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Rahul Sharma
CEO - Aluminium Business, Vedanta Ltd.



Vedanta Aluminium, Accelerating India's Journey Towards a Low Carbon Future



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Commitments to Net Zero and Sustainable Development Goals by countries and organizations gather significant momentum around the world, propelled by the need to create climate-resilient business models. This has had a direct bearing on global demand and supply equations across numerous sectors – energy and storage solutions, electric mobility, renewable energy, low carbon or green products, green buildings and sustainable packaging being some of them.

According to a World Bank report on the green energy revolution, aluminium is the only metal that will find application in all potential clean power technologies, paving the road to net zero. Clearly, the transition to a net zero economy will be metal-intensive, with sustainable metals like aluminium ubiquitous to the global transition to a low-carbon future. Vedanta Aluminium, one of the world's top aluminium producers and India's largest producer of aluminium, is poised to accelerate this journey.

Aluminium, the Green Metal for a Sustainable Future

A strategic metal crucial for any country's socio-economic development, aluminium has shown maximum promise amongst all metals, growing nearly 20x in the last sixty years (compared to 6-7x for other metals). It is the largest non-ferrous metals industry in the world today. Aluminium has unique properties like high strength-to-weight ratio, exceptional design flexibility, 100% recyclability, high electrical and thermal conductivity, and excellent corrosion resistance, which have made it the metal of choice for diverse applications in critical industries like aerospace, defence, aviation, automobile, infrastructure, electrical, consumer durables and packaging as well as sunrise sectors like renewable energy, electric vehicles, and more. This is why the global aluminium industry is the fastest growing metal industry, and its demand is expected to increase from 86 million tonnes in 2020 to 120 million tonnes by 2030.



Vedanta Aluminium's Smelter at Jharsuguda (Odisha)

Aluminium to Partner India's Economic Development

Closer home, aluminium will be pivotal to the success of all major government initiatives, such as 100 Smart Cities, 500 AMRUT cities, 24X7 Power for All, 100% Rural Electrification, the Indigenous Space Programme, 100 GW Solar Power capacity and other ambitious programs. India's aluminium demand is expected to double to approx. 8 million tonnes by 2032, driven by building & construction, transportation, packaging, electrical, and fast-emerging sunrise sectors like renewable energy, electric vehicles, defence and aerospace. And hence, Vedanta Aluminium is investing in capacity expansion, R&D, innovation, cutting-edge digital solutions and value-added products and services to cater to this growing demand with top-of-the-line aluminium products.

Aluminium consumption in India, currently at 2.7 kg per capita, is much below the global average of 12 kg per capita. Aluminium consumption of countries has risen with GDP growth and industrialization. The aluminium industry is a very capital-intensive sector with huge investments needed for setting up new plants and adding extended production capacity. For example, adding a 1 MTPA aluminium production capacity requires an investment of about USD 7 billion. The aluminium industry thus has a high multiplier effect leading

to development of downstream SMEs and industrial clusters like aluminium parks, thereby significantly increasing capital outlay and employment opportunities. Even with the present relatively low per capita consumption, aluminium presently contributes up to 2% of the manufacturing GDP in India, creating more than 10 lakh direct and indirect jobs across the value chain and has developed over 4000 SMEs. As the country's largest producer of aluminium, Vedanta Aluminium has enormous potential to contribute as a wealth creator for the nation's economic growth. With its expansive value-chain, customer and supplier ecosystems, it has created 8 lakh livelihood opportunities and fostered over a thousand MSMEs and many start-ups across the value-chain.

Vedanta Aluminium, Transforming India into the Global Aluminium Destination

Vedanta Aluminium contributes over 50% to India's production, at 2.26 million tonnes in FY22. With the manufacturing excellence of its world-class large-scale assets and talent pool, Vedanta Aluminium produces one of the largest ranges of high-quality aluminium products in the form of Billets, Primary Foundry Alloy (PFA), Wire Rods, Slabs, Ingots, Rolled Products, Flip Coils and many more. It is also the largest producer of Wire Rods globally (ex-China) and India's leading exporter of Billets.



Cast House

In fact, Vedanta Aluminium is India's first producer of low carbon aluminium, branded 'Restora', under which it has unveiled two product lines – Restora (low carbon aluminium) and Restora Ultra (ultra-low carbon aluminium). With Restora, Vedanta Aluminium will address the fast-growing global demand for low carbon aluminium, driven by greater climate consciousness. Restora has a carbon footprint that is almost half the global threshold of 4 tonnes of CO₂ equivalent per tonne of aluminium to be considered 'green' aluminium. Restora Ultra has an even lower carbon footprint, almost near-zero.

“For India to be a manufacturing powerhouse, value-addition and product innovation will play a key role in modernizing the landscape of domestic manufacturing. High quality and high precision production in India will be crucial in propelling the wheels of India's manufacturing prowess. With customer obsession at the heart of everything we do, we see our role as that of a catalyst, giving our customers an edge above the rest. Therefore, we not only offer them the highest quality of products, but a bundle of advantages through 360-degree holistic solutions that support them at various stages of their business aspirations. For instance, we work with them to co-create product solutions through our deep R&D capabilities, ecosystem of technical experts and a Centre of Excellence. In fact, we are on the cusp of launching an online sales solution that brings together all of Vedanta's offerings under one roof, backed by robust CRM, finance and logistics solutions, to provide our customers an unprecedented ease of buying.” – Rahul Sharma, CEO – Vedanta Aluminium

Case in point, Vedanta Aluminium's highly advanced R&D capability have allowed it to produce sophisticated alloys such as Primary Foundry Alloy and Cylinder-Head Alloy for the automotive industry, and AlSi₃ for the steel industry for the very first time in India. Before the company produced them indigenously, these alloys were being entirely imported into India. Vedanta Aluminium has also recently launched High-Speed Billets, a special billet variant with advanced metallurgical properties to significantly boost productivity of extruders.

The company has instituted a Centre of Excellence with the aim of inventing the next big thing in aluminium to create a competitive edge. Through Vedanta Spark, its start-up incubator, it is working with some of India's leading-edge start-ups on various innovations for the industry. The relentless efforts of the in-house R&D team have allowed Vedanta Aluminium to continually explore newer applications of aluminium by focusing on application-based development, such as special wire-rods customized for usage along coastal belts

for the electrical market, crash-resistant alloys for electric vehicles, etc.

Vedanta Aluminium is also developing the world's largest Aluminium Park near its plant at Jharsuguda, which is one of the world's largest aluminium smelters. It will attract hundreds of SMEs in Extrusion, Electrical, Casting, Auto Ancillaries, Packaging, etc. to set up their plants in the park and leverage benefits of liquid metal, water, power, dross processing plant and access to the company's world-class R&D and innovation facilities. By supporting aluminium-based industries in a robust ecosystem for creating cost-competitive aluminium products, Vedanta Aluminium aims to establish India strongly on the global map as the manufacturing capital of the world.

Sustainability is Key

Sustainability is no longer a matter of choice, rather a matter of how fast and how efficiently countries and companies must achieve it. As India's largest aluminium producer, Vedanta Aluminium is determined to grow its business sustainably through responsible utilization of resources, highest efficiency of assets and processes, and a relentless focus on carbon mitigation. Vedanta Aluminium's growth story over the past decade stands testimony to its focus on sustainable development.

“For us, business growth and sustainable development are two sides of the same coin. And hence, we have a laser-focus on conceiving growth plans on the bedrock of Environmental, Social and Governance (ESG) excellence. Testimony to our climate action endeavours, Vedanta Aluminium has reduced its GHG emissions intensity by 21% in the 2012-21 period, while almost tripling its production in the same period. In FY22 alone, our largest aluminium smelter has substantially reduced its carbon footprint by around 12% in FY22 over the previous fiscal, while increasing production by 20%.” – Rahul Sharma, CEO – Vedanta Aluminium



Aluminium Smelter



Aluminium Rolled Products

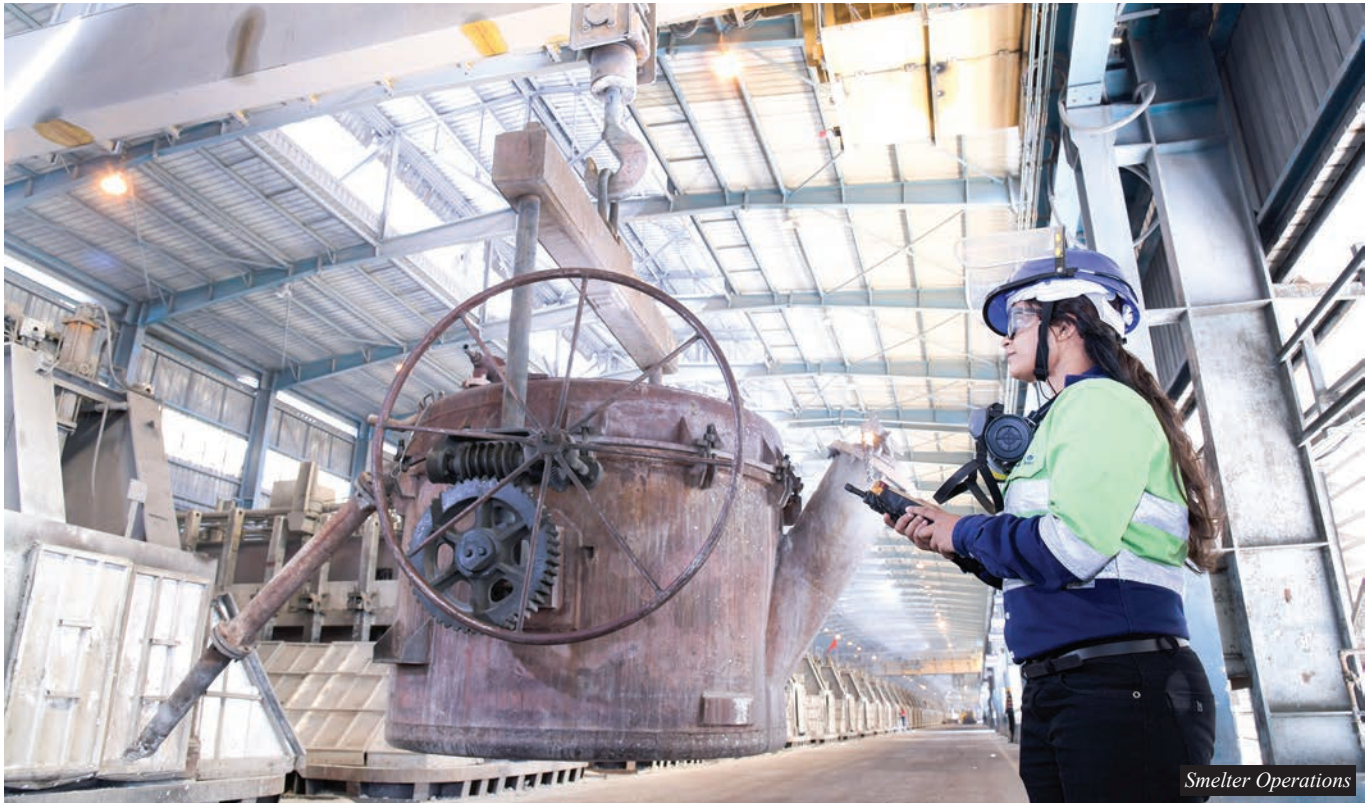
Operational efficiency and energy conservation initiatives have resulted in energy savings of 23 lakh Giga Joules across Vedanta Aluminium's operations in the last fiscal. The company runs some of the most energy-efficient plants in the country. In fact, its subsidiary BALCO continues to be the national benchmark in energy efficiency.

Vedanta Aluminium is also India's largest consumer of renewable energy, at 3 billion units in FY22, and has further signed a Power Delivery Agreement for 380 MW of renewable energy for its aluminium smelters. As a reflection of its sustainable development practices, Vedanta Aluminium ranks 4th in the Dow Jones Sustainability Index (DJSI) 2021 world rankings for aluminium industry.

Alongside ESG, leading-edge technologies, a digital-first approach and global collaboration on emerging technologies to develop new ways of working to accelerate this transition will be crucial for achieving this target. Deep learning algorithms and sophisticated modelling techniques allow Advanced Asset Performance Management at Vedanta Aluminium's smelters and power plants. Digital twin technology for predictive and prescriptive maintenance helps ensure greater efficiency, avoid downtimes and reduce safety risks with minimal or zero human touch. Manufacturing Execution System gives the company visibility of all critical



Primary Foundry Alloys



plant operations, allowing for remote decision-making through mobile applications. These are but a few examples of how Vedanta Aluminium is leveraging leading-edge technology solutions for extracting maximum productivity from its world-class plants.

Debottlenecking the Road Ahead

In its article on the raw material challenge in energy transition, consulting giant McKinsey says that metals and mining companies will be expected to grow faster and more cleanly than ever before. With net-zero commitments outpacing the formation of supply chains, market mechanisms, strengthening of upstream linkages, etc., it is more critical than ever that policy frameworks are designed to ensure that the industry is viable and cost-competitive enough to produce those critical raw materials needed to drive the energy transition. For the Indian Aluminium industry, that means four things:

- First, promotion of aluminium usage in govt. projects should be a priority area. With the aim to make India a USD 5 trillion economy, the govt. is rolling out numerous high-impact projects, which have ample opportunities for aluminium.
- Second, focus should be given to build domestic capability for critical application development for such sectors under Make in India. Aluminium has potential for myriad uses, majority of which are yet to be explored by the domestic downstream sectors.
- Third, the potential of aluminium industry should be acknowledged and recognised as a core sector with a National Aluminium Policy that will encourage, protect, and boost the domestic aluminium industry. Alongside this, the domestic industry should be made globally cost-competitive with rationalization of inverted duty structure on critical raw materials, raw material security, etc.
- And finally, the domestic capability needs to be promoted in these critical sectors (electrical, automobile, building & construction). Besides enhancing domestic capacity and reducing import dependency and subsequently trade deficit, it will also generate huge employment opportunities in India with its rich talent pool, which needs to be capitalized on for realization of the national vision of a USD 5 trillion economy.

With unique advantages like 5th largest bauxite reserves globally, a strategic geographical location, expansive primary and downstream processing capabilities, and the national fervour for self-reliance, India has immense potential to capitalize on its natural advantages. The ongoing evolution of the current global economic order creates prime conditions for India to establish itself strongly as the manufacturing and value-addition destination of the world. All that is needed is a favourable policy structure that makes the Indian Aluminium Industry globally competitive and primed to lead the way in the creation of a sustainable tomorrow. ■