

Aluminium Industry

1. Profile of the Aluminium industry

The Aluminium industry is highly concentrated, with just five plants accounting for the entire production capacity of 7,02,000 tonnes per annum. The capacity and production figures for these producers are given below:

Company	Capacity (lac tonne)	Production (lac tonne)	Capacity utilisation (%)
BALCO	1.00	0.96	96
HINDALCO	2.42	2.49	103
INDAL	1.17	0.44	37.18
MALCO	0.25	0.02	0.06
NALCO	2.18	2.13	97.56
Total	7.02	6.03	85.92

* figures pertaining to the year 1999-2000

The per capita consumption of aluminium in India is only 0.5 kg as against 25 kg. in USA, 19 kg. in Japan and 10 kg. in Europe. Even the World's average per capita consumption is about 10 times of that in India. One reason of low consumption in the country could be that consumption pattern of aluminium in India is vastly different from that of developed countries. The demand of aluminium is expected to grow by about 9 percent per annum from present consumption levels. This sector is going through a consolidation phase and existing producers are in the process of enhancing their production capacity so that a demand supply gap expected in future is bridged. However, India is a net exporter of alumina and aluminium metal at present.

In order to develop a guidelines for energy management policy for the plants comprising the aluminium industry, it was decided to undertake a questionnaire survey that was followed up by plant visits.

Salient features of Indian Aluminium Industry

- Highly concentrated industry with only five primary plants in the country
- Controlled by two private groups and one public sector unit
- Bayer-Hall-Heroult technology used by all producers
- Electricity, coal and furnace oil are primary energy inputs
- All 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 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
- Two plants have declared formal energy policy
- Each plant has an Energy Management Cell
- Achievements in energy conservation are highlighted in the Annual Report of the company
- Energy targets are based on best energy figures achieved in their sector / region and by the plant itself in the past
- Generally, government policies were rated as conducive to energy management
- 'Task Force' formed by BEE in this sector to work as catalyst in promoting energy efficiency
- High cost of technology is the main barrier in achieving high energy efficiency

2. Quantitative details:

2.1 Raw material and product type:

Bauxite and calcined petroleum coke are primary raw materials for this industry. However, alumina is raw materials for smelters and aluminium metal is raw material for fabrication units.

2.2 Fuel Usage:

Coal, Furnace oil and electricity are primary energy inputs in aluminium production. Coal is primarily used to generate steam, which is used in the process while fuel oil is mainly used in Calcination of alumina and various furnaces in fabrication plants. Electricity is the major energy input in aluminium production and is considered to be prime factor in determining economics of aluminium production. Hence, all primary metal producers have installed their own captive power plants to supply cheaper and uninterrupted power for their use. Majority of electricity consumed in this industry is supplied by their captive power plants.

2.3 Technology Status:

Invented over 100 years ago, Bayer-Hall-Heroult is the only available commercial technology, even today, for the production of aluminium. Alumina is the basic raw material for the production of aluminium metal through electrolytic process. The production of alumina obtained from bauxite, a mineral containing upto 60% in the form of mono/tribhydrate is carried out through the Bayer route, which is an extractive hydro-metallurgical process.

Reference:

Energy Management Policy – Guidelines for Energy Intensive Industry of India,
Chapter 3, pp 13-36 by Bureau of Energy Efficiency