

Metals

MARKET & OPPORTUNITIES



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Metals Sector in India

The metal industry is a key sector in the Indian economy, as it meets the requirements of a wide range of key industries including engineering, electrical and electronics, infrastructure, automobile and automobile components, packaging etc. The metal industry comprises of two major segments: ferrous metals and non-ferrous metals.

Ferrous metals, primarily consist of iron and different varieties of steel. Indian steel industry has shown strong performance in the recent past in terms of production, capacity utilisation, exports and consumption, because of rapid growth in the construction and automobile industries. India, is now a major player among steel producers in the world.

Non-ferrous metals, which include aluminium, copper, zinc, lead, nickel and tin, are used to make alloys, castings, forgings, extrusions, wires, cables and pipes. They find application in a number of sectors such as, agriculture, infrastructure facilities like power plants, automobiles, railways, telecommunications, building and construction, engineering and chemical plants. India is rich in bauxite (aluminium ore) and has grades of zinc, lead and copper reserves. Copper, lead and zinc are also imported as scrap or concentrates, to be processed by secondary/custom smelters. Nickel and tin are also imported into India.

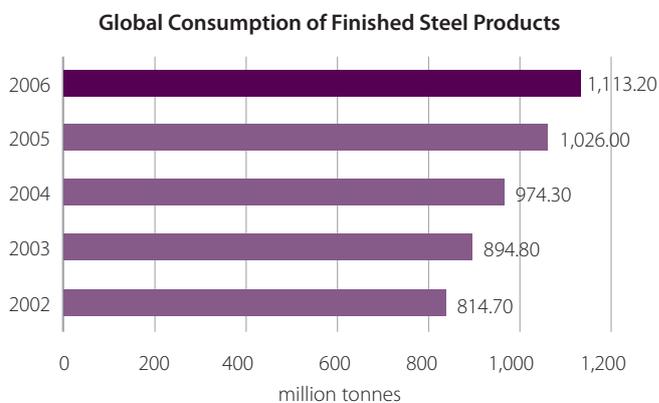
While the metal sector covers a large domain consisting of a wide variety of metals, this report focuses on four key metals namely, iron (steel), aluminium, copper and zinc.

IRON AND STEEL

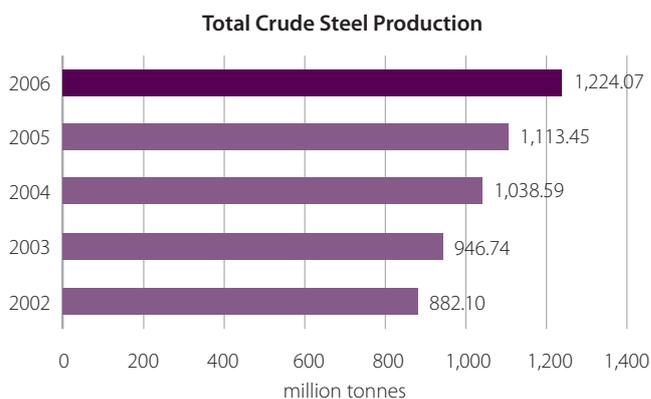
Steel, is an alloy of iron and carbon containing less than 2 per cent of carbon with smaller amounts of other elements, such as, manganese, silicon, phosphorus, sulphur and oxygen. It is also the world's most recycled material, with around 65 per cent of new steel coming from recycled

steel. There are more than 3,500 different grades of steel, a majority of which have been developed in last two decades. Per capita steel consumption is regarded as an indicator of economic development of a nation. Steel demand gets derived primarily from infrastructure, automobile sector and durable goods.

Global crude steel production as well as consumption is growing at more than 8 per cent



Source: International Institute of Steel & Iron Website

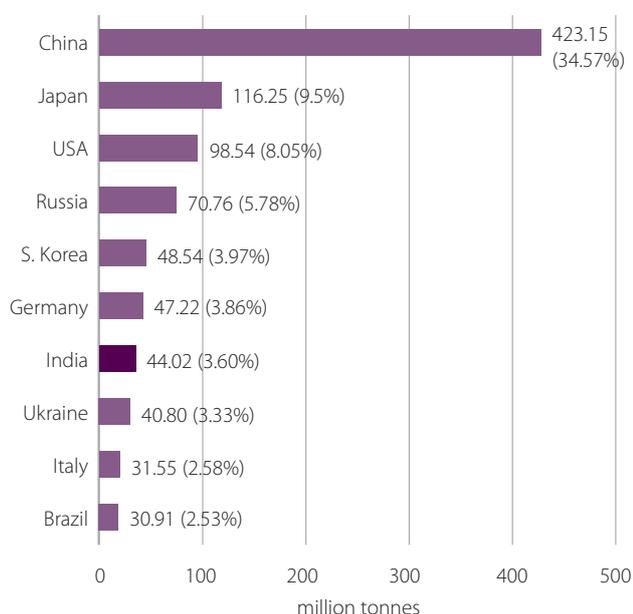


Source: International Institute of Steel & Iron Website

The world crude steel production grew at 8.54 per cent compounded annually from 2002 to 2006, while, the world consumption rate grew at 8.14 per cent during the same period.

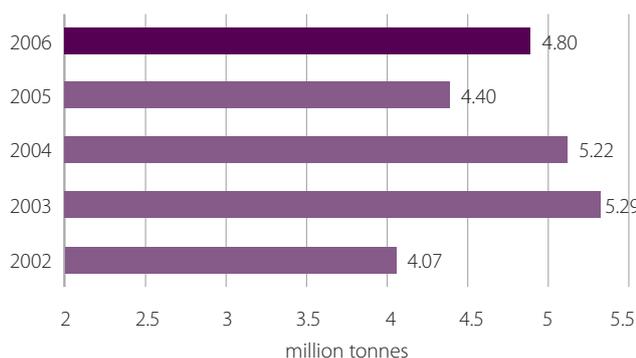
The top ten crude steel producing nations accounted for 78 per cent of total crude steel production in 2006, of which a bulk of the consumption as well as production originated from China, which constituted around 34 per cent of total crude steel production. India ranks seventh globally in crude steel production, as shown in the chart below.

Top 10 Producers for Crude Steel in 2006



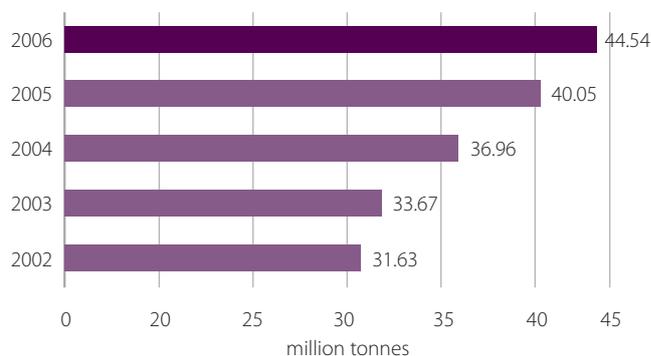
Crude steel production in India has grown compounded annually at 8.9 per cent during the same period, with the production around 44 million tonnes in 2006. India has strengthened its position with a jump from ninth to seventh rank in the global steel production during this period.

Production of Pig Iron in India



Source: Ministry of Steel – Annual Reports

Production of Finished Steel in India



Source: Ministry of Steel – Annual Reports

Indian companies that are engaged in mining iron ore for the use of main and secondary producers include National Mineral Development Corporation (NMDC), Kudremukh Iron Ore Co (KIOCL), Essel Mining & Industries Ltd, and Sesa Goa (Sesa). Apart from this, some of the integrated steel companies, such as, Steel Authority of India Limited (SAIL) and Tata Iron and Steel Companies (TISCO), have their own captive mines.

Main Producers

Main Producers can be classified depending upon the production process and the type of products manufactured by the producers.

- Based on production process: Producers use three types of processes for converting iron ore into steel: Coke Oven (BF/BOF route), Electric Arc Furnace (EAF route) or Corex Process.
- Based on the products: Products manufactured by the main producers are of two types - Long products and Flat Products. Long products, include bars, structural products, wire rods, angles and rounds. They are used in construction and heavy engineering. Flat products, include Hot Rolled Coils/sheets (HRC), Cold Rolled Coils/sheets (CRC) and Galvanised sheets. These products are used for automotive sector and white goods, fabrication work like car bodies, ducts, consumer durables and roofing. RINL, SAIL and Tata Steel are the major producers of long products. For flat products, the major producers are SAIL, Tata Steel, Ispat Industries, Jindal group of companies, Uttam Steel and Bhushan Steel.

Secondary producers

Secondary producers, consist of suppliers of processed inputs for steel making - the primary steel makers and independent re-rollers. Secondary producers account for about 36 per cent of India's steel production. Stand alone producers, produce sponge iron and pig iron to be used by the main producers. India is the largest producer of coal based sponge iron in the world and accounts for 15 per cent of global output. Jindal Steel & Power Ltd is the largest producer of coal based sponge iron in India and second largest in the world, with a capacity of 650,000 TPA.

Raw Material constitutes around 50 per cent of total costs in Steel production

Raw Material is the main component of costs involved in the steel industry. A percentage break- up of costs of steel industry revealed that raw materials formed the largest chunk of costs (50 per cent), followed by interest payments (9.2 per cent) and power and fuel expenses (9 per cent). Though, India's raw material and labour costs are lower as compared to CIS countries, China, USA, Japan, South Korea, however India's financial expenses are higher.

Indian Steel Industry - Cost Structure	
Raw Material	50%
Tax	9%
Staff Cost	6%
Power & Fuel	6%
Depreciation	5%
Spare Parts	4%
Interest	3%
Purchases	1%
Freight Charges	1%
Other Expenditure	15%

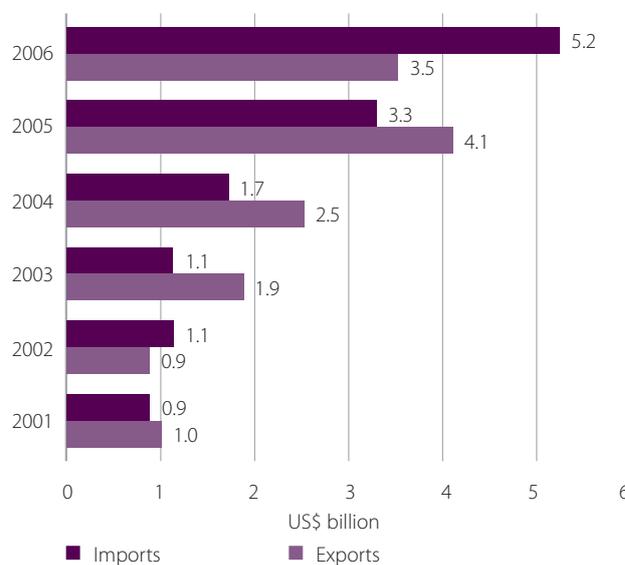
Source: Indian Steel Industry – Cygnus Report August 2007

Indian Steel Imports exceed Exports

The total exports of steel from India were around US\$ 3.5 billion as compared to imports worth around US\$ 5.2 billion in 2006, making it a net importer. India's exports mainly consist of carbon steel which accounts for 95 per cent of total steel exports, the balance being pig iron.

The main consuming market for steel exported from India is, USA & China, accounting for 38 per cent of the

Exports and Imports of Steel



Source: International Institute of Steel & Iron Website

Imports of Iron and Steel

Russia	18%
Korea	12%
UK	11%
USA	10%
Germany	9%
China	8%
Others	32%

Source: Indian Steel Industry – Cygnus Report August 2007

Exports of Iron and Steel

USA	20%
China	18%
UAE	9%
Belgium	8%
Indonesia	7%
Italy	6%
Others	32%

Source: Indian Steel Industry – Cygnus Report August 2007

total steel exports in 2006. The other key markets include UAE (8 per cent), Belgium and Indonesia. The major steel import destinations for India, include Russia, USA, UK and Korea.

Aluminium

Aluminum, is a light weight, silver-white, metallic element, that makes up approximately 7 per cent of the earth's crust. It weighs about one third as much as steel (7480- 8000 Kg/ cubic metre) or copper (8930 Kg/cubic metre). Aluminium is malleable, ductile, easily casted and has excellent corrosion resistance and durability. It is mined in the form of bauxite ore and exists primarily in combination with oxygen as alumina.

India has nearly 10 per cent of the world's bauxite reserves and a growing aluminium sector that leverages this. Demand in the domestic market is expected to grow by 8-10 per cent. By 2020, India is expected to have an installed aluminium capacity of 1.7 to 2 million tones per annum.

GLOBAL ALUMINIUM PRODUCTION HAS GROWN AT 7 PER CENT

Per capita consumption of aluminum is closely related to Gross Domestic Product (GDP) of a country.

The global aluminium production grew at a CAGR of 7.7 per cent, while the consumption increased at a CAGR of

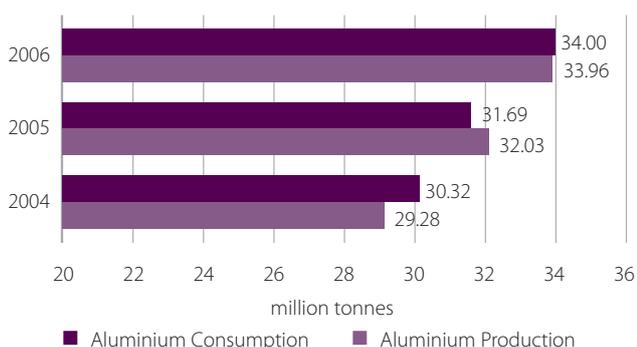
5.89 per cent during 2003-06. The market size for aluminum globally is US\$ 96.56 billion. Europe and North America, are the biggest players in the aluminum segment, with 35 per cent and 22 per cent of global market share respectively.

INDIAN ALUMINIUM INDUSTRY

India's share of global aluminum production is hovering around 3 per cent. The Indian aluminium industry is highly concentrated with only five primary plants in the country from three business groups.

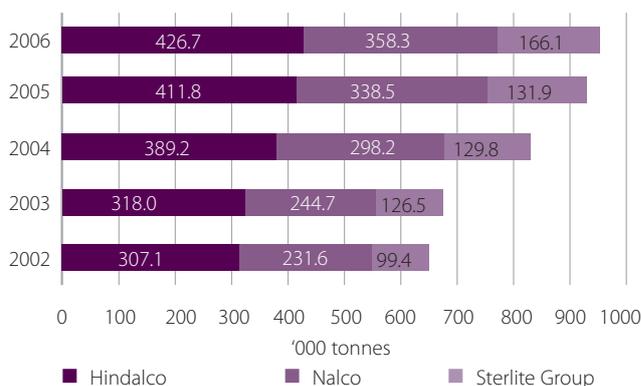
Business Groups	Players
The Aditya Birla Group	Hindalco Industries Limited (Hindalco) Indian Aluminium Company Limited (Indal)
Sterlite Industries	Bharat Aluminium Company Limited (Balco) Madras Aluminium Company Limited (Malco)
Public Sector Undertakings	National Aluminium Company Limited (Nalco)

Global Aluminium Production & Consumption

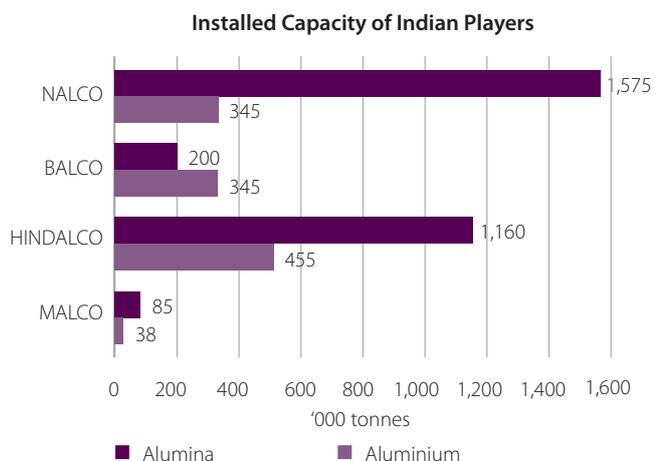


Source: Aluminium Commodity Report, Infoline, August 2007

Primary Aluminium Production



Source: Aluminium Castings, Aluminium Association of India, April 2007



Source: Aluminium Commodity Report, Infoline, August 2007

The technology used by all Indian players is Bayer Hall Heroult. The energy inputs used are electricity, coal and furnace oil with all plants having their own captive power units for cheap and uninterrupted power supply.

Although, domestic aluminum production exceeds the domestic demand, India imports on an average 15-20 per cent of the total supply of aluminium. Imports are necessary, due to the shortage of domestically produced ingots. India's imports of aluminium and products, primarily comprise of unwrought items like ingots, billets, scrap, bars and rods. Imports of primary aluminum products account for less than 10 per cent of domestic consumption. India also exports aluminium products such as, scrap, powder and flakes, bar rods, foil, pellets, sheets, tubes and pipes.

ENERGY COSTS CONSTITUTE A HIGH 40 PER CENT OF TOTAL MANUFACTURING COSTS IN INDIA

Energy and alumina costs represent the largest components for the global aluminium industry. Energy costs represent around 30 per cent of the total smelting cost of aluminium and around one-third of total alumina production costs. During 2002-06, energy costs have increased drastically due to increase in crude oil prices.

In India, the energy cost represents 40 per cent of manufacturing cost for aluminium and 30 per cent for finished rolled products. However, most Indian companies have set internal targets to reduce specific energy consumptions in next 5 - 8 years along with declaration of formal energy policies as well. Each plant has an Energy Management Cell and achievements in energy conservation are highlighted in the Annual Reports.

Aluminium Cost Structure	
Alumina	41%
Energy Cost	28%
Other Raw Materials	12%
Labour Cost	8%
Other Costs	11%

Source: Aluminium Commodity Report, Infoline, August 2007

USAGE PATTERN FOR ALUMINIUM IS DIFFERENT FOR INDIA

Aluminium, is used in various sectors, such as, transportation, packaging, building / construction and electricity. However, the usage pattern differs significantly for Indian and rest of the world, as shown figure 14 & 15.

Globally, the automotive, packaging and the construction sectors are the major end users of aluminium, while in India the power sector consumes about 31 per cent.

Aluminium Consumption in India	
Electrical	31%
Automotive	18%
Building and Construction	13%
Packaging	11%
Others	27%

Source: Aluminium Commodity Report, Infoline, August 2007

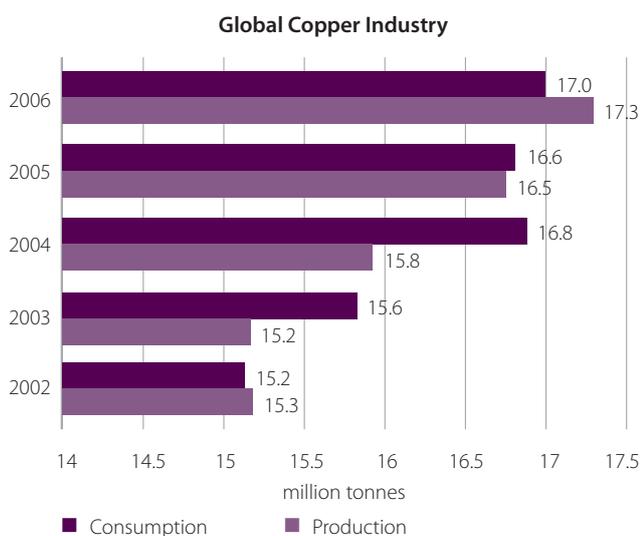
Aluminium Consumption - Global	
Automotive	26%
Building and Construction	20%
Packaging	20%
Electrical	9%
Others	25%

Source: Aluminium Commodity Report, Infoline, August 2007

Copper

Copper, is a key metal for industrial applications owing to its high electrical conductivity, corrosion resistance, ductility, malleability and rigidity.

GLOBAL COPPER PRODUCTION AS WELL AS CONSUMPTION HAS GROWN AT ABOUT 3 PER CENT CAGR



Global copper production has grown at 3.16 per cent compounded annually over the period 2002 – 2006, from a level of 15.3 million tons to 17.33 million tonnes. During the same period consumption of copper grew at 2.88 per cent, from 15.21 million tonnes to 17.04 million tonnes.

Asia and USA, are the biggest producers of copper in the world, together accounting for over 70 per cent of global production. Asia and Europe, are the key consuming markets, accounting for close to 80 per cent of global consumption of Copper

Copper Production -2006	
Asia	41%
USA	33%
Europe	21%
Africa	3%
Oceania	2%

Source: Aluminium Commodity Report, Infoline, August 2007

USAGE PATTERN FOR COPPER DIFFERS REGION TO REGION

The specific applications of copper include power cables and wires, jelly filled cables, building wires, air conditioning and refrigeration tubings. It is widely used in sectors, such as, telecom, power, construction, transportation, handicrafts, engineering, consumer durable, defence and highly dependent on the performance of them. Hence, the copper industry growth is also closely linked to the country's economic and industrial growth.

Copper Consumption - 2006	
Asia	48%
Europe	31%
USA	19%
Oceania	1%
Africa	1%

Copper Consumption by Sector - Asia	
Electrical and electronic products	50%
Transportation equipment	15%
Building / Construction	15%
Consumer and general products	11%
Industrial machinery and equipment	9%

Copper Consumption by Sector - Europe

Building / Construction	39.5%
Electrical and electronic products	37.5%
Industrial machinery and equipment	9.0%
Transportation equipment	7.5%
Consumer and general products	6.5%

Copper Consumption by Sector - USA

Building / Construction	43%
Electrical and electronic products	25%
Transportation equipment	12%
Industrial machinery and equipment	11%
Consumer and general products	9%

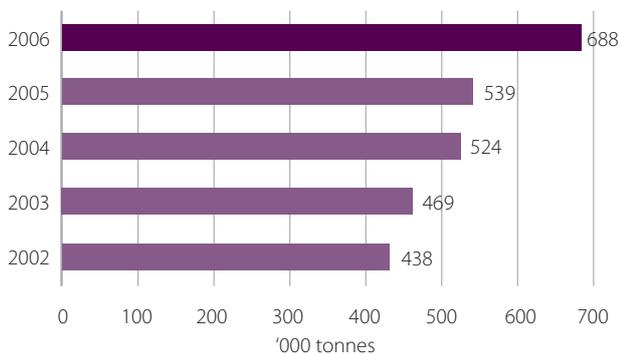
INDIAN COPPER INDUSTRY IS HIGHLY CONCENTRATED WITH THREE MAJOR PLAYERS

The copper industry consists of two segments

- Continuous Cast Copper Rod
- Copper Cathodes

Continuous cast copper rod segment has grown at 10 per cent CAGR over the period 2002-2006 and constitutes about 37 per cent of the aggregate market. Copper Cathodes, have grown at 13.17 per cent over the same period, and constitute 63 per cent of total copper production. The aggregate production has grown cumulatively at 11.95 per cent.

Copper Production in India



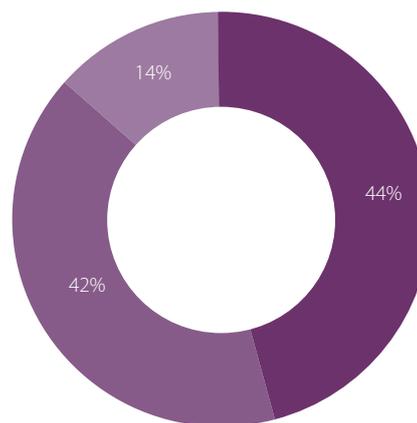
Source: The Indian Copper Industry, ICRA, October 2006

The Indian copper industry was opened for private sector investments in 1992. Earlier, the industry was dominated by Hindustan Copper Limited (HCL), a public sector undertaking, which had taken over the copper ore mines at Khetri and Kolihan, in Rajasthan and Rakha Copper Complex in Bihar, from National Mineral Development

Corporation Ltd. The Industry has three major players at present.

- Hindustan Copper Limited [HCL]
- Sterlite
- Hindalco

Copper Industry Market Shares



■ Hindalco ■ Sterlite ■ HCL

Source: The Indian Copper Industry, ICRA, October 2006

Other players include around 1000 Small Scale Industries, which are primarily involved in converting scrap into ingots. HCL, is the only primary producer, which mines and refines copper. Hindalco and Sterlite, are secondary producers, who process indigenous and/or import copper concentrate to produce end products such as copper bars, rods and wires. The output from the three major producers accounts for a share of approximately 80 per cent of the total copper consumption in the country. The balance is on account of imports and sales of smaller producers.

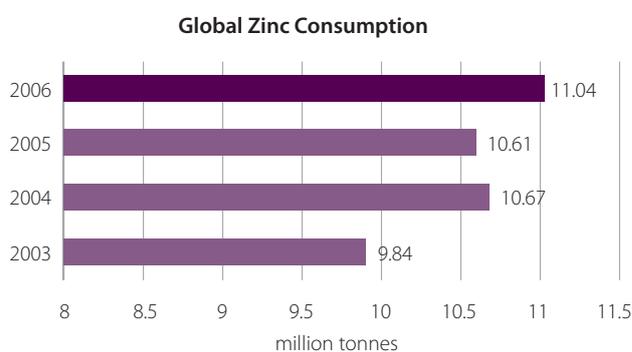
The capacity for production of primary copper in India has risen from a mere 47,500 tonnes per year in 1997 to 947,500 tonnes in 2006-07, which has enabled India to become a net exporter of refined copper.

The Indian copper Industry has a moderate importance in the Indian economy. While it has a number of applications across several sectors, its turnover of around US\$775.9 million. Is just 0.2 per cent of GDP. About 40 per cent of the production is exported. The total employment in the sector is less than 40,000.

Zinc

Zinc, is the fourth most widely used metal globally, after steel, aluminum and copper. Zinc was being produced from its oxide ores, before more abundant sulphides became a major source of supply. In 1916, the electrolytic process replaced the pyrometallurgical process as the dominating production method.

Around 47 per cent of total zinc produced globally is used for galvanising. Galvanising, is the process of coating iron or steel with a thin layer of zinc, by passing steel through a molten bath of zinc at high temperatures. The recycle life of galvanised steel can be up to 100 years, compared with about 20 years for ungalvanised steel. The most widely used alloy of zinc is brass, in which copper is alloyed with zinc along with smaller amounts of lead and tin. Other alloys of zinc are used in certain types of machine bearings, diecasting, stamping dies. Zinc is also widely used in building, fittings, electrical components medical equipment, rubber goods, paint pigments and ceramics.

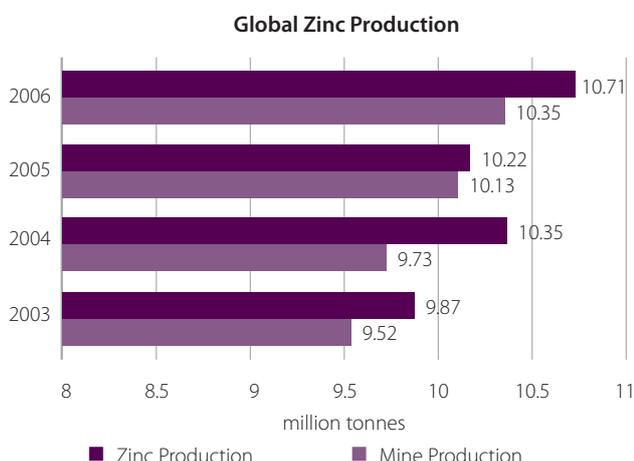


Source: Zinc Commodity Report, India Infoline, July 2007

GLOBAL ZINC CONSUMPTION HAS BEEN GROWING FASTER THAN PRODUCTION

The zinc production increased at a CAGR 2.73 per cent during 2002-06, while the consumption increased at a CAGR of 3.77 per cent during the same period.

China, USA, Japan, Germany and Korea, are the largest consumers of zinc in the world, with USA accounting for 10 per cent of total zinc consumption.



Source: Zinc Commodity Report, India Infoline, July 2007

INDIA'S ZINC INDUSTRY IS DOMINATED BY TWO PRIMARY PRODUCERS

India's zinc ore resources are estimated at 385 million tonnes. There are two primary producers of Zinc.

- Hindustan Zinc Limited (HZL), with a smelting capacity of 411,000 tonnes shared by three plants. The company was recently transferred on a strategic sale to Sterlite Industries.
- Binani Industries, with smelting capacity of 38000 tonnes per annum

Hindustan Zinc Limited, has entered into a number of alliances to strengthen exploration activities of zinc, such as

- With Broken Hills Minerals, Australia, for exploration of base and precious minerals in Rajasthan
- With Vigego, Vietnam and La-Source, France, for exploration activities at Pac-Lang;
- With Council of Scientific and Industrial Research (CSIR) for setting up a 'nickel technology proving plant' of 10 tonnes per day; Negotiating with another Australian company, Pasmaico, for exploration in Ajmer district.
- The company has completed exploration for evaluation of Gossan resource in parts of Jagpura. The working permission for additional 10 sq km has been obtained for further exploration.

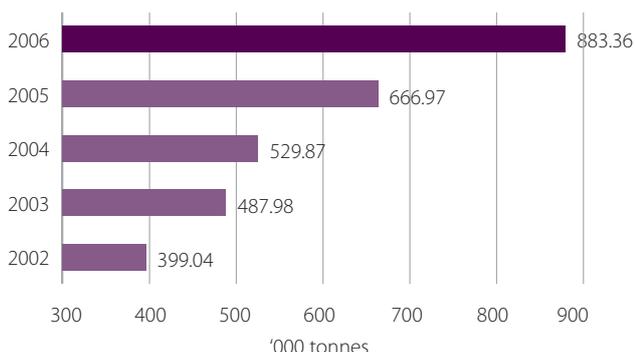
Binani Industries, has also undertaken diversification programme based on Imperial Smelting process from the UK. Binani, has plans to increase the existing capacity to 100,000 tonnes per annum.

Since, zinc production is a power intensive process, the lower consumption of power, usage of cheap scrap, dross or ash and low overheads offer the secondary players a competitive edge, over the primary producers. As a result, a number of producers have emerged in the secondary sector, such as, Ambuja Zinc, Mewat Zinc, Bharat Zinc, Indo Zinc, Sunrise Zinc and Rose Zinc.

MOST OF THE ZINC CONSUMPTION IN INDIA IS FOR GALVANISING

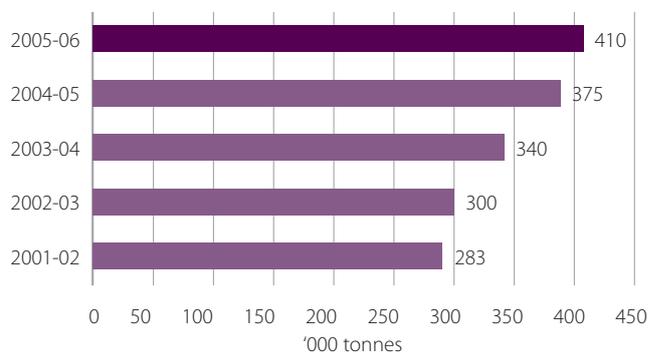
Zinc consumption in India is primarily for galvanising (70 per cent). Other usage segments include batteries (10 per

Production of Zinc Concentrates in India



Source: India Stat

Zinc Consumption in India

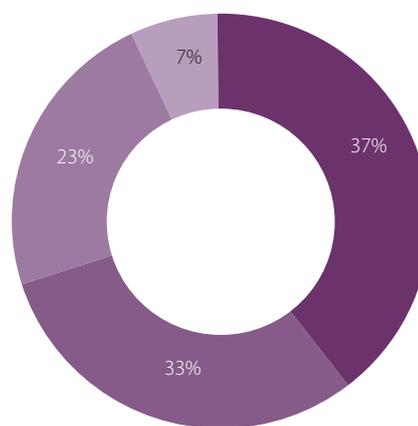


Source: India Stat

Indian Zinc Market Segmentation	
Galvanising	70%
Dry Cells	10%
Zinc Alloys	10%
Die casting	5%
Chemicals and others	5%

Source: India Stat

Indian Zinc Products



■ Tubes ■ Sheets ■ Structural ■ Wires

Source: India Stat

cent), zinc alloys (10 per cent), die casting (5 per cent), chemicals and others (5 per cent).

In terms of products, zinc tubes and sheets comprise 70 per cent of consumption, while structurals and wires comprise the balance.

India has Definitive Competitive Advantages in Metals Industry

India's competitiveness in metal industry can be analysed by using the framework depicted below.

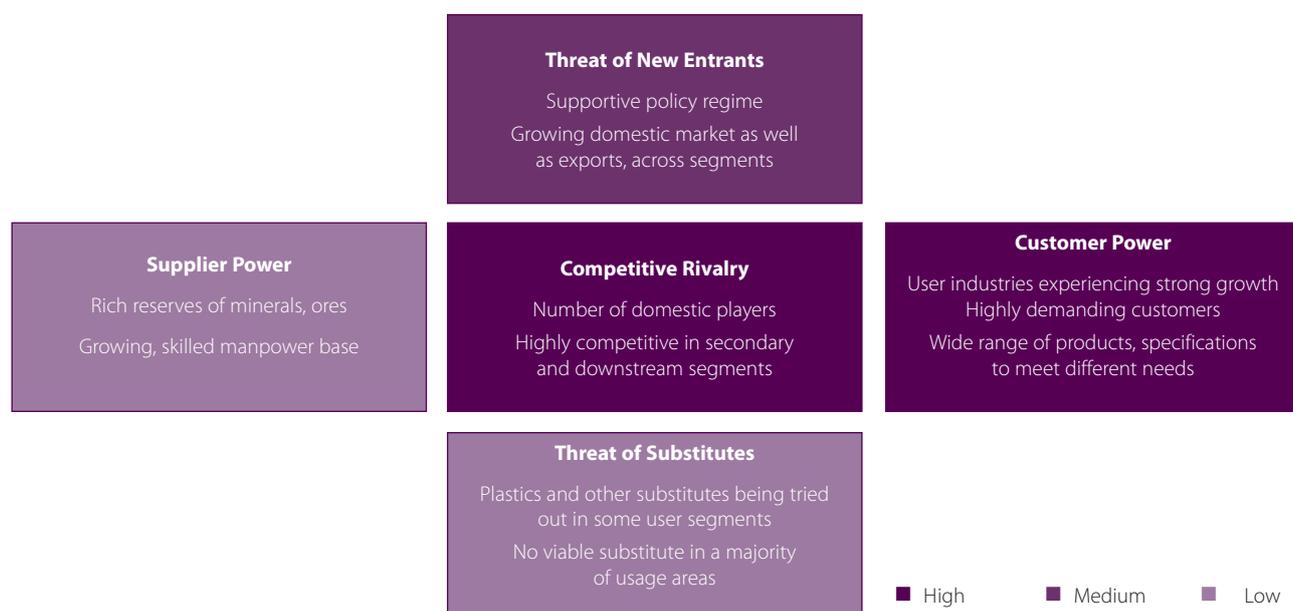
The key advantages can be categorised into:

- Growing market demand
- Favorable factor conditions for production
- Presence of related and supporting industries
- Government support for helping companies improve performance and stimulating industry environment

GROWING MARKET DEMAND

Metals constitute a key input to other manufacturing sectors such as, engineering, electrical and electronics, automobile and automobile components, packaging etc, and infrastructure. The performance of the metal sector is hence, a reflection of the overall economy. In this context, there are several positive indicators for growth in the metals industry such as, capacity creation and growth in sectors like, infrastructure, power, mining, oil & gas, refinery, automotive and consumer durables. For example:

- India's overall economic growth is projected to sustain, with annual projected growth of about 8 per cent. The manufacturing sector, that currently constitutes about 15 per cent of GDP, is expected to grow faster and contribute significantly to overall economic growth. This will have a positive effect on metals demand.
- Key consuming segments such as Automotive and Auto



Components, have been experiencing robust growth in recent years, this has had a positive impact on the metals sector. Automobile production has been growing at 16 per cent CAGR over the past 6 years, while Auto Components has grown at 22 per cent. These segments are expected to show strong growth in future, as well.

- Major infrastructure projects such as, the World Bank-funded Golden Quadrilateral Project, and the North-South and East-West corridors, linking major cities across the country have also fuelled the industry’s growth, which in turn, has positively impacted the Metals industry.

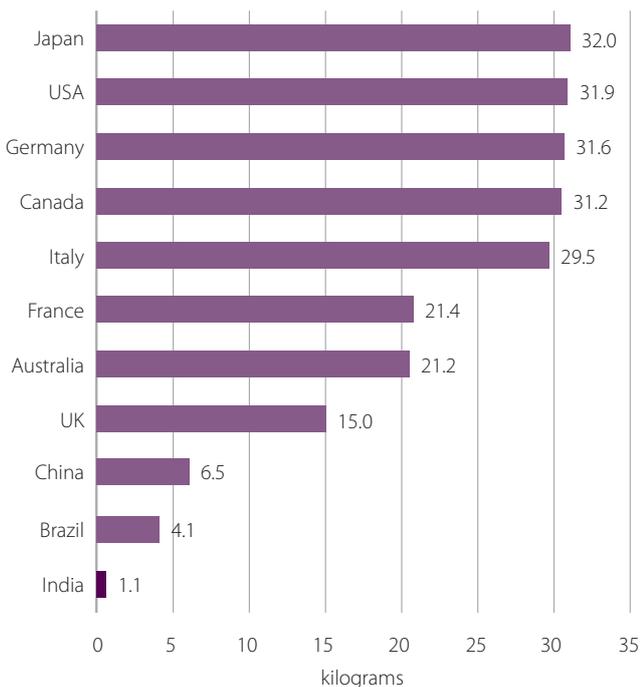
The user industries are also getting increasingly demanding and sophisticated. This motivates firms in the Metals industry to constantly improve their competitiveness, via innovative products through higher quality, thereby improving their global competitiveness

INDIA’S PER CAPITA CONSUMPTION OF METALS IS BOUND TO INCREASE WITH TIME

India has a low per capita consumption of metals as compared to developed nations.

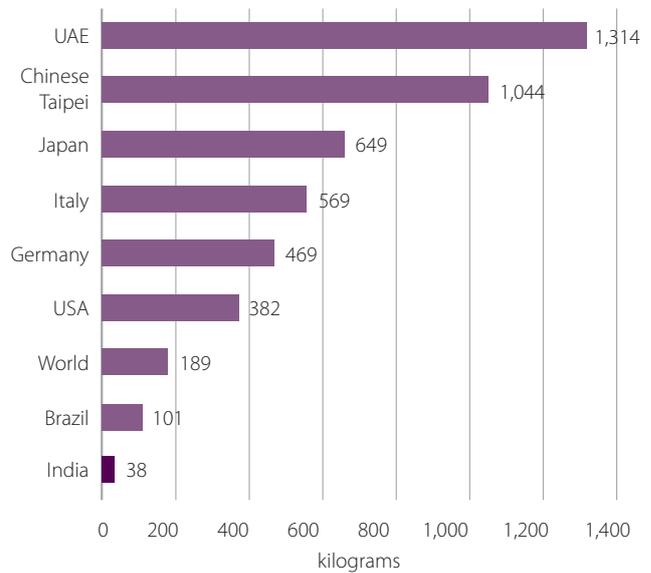
The per capita consumption of steel varies significantly across nations. India has a low per capita of 38 Kg compared

Per Capita Consumption of Aluminium



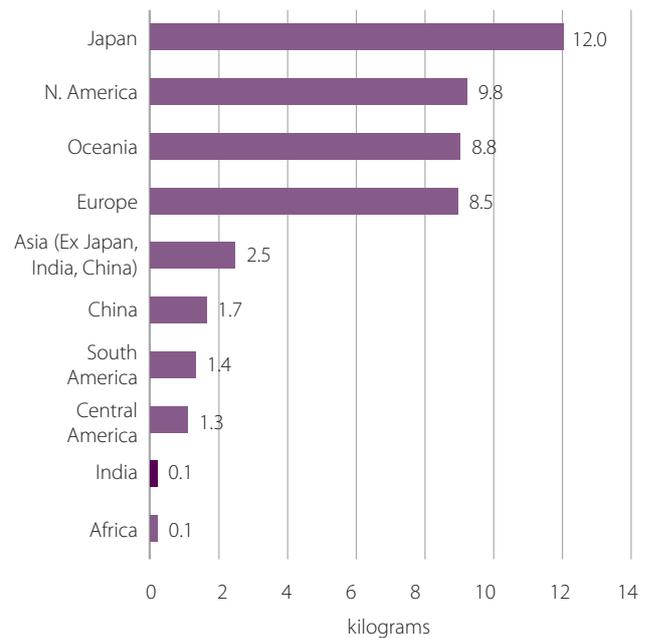
Source: World Coal Institute Website

Per Capita Consumption of Crude Steel



Source: World Coal Institute Website

Per Capita Consumption of Copper



Source: International Copper Study Group Website

to a global average per capita consumption of around 189 Kg. The case is similar for other metals, as well.

The per capita consumption of zinc in India is a negligible 0.2 kg, while Asian countries such as Korea and Taiwan have a consumption level of 2 kg, and developed countries, such as, the US, the UK, France, Japan and Germany, have per capita consumption going up to 6.5 kg.

With rapid growth in sectors, such as, infrastructure, automobiles and construction, it is expected that the per capita consumption of the metals in India will go up.

FAVOURABLE FACTOR CONDITIONS FOR PRODUCTION

India has rich reserves of minerals like bauxite, iron ore, copper, zinc etc. It provides major cost advantage to the domestic steel industry, with companies like Tisco, being one of the lowest cost producers in the world. India has large resources of high grade bauxite deposits, - 3037 million tonnes, and ranked fifth in the world bauxite reserves next to Australia, Guinea, Brazil and Jamaica. Bauxite reserves in India account for 7.5 per cent of the world's total world deposits.

The country has a growing workforce that is English-speaking and highly skilled and well developed designing and machining capabilities. India also has lower wages as compared to developed nations providing it an edge over them. Abundance of quality manpower is increasingly proving to be a boom. These strengths provide competitive advantage to India, in the engineering and manufacturing fields that in turn, impact the Metals sector.

Conditions are also favorable for the sector's growth, from the point of view of capital investments. Indian players in the sector have been investing in capacity building, to fuel their growth strategies. Companies that have embarked on or completed significant expansion in recent years, include Sterlite Industries (India) Ltd (expansion of Tuticorin complex), Hindalco (brown field expansion in its Copper business, to double its capacity from 250,000 to 500,000 tonnes per annum), The Tata Iron and Steel Company (TISCO) and Ispat industries.

Ample availability and potential growth in key factors of production provide the right stimulus for India's Metals sector to grow and become globally competitive.

PRESENCE OF RELATED AND SUPPORTING INDUSTRIES

Apart, from the favorable demand and factor conditions, the Indian metals industry is well supported by India's mining industry and educational and research institutions.

India is endowed with significant mineral resources and has a well developed Mining sector, to leverage these resources. Indigenous mining capability supports the metals sector by making available raw materials at lower costs and reducing dependence on imports.

India also has several educational institutions, including

the Indian Institute of Technology that facilitate advanced studies in the areas of metallurgy and materials science. They not only provide a steady stream of qualified manpower to the metals industry, but also promote fundamental research and innovation.

GOVERNMENT REGULATIONS AND SUPPORT

The Government of India, has revised its foreign direct investment policy to attract foreign investments in the metal sector. Government initiatives to boost the end-user segment (like Telecom, Power, Construction, Transportation, Engineering, Consumer Durable etc.), also have a significant positive impact on the demand for metals. Liberalised overall policy regime, with specific incentives, provides a very conducive environment for investments and exports in the sector.

Some of the policy initiatives aimed at boosting investment and growth in the metals sector are-

- Foreign equity holding is allowed upto 100 per cent on the automatic route for all non-fuel, non-atomic minerals except diamond and precious stones.
- Thirteen minerals, like iron ore, manganese ore, chrome ore, sulphur, gold, diamond, copper, lead, zinc, molybdenum, tungsten, nickel and platinum group of minerals, which were reserved exclusively for public sector have been opened up for private sector investments.
- Customs duty on primary and secondary metals reduced from 15 per cent to 10 per cent.
- The Andhra Pradesh Cabinet, have decided on 1st August 2007, to allow integrated steel plants and ferro-alloy units, that use blast furnace and direct reduction technology to enjoy incentives, such as, tax holiday and reductions in tariff of power and water for a limited period of time. The offer is further extended to greenfield steel plants.

STEEL

- The National Steel Policy (NSP) 2005, lays emphasis on improving productivity, efficiency, cost, quality and product mix for accelerating growth in the domestic production and consumption of steel. The Policy envisages production level of steel to touch 100 million tonnes, by the end of 2020.
- The import duties on various steel products have been

reduced from 15 per cent to the current 5 - 10 per cent.

- Customs duty on alloy and stainless steel has been reduced to 5 per cent.
- The government has also proposed to reduce the duty on seconds and defectives of steel, from 20 per cent to 10 per cent. Although, this will increase competition by allowing cheaper imports to enter the domestic markets, the positive side is that domestic prices can now track the global prices more closely.
- Duty on nickel reduced from 5 per cent to 2 per cent, to help domestic stainless steel manufacturers, tackle increase in global raw material prices.

COPPER

- Copper and Copper products can be imported at zero duty from Sri Lanka, under the Free Trade Agreement (FTA) with that country.
- Duties on copper and copper products have been progressively reduced for example: customs duty has been reduced from 35 per cent in 2001 to 10 per cent in 2006.

LEVERAGING ECONOMIES OF SCALE AND CONSOLIDATIONS

Metal Players are focusing upon capacity additions

Though capital intensive, there are good opportunities to take advantage from economies of scale in metal industry. Many players are increasing the capacity to meet the increasing demand requirements.

For instance, Sterlite Industries (India) Ltd. (SIIL) is expanding the Tuticorin complex, for an estimated total cost of US\$ 81.4 million. The expansion will increase smelting capacity at Tuticorin, to 300,000 tonnes per annum of copper anode. A captive power plant of 22.5 MW is also being constructed, as part of the expansion. This together with a further 10 MW generated from the smelter waste heat boiler and the supply from the existing power plant, is expected to meet most of the complex's power requirements and reduce power costs on a per unit basis.

Hindalco, is engaged in the brownfield expansion in Copper business to double its capacity from 250,000 TPA to 500,000 TPA. On completion, Birla Copper will become

the world's largest custom smelter at a single location. It will catapult Hindalco into the league of the 'Top-10 copper producers in the World'.

The Metals Industry is witnessing consolidation

As players in the Metals sector in India seek to expand capacities and grow rapidly, acquisition has emerged as a key strategy to achieve this objective. Acquisitions have been used for backward integration along the value chain, as well as to grow in size and scale. As a result, the industry is gradually consolidating. Examples of key acquisitions and joint ventures in the sector include the following:

Copper

- Both the secondary producers Sterlite and Hindalco, have acquired copper mines to reduce dependence on external sources and to ensure consistent supplies of good quality copper concentrate. Sterlite, acquired two copper mines in Australia, through 100 per cent of the equity of their holding company, Monte Cello Corporation, BV, Netherlands. Hindalco, has also acquired two copper mines (Mount Gordon and Nifty) in Australia, in 2003.

Iron & Steel

- Acquisition of the Anglo-Dutch steelmaker Corus by Tata Steel, which made it world's fifth largest steelmaker and added 19 MT of steel-making capacity.
- Essar Steel, partnered with two state-run Vietnamese companies to build a US\$ 0.527 billion plant in Vietnam.
- Tata Steel, has started construction on its US\$ 0.103 billion ferrochrome steel plant at Richards Bay in South Africa

KEY ISSUES FACED BY METAL INDUSTRY

Despite the comparative advantages, Indian metal industry is also undergoing certain issues that hinder the growth of the sector.

- Lack of adoption of scientific mining methods, especially by small players, leads to inefficient extraction of ores from commercial mines. There is a need for ore miners, as well as the state governments to focus upon adopting the latest technology for ore mining.

- Changes in market demand: The change in product mix can lead to a dramatic rise or fall of a particular metal demand. For instance, as the telecom sector is shifting from fixed line to optical fibres and wireless mode of communication, demand for copper from this segment is expected to reduce.
- Disadvantages of Secondary Producers: In the copper industry, the Indian players (except HCL) did not have copper mines and had to import copper concentrate from the International markets. Due to high dependence on overseas markets for copper concentrate, the profitability is strongly dependent on the international variation in Treatment Charges and Refining Charges (defined as the difference between the Copper Cathode prices and the Copper Concentrate prices).

To have access to mines, Indian players are acquiring copper mines at overseas locations (primarily Australia) and sourcing a share of their copper concentrate requirements from these mines.

- The other issues faced by metal players are low productivity, high cost of debt, and inadequate infrastructure. However, the government is taking corrective measures to improve the situation, gradually.

The metal industry possesses strong opportunities in the form of unexplored rural markets and increasing exports.

Critical Success Factors

STATE OF THE ART REFINING TECHNOLOGY WOULD PLAY A DIFFERENTIATING ROLE

Due to the depletion of the metal ores and known sources, the latest technology in refining ores will play a key role in ensuring the profitability of the players. As the input costs have been rising globally, due to increase in crude oil prices, to adopt the latest technology is becoming increasingly crucial for Metals sector players. Technology can play a key role in enabling productivity improvements and reducing costs. However, high cost of technology is a key barrier.

Need for increased focus on Research and Development

Expenditure on Research and Development activities by Indian Metals sector players, has been much below global norms. To address this, the Indian government provides monetary aid to some of the R&D projects, from the Steel Development Fund.

The Indian government plans to launch a National Research and Development Mission in steel industry, to encourage research and development. It is also, looking to set up a US\$ 16 million state-of art research and development facility. The capital is likely to be funded by steel giants such as, Tata Steel, SAIL, JSW and RINL.

Cost and Operational Efficiency needs to be focused upon at all stages

The Metals industry is highly capital intensive, therefore overall cost efficiency in operations, plays a very critical role. Raw materials constitute around 50 per cent of total costs in the steel industry, therefore having an access to ore mines will provide a competitive edge over players, who need to procure the raw materials from external players.

In the aluminium industry, energy costs represent a major component in the overall costs, energy management and efficiency will play a critical role, in the overall profitability. The same situation can be generalised for other metals, as well.

Selection of the right base locations is critical

Metals being a capital intensive industry, locations that offer robust access to raw materials supply, labour and energy will offer competitive advantage. India's Copper reserves, are mainly concentrated in Bihar, Rajasthan and Madhya Pradesh, while, Bauxite reserves are mainly located in Orissa, Chattisgarh, Belagaum in Karnataka and some parts of U.P. such as, Renukoot.

Orissa, is endowed with abundant reserves of iron ore and is located strategically, near to the port of Paradeep. The state government of Orissa, has signed 45 Memoranda of Understanding (MoUs) for setting up steel capacities aggregating 60 million tonnes. The players setting up steel capacities in Orissa include, international player POSCO and big domestic players such as Tata Steel, Jindal Stainless, Jindal Steel & Power, Bhushan Steel, Uttam Galva, Visa Steel and Welspun.

FUTURE OUTLOOK

The outlook for the Metals sector in India is bright. Sustained growth is expected across all key segments, aided by several factors such as, growing domestic demand, investment in capacity addition, increasing supply deficit in other countries and favorable government regulations.

- Government's initiatives such as power and infrastructure development, reduction in import duties and facilitation of FDI, along with overall economic growth will provide a

boost for the Indian metal industry

- With economy projected to grow at 8 per cent in the coming years, there is expected to be a surge in per capita steel consumption. Steel capacity is expected to double to 60 million tons by 2010
- Growth in the steel sector will have an immediate positive rub-off on the Zinc sector as 70 per cent of zinc production is used for galvanising
- Current shortages in worldwide copper supplies are expected to continue following production cuts by leading producers in Mexico and Chile. This will further shore up demand for Indian copper. For aluminium, exports will be a major demand source

The attractive prospects in the Indian metals sector have attracted multinationals like BHP Billiton and Rio Tinto to enter India for prospecting. At the same time successful Indian players are looking at acquiring mining rights abroad for example, the AV Birla group has acquired mining rights in two copper mines in Australia.

The metal sector in India, is clearly an attractive sector for investment and offers significant growth potential, both in the domestic as well as exports markets. Metal companies must assess their core competency and realign their strategy to cope with the internal and global competition.

Appendix

Profile of Domestic and Overseas players

Name of the company	Parent company	Output	Products/divisions/sectors served	Plants
Hindustan Copper (HCL)	Public Sector Enterprise under the Ministry of Mines, Government of India	Sales – US\$ 108.6 million in 2004	The company's major activities include exploration, mining beneficiation, smelting, refining and casting of finished copper.	Khetri in Rajasthan, Jharkhand, Malanjkhand in Madhya Pradesh, Taloja in Maharashtra
Ispat Industries	Jindal group	Sales – US\$ 860 million in 2004	produces sponge iron, galvanized sheets and cold rolled coils, in addition to hot rolled coils	Dolvi and Kalmeshwar
SAIL	Government of India has 86 per cent stake in the company and it is the world's 13th largest steel producer	Sales – US\$ 4,960 million in 2004	manufactures steels for domestic construction, engineering, power, railway, automotive and defence industries and for exports.	Bhilai, Bokaro, Durgapur, Rourkela, Salem, Bhadravati
Tata Iron & Steel Co. (TISCO)	Tata Group	Sales – US\$ 2,781 million in 2004	TISCO has diversified to manufacture, welded-steel tubes, cold-rolled strips, seamless tubes, carbon and alloy steel bearing rings, alloy steel ball bearing rings, bearings, ferro manganese, ferro chrome, metallurgical machinery, etc.	Jharkhand, Karnataka, Orissa, West Bengal, Maharashtra
Jindal Iron & Steel Company Ltd (JISCO)	Jindal group JISCO is the market leader in galvanised steel products	Sales – US\$ 507 million in 2004.	Engaged in Hot Rolling, Cold Rolling and Galvanizing business.	Vasind and Tarapur in Maharashtra
Essar Steel	Promoted by the Bombay-based Essar group which is into power, shipping, oil & gas, construction and telecom.	Sales – US\$ 853 million in 2005	Offers over 300 customised grades of steel and is on the approved list of companies for supplies to some of the world's most renowned automotive companies and Oil and Gas Pipeline projects.	Hazira, Indonesia, Vishakhapatnam
Hindalco Industries Ltd.	a flagship company of the Aditya Birla Group	Turnover – US\$ 2.12 billion in 2005	Structured into two strategic businesses —aluminium and copper— and is an industry leader in both these segments It is the largest integrated aluminium manufacturer in the country.	Renukoot, Muri, Belgaum, Hirkud, Alupuram, Belur, Taloja, Silvassa, Kalwa and Dahej
Bhushan Steel & Strips Limited	Bhushan group	Operating profit during the period between April-Dec 2004 was US\$ 63.5 million	Cold rolled steel coils, Galvanised steel coils and sheets, Billets, Stainless steel plates	Major plants are located at Sahibabad (UP) and Khapoli (Maharashtra).

Hindustan Zinc Ltd.	A part of Vedanta resources, a London listed metals and mining major with aluminium, copper and zinc operations in UK, India and Australia	Net sales – US\$ 400.7 million in 2004	Only integrated Zinc manufacturer in India and owns captive Zinc mines that supply complete requirement of Zinc concentrate for its smelters.	Mines and smelters are spread across multi-locations – Rajpura Dariba mine, Zawar mining complex, Chanderiya smelter, Debari smelter, Vizag smelter, Rampura Agucha mine.
Nalco	a public sector enterprise of the Government of India	Net sales – US\$ 705 million in 2004	Asia's largest integrated aluminium complex, encompassing bauxite mining, alumina refining, aluminium smelting and casting, power generation, rail and port operations.	Captive power plant and aluminium smelter, Rolled products unit at Angul, alumina refinery at Damanjodi, Bauxite mines at Panchpatmali
Sterlite Industries India Ltd.	Part of Vedanta Resources, a London listed metals and mining major with aluminium, copper and zinc operations in UK, India and Australia	Net sales- US\$ 1510.2 million in 2004	The Group's principal activity is to manufacture and market cast copper rods, copper cathodes, aluminium cold rolled products and conductors.	A Copper producer with its own captive mines in Australia, and Refineries and Smelter in India – Silvassa refinery, Tuticorin smelter
Rio Tinto	Part of Rio Tinto Group. Rio Tinto Group is the world's No. 2 exporter of iron ore. World leader in finding, mining and processing the earth's mineral resources.	World's largest private mining company with assets of over US\$ 17.7 billion.	Produces and/or refines aluminium/bauxite, borates, coal, copper, diamonds, gold, iron ore, molybdenum, salt, silica, silver, talc, tin, titanium dioxide, uranium, zinc and other industrial metals.	Rio Tinto operates over 60 mines and processing plants in 40 countries. The company is looking for developing iron ore mines in India.
BHP Billiton	World's largest diversified resources company.	In 2004, it had turnover of US\$ 24.9 billion	It has the industry leader or near industry leader positions in major commodity businesses, including energy coal and metallurgical coal, copper, nickel, iron ore, uranium, silver and titanium minerals, and have substantial interests in oil, gas, liquefied natural gas and diamonds.	The company has around 35,000 employees working in more than 100 operations in approximately 20 countries. BHP Billiton in India is present for over 30 years and is a major supplier to steel industry. It has Memorandum of understanding with SAIL.

Address of the apex contact agency for the sector

Apex Contact Agency	Address
Ministry of Steel	Government of India, Udyog Bhawan, New Delhi - 110011 Phone – 91-11- 23793432 Website – www.steel.nic.in
Sponge Iron Manufacturers Association	1501, Hemkunt Tower, 98, Nehru Place, New Delhi-110 019 Phone - 26294492 /51619204. Website - www.spongeironindia.org
All India Stainless Steel Industries Association	302, Arun Chambers, Madan Mohan Malavia Road, Mumbai 400 034 Phone - 91 22 4949764 Email - aissia@usa.com
All India Induction Furnace Association	209, M G House, Community Centre, Wazirpur Industrial Area New Delhi - 110 052 Phone – 91 11 27376194 Website - www.aiifa.org
Ministry of Mines	Ministry of Mines, Government of India A-wing, Shastri Bhavan, 3rd Floor, New Delhi - 110 001 Fax. +91-11-3386402 Telex : 31.66601 Website - http://mines.nic.in/

Exchange Rate Used

Year	Exchange Rate (INR/US\$)
2000-01	45.75
2001-02	47.73
2002-03	48.42
2003-04	45.95
2004-05	44.87
2005-06	44.09
2006-07	45.11

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