



COMMODITY PROFILE- ALUMINIUM

Aluminium (Al) is the third most abundant element in the earth's crust and constitutes 7.3% by mass. In nature however, it only exists in very stable combinations with other materials (particularly as silicates and oxides). It has become the world's second most used metal after steel. Aluminium is a unique metal; strong, durable, flexible, impermeable and light-weight. It does not rust and is 100 percent recyclable. The metal has a long working life due to its propensity for recycling.

Aluminium ore, most commonly bauxite, is plentiful and occurs mainly in tropical and sub-tropical areas - Africa, West Indies, South America and Australia - with some deposits in Europe. The primary aluminium production process consists of three stages. First is mining of bauxite, followed by refining of bauxite to alumina and finally smelting of alumina to aluminium.

A CUTTING EDGE PLATFORM

Importance & Uses

Aluminium is an extraordinarily versatile material. It can take the range of forms like castings, extrusions and tubes, sheet & plate, foil, powder, forgings etc and variety of surface finishes available (coatings, anodizing, polishing etc). It is a good conductor of electricity (one kilogram of aluminium cable can carry twice as much electricity as one kilogram of copper). Most overhead and many underground transmission lines are made of aluminium. It is an excellent medium to produce cooking utensils and foils, radiators and building insulation. Its strength, combined with low density, make it ideal for transport and packaging applications. The main uses of aluminium in packaging are as multi-purpose foil and cans. Aluminium has uses in the following sector-

- Building & constructions

- Transportation
- Packaging
- Electricity
- Medical and Water
- Cooking utensils

Production Process

The primary aluminium production process consists of three stages. First is mining of bauxite, followed by refining of bauxite to alumina and finally smelting of alumina to aluminium. Bauxite, found in parts of the world where high temperatures are combined with heavy rainfall, is a mixture, produced by weathering of chalk and rock containing aluminium hydroxide. It has the highest concentration of aluminium of the easily accessible compounds found in the Earth's crust, producing about one ton of metal from every four tons of ore.

The alumina breaks down by electrolysis, and molten aluminium falls to the bottom of the pot, where it is regularly tapped off to be cast into ingots or slabs weighing up to 20,000 kg. Production of one ton of aluminium requires two tons of alumina, while production of one ton of alumina requires two to three tons of bauxite.

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Primary Aluminium

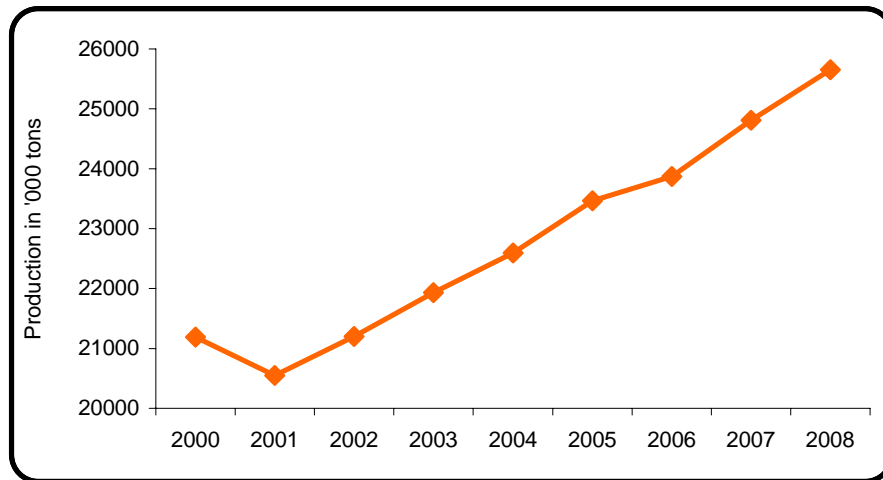
It is aluminium tapped from electrolytic cells or pots during the electrolytic reduction of metallurgical alumina (aluminium oxide). It is the quantity of molten or liquid metal tapped from the pots and that is weighed before transfer to a holding furnace or before further processing. Therefore, primary aluminium excludes alloying additives and recycled aluminium.

Global Scenario

Aluminium, the most widely used non-ferrous metal in the world only next to steel, has various applications from transport, packaging, electrical application, medicine, and construction of homes and furniture.

Aluminium Output

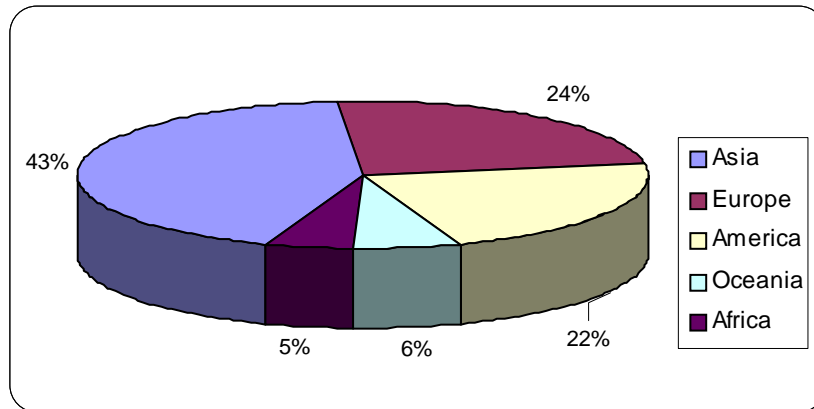
Fig.1: Global Primary Aluminium Production



Source: IAI

Global Aluminium production is increasing year after year and stood at 25600 thousand tons in 2008. Since the beginning of current decade (during the period from 2000 till 2008), the production growth rate (CAGR) stood at about 3%.

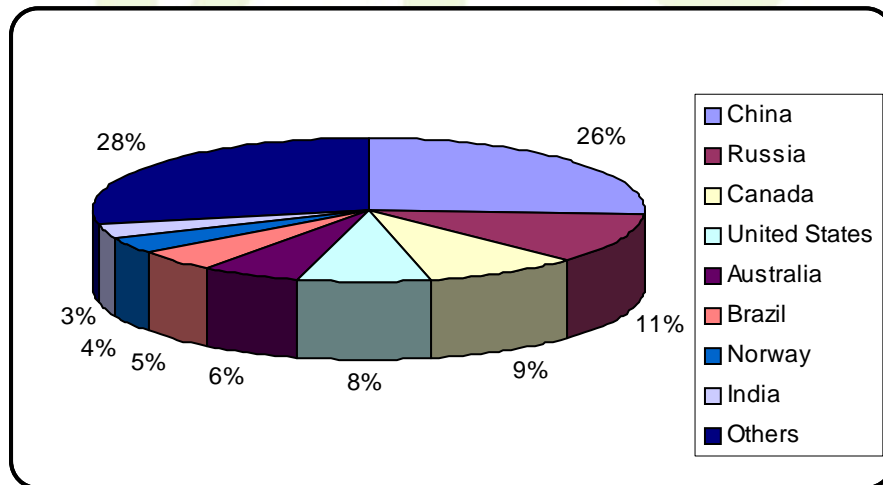
Fig. 2: Major Producing Regions in Primary Aluminium Production



Source: www.world-bureau.com

Asia is the largest Aluminium producing continent with a share of 43% of the world total production, followed by Europe 24% and America is about 22%.

Fig. 3: Production Share of Major Producing Countries



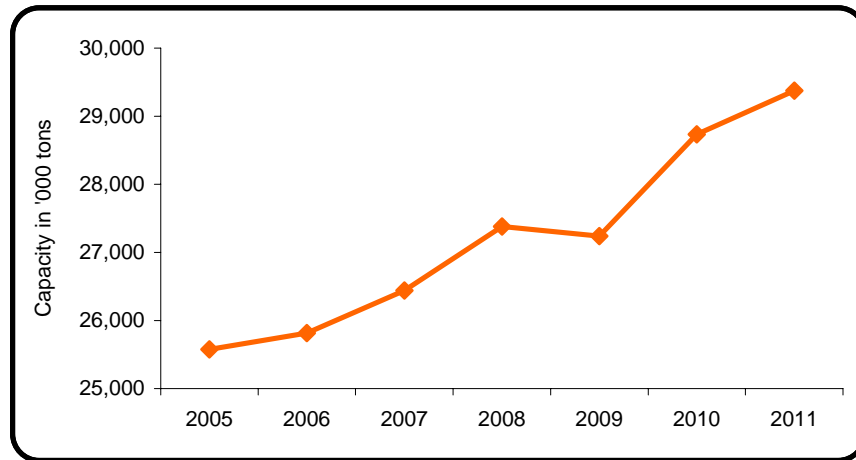
Source: US Geological survey mineral resource program

Note: Avg. for five years from 2003 till 2007

China, Russia, Canada, United States and Australia are the major Aluminium producing countries with the share of 26%, 11%, 9%, 8% and 6% respectively. China share in the global Aluminium production is increasing significantly in recent years. The country is the

world's largest producer with the total output of 13105 thousand tons in 2008. Its annual production was merely 7800 tons in the year 2005.

Fig. 4: Primary Aluminium Annual Production Capacity



Source: IAI

Global aluminium primary production capacity is seen at 29374 thousand tons by the year 2011. In terms of inventories, world stocks were 2959 thousand tons as reported by IAI. Not many changes in inventories had been witnessed over the years during the current decade.

A CUTTING EDGE PLATFORM

World Bauxite Reserves

Table 1: World Bauxite Mine Production, Reserves and Reserve Base ('000 tons)

Countries	Mine production		Reserves (E)	Reserve base (E)
	2007	2008 (E)		
Australia	62,400	63,000	5,800,000	7,900,000
Brazil	24,800	25,000	1,900,000	2,500,000
China	30,000	32,000	700,000	2,300,000
Guinea	18,000	18,000	7,400,000	8,600,000
India	19,200	20,000	770,000	1,400,000
Jamaica	14,600	15,000	2,000,000	2,500,000

Vietnam	30	30	2,100,000	5,400,000
Other countries	32,970	31,970	6,330,000	7,400,000
World total	202,000	205,000	27,000,000	38,000,000

Source: US Geological survey mineral resource program

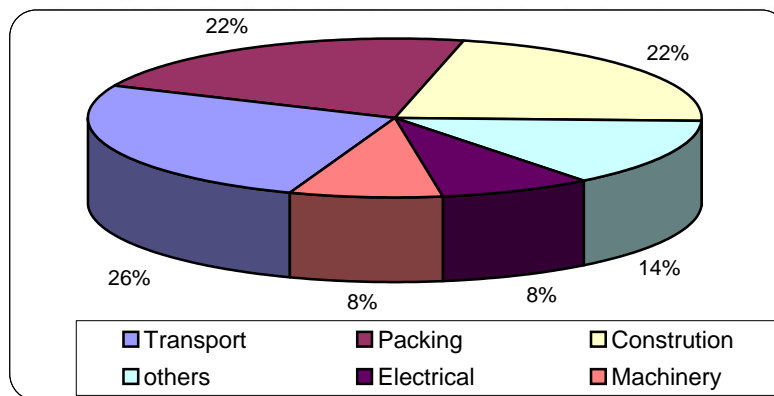
Note: E- estimated

World Bauxite reserves base anticipated at 38,000 million tons. Out of this, countries such as Guinea, Australia and Vietnam have been considered as the most potential with the anticipated output of 8600 million tons, 7900 million tons and 5400 million tons of bauxite. Vietnam, although it has contributed meager quantity in the total global output currently, its supply prospects seen to be huge.

Aluminium Demand

Transport, packaging and construction are the major sectors, which have a share of 26%, 22% and 22% respectively in the total aluminium off-take. Usage in electrical and machinery sector is also significant with the share of 8% each in the total demand.

Fig. 5: Industry Consumption of Aluminum



Source: Standard CIB Global Research (www.standardbank.co.za)

Domestic Scenario

India is one of the major aluminium producing and consuming countries of the globe. The country has huge deposits of natural resources in form of minerals like copper, chromite, iron ore, manganese, bauxite, gold, etc. The Indian aluminum industry falls under the category of non-iron based which include the production of copper, tin, brass, lead, zinc, aluminum, and manganese. The growth of the aluminum metal industry in the country would be sustained by the diversification and exploration of new horizons for the industry.

Aluminium Production in India

Backed by abundant and good quality bauxite reserves and cheap labour costs, Indian aluminum producers have emerged among the lowest cost producers in the world. India is an important player in the aluminium sector. The country has the fifth largest bauxite reserves with deposits of about 3 bn tonnes or 5% of world deposits. India has got huge bauxite reserves in states like Andhra Pradesh, Orissa, Chhattisgarh etc. In the total bauxite reserves in India, Orissa has the highest share at 60%, followed by Andhra Pradesh and other states. India's share in world aluminium capacity rests at about 3%. At present, **the country ranks sixth in alumina production, eighth in aluminium production and fifth in aluminium consumption in the world.** Production of 1 tonne of aluminium requires 2 tonnes of alumina while production of 1 tonne of alumina requires 2 to 3 tonnes of bauxite. The Aluminium industry is highly concentrated, with just five plants accounting for the entire production capacity of around 1.2 million tonnes per annum.

Aluminium Consumption in India

The per capita consumption of aluminium in India is abysmally low at 0.8 kg as against 25 kg in USA, 19 kg in Japan, 10 kg in Europe and 3 kg in China. Even the World's average per capita consumption is about 10 times of that in India. On the demand front, the country consumed 1.2 million tons of aluminium in 2006-07, a rise of 11% over 2005-06 (Investment Commission of India). The electricity sector, which requires over 40 per cent of aluminium, continues to lead in terms of domestic consumption. However, certain new areas besides

other sectors like automobiles and construction are expected to boost the country's domestic aluminium consumption.

Major Players in Indian Aluminium Sector

Table 2: Major Players in Aluminium Sector

Group	Key Players
Aditya Birla Group	Hindalco Industries Ltd.
	Indian Aluminium Company Ltd. (INDAL)
Sterlite Industries Ltd.	Bharat Aluminium Company Ltd. (BALCO)
	Madras Aluminium Company Ltd. (MALCO)
Public Sector	National Aluminium Company Ltd. (NALCO)

Indian Aluminium (INDAL) now merged with HINDALCO, Bharat Aluminium (BALCO) and Madras Aluminium (MALCO) the erstwhile PSUs, which have been acquired by Sterlite Industries. NALCO is in the public sector.

Export-Import of Aluminium in India

Export

On the supply side, India has also export potential for aluminium on a competitive basis. India's National Aluminum Company Limited (Nalco) exported 101,723 tons of aluminium in 2007-08 and 82,314 tons in 2008-09. Bharat Aluminium Co., a unit of London-based Vedanta Resources achieved aluminium export volumes close to 94,000 tonnes in FY 2008.

Import

In 2007-08, India's aluminium products imports from China were worth \$252.89 million, which was 108.81% increase over \$121.11 million in 2006-07. The market share of Chinese imports in India has gone up from 7% during 2006-07, to 24% in 2007-08. On the other hand, the market share of domestic producers fell by more than half -- from 93 % in 2006-07 to 76% in 2007-08. Chinese imports have affected many domestic aluminium producers.

Table 3: Import of Aluminium Products (in MT)

	2005-06	2006-07	2008-09
Aluminium Flat Rolled Products			
China	9,853	16,155	26,617
Other Countries	16,193	20,814	21,657
Total Import	26,046	36,968	48,274
Aluminium Foil			
China	5,437	10,777	23,925
Other Countries	14,826	13,304	15,465
Total Import	20,263	24,081	39,390

Source: www.dgsafeguards.gov.in

In order to protect the domestic industry, the government has imposed up to 30% safeguard duty on import of aluminium products from China. Imports of aluminium flat sheets used by sectors like auto and construction are imposed a duty of 12% to 14% while import of aluminium foils, mainly used by the packaging industry attracts around 25% to 30% duty. This duty is imposed for a period of two years starting March 2009.

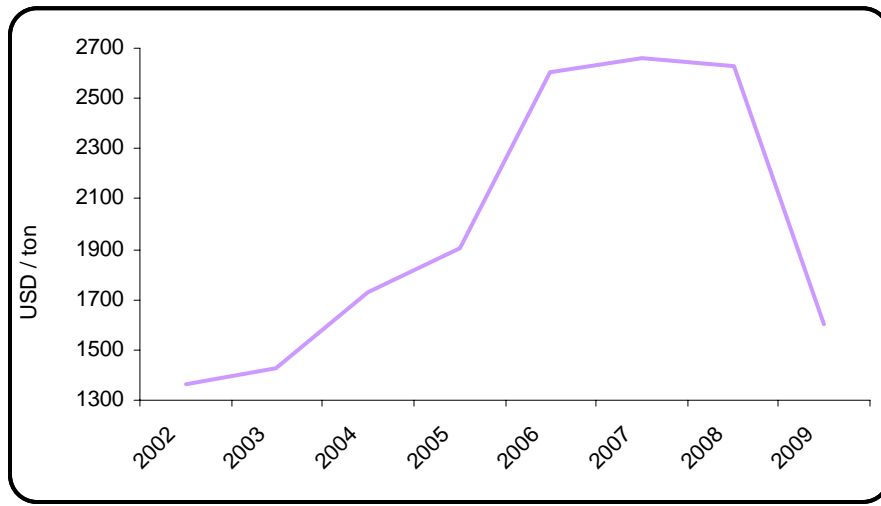
Recent Trends in India

India has surplus Aluminium production as compared to its domestic demand. The aluminium demand growth is expected to accelerate to 4-5% in 2009 from 3% last year, helped by the power, auto and construction sectors, according to the Federation of Indian Mineral Industries. India's Aluminium consumption is likely to be more than 1.2 million tons in 2009-10 (April-March) up from 1.15 million tons in 2008-09, when the demand eased.

Aluminium Prices

Aluminium prices (annual average) have ruled at significantly higher levels during the period between 2006 till 2008. After recording historic high levels in mid 2008, prices have witnessed sharp decline due to subdued demand on global economic slowdown. Although prices are ruling lower levels during the current year, they are witnessing recovery in recent months.

Fig. 6: LME - Aluminium prices



Source: LME

Note: Three months forward LME daily avg. prices and Jan to Sept Avg. prices for 2009

Factors influencing Aluminium prices

- World economic growth
- Demand for aluminium in power generation and transmission, packaging and transport sectors
- Demand growth in emerging economies, particularly, China and India
- LME Aluminium inventories
- Freight rates
- US Dollar movements against other major currencies such as EUR, GBP.
- Government regulation on bauxite mining, imports and duties
- Interference of Government and various associations

Major Global Exchanges for Aluminium

- London Metal Exchange (LME)
- New York Mercantile Exchange (COMEX / NYMEX)
- Tokyo Commodity Exchange (TOCOM)
- Shanghai Futures Exchange (SHFE)

References

- International Aluminium Institute
- www.metalprices.com
- www.minerals.usgs.gov
- www.lme.co.uk
- www.basemetals.com

