1	40.0	39.9	39.8	39.7	39.7	39.6	39.5	39.4	39.3	39.3	39.2
Leeuwpan PCI (FOB)	65.9	64.4	50.7	44.9	45.5	45.4	45.3	45.1	44.9	44.8	44.7	44.6	44.5	44.4	44.3	44.3	44.2	44.1	44.0	44.0
Grootegeluk S.Sft. (FOB)	50.7	46.4	42.9	40.3	40.8	40.7	40.6	40.5	40.3	40.2	40.1	40.0	39.9	39.8	39.7	39.6	39.6	39.5	39.4	39.4
Chinese Coke (FOB) ⁽³⁾	142.4	138.5	135.7	132.9	132.1	131.8	132.7	132.9	130.9	129.2	131.2	132.9	131.8	130.4	132.4	134.2	133.1	131.6	133.8	135.6

⁽¹⁾ Eyesizwe coal prices are predominantly contract dependent.

⁽²⁾ All commodity prices are quoted at the closing period of 31 December (real 2005 \$ prices).

⁽³⁾ Sources: McCloskey, Barlow Jonker and Kumba.

Table 13.3 Base-case Commodity Projections for Heavy Minerals⁽¹⁾ (2006 – 2025)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Unit	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Chloride ilmenite (USD/t)	87	85	84	86	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87
Sulfate ilmenite (USD/t)	80	79	78	78	78	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
Rutile (bulk) – pigment use (USD/t)	450	405	395	400	400	420	420	420	420	420	420	420	420	420	420	420	420	420	420	420
Synthetic rutile (USD/t)	395	380	370	370	375	390	390	390	390	390	390	390	390	390	390	390	390	390	390	390
Chloride slag (USD/t)	360	345	335	335	340	355	355	355	355	355	355	355	355	355	355	355	355	355	355	355
Sulfate slag (USD/t)	300	285	280	280	285	290	290	290	290	290	290	290	290	290	290	290	290	290	290	290
Chloride slag fines (USD/t)	275	270	260	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250
LM pig iron (USD/t)	270	250	220	200	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180
Bulk zircon (USD/t)	725	740	660	590	520	465	465	465	465	465	465	465	465	465	465	465	465	465	465	465
Pigment (USD/t)	1,875	1,800	1,825	1,875	1,925	1,900	1,900	1,900	1,900	1,900	1,900	1,900	1,900	1,900	1,900	1,900	1,900	1,900	1,900	1,900

(1) All commodity prices are quoted at the closing period of 31 December (real 2005 \$ prices).

(3) Source: TZMI.

Table 13.4 Base-case Commodity Projections for Base Metals⁽¹⁾ (2006 – 2025)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Unit	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Lead Price LIME (USD/t)	904	720	633	613	613	613	613	613	613	613	613	613	613	613	613	613	613	613	613	613
Lead TC (USD/t)	154	159	166	184	184	184	184	184	184	184	184	184	184	184	184	184	184	184	184	184
Zinc price (Brook-Hunt) (USD/t)	2,157	2,192	1,460	1,237	1,141	1,075	995	1,130	1,200	1,250	1,275	1,225	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125
Zinc TC – After Price Participation (USD/t)	224	209	208	205	208	207	189	184	185	183	171	185	185	185	185	185	185	185	185	185

(1) All commodity prices are quoted at the closing period of 31 December (real 2006 \$ prices).