THE SOUTH AFRICAN IRON AND STEEL VALUE CHAIN

AngloAmerican

KUMBA IRON ORE
March 2011

BACKGROUND TO KUMBA IRON ORE

Kumba Iron Ore Ltd is the fifth largest supplier of seaborne iron ore in the world. Operating through its 74%-held subsidiary Sishen Iron Ore Company (SIOC), Kumba has two operational mines at Sishen and Thabazimbi, with a third, Kolomela, scheduled to begin production in 2012.

Kumba has a market capitalisation of R137 bn and is the 11th largest listed company on the JSE. Kumba generated revenue of R38.7 bn in 2010, of which R36.1 bn was from export sales; and operating profit of R25.1 bn. SIOC, as its operating company, contributes significantly to the fiscus, paying taxes of R8.5 bn (including secondary taxes).

Kumba employs approximately 11 800 employees and contractors, and since 2007 has spent R368 m on skills development. Over the past two years, the company has created 37 new businesses and 360 new permanent jobs.

Through one of the country's most successful empowerment transactions, Kumba has made a significant contribution to broad-based transformation, which includes R8.6 bn in dividends to empowerment partners since 2007. In addition, R3.7 bn was spent on preferential procurement in 2010 and the company is compliant with the requirements of the Mining Charter.

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SECTION 1
AN OVERVIEW OF THE SOUTH AFRICAN IRON AND STEEL VALUE CHAIN

1.1 EXECUTIVE SUMMARY

The Ministers of Trade and Industry, Economic Development and Mineral Resources have established an interdepartmental task team (the Task Team) to make recommendations on appropriate policies to achieve certain developmental objectives related to the South African iron and steel value chain.

Kumba Iron Ore Limited (Kumba) is fully committed to and supportive of government's intentions to stimulate growth, employment and development across the iron and steel value chain in South Africa. Kumba believes that government interventions and policy considerations in this value chain need to be carefully evaluated having regard to the relevant structural features and underlying factual considerations. In this paper, Kumba has sought to examine some of the most critical features of the iron ore, steel and steel consuming downstream industries and to highlight those considerations which could have an important bearing on formulating appropriate policies.

These include:

Iron ore

The South African iron ore industry is globally competitive, given the fact that a significant proportion of iron ore produced in South Africa is high quality and South Africa is geographically well positioned to export iron ore.

The iron ore industry has the potential to more than double output in the next 10 years if appropriate conditions exist, including:

- The necessary logistics (rail and port) infrastructure is put in place;
- Secure availability of energy and water resources;
- A viable market is available for a secure offtake of iron ore and steel products;
- Opportunities are available to generate an appropriate return on capital invested; and
- A suitable regulatory environment that encourages market participants to make the required investments.

These growth projects are capital intensive and will not be economically viable without market related iron ore prices (at export parity price levels).

Iron ore prices do not materially influence steel prices in South Africa as steel is priced on the basis of international prices. Importantly, from a cost perspective iron ore currently only accounts for between 11–13% of ArcelorMittal's (AMSA) total steel production costs at interim prices. Other key input costs that are of greater significance for AMSA, include coking coal (up to 27%), labour (12%) and logistics costs.

Steel

The South African steel industry had approximately 10.3–11.9 mt of steel production capacity with 4.9–6.2 mt of spare steel capacity over domestic demand in 2008. Various factors, including South Africa's distance from major export markets, mean that South African steel producers are not cost competitive in these markets and that only 2.8 mt of that excess steel capacity was able to be exported in 2008.

Growth opportunities are limited in the steel sector due to its current large size (relative to the economy), local over capacity and structural lack of export competitiveness of South Africa's steel manufacturing industry.

The majority of South Africa's steel operations (particularly the mini mills) are currently either only marginally profitable or are in a loss making position. Accordingly, lower steel prices are likely to have an adverse impact on the viability of these plants.

Downstream beneficiation

South African converters and manufacturers are in most cases very competitive in domestic and regional markets, but would not be able to increase current levels of exports significantly, owing to high logistics costs and/or lack of scale.

More than 85% of South African steel is consumed in industry sectors for which steel's share of product value is typically very low (<5%).

- Therefore, iron ore typically contributes less than 1% to the costs of these end products and is largely insignificant in its impact on overall costs of downstream products.
- Even if iron ore is discounted significantly, this has an immaterial impact on the cost of most downstream users. This should be weighed against the benefits of growing the iron ore industry by ensuring the viability of the Limpopo deposits.

In order to create a viable steel industry, the following are needed:

- Stimulation of local demand for steel in downstream industries, such as construction and mining;
- Ensuring that domestic steel producers are treated in an equitable manner without any undue preference being accorded to steel producers who use iron ore as their principal input; and
- Currently nascent technologies that may reduce South African steel producers' dependence on expensive imported coking coal should be explored to determine if they are commercially viable.

The South African iron ore and steel value chain faces a number of possible outcomes that may range from or in between a "high road scenario", in which the right supportive conditions exist to enable growth and job creation and a "low road scenario", where the absence of supportive conditions results in stagnant growth. These scenarios are discussed in more detail at the conclusion of this paper.

Given the facts set out above, one of the principal issues which Kumba would like to discuss with the Task Team in due course, is the link, if any, between steel pricing (and conceivably iron ore pricing) and the extent to which South Africa is able to promote downstream metal fabrication and manufacturing. Kumba is in the process of preparing more detailed papers on this issue for follow-up discussions with the Task Team.

1.2 CONTEXT AND PURPOSE

There has been an ongoing debate in South Africa on how best to grow the iron and steel value chain and how to sustainably promote additional beneficiation in this sector. Recent events have caused government to accelerate this discussion and have resulted in the formation of the Task Team. At the last meeting between Kumba and the Deputy Director General for the Department of Trade and Industry (DTI), Nimrod Zalk, it was agreed that the Task Team and industry should engage collaboratively, and that such engagement should rest upon a common factbased understanding of the iron and steel value chain, its value add to South African society and its future growth prospects. This document seeks to provide a common basis for future dialogue. Kumba largely bases its analysis on data from Stats SA (eg Supply and Use tables), with additional reclassifications, to better reflect Kumba's understanding of the structure of the iron and steel value chain. In certain instances, our analysis differs from that contained in the DTI presentation to the PPC on 25 August 2010. Our analysis of the relevant data is attached in Appendix 1.

1.3 DESCRIPTION OF THE VALUE CHAIN IN SOUTH AFRICA

The iron and steel value chain consists of four distinctive stages, spanning multiple industries: exploration and extraction, mining beneficiation, metallurgical beneficiation and shaping and conversion/fabrication and manufacturing/end user industries.

Exploration and extraction
The process of exploring for and then extracting iron ore (drilling, blasting, loading, hauling) is typically open pit mining performed by mining companies.

Mining beneficiation
Although some iron ore miners sell their iron ore directly to steel producers, referred to as directly shipped ore (DSO), most iron ore in South Africa is beneficiated through capital intensive dense medium separation or jigging by miners at the mine site, in order to convert the mined ore into a saleable product and/or to increase its value in use (VIU) to local and international steel producers.

Metallurgical beneficiation and shaping
This process is performed by the steel manufacturing industry and typically involves smelting to convert iron ore into pig-iron (in South Africa primarily via the blast furnace route) and then refining (eg using a basic oxygen furnace) and shaping it in rolling mills into steel products (eg HRC - hot rolled coil). Other input materials in steel manufacturing are scrap, manganese and coking coal. The most expensive component in this process is coking coal (mainly imported into South Africa), which is used to produce coke, needed both as the chemical reductant and as the source of energy in the process. An alternate steelmaking technology also used in South Africa is the electric arc furnace (EAF) route. Although this process uses small quantities of iron ore, most of the iron is obtained from smelting scrap metal using significant quantities of electricity as the energy source.

Conversion/fabrication and manufacturing/end user industries
This final step in the value chain encompasses two groups of players:

- converters/fabricators that convert standard steel products into intermediate products (eg wire and tube); and
- manufacturers/end users that consume both standard steel products and intermediate products from converters.

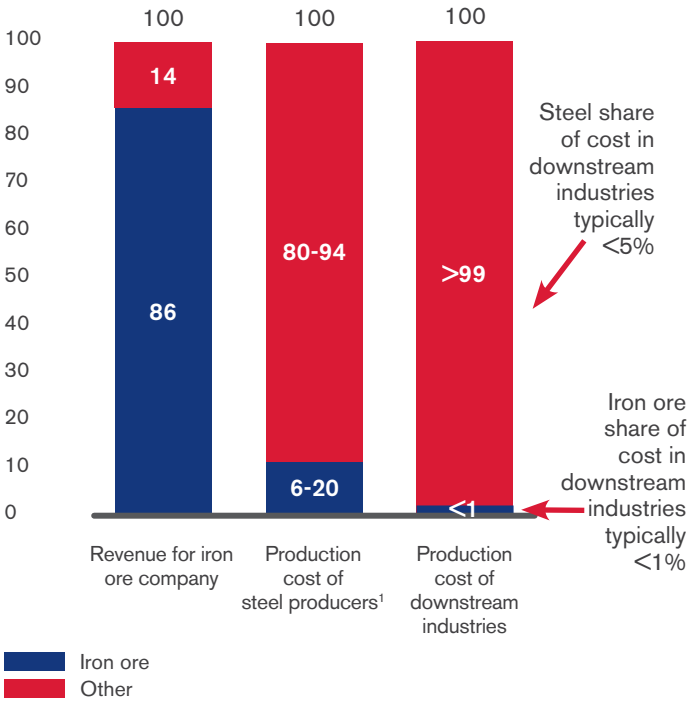
The largest end user industries in South Africa are building and construction (40%), automotive (11%), machinery (9%) and mining (7%).

1.3.1 Iron ore price as a competitive advantage

It is pertinent to consider the relative economic importance of iron ore to the various industries involved in all four stages of the value chain. In relation to iron ore miners (steps 1 and 2 in the value chain), iron ore accounts for the bulk of their revenue. Iron ore prices are the primary determinant of their economic viability and expansion potential.

EXHIBIT 1.1: ECONOMIC IMPORTANCE OF IRON ORE AND STEEL PRICES ACROSS THE VALUE CHAIN

Percent



[1] High range indicates AMSA cost of iron ore at spot level. Low range indicates cost of iron ore for small EAF based steel producer

SOURCE: Kumba

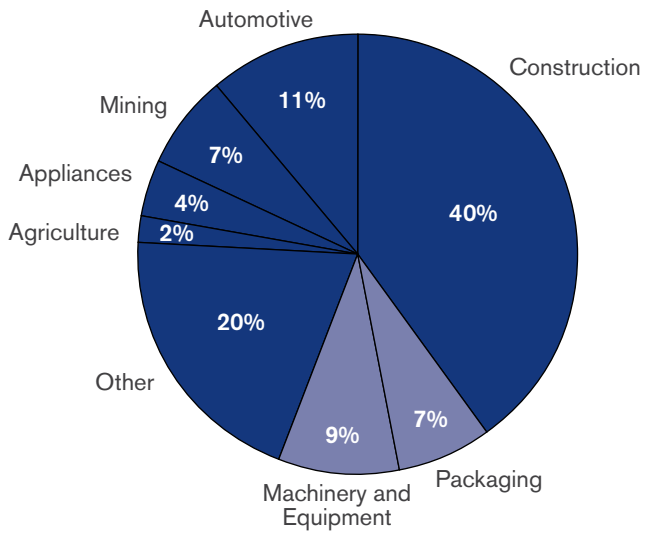
At the third stage (steel manufacturing) iron ore fines and lump, supplied by Kumba from the Sishen and Thabazimbi mines, accounts for up to 20% of input costs for steel plants of AMSA (assuming iron ore at EPP), which primarily uses the iron ore intensive blast furnace process to produce steel as illustrated in *Exhibit 1.1*. Even at export parity prices, iron ore would constitute less than 20% of output costs. For AMSA's export oriented steel plant at Saldanha, using Midrex and Corex processes, domestic iron ore is an even smaller part of the overall production cost since the process relies on imported pellets. Factors such as the availability and price of coking coal (up to 27%), labour cost (12%) and productivity, as well as proximity of demand (transport and logistics costs) are of greater cost importance in respect of AMSA's operations.

Other South African steel producers are either self sufficient in vanadium-rich iron ore (eg Evraz Highveld Steel and Vanadium) or EAF based (eg Scaw Metals, CISCO, Cape Gate) and thus source the majority of their iron input from scrap metal. The availability and price of iron ore only account for 6% of input costs and are not meaningful determinants of economic viability and competitiveness.

As illustrated in *Exhibit 1.2*, there are various types of steel users in South Africa. Manufacturers and end users of low steel intensity products consume approximately 85% of South African steel. Steel contributes less than 5% of these users' total costs and iron ore therefore makes up less than 1% of their total costs (iron ore content in steel is c. 6-20% and steel content in end products is typically less than 5%), as illustrated in *Exhibit 1.1*.

EXHIBIT 1.2: SOUTH AFRICAN STEEL CONSUMPTION BY INDUSTRY

Percent of available steel in downstream



SOURCE: SAISI, Stats SA

1.4 INDUSTRY PARTICIPANTS AND CONTRIBUTION TO SOUTH AFRICA, PER STEP IN THE VALUE CHAIN

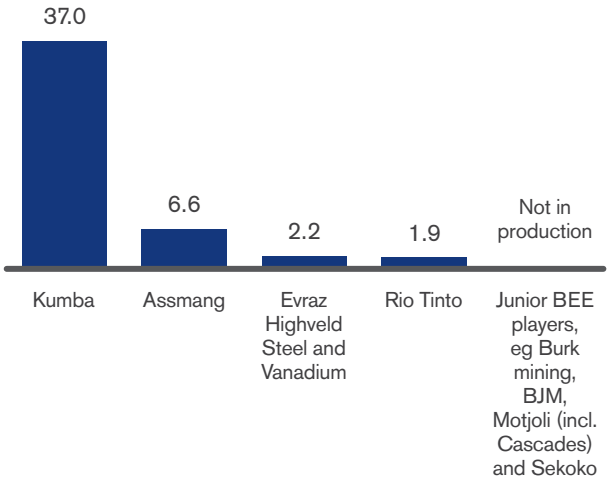
1.4.1 Exploration and extraction and mining beneficiation

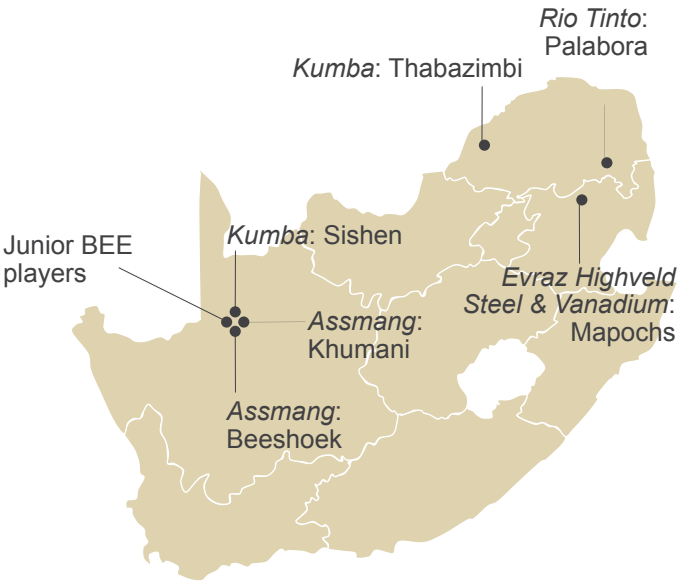
The South African iron ore industry supplies the domestic market's full demand for iron ore and the remaining volumes are beneficiated and exported.

The South African iron ore mining industry produced approximately 48 mt of iron ore in 2008 and is the fourth largest exporter of seaborne iron ore after Australia, Brazil and India. The South African industry supplies the domestic market's full demand for iron ore, and the remaining volumes are beneficiated and exported. There are three established players in the market, namely Kumba, Assmang and Evraz Highveld Steel and Vanadium (which mines a unique form of captive iron ore). The industry also contains some smaller players, including junior BEE companies, which either have the potential to commence production or are still ramping up current levels of production *(see Exhibit 1.3).*

EXHIBIT 1.3: IRON ORE MINING COMPANIES IN SOUTH AFRICA

2008 production,
million tonnes





SOURCE: Kumba annual report, Assore annual report, Evraz Highveld annual report, Palabora annual report

Kumba Iron Ore

Is the largest iron ore mining company in South Africa, with an output of approximately 37 mt in 2008 from the Sishen (Northern Cape) and Thabazimbi (Limpopo) mines. Kumba Resources was created in the commercially driven unbundling of Iscor in 2001 and Kumba Iron Ore was listed in 2006. Its newest mine, Kolomela in the Northern Cape, will reach full production of 9 mtpa in 2012.

Assmang

(50% owned by African Rainbow Minerals and Assore respectively) is the second largest iron ore mining company in South Africa, with an output of approximately 6–7 mtpa from its Beeshoek and Khumani mines in the Northern Cape. Beeshoek is nearing the end of its life and the newly opened Khumani will reach a capacity of 16 mt in 2012, with a total potential of 20 mt thereafter.

Evraz Highveld Steel and Vanadium

Operates a captive mine at Mapochs in Mpumalanga, with an output of approximately 2 mtpa. Mapoch's iron ore is supplied only to Highveld Steelworks, since the mine's ore contains a high proportion of vanadium. These ores are processed at its downstream facility in a complex process which separates the vanadium and titanium from the iron.

Rio Tinto

Operates a copper mine at Palabora in Limpopo with small reserves of iron ore and sells small amounts of iron ore directly to industrial end users (not steel manufacturers).

Junior BEE miners

Are exploring deposits mainly in the Northern Cape for future production. These include companies such as Burk Mining, BJM, Motjoli (including Cascades) and Sekoko.

In 2008, the iron ore industry contributed R15.6 bn in GDP (0.7%) and R8.1 bn to the fiscus. The iron ore industry directly employed approximately 14 400 people in 2008 and investments in the industry led to the creation of 5 000 new jobs during 2002-08[1].

Other input materials in steel manufacturing

In addition to iron ore, other input materials are used in the manufacturing of steel, including scrap, manganese and coking coal. Currently South Africa is self-reliant in terms of scrap and manganese, but needs to import coking coal.

Characteristics of the South African market for these products are outlined below:

- Scrap substitutes for iron ore for companies using the EAF route and the South African scrap industry is currently very well developed. In addition to satisfying local demand (2.6 mt in 2008), local companies exported scrap amounting to 0.1 mt in 2008. The scrap industry is extremely fragmented, with >140 companies supplying metal scrap in South Africa. Prices of scrap are linked to export parity.

- Manganese improves the hardness, toughness and wear resistance of steel. South Africa has the largest high-grade manganese resources in the world (80% of global resources). Exports of manganese ore increased from 3.5 mt in 2003 to 6.9 mt in 2008, equivalent to >98% of local production. The two main manganese miners in South Africa are Samancor (4.5 mtpa capacity) and Assmang (3.7 mtpa).

- Coking coal is the biggest cost contributor in steel manufacturing, accounting for up to 27% of total costs. It is used to provide the energy in the blast furnace process and acts as a chemical reductant to transform iron-oxide ores into steel. South Africa consumed approximately 4 mt of coking coal in 2008. Due to supply constraints 50% of coking coal is imported from Australia. The major producer of coking coal in South Africa is Exxaro (2 mtpa).

The scrap, manganese and coking coal industries are significant contributors to the South African economy, employing approximately 14 000 people.

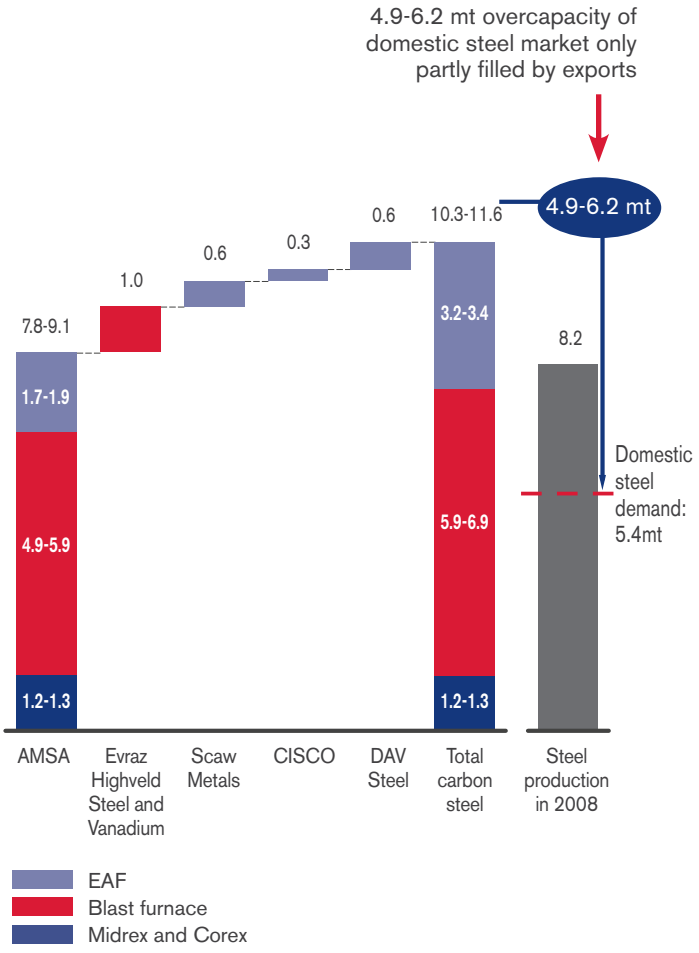
[1] Only direct GDP and employment given; Sources include Stats SA, Chamber of Mines and financial reports

1.4.2 Metallurgical beneficiation and shaping

In 2008, South Africa had approximately 10.3–11.9 mt of steel production capacity. Compared to domestic consumption, this implies 4.9–6.2 mt of excess capacity, of which 2.8 mt were utilised for the production of steel exports. The local steel industry is large enough to supply all domestic and regional overland demand (see Exhibit 1.4).

EXHIBIT 1.4: SOUTH AFRICAN STEEL CAPACITY AND PRODUCTION IN 2008

Thousand tonnes per year



SOURCE: Annual reports; SAISI; JF King; VDEh plant facts; Kumba

There are several reasons behind the excess steel capacity, including historic isolation which led to the local production of a comprehensive range of steel grades for which minimum capacity investments exceeded local demand.

South Africa is the third largest exporter of steel relative to its production after the Ukraine and Russia. In South Africa, AMSA sets domestic prices for its steel products based on global steel prices with the addition of logistics costs for the specific market (ie import parity pricing). On the other hand, the price for exports from South Africa is determined by global steel prices less logistics costs (ie export parity pricing). Steel pricing is therefore driven by global markets rather than by input costs (eg of iron ore).

Import parity price (IPP) = world price (FOB export) + shipping costs to South Africa + inland transport cost in South Africa

Export parity price (EPP) = world price (domestic market) – shipping costs to South Africa – inland transport cost in South Africa

The South African steel industry landscape is structured in the following way *(see Exhibit 1.5 on page 7)*:

ArcelorMittal South Africa

Is Africa's largest steelmaker, accounting for approximately 75% of domestic production. The company was created in 2001 through the unbundling of Iscor Ltd into Iscor and Kumba Resources. Iscor ultimately became ArcelorMittal South Africa following the acquisition by Mittal and the subsequent merger with Arcelor to form ArcelorMittal. AMSA sourced 5.4 mt of iron ore from Kumba in 2008 (ie not the full allocation of historical 6.25 mt supply agreement). AMSA operates several plants in South Africa. Its principal operations are:

- Vanderbiljpark (Gauteng), AMSA's largest plant produced approximately 3.3 mt in 2008 (4.4–5.1 mt capacity), mostly flat products, primarily using the blast furnace process;
- Newcastle (KwaZulu-Natal), which produced approximately 1.4 mt of long products in 2008 (1.8–2.4 mt capacity) using the blast furnace process;
- Vereeniging (Gauteng), which produced approximately 0.3 mt of speciality products in 2008 (0.3–0.4 mt capacity) using the EAF process; and
- Saldanha (Western Cape), which produced approximately 0.9 mt of flat products in 2008 (1.2–1.3 mt capacity) through special manufacturing processes called Midrex and Corex which require imported iron ore pellets. Saldanha is mainly export oriented.

Steelmakers using the EAF process, which uses scrap metal and not iron ore as the primary source of iron, include:

Scaw Metals
Owned by Anglo American and a consortium of empowerment partners, produced approximately 0.6 mt of steel products in 2008. Scaw manufactures rolled long products (rebar, wire rod, light and medium sections and grinding bar) at its facilities at Union Junction (Germiston). It also produces a range of castings, grinding media and wire rod products (wire rope, wire strand, chain and various wire products) at a variety of locations around South Africa.

DAV Steel
Owned by Cape Gate Holdings, which produced approximately 0.5 mt in 2008. DAV Steel manufactures mostly sections, rebar and wire rod at its production facilities in Vanderbiljpark (Gauteng). It also produces various wire products.

CISCO
Owned by Murray and Roberts, produced approximately 0.3 mt in 2008. Cisco manufactures mostly rebar at its production facilities in Kuilsriver (Western Cape).

Evraz Highveld Steel and Vanadium
Produced approximately 0.8 mt of steel products in 2008. Highveld is the only small-scale steelmaker in South Africa using the blast furnace route. The company's facilities in Witbank (Mpumalanga) are optimised to adapt to iron ore with a high vanadium content from the steelmaker's captive iron ore Mapochs mine, and produces both vanadium and steel.

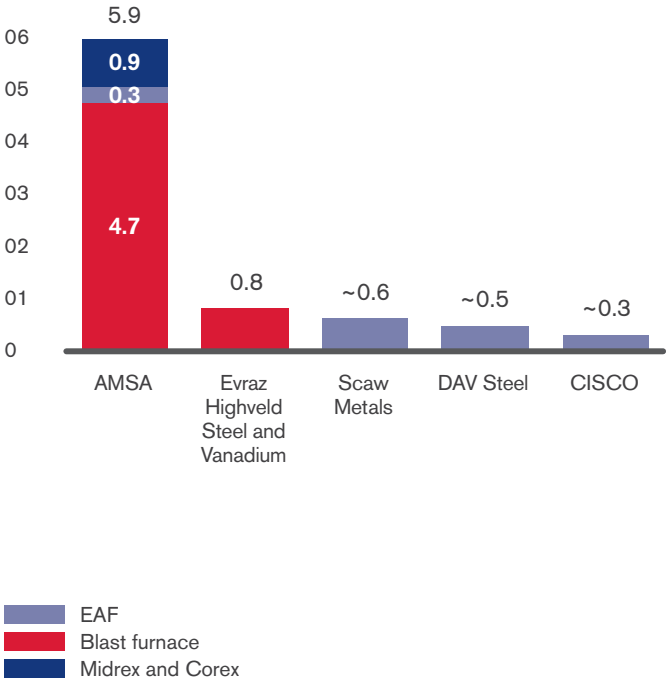
The smaller South African producers are financially challenged and currently earn marginal returns over their cost of investment.

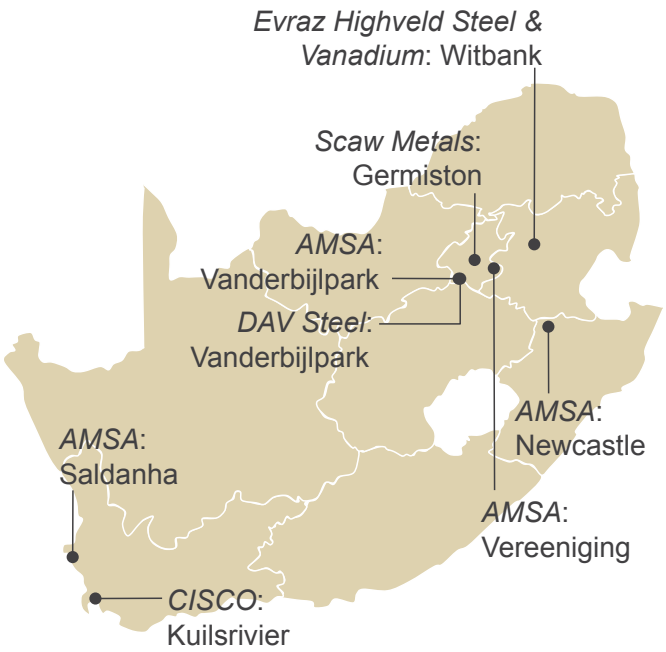
The South African steel industry made significant contributions to the economy in 2008, contributing R12.7 bn in GDP (0.6%) and R4.0 bn to the fiscus. The steel industry lost approximately 5 000 jobs between 2002 and 2008, having directly employed approximately 12 800 people in 2008, down from 18 400 people in 2002[1].

[1] Only direct GDP and employment given; Sources include STATSSA, Chamber of Mines, financial reports

EXHIBIT 1.5: STEEL MANUFACTURERS IN SOUTH AFRICA

2008 production,
million tonnes





SOURCE: Company annual reports, Kumba

1.4.3 Conversion/fabrication and manufacturing/end user industries

The last step of the value chain consists of two groups of players (see Exhibit 1.6).

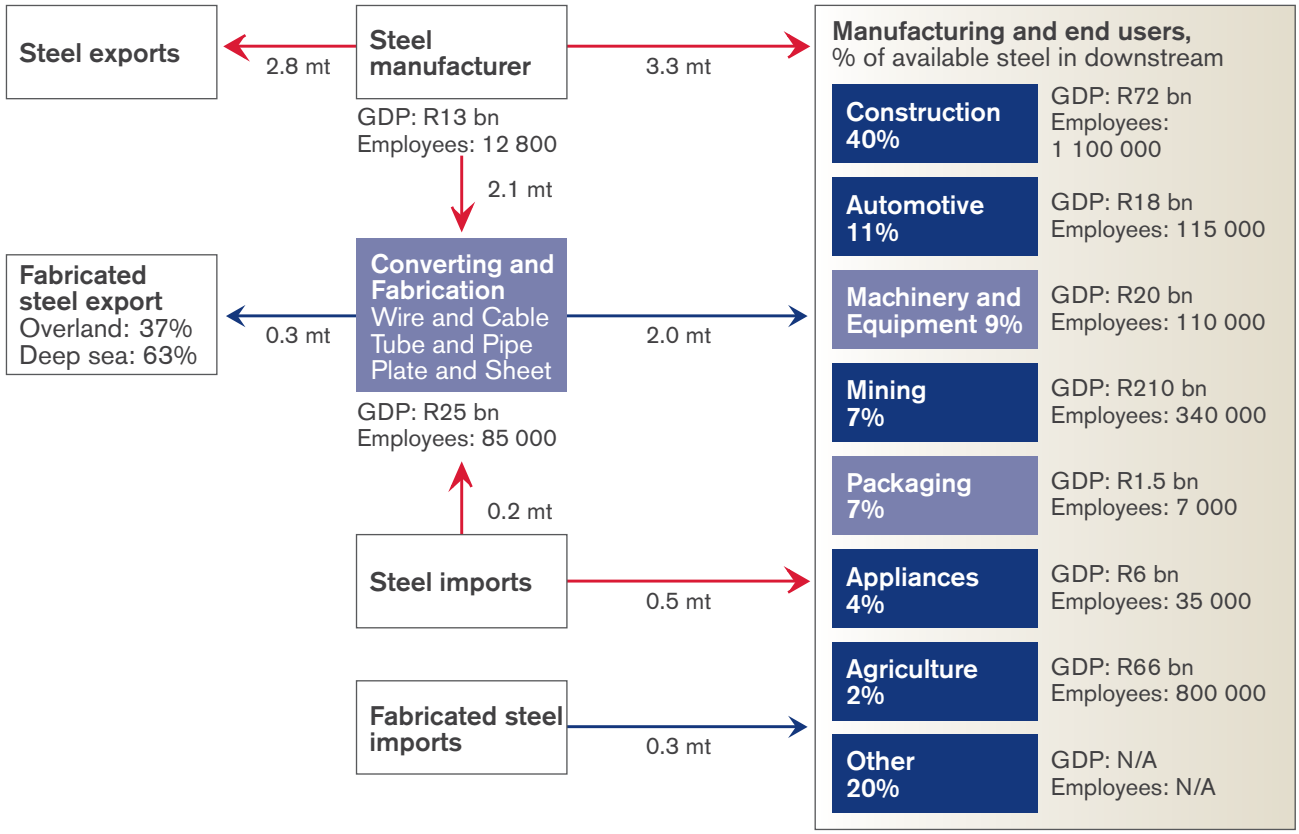
Converters/fabricators buy standard steel products (eg hot rolled coil and merchant bars) from steel mills and convert them into intermediate products (eg wire and tube). In 2008, these consumed 2.3 mt of standard steel products (2.1 mt domestically produced and 0.2 mt imported).

Manufacturers/end users consume both standard steel products from steel mills and intermediate products from converters as input materials for production of end products (eg light vehicles or construction projects). In 2008, they consumed 3.8 mt of standard steel products (3.3 mt domestically produced and 0.5 mt imported) and 2.3 mt of fabricated steel products (2.0 mt domestically produced and 0.3 mt imported).

The domestic standard steel market thus supplied 5.4 mt to downstream industries (2.1 mt to converters/fabricators and 3.3 mt to manufacturers/end users).

Converters/fabricators: Converters consumed approximately 30% of total available steel in 2008 in the fabrication of standard steel products into various intermediate steel products eg wire, cable, tube, pipe, nails, screws, plate and sheet products. The vast majority of their sales are to domestic manufacturers/end user industries and the balance is exported at lower margins. This group consists of companies such as Scaw's Wire Rod Products Division, General Profiling, Pro Roof Steel Merchants, Hall Longmore and Robor. Converters employ approximately 85 000 people in South Africa and steel's share of product value is typically high (approximately 40%). Despite the high share of steel in the overall production cost, converters would not be competitive in the international market even with steel prices at or close to cost price. As an example, steel accounts for 60% of the production cost of wire rods *(see Exhibit 1.7 on page 9)*. Logistics costs in these markets are significant, resulting in imports from low cost countries not being competitive in South Africa, even with

EXHIBIT 1.6: STEEL FLOWS IN SOUTH AFRICA IN 2008

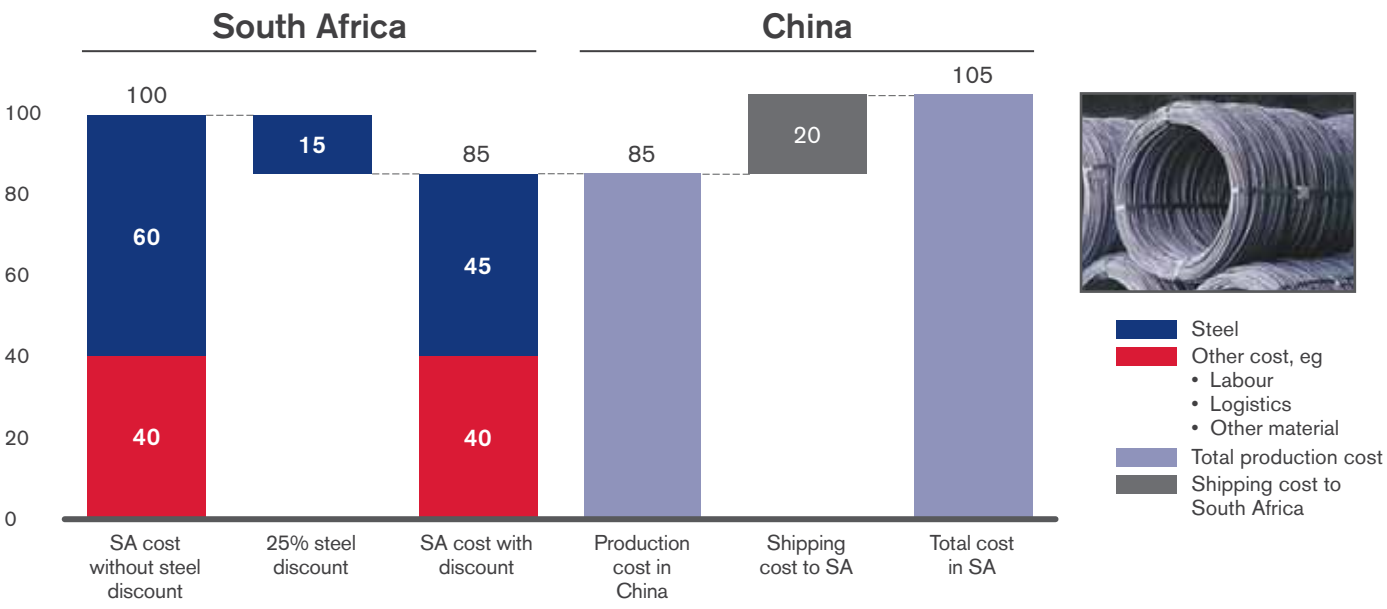


[1] Export data not comprehensive in this data set

SOURCE: Stats SA, SA customs data

EXHIBIT 1.7: STEEL USAGE IN CONVERTING AND FABRICATION (WIRE ROD EXAMPLE)

% of baseline cost (without steel discount)



SOURCE: Kumba

steel priced at import parity price levels. Similarly, exports from South Africa will not be able to successfully compete internationally, even if steel is provided at discounted prices.

The domestic industry is, however, well developed and has all major products in its portfolio. Only c 0.3 mt of imports of various intermediate niche steel products, such as galvanised steel, are imported into South Africa, which is unlikely to be able to produce these products competitively, as significant economies of scale are required.

Manufacturers/end users: The last part of the iron and steel value chain consumes both standard steel products delivered by steel mills and intermediate steel products delivered by converters. A wide variety of industries use these products and can be split into two categories based on steel intensity:

- **Low steel intensity sectors:** More than 85% of South African steel is consumed in industry sectors for which steel's share of product value is typically very low (<5%). These industries include building and construction (40%), automotive (11%), machinery (9%), mining (7%), electrical appliances (4%) and white goods (2%). They account for >90% of jobs in steel consuming industries and 18-20% of GDP.

  Typically, steel is not a determining factor of these industries' competitive position since it accounts for a very small portion of their total costs. For example, steel only accounts for approximately 3% of the total cost of a vehicle *(see Exhibit 1.8).* Therefore, a steel price discount would only marginally improve automotive manufacturers' cost position versus other car producing and exporting regions. Sufficient manufacturing volume, scale and favourable foreign exchange rates, for example, are more important determinants of these industries' competitive position versus other countries. In the case of China, the production cost difference would still be 36% after steel price discounts.

  In some of these industry sectors, the South African economy is very well developed as a result of the domestic scale and know-how (eg grinding media). In other areas the industry is not well developed due to domestic scale and know-how (eg mobile mining equipment such as shovels).

- **High steel intensity sectors:** Less than 15% of steel is consumed in industry sectors for which steel's share of the final product value is relatively high (>50%). These industries include certain sectors of machinery and packaging, which account for 9% and 7% of South Africa's steel demand respectively. These industry sectors represent <10% of total jobs in steel consuming industries and <1% of GDP.

  Typically, these markets are more domestic and regional in nature. Although a steel price discount would make these more competitive, large scale exports and imports are challenging due to logistics costs and other inconvenience factors. In the example of bottle crowns (packaging industry), a steel price discount would make production cost similar to that of China, but logistics would still restrict exports (*see Exhibit 1.9*).

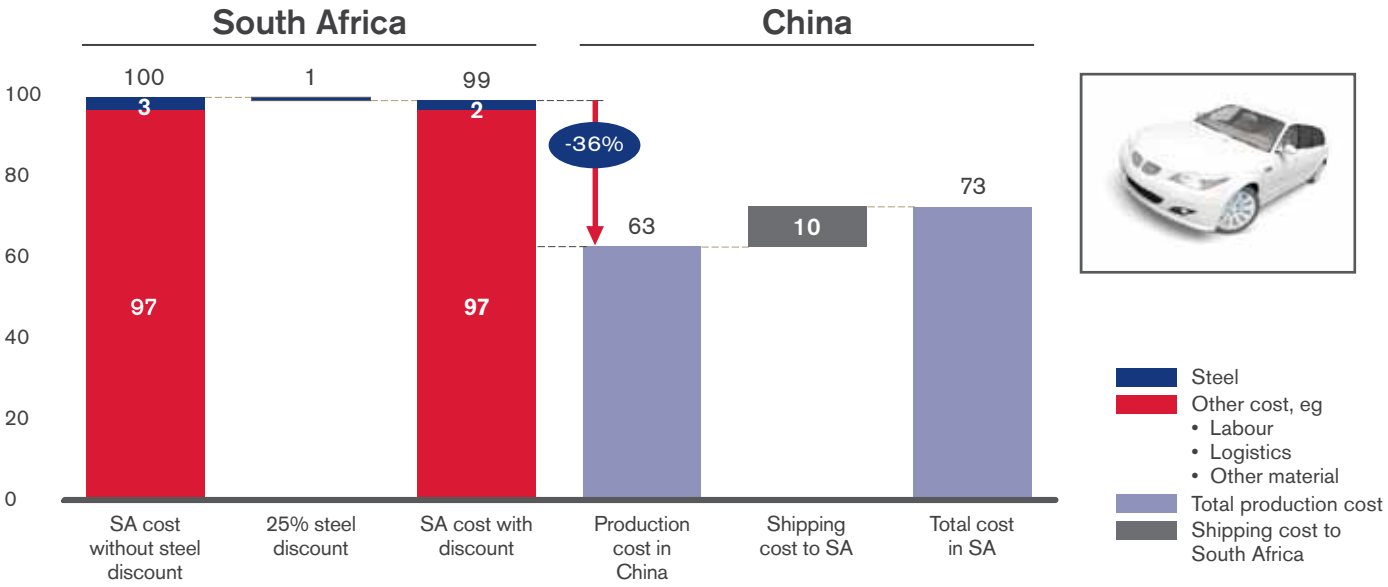
  In many areas, the South African industry is well developed, producing the bulk of domestic demand requirements, as well as exporting to the Southern African region. These high steel intensity sectors contributed approximately R10 bn in GDP.

  In 2008, the converting and manufacturing/end user industries contributed R440 bn in GDP (20%) and R40 bn to the fiscus. These industries employed approximately 2.6 million people in 2008[1].

[1] Only direct employment given; Sources include STATSSA, Manufacturing report, and labour report (2008)

EXHIBIT 1.8: STEEL USAGE IN LOW STEEL INTENSITY SECTORS (AUTOMOTIVE EXAMPLE)

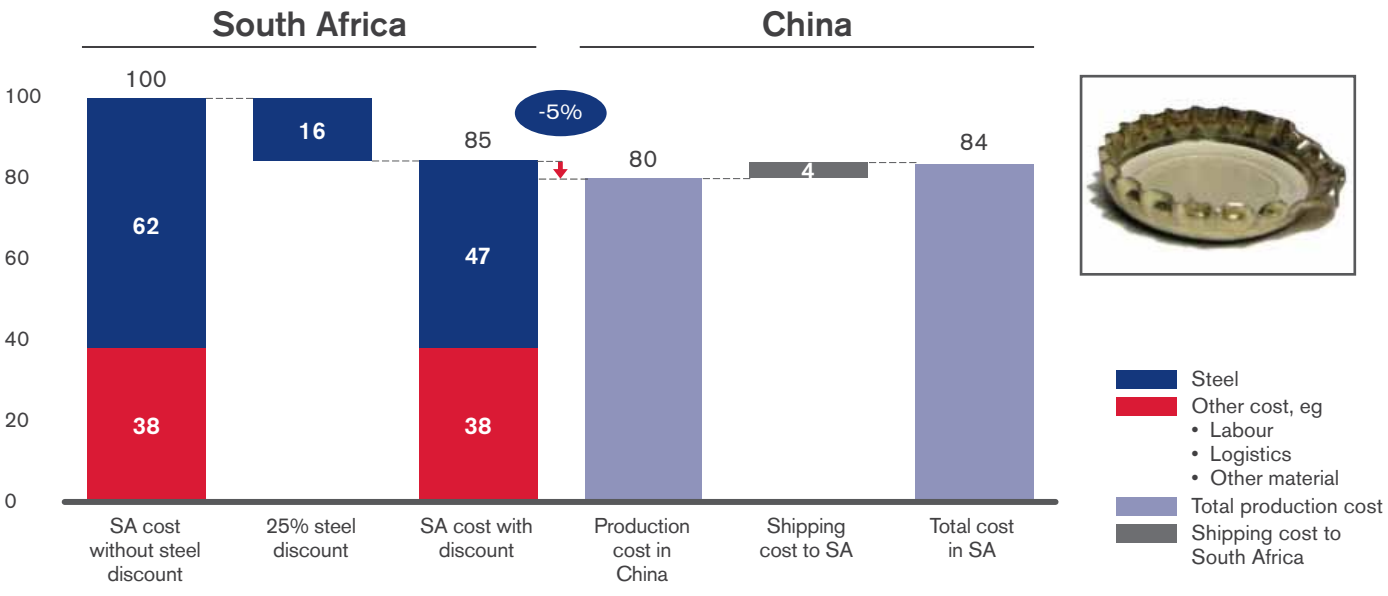
% of baseline cost (without steel discount)



SOURCE: Kumba

EXHIBIT 1.9: STEEL USAGE IN HIGH STEEL INTENSITY SECTORS (PACKAGING EXAMPLE)

% of baseline cost (without steel discount)



SOURCE: Kumba

1.5 CURRENT POSITION, GROWTH PROSPECTS AND CONDITIONS NEEDED FOR SUCCESS

1.5.1 Exploration and extraction and mining beneficiation

Current position
Globally, iron ore is a cyclical commodity, making prices fairly volatile. Quality iron ore deposits of material scale are not common and are largely concentrated in Brazil, Australia, West Africa (not fully developed) and South Africa (Northern Cape). There is significant demand for imported iron ore in China, developed Asia, the Middle East and Europe.

Given the geographic imbalance between supply and demand and the fact that iron ore is cheaper to transport than finished steel, there is a large and healthy market for seaborne iron ore. Transport costs (rail overland to ports/ steel mills and oceangoing ships) are significant and both operating and capital costs for these bulk logistics systems (railways, ports, ships) are often higher than the mining and mining beneficiation operating costs and investments. South Africa is not logistically disadvantaged in this market as its distances to markets are similar to those of the other major exporting regions (eg Brazil).

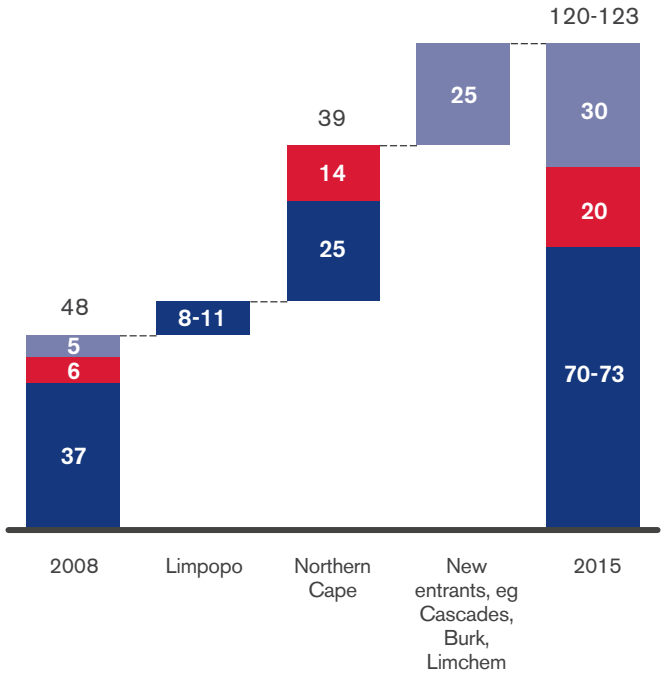
South African iron ore deposits in the Northern Cape are world class with very good physical characteristics and average chemical characteristics. The major mines in the region (Sishen, Kolomela, Khumani and Beeshoek) all have significant scale and share a common, well developed export channel (IOEC rail line and Saldanha port). There is an additional iron ore mining region in Limpopo province which currently has one active mine, Thabazimbi (owned by Sishen Iron Ore Company, a subsidiary of Kumba), Thabazimbi currently supplies its entire iron ore volume on a cost plus basis to AMSA. It is nearing end of life and is set to close in approximately 2016.

Growth prospects and requirements for success
The South African iron ore industry has the potential to more than double output in the next 10 years if there is appropriate government support (regulatory, energy, transport and water) *(see Exhibit 1.10).* This would create approximately 14 000 jobs (7 000 direct), materially contribute to the national fiscus and provide significant growth momentum to the Northern Cape and Limpopo local economies. The demand for iron ore is driven by international steel production and not by domestic consumption.

These growth projects are capital intensive and will not be economically viable without market related iron ore prices (at export parity price levels).

- In the Northern Cape, Kumba and Assmang have plans to almost double the industry by adding 39 mtpa. Most of these planned expansions will leverage beneficiation technology (jigging to upgrade product or pelletising to increase granulate size) to convert ore types, which in the past would have been regarded as waste, into valuable saleable product. To capture this growth opportunity, the various iron ore producers will need government support to ensure additional logistics capacity is built (IOEC rail and Saldanha port, which Kumba currently supports) and that the resulting tariffs

EXHIBIT 1.10: GROWTH PROSPECTS IN THE IRON ORE MINING INDUSTRY
Million tonnes of iron ore



Potential impact on employment:
Direct: ~7 000
Indirect: ~7 000

SOURCE: Kumba

remain close to current levels, ensuring that these projects remain economically viable.

- In Limpopo the opportunities are smaller and revolve around two projects:
  - Project Phoenix, a 3.4 mtpa Kumba project to utilise the banded ironstone ore-body in and around the existing Thabazimbi mine; and
  - Zandrivierspoort, a 5–8 mtpa greenfield project, owned jointly by AMSA and Kumba.

  These two projects together create an additional 8–11 mtpa iron ore system in Limpopo, but are too small to economically justify the development of new dedicated export infrastructure (railway or pipeline). It is thus critical for the future of these projects that these two mines supply their volumes to the domestic steel manufacturing industry (eg to AMSA or a new steel manufacturer in South Africa/the Southern African region). Supplying inland steel mills with iron ore from Limpopo would increase usage options for the Northern Cape iron ore volumes currently supplied inland. In addition, the possibility for the development of the Limpopo iron ore deposits could increase if the Waterberg coal reserves were developed simultaneously since there are significant synergies.

  Assuming that Limpopo iron ore would be supplied to the Gauteng region, the rail network would need to be upgraded to ensure reliable rail capacity. In particular for Zandrivierspoort, any iron ore offtake beyond 2.5 mtpa will require a new 1.3 km crossing loop (Pyramid South to Sentrarand), a short loop extension (Solomondale to Polokwane), rolling stock amounting to R3 bn to transport the iron ore, a diversion of the N1 highway and potentially a river course.

  It will also be important to invest significantly in VIU research (chemical balancing of iron ores to increase productivity of steel mills) and mining beneficiation plants (eg pelletising or micro-pelletising) to ensure this considerable volume of iron ore can be used effectively by domestic steel manufacturers.

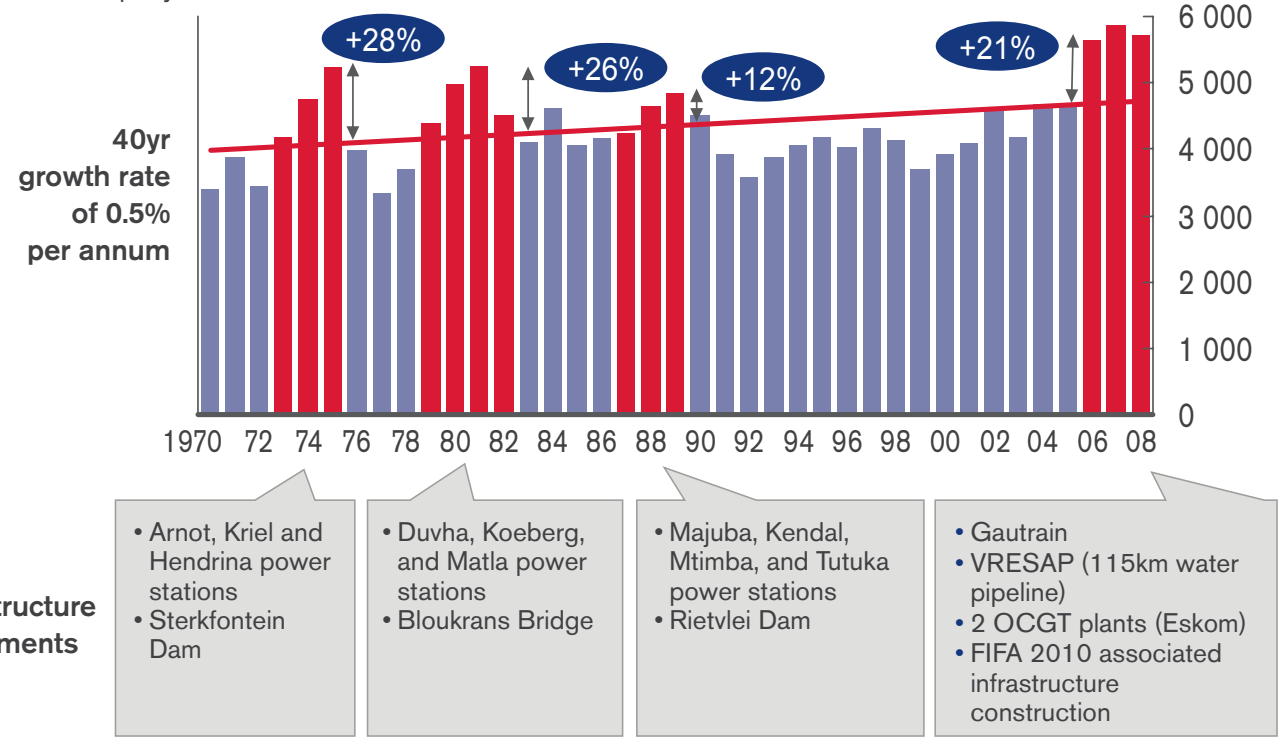
1.5.2 Metallurgical beneficiation and shaping

Current position
Given the global nature of steel markets and South Africa's heavy reliance on the export market, it is important to discuss these markets. The markets for South African steel can be segmented into three categories:

- **The domestic market:** Average demand for steel in South Africa has been approximately 5.1 mtpa over the last five years. This includes both a few years of peak demand (2006-08), driven by the recent infrastructure build out, as well as years with lower demand (eg 2003) *(see Exhibit 1.11).*

EXHIBIT 1.11: HISTORICAL SOUTH AFRICAN DOMESTIC STEEL CONSUMPTION

Thousand tonnes per year



Peaks in South African steel consumption were historically driven by infrastructure projects
[1] Apparent consumption figures are used for 1970-1989 and real consumption figures for 1990 onwards

SOURCE: SAISI

This total demand represents less than 50% of South Africa's steelmaking capacity. In the domestic market, South African producers are well positioned, given the significant logistics costs (shipping and rail inland) amounting to between $60 /t and $90 /t that competitors would incur should they supply into South Africa. This situation is very similar to that in many other major markets (eg the USA) with a logistics advantage that protects domestic manufacturers from very low cost steel exporters (eg China, Russia and the Ukraine).

- **The regional overland market:** South African steel producers are competitive in this market given their natural logistics advantage due to their proximity to the market and are able to earn their cost of capital over the cycle. Steel demand in this regional overland market is growing strongly, albeit off a very low total demand base of approximately 0.3 mtpa. Even with a projected 30-50% increase in demand by 2015, the total demand available to South African producers would represent only 2-3% of South Africa's domestic consumption, thus representing a relatively small opportunity.

- **The seaborne export market:** The global seaborne steel market is structurally unattractive:

  – Historically, there has been global structural over-capacity. This is anticipated to rise to 185 mt (approximately 18%) surplus capacity by 2012, creating excess steel capacity, many times larger than export demand *(see Exhibit 1.12).* Therefore, there is much greater supply than demand.

  – This results in significant competition for limited export markets, with only the lowest cost producers (eg Russia, the Ukraine) being able to break even on exports over the steel cycle. As a result, the global steel industry has been unable to earn its cost of capital over the cycle and is systemically destroying value.

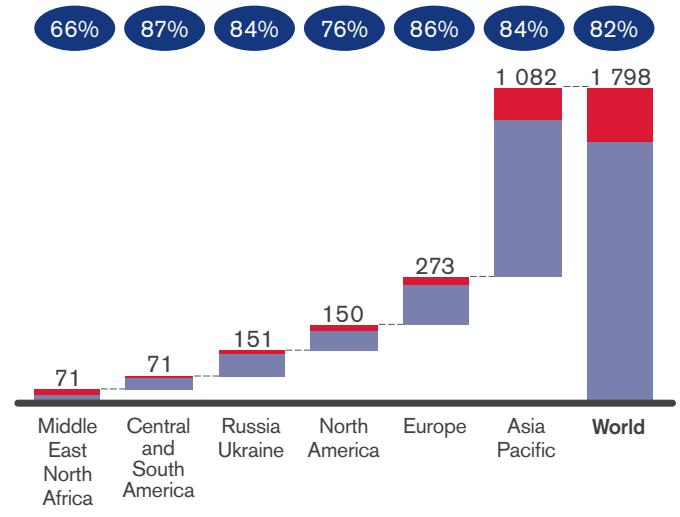
  – For a brief period (2004-2008), urbanising China temporarily needed to import a small portion of its very large steel consumption, providing a window of strong profits for the global industry. However, as of 2006, China has had sufficient steelmaking capacity and has resumed exporting steel. This has resulted in a return to the long term unattractiveness of the global steel market.

  – Even accounting for AMSA's historical iron ore cost advantage, South African steel producers are in the 2nd to 3rd quartile of landed cost curves (eg average or below average cost position) to the main export markets in Western Europe, Asia, and North and East Africa. Thus, South African steel exports are only attractive during an "up market" and destroy economic value over the cycle (earning lower returns on invested capital than its cost of capital) *(see Exhibit 1.13).*

This inability to compete in the global export market is illustrated clearly by the fact that the South African steel industry had approximately 4.9–6.2 mt of excess steel capacity over domestic demand (approximately 50% excess capacity) in 2008, but was not able to export more than 2.8 mt during that year. The overcapacity existed even-though AMSA could have received additional iron ore at cost plus 3% prices.

EXHIBIT 1.12: GLOBAL CRUDE STEEL CAPACITY AND PRODUCTION

Million tonnes of crude steel

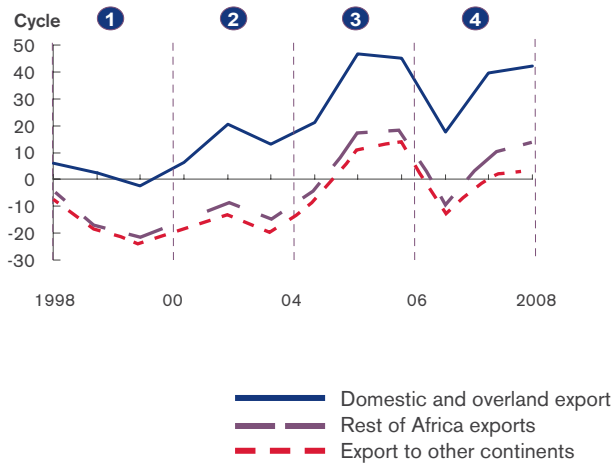


~185 mt of excess capacity compared to practically feasible utilisation

SOURCE: HSBC; Kumba

EXHIBIT 1.13: ECONOMIC VALUE ADD (EVA) OF SOUTH AFRICAN STEEL DOMESTIC SALES AND EXPORTS

Economic value added (ROIC-WACC)[1], percent



[1] ROIC: Return on invested capital
WACC: Weighted average cost of capital

SOURCE: AMSA annual reports, JF King, Portnet, UN Comtrade, Bloomberg, Kumba analysis

Growth prospects and requirements for success

South African steel producers are not cost competitive on the seaborne export markets. The reasons become apparent in an analysis of the factors needed to create successful steel industries:

- **Advantageous factor costs:** On four of the largest input cost components (coking coal, logistics, labour and capital), accounting for more than 40% of total production cost, South African steel producers have significant cost disadvantages compared to the major steel exporting nations (eg Brazil and the Ukraine) *(see Exhibit 1.14).* These disadvantages more than offset any historic advantage which may have been enjoyed by one South African steel producer in respect of the price at which it acquired iron ore. Thus, the price of iron ore is not a determinant of the steel industry's competitiveness.

- **Large domestic markets resulting in steelmaking facilities of significant scale, primarily serving profitable domestic markets (eg Korea and China):** With structural over capacity of approximately 50% and several players owning sub-scale assets, South African steel manufacturers are not well positioned.

- **Proximity to large export markets:** While the iron ore market is truly global, the steel market is more regional and driven by transportation costs. Compared to its international competitors, South Africa has a geographic disadvantage in both rail (as most manufacturing assets are inland) and shipping (long seaborne routes to major markets), leading to significant landed cost disadvantage. In other words, the cost of transporting South African produced steel to export markets makes South African steel products uncompetitive.

- **Ability to produce very high quality niche products (eg high end exposed body panels for cars; and rail sections):** South African assets are generally not configured for high end niche markets. The very small domestic and regional markets for these products also result in economically unviable investment cases for these facilities.

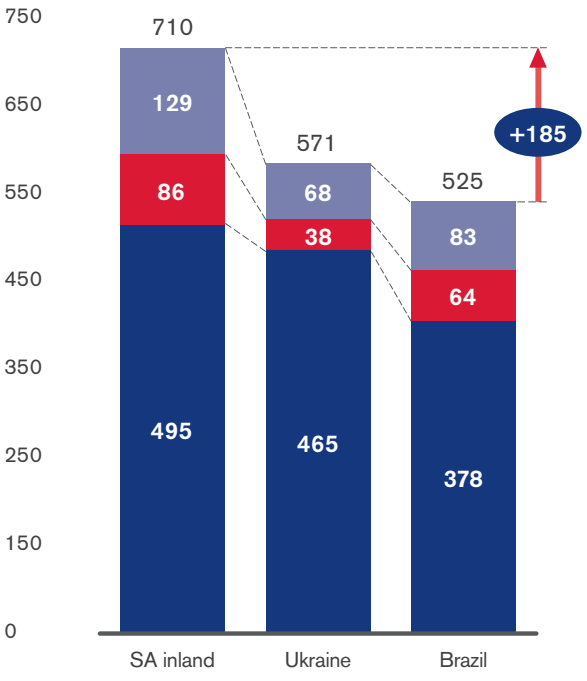
The current large size relative to the economy, local over capacity and structural lack of export competitiveness of South Africa's steel manufacturing industry significantly limit prospects for additional capacity in this step of the value chain. There are two possibilities to change this economic paradigm in the South African steelmaking industry:

- The majority of global steelmaking capacity relies on the use of blast furnace technology requiring high quality iron ore and coking coal. The majority of the world's seaborne coking coal is sourced from Australia and Canada. This resource is becoming increasingly rare and expensive, creating the long term need to develop alternative technologies for steelmaking. One such option would be the successful development of emerging ironmaking technologies (to date, largely experimental and not commercially proven) that could eliminate the use of expensive coking coal/coke which South Africa must import. Such technologies (eg IMTK3 and Circofer) would employ novel DRI/pig-iron processes to utilise low grade iron ore fines and local coal to capitalise on South Africa's natural advantages. This would require very significant R&D investments from both government and key players across the local iron and steel value chain. Bearing in mind this objective, Kumba has already commenced working together with other key players in the value chain to accelerate the development of these technologies.

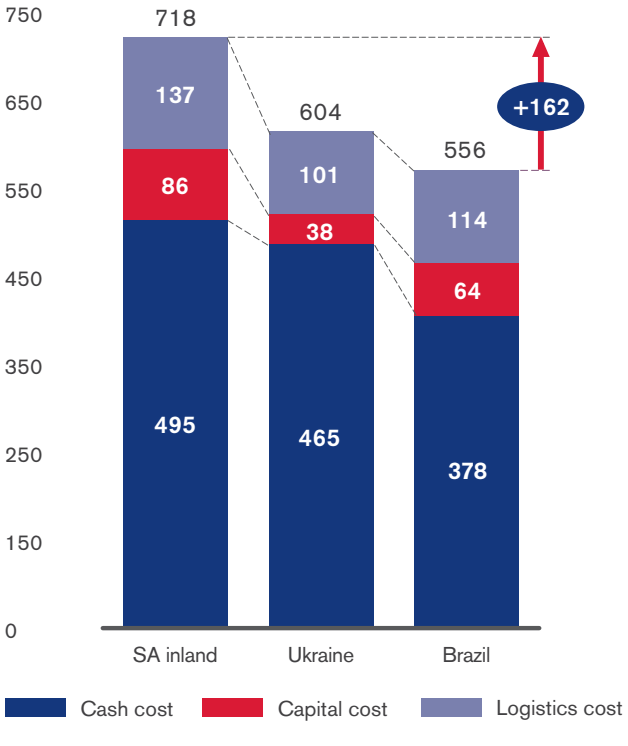
EXHIBIT 1.14: COST COMPARISON OF SOUTH AFRICAN EXPORTS WITH INTERNATIONAL COMPETITORS

HRC full cost Q1 2010, US$/t

Delivered North West Europe (Rotterdam)



Delivered China (Shanghai)



SOURCE: James F King; AMSA; Kumba

- While South Africa does not have the scale and cost advantage to compete on a sustainable basis in the export steel market, a potential option could be to create additional capacity to manufacture intermediate steel products (eg steel slabs) to markets in the East (eg China, Japan and Korea), such as Brazil has done. To date, the economic case behind this model has been difficult to justify in South Africa, as well as globally. To improve economic viability, several pre-conditions would need to be met:

  – A new steel mill would need to be constructed at the coast to avoid the punitive costs of transporting finished steel to the coast. This mill would also need to be of sufficient scale (producing 5 mtpa or more) and to be built at a globally competitive capital cost potentially requiring Chinese partners to achieve world class capital productivity;

  – Significant infrastructure development (rail and port) to facilitate the transport of iron ore from the Northern Cape or Limpopo regions to a suitable deep water port (eg Maputo or Saldanha), capable of handling the size of ships needed for slab exports; and

  – A partnership with a steel manufacturer in the East would have to be established with guaranteed offtake from the slab mill through the entire steel economic cycle. Typically, slab investment cases fail since the global market is flooded with cheap slabs (eg from the Ukraine) when demand/price is low and other producers cannot find a market for their slab production.

However, any such investments in new capacity would require an environment that enables fair competition. Since the majority of South African steel makers are dependent on scrap, rather than on iron ore, a level playing field could only be achieved through the introduction of market related prices for iron ore.

1.5.3 Conversion/fabrication and manufacturing/end user industries

Current position
South African converters and manufacturers are, in most cases, very competitive in domestic and regional markets, but cannot export due to high logistics costs and/or lack of scale. Simultaneously, the volatility related to foreign exchange fluctuations adds further risk to building an export oriented industry. The specific competitiveness of the South African industry in the domestic and export markets is as follows:

- **Converters/fabricators:** The Southern African market is typically very regional and supplied from South Africa as a result of the existence of domestic steel supply and natural proximity to customers. South African players' market position is strong against imports (eg from China). Due to high logistics costs relative to product value, exports beyond Southern Africa are not competitive for most product categories.

- **Manufacturers/end users:**

  – **Low steel intensity sectors:** The current competitive position differs across industries depending on the nature of demand. In sectors that are purely domestic in nature (eg building and construction), the South African industry is essentially meeting domestic demand fully, as there is limited possibility for foreign competition. However, in manufacturing sectors (eg automotive) the South African industry is often sub-scale and far from major export markets. In many of these industries, South Africa's cost position is also disadvantageous and is mainly driven by labour costs, or these industries lack critical success factors, such as technological know-how (eg heavy machinery). With government support, the industry is competitive enough to supply the domestic market in most of these sectors (eg automotive), but has thus far not been successful in building a competitive industry (eg in mobile mining equipment) that would rely mainly on exports.

  – **High steel intensity sectors:** In most product categories (eg packaging), South Africa is domestically competitive and supplies most local demand. However, exports of these products are seen as challenging, since logistics costs and inconvenience factors are high, relative to product value.

Growth prospects and requirements for success
Given the varying competitiveness of the different groups, growth prospects and requirements for success are group-specific:

- **Converters/fabricators:** There is limited potential to increase exports since logistics costs limit reach to Southern Africa. Most domestic demand is already supplied locally. However, the production of a small set of niche product categories could be increased by replacing import leakages or increasing regional exports. The most effective lever for growing economic activity among converters would be to accelerate growth in some of the key end user industries (eg infrastructure building and construction projects and mining).

- **Manufacturers/end users:**

  – **Low steel intensity sectors:** Increasing exports in most industry sectors is not seen as feasible as it is not cost competitive (eg due to labour costs). It is also highly unlikely that local production can be grown by replacing imports, since current imports are either from countries with a significantly lower cost base or are highly specialised products requiring global scale and special technology. Growth in this sector is thus

limited to the growth of the Southern African economy in general. The key requirement for maintaining high local content and responding to domestic sales growth is a sustainable competitive steel industry with a high quality product portfolio.

– **High steel intensity sectors:** In some small pockets, there is potential to increase local content by targeted productivity increases and through long term strategic government purchasing. For example, in some machinery categories (eg generators), industry growth could be supported through government guaranteed demand for the next 10-20 years, with significant knowledge and capability investments. This would enable long term investments by the industry so as to base production in South Africa. Large scale exports are unlikely.

To synthesise, there are three material growth opportunities, each with specific requirements:

- Growing converters as a result of increased South African demand, eg spending on infrastructure and mining projects;
- Growing converters of niche products through targeted competitive measures to increase exports or replace imports; and
- Increasing local production in high steel intensity sectors with a low current share of domestic production through strategic government spending.

1.6 DETERMINING THE WAY FORWARD

Given the major importance of this value chain to South Africa and our people, Kumba values government's aspirations for the sector and is fully committed to co-operating and participating within a joint government industry process.

The impact of global economic markets, local policy and regulation and the actions of industry participants will define the prospects for the entire iron and steel value chain.

The best answer for South Africa is not always intuitive and the challenges of achieving structure transformation through selective policy intervention, specifically in relation to benefication is well documented, notaby in the final recommendation of the International Panel on ASGISA.

The road forward is uncertain and South Africa faces a range of possible outcomes:

1.6.1 The high road scenario

The high road scenario is one in which the following pre-requisites, to stimulate the iron ore and steel sectors, are in place:

- The necessary logistics (rail and port) infrastructure;
- Secure availability of energy and water resources;
- A viable market being available for a secure offtake of iron ore and steel products;
- Opportunities to generate an appropriate return on capital invested; and
- A suitable regulatory environment that encourages market participants to make the required investments.

Iron ore sector

In this scenario, the South African iron ore industry realises its full potential and conceivably more than doubles output over the next 10 years. The viable iron ore deposits in the Northern Cape region become fully developed, and unexploited iron ore resources in the Limpopo region also become economically viable. This is likely to have the following benefits:

- Creation of 14 000 jobs (7 000 direct);
- Increased infrastructure spend in order to develop rail and port infrastructure, leading to the creation of further jobs;
- Increased contribution to GDP and the fiscus, as well as increased foreign exchange earnings; and
- Boost related sectors, such as construction and engineering.

Furthermore, the development of the necessary infrastructure could also enable the development of other natural resources in the Limpopo region, such as the coal resources in the Waterberg. These resources could be supplied to steel plants near the iron ore deposits using new technologies. This infrastructure could also support the development of new export orientated coal mines in the Waterberg.

Steel sector

If the necessary pre-requisites are in place, this will facilitate a sustainable steel industry and boost domestic consumption of steel. Local demand for steel products could be stimulated by creating a supportive environment for large scale investments in key steel consuming industries, such as building and construction and mining.

AMSA will not enjoy any preferential treatment or subsidised inputs (eg access to iron ore at a discounted price) relative to other steel producers in South Africa, creating a steel industry in which all steel manufacturers compete on an equal footing.

Government and industry will also work together to develop new technologies that could allow for enhanced and sustainable development of iron ore and steel manufacturing capability and the ability to conceivably replace expensive coking coal imports with local resources.

Government policy will assist in preserving jobs and facilitating new investment opportunities, particularly through the entrance of new steel manufacturers into the local steel industry.

Downstream industries
Competitive iron ore and steel sectors will enhance opportunities for downstream industries and create conditions for these industries to diversify and grow.

1.6.2 The low road scenario

The low road scenario, where the necessary pre-requisites are not in place, is one in which the South African iron ore industry does not achieve its potential, the well developed South African steel sector becomes unattractive and steel producers cannot justify maintaining or expanding their operations, increasing the threat of closing existing operations.

Iron ore sector
Assuming that the necessary pre-requisites are not in place, this would deter new investment and developments in the Northern Cape and Limpopo regions, resulting in lost growth opportunities and not achieving the associated benefits highlighted in the high road scenario.

Steel sector
Continued subsidised or preferential iron ore input costs would reinforce AMSA's dominant position in the steel sector. Regulatory intervention relating to the pricing of steel could have the unintended consequence that AMSA's smaller steel competitors in South Africa would not be able to operate profitably and would either downscale their operations significantly or cease to operate. It could have the unintended effect that the local steel industry shrinks considerably, resulting in:

- Underutilisation of current steel production capacity;
- Significant additional job losses;
- Loss of the ability to support domestic downstream industries; and
- Increased imports of steel products.

Downstream industries
Accordingly, downstream industries, such as converters and fabricators, would not experience growth above historical levels and would find it difficult to access required product ranges and suitable product quality.

1.7 CONCLUSION

Kumba is fully committed to and supportive of government's intentions to stimulate growth, employment and development across the iron and steel value chains in South Africa. As this is of national importance, the viability of the iron ore and steel sectors should be maintained, by providing a framework that enables private sector participants to maximise their potential. However, Kumba believes that government interventions and policy considerations in these sectors need to be carefully evaluated, given the significant impact which such policies could have in time to come. There should be a common understanding of the economic, commercial and policy drivers that inform the viability of the iron ore and steel value chain.