

Scope and Potential of Indian Aluminium Industry: An Indepth Analysis

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Abstract: Indian Aluminum Industry is one of the leading industries in the Indian economy. The India aluminum industry sector in the previous decade experienced substantial success among the other industries. The India aluminum industry is developing fast and the advancement in its technologies is boosting the growth even faster. The industry has a bright future as it can become one of the largest players in the global aluminum market as in India the consumption is fairly low. The industry may use the surplus production to cater the international need for aluminum which is used all over the world for several applications such as aircraft manufacturing, automobile manufacturing, utensils, etc. India has the fifth largest bauxite reserves with deposits of about 3 bn tones or 5% of world deposits. India's share in world aluminum capacity rests at about 3%. This paper is an attempt to identify the scope and potential of aluminium industry not only in the Indian economy but throughout the world. Strategic models like SWOT analysis and Michael Porter's five Forces theory are used to analyse the Indian aluminum Industry in the best possible way.

Keywords: Aluminium, Bauxite, Economy, Production, Tonnes

1. Introduction

Indian Aluminum Industry is one of the leading industries in the Indian economy. Aluminium Industry in India is a highly concentrated industry with the top 5 companies constituting the majority of the country's production. With the growing demand of aluminium in India, the Indian aluminium industry is also growing at an enviable pace. In fact, the production of aluminium in India is currently outpacing the demand. Though India's per capita consumption of aluminium stands too low (under 1 kg) comparing to the per capita consumption of other countries like US & Europe (range from 25 kg to 30 kgs), Japan (15 kgs), Taiwan (10kgs) and China (3 kgs), the demand is growing gradually. In India, the industries that require aluminium most include power, consumer durables, transportation, construction and packaging etc.

The growth of the aluminium industry in India would be sustained by the diversification and exploration of new horizons for the industry. India has huge deposits of natural resources in forms of minerals like copper, chromite, iron ore, manganese, bauxite, gold etc. The Indian Aluminium industry falls under the category of non iron based which include the production of copper, tin, brass, lead, zinc, aluminium and manganese.

The main operation of the Indian aluminium industry is mining of ores, refining of the ore, casting, alloying, sheet and rolling into foils. At present, Hindalco and Nalco are one of the most economical in the production of the aluminium in the world. For the sustenance of the growth the aluminium industry in India has to develop research and development units to assist the production and improve on the quality measures to keep a stringent quality control. The India aluminum industry sector in the previous decade experienced substantial success among the other industries. The India aluminum industry is developing fast and the advancement in its technologies is boosting the growth even faster. The utilization of both international and domestic resources was significant in the rapid development of the India aluminum industry. This rapid development has made the India aluminum industry prominent among the investors. The India aluminum industry has a bright future as it can become one of the largest players in the global aluminum market as in India the

consumption is fairly low, the industry may use the surplus production to cater the international need for aluminum which is used all over the world for several applications such as aircraft manufacturing, automobile manufacturing, utensils, etc. Bayer-Hall-Heroult technology is used by all the producers. Electricity, coal and furnace oil are primary energy inputs. All the plants have their own captive power units for cheaper and un-interrupted power supply. Energy cost is 40% of manufacturing cost for metal and 30% for rolled products. Plants have set the internal target of 1-2 % reduction in specific energy consumption in the next 5-8 years. Energy management is a critical focus in all the plants. Each plant has an Energy Management Cell

2. Global Aluminium Industry

Aluminium is the third most abundant element in the earth's crust and the most abundant metallic element. It never occurs as a free element in nature. Aluminium smelting as an industrial activity is the youngest and largest activity of the non-ferrous metal industry, as it began only about a century ago. Aluminium is a material with a wide range of applications, e.g. Transport vehicles, construction, packaging industry, electronic production, household appliances, etc., and consequently the economic activities of these industrial sectors determine the overall demand for aluminium.

Primary aluminium production is concentrated in relatively few countries. China alone produces more than 26 % of the world total. The top five producers – China, Russia, Canada, The United States and Australia accounts for more than 59% of the world output. Production is found where energy is cheap because making aluminium uses large quantities of electricity. Growing demand for the lightweight metal is fuelled largely by the booming Chinese economy which already consumes a quarter of the world's aluminium production. Analysts predict an annual growth rate of 7 to 14% in the Chinese automotive industry up to 2011, a 12% increase in construction expenditure in 2007 and a minimum of plus 16 million annual growths in urban population during the next 8 years. According to analysts these factors will combine to see China consume 36% of world's aluminium production as early as 2010. Global demand for aluminium is increased by 8% to 43.8 Mt in 2011 and aluminium prices are increased from \$2,400 and \$2,500/t. China has become a net importer of aluminium in 2011.

The price of aluminium fixed by the primary producers is generally aligned to the London Metal Exchange (LME) prices. In FY 2009-10, the world aluminium price averaged around \$1666/tonne, which was about 16% below the FY 2008-09 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. Global aluminium capacity is estimated at 50.30 million tonnes in 2010, while production is 41.9 million tonnes. This indicates a capacity utilization of around 80% in 2010 compared to 75% in 2009. 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. Supporting the prices was the vast amount of Aluminium metal tied up under cheap rent and financing deals where metal holders would make profits if the prices rise faster than storage costs. In FY 2010-11, the average aluminium price upto Dec., 2010 has been \$ 2176/tonne which is around 17% higher than that of FY 2009-10. It is expected that LME price of aluminium will remain between \$ 2400 to \$ 2600/ tonne in the remaining months of FY 2010-11. Aluminium still remains as the prime candidate for a bearish bet and the unwinding of financing deals could be the key in this respect. Analysts forecast prices to average between \$2,350/tonne and \$2,500/tonne in 2011 as a large stock overhang and a declining share of metal tied up in financing deals are expected to restrict further price surges

3. Aluminium Production and Consumption in India

India has the credit of being the fifth largest producer of aluminium in the world. The country has a capacity to produce more than 2.7 million tones of aluminium per year, accounting making up about 5% of the total aluminium production on the globe. India boasts of a massive quantity of Bauxite reserve of about 3 billion

tones. India enjoys the eighth position among the leading producers of primary aluminium in the world. The country has been witnessing a phenomenal growth in aluminium production over the past ten years.

There was stagnation in the consumption of aluminium between the 1990s and 2002 when the consumption of the metal was estimated at 500-600 KT. However, since 2002, there has been a sharp rise in the consumption of aluminium in the nation. Chiefly, the industries that lead in the consumption of aluminium are power, infrastructure, and transportation and related firms.

Aluminium industry is one of the leading segments of the Indian economy and is expected to play a significant role in its future growth. Apart from its potentially large, growing market. India is endowed with large deposits of high quality bauxite ore, resources for power generation (coal) and formidable pool of manpower – both skilled and unskilled. Indian aluminium industry is forging ahead with rapid expansion in both Primary metal and downstream sectors. With the Indian economy projected to be amongst the top five in the world by 2020, the overall consumption of aluminium in India is projected to be about 5 million tonnes by 2015, and 10 million tonnes by 2020. Major sectors contributing to Indian aluminium consumption growth, namely, electrical (power), building and construction, packaging and transportation, are expected to grow in double digits during the next decade with this India is likely to achieve a per capita aluminium consumption of about 10kg per annum.

Aluminium is a key component of so many aspects of our life—from the buildings, cars, cans and flights. It ranks amongst the world's most abundant elements. The global inventory of aluminium in use has grown from 90 million tonnes in 1970 to about 600 million tonnes today and is forecast to reach more than 1 billion tonnes by 2020. This is creating vast material and energy storage bank for future recycling use. Aluminium is used in building and construction sector for its performance like heat conductivity, durability, high strength-to-weight ratio, optimal security, high reflectivity and low maintenance. This sector is forecasted to represent up to 35%. Aluminium is used excessively in the modern power sector. Aluminium's alloy electrical conductors are widely used in overhead electrical transmissions and distribution cables and Power systems and substations. In transportation sector, this is one of the most important applications such as it uses in making of Cars, trucks, trailers, buses, Marine, Rail and Aerospace.

4. The Major Players in the Indian Aluminium Production Sector

Aluminium production industry in India is mainly dominated by about five firms that account for the majority of the country's metal production including Hindustan Aluminium Company (HINDALCO), National Aluminium Company (NALCO), Bharat Aluminium Company (BALCO), MALCO and INDAL. HINDALCO: Hindalco is the largest firm in the Indian aluminium industry holding more than 39% of market share. This is a flagship unit of the Aditya Birla Group with its aluminium plant located at Renukoot in Uttar Pradesh. The firm manufactures a number of aluminium products making up a market share of 42% in the primary aluminium segment, 20% in extrusions and 63% in rolled products, while 31% of the products are in the wheels and 44% in foils segments.

Sterlite Industries is one another giant in the arena comprising two wings namely BALCO and MALCO. BALCO is a partly integrated firm, MALCO is a completely integrated producer of aluminium. Sterlite company holds a market share of about 32%.

NALCO is yet another leading producer of the aluminium metal in India. Government of India has purchased a stake of about 87.15% in this firm. NALCO's aluminium refinery unit is situated at Damanjodi. In addition, the firm also has a smelter unit at Angul, Orissa. At present, NALCO is focussed on a capex project aimed at increasing the volume of its production from 345,000 tonnes to 460,000 tonnes.

The list of aluminium companies in India includes Hindalco, Hindustan Zinc, Jindal Stainless, Kennametal, India, Nalco, Malco, Ratnamani Metals, Sujana Metal Products, Balco and Indal.

In the past, the growth of alumina and aluminium industries was in the range of 2 to 3% per annum. However, the growth rate may remain minimal in developed countries like US, Canada, Europe and Japan. But its

growth is bound to be reasonably high in developing economies such as BRIC countries (Brazil, Russia, India and China) and Middle East.

5. Strategic Models used for better analysing of indian aluminium industry

In order to analyse the Indian Aluminium Industry in a better way, two most important and common models are used which are given below:

5.1. SWOT analysis of the Indian Aluminum Industry

Indian Aluminium Industry inspite of being an important sector in Indian economy, it is exposed to certain challenges and opportunities. In order to get the depth insights of the sector, an important strategic analytical tool, SWOT analysis is used which is shown below,

5.1.1. Strengths:

- Abundant resources of aluminum ore
- Low cost and efficient labour force
- Strong Managerial capability
- Strongly globalised industry and emerging global competitiveness
- Modern new plants & modernized old plants.

5.1.2. Weakness:

- High cost of energy
- Higher duties and taxes
- Labour laws
- Dependence on imports for aluminum manufacturing equipments & technology.

5.1.3. Opportunity:

- Rapid Urbanization
- Increasing demand for consumer durables
- Untapped rural demand
- Increasing interest of foreign aluminum producers in India
- Globalization

5.1.4. Threats:

- Market fluctuations and China's export possibilities
- Global economic slowdown
- Governance issues.
- Environmental concerns.

5.2 Michael Porter's Five Forces Model

As described by Michael Porter, like other industry, Indian Aluminium Industry is also influenced by five forces which are explained by this model below:

5.2.1. Bargaining Power of Suppliers

Most domestic players operate integrated plants. Bargaining power is limited in case of power purchase, as Government is the only supplier. However, increasing usage of captive power plants (CPP) will help to rationalize power costs to a certain extent in the long term.

5.2.2. Bargaining Power of customers

Being a commodity, customers enjoy relatively high bargaining power as prices are determined on demand and supply.

5.2.3. Threat of Competition

Competition is primarily on quality and price, as being a commodity, differentiation is difficult. However, the recent spate of consolidation has reduced the competitive pressure in the industry. Further, increasing value addition to aluminium products has helped some companies protect themselves from the high volatilities witnessed in this industry.

5.2.4. Barriers to entry

Large economies of scale. Consequently, high capital costs, time to set up, scarcity of Power, Government factors, land problems, geographical factors etc are some of the barriers to entry.

5.2.5. Threat of Substitute Products

Aluminium is comparatively more cheaper, lighter and durable as compared to other metals. Demand for aluminium is estimated to grow at 6%-8%, per annum in view of the low per capita income consumption in India. Also the demand for the metal is expected to pick up as the scenario improves for user industries, like power, infrastructure and transportation. But copper can replace aluminium in electrical applications; magnesium, titanium and steel can substitute for aluminium in structural and ground transportation uses. Composite wood and steel can substitute for aluminium in construction. Glass, plastics, papers and steel can substitute for aluminium in packaging.

6. The Future and prospects of Aluminium Industry in India

In CY11, global aluminium demand has recovered back to almost 39 m tonnes, an improvement of almost 13% over 2009. Chinese demand is expected to rise by almost 18% after a relatively modest increase in CY09. US demand is expected to recover sharply while Europe is expected to recover slowly. In India, the demand is expected to increase at almost 14% with an improvement in industrial activity and automobile growth. Over the medium term, thrust on power sector spending will spur the aluminium demand.

Aluminium production is expected to increase in line with the demand. The market surplus is going to continue for a while. With unprecedented demand destruction towards the later part of FY09, prices of aluminium had declined by over 50% in less than 4 months. The recovery has also been strong. As a result, many smelters that had curtailed production are again back in action. In addition, some new smelters are on the verge of delivering.

The per capita consumption of aluminium metal at developed countries is estimated at about 20 to 30 kg. In most countries, the bauxite reserve has got almost depleted. The scenario in India is just the opposite. While the per capita consumption of the metal is only 1.3kg, the country has a huge reserve of good quality bauxite reserve. In addition, several factors including high GDP growth rate, skilled employees, highly encouraging Government policy and the favourable trade relations of the nation with a number of developed and developing countries will ensure a bright future for the aluminium industry in the country.

A study of the aluminium industry in India today reveals that most refineries will be commissioned in the subcontinent around 2020. The scenario existing suggests that India is the right place following Vietnam where aluminium industry can hope to see a bright future. All these factors indicate that there is a highly promising future for the aluminium industry in the country further stimulated by the huge global market potential that will give a thrust to the industry. Aluminium inventories across the globe are near all time high.

But most of these inventories are reportedly bound in financing deals and are not expected to flood the market. The long term fundamentals are strong and the surplus is expected to reduce significantly in the near future.

7. Conclusion

In Aluminium Industry, demand is enormous, consumers are wealthy, profitability is evident: it seems a lot of companies should be rushing to enter the aluminium sector, yet the situation is not as simple as it may seem. Only those who can establish and manage the full production cycle (from the extraction of raw materials, the production of alumina and the reduction of aluminium) in a highly efficient way can become leaders in the aluminium industry. Finally the rising price for substitute metals, such as zinc and copper stimulate a direct increase of demand for aluminium in the power, transportation and construction sectors in particular. India being one of the main producers and consumers, analysts believe that Indian will play an important role in the global aluminium industry in the years to come. Aluminium has been used for just over 150 years, yet it has already gone from being purely decorative, used by jewellers alone to being a material which allows to travel faster, live more comfortably, use all the advantages of progress and study the worlds around us.

India is world's fifth largest aluminium producer with an aluminium production competence of around 2.7 million tones, accounting almost 5 % of the total aluminium production in the world. India is also a huge reservoir of Bauxite with a Bauxite reserve of 3 billion tones. India saw a significant growth in aluminium production in the past five years. Due to the growing demand from the construction, electrical, automobiles and packaging industry, the production of aluminium also hiked up. Whosoever has the resources, rules the world and India as the potential of becoming a ruler in the years to come.

8. Challenges faced by the Indian Aluminium Industry

A long term decline in the real price of Aluminium will erode margins of the firms manufacturing primary aluminium. The industry will face the pressure to improve return on investment. The technology has to be improved further to extract the metal from the ore. The industry will have intense competition from other materials such as steel and plastics which are the substitutes to aluminium. As the global environment is becoming eco-friendly, the industry has the pressure to reduce the greenhouse gases emissions and PFC from the production process. The industry needs to increase the energy efficiency in the aluminium production process. They have to reduce the consumption of electricity consumed in producing aluminium. The demand of the aluminium is growing exponentially from the various sectors specially the automobile industry and construction industry. They have to respond appropriately according to the changing demands of global customers.

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Table 1 Major Aluminium producing countries and expected production throughout the world

Countries	Production in '000 t			
	2008	% of total	2014	% of total
China	13,695	34	21,481	43
Russia	4,191	10	3,712	7
Canada	3,124	8	756	2
USA	2,658	7	1,754	3
Australia	1,978	5	1,727	3
Brazil	1,661	4	1,684	3
Norway	1,383	3	1,195	2
India	1,348	3	3,958	8

Dubai	899	2	1026	2
Others	9,194	23	13,042	26
Total	40,131	100	50,335	100

Table 2 The production of aluminium by primary aluminium producers in the years 2008-09 to 2010-11 (upto December, 2010)

Production of aluminium in India (in Tonnes)			
Name of Company	Aluminium Production		
	2008-09	2009-10	2010-11 (upto Dec, 2010), Provisional**
NALCO	3,61,262	4,31,488	3,32,195
HINDALCO	5,23,453	5,55,404	3,99,253
MALCO	23,224#	-----	-----
BALCO@	3,56,781	2,68,425	1,92,383
VAL	82,031	2,69,083	2,76,013
Total	13,46,751	15,24,751	11,99,844

#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.
 ** Compiled on the basis of information provided by primary aluminium producers to the Ministry of Mines, India

Table 3 Major Aluminium Consuming Countries and expected Consumption throughout the world

Countries	Production in '000 t			
	2008	% of total	2014	% of total
China	12,604	34	22,088	44
USA	5,147	14	5,505	11
Japan	2,319	6	2,259	4
Germany	1,929	5	2,054	4

Middle East	1,459	4	2,030	4
India	1,089	3	3,800	8
Italt	951	3	869	2
South Korea	937	3	1297	3
Brazil	933	3	1,198	2
Others	10,051	24	9,551	19
Total	37,419	100	50,651	100

Table 4 The sales figures of aluminium during the years 2008-09 to 2010-11 (upto December, 2010)

Sales Figures of Aluminum in India (in Tonnes)			
Items	2008-09	2009-10	2010-11 (upto December, 2010) Provisional
Domestic sales	9,52,958	11,58,964	9,51,829
Export sales	3,81,870	3,72,801	2,24,657
Total sales	13,34,828	15,31,765	11,76,48

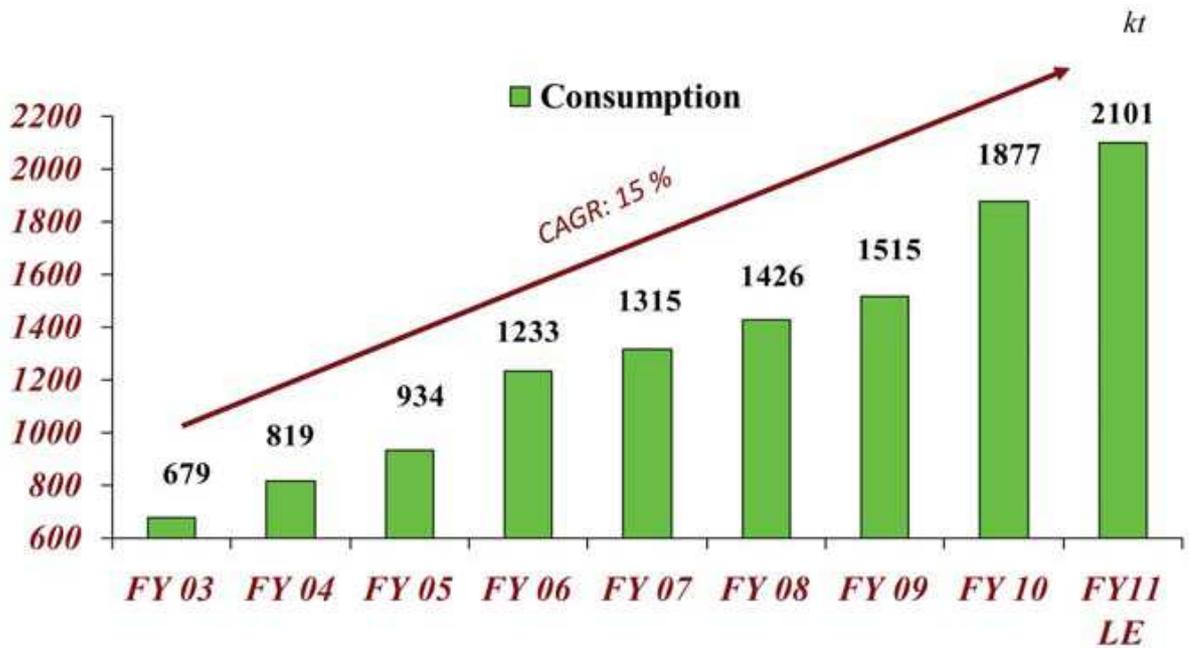


Figure 1 Indian Aluminium Market Growth

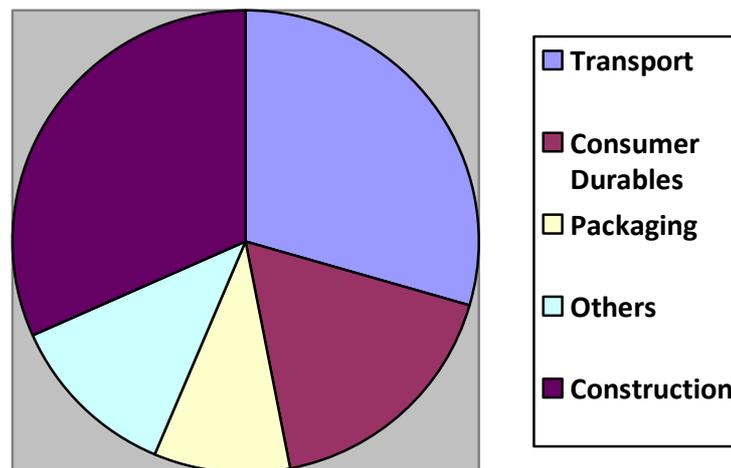


Figure 2 Aluminium: Segment-wise consumption in India

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