

ALUMINIUM & ALUMINA



Indian Minerals Yearbook 2021 (Part- II :Metals and Alloys)

60th Edition

ALUMINIUM AND ALUMINA

(ADVANCE RELEASE)

**GOVERNMENT OF INDIA
MINISTRY OF MINES
INDIAN BUREAU OF MINES**

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1 Aluminium and Alumina

Aluminium Industry in India is strategically well-placed and is one of the largest producers 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 Indian Aluminium Industry 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 in 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.

The overall total annual installed capacity of aluminium plants in the country has increased to 41.65 lakh tonnes from 41 lakh tonnes in previous year. The production of aluminium comes from the plants viz, NALCO, HINDALCO, BALCO, & VEDANTA whereas the MALCO plant remained non-operational during the year 2020-21. Producer-wise capacity of aluminium is furnished in Table-1.

The installed capacity of alumina plants in the country was 75.60 lakh tpy. However, the operational capacity was 72.75 lakh tpy and plant capacity of 2.85 lakh tpy remained non-operational. Producer-wise capacity of alumina is furnished in Table-2.

PRODUCTION

Aluminium

The production of aluminium at 3,619 thousand tonnes in 2020-21 registered an decrease of 0.50% as compared to that in the previous year. Seven plants reported production of aluminium during the year (Tables - 3 & 4).

Table – 1: Installed Capacity of Aluminium, 2020-21 (By Producers)

		(In '000 tonnes)
Producer	Plant	Annual capacity
Total		4165
Public Sector		
National Aluminium Co. Ltd	Angul (Odisha)	460
Private Sector		
Bharat Aluminium Co. Ltd	Korba (CG) - I 245	570
	Korba (CG)- II 325	
Hindalco Industries Ltd	Aditya (Odisha)-	1345
	Hirakud (Odisha)-	
	Mahan (M.P) -	
	Renukoot(U.P) -	
Madras Aluminium Co. Ltd	Mettur (Tamil Nadu)	40 [#]
Vedanta Aluminium Ltd	Jharsuguda-I (Odisha) -	1750
	Jharsuguda-II (Odisha) -	

*Source: Information received from the companies/Annual Reports.
MALCO has closed its smelter since December, 2008.*

Table – 2: Installed Capacity of Alumina, 2020-21 (By Producers)

		(In '000 tonnes)
Producer	Plant	Annual capacity
Total		7560
Public Sector		
National Aluminium Co. Ltd	Damanjodi (Odisha)	2275
Private Sector		
Bharat Aluminium Co. Ltd	Korba (Chhattisgarh)	200 [#]
Hindalco Industries Ltd	Renukoot -	3000
	(Uttar Pradesh)	
	Belagavi -	
	(Karnataka)	
	Muri -	450
	(Jharkhand)	
	Utkal Alumina -	1500
	(Odisha)	
Madras Aluminium Co. Ltd	Mettur (Tamil Nadu)	85 [#]
Vedanta Aluminium Co. Ltd	Lanjigarh (Odisha)	2000

Source: Information received from the companies/Annual Reports.

Plants remained non-operational during the year.

ALUMINIUM & ALUMINA

**Table – 3: Production of Aluminium
2019-20 to 2020-21**

(Quantity in tonnes; Value in ₹ '000)

Year	Production	
	Quantity	Value
2018-19	3696181	528227924
2019-20	3635089	455960160
2020-21 (P)	3619237	415967702

**Table – 4: Production of Aluminium
2019-20 and 2020-21
(By Plants)**

(In tonnes)

Producer	Plant	Production	
		2019-20	2020-21 (P)
National Aluminium Co. Ltd	Angul	408410	418522
Hindalco Industries Ltd	Aditya	365733	355881
	Hirakud	171160	154126
	Mahan	363327	356354
Bharat Aluminium Co. Ltd	Renukoot	413752	362587
	Korba	565112	568496
Vedanta Aluminium Ltd	Jharsuguda	1347595	1403271

Alumina

The production of alumina at 6,520 thousand tonnes in 2020-21 decreased by about 2.24 % as compared to that in the previous year. NALCO continued to be the leading producer of alumina accounting for 33% of the total production during the year under review (Tables-5 & 6).

**Table – 5: Production of Alumina(including
Calcined alumina)
2018-19 to 2020-21**

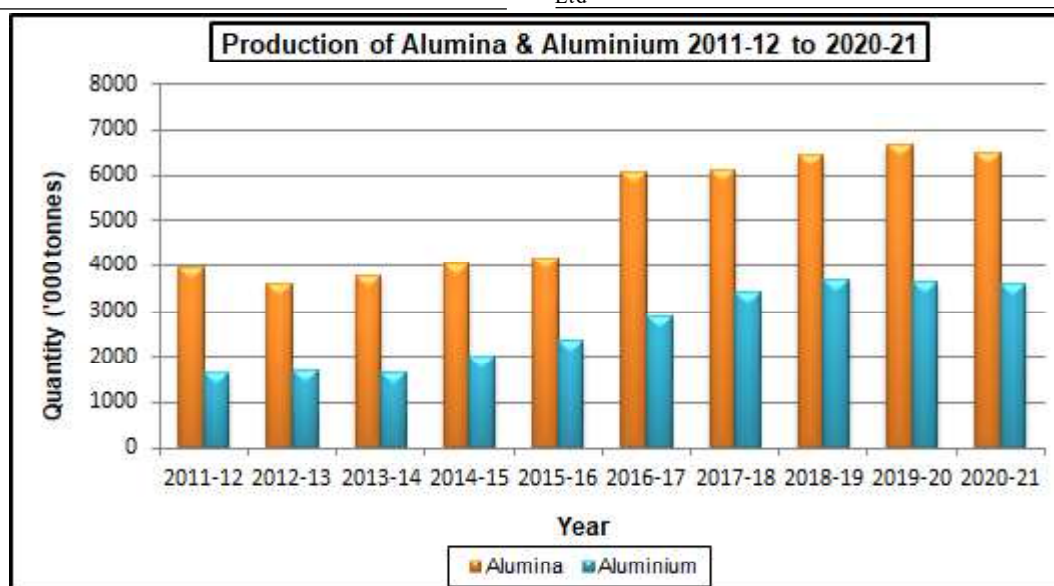
(Quantity in tonnes; Value in ₹'000)

Year	Production	
	Quantity	Value
2018-19	6446370	153674440
2019-20	6670576	130410346
2020-21(P)	6520852	118069838

**Table – 6: Production of Alumina
2019-20 and 2020-21
(By Plants)**

(In tonnes)

Producer	Plant	Production	
		2019-20	2020-21 (P)
National Aluminium Co. Ltd	Damanjodi	2103500	2202220
Hindalco Industries Ltd	Belagavi	285600	253000
	Muri	87663	222126
	Renukoot	690611	511831
Vedanta Aluminium Ltd	Lanjigarh	1810702	1688665



INDUSTRY

Aluminium is the fastest growing non-ferrous metal in India and the same is evident by its growing and widespread use. Most of the Aluminium Smelter are located near their respective alumina refineries. Ten aluminium smelters are operated by four companies viz. NALCO, BALCO, HINDALCO & VEDANTA. NALCO is the only company in the Public Sector with installed capacity of 4,60,000 tpy. BALCO, earlier a Public Sector company, is now under Private Sector. The aluminium plants of NALCO and BALCO have their alumina-aluminium complexes at Damanjodi-Angul (Odisha) and Korba (Chhattisgarh), respectively.

NALCO is one of the largest integrated Bauxite-Alumina-Aluminium- Power Complex in the country. The Company has 4,60,000 tpy, Aluminium Smelter at Angul and 22,75,000 tpy Alumina Refinery located at Damanjodi in Koraput, Odisha.

Hindalco Aluminium smelting operations are located at Renukoot (Uttar Pradesh), Aditya Aluminium (Odisha), Mahan Aluminium (Madhya Pradesh) and Hirakud (Odisha). Newly installed smelters at Aditya Aluminium and Mahan Aluminium have state-of-the-art AP36 technology. The Hindalco's total primary aluminium (metal) capacity has enhanced to around 13,45,000 tpy from earlier capacity of 5,62,000 tpy. This increase was primarily on account of production from Mahan and Aditya smelter commissioned during the year 2014-15. In addition to aluminium, Renukoot Integrated Aluminium Complex also produces semi-fabricated products viz. conductor redraw rods, sheet, extrusion, etc. The Alupuram (Kerala) smelter is closed but extrusion unit currently operates at a capacity of 8,000 tpy.

Hindalco's plants are equipped with sophisticated rolling mills and finishing equipment. The plants are located at Hirakud (Odisha), Belur (West Bengal), Mouda (Maharashtra), Renukoot (Uttar Pradesh) & Taloja (Maharashtra). Hindalco's finished products include, alumina, primary aluminium in the form of ingots, billets & wire rods, value-added products, such as, rolled products, extrusion and foils. Hindalco is the largest manufacturer of entire range of Flat Rolled Products. Flat Rolled Products facilities at Hirakud (Odisha) and Mouda (Maharashtra) are being modernised to

produce world class Can Body stock and Ultra Thin Gauge Foils, respectively. The Hirakud plant produces Flat Rolled Products (FRP), rolled products, extrusions products and wire rods. Hindalco has a conductor redraw capacity of 56,400 tpy at Renukoot plant and sheet rolling capacity of 2,05,000 tpy spread over at Renukoot (80,000 tpy), Belur (45,000 tpy), Taloja (50,000 tpy) and Mouda (30,000 tpy) plants. The Company also has two plants for aluminium extrusion with capacity of 31,000 tpy comprising units at Renukoot with 23,000 tpy capacity and Alupuram (Kerala) with 8,000 tpy capacity.

Hindalco's foil unit located at Silvasa (Dadra & Nagar Haveli) has an installed capacity of 30,000 tpy and produces foils with thickness varying from 9 microns to 200 microns. Kollur plant in Medak district (Andhra Pradesh) has capacity of 4,000 tpy and produces an array of high-quality foils, from cigarette and blister foil to lidding foil in thicknesses from 50 to 7 microns.

The overall BALCO's smelter capacity augmented to 5,70,000 tpy with the commissioning of Korba-II smelter with 3,25,000 tpy capacity, has capabilities to produce ingots, wire-rods billets, bushbars and rolled products. The Korba-I plant with 2,45,000 tpy capacity showed consistent production during the year. The Company has two power plants for commercial power generation of which one produces power for captive consumption, refining, smelting, fabrication, etc. and the other 1,200 MW power plant is under construction. The ramp up of BALCO-II smelter was completed during the year 2018.

With the ramping up of the Jharsuguda-II smelter with capacity of 1.25 million tpy, the total smelter capacity of Vedanta in Odisha, has been enhanced to 1.75 million from 50,000 tpy capacity. MALCO is under care and maintenance by Vedanta since May, 2017. It generates 100 MW power from 4 units of 25 MW each through power plants located at Mettur (Tamil Nadu), and is one of the largest Private Sector power suppliers in Tamil Nadu.

Jindal Aluminium Ltd (JAL) established its factory for manufacture of aluminium extrusion in the year 1968 at Bengaluru. JAL has 11 aluminium extrusion presses with an installed capacity of 1,20,000 tpy. The Company is the leader in aluminium

ALUMINIUM & ALUMINA

extrusions, meeting country's about 30% demand. JAL has taken a step forward by diversifying into Aluminium rolled products. Jindal commissioned the state-of-the-art Aluminium sheet and foil manufacturing facility with installed capacity of

40,000 tpy, at Dabaspet, Bengaluru, 35 km from the existing extrusion plant. The information on installed capacity of Aluminium semis by different plants is furnished in Table-7.

Table – 7: Capacity for Aluminium Semis

Producer/product	Annual installed capacity
HINDALCO INDUSTRIES LTD	
Rolled product	205000
Extruded products	31000
Conductor redraw rods	56400
Aluminium foils	40000
Aluminium wheels (No. of pieces)	-
NALCO	
Aluminium wire rods	100000
Aluminium billets	30000
Aluminium strips (smelter)	26000
Aluminium strips (RPU)	52000
Rolled products	45000
MALCO	
Rolled products	12000
Properzi rods	36000
Bus bars-Aluminium wire rods	32850
BALCO	
Extruded products	8000
Rolled products	72500
Properzi rods	111500
Foil product	600
Conductors	1200
Aluminium wire rods	43200
JINDAL ALUMINIUM LTD	
Aluminium Extruded products	128000
Foil product	40000

Source: Information received from individual plants/Annual Reports.

DEVELOPMENT & EXPANSION

National Aluminium Company Limited (NALCO): NALCO is in the process of setting up of 5th Stream expansion of its existing Alumina Refinery which would reportedly add 10.0 lakh tonnes to its existing installed capacity of 22.75 lakh tonnes per year (total capacity 32.75 lakh tonnes). This expansion would be based on improved Medium Pressure Digestion technology of M/s Rio Tinto Alcan International Limited (RTAIL).

Sourcing of bauxite for 5th Stream expansion of alumina refinery has been envisaged from Pottangi Bauxite Mines. The availability of bauxite from Pottangi Mines is expected beyond the scheduled commissioning of 5th Stream expansion. Hence, sourcing of bauxite from South Block of Panchpatmali Mines has been planned through setting up of a crushing & conveying system.

The Pottangi Bauxite mine (75 million tonnes) has been reserved by Government of India in favour

of NALCO for meeting the bauxite requirement of 1 million tonnes alumina refinery under expansion. The mining plan has already been approved. The pre-project activities are underways. The mine is likely to be operational in the 4th quarter of financial year 2023-24.

Mining Lease of Utkal-D coal block has been granted by the Govt of Odisha over an area of 301.28 Ha and the lease is executed on 25.03.2021 thereafter Utkal coal block will be operationalised after obtaining of statutory clearances.

NALCO a JV Company Mishra Dhatu Nigam Ltd (MIDHANI) named Utkarsha Aluminium Dhatu Nigam Ltd (UADNL) in August 2019 for establishment of 60,000 TPA for setting up of High End Aluminium Alloy Plant in JV mode for Defence, Aerospace & Automobile Sectors. The plant is expected to be commissioned by financial year 2024-25. The Company has formed JV with Neelachal Ispat Nigam Ltd (NINL) to set up a Coal Tar Distillation plant of 20,000 TPA based on the Coal Tar generated in NINL's Coke Oven Plant.

NALCO and Odisha Industrial Infrastructure Development Corporation (IDCO) have formed a JV Company for establishment of Angul Aluminium Park Pvt. Ltd (AAPPL) for promotion of downstream industries in the State of Odisha. The project is expected to be completed by financial year 2021-22.

HINDALCO : In the field of aluminium, Hindalco operates in primary aluminium and downstream aluminium segments and is one of the world's largest integrated aluminium producer. Hindalco's subsidiary Novalis with 61% recycling capability, is the largest aluminium recycler and producer of rolled aluminium products in the world. Hindalco launched India's first indigenous lightweight and eco-friendly aluminium bulker in India. This bulker saves up to 13,000 litres of fuel, generates 20 tonnes lower GHGs and is BS-VI compliant.

Hindalco is planning to expand its Aluminium downstream business with a focus on Value added product over the next 3-7 years. Products would cater to customised requirement for varied and complex applications of Aluminium. We plan to invest around ₹ 8,000-10,000 crore in expanding flat rolling capacity at Hirakud, new extrusion plant at Silvassa and in a greenfield site at Mundra with a recycling facility. The Hirakud plant capacity for flat rolled products is estimated to be 340 KTPA. The planned capacity of

the extrusion plant at Silvassa is 34 KTPA, which would have three extrusion presses to service premium customers in building and construction, automobile and transport, electrical, consumer and industrial good sectors. In addition, the new extrusion and recycling unit at Mundra is awaiting land acquisition process and would have a capacity of 93 KTPA.

VEDANTA : Vedanta Aluminium Ltd (VAL) is the largest aluminium producer in India with a capacity of 1.75 million tonnes per annum. The aluminium smelting unit at Jharsuguda has come a long way to establish itself as the world's largest single-location smelter. With an already installed capacity of 1.75 mtpa, backed by two smelters – 0.5 million tonnes per annum and 1.25 million tonnes per annum (SEZ) and two power plants with a combined capacity of 3,615 MW, it is over 1.3 million tonnes per annum. could be achieved further by scaling up to the production capability of the smelter and the refinery has been significantly enhanced in the last few years. With the ramp up of both smelters, production of aluminium has increased during the last couple of years. Similarly, production of Alumina has also increased due to debottlenecking of the refinery operations. The bauxite requirements for alumina refinery are met from captive mines, domestic source and imports.

BALCO operates through its plant at Korba in Chhattisgarh with a smelter capacity of 0.57 million tonnes per annum and power generation capacity of 2,010 MW. The state-of-the-art alumina refinery at Lanjigarh feeds the aluminium smelters at Jharsuguda and BALCO and forms a crucial link in the value chain. It is one of the world's largest one-site integrated alumina refining complexes with a current capacity of 2 million tonnes per annum that can be ramped up to 5 million tonnes per annum.

USES

Aluminium is more environment-friendly than steel, plastic and other materials. The metal that made flying possible, is sustainable, light and energy efficient. Aluminium has widespread uses throughout the economy and is equally important to both the industrial and consumer sectors. Aluminium is used in the Aerospace Industry as well as other industries requiring light metal. On the industrial side, aluminium is heavily used in electrical power transmission, machinery & equipment and construction. Aluminium

usage in automobiles is rising and is expected to increase internationally. India's auto sector consumes about 4% aluminium. Over the past five years considerable progress has been made in aluminium-intensive vehicle production.

Housing, in particular, make heavy use of the lightweight material as a substitute for steel and wood in doors, windows and sidings. Aluminium is also used in a variety of retail products including cans, packaging, air conditioners, furniture and automobile. In addition, India has pioneered the replacement of copper by aluminium in power transmission & distribution which has enhanced the demand for aluminium. There are nearly 600 cable and conductor manufacturing units in the country, having a total capacity of about 4,00,000 tpy. The major end-use of aluminium is as rolled sheets, extrusions and foils. India Foils, Pennar Aluminium and Century Extrusions are the major players in the extrusion & foil market.

CONSUMPTION

Key sectors to drive aluminium consumption in India are Auto, Power, Electronics, Railways, Aerospace & Defence Construction, Solar Energy and Aluminium packaging.

China was the largest producer as well as consumer during the year, contributing about 57% share of the world production (36.15 million tonnes) and 55% of the world consumption (35.71 million tonnes) of aluminium. The world excluding China is expected to see aluminium consumption growth of around 1% in the year 2019 from around 2% in the year 2018 due to likely moderation in demand from North America and Europe.

In India, the power, packaging, transport, construction, machinery and equipment sectors are key demand drivers of aluminium. The domestic imports of aluminium products, including scrap, are growing significantly, which is a major concern for the domestic aluminium producers. In advanced economies, aluminium is increasingly replacing wood and steel in Building Sector. Aluminium cans and containers are used extensively, world over. Aluminium is also the ideal packaging material for pharmaceuticals and processed foods.

In India, aluminium was consumed mainly in the Electrical sector (48%), followed by Automobile & Transport sector (15%), Construction (13%), Consumer Durables (7%), Machinery & Equipment

(7%), Packaging (4%) and others (6%). In the Electrical sector, aluminium usage is in overhead conductor, and power cable used in generation, transmission and distribution of electricity. Aluminium is also used in switchboards, coil windings, capacitors, etc.

As per Technology Vision Document 2035, the per capita consumption of aluminium in India is among the lowest in the world with only 2.2 kg as compared to the world average of roughly 8 kg and with that of the developed nations which is 22-25 kg.

Alumina is produced from bauxite. About one tonne of alumina is produced from 3 to 3.5 tonnes of bauxite and about one tonne of aluminium is produced from about two tonnes of alumina.

RESEARCH & DEVELOPMENT

The Hindalco's Research & Development (R&D) activities are focused on providing innovative, cost-effective and sustainable solutions to support consistent growth of business. The R&D activities include process, product and application development, to develop short-term as well as long-term solutions to the issues faced by Non-ferrous sector, such as, raw material quality, new product development, cost-effective management of waste generated during processing, recovery of values from by-products as well as any waste products, developing better understanding of the science of processes, reducing the specific energy consumption & carbon footprint etc.

Hindalco operates three Hindalco Innovation Centres (HIC) (i) HIC–Alumina at Belagavi, Karnataka, undertakes specialised works on R&D of bauxite ore, alumina refining and specialty alumina, hydrate products as well as waste management; (ii) HIC–SemiFab located at Taloja, near Mumbai, Maharashtra, handles projects in the areas of tribology, metallurgy related to aluminium fabricated products and new applications and modelling; (iii) Innovation Centre at HIC–Copper at Birla Copper, Dahej, has its focus on maximisation of copper recovery as well as recovery of various metal values, such as, selenium, tellurium, nickel, bismuth etc. from the effluent generated in the plant.

The R&D activities undertaken at Hindalco during the year include (i) Developing a superior

Aluminium – Jute packaging material by combing aluminium foil with jute. Aluminium foils are impervious to moisture, bacteria and gases while jute is an environment-friendly natural material with elastic properties. (ii) Aluminium foil for Li-ion batteries–Hindalco developed aluminium foils which can be used for the packaging of Lithium-ion (Li-ion) batteries. These foils are approved by the Indian Space Research Organisation (ISRO) and the Automobile Research Association of India (ARAI). These foils are expected to reduce the use of plastic in the manufacturing of Li-ion batteries and increase battery life.

NALCO is exploring to set up world class, state-of-the-Art research and development centre in the field of bauxite, alumina, aluminium, downstream products, power, waste utilisation and in other allied areas. Some of the in-house R&D activities carried out by NALCO include R & D trial for Development of APz×No technology in smelter plant for DC energy reduction in electrolysis process successfully completed in 30.01.2021 against MoU 2020-21.

The five ongoing Research & Development projects sponsored by Ministry of Mines (SSAG) at JNARDDC, Nagpur, are as follows (i) Nano Processing of Industrial Rejects for use as additives in Mixdesigns for improved pozzolanic reaction efficiency with VNIT (ii) Fabrication of Advanced Ceramic Nano-coatings for Automotive Applications with Christ University (iii) Techno-economic Survey of Aluminium Scrap Recycling in India with MRAI (Metal Recycling Association of India) (iv) To study the fire retardancy of nano-ATH in polymers with CIPET (Central Institute of Plastics & Engineering Technology) (v) Bench-scale study on extraction of pure Silica and smelter grade Aluminium Fluoride from Coal Fly Ash (CFA)– S&T (Mines).

RECYCLING

Aluminium is 100% recyclable and consumes 95% less and releases 95% less greenhouse gases as compared to primary aluminium and there is no loss of properties or quality during the recycling process. Products of aluminium, such as, UBC (Used Beverages Can), aluminium foils, plates and automotive components can be easily recycled, thereby, saving energy and reducing greenhouse emissions. Aluminium recycling process is less capital

intensive than primary metal production as the process requires only 5% of energy, i.e., 13–15 thousand units of power for producing one tonne of aluminium through primary route. Recycling of aluminium saves about 6 kg of bauxite/kg and 14 kWh of electrical energy /kg of primary aluminium. Besides, it keeps the emission levels of greenhouse gases as low as 5% from the actual emission experienced during primary production. Further, recycling facilitates reduced stress on the use of bauxite and thereby preserving about six lakh tonnes of bauxite resources every year.

India's metal recycling rate is about 25%. Altogether the rise in aluminium production from old scrap has grown from one million tonnes in 1980 to 20 million tonnes in 2019. All the activity related to aluminium scrap recovery are limited to the Unorganised sectors, catering mostly to the utensil and casting industries. The proportion of recycled aluminium has been increasing over the years. It is expected that in the years to come, it will reach a figure of about 35–40% of total aluminium consumption. Currently, there is only one recycling unit of Hindalco in the Organised Sector at Talaja with 25,000 tonnes annual capacity. Although the plant at Talaja was facing challenges due to less availability of scrap, the production from the unit has improved and the plant is now operating at 80% of the rated capacity as against earlier capacity of 60%. Hindalco is planning to set up greenfield recycling unit at mundra with a capacity of 93 KTPA.

Most recycling units in India operate on outdated, or primitive technology which leads to high levels of pollution and energy consumption. This is an area that needs to be addressed by the Indian Aluminium Industry. Due recognition of recycling could encourage users of aluminium particularly in transport, housing, packaging and durable sectors to broaden the organised markets for the scrap generated.

WORLD REVIEW

World production of alumina was 134 million tonnes in 2020. China continued to be the leading producer with a share of about 55% which is followed by Australia (15%), Brazil (8%), India (5%) and Russia (2%) & Jamaica (1% each). World production of aluminium was at 65.40 million tonnes in 2020. China continued to be the leading producer with a share of

about 57% which is followed by Russia, (6%) Canada (45%) and India (6%) & UAE (4%) (Tables-8 & 9).

To provide a generalised view of the development in various countries, the countrywise description source from latest available publication of Minerals Yearbook 'USGS-2018' is furnished below:

Australia

Production of aluminium shoused a marginal decline in Australia in 2019 compared with that in 2017. The increase was attributed to the restart of capacity in 2017 at the Portland, Victoria, smelter; production increased by 46% compared with that in 2017. On January 19, 2017, capacity that was shut down after a power failure on 1st, December 2016, was restarted at the 3,85,000-t/yr smelter. By mid-October 2017, the smelter was producing at 85% of its capacity, the same rate as before the shutdown. The smelter was a joint venture of Alcoa of Australia Ltd (55%), CITIC Nominees Pty. Ltd (22.5%), and Marubeni Aluminium Australia Pty. Ltd (22.5%). Alcoa of Australia was owned by Alcoa (60%) and Alumina Ltd (40%).

Bahrain

Aluminium Bahrain B.S.C. (Alba) continued construction on a sixth potline that would have a capacity of 5,40,000 t/yr when completed in 2019. The project also included an expansion of Alba's captive powerplant. Production from some pots started in December, and full ramp-up of the new capacity was scheduled for 2020. The project would increase the smelter's capacity to 1.5 million metric tons per year from 9,60,000 t/yr.

Brazil

Primary aluminium production decreased by 18% as compared with that in 2017. In April, Norsk Hydro temporarily shut down 2,30,000 t/yr of capacity at the 4,60,000-t/yr Albras aluminium smelter in Barcarena, citing a shortage of alumina. In March, Norsk Hydro temporarily shut down one half of the capacity at the adjacent 6.3-Mt/yr Alunorte alumina refinery, citing high water levels in the red mud impoundment after heavy rainfall. The Albras smelter, a joint venture between Norsk Hydro (51%) and

Nippon Amazon Aluminium Co. Ltd (49%), would return to full production once the Alunorte refinery resumed full production.

In July, the Government extended the elimination of a 6% tariff on unwrought primary aluminium imports through the end of June 2019. A quota of 2,82,500 t of unwrought primary aluminium would be permitted to be imported without payment of the tariff. Since 2014, the Government has eliminated the 6% tariff on imported aluminium for a limited amount of metal during a specific time, citing the shutdown of smelting capacity caused by high power prices. The most recent quota was for 1,73,000 t of primary aluminium imports from July 1, 2017, through 30th June 2018. The elimination of the tariff caused prices in Brazil to decrease even though the capacity at the Albras smelter was shut down in April.

Novelis was planning to expand the secondary smelting and rolling capacity in Pindamonhangaba. Smelting capacity would increase to 4,50,000 t/yr from 3,90,000 t/yr, and rolling capacity would increase to 6,80,000 t/yr from 580,000 t/yr. The mill produced beverage can sheet and other aluminium packaging products from UBCs and other scrap. The project was scheduled to start in February 2019 and was scheduled for completion in 2021.

China

Primary aluminium production in 2018 was 35.8 Mt, 11% more than the 32.3 Mt in 2017. Aluminium production increased from an average rate of 98,200 metric tons per day (t/d) in the first quarter of the year to 1,02,000 t/d for the remainder of the year. Smelters in 31 cities, mainly in the eastern and central Provinces, shut down 30% of their capacity from 15th November, 2017, until 15th March, 2018. The Government cited winter pollution control efforts for ordering the shutdown of capacity at primary aluminium smelters, alumina refineries and powerplants. When the restrictions on production expired, some of the capacity affected by the policy was restarted. At the end of the year, the Government instituted a similar production cut from 5th October, 2018, to 31st March, 2019, to reduce pollution during the winter. The policy required aluminium smelters

ALUMINIUM & ALUMINA

and alumina refineries to close 30% of their capacity and carbon anode plants to close 50% of their capacity. The policy applied to facilities in 26 cities. In order to contain smelter capacity, the Government had implemented a capacity replacement quota system in recent years. To expand capacity, companies were required to purchase capacity replacement quotas from companies that had shut down older, inefficient capacity. In the last quarter of the year, decreasing aluminium prices and increasing production costs were cited for capacity shutdown at several smelters throughout China. An estimated 3.2 Mt/yr of capacity was shutdown during the year for economic reasons.

Import restriction were cited for aluminum scrap imports declining by 28% as compared with those of the prior year. Scrap availability from domestic sources enough that secondary smelters did not need to import scrap, and imports were expected to decline in future years. China was considering a complete ban on imports of solid waste, including aluminium scrap, by 2021. Environmental concerns and goals to advance the domestic recycling industry were cited for the proposed ban on scrap imports.

Oman

Production increased by 50% compared with that in 2017 because capacity at the 3,75,000-t/yr Sohar smelter was restarted after a power failure on 4th August, 2017, resulted in a shutdown. Production was restarted in mid-September 2017, and the ram-pup was completed by April 2018. The Sohar smelter was a joint venture among Oman Oil Co. S.a.O.C. (40%), Abu Dhabi National Energy Co. PJSC (40%) and Rio Tinto (20%).

United Arab Emirates

Aluminum production increased slightly compared with that in 2017 because new capacity completed in 2016 was ramped-up. Emirates Global Aluminium PJSC completed a modernisation and expansion project at the Jebel Ali smelter in October 2017.

The project replaced 520 smelting pots in two potlines with pots that were more energy efficient

and produced fewer emissions of perfluorocarbons. Capacity of the smelter increased by 58,000 tpy.

Table – 8: World Production of Alumina (By Principal Countries)

(In '000 tonnes of Al ₂ O ₃ content)			
Country	2018	2019	2020
World: Total	1310000006	131200000	134700000
(rounded off)			
Australia	20061795	20239198	20836304
China	73607591	71474166	73131900
Brazil	8258000	9170800	10185000
India* ^(d)	6446370	6706500	6624500
Russia	2763000	2755000	2873000
UAE	0	1100000	1920000
Ireland	1818065	1860970	1822368
Saudi Arabia	1774000	1798340	1782041
Ukraine	1715000	1690000	1725000
Jamaica	2483572	2172977	1620943
Other countries	12074943	12271847	12149742

Source: BGS World Mineral Production, 2016-2020.

(d) Years ended 31st March following that stated

** During 2018-19, 2019-20 and 2020-21 India's production of alumina was 6,446, 6,670 and 6,520 thousand tonnes, respectively.*

FOREIGN TRADE

Exports

Export of alumina decreased marginally by 5% to 1,265 thousand tonnes in 2020-21 from 1,330 thousand tonnes in the previous year. Exports were mainly to UAE (56%), Malaysia (5%), China (5%) and Egypt (5%).

Export of aluminium and alloys including scrap increased by 15% to 2,735 thousand tonnes from 2,371 thousand tonnes. Exports in 2020-21 were mainly to Malaysia (24%), Republic of Korea (22%), USA (6%), Taiwan (5%) and Japan (Tables-10 to 12).

ALUMINIUM & ALUMINA

**Table – 9: World Production of Aluminium (Primary)
(By Principal Countries)**

(In '000 tonnes)

Country	2018	2019	2020
World: Total (rounded off)	64100000	62900000	65400000
China	36447290	35043604	37080400
Russia	3627000	3637000	3638000
India* ^(d)	3696181	3635089	3619237
Canada	2923204	2853771	3154493
UAE	2640000	2600000	2520000
Australia	1574240	1569591	1585017
Bahrain	1011101	1365005	1548000
Norway	1295000	1312000	1330000
USA	898652	1126032	1026617
Argentina	437771	438200	309800
Other countries	9588255	9338829	9557603

Source: BGS World Mineral Production, 2016-2020.

(e) Years ended 31 March following that stated. # estimated

* During 2018-19, 2019-20 and 2020-21 India's production of aluminium was 3,696, 3,635 and 3,619 thousand tonnes, respectively.

**Table – 10: Exports of Alumina
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	1330038	30900409	1265941	28280781
UAE	677614	15051302	706087	15048867
Oman	205	10849	183711	3891344
China	186328	4072835	69353	1658847
Qatar	32	23904	61208	1284659
Malaysia	214503	4578599	61330	1203104
Egypt	122738	2675711	61683	1182271
Taiwan	23151	976638	23266	921583
U K	515	28146	30935	734852
Netherlands	1	57	30640	717926
Korea	15021	629038	14037	564754
Other countries	89930	2853330	23691	1072574

Figures rounded off

ALUMINIUM & ALUMINA

**Table – 11: Exports of Aluminium and Alloys Incl. Scrap
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	2371062	361046684	2735588	427759670
Malaysia	686137	90572778	666017	90880481
Korea	495519	65253020	603703	79903721
USA	243638	45108317	160795	37510442
China	36780	4327045	219829	29862598
Taiwan	74517	9967245	123356	16079407
Singapore	30775	4136217	126652	16052945
Mexico	63110	9103078	77356	12689868
Bangladesh	41186	8268419	48564	11256437
Brazil	61579	8548411	72708	10976999
Greece	9337	1300372	66598	9596608
Other countries	628484	114461782	569983	112950164

*Figures rounded off***Table – 12: Exports of Aluminium
(By Items)**

Item	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All items	2371062	361046684	2735588	427759670
Aluminium & Alloys : Unwrought	1961096	258975274	2324305	317093138
Aluminium Alloys Unwrought	289387	39904467	240867	36269198
Aluminium Ingots	1663948	217981548	2081831	280582856
Aluminium Unwrought Nes	7761	1089259	1607	241084
Aluminium & Alloys : Worked	212073	40300783	231811	45462208
Aluminium & Alloys :Worked (Bars, Rods, Plates)	121923	20021980	164374	28138974
Aluminium & Alloys :Worked (Bars, Rods, Profiles)	73783	16972515	47824	13330801
Aluminium Worked (Bars, Rods, Profiles etc.)	16367	3306288	19613	3992433
Aluminium & Alloys, Worked, Nes	188045	60229981	170757	63784997
Aluminium & Scrap	6108	655929	5428	598217
Aluminium Powders & Flakes	3740	884721	3287	821110

Figures rounded off

ALUMINIUM & ALUMINA

Imports

Import of alumina increased drastically by 27% to 2334 thousand tonnes in 2020-21 from 1,844 thousand tonnes in the previous year. Imports were mainly from Australia (57%), Vietnam (16%), Indonesia (21%), China (3%) and Netherlands (1%).

Imports of aluminium & alloys including scrap also decreased considerably like alumina by 4% to 2,060 thousand tonnes in 2020-21 from 2,152 thousand tonnes in the previous year. The imports were mainly from USA(16%), China (11%), Malaysia (6%), UAE (9%), UK (7%), Saudi Arabia (6%), Australia (4%) and Republic of Korea (2%) (Tables- 13 to 15).

**Table – 13: Imports of Alumina
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	1844483	49829384	2334786	57491719
Australia	854941	19241870	1323262	30057614
Indonesia	338352	22811269	490792	10803369
Vietnam	489849	8928324	378634	8817322
China	53408	12585192	62128	3706946
Netherlands	33338	3221286	19710	972577
Germany	7268	1859525	5686	752942
U S A	3976	859060	3418	531390
Canada	2678	703558	3630	441073
France	10991	318780	8266	419867
Baharain	5051	125935	28092	302334
Other countries	44631	1440442	11168	686285

Figures rounded off

**Table – 14: Imports of Aluminium Alloys Incl. Scrap
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	2152419	310945506	2060227	299126164
China	310132	67591927	228165	54307692
USA	334240	36470103	332610	36918693
U A E	156532	20499485	181587	25032890
Malaysia	178836	25776840	127515	19415186
UK	161092	18437476	147742	16647921
Saudi Arabia	115095	13509704	128621	16357314
Korea	73870	14482612	51085	11663612
Thailand	45390	9318099	40730	8824410
Germany	34833	7525113	50571	8730862
Australia	83211	9237109	77001	8605834
Other countries	659188	88097038	694600	92621750

Figures rounded off

ALUMINIUM & ALUMINA

**Table – 15: Imports of Aluminium
(By Items)**

Item	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All items	2152419	310945506	2060227	299126164
Aluminium & Alloys:Unwrought	264667	37128024	265121	39500561
Aluminium Alloys Unwrought	38262	5847389	36521	5567424
Aluminium Ingots	223678	30671776	224566	33335909
Aluminium Unwrought Nes	4527	608859	4034	597228
Aluminium & Alloys:Worked	452255	95531395	369440	83394272
Aluminium & Alloys:Worked (Bars,Rods,Plates)	150383	30722227	134777	29387734
Aluminium & Alloys:Worked (Bars,Rods,Profiles)	232566	51178614	191905	45018990
Aluminium Worked(Bars,Rods,Profiles Etc)	72306	13630554	42758	8987548
Aluminium &Alloys,Worked,Nes	78624	37346586	52537	27206116
Aluminium & Scrap	1347920	140090406	1369546	148399920
Aluminium Powders & Flakes	4153	849095	3583	625295

Figures rounded off

hub and a major contributor to the Nation's GDP.

FUTURE OUTLOOK

Aluminium plays a meaningful role when usages of aluminium are concerned as it labelled the Salt of the new earth. As per the industry sources, the primary aluminium demand in India is expected to reach 6 million tonnes by 2025, which is equivalent to 4.1 kg per capita aluminium consumption. The per capita aluminium consumption in India during 2020-21 is around 2.7 kg which is much below the global average of 11 kg. Thus, Indian market offers a huge potential for demand growth of Aluminium Industry. To reach the global average of 11 kg per capita, India will require an additional annual consumption of 16 million tonnes, and if achieved India would become the second largest consumer in the world.

Aluminium contributes to nearly 2% of manufacturing GDP and with projected consumption growth, the share (% of manufacturing GDP) may go higher. It is envisaged to expand the aluminium capacity from 4 MTPA to 12 MTPA by 2030. India is saving fuel to become a major global low-cost aluminium production

Aluminium consumption is most likely to increase as a result of Government's key flagship programmes like Make in India, National Capital Goods Policy, Development of 100 smart cities and Government's commitment to reach a 100 GW solar capacity by 2022 from 20 GW today. The Governments thrust in reinforcing the Power Sector, which a dominant consumer of aluminium in India, augers well for Aluminium Industry.

Aluminium has forward linkages with key sectors like aviation, defence, auto, electricity, construction, packaging, machinery, marine etc. and backward linkages with mining, chemical, power, machinery etc. By speeding up investment in sectors with high backward and forward multipliers, the industrialisation process can be speeded up which would in turn enable accelerating economic growth. The cumulative demand for aluminium is set to rise by several hundred thousand tonnes by 2030.