



# Minerals & Metals Review

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Vedanta, Propelling India  
ahead with Aluminium –  
the Metal of the Future



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# Vedanta leading India towards a sustainable future

**T**here is a little bit of metal in all our lives. The world runs on the power of metals to build and hold structures, making them indispensable for modern civilization. The metal that has, over a short span of time, emerged as a critical raw material for supporting almost all manufacturing across sectors is aluminium, the 'green metal of the future'. Growth of critical industry sectors like aerospace, infrastructure, defence, automotive, transportation, rural & urban electrification, building and construction, renewable energy, etc. will organically drive its demand and help it grow it multi-fold over the next few years.

High strength to weight ratio, corrosion resistance, supreme formability, and infinite recyclability of the metal, coupled with the fact that bauxite (aluminium ore) mining is sustainable and eco-friendly, have given aluminium the 'green metal' moniker. Aluminium is a sector of strategic importance for the country and an essential

*"2021 will see global supply chains getting reworked, providing India a great opportunity to become a global leader in non-ferrous metals like aluminium. The metals sector is also fundamental to the revival of the Indian manufacturing ecosystem, realization of the dream of an Aatmanirbhar Bharat and positioning India as an alternative global manufacturing destination.*



*Vedanta Aluminium is determined to work in close collaboration with its technology partners, consultants and customers to lead a globally competitive aluminium industry into the post-pandemic world."*

**Rahul Sharma**

Dy. CEO - Aluminium Business, Vedanta Ltd

commodity due to its usage in diversified application. India has abundant raw material

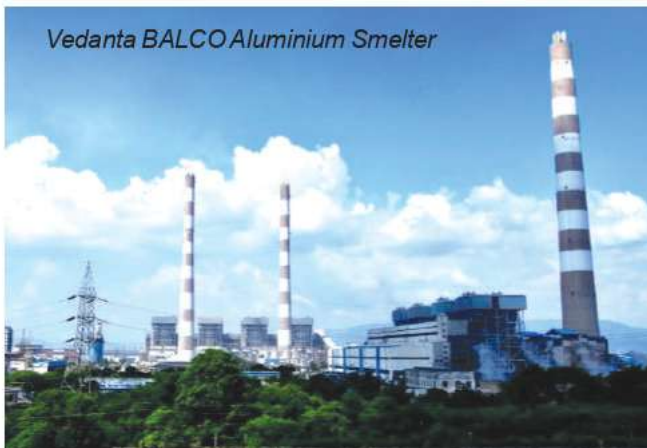
### MMR Bureau

availability - bauxite and coal (for power) for aluminium production, along with

availability of labour, water resources, logistics infrastructure and a strategic geographical location, and possess immense potential to become a global aluminium hub. The Indian domestic aluminium industry has to play a crucial role for achieving country's vision to become a USD 5 trillion economy and an economic powerhouse for the world. India has significant mineral ore reserves, sufficient primary capacity and downstream processing capacity, all of which provide a solid base for scaling up and leveraging our natural resources. Having a strategic geographical location, the country has immense potential to become a global aluminium

Vedanta Lanjigarh Alumina Refinery





hub, with the potential to double the metal's exports to the tune of \$10 billion in forex earnings in the near future. Because of this, aluminium has also been identified amongst the Champion Sectors by the government.

**Rahul Sharma, Dy. CEO – Aluminium Business, Vedanta Ltd.**, in conversation with **Paresh Parmar** sheds light on the present status of primary aluminium production in India and shares his vision on taking the industry to a numero uno position globally.

### World-class assets and a strong value-chain

As the country looks to become a global manufacturing hub, Vedanta's Aluminium Business is leading the way with its world-class assets, which include an alumina refinery in Odisha, aluminium smelters in Odisha and Chhattisgarh. Vedanta Aluminium is India's largest producer of aluminium producing 1.9 million tonne per annum (MTPA), which is more than half of the country's primary aluminium production, commanding 40% of the domestic market share and more than 2% of the global market share. The aluminium value chain is supported by integrated power generation capacity of more than 5400 MW, spread across three locations. With the ever-increasing

demand for aluminium, the company's mammoth production capacity, expertise in the metal, engineering and technological prowess is going to consolidate Vedanta's leadership in fueling the country's self-reliance in all things aluminium.

Vedanta is a premiere producer of metallurgical grade alumina. Its world-class 2 MTPA capacity alumina refinery and associated 90MW captive power plant in Lanjigarh, Kalahandi (Odisha), occupies a key position in the business' value-chain. This highly efficient refinery that feeds Vedanta's Aluminium smelters at Jharsuguda and BALCO, is recognized for having the lowest greenhouse gas (GHG) emissions by any such thermal power fueled refinery in the world. The plant is widely hailed as having transformed one of the most impoverished regions of the country to bring it into the socio-economic mainstream of the state of Odisha.

Vedanta's 3000+ acre large aluminium and power operation at Jharsuguda has 1.6 MTPA aluminium smelting capacity supported by 3615 MW thermal power generation facility. Vedanta Ltd., Jharsuguda is the only Indian company in the global '1 million tonne' production and export club. With two smelters and two power plants, it is the world's largest single-location

aluminium smelter, outside of China.

Hailed as an iconic producer of aluminium in India, BALCO (Bharat Aluminium Company Limited), owned 49% by the Government of India and 51% by Vedanta Limited, was conceived as a temple of modern India. This 0.57 MTPA aluminium smelter in Korba, Chhattisgarh is widely acclaimed as one of India's greatest disinvestment and privatization success stories. The company has seen an approximate growth of roughly 6 times since the government divested a 51% stake. From 100 KTPA (kilo tonne per annum) in FY01 to 345 KTPA in FY05 to a whopping 575 KTPA in FY20, the company has unlocked world-class operational efficiencies to clock this quantum growth.

"With its world-class smelters and power plants, Vedanta is fulfilling its mission of spurring emerging multi-sector applications of aluminium by marrying sustainable and efficient manufacturing with best of breed technology. Towards realization of the national vision of an 'Aatmanirbhar Bharat', Vedanta Aluminium aims to become the country's partner in progress, propelling it towards its destiny of a USD 5 trillion economy," says Rahul Sharma, Dy CEO – Aluminium Business, Vedanta Ltd.



### Charting strategic transformation through global partnerships

Vedanta believes in working with the best technology providers to bring in global excellence and best practices, and this strategy is at the core of its manufacturing excellence. Vedanta's Jharsuguda complex is the first in India and third in the world to deploy GE's Digital Smelter Solution, a cutting-edge technology which uses digital twin technology, predictive and prescriptive analytics to enhance energy efficiency, reduce raw material consumption and arrest wastage of material through remote advisory system. Similarly, the company has accelerated adoption of smart analytics and intuitive solutions across the width of its operations, fast transitioning its plants to become future-ready.

It has also implemented OSIsoft's PI (Process Information) System at the Jharsuguda plant, which is a one-of-a-kind application of industrial IoT solutions that is expected to deliver greater operational improvements and breakthroughs by using machine learning and predictive analytics to boost operational efficiency and productivity. The PI system is expected to provide plant managers, executives, and engineers with

greater visibility through real-time data management while effectively reducing the expense and time taken for data collection and analysis.

Speaking on smart manufacturing Avijit Deb, Chief Digital Officer, adds, "When one thinks industry 4.0, a manufacturing set-up like an aluminium smelter is not the first thing to come to mind. In our commitment to the growth of our customers and country, we are on a mission to improve our productivity, optimize resource usage and develop solutions perfectly tailored to the needs of the market. As a digital-first company, Vedanta Aluminium is on the leading edge of the technology curve, leveraging smart manufacturing to become leaner, more agile, and resilient, in a fast-evolving marketplace."

### Technology and R&D Excellence for Competitive Edge

Well on course to becoming the world's lowest cost, most sustainable and fully integrated aluminium producer, Vedanta has zeroed in on its focus to expand its Value-Added Product portfolio and cater to emerging needs of the market. Today, the company already offers a diverse portfolio of high-quality value-added aluminium products in the form of billets, Primary Foundry Alloy

(PFA), wire rods, slab, and others. Vedanta Aluminium is the largest producer of wire rods globally and India's leading exporter of billets to developed markets like the US and Europe. The company has partnered with globally reputed technology providers for its state-of-the-art casting lines. All of its products undergo rigorous quality assurance and compliance checks at par with global standards to ensure that customers' access to products of the highest quality.

"Vedanta's value additions are helping the domestic industry sectors cut down on imports. During FY2020, 33% of the company's total sales were to the Indian markets, specifically for electrical, construction and transportation industries; of which 68% of domestic sales were for value-added products. In our mission to convert our entire product portfolio to 100% value-added products, we have already crossed the 50% threshold" says, GG Pal, Chief Operating Officer (Metal) at the Jharsuguda Plant.

In fact, the company's recent value additions like Primary Foundry Alloys (PFA) for the automotive industry and AlSi3 ingot for the steel industry have helped to curb unnecessary import dependency of Indian industries to boost the country's self-reliance.

Vedanta has instituted a Centre of Excellence with the aim of inventing the next big thing in aluminium to create a competitive edge for the company. The Centre sees the culmination of ideas from key verticals like Research & Development, Technical, Operations and Marketing. Vedanta Spark, a start-up incubator, has also been created to foster ideation and accelerate our adoption of emerging technologies. The response to the incubator has been extremely encouraging and the company is already working with over 20 start-ups on various business solutions for the industry.



Potline Operations

The efforts of relentless in-house R&D team have allowed Vedanta to continually explore newer applications of aluminium by focusing on application-based development. Some of its recent developments include special wire-rod variants customized for usage along coastal belts for the electrical market, crash-resistant alloys for electric vehicles, and high-performance billets for boosting productivity of extrusion industry.

Clint David Mclachlan, Chief Technical Officer for the business said, "Innovation and excellence are the hallmarks of Vedanta's exceptional performance culture. Our vision for Vedanta is to not only develop business applications, revenue models and new products, but truly invent indigenous technologies ourselves which are perfectly customized to our assets and processes. This vision resulted in the formation of Vedanta Aluminium's Technical Cell, where the innovation departments of all business units joined hands with Business Excellence (BE) and R&D teams to focus on business improvement projects, sustainability, and value addition to the company. R&D

turns money into knowledge, innovation creates business from this knowledge and BE helps sustain the business with improved operational and process efficiency."

Vedanta Aluminium's prudent outlook of the manufacturing process saw it build end-to-end digital Logistics Control Towers for the business using classical Machine Learning and install a digital 'war room' that scrutinizes the health of potline operations to intercept failures or breakdowns. Automation and robotic technologies have been extensively used across plant operations to unlock greater speed and efficiency while safeguarding employees and business partners. All these measures have gone a long way in enabling Vedanta Aluminium to reduce commodity costs, check pilferages and process inefficiencies, impacting toplines and enabling paperless operations through complete automation.

### Building the future with a young & vibrant workforce

One of Vedanta Aluminium's unique features is its young and dynamic workforce. In fact, it is probably the only aluminium operation in the world where

young professionals with an average age of 29 run mammoth smelters and power plants, a feat synonymous with the country's potential as the home to young workforce with skillsets to compete at the global scale.

High in this vibrant workforce is the presence of women professionals, hailing from some of the country's finest institutions, who make up 13% of the company's workforces. Vedanta has implemented HR policies aimed at providing women professionals a holistic and encouraging work environment to deliver their best. Today, the company is one of the most preferred equal opportunity employers for women professionals in the Indian manufacturing sector. Our people practices, from hire to retire, lean on digital heavily, for talent management and for creating our robust internal leadership pipeline.

### Sustainability imperatives for a better tomorrow

The litmus test of sustainability of operations is based on performance around ESG, Health, Safety, Environment and Community Welfare. 'Zero Harm, Zero Waste and Zero Discharge' are the underlying principles that govern every action and business decision across all Business Units. With this ethos, Vedanta delivers sustainable and responsible growth that nurtures communities and ecosystems side by side.

A forerunner in the domain of energy efficiency and energy conservation, the Jharsuguda plant was the first in Asia to receive ISO 50001 certificate for Energy Management System. BALCO achieved lowest specific power consumption in potlines in 2020, setting a benchmark in India. Initiatives to enhance operational excellence have resulted in reduction of thermal

and electrical specific energy by 20% and 24% respectively, and overall specific energy consumption by 22% over the last five years at the Lanjigarh alumina refinery.

Vedanta's Aluminium Business, which is incidentally a very energy intensive operation, has made strong strides towards reducing its carbon footprint and adopting renewable sources of energy. The business has reduced its indirect energy consumption by 8 million Giga Joules between FY19 and FY20. A highlight in this journey has been the reduction of GHG intensity of the Aluminium Business by 20%, against Vedanta's commitment to reduce the GHG intensity by 16% by 2020 from a 2012 baseline. Its Bodai-Daldali bauxite mine ranked 6th globally by Responsible Mining Index 2020 for phenomenal sustainability practices. Recently, the Vedanta Group was ranked amongst the world's top 15 metals and mining companies by the Dow Jones Sustainability Index 2020, which has bolstered the company's resolve to raise the bar even further.

### Propelling India ahead with the 'Metal of the Future'

As India steams ahead to become a global manufacturing powerhouse, Vedanta is poised

### Vedanta Aluminium Business

- India's largest producer of aluminium and value-added aluminium products with 2.2 MTPA installed smelting capacity
- A leader in the manufacture of value-added aluminium products used across core industries like Automotive, Transportation, Electricity Distribution, Building & Construction, etc.
- Manufactures vast portfolio of high-quality products such as Billets, Primary Foundry Alloy (PFA), Wire Rods, Slabs, Flat Rolled Products, Flip Coils, Ingots, etc.
- Operates one of the world's largest aluminium smelters which has a capacity of 1.6 MTPA, and single-handedly producing 37% of India's aluminium
- Its Jharsuguda plant is the only Indian smelter in the global '1 Million Tonne' production and export club
- Vedanta's aluminium brands are listed on the London Metal Exchange (LME)

to meet domestic and global demands across a diverse range of sectors from automotive to building and construction to electricals to defence, while also catering to the paradigm shift in global consciousness towards a greener & more sustainable future. In India, alone, Vedanta has been responsible for fostering an entire ecosystem of MSME suppliers and customers and has provided them with a massive boost through innovative channel financing solutions from Fintech start-ups and ecommerce platforms.

With government's support and policy intervention, the development of the aluminium industry will create a thrust for other sectors as well. The recent mining reforms will bring more bauxite and coal mines for auction and ensure sufficient raw material security to boost domestic aluminium production. Along with this, further policy intervention entail cost competitiveness vis-à-vis global players by rationalizing power cost, reducing coal cess, RPO, electricity duty etc., correction of inverted duty structure and reduction in custom duty on critical raw materials for aluminium industry value chain, and check on increasing imports with adequate tariff and non-tariff barriers and BIS standards. All these measures will go a long way for made in India aluminium, bridging the competitive gap it faces with respect to other major global aluminium producers, and establishing the dominance of Indian aluminium industry on the world map.

