METALS & ENERGY INSIGHT

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Aluminium

The aluminium industry in India is strategically well-placed and ranks seventh largest in the world with discernible growth plans and prospects for the future. India's rich bauxite mineral base renders a competitive edge to the industry as compared to its counterparts globally. The aluminium industry in India scaled lofty notches since the establishment of the first manufacturing company, namely, Indian Aluminium Company (INDAL) in 1938. In 2004, all business activities of INDAL have been merged subsequently with Hindalco Industries Limited (Hindalco). Four major primary producers, National Aluminium Co. Ltd., Hindalco Industries Ltd., Bharat Aluminium Co. Ltd., and Vedanta Aluminium Ltd (VAL) are at the forefront of aluminium production. The primary producers have a strong presence in the sheet business and are enlarging their roles in the foil segment. The primary producers are also in the extrusion segment in which a large number of secondary manufacturers participate with fragmental capacities.

Production of Aluminium in India ('000 Tonnes)

Year	Aluminium Smelter	Alumina Refinery	Bauxite Mine
2010	1610	3802	10920
2011	1660	7241	10920
2012	1708	4987	11220
2013	1714	9920	13920
2014	1989	10120	15220

Source: Thomson Reuters

Domestic Demand and Supply of Aluminium ('000 Tonnes)

Year	Production	Consumption	Exports	Imports
2009	1598	1458	278	250
2010	1607	1475	353	320
2011	1667	1569	338	379
2012	1714	1687	415	256
2013P	1989	1900	425	300

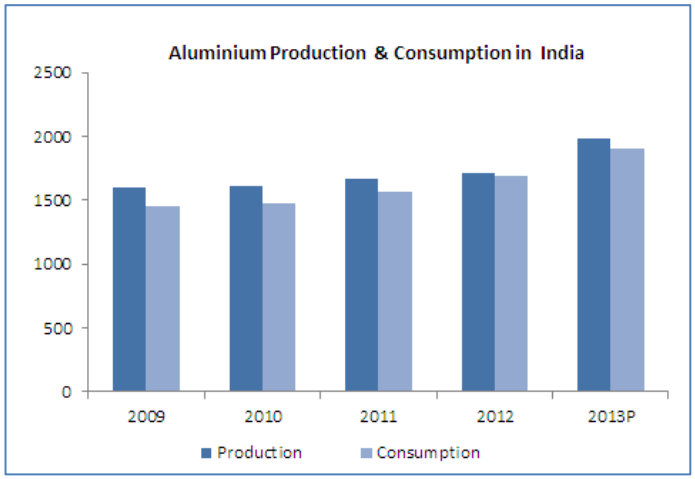
Source: USGS, Indian Bureau of Mines (IBM)

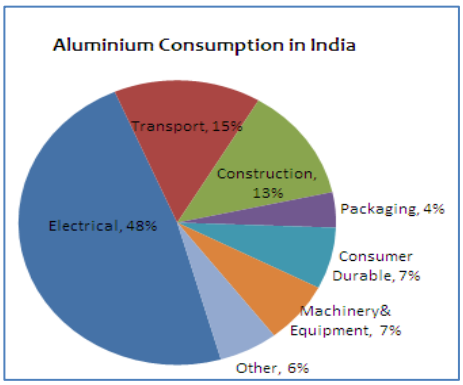
The overall total annual installed capacity of aluminium in the country has risen to 19.07 lakh tpy during 2012-13. The actual production of aluminium comes from a plant capacity of 17.67 lakh tpy as 1.40 lakh tpy capacities are presently non-operational.

The installed capacity of alumina plants in the country was 48.85 lakh tpy, out of which plant capacity of 46.00 lakh tpy reported alumina production during the year. Alumina capacity of 2.85 lakh tpy remained non-operational.

Production

India occupies the fifth position in terms of bauxite reserves at about 5 billion tons. But in terms of production, India stands in the seventh place. India's output accounts for only 3.7% of world production. Among states, Odisha and Andhra Pradesh account for more than 90% of reserves in the country. In terms of consumption, India is the fifth largest in the world. Per capita consumption of aluminium in India is much lower at 1.3 kg compared to that of the world average at 12-15 kg.





Consumption

Consumption pattern of aluminum in India is different from that of world. The largest industry is electrical industry accounting for about 48% of total aluminium consumed in the country followed transport sector with 15%, construction with 13%, machinery & equipment with 7% and consumer durables with 7% of total consumption.

Recycling of aluminium is encouraged all over the world and India is also adopting similar policies, as recycling is lees capital intensive, less polluting and more energy efficient. However, recycling of aluminium is limited to unorganized sector confining mostly to utensils and casting industry. Nevertheless, according to the IBM estimates, the recycling industry may contribute for over 35-40% of total aluminium consumption in the country.

Domestic Trade Scenario

India's aluminium exports could rise 5% in the current fiscal year to 325,000 tonnes, despite a slowdown in global demand, as falling prices have led rival global producers to cut production.

Declining aluminium prices have forced major players such as Alcoa and Norsk Hydro to cut output and have prompted China, the world's largest consumer of the metal, and Japan to ramp up purchases. Due to the sudden closure of some of the smelters in the US, the export demand has slightly improved. India exported 310,000 tonne of aluminium in 2011-12.

Aluminium prices have fallen this year alongside other metals as the global economy has cooled.

Indian aluminium exports to South Korea, Japan and China are currently priced at a premium of $223-$230 per tonne above the LME benchmark, lower than the $240-$260 premium from other countries.

Low costs and availability of better grades of inputs such as bauxite give Indian smelters an edge over other suppliers, but bureaucratic and environmental delays have limited the availability of coal, a major fuel for aluminium production.

The capital expenditures and operating costs in India's plants are nearly 70 to 80% of the world average cost due to high-quality bauxite, rich coal deposits and low labor costs, Kumar said. India is blessed with high quality bauxite and coal but the delay in processing of applications (for allotting mines) is the main cause of concerns, he added. India produces around 1.6 million tonne of aluminium and consumes about 1.3 million tonne annually.

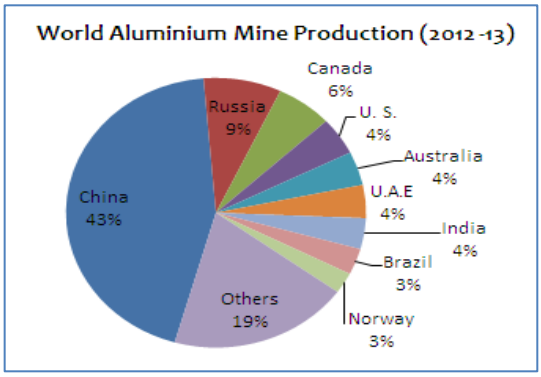
World Review

Globally, primary aluminium production has increased marginally to 47 million tonnes from 45.2 million tonnes in 2011. The principal producers were China (43%), Russia (9%), Canada (6%) and USA (4%). The world production of alumina increased considerably to 95.6 million tonnes in 2012 in terms of contained Al2O2 from 91.2 million tonnes in 2011. China accounted for 39%, followed by Australia (22%), Brazil (11%), USA (5%) and Russia (3%) in the production of alumina in 2012. The country-wise developments in Aluminium & Alumina sector are as follows:

Mineral Source

Aluminium ore is bauxite, occurs mainly in tropical and sub-tropical areas: Africa, West Indies, South America and Australia. There are also some deposits in Europe.

Bauxite is refined into aluminium oxide trihydrate (alumina) and then electrolytically reduced into metallic aluminium.



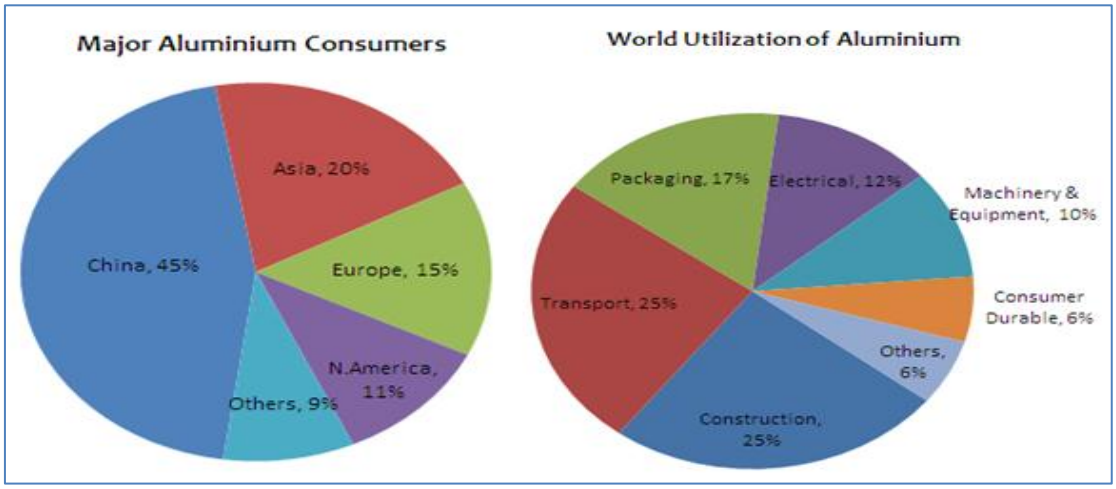
Production

Alumina is extracted using smelting process. Liquid aluminium is produced by the electrolytic reduction of alumina dissolved in an electrolyte (bath) mainly containing Cryolite. Aluminium is formed at about 900°C, but once formed has a melting point of only 660°C.

Recovery

Two to three tons of bauxite is required to produce one tonne of alumina and two tons of alumina is required to produce one tonne of aluminium metal.

Recycled metal requires only 5% of the energy required to make new metal. Blending recycled metal with new metal allows saving large amount of considerable energy, as well as the efficient use of the extra heat available. At the same time, there is no difference between primary metal and recycled metal.



Outlook for the major demand drivers of Aluminium

Power Sector: Around 80% of aluminium demand in power sector is accounted for by bare conductors used for the transmission and distribution of electricity. The 12th five year plan (2012-2017) has laid an ambitious target of generating 100,000 megawatt (MW) of power which is double of what was planned in the 11th five year plan. This additional capacity augments well for aluminium demand.

Transportation sector: The auto industry has been growing at 18% for the past two years and is expected to grow even faster in the coming years. Aluminium is increasingly being used in the transportation sector and is replacing steel because of its high strength to weight ratio, which leads to better fuel efficiency. Also, while the use of aluminium in rail wagons in India is almost negligible at present, there is a possibility

that aluminium would be used in significant quantities in the manufacture of rail wagons and coaches in future.

Construction sector: Aluminium is being used in the construction industry because of its properties like corrosion resistance, malleability, ductility and strength. The metal finds extensive use in corrugated sheets (for roofing), latches, tower bolts, handles etc. The Indian construction industry has grown at a fast pace over the last few years, but rising interest rates could see a slowdown in investments in this sector.

Consumer Durable sector: Aluminium is used in variety of consumer durables like air conditioners, water coolers, refrigerators, utensils and pressure cookers. This sector is also witnessing trends towards weight reduction which augurs well for demand for aluminium.

Packaging sector: In packaging, aluminium is used in foils, cans and bottle caps. Hence, globally, the growth of the packaging industry hinges on growth in sectors like foods, beverages, and medicines. In India, the foils segment is expected to grow faster than the rest because of its wide use in food packaging. As public awareness of the advantages of foil use increases, the demand for aluminium from the packaging sector is also expected to increase.

Foreign Trade

Exports

Exports of alumina increased to 9.3 lakh tonnes in 2012-13 from 8.9 lakh tonnes in the previous year. Exports in 2012-13 were mainly to Bahrain (42%), Iran (30%), UAE (15%), Georgia & Egypt (3% each). Exports of aluminium and alloys including scrap increased in 2012-13 to 5.67 lakh tonnes from 5.06 lakh tonnes in 2011-12. Exports in 2012-13 were mainly to Korea (24%), Mexico (9%), USA (8%), UAE, Nigeria, & Turkey (4% each) and Germany, Kenya & Saudi Arabia (2%).

Imports

Imports of alumina increased to 11.14 lakh tonnes in 2012-13 from 5.5 lakh tonnes in the previous year. Imports were mainly from Australia (88%) and China (4%). Imports of aluminium & alloys and scrap increased to 13.27 lakh MT in 2012-13 from 11.08 lakh tonnes in the previous year. The imports were mainly from China (13%), UAE (12%), Saudi Arabia (7%) & UK (6%) and USA (5%).

The main factor influence Nickel prices rise run as upward trend continues

- Global aluminium production reached a new high in March despite cuts to capacity by the biggest manufacturers. The aluminium market is facing a supply deficit of 1.1 million mt in 2014, up from a deficit last year of 726,000 mt.
- Aluminum shipments from China, the world's largest producer and user, rose to the highest level in three years as higher prices overseas encouraged exports of the metal used in everything from aircrafts to window frames.
- China shipped 380,000 metric tons of unwrought aluminum and aluminum products in July, according to data released by the country's General Administration of Customs today. That was the highest since 390,000 tons in July 2011 and up 23 percent from a year earlier, customs data showed.
- China, the leader in aluminium industry is facing an increasing shortage of bauxite after the Indonesia's mineral export ban came into effect, said Wood Mackenzie, the advisory firm.

• Japanese aluminium shipments rose for a fifth month in November, as strong domestic demand offset continued weakness in exports.

• Japan's exports of aluminum scrap are headed for a record this year as a weaker yen and higher recycling capacity in South Korea boost shipments, according to Mitsui Bussan Metals Co.

• Aluminium consumption in India declined by 22% in 2013 (till October) compared with an increase of 7.2% and 6.4% in 2012 and 2011 respectively.

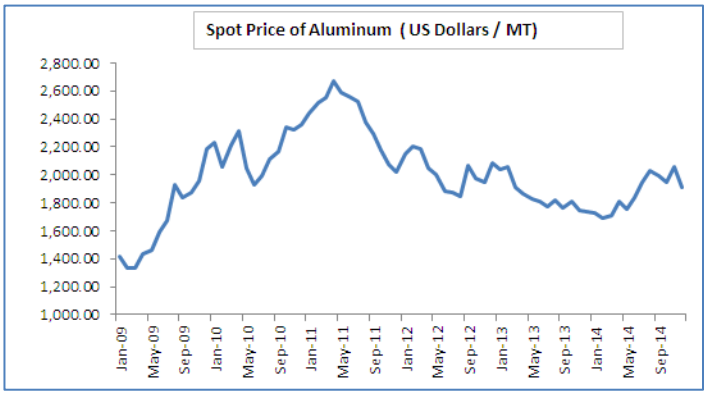
• Brazilian aluminium premiums have posted a modest decrease over the past week, as sellers attempted to find buyers to its metal supplies amid concerns with a persistent slowdown of the country's economy.

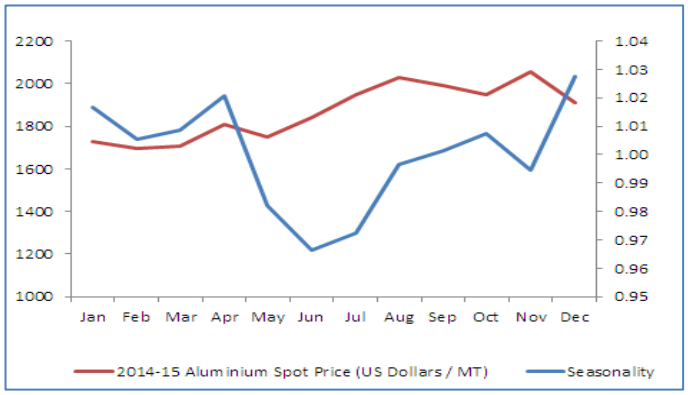
• The aluminium market outside China is set to record its first deficit in nine years in 2015 following production cuts and an Indonesian ore export ban, a turning point that could be the start of a prolonged shortfall as demand recovers.

• China's stranglehold on the global aluminium industry could be weakened by changes to export laws in Indonesia, according to American giant Alcoa.

Price Trend Analysis

Future Outlook





As per the industry sources, the primary aluminium demand in India is expected to reach 6 million tonnes by 2025, which equates 4.1 kg of per capita aluminium consumption in 2025, whereas at present per capita aluminium consumption is around 1.3 kg and aluminium demand of 1.8 million tonnes underscores the immense potential for demand growth in India.

India occupies fifth position in terms of bauxite reserve with deposit of about 3 billion tonnes with a share of 3.19 % of world reserves. Odisha and Andhra Pradesh accounts for more than 90% of country's metallurgical grade resources. While gibbsitic bauxite resources in the world are depleting, vast gibbsitic deposits in India assume particular interest because of its ease in processing. Since gibbsitic bauxite processing has specific advantage of low energy consumption, the alumina refineries enjoy sustainable comparative cost advantage.

It is projected that aluminium production capacity in India at the end of the 12th Plan Period viz, 2016-17 would be about 4.7 million tonnes. This would require about 9.2 million tonnes of alumina. So, if all the announced alumina capacity additions fructify, India would be surplus in alumina and would be a significant player in alumina trade. To produce 13.3 million tonnes of alumina at the end of the 12th Plan period, the bauxite requirement would be about 40 million tonnes. The Report of the Sub Group for the 12th Plan Period has recommended that all efforts should be directed towards ensuring bauxite availability to the alumina refineries.

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