

## **METALS SCENARIO**

### **Aluminium**

Aluminium is the most abundant metal in the earth's crust. It ranks second, next only to Iron (steel), in terms of volumes used due to its versatility, which stems from its excellent and diverse range of physical, chemical and mechanical properties. Aluminium, which is only one-third the weight of steel is highly resistant to most forms of corrosion, is non-magnetic, non-combustible, is non-toxic and impervious (hence used in the food and packaging industries) and is also a superb conductor of electricity. Other valuable properties include high reflectivity, heat barrier properties and heat conduction. The metal is malleable and easily worked by the common manufacturing and shaping processes.

3.20 Uses of aluminium metal are as follows:-

- (i) In construction- windows, doors, cladding, weather-proofing, light constructions such as conservatories and canopies.
- (ii) In transport- auto, aerospace, rail and marine industries.
- (iii) Packaging- protection, storage and preparation for food and drinks.
- (iv) Electrical uses- overhead conductors and underground power-lines and power cables.
- (v) Water treatment and medicine-antacid to combat gastric upsets, anti-perspirants.
- (vi) Machineries and Equipments.
- (vii) Castings- Domestic Utensils.

In India the electrical sector is the largest consumer of aluminium. Bulk of the Aluminium usage is in overhead conductors and power cables used in generation, transmission and distribution of electricity. Aluminium is used in switchboards, coil windings, capacitors, and many other applications as well.

The global aluminium production which was 399.00 lakh tonnes in 2008 fell to 377.81 lakh tonnes in 2009, as per CRU Monitor-Aluminium. The Global aluminium production is forecast to increase by about 2% i.e. to 385.00 lakhs tonnes in 2010. The world aluminium consumption in 2008 and 2009 was 376.68 lakh tonnes and 343.41 lakh tonnes respectively. India produced 12.33 lakh tonnes aluminium in 2007-08 and 13.48 lakh tonnes in 2008-09 which approximately was a little over 3% of world production.

India is endowed with rich bauxite reserve of 2300 million tonnes (approx. 6.76% of the world total) and ranks 5th in the world bauxite reserve base. The primary aluminium industry in India consists of five producers viz. National Aluminium Company Limited

(NALCO), HINDALCO Industries Limited, Bharat Aluminium Company Limited (BALCO), Madras Aluminium Company Limited(MALCO) and Vedanta Aluminium Limited(VAL). VAL started its operations in April, 2008. Out of these Companies, only NALCO is in the Public Sector. The production of aluminium by Primary Aluminium Producers in the years 2007-08 to 2009-10 (upto December, 2009) is as follows:-

(in tonnes)

Name of the company	Aluminium production		
	2007-08	2008-09	2009-10 (upto December, 2009) Provisional
NALCO	3,59,213	3,61,262	3,18,741
HINDALCO	4,77,723	5,24,133	4,17,039
MALCO	37,635	23,224#	0#
BALCO	3,58,671	3,56,781	1,98,869@
VAL	-	82,785	1,80,436
<b>Total</b>	<b>12,33,242</b>	<b>13,48,185</b>	<b>11,15,085</b>

#MALCO has closed its smelter since December, 2008.

@ BALCO has closed its old smelter of 1,00,000 tonnes per annum capacity due to its non-viability.

The sales figures of aluminium during the years 2007-08 to 2009-10 (upto December, 2009) are as follows:-

(In tonnes)

	2007-08	2008-09	2009-10 (upto December, 2009) Provisional
	Domestic sales	9,28,544	9,52,958
Export sales	3,03,643	3,81,870	2,71,291
<b>Total sales</b>	<b>12,32,187</b>	<b>13,34,828</b>	<b>11,05,124</b>

The price of aluminium fixed by the primary producers is generally aligned to the London Metal Exchange (LME) prices. In 2009, the world aluminium price averaged around \$ 1665/tonne, which was about 35% below the 2008 average price. The decline in aluminium price in 2009 was the largest annual decline on record, mainly as a result of consumption falling faster than production and stocks increasing to end at over 4.6 million at LME. One of the primary producers in India, viz. M/s MALCO temporarily shut down its aluminium production line in December, 2008, which had a capacity of 40,000 tonnes per annum. BALCO has also closed its old smelter of 1,00,000 tonnes per annum capacity due to its non-viability. It is anticipated that economic recovery along with the combined strong demand coupled with growth in demand in industrialized countries at 2-3 per cent a year would propel aluminium higher this year.

The financial year wise average LME price per tonne of aluminium is given below:-

<b>YEAR</b>	<b>Average LME price of aluminium (US\$ per tonne)</b>
1995-1996	1724
1996-1997	1506
1997-1998	1567
1998-1999	1291
1999-2000	1473
2000-2001	1533
2001-2002	1395
2002-2003	1354
2003-2004	1495
2004-2005	1778
2005-2006	2029
2006-2007	2665
2007-2008	2624
2008-2009	2227
2009-2010 (upto December,09)	1767

Chart/graph showing month to month price movement for Bauxite, Aluminium Metal and Average LME Prices of Aluminium during 2009-10 are given below :

#### **Bauxite**

<b>MONTH 2009-10</b>	<b>AVG PRICE RS. PER TONNE</b>
APRIL	308
MAY	304
JUNE	302
JULY	329
AUGUST	346
SEPTEMBER	340
OCTOBER	307
NOVEMBER	290
DECEMBER	359

#### **ALUMINIUM**

<b>2009</b>	<b>AVG PRICE RS. PER TONNE</b>
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APRIL	93320
MAY	94150
JUNE	90910
JULY	93300
AUGUST	93300
SEPTEMBER	101530
OCTOBER	106280
NOVEMBER	109140
DECEMBER	112230

## **ALUMINIUM**

<b>2009</b>	<b>AVG LME PRICE \$ PER TONNE</b>
APRIL	1421
MAY	1460
JUNE	1574
JULY	1668
AUGUST	1934
SEPTEMBER	1834
OCTOBER	1879
NOVEMBER	1949
DECEMBER	2180

## **Copper**

Copper is a base metal of strategic importance – an essential component of energy efficient motors and transformers. Its exceptional strength combined with ductility and resistance to creeping and corrosion makes it the preferred and safest conductor. Copper is a critical metal being used in areas such as defence, space programme, railways, power cables, mint, Tele-communication Cables etc.

At present, the demand for copper minerals for primary copper production is met through two sources i.e. Copper ore mined from indigenous mines and imported concentrates. The indigenous mining activity among the primary copper producers is limited to only Hindustan Copper Limited (HCL). The other primary copper producers in the private sector import the required mineral in the form of concentrate. HCL also imports some quantity of copper concentrates for its Smelter Plants to supplement the shortfall in indigenous production. Indian Copper ores are of low grade and large scale mechanization in the underground mines has caused difficulty in extraction due to the geometry of the ore body (narrow width and a flatter inclination). Manufacture of primary copper based on

indigenous ores is characterized by high energy consumption because of low scale of operations and minimal automation.

Till 1997, the only producer of primary refined copper was Hindustan Copper Limited (HCL), a public sector enterprise under the Ministry of Mines. The installed capacity for refined copper production at its two integrated copper plants was around 47,500 tonne per year, which used to meet approximately 25-30% of India's requirement for refined copper. The balance demand was met through imports. However, the scenario has changed drastically after emergence of the other two primary producers of Copper in private sector namely M/s Hindalco Ind. Ltd. (Unit: Birla Copper) and M/s. Sterlite Industries (I) Ltd. Their present annual capacities are 5,00,000 MT and 4,00,000 MT of refined copper respectively. The plants of M/s Hindalco Ind. Ltd. (Unit: Birla Copper) and M/s Sterlite Industries (I) Ltd. are based on imported copper concentrate. Besides, another private player viz. M/s Jagadia Copper Ltd. (formerly SWIL Ltd.) has started operating its 50,000 tonnes plant based on secondary route. Continuous Cast Rod (CCR) plants of M/s TDT and M/s Finolex are based on imported cathode. The capacity for production of primary copper in India has risen from a mere 47,500 tonnes per year till 1997 to 9,99,500 tonnes at present which also includes 50,000 tonnes from secondary route by M/s. Jagadia Copper Ltd., with the result that India is now a net exporter of refined copper.

The details of production of major players in copper industry during 2009-10 (upto December, 2009) are given below:-

(In tonnes)					
SI. No	Commodity	Unit of Prodn.	No. of Factories	Installed Capacity	Production during 2009-10 (upto Dec.,2009)
1	2	3	4	5	6
1	Cathode				
	a) HCL	tonnes	2	49,500	10,646
	b) Sterlite Industries (I) Ltd.	tonnes	1	4,00,000	2,54,670
	c) Hindalco Ind. Ltd. (Unit: Birla Copper)	tonnes	1	5,00,000	2,58,626
<b>Total:</b>		<b>9,49,500</b>	<b>5,23,942</b>		

### Price of Copper

The domestic price of copper is linked to London Metal Exchange (LME) price. The price of Copper declined sharply till 1998-99. Thereafter it was fluctuating between US \$ 1450 & 1800 per tonne. Since 2003-04, the LME price is rising steadily and has reached historical levels. Recently, The London Metal Exchange (LME) price of copper which was hovering in the ranges from US \$ 7,000 to US \$ 8,600 per tonne during the months of April'2008 to September'2008 had a drastic fall during October, 2008 and the price reached a level of US\$ 3071 during December, 2008. The average LME price during 2008-

09 was US\$ 5864 as against US\$ 7584 during 2007-08. The copper industry was adversely affected due to the drop in LME price along with the economic slowdown in general. Along with the drop in LME copper price, TCRC (treatment and refining charges) were also unfavourable. This situation affected Indian copper producers in general. HCL which was importing part of its copper concentrate requirement for running Khetri smelter was forced to stop operations of Khetri smelter on economic considerations from December, 2008. The Khetri smelter continues to be under temporary shutdown during 2009-10 also. During the present year there has been an improvement in the price situation. Till December, 2009 the LME average for the year 2009-10 has improved to US\$ 5724. Along with improvement in the LME copper price, the industrial situation has also improved in general indicating a hopeful position for the copper industry.

The year wise average LME price per tonne of copper is shown in the following table:

<b>YEAR</b>	<b>Average LME price of Copper (US \$ per ton)</b>
1995-96	2844
1996-97	2257
1997-98	2096
1998-99	1581
1999-2000	1670
2000-2001	1806
2001-2002	1527
2002-2003	1586
2003-2004	2046
2004-2005	3000
2005-2006	4097
2006-2007	6970
2007-2008	7584
2008-2009	5864
2009-10 (upto December, 2009)	5724

Chart/graph showing month to month price movement for Copper Metal and Average LME Prices of Copper are given below:-

#### **COPPER 2009-10**

<b>MONTH</b>	<b>AVG PRICE Per Tonne</b>
APRIL	210000
MAY	206750

JUNE	206230
JULY	214040
AUGUST	214040
SEPTEMBER	266260
OCTOBER	271720
NOVEMBER	297290
DECEMBER	317730

### **COPPER 2009-10**

<b>MONTH</b>	<b>AVG LME PRICE \$ PER TONNE</b>
APRIL	4407
MAY	4569
JUNE	5014
JULY	5216
AUGUST	6165
SEPTEMBER	6196
OCTOBER	6288
NOVEMBER	6676
DECEMBER	6892

Copper consumption in a country is an indicator of its level of economic development. Per capita consumption in India is in the order of 0.50 Kg as compared to 10 Kg in developed nations.

The known mineral resources for copper within the country are few with low grades of copper with the average metal content being in the region of a mere 1% and the precious metal content being very low. The estimated copper reserves in the country are approx. 369.4 million tonnes of ore containing 4.4 million tonnes of copper metal.

As per the estimate of Indian Copper Development Centre (ICDC), during 2008-09, consumption of refined copper in the country was approximately 5,35,000 MT. During 2009-10, production of refined copper is expected to be 7,03,000 MT. The refined copper consumption growth during 2009-10 would be around 6-7%. However, the production and consumption of refined copper in 2009-10 would depend on the growth of the economy and LME price.

Electrical, Electronics and Telecommunications sectors account for nearly 52% of copper usage in India. The demand again is primarily from the telecom, power and infrastructural sectors. There has been substantial reduction in demand of copper in telecom sector with increased application of Fibre optic cables and fast penetration of wireless communication through cell phones, Wireless in Local Loop and DTH Telecasting.

In the household wiring sector, despite many advantages of using copper conductors, aluminum conductors are widely used. The trend, however, has started reversing and increased usage of copper in this sector is perceptible. But unfortunately, in place of cables and wirings made from high grade electrolytic tough pitch copper, applications are mostly of cables and wirings made from "Scrap recycled" (Commercial copper) resulting to substantial electrical energy loss to the country without counting indirect losses and other costs due to failure of these wirings. Usage of copper in building construction, as prevalent in Western World, is slowly making inroads into the country, mainly in metro cities and industrial projects.

### **Lead and Zinc.**

As per the data made available by the Indian Bureau of Mines (IBM), the production of zinc is more than its consumption in the country. However, there appears to be shortage of lead in the country as its production is less than its consumption. The production of primary lead metal was 60 thousand tonnes and that of primary zinc metal was 579 thousand tonnes in 2008-09. As against this the apparent consumption of lead was 257 thousand tonnes and that of zinc was 464 thousand tonnes in 2008-09. The exact details of demand and supply of lead and zinc are not maintained. Lead and Zinc are freely importable as per the import policy of the Government. Data relating to import of lead and zinc (metals & alloys) provided by the IBM for the years 2006-07, 07-08 and 08-09 and the data regarding apparent consumption and production of lead and zinc for the years 2006-07, 2007-08 and 2008-09 available with the IBM is as under :

#### **Apparent consumption of Lead (2006-07 to 2008-09) (Quantity in Tonnes)**

<b>Item</b>	<b>2006-07</b>	<b>2007-08 (Provisional)</b>	<b>2008-09 (Provisional)</b>
Total production Lead (primary)	44627	58246	60323
Total imports*	184021	154292	209455
Total exports*	15535	19806	12566
Apparent consumption	213113	192732	257212

\* Lead and alloys & scrap

(Apparent Consumption = Production + Imports - Exports)

#### **Apparent consumption of Zinc (2006-07 to 2008-09) (Quantity in Tonnes)**

<b>Item</b>	<b>2006-07</b>	<b>2007-08 (Provisional)</b>	<b>2008-09 (Provisional)</b>
Total production zinc (ingots)	380945	457075	579091
Total imports**	179034	106214	94694
Total exports**	189249	81536	209434
Apparent	370730	481753	464351

consumption

\*\* zinc and alloys & scrap

(Apparent Consumption = Production + Imports – Exports)

### **Other Metals/ Ores**

Chart/ graph showing month to month price movement for Gold, Manganese Ore, Iron Ore, Chromite, and Average LME prices and domestic prices of Lead/ Zinc Nickel and Tin have been enclosed at [Annexure 3.7](#).