

## Sector

# Mining and Metallurgy Business Review

The Mining and Metallurgy Business Unit (MMBU) at Tata Consulting Engineers continues to anchor itself as a critical enabler of India's industrial growth and global sustainability transition. Drawing upon deep technical expertise and domain knowledge, the business unit delivers cutting-edge engineering solutions across ferrous and non-ferrous sectors. MMBU operates at the intersection of traditional materials engineering and modern innovation, offering capabilities that align with global sustainability initiatives, resource efficiency, and the growing emphasis on a circular economy.

## 2024-25 Performance Highlights

14%

share in total revenue

11%

share in total acquisition

648

workforce on 31st March 2025

5,613

crore worth value engineering for customer

## Industry Trends and Market Outlook

The global mining and metallurgy sector is undergoing a defining transformation, balancing the dual imperatives of driving industrial growth and enabling the energy transition. The sector's future is being shaped by evolving demand patterns, aggressive decarbonisation targets, and rapid technological innovation across the metals value chain.

In the ferrous space, steel continues to anchor infrastructure, construction, and manufacturing industries worldwide. Global steel demand is expected to grow by 1.2 per cent in 2025, with the industry value projected to reach USD 1.8 trillion, and longer-term forecasts point to an expansion to USD 2.3 trillion by 2030 at a compound annual growth rate of over four per cent. The industry is shifting steadily toward lower-carbon production methods, with Electric Arc Furnace (EAF) technology emerging as a preferred route because of its reliance on scrap recycling and its ability to deliver significant emissions reductions.

Simultaneously, hydrogen-based direct reduced iron (DRI) processes are being piloted and scaled up in developed markets, backed by strong ecosystems for renewable energy, hydrogen, and scrap availability. India has emerged as a key growth driver within this global context. Crude steel production reached 143 million tonnes in FY24, growing 12.6 per cent year-on-year. With the government's stated ambition to scale capacity to 300 million tonnes by 2030, the industry is prioritising high-strength low-alloy steel production and innovative fossil-fuel-free steelmaking routes, aligned to its long-term decarbonisation targets.

The non-ferrous sector is equally buoyant, with aluminium and copper continuing to underpin energy transition and industrial expansion. The global non-ferrous metals market is expected to touch USD 1.23 trillion by FY26, driven by strong demand from electric vehicles, renewable energy systems, electronics, and infrastructure development. India's non-ferrous metals industry is projected to grow at nearly six per cent CAGR between 2025 and 2031, supported by government policies that prioritise self-reliance in critical materials and promote recycling and circular economy initiatives. Macroeconomic factors also remain highly influential. Commitments to net zero, the shift to hydrogen-enabled steelmaking, rising electrification of transport and industrial processes, and the growing emphasis on recycled metals are reshaping industry priorities. Policy support in the form of green mandates, sustainability-linked financing, and incentives for clean technologies is accelerating this transformation. For engineering consultants like Tata Consulting Engineers (TCE), these trends create significant opportunities to help design the plants, processes, and solutions that will power a greener and more competitive future for the mining and metallurgy sector.

### Key Areas of Expertise

MMBU at TCE brings integrated engineering expertise across the entire ferrous and non-ferrous spectrum, spanning process development, project engineering, and sustainability-linked solutions.

**In the ferrous space,** the team has developed strong BF-BOF capabilities across all major production routes, including conventional DRI with Electric Arc Furnaces (EAF), DRI with refining, and hydrogen-based DRI technologies. MMBU also supports the production of speciality steels, including electric-grade and defence-grade variants. Our engineering services are designed to improve energy efficiency, reduce emissions, and embed sustainability into both new facilities and retrofitted plants.

**In the non-ferrous space,** In the non-ferrous space, MMBU delivers solutions across the aluminium, copper, zinc, and lead value chains, covering refining, smelting, downstream processing, and material handling. The business has strong expertise in aluminium and copper scrap recycling, enabling clients to adopt greener and more circular production processes.

**In beneficiation,** TCE engineers deliver cutting-edge solutions for low-grade ore processing, optimised recovery, and tailings management. Our designs are benchmarked against the Global Industry Standard on Tailings Management (GISTM 2020) and aligned with global best practices for safety and environmental stewardship, ensuring zero liquid discharge (ZLD).

MMBU has successfully demonstrated simultaneous beneficiation of hematite and magnetite, helping clients maximise resource recovery while minimising environmental impact. A strong sustainability orientation underpins all these services. From designing integrated scrap recycling facilities to creating advanced tailings storage and reuse systems, the unit works to align client operations with evolving regulatory norms, global standards, and broader societal expectations.

### Business Performance and Capabilities

The Mining and Metallurgy Business Unit has demonstrated strong performance and resilience in FY25, building on its established leadership in both ferrous and non-ferrous sectors. On the domestic front, MMBU played a pivotal role in advancing large-scale projects across the aluminium, copper, and steel industries. Roughly 40 per cent of the unit's project acquisitions during the year came from India, focused on downstream expansion, asset optimisation, and greenfield developments.

Internationally, MMBU has broadened its footprint through strategic project wins in Europe, North America, and Asia-Pacific, which together contributed nearly 60 per cent of the total project acquisition value. These global assignments range from designing integrated green steel plants to providing sustainability-linked solutions for international clients. They also demonstrate growing demand for TCE's engineering expertise in delivering hydrogen-ready plants, recycling solutions, and low-carbon metallurgy processes. The business unit's delivery model remains highly flexible, with the capability to operate in both EPCM and Owner's Engineer and Project Consultant (OEPC™) roles, supported by a DEC and onsite-offshore delivery approach. With robust engineering centres, a strong ecosystem of partners, and digital integration across projects, MMBU continues to deliver projects that meet demanding technical requirements and stringent sustainability goals while managing complexity across geographies.

### Key Initiatives

MMBU has pursued several strategic initiatives this year to reinforce its leadership and position the business for future growth.

- **Advancing the Green Transition:** The unit has been at the forefront of designing and engineering large-scale green steel facilities, both in India and internationally. These projects deepen MMBU's technological expertise in hydrogen-based production and reinforce its role as a trusted partner for clients looking to decarbonise operations.

- **Recycling and Circular Economy Leadership:** MMBU has strengthened its position as a pioneer in aluminium and copper recycling, leading engineering projects that cover the entire recycling value chain, from collection and processing to downstream integration. These efforts are setting new benchmarks for circular economy practices in the sector.
- **Strategic International Expansion:** Key project wins in Asia Pacific, Europe and North America have helped the unit expand its global presence. These assignments underline TCE's growing reputation as an international engineering partner capable of delivering solutions that meet the highest standards of technology, sustainability, and governance.
- **Digital and Process Innovation:** The team has embraced digital engineering and simulation tools to enhance design accuracy, streamline project timelines, and improve cost efficiency. By embedding innovation into every stage of delivery, MMBU has enhanced project predictability and client confidence.
- **Capability Building:** Recognising the complexity of metallurgy projects, MMBU has invested in workforce training and knowledge-sharing, ensuring that its engineers are equipped with the latest technical, digital, and sustainability competencies.
- **Integrated Steel Plants, Hydrogen-Based Steel, and Low-Carbon Technologies:** The unit will continue to strengthen its capabilities in hydrogen-based DRI and Electric Arc Furnace technologies, enabling clients to transition to the next phase of low-carbon steel production.
- **Low-Grade Ore Beneficiation and New-Age Metals such as Silicon, Nickel, and Lithium; Scaling Recycling Solutions:** With growing global demand for recycled aluminium, copper, and steel, MMBU is focused on accelerating the design and delivery of integrated recycling and waste-to-resource systems, supporting clients in adopting circular manufacturing practices.
- **International Market Growth:** With demand for sustainable metallurgy solutions rising worldwide, MMBU will expand its reach by building on strategic wins in Europe, North America, Africa, the Middle-East and Asia-Pacific, and leveraging partnerships to enter new markets.
- **Strategic Collaborations:** The business will continue to strengthen partnerships with technology providers, global EPCs, research institutions, and industry alliances to remain at the cutting edge of emerging technologies and bring innovative solutions to clients.

Through these priorities, MMBU is well positioned to deliver on TCE's promise of Engineering Excellence, Enabling Growth, helping clients meet sustainability goals, adopt future-ready technologies, and create long-term value for industries and communities alike.

### Future Priorities

Looking ahead, MMBU is committed to driving sustainable growth by combining engineering expertise with innovation and foresight.

*“Mining and metallurgy are evolving at an unprecedented pace, driven by the demand for green steel, circular economy practices, and sustainable resource use. At TCE, we are applying engineering excellence to help reimagine this sector, from designing low-carbon processes to enabling recycling ecosystems and advancing digital innovation. By aligning with global sustainability goals, we are enabling growth that is both responsible and transformative.”*



**Biswajit Bhattacharyya**  
Business Head - MMBU



## Projects 2024-25

Brownfield Expansion Project for an Integrated Steel Plant



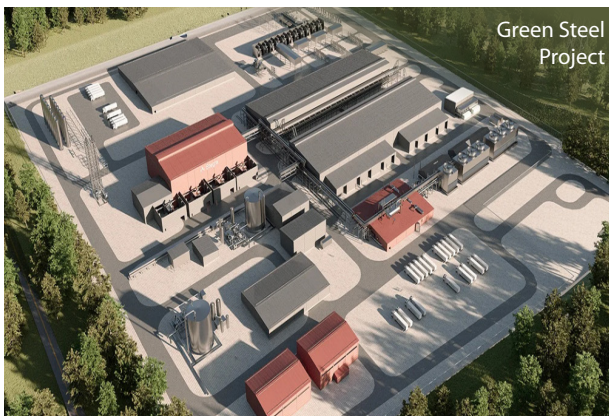
E Scrap & Cu Scrap Recycling Project



Aluminium Complex Project



Alumina Refinery Project



Green Steel Project



Pb-Zn Concentrator Project



Aluminium Recycling Facility



Adoption of GISTM