

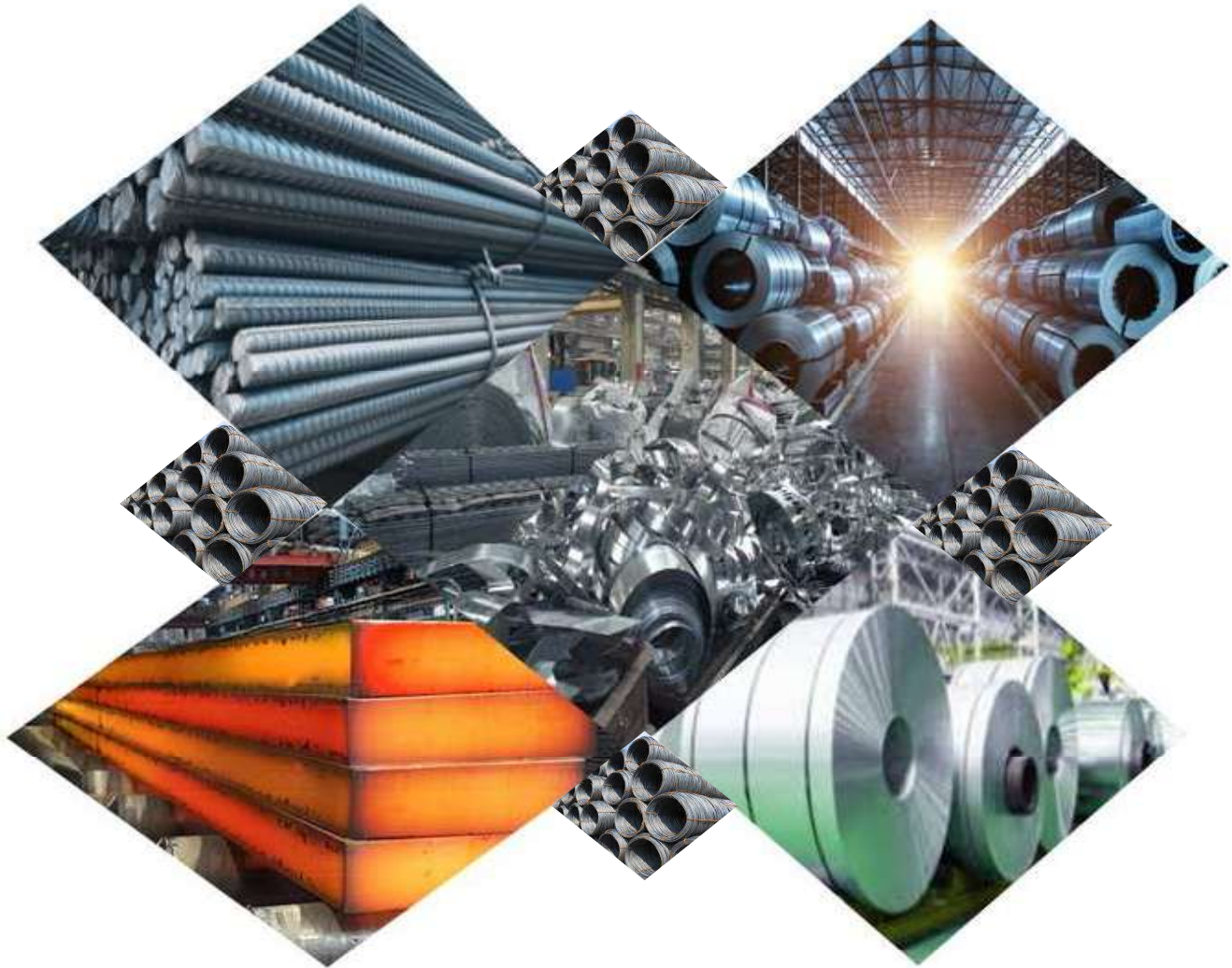


IIM

Metallurgy
Materials Engineering
The Indian Institute of Metals-Delhi Chapter

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The Indian Institute of Metals Delhi Chapter

39, Tughlakabad Institutional Area
M B Road, Near Batra Hospital, New Delhi-110 062

Tele: 011-29955084

@ iim.delhi@gmail.com



www.iim-delhi.com

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Editor-in-Chief: R. K. Vijayavergia

Associate Editors: R. K. Singhal, Chandana Arjun

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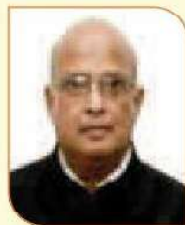
Dr. Ramen Datta



N Vijayan



Gur Iqbal S Chauhan



B R Jain



R K Singhal



R K Sinha



Neeraj Nautiyal



Ashok Kumar



Vijay Gupta



Prof. S Basu
Special Invitee

Executive Committee Members: Contact Details

Name / Designation	Affiliation	Contact No / E-Mail
Shri Manoranjan Ram <i>Chairman</i>	Vice President – Sales & marketing Danieli Group	9910014989 manoranjanram@yahoo.com m.ram@danieli.com
Shri Deepak Jain <i>Vice Chairman</i>	Former Dy. Director General (W) BIS	9868640986, 8368622619 deepakjain7177@gmail.com
Shri N K Kakkar <i>Vice Chairman</i>	Former Vice President Somani Kuttner India Pvt. Ltd.	9871008505 nirmalkakkar@gmail.com
Shri K R Krishnakumar <i>Hon. Secretary</i>	Ex CGM SAIL & Former Consultant, Ministry of Mines	9818277840; 01202773861 kuduvak059@gmail.com kuduvakrishna@yahoo.co.in
Shri Ramesh Kumar Narang <i>Hon. Treasurer</i>	Former Head (Corporate Affairs) BALCO New Delhi	9899298857 rknarang62@gmail.com
Shri M P Sharma <i>Hon. Jt. Secretary</i>	Scientific & Technical Consultant Aluminium Industries	9212202084; 9818508300 aluminiumconsultant@yahoo.com aflmps@rediffmail.com
Ms Chandana Arjun <i>Hon. Jt. Secretary</i>	Manager - Design Technotherma India Pvt. Ltd	8547621796 chandanaalicut@gmail.com
Shri K K Mehrotra <i>Member</i>	Ex CMD MECON Limited	9868112514; 01203645267 kishorekmehrotra@gmail.com
Shri R K Vijayavergia <i>Member</i>	Ex Executive Director (Operations), SAIL & Former Consultant, SRTMI	9650155544 rkv.sail@gmail.com
Dr. Ramen Datta <i>Member</i>	Ex General Manager, RDCIS, SAIL & Former Consultant, SRTMI	9958084110 dattaramen@gmail.com
Shri N Vijayan <i>Member</i>	Director Technotherma India Pvt. Ltd.	9818695690 technothermaindia@gmail.com
Shri G I S Chauhan <i>Member</i>	Ex Executive Director I/c, RDCIS, SAIL	9717302437; 7048993116 gisc.delhi@gmail.com
Shri B R Jain <i>Member</i>	Sr. Adviser Engineering Council of India	9313190011 jainbinay@gmail.com brjeci@gmail.com
Shri R K Singhal <i>Member</i>	Consultant - Communications Professional Golf Tour of India & Ex Consultant, SRTMI & Ex Executive Director (Corporate Affairs), SAIL	9910055630 rksh.singhal@gmail.com
Shri R K Sinha <i>Member</i>	Ex Director (Operations) Modern Steels Ltd	8968684955 rksinha555@gmail.com
Shri Neeraj Nautiyal <i>Member</i>	Senior Vice President Yogiji Digi Pvt Ltd	9811956565 nautiyal_n@yahoo.co.in
Shri Vijay Kumar Gupta <i>Member</i>	Ex Director (Engg.) AIR & DD, New Delhi	9810135561 vijay_gupta_m@yahoo.com
Shri Ashok Kumar <i>Member</i>	Ex General Manager SAIL, New Delhi	8076904331 akdel12@gmail.com
Prof. Suddhasatwa Basu <i>Special Invitee</i>	FIPI Chair Prof. (HAG) IIT Delhi	7838134181 drsbasu@gmail.com

Indian Steel Industry's Performance in FY'26

India's steel industry maintained a strong growth trajectory in FY'26, supported by infrastructure-led demand and ongoing capacity additions across major producers. However, demand growth moderated during the year even as production continued to expand steadily, leading to emerging imbalances in the domestic market.

Pricing remained under pressure despite an improvement in trade dynamics, with the India Steel Composite Index averaging 132 in FY'26 compared to 135 in FY'25, indicating limited absorption of incremental supply. While weak global market conditions continued to influence pricing trends, domestic market dynamics remained the primary driver.

Overall, FY'26 reflects a phase where growth persisted, but the divergence between production, demand and pricing became more pronounced, alongside increasing reliance on imported raw materials.

Crude steel production in India increased by 10.5% y-o-y to 168 mnt in FY'26, marking continued capacity-led growth, albeit at a more measured pace compared to the sharper expansion seen in the previous fiscal.

The increase in output was supported by sustained capacity additions and stable utilisation levels across primary producers.

Route-wise, the BF-BOF segment continued to account for a significant share of overall production, supported by integrated steelmakers operating at steady utilisation levels. At the same time, the induction furnace (IF) route remained a key contributor to incremental volumes, driven by its flexibility and cost competitiveness, particularly in the long products segment.

The electric arc furnace (EAF) route also maintained a stable contribution, supported by improved domestic scrap availability, although its share in total output remained relatively unchanged.

India's finished steel trade dynamics improved markedly in FY'26, with exports increasing by 28.7% y-o-y to 8.24 mnt. Finished steel, which includes flat products such as hot rolled coils (HRC), cold rolled coils (CRC), plates and coated products, as well as long products including rebar, and wire rod, along with stainless steel, recorded a recovery in export volumes during the year.

Imports declined by 22.8% y-o-y to 7.8 mnt, reflecting the impact of the 12% safeguard duty on flat steel imports, along with a narrowing price differential between imported and domestic material.

As a result, India moved close to a net exporter position, marking a clear shift from the earlier phase of elevated import dependence. This rebalancing in trade flows also helped absorb part of the excess supply arising from production outpacing consumption, with exports providing an outlet for incremental volumes and lower imports reducing competitive pressure in the domestic market.



How did the Indian iron & steel industry perform in FY'26?

Category	FY 26	FY 25	% Change
Crude Steel Production	168	152	+11%
Finished Steel Production	162	147	+11%
Finished Steel Exports	8.2	6.4	+29%
Finished Steel Imports	7.8	10.1	-23%
Steel Consumption	162	152	+7%
India Steel Composite Index	132	135	-2%
Iron Ore Production	307	289	+6%
Iron Ore Exports (Including Pellets)	26	30	-13%
Iron Ore Imports	12.5	6.5	+92%
Coking Coal Production	65	67	-2%
Non-coking Coal Production	984	981	0%
Metallurgical Coal Imports	84	77	+9%
Thermal Coal Imports	160	169	-5%
Domestic Scrap Production	32	25	+25%
Scrap Imports	8.5	9.7	-12%

Note- Domestic coking coal consumption is considered on a usable-grade basis. | Finished steel includes non-alloy, alloy, and stainless steel. | Scrap consumption includes both domestic scrap usage and imports. | Quantity in million tonnes (mnt) % change in year-on-year (y-o-y) | Source : BigMint

BigMints India Steel Composite Index, a barometer of domestic finished steel prices, averaged 132 in FY26 compared to 135 in FY'25, reflecting a 2.2% y-o-y decline. While the decline was milder than the sharper correction seen in the previous year, indicating some easing of import-led pressure, domestic prices remained constrained by the imbalance between supply growth and demand absorption. Lower imports and improved trade balance provided partial support, but this was insufficient to offset the impact of elevated supply and weak global benchmarks.

Flat steel prices continued to face pressure from global markets, particularly amid subdued international demand, while the longs segment remained relatively better supported by infrastructure-led demand and limited direct exposure to imports. As a result, pricing remained range-bound through much of the fiscal, constraining margins across the sector.

Steel raw materials landscape

Iron ore: Iron ore production increased by 6.2% y-o-y to 307 mnt in FY26, but this growth lagged behind the pace of steel output expansion. Exports declined by 13.3% y-o-y to 26 mnt, while imports surged by 92.3% y-o-y to 12.5 mnt, indicating increased reliance on imported ore to bridge the gap between domestic availability and steelmaking requirements.

Coal: Domestic coking coal production declined marginally by 2.3% y-o-y to 65 mnt, while imports increased by 9.1% y-o-y to 84 mnt. The rise in imports reflects the need to support higher steel output amid limited domestic availability, reinforcing India's structural dependence on imported coking coal.

In contrast, thermal coal imports declined by 5.3% y-o-y to 160 mnt, while domestic production remained broadly stable, indicating a lower import requirement. This divergence highlights improving domestic availability in thermal coal, even as dependence on imported coking coal continues to persist.

Scrap: Domestic scrap availability increased by 24.5% y-o-y to 31.5 mnt, supported by policy measures and improved collection and processing systems. Scrap imports declined by 12.4% y-o-y to 8.5 mnt, indicating a gradual shift towards domestic sourcing. The rise in domestic scrap supports the expansion of the electric arc furnace route and reflects a structural shift towards a more circular steel ecosystem.

Source: *BigMint*

Global Aluminium Capacity to Grow 4.58% by End-2026

Global primary aluminium production in 2025 grew marginally to approximately 73.78 million tonnes, up from 73.01 million tonnes in 2024, representing a 5-year low in growth rate. China, holding a 45 million tonne capacity cap, operated at nearly 97 per cent capacity (approx. 43.9 million tonnes) in 2025, limiting global growth, with the market facing continued supply deficits.

Global primary aluminium operating capacity is set to rise sharply. An increase of about 20.9 million tonnes is projected by the end of 2026, which includes expected commissioning, resumption and replacement, with Indonesia among the largest incremental contributors. The global drivers of aluminium demand remain the automotive and construction industries.

The global market is expected to remain in a deficit, potentially around 200 thousand tonnes in 2026, which could rise to 600 thousand tonnes as and when smelters in regions like Mozambique shut down.

Region-wise primary aluminium production between 2021 and 2025 (p), measured in thousand tonnes (thousand tonnes), brings forth Asia's structural dominance and shifting regional balances.

Asia expands steadily from 43.67 million tonnes in 2021 to 45.49 million tonnes in 2022, 47.31 million tonnes in 2023, 49.09 million tonnes in 2024, and 50.06 million tonnes in 2025, remaining the clear growth engine of global supply.

The Middle East also trends upward, rising from 6.44 million tonnes (2021) to 6.7 million tonnes (2022 and 2023), 6.77 million tonnes (2024), and 7.05 million tonnes (2025), reflecting capacity additions and competitive energy positioning.

North America fluctuates at 4.06 million tonnes (2021), 3.9 million tonnes (2022), 4.06 million tonnes (2023), 3.99 million tonnes (2024), and 3.95 million tonnes (2025), hinting towards stagnation. Europe contracts sharply from 4.31 million tonnes (2021) to 3.41 million tonnes (2022) and 3.17 million tonnes (2023) before marginally recovering to 3.20 million tonnes (2024) and 3.22 million tonnes (2025) amid energy market pressures.

Russia and Caspian remain relatively stable at from 4.33 to 4.47 million tonnes across the five years. Africa holds near-flat at 1.6 million-tonne range, while Latin America improves from 1.14 million tonnes to 1.64 million tonnes. Oceania stays broadly steady at 1.8 to 1.9 million tonnes.

China's national electrolysis capacity remains capped at 45 million tons, with new projects restricted to replacing older, less efficient, or high-emission capacity. A notable project is Wanji's new smelter in Inner Mongolia, scheduled for completion in May 2026, replacing older Henan facilities.

Chinese demand from the traditional construction sector is expected to contract, while demand growth in other traditional end-use sectors is expected to slow down. However, demand increments from energy storage systems (ESS), data centres, hydropower stations, and related facilities warrant attention. Record-high copper prices and a high copper-to-aluminium price ratio will stimulate the development and implementation of aluminium as a substitute for copper.

Source: AL CIRCLE, 13 February 2026

From Copper to Aluminium: Electrification's Next Era

The world has been undergoing electrification for the past 140 years. During the first 60 years, copper, a heavy metal, was used for electrical construction. It wasn't the best conductor material because of its relatively *low conductance per pound*, but its abundance led to its exclusive use during the initial six decades of the electrical industry.

During that time, aluminium, a rare light metal, which has *twice the weight conductivity of copper*, was only available in small quantities. To get a feeling for what it was like at the beginning of the electrical industry in the 1880s, picture the Statue of Liberty, a gift from France to the United States in 1886, made of 200 thousand pounds of copper.

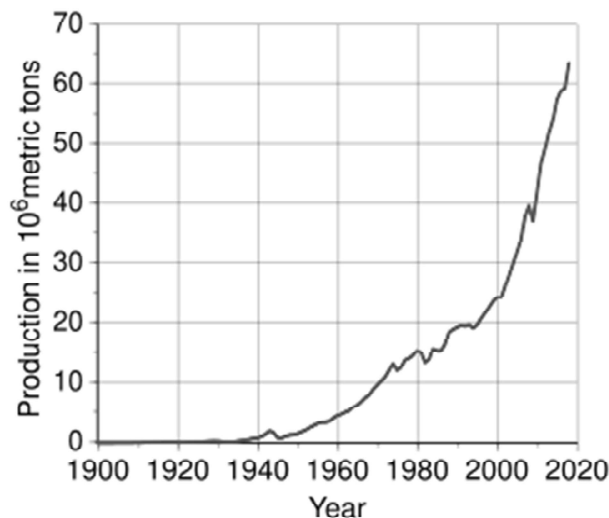
At about the same time, the Washington Monument, erected to honour the first president of the United States, was completed with an aluminium cap weighing 100 ounces. That cap was then the largest aluminium casting in the world.

During this initial chapter of electrification (1884-1944), everything that carried current was made with copper.

The electrical industry grew dramatically in the 20th century. Electricity became available everywhere. Regardless of time of day or where you were, you could flip a switch and the lights came on.

When power met water: How hydropower unlocked industrial aluminium

This electrical growth came to include the harnessing of hydro energy sources, which generated large amounts of electricity. Hydropower enabled the production process for making aluminium to switch from chemical to electrolytic reduction. Thus, after World War II, aluminium began to be produced on an industrial scale.



Global Production of Aluminium from 1900-2020

This flipped the copper-aluminium narrative: aluminium becomes plentiful and economical, while copper supply doesn't grow as fast.

The post-war turning point: When aluminium overtook copper

Thus, in the second half of the 20th century, aluminium started to replace copper for carrying current. Within a period of two decades after World War II, electric utilities completely switched their lines from copper to aluminium.

Now in the 21st century, where the electrification of transportation, integration of renewable energy sources, bitcoin mining and growth of data centres are creating new challenges, the switch from copper to aluminium is additionally being driven by dramatically increasing copper prices.

From monopoly to competition: The end of copper's exclusive reign

The electrical industry's six-decade reliance on copper resulted in the "Copper: The Metal of Electrification" brand. Even though the monopoly is over and copper now competes with aluminium, people still think copper is best for all things electrical because the copper-electrical brand is so strong.

Change takes time, as the tendency is to continue what has worked in the past. The electrical industry can no longer afford to rely on the past if it is to meet the growing needs of the 21st century.

What the industry must now understand

The following is what one now needs to know about aluminium and copper:

Material Properties

- Aluminium has twice the weight conductivity of copper.
- Aluminium weighs just one-third as much as copper.
- One pound of aluminium provides the same current-carrying capacity as two pounds of copper.

Supply

- Aluminium production has increased tremendously since World War II. In just ten years, 1945-1955, aluminium production surpassed that of copper and continues to increase.
- Today, roughly three times more aluminium than copper is being produced. Aluminium is the third most abundant element in the Earth's crust after oxygen and silicon.
- Copper prices are skyrocketing and are predicted to go higher because of constrained supply.
- The price ratio of copper to aluminium is now roughly four to one.

Bottom Line

- Aluminium now has an eight-to-one cost advantage over copper: \$1 worth of aluminium provides the same electrical function as \$8 copper.
- Aluminium is lightweight
- Aluminium prices are more stable than copper prices

- Aluminium is less prone to theft

Aluminium's advantages are now so overwhelming that even tariffs cannot significantly change the aluminium-copper value proposition staring the global electrical industry in the face.

Conclusions

The electric switch has been flipped. It is a new "ball game" for the electrical industry. Antiquated standards, designs and ways of thinking about copper and aluminium are changing because the old way of doing business is unsustainable. Aluminium will increasingly be used to meet the electrification challenges of the 21st century.

Source: AL Circle Blog, 20 Jan. 2026

Problems in Aluminium Recycling

As the world changes, technology transforms! Technology is the "employment of scientific knowledge for useful ends".

The most important Earth's natural resources are:

1. Water;
2. Air;
3. Oil;
4. Natural gas;
5. Coal;
6. Mineral

None of these resources is renewable. Consuming these limited resources threatens both our industrial existence and, through the emissions generated during these processes, our natural environment. The solution, however, is simple: *the seventh resource: recycling*.

The present materials situation is literally reversed; all waste and scrap, which are now called secondary metals, will become our major resources and our natural untapped resources become our back-up supplies.

To distinguish between traditional and modern technological paradigms, it is essential to first break technology down into its components: *manufactured objects* and *tacit knowledge*. "Manufactured objects" refer to manufactured items or "artefacts," ranging from stone or wooden tools to modern microprocessors. In contrast, "tacit knowledge", often referred to as "technical," represents the unmanifested knowledge base encompassing the knowledge and skills required to design, produce and use these objects.

Traditional technology is characterised by a high degree of "tacit knowledge", where the tool and the craftsman are inextricably linked, while modern technology is

defined by its “systemic nature,” where an individual artefact cannot function outside of its broader infrastructure. When we reconstruct this technological paradigm through modern metallurgical process technologies, we encounter a different picture. On the other hand, modern metallurgical processes have a different systematic nature. Because:

- Process costs must now be calculated not only as economic costs, but also considering environmental impacts and workers’ health and safety.
- Taking into account the decreasing and declining ore quality and grade, we must develop new and more sustainable extraction technologies.
- We need to use more scrap and process by-products as raw materials within the total metallurgical production.
- In the context of a circular economy, we must also utilise or, at least, transform into harmless waste forms the by-products and waste generated during metallurgical processes.

In contrast to primary aluminium production, which requires bauxite as its raw material, secondary operations depend on *sufficient quantities of suitable scrap*.

The amount of dross and slag generated during the metallurgical process of Secondary Aluminium Production depends on:

- The type of scrap – which results in different amounts of oxides and contaminants!
- The type of furnace in use!
- The metallurgical process management itself!

There are several ways to minimise the formation of these waste streams during the process and in addition, there are some processes known to recover the metallic aluminium content of dross or salt slag in-house.

The main problems of aluminium recycling

Scrap-related

- Variations of old scrap
- Complexity of compositions and contaminants in the various types of aluminium scraps. The scrap quality also limits the quality and composition of the final alloy.

Technology-related

- Metal losses due to dross generation
- Less energy consumption
- Secondary metal quality: Difficulties in controlling the level of impurities, as well as difficulty in obtaining the targeted alloy composition. Both wrought

and casting alloys can be obtained by recycling, but they strongly differ. Casting alloys have higher alloying content than wrought ones. While the formers have a concentration of elements up to 20 wt %, the wrought alloys have up to 10 wt %.

- Understanding the behaviour of different scraps during melting is crucial in the recycling process.
- To avoid downcycling instead of recycling. The feature of aluminium to absorb foreign and undesired/segregated elements, which are not normally described in the international standards. To remove impure elements from a molten bath is impractical or inconvenient. In this case, two possible solutions are currently followed: “downgrading and dilution”. By downgrading, lower value products are produced from high-quality scrap, while by dilution, the molten scrap is diluted with primary aluminium or high-purity/expensive scrap to reduce the concentration of elements below target chemical composition levels.
- Processing of aluminium dross/salt cake to produce valuable materials.

Environment-related

- Minimisation of carbon emissions (related to Scope 1 and 2)
- Minimisation of losses to oxidation dross/salt cake (solid residue).

Economy-related

- The key factor is “molten metal cost”!
- Look for high premium products from scrap (upcycling)
- Cost of carbon emissions
- Trade wars
- EU and USA secondary aluminium demand is growing.

Engineering-related

- Minimise conversion cost
- Maximise alloying elements recovery
- Look for high premium products in a certain percentage of total production
- Focus on green production
- To process low-grade scrap with high contaminations
- Try to minimise and/or utilise waste.

Conclusions

Recycling is a critical component of the aluminium industry based on its favourable economic impact on production and its contribution to the environment.

In this context, compared to other metallurgical processes, the “recycling” process requires more “tacit knowledge”. When we talk about aluminium recycling, we are

talking about more than 450 alloys, more than 50 defined scrap types and scrap from a metallic material used in almost every sector.

To control recycling processes, we have to minimise “conversion cost” from scrap to product by;

- Understand the technology,
- Manage the technology
- Control of process using digital tools

Source: AL Circle Blog, 04 February 2026,

Aluminium’s Green Transition

Every industry, whether directly or indirectly connected to power, electricity and fuel, must now reassess its strategies in light of accelerating energy transition journey. And among all the industries, definitely aluminium takes a centre stage in this discussion, given its energy-intensive nature. Aluminium embodies total 186-211 GJ of energy per tonne, while primary aluminium production alone needs 13.5 to 17 MWh per tonne. The industry is under mounting pressure to decarbonise its ecosystem, with a near-term goal of bringing the carbon footprint of primary aluminium below 3–4 tonnes of CO₂e per tonne by 2030.

The pathways to this transition are typically greater integration of renewable and green energy and a higher share of recycled aluminium in production.

Decentralised renewables and grid resilience is much required in India

Clean energy demand is growing rapidly in India but grid stability remains a major challenge. So, micro grids are the solution for stable power. To decentralise renewable energy, strong and consistent policy support is essential, as “policy is the first line of defence” for renewable expansion.

Nuclear power as a firm decarbonisation lever

Nuclear energy is one of the most viable options for decarbonising aluminium production as nuclear power itself is carbon-free and not dependent on weather conditions – which is an important advantage for energy-intensive, continuous processes such as aluminium smelting. In 2024 nuclear power accounted for 9 per cent of global electricity and helped avoiding 2.1 billion tonnes of CO₂, equivalent to eliminating the entire aviation sector’s emissions twice over.

While countries like the United States, China, France, Russia, and South Korea dominate nuclear power generation, ASEAN countries such as Vietnam, Indonesia

and Malaysia, which are the emerging hub of aluminium production, are also exploring nuclear energy production. On costs, the absence of green energy will ultimately be more expensive than its adoption.

Green hydrogen can come to rescue for decarbonising the value chain

Reducing emissions is not limited to primary aluminium production alone. To curb carbon emissions from bauxite transportation, the shipping sector must transition to alternative fuels, such as green hydrogen, ammonia, methanol, biofuels, LNG, e-Fuels to achieve carbon-free transportation. Bauxite mining is a diesel-intensive process; so, the initiative can be started with converting mining trucks from diesel-fueled to green hydrogen. Gradual integration of green hydrogen for process heat in alumina refining and aluminium smelting can be considered, i.e. a blended energy approach, rather than a complete and immediate shift.

India targets to produce 5 million tonnes of green hydrogen by 2030, which could account for nearly 25 per cent of the renewable energy mix.

How Africa is doing in energy transition

When it comes to bauxite, the African country Guinea is currently the world's leading producer and supplier. Africa is embracing energy transition with high hopes because of the volatility of the fossil-fuel market. And with the advancement of technology, renewable energy prices are competitive for the African aluminium industry. Renewable energy is the way for Africa in the near future, with the abundant availability of solar energy.

African government has listed aluminium as critical mineral. And now the continent wants to protect the resource in its homeland, safeguarding it from going out into the other countries. Hence, Africa has taken a strict stance of "mine here and refine here".

Energy efficiency, storage and baseload renewables are solutions too

Energy efficiency improvements and renewable integration are the primary pathways to aluminium decarbonisation. Carbon capture and energy storage play a crucial role too. Given that aluminium smelters require 24/7 power, baseload renewables such as hydro and biomass, along with nuclear energy, are particularly well suited.

70–90 per cent of smelting energy is consumed by the electrolytic reduction process, making electricity the single largest cost driver. Long Duration Energy Storage Council (LDES) can enable smelters to store surplus low-cost renewable power and deploy it during peak periods, thereby stabilising electricity costs and reducing dependence on fossil fuels.

PPA dilemma needs to be addressed

Renewable power flows through the same grid as conventional electricity. Aluminium smelters tied into long-term power purchase agreements (PPAs) with thermal plants often find it difficult to exit these contracts and transition to renewables, underscoring the importance of strategic energy procurement decisions.

For the aluminium industry that energy transition is no longer a peripheral agenda, rather it is central to competitiveness, compliance, and long-term sustainability.

Source: Brief from India Energy Week 2026, AL CIRCLE 31 January 2026

India Needs to Scale Up Washery Capacity to Cut Coal Imports

India's steel self-reliance cannot be met without a rapid scale-up of coking coal washeries, given that barely around 5 – 10 MT of domestically washed coking coal feeds a demand of nearly 90 MT today.

Structural Import Dependence in Coking Coal

India's coking coal demand is estimated at about 87 MT in FY26 and is projected to rise to 135 MT by 2030 as crude steel capacity targets 300 MT. Around 90% of this requirement is currently met through imports, making India one of the most import-dependent major steel producers globally.

Domestic raw coking coal production has increased from roughly 45 MT in FY21 to about 83 MT by FY26, but high ash content and limited beneficiation mean only a small fraction is suitable for BF-BOF steelmaking without blending with imported prime hard coking coal.

Washeries: The Weakest Link in The Value Chain

Coal India currently operates 13 washeries with a combined washing capacity of 39.35 MT per year, of which 10 washeries (18.35 MTY) are dedicated to coking coal. Yet, total washed coking coal output from these facilities was only about 2.4 MT in FY25, implying very low utilisation and a negligible share in total met coal consumption.

Similarly, Private sector combined have 37.6MT (active coal washing capacity) of coal washery capacity with the utilization rate of about 16.6 – 17MT, producing approx. 6 – 6.5MT of washed coal. Around only 12 – 13% of domestically produced coking coal is consumed by the steel sector, showing a very low utilization rate.

Policy Push: Mission Coking Coal and New Washeries

Under the Atmanirbhar Coal project, the government aims to boost raw domestic coking coal production to 140 MT by FY30, therefore addressing this gap together with capacity improvement of washed coking coal to roughly 15 MT. Under revenue sharing models, Coal India and the Coal Ministry are concurrently encouraging private involvement in abandoned coking coal mines and washeries.

Along with BCCL's recently commissioned 5 MTPA New Madhuband washery, eight new coking coal washeries with a total capacity of 21.5 MTPA are under different stages of building in Jharkhand and West Bengal.

These initiatives have the potential to boost the domestically washed coking coal production over the five to seven years, significantly replacing importing PCI of low quality and some medium volatile HCC.

Source: Metalogic Research & Advisory, 06 March 2026

How Relevant is Dry Beneficiation For Coal

Dry beneficiation can become crucial to India's coal value chain, as its relevance increases with an increasing import dependence for steel and power sector, strict environmental regulations and water scarce coal ecosystem.

Parameter	Wet Beneficiation	Dry Beneficiation
Capex (5 Mtpa)	₹400–600 Cr	₹200–350 Cr
Operating Cost	₹300–450 per ton	₹150–250 per ton
Yield	Generally higher	~35–75% yield; ash reduction of 5–8% (slightly lower than wet)
Transport Weight	Higher (due to moisture/slurry)	~20% lighter loads
Waste Handling	Requires slurry ponds	Eliminates slurry ponds
Environmental Impact	Higher water usage and environmental penalties	Lower environmental penalties and no water usage

India's steel production is increasing, and optimising the use of domestic coal has become vital. Dry beneficiation can become a good alternative, as it can also improve structural efficiency from mining to final use.

Dry beneficiation advantages are that it uses air-based or sensor-based separation technologies, it operates in a water-free environment and reduces operational and environmental issues.

Relevance For Indian Coal:

Indian coal has a high ash content of 30% to 45%, especially in coking coal. Despite

large reserves, India heavily imports low ash coking coal due to the underutilization of coal washeries (operating only at 16.6 MT). Other issues include inconsistent grades and declining quality.

The steel sector requires washed coal with 17% to 19% ash for the most optimum utilisation ratios.

Dry beneficiation can help remove large stones and high-density material at the mine level, thereby reducing logistics costs, improving feed consistency for washeries, increasing yield, benefiting the steel sector, and improving the calorific value of non-coking coal, thereby reducing imported coal for DRI production.

Jharkhand and Chhattisgarh will benefit the most as this process is particularly important for water-scarce regions.

Key Technologies:

- FGX Separator: Vibrating deck + airflow, ideal for 6–300 mm coal.
- Air Dense Medium Fluidised Bed: Effective for 6–50 mm coal, moderate precision.
- Air Jig: Simple, low-cost, suitable for power-grade coal.
- XRT Sorting: High precision, high capex, used globally in Australia and South Africa

Outlook:

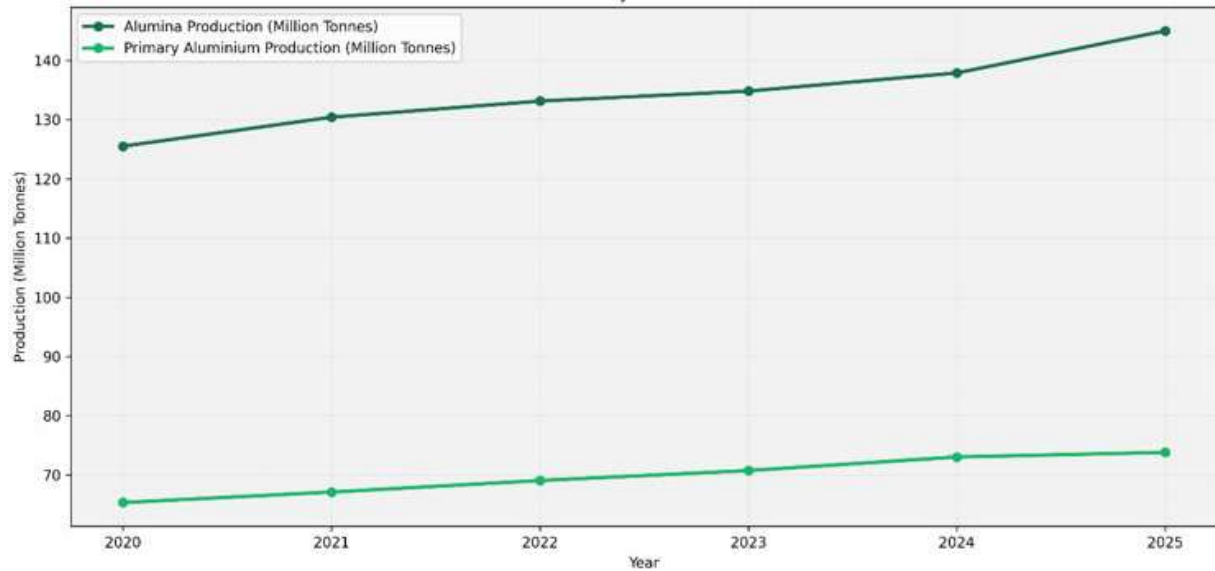
Dry beneficiation has the potential to become a supporting technology rather than a direct substitute for wet washing. In CY 2025, India imported 60.42MT of coking coal, and based on this figure, it can be estimated that implementing dry beneficiation on a larger scale could reduce imports by approximately 5-10 MT, which is around 8-16% of total imports.

Source: Metalogic Research & Advisory, 06 March 2026

World Alumina and Primary Al Production in 2025

The world alumina production in 2025 tells markedly different story than primary aluminium. While the primary metal clocked the weakest growth rate in recent years, alumina registered the strongest five-year leap. According to the International Aluminium Institute (IAI), the world alumina production gained 5.07 per cent Y-o-Y in 2025 as against a 1.06 per cent increase in the world primary aluminium output. In the preceding years, the global alumina production growth rate majorly ranged between 2-4 per cent from 2021 to 2024.

The acceleration was led overwhelmingly by metallurgical-grade alumina, the feedstock for aluminium smelters. As far as chemical-grade is concerned, it grew by 3.15 per cent in 2025, which, however, was not the highest growth in past five years. In years like 2021 and 2022, the world chemical-grade bauxite production had even surged by 8.3 per cent and 11.3 per cent.



Global Alumina v/s primary aluminium production trends

Coming back to metallurgical-grade alumina, the growth rate seen in 2025 can apparently leave a room for a few critical questions like - how alumina production boomed despite the bauxite supply chain constraint worldwide and where was this additional alumina output absorbed, given the tight growth rate in primary aluminium production. However, this puzzle can be solved with some facts and figures and here they are.

A strong finish drives annual growth

According to the data revealed by the International Aluminium Institute, the world alumina production in 2025 totalled 144.98 million tonnes as against 137.879 million tonnes in 2024. The year-on-year surge was decisively driven by the second half of the year. The turning point came in Q3 2025, when the output rose 5.9 per cent Q-o-Q and 6.36 per cent Y-o-Y. Successively, in Q4, the output grew by about 2 per cent sequentially and 6 per cent annually.

Yet this surge was far from geographically uniform. Regional declines masked by Asian strength

Despite the strong global headline number, several major alumina-producing regions underperformed in 2025, such as South America, Europe (including Russia),

and Oceania. Alumina production in all these regions saw either downfall or restraint. IAI data shows that alumina production in South America dipped by 0.41 per cent to 11.194 million tonnes (vs 11.240 million tonnes), while that in Europe decreased by 2.81 per cent to 5.778 million tonnes (vs 5.945 million tonnes). In Oceania, the output volume did not contract much but remained restrained at 17.213 million tonnes versus 17.242 million tonnes.

These regional setbacks meant that the global growth story hinged almost entirely on two regions: China and Africa and Asia (excluding China).

China: The primary engine of 2025 alumina growth

China emerged as the single largest driver of global alumina expansion in 2025. The country's alumina production rose by 8.31 per cent year-on-year, reaching 88.30 million tonnes versus 81.52 million tonnes in 2024.

The acceleration was primarily driven by the hike in Q3 when production gained 8.2 per cent sequentially and 8.9 per cent annually. On the other hand, Africa and Asia's (ex-China) alumina output primarily surged in Q2 by 5.3 per cent, reaching 3.586 million tonnes, followed by a rise of 4.2 per cent sequentially in Q4 to 3.845 million.

Notably, in contrast, China is the same region where primary aluminium production growth was modest at 2 per cent in 2025. Then, with limited primary metal growth, what did this region do with this staggering alumina output? If seen in absolute numbers, China's alumina production was almost in sync with primary metal output, maintaining nearly the global standard ratio of 2:1. Rather in the previous year, China's alumina production was less than what is required as standard to produce primary aluminium. While the alumina production was 81.523 million tonnes, primary aluminium output was 43.396 million tonnes.

With the growing alumina production in China, the country became the net exporter of the ore in 2025. After feeding domestic smelters to a large extent, China further exported its alumina to Russia, Indonesia, and the United Arab Emirates. However, for the domestic usage, China still imported some alumina of about 1.2 million tonnes, but down by 15.6 per cent Y-o-Y. As such, China recorded net alumina exports of 1.35 million tonnes during the year.

Now, addressing the question, how China built up the momentum of alumina production amidst global bauxite supply strain. The answer lies in Guinea where China has a strong foothold, accounting for 74 per cent of the West African nation's total exports. The mines ministry data shows 23 companies shipped bauxite from Guinea, of which China's Chalco led with 22.1 million tonnes. China's overall bauxite imports from Guinea jumped 35.3 per cent on year to 149 million tonnes, indicating a limited impact of the mining licence revocation by Guinea in May 2025 on China.

Africa & Asia (ex-China): The emerging alumina hub, where Indonesia plays a key role

After China, Africa and Asia (ex-China) saw the highest growth rate of 4.8 per cent in alumina production, standing at 14.529 million tonnes at the end of the year. Africa has been emerging as an alumina production hub since 2024 when the production volume rose even higher on year by 6.5 per cent from 13.014 million tonnes to 13.859 million tonnes. Indonesia and India have been the two major countries driving the strategic position of Africa and Asia (ex-China) as one of the global alumina hubs.

The longstanding raw bauxite export ban in India has channeled all the resources to domestic alumina refining and aluminium smelting. With PT Borneo Alumina Indonesia's operation commissioning in the fourth quarter of 2024 added to the 2025 production, estimated at 7 million tonnes, according to SMM. PT Borneo Alumindo Prima's 1,000,000-tonne phase one facility, although could not meet the initial commissioning timeline of 2025, is expected to contribute further to Indonesia's comprehensive capacity expansion strategy. In fact, Indonesia's bauxite demand is estimated to grow on year in 2026 from 20.9 million tonnes to 25 million tonnes, driven mainly by the rapid expansion of the domestic alumina industry, Shanghai Metals Market said during a webinar on Thursday.

India, being another important alumina producing hub from Asia, also showed progress in its ongoing financial year to be ended on March 31, 2026. While India's state-owned firm NALCO reported a 20 per cent increase in alumina production during the first nine months of FY2026, Vedanta achieved a record-breaking performance at its Lanjigarh refinery by producing 653,000 tonnes. Vedanta has expanded its Lanjigarh refinery capacity to 5 MTPA, while NALCO is progressing with its expansion, including the commissioning of a fifth stream refinery in June 2026, targeting a total production of 2.25-2.3 million tons for FY2026.

Offsetting weakness elsewhere

The robust expansion in China, and Africa and Asia (ex-China) effectively offset declines in South America, Europe, and Oceania. Although South America showed sequential improvement in Q3, rising from 2.748 million tonnes to 2.846 million tonnes and then stood stable in Q4, the annual declines through each quarter of 2025 offset the improved quarterly performance. Similarly, in Europe, although alumina production grew in Q3 and Q4 2025, standing at 1.425 million tonnes and 1.454 million tonnes, yet the volumes stood low compared to Q1 2025 when the output was 1.479 million tonnes or in the preceding periods when the production was 1.515 million tonnes in Q3 2024 and 1.519 million tonnes in Q4 2024.

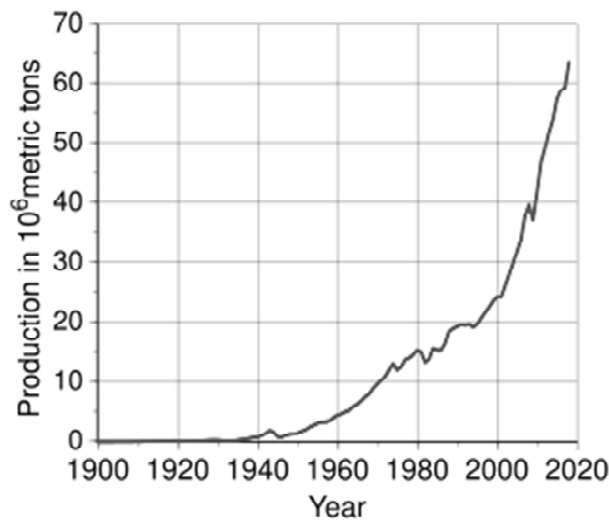
What's in store in contrarian situation?

Surely, the alumina surge in 2025 reflects a deeper structural recalibration in the aluminium value chain, but it happened just when the demand for the ore is sluggish. Already NALCO CMD has warned that their higher alumina output may not translate into revenue gain in FY2027 due to soft prices owing to sluggish demand. So, what needs to be watched is how the alumina production growth gets used by the primary aluminium industry, where production is currently constrained by energy costs, carbon pressures, and policy uncertainty.

Source: AL Circle 12 FEBRUARY 2026, International Aluminium Institute

Why Aluminium is the Real Metal of Electrification

Which is better for carrying current, copper or aluminium? For decades, the conventional wisdom has been that copper is better because it has higher electrical conductivity. After all, copper is “The Metal of Electrification.” This fundamental belief has been outdated for 80 years, since aluminium became available in industrial quantities after World War II.



Global Production of Aluminium from 1900-2020

The truth is that aluminium has double, 200 per cent, the weight-conductivity of copper! Furthermore, today copper costs four times as much, so one dollar's worth of aluminium can provide the same current-carrying capacity as eight dollars' worth of copper.

Artificial intelligence and copper panic

A January 2026 S&P Global report predicts that the demand for copper in the “New Age of AI” will exacerbate the already existing copper shortages. There will not be

enough copper to build data centres, the brains of AI and the increased electric infrastructure needed to supply them.

In a recent interview at the World Economic Forum in Davos, Switzerland, Elon Musk said that many AI chips will soon be produced and a substantial portion of them will never be turned on because there won't be enough electricity. Electricity is like oxygen in our brains. Oxygen deprivation has well-known consequences. Similarly, not enough electricity could short-circuit data centres' ability to function.

Consequently, the need for more electricity is now showing up on everyone's radar. This means that more generating plants and power lines are needed. To address concerns about the ability to get new lines built, ideas for siting new generating facilities collocated with data centres are even being considered.

This apparent need for more electricity and power lines has people thinking that more copper will also be needed. After all, copper is "The Metal of Electrification".

Let's look at examples of "copper panic" among some mega-cap technology companies and how they are reacting to shortages and record-high copper prices.

Example 1: Tesla Motors

Tesla Motors announced that it is changing the low-voltage power system in its EVs from 12 volts to 48 volts to reduce the amount of copper. (The Tesla Model S, for example, has a mile of copper just to connect the battery to the electronics.)

Increasing the voltage to reduce copper is a good strategy. However, a better one would be to also replace the reduced copper with aluminium. The aluminium would carry the same amount of current and provide additional benefits of reduced weight and cost.

Tesla engineers already know a lot about aluminium, its "strength-to-weight" ratio and how to design EV structures to take advantage of that ratio. Now they need to adopt a similar approach for electric design using a new metric: "conductivity-to-weight" ratio.

Example 2: Tesla Optimus Robots

Of late, Tesla is reported to be transitioning from traditional EVs to autonomous vehicles and humanoid robotics. Elon Musk has stated his belief that the Optimus Robot is the company's future. Like EVs, these robots are electrical devices that can also benefit from using aluminium to carry current instead of copper.

Example 3: Nvidia

NVIDIA, the AI data centre chip producer, recently indicated that millions of pounds of copper busbar will be needed to build a data centre. Copper supply

shortages and escalating prices can be avoided by using aluminium busbar. Extruded aluminium busbar can provide the same current-carrying capability as copper with reduced weight and cost. It is a proven product that has been quietly replacing copper busbar for decades.

Example 4: Amazon

Amazon's Web Services, the Data Center Division of Amazon, has announced a partnership with Rio Tinto mining to develop a new domestic supply of copper.

Example 5: Rio Tinto

Rio Tinto is also a big producer of aluminium. Since copper and aluminium are fungible for carrying current, Amazon Web Services could switch to aluminium, avoid copper supply issues and realise weight and cost savings.

Beyond Tesla, Nvidia and Amazon

Tariffs and the rearrangement of international manufacturing sites are causing global businesses to build new plants in the United States for the first time in decades. Industrial plant specifications have historically called for copper conductors and were never updated to permit aluminium, as electrical utilities did. Now, projected copper shortages and increasing prices may motivate companies to update their specs so that they can use copper or aluminium.

The Grid

It has been suggested that there won't be enough copper to modernise and expand the ageing electric grid. What is being overlooked is that electric utilities have already completely switched from copper to aluminium after World War II. Today, the entire transmission and distribution grid of the United States is comprised of aluminium.

Conclusions

Copper panic, the fear that there will not be enough copper to build data centres and electrical infrastructure to supply them, is based on outdated information. More than enough aluminium is available to do the job. The answer to the basic question at the beginning of this article, which is better for carrying current: copper or aluminium, is obvious; aluminium is much better than copper for carrying current.

"Change the way you look at things, and the things you look at change."

The following summarises what one needs to know:

Material Properties

- Aluminium has twice the weight conductivity of copper.

- Aluminium weighs just one-third as much as copper.
- One pound of aluminium provides the same current-carrying capacity as two pounds of copper.

Supply

- Aluminium production has increased tremendously since World War II. In just ten years, 1945-1955, aluminium production surpassed that of copper and continues to increase.
- Today, roughly three times more aluminium than copper is being produced.
- Aluminium is the third most abundant element in the Earth's crust after oxygen and silicon.
- Copper prices are skyrocketing and are predicted to go higher because of constrained supply.
- The price ratio of copper to aluminium is now roughly four to one.

Bottom Line

- Aluminium now has an eight-to-one cost advantage over copper: \$1 worth of aluminium provides the same electrical function as \$8 copper.
- Aluminium prices are more stable than copper prices
- Aluminium is less prone to theft

Source : AL Circle Blog, 12 February 2026

Red Mud: Problem the Aluminium Industry Must Solve

When we think about aluminium, the sleek cans, aircraft bodies, or smart electric car frames might come to mind. But there's a hidden story behind all that shine — a by-product known as *red mud*. For every tonne of alumina produced, about 1.25 tonnes of this highly alkaline waste are left behind. With over 4 billion tonnes generated globally to date, red mud isn't just a by-product — it's a colossal environmental challenge.

But within this scarlet dilemma lies a silver (and sometimes rare earth) lining.

What exactly is Red Mud?

Red mud, also called bauxite residue, is what remains after extracting alumina from bauxite ore using the Bayer process. It's a thick, caustic sludge packed with oxides of iron, aluminium, titanium, sodium, and rare earth elements. Historically, it was dumped into large ponds in slurry form, sometimes leading to severe consequences when containment systems failed.

Main chemicals constituent of red mud in different nations

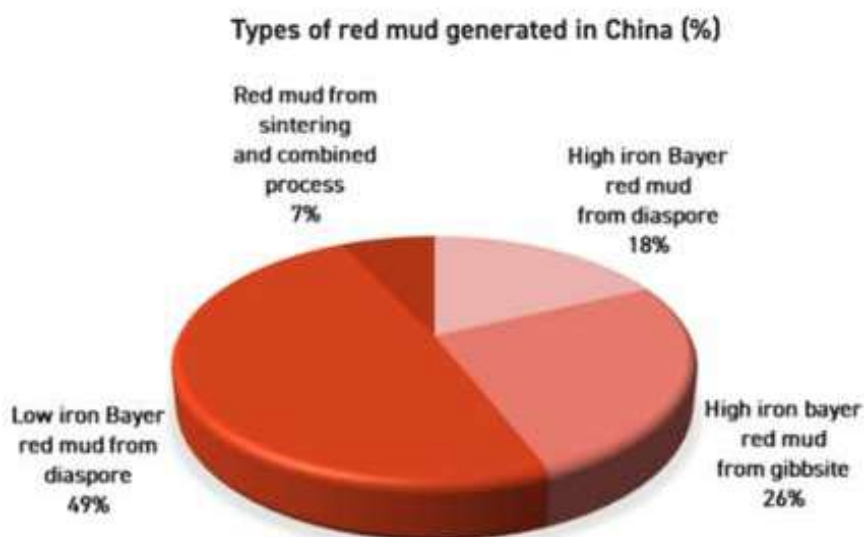
Country	Plant	Chemical constituents (Wt %)					
		Fe ₂ O ₃	Al ₂ O ₃	TiO ₂	SiO ₂	Na ₂ O	CaO
Italy	Eurallumina	35.2	20	9.2	11.6	7.5	6.7
Turkey	Seydisehir	36.94	20.39	4.98	15.74	10.1	2.23
China	Guizhou	26.41	18.94	7.4	8.52	4.75	21.84
Australia	Kwinana	28.5	24	3.11	18.8	3.4	5.26
Brazil	Alunorte	45.6	15.1	4.29	15.6	7.5	1.16
Germany	AOSG	44.8	16.2	12.33	5.4	4	5.22
USA	RMC	35.5	18.4	6.31	8.5	6.1	7.73
UK	ALCAN	46	20	6	5	8	1
France	Gardanne	26.62	15	15.76	4.98	1.02	22.21
Vietnam	Tanrai	30.8	15.6	2.58	31.7	3.14	3.51
Russia	Uralsky	36.9	11.8	3.54	8.71	0.27	23.8
Greece	Boeotia	42.34	16.26	4.27	6.97	3.83	11.64
Spain	Alcoa	47.85	20.2	9.91	7.5	8.4	6.22

Note: Some plants are now out of operation. These data were collected when they were in operation
Source: NISPR

Red Mud generation — A global snapshot

From China to Brazil, India to Australia, alumina refineries are still pumping out red mud at alarming rates. China leads in absolute volume with rapidly expanding alumina capacities. Meanwhile, countries like Australia have moved towards more environmentally sound storage solutions like dry stacking.

The numbers don't lie: from under 10 million tonnes in the early '70s to well over 160 million tonnes annually today, red mud production is surging with aluminium demand.



Why Red Mud matters — And why it's dangerous

Beyond sheer volume, red mud is problematic due to its chemical makeup. Highly alkaline (pH ~11.3), it can cause chemical burns on contact and leach toxic metals into soil and water if mismanaged. And once it dries, it can become airborne dust, posing risks to respiratory health — particularly in regions with strong winds and dry climates.

Bright spots: Case studies in innovation

Several companies are pioneering new ways to tame — and even transform — red mud:

- EGA (UAE) has developed a method to convert red mud into manufactured soil, helping re-vegetate arid land.
- CHALCO (China) implemented advanced dry stacking systems, reducing the footprint and risks associated with wet storage.
- Hydro Alunorte (Brazil) and partners are working to extract valuable minerals like scandium and titanium from red mud — turning waste into wealth.
- Alcoa has introduced press filtration at its Poços de Caldas refinery, recovering more water and creating drier, safer waste.

These examples offer a glimpse into a future where red mud isn't a burden but a resource.

From liability to opportunity: Red Mud valorisation

For full valorisation — making red mud an asset rather than a liability, there are several exciting prospects:

- *Metal recovery:* Through reductive smelting and acid leaching, red mud can yield iron, rare earths, and even aluminium.
- *Construction materials:* As a raw material for bricks, tiles, or cement, red mud has shown great promise, especially in developing economies.

China, in particular, has made strides in red mud utilisation, blending it into building materials and chemical industries. Yet globally, only a small fraction (less than 5%) of red mud is reused — the rest remains an environmental time bomb.

A wake-up call — and a roadmap

- *Policy push:* Stricter environmental norms and incentives can drive innovation in waste management.

- *Technology transfer*: Best practices from Australia or the UAE must spread to lagging regions.
- *Research investment*: Unlocking the full potential of red mud requires more R&D, particularly in mineral extraction technologies.

And perhaps, most importantly, industry leaders, policymakers, and innovators must work together to reimagine red mud not as a toxic leftover — but as an untapped resource.

Source: AL Circle Blog, 06 May 2025

Tackle Steel Industry Challenges with Future-ready Solutions

Steel manufacturing is evolving fast. From digitalisation to decarbonisation, the industry is under pressure to adapt or risk falling behind. To remain resilient, steel producers must embrace innovation and stay informed on developing technologies.

How has steel manufacturing changed in the last 30 years?

Fluctuating demand, production costs, and environmental regulations have all brought the long-term sustainability of many steel companies into question. To survive these challenges of the modern market, the industry has become leaner, smarter, and more data driven.

Increasing scrutiny of carbon intensive industries has required extensive reporting and compliance. Meanwhile, the workforce has become fewer but more expert than ever before.

Advancing technology has also changed the steel industry – for example in temperature measurement. Continuous monitoring and with thermal imaging and automated process control has become central to process optimisation.

Historically, metal production has faced issues like:

1. Slag carryover in steel
2. Crust formation in aluminium furnaces
3. Inconsistent temperature control.

These challenges have caused waste and inefficiencies at metal plants.

Some of the innovations have made huge bounds towards solving these problems with technologies such as:

1. Data driven Slag Detection Systems (SDS)
2. Real-time thermal imaging combined with Imagery software
3. Multi wavelength emissivity-corrected instruments

Using real-time data to improve performance is fast becoming the industry standard. With this, we see increased demand for digital solutions that tighten process control.

Thermal imaging: how NIR-b and MWIR-b cameras have changed the steel industry

Across each phase of the production process, the steel industry represents some of the most extreme environments in manufacturing. Precision, safety, and efficiency are all critical on a day to day. Errors caused by outdated practices can result in defective products, dangerous equipment malfunctions, and even environmental penalties.

Thermal imaging technology has made it possible to collect in-depth real-time data during production. The adoption of *near infrared (NIR)* and *mid-wave infrared (MWIR)* borescopes have affected how steelmakers:

- Monitor furnace conditions
- Improve process control
- Ensure worker safety

While they may sound similar, MWIR and NIR borescope imaging cameras serve different purposes on the plant floor.

Mid-wave infrared borescope (MWIR-b)

MWIR-b thermal imaging cameras work in the mid-wave infrared spectrum (around 3 to 5 microns). They capture images of thermal radiation in high-temperature environments. This visual data allows precise temperature mapping of molten steel, refractory linings, and combustion zones.

With MWIR-b imaging, steel plants benefit from:

- Real-time, radiometric temperature readings
- Thermal mapping of molten metal surfaces or furnace walls
- Process control for Electric Arc Furnaces (EAF), Basic Oxygen Furnaces (BOF), and tapping operations
- Reliable data in visually obstructed environments (e.g., dusty, high-flame)

For example, steel tapping requires monitoring of the exact surface temperature of molten steel. This data is essential for yield, safety, and high quality. To achieve this, specialist instruments can deliver consistent and reliable results – even in environments heavy with dust and smoke.

Near-infrared borescope (NIR-b)

NIR-b thermal imaging cameras operate in the near-infrared spectrum (typically 0.78 to 1.4 microns). They are effective for visualising internal furnace structures at high resolutions, even under harsh lighting and high temperatures. You can use it for:

- High-resolution visual monitoring of furnace interiors
- Clear views of flame shape, burner condition, and refractory structure
- Visual feedback during inspections, maintenance, or process startup

With resolutions up to 3 million pixels, *NIR-b borescopes* allow steel producers to analyse performance to the finest detail for continuous improvement.

Enhanced safety for workers in the steel industry

The benefits of remote temperature monitoring extend beyond the final product. It also creates a safer work environment by keeping workers further from the furnaces than traditional methods of measurement.

Data is also key to preventing disaster. Furnaces operating at extreme heat create risk. Fires, explosions, and hot metal were collectively the cause of many accidents. With continuous real-time data, operators on-site can perform proactive repairs to reduce the likelihood of accidents.

What are the main challenges facing the steel industry in 2025?

Balancing net-zero targets with industrial demand

One of the greatest challenges steel faces today is balancing environmental targets with delivering for its loyal customers across the automotive, construction, energy, and manufacturing sectors.

These end-users depend on your ability to deliver consistent, large-scale supplies. Any disruption or slowdown could have widespread ripple effects. Recognising this challenge, we deliver customisable solutions that integrate with existing systems to minimise disruption.

The transition to green steel

To meet climate commitments while maintaining their competitive edge, steelmakers worldwide are accelerating the shift toward low-emission production. This transition is being driven primarily by two emerging technologies:

1. H₂ steel, or hydrogen-based direct reduced iron (H₂-DRI), to produce steel without carbon.
2. Electric arc furnace (EAF) technology to melt scrap steel without coke or coal. EAFs have replaced most basic oxygen furnace in modern steel production.

By adopting these advancements, steel producers can take advantage of:

- Reduced carbon emissions and lower carbon taxes
- Greater energy efficiency in an inherently energy intensive process
- Increased flexibility in feedstock sourcing (scrap or DRI)

Global industrial regulations and supply chain reporting

Increasing environmental regulations mean many steelmakers must report on emissions from their entire value chain – known as 'Scope 3' emissions. As a supplier, falling behind can be a competitive disadvantage when up against more sustainable steel manufacturers.

To keep up with the increasing pressure, operators must keep up with advancing Best Available Techniques (BATs) and continuously look to improve environmental performance.

Adoption of lightweight alloys and recycled materials

The growing use of lightweight alloys and recycled materials poses a real challenge for the steel industry. Unlike traditional raw materials, these inputs don't behave consistently in extreme conditions.

Without precise thermal control, this variability can lead to quality issues, increased scrap, and costly downtime. As steelmakers aim for efficiency and sustainability, managing this inconsistency with advanced thermal imaging becomes critical.

Utilising customised integration in steel making

In steel production, every part of the process needs to work together. Data that isn't integrated into your broader system is wasted potential. To find solutions for the challenges steel plants are facing, monitoring technology needs to integrate with the system, not the other way around.

To tackle these challenges, steel producers require:

- Proven solutions for extreme environments
- Fully customised system integration
- Support, service, and training

What emerging technology is going to impact steel producers?

The future of technology in steel production is vast with new tools opening doors in predictive process control. Most notably, AI is the hot topic in industrial data analytics. Increased quality of imagery is also expanding what we can do with data.

Operators. With application-specific thermal imaging solution, operators can achieve improved safety and yields compared to plants without it.

The next leap in thermal imaging technology will be multi-spectrum instruments – advanced infrared cameras capable of detecting multiple parts of the infrared spectrum in a single device. These versatile instruments can adapt for multiple applications, helping drive the next wave of steel.

Looking further ahead, technologies like digital twins, edge-based analytics, and thermal modelling are moving from concept to reality. Integrating them with thermal intelligence will drive smarter, faster, and more energy-efficient operations across steel producers.

Source: LAND Newsletters, 05 September 2025

Role of Si and Flux for Secondary Aluminium Manufacturing

In aluminium scrap melting, furnace charge can contain cans, old engine blocks, window frames, painted sheets and oily turnings. Each scrap type melts at a different rate depending on geometry, oxidation and alloy composition, introducing varying alloying and impurity elements into the melt. Some add silicon. Some add magnesium. Some add iron, dirt, or gas.

If mixed scrap is melted without chemistry control, degassing and inclusion removal, the resulting metal is prone to porosity, inclusions and inconsistent mechanical properties. The casting might look fine, but it will fail in use.

This is where metallurgy matters.

Secondary smelters do not just melt scrap. They change it. They test the chemistry, adjust alloying elements such as silicon, and use specialised fluxes to remove oxides and certain reactive elements like magnesium. That process turns random scrap into a controlled aluminium grade.

Variety of aluminium scrap and its variability

Each type of scrap brings a different mix of aluminium. The most common scrap types include:

- **UBC scrap:** Used beverage cans. Aluminium alloy scrap with coatings and relatively high magnesium content.
- **Cast scrap:** Old engine parts, pumps, housings. Typically, silicon-containing aluminium alloys are often contaminated with oxides, oils, and inclusions.
- **Extrusion scrap:** Generally low in silicon compared to casting alloys, but composition varies by extrusion alloy.

- **Mixed scrap:** A blend of many alloys. Hard to predict
- **Turnings and chips:** Fine metal but high oxidation
- **Painted and oily scrap:** Loses yield and needs more flux



This mix is why every melt is different. And this is why silicon and flux matter so much.

The role of silicon in secondary aluminium manufacturing

Silicon improves fluidity, reduces solidification shrinkage and influences strength depending on alloy composition and microstructure. More silicon means:

- Better fluidity in the mould
- Less shrinkage during cooling
- Lower cracking risk
- Improved castability and surface finish under controlled melt and mould conditions

But too much silicon makes the metal brittle. Too little silicon makes it hard to cast.

So, smelters aim for a tight range. This is where precise silicon grades come in.

Common silicon metal grades used in secondary aluminium include 2202, 441, and 553. These silicon grades are not the same.

Lower-impurity silicon grades (e.g., grade 2202) are preferred where tighter chemistry control is required.

Higher impurity grades like *silicon 441* and *silicon 553* are used where tolerance permits.

Good smelters pick the grade based on how they melt and what they cast.

Many plants treat flux as an expense. That is a mistake. Flux does three jobs:

- It helps release entrapped aluminium by breaking oxide films and improving metal separation
- It removes oxides and can reduce certain reactive elements, such as magnesium
- It cleans the liquid metal

If you skip flux or use the wrong type, you lose metal and you get bad castings.

Drossing flux

Dross holds trapped aluminium. Drossing flux breaks that bond. *Granular drossing flux* releases usable metal back into the melt.

That means:

- Higher recovery
- Less metal is thrown away
- Better furnace output

Magnesium removing flux

Excess magnesium increases oxidation, dross formation, and gas-related defects in certain casting alloys. Magnesium-removing flux pulls magnesium out of the melt.

This keeps:

- Alloys within spec
- Porosity under control
- Surface finish stable

Alkaline removing flux

Granular alkaline removing flux removes alkali and alkaline-earth elements such as sodium and calcium, which increase oxidation and inclusion formation. It helps keep the melt calm and clean.

This gives:

- Less dross
- Fewer inclusions
- Better ingot quality



How secondary aluminium smelters convert scrap into saleable ingots

The process appears straightforward, but maintaining consistent metallurgy requires tight control at every stage:

- Scrap goes in
- Metal melts
- Silicon is added
- Flux cleans the melt
- Chemistry is checked

Metal is cast into ingots But in practice, it takes control at every step.

Good smelters do not chase tonnage. They chase stable chemistry and clean metal.

Aluminium alloy ingots are used in:

- Automotive parts
- Industrial housings
- Marine fittings
- Defence components

They need:

- Tight silicon levels
- Low magnesium
- Low oxide inclusions and controlled hydrogen levels

If the melt is wrong, the casting will fail. Cracks, pores and weak spots all start in the furnace. So, when die casters buy secondary ingots, they are really buying the smelter's process.

Conclusions

Secondary aluminium is no longer a low-end business.

Die casters now expect secondary aluminium with consistent casting behaviour comparable to primary metal.

That only happens when:

- Scrap is selected well
- Silicon is added with care
- Flux is used the right way
- The melt is controlled

This is why the scrap yards, silicon suppliers, flux makers and smelters must work closer than before.

Source: AL Circle 30 January 2026

Tata Steel Partners USTB to Accelerate Low-carbon Steelmaking Technologies

Tata Steel has entered into a MoU with the University of Science and Technology Beijing (USTB) to advance research and development in low-carbon steelmaking technologies. The collaboration brings together industrial capabilities and academic research to address the growing need for sustainable steel production.

Under the agreement, teams from Tata Steel, Tata Steel Research and Innovation Limited, and USTB will jointly work on four key areas: scrap-based steelmaking, steel waste valorisation, end-product performance, and carbon capture and utilisation technologies. These areas are central to reducing emissions across the steel value chain while maintaining product quality and performance.

The partnership reflects Tata Steel's ongoing focus on innovation-led decarbonisation, with an emphasis on developing scalable solutions for industrial deployment.

Focus on pilot validation and industrial scalability

A key component of the collaboration will be the use of USTB's experimental and pilot-scale facilities to test and validate emerging technologies. This approach is expected to accelerate the transition from research to industrial application, addressing one of the primary challenges in low-carbon steelmaking.

The collaboration will combine USTB's expertise in metallurgy and materials science with Tata Steel's operational and engineering strengths. The objective is to move beyond conceptual research and towards practical implementation of low-carbon processes in steel manufacturing.

According to Tata Steel, the initiative aligns with its broader sustainability strategy, which prioritises reducing carbon intensity while enhancing process efficiency and product innovation.

Industry stakeholders note that such cross-border collaborations are becoming increasingly important as steelmakers work to meet global decarbonisation targets. The integration of academic research with industrial scale-up capabilities is seen as critical to accelerating technology adoption in energy-intensive sectors such as steel.

The partnership also underscores the role of collaborative ecosystems in addressing complex challenges such as emissions reduction, resource efficiency, and circularity in manufacturing.

Source: Manufacturing Today, March 17, 2026

China to Reduce Steel Production Capacity by 2026

China has committed to capping steel production capacity by 2026 as part of a broader campaign to eliminate excessive competition and stabilize the heavy industry sector.

The directive is included in the draft National Economic and Social Development Plan for 2026 and the corresponding report for 2025. The latter was submitted by the National Development and Reform Commission (NDRC) to the National People's Congress in early March and subsequently officially approved.

The new plan emphasizes accelerating the modernization of industrial systems and developing new growth drivers with a strong focus on the real economy. The document calls for coordinated efforts to transform traditional industries, expand

emerging sectors, and foster the development of “new, high-quality productive forces” adapted to local conditions.

For the steel industry specifically, this means tighter control over production capacity. The plan calls for an orderly reduction of capacity to achieve a stable balance between supply and demand, optimize the industrial structure, and significantly improve corporate profitability.

Last year, China accelerated the modernization of its steel industry, focusing efforts on addressing the problem of “involutionary” competition—market rivalry in which companies resort to excessive price cuts, overproduction, and cost-cutting to push out competitors, yet fail to actually improve efficiency, innovation, or product quality.

In 2025, government agencies introduced controls on steel production and stepped up capacity replacement programs. However, as noted in the NDRC report, this year’s strategy goes beyond simple capacity reduction. It calls for improved product quality, cost reduction, and decarbonization initiatives through technological transformation and modernization—this applies to the steel sector and other key industrial sectors.

Beijing intends to improve standardization systems, gradually phase out outdated and inefficient processes, and promote cutting-edge technologies. Expanding the use of artificial intelligence in key sectors will drive new advantages in green and digital development. These efforts, in particular, aim to reduce energy consumption and carbon emissions per unit of steel produced, providing significant support for China’s environmental commitments.

As a reminder, in January-February 2026, China reduced steel production by 3.6% year-on-year to 160.3 million tons.

In 2025, steel production in the country fell below the 1 billion-ton mark, reaching its lowest level since 2018. According to data from the National Bureau of Statistics of China, Chinese steelmakers produced 960.81 million tons of steel last year, a 4.4% year-on-year decrease. The decline was a result of the protracted crisis in the real estate market, which significantly curtailed domestic demand for steel products.

Source: MRAI News Updates: 17th March, 2026

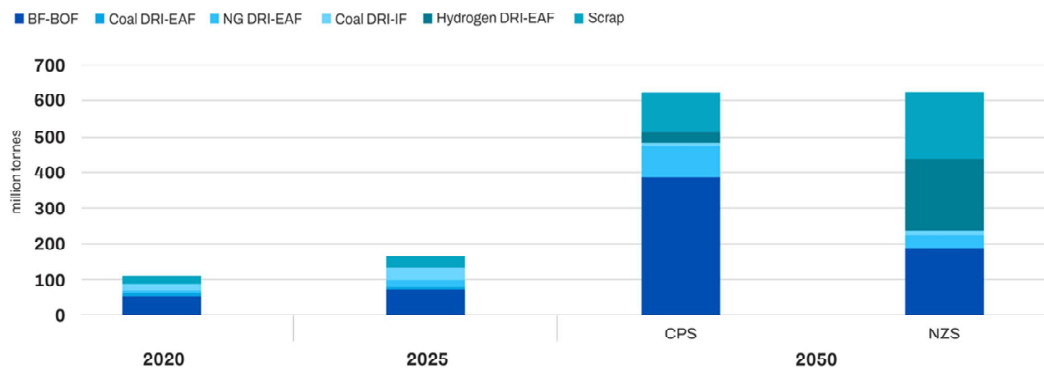
Net-zero Policies Could Cut Steel Industry CO₂ Emissions Intensity by Over 70% by 2050

The Indian steel industry's carbon emissions intensity is expected to drop by 44% by 2050 from current levels under a business-as-usual scenario, while emissions

reductions are expected to be much sharper, around 74% compared with current levels, under a net-zero scenario (NZS), according to NITI Aayog.

While CO₂ intensity may reach around 1.3-1.4 tCO₂/t of steel by 2050 under the business-as-usual scenario, emissions may drop to around 0.6-0.7 tCO₂/t under the net-zero scenario. Current CO₂ intensity is around 2.5 tCO₂/t, as per Ministry of Steel.

Evolving technology-wise steel production mix under current & net-zero scenarios



NZS: Net Zero Scenario | CPS: Current Policy Scenario | Source: NITI Aayog, BigMint

NITI Aayog's steel sector modelling focuses on two scenarios - the 'current policy scenario' (CPS) or business-as-usual, and the net-zero scenario (NZS). The two scenarios are based on a set of assumptions:

- BF-BOF dominates in CPS till 2050. But in the NZS, BF-BOF dominates till 2040, with no new additions after 2060.
- Coal-DRI-IF is phased out after 2030 under both scenarios
- Natural gas (NG)-DRI to be transition technology under both scenarios but no new capacity additions happen after 2040 in the NZS
- H₂-DR-EAF commercialisation starts from 2035 and attains scale after 2045 under CPS but under NPS this technology starts in 2030 with significant scale emerging in the 2040s

Energy use and fuel mix

NITI Aayog projects crude steel production to reach 624 million tonnes (mnt) by 2050 using a 'saturation-growth model'. As India industrialises, steel demand is expected to increase rapidly by mid-century, after which the growth is expected to slow down. This mirrors the pattern seen in other industrialised nations. Per capita consumption is expected to reach around 450/kg after which it is expected to plateau.

Notably, the steel sector's specific energy consumption (SEC) is expected to drop by 24% under the NZS, with the domestic mills reaching the level of global best practices as opposed to just 12% under CPS. Indian BF-BOF mills' SEC currently averages around 26-27 gigajoules per tonne (Gt) versus the global best of 20-22 Gt.

Also, another ambitious assumption made by NITI Aayog is the decline in coal's share in captive generation to just 20% by 2050 from 93% in 2023-24 due to the rapid shift to renewables and nuclear power, tightening of taxonomies under CCTS, and development of storage capacities. Reliance on a clean and stable grid is projected to increase vis--vis captive power.

Importantly, despite the positive policy framework created to boost domestic scrap generation, under the current policy scenario scrap consumption in steel industry will remain at the same level of 20% in 2050 as in 2024. In the NZS, however, scrap use in steelmaking is projected to increase to 30% by mid-century through strong EPR policies, minimum recycled content norms and a formalised value chain.

Technology transformation

Therefore, ambitious targets and policies are required to drive net-zero goals broadly in alignment with the IEAs NZS 2050. While reduction in SEC and steel sector emissions will continue, albeit at a very slow pace, under the CPS, net-zero policies are needed to drive faster and deeper decarbonisation.

Importantly, the share of BF-BOF under net-zero by 2050 should be well below 200 mnt, according to NITI Aayog model, whereas in the CPS that share is close to 400 mnt. This is a key challenge for India.

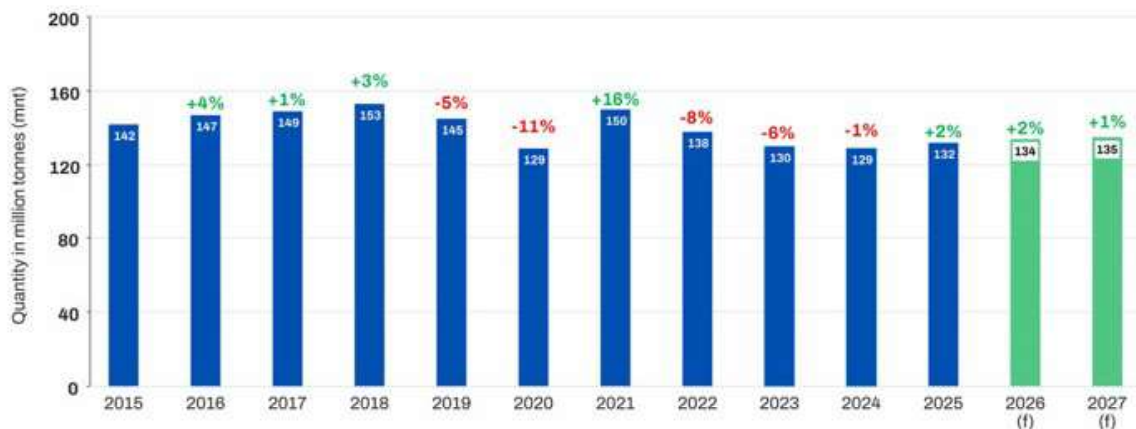
Another key challenge is to quicken the pace of H₂-based DRI production and steel production via EAF technology which has the potential to replace a large share of BF-BOF steel production in India. While the shift from NG-based ironmaking to H₂ is quite marked in the NZS, the share of green DRI-based steel is quite low in CPS.

Additionally, if 180-200 mnt of crude steel output in 2050 is projected to be based on scrap under the NZS then fast-tracking of policy measures and strict implementation are required to raise the share of domestic scrap generation.

According to NITI Aayog, scaling up EAF technology requires a dedicated and robust framework for scrap policy that goes beyond vehicle scrappage policy and includes segregation networks, formal scrap collection targets, digital information of the scraps used, and a certification mechanism for quality assurance.

Source: BigMint Updates 25 Feb 2026

EU Crude Steel Production in CY'25



f: Forecast | All above figures are rounded off | % change in year-on-year (y-o-y) | Source: EUROFER, BigMint

European Union's Apparent Steel Consumption and Forecast

The EU's crude steel production fell 3% y-o-y to a historic low of 125.8 million tonnes (mnt) in CY'25, as per EUROFER's latest Economic and Steel Market Outlook 2026-2027, First Quarter Report. Pressured by elevated imports, weak consumer confidence, and trade tensions, the steel market down cycle continued, though some signs of recovery emerged. A slight improvement in apparent steel consumption took place in CY'25, projected at 2.4%. This was driven by stronger construction activity and a robust government-supported infrastructure pipeline.

Steel demand revives but remains below pre-pandemic levels

Following three consecutive years of contraction, apparent steel consumption climbed higher in CY'25, triggered by a low base effect, an improving industrial outlook, and a stronger-than expected demand in some national markets.

EUROFER has also forecast a 1.3% y-o-y increase in apparent steel demand in CY'26, again stemming from a low base effect rather than a recovery in demand.

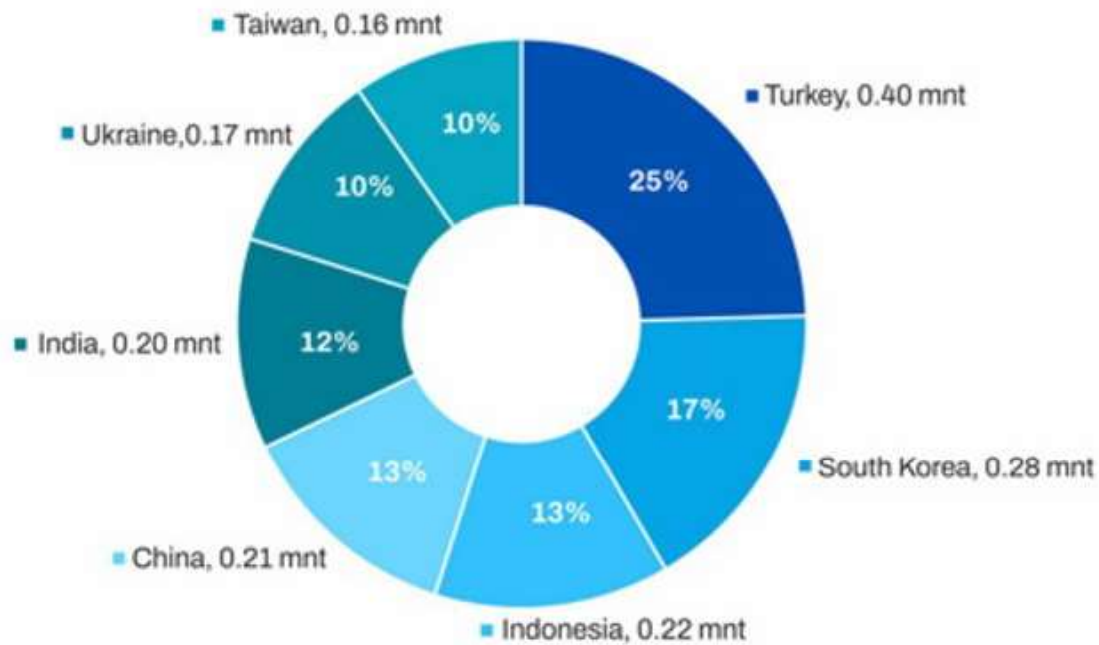
Even with the projected rebound, the EU's steel consumption is estimated to remain well below pre-pandemic levels, by around 11 mnt in CY'26 and 9 mnt in CY'27.

Similarly, the decline in real steel consumption is projected at a minor 0.2% against the earlier forecast -2.1%. Restocking is expected only in late 2026 amid prolonged uncertainty and low confidence in economic and industrial activity.

Imports surge in CY'25, market penetration hits record high

The EU's steel imports increased 14% y-o-y in CY'25, with finished longs up 17% and flats rising 7%. Q4CY'25 witnessed a sharp 53% surge in total imports, as buyers

actively stocked up on cheaper imported material ahead of the phase-in of the definitive period of the Carbon Border Adjustment Mechanism (CBAM), fearing high carbon costs.

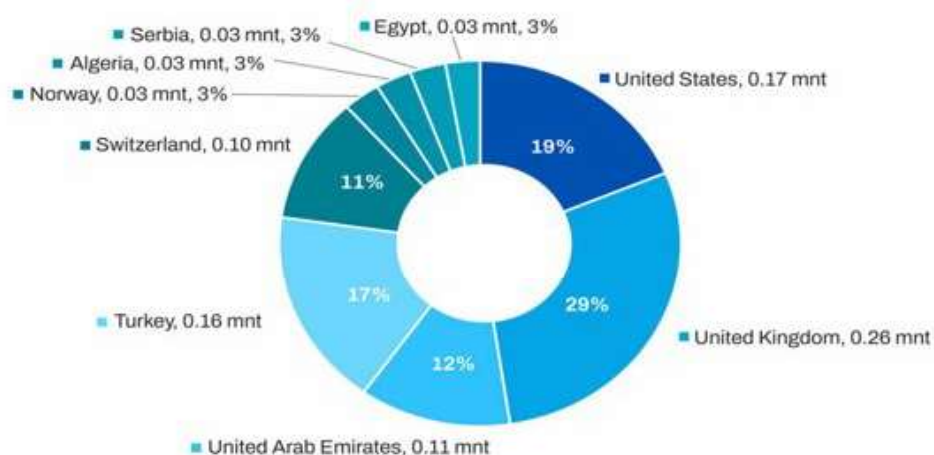


European Union's country-wise monthly averages steel imports in 2025

Notably, in Q3CY'25, imports accounted for 29% of the EU's apparent steel consumption - a record high.

Imports increased sharply from Indonesia (+263%), Turkiye(+24%),and China (+31%) but declined from India (-28%) and Taiwan (-15%).

Conversely, the EU's steel exports to third countries decreased by 12% in CY'25, pointing to a weakening trade balance.



EU's Country-wise Monthly Average Exports in 2028

Sector	% Share in total consumption	2025	Q1'26	Q2'26	Q3'26	Q4'26	2026	Q1'27	Q2'27	Q3'27	Q4'27	2027
Construction	37	0.7	1.4	2	2.9	3.1	2.4	2.6	2.4	2.9	3.2	2.8
Mechanical engineering	12	-0.8	0.5	1	2.3	1.9	1.4	2.2	2	0.9	2.4	1.9
Automotive	19	-4.3	3.5	1	0	-1.2	0.9	0.7	1.7	2	2.3	1.7
Domestic Appliances	3	0.5	2.1	0.3	2.1	1.4	1.5	0.3	1.3	0.3	1.6	0.9
Other Transport	3	2.3	2.8	2.7	3.1	2.8	2.9	1.8	2.2	2.8	2.3	2.3
Tubes	11	0.2	2.6	-0.8	0.2	1.2	0.8	0.7	2.8	1.8	0.7	1.5
Metal Goods	13	-0.1	2.3	2.9	3.7	2.8	2.9	2.8	2.3	1.7	3.1	2.5
Miscellaneous	2	2.5	1.8	2.5	-0.3	1.1	1.3	1.7	1.5	1.8	1.7	1.7
Total	100	-0.3	2.3	1.5	2.1	1.7	1.9	1.8	2.2	2.3	2.5	2.2

EU Steel Weighted Industrial Production (SWIP) Index

Steel-consuming sectors' performance rebounds in Q3CY'25

In Q3CY'25, the Steel Weighted Industrial Production index (SWIP) - an indicator of real steel consumption in major end-user segments - increased for the first time since Q4CY'23.

Positive growth in all steel-consuming sectors - construction (1.6%), automotive industry (1%), mechanical engineering (0.6%), and steel tubes (3.8%) - triggered an increase of 1.8% following six consecutive quarters with a decline.

In CY'25, the SWIP is projected to fall 0.3% amid US tariff uncertainties despite a modest recovery in the construction sector.

Construction sentiment improves as investment growth surges:

In Q3CY'25, a substantial 15% increase in construction investment led to improved construction output. However, the sector is expected to grow merely 0.7% in CY'25, weighed down by subdued housing demand during H1.

Growth is expected to accelerate in the next two years, aided by easing monetary policies and increased government expenditure. The major pillars of development will be the implementation of NextGenerationEU investment schemes - a post-COVID recovery instrument by the European Commission (EC) - along with increased flexibility in EU fiscal rules for Member States and Germany's massive EUR 500 billion infrastructure fund announced in CY'25.

Tariff tensions, weak demand keep auto sector in slow lane:

Output from the automotive sector is set to remain subpar with a 4.3% fall projected in CY'25.

Mounting trade challenges, especially with the US's tariffs on EU-manufactured cars and increasing Chinese EV exports to the EU, weighed on automakers' investment decisions; order delays due to supply chain disruptions (such as over the adequate availability of rare earth elements) also dampened production momentum. Similarly, war-led turmoil, low growth in disposable incomes, and economic uncertainty dragged down consumer confidence.

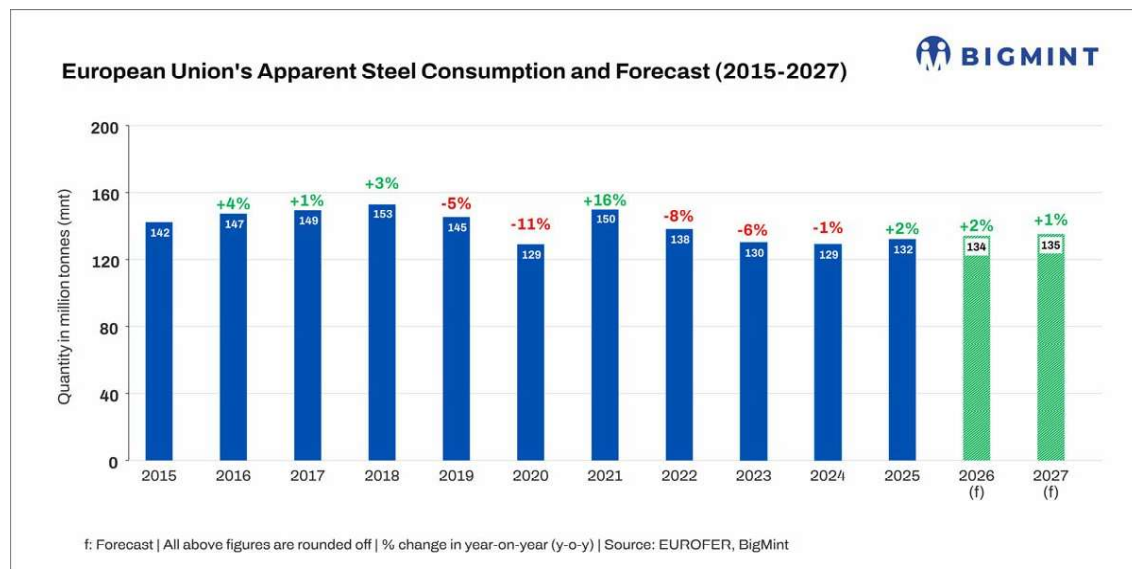
However, a promising sign is that new car registrations in the EU increased slightly by 1.8% y-o-y in CY'25, driven by a surge in EV sales as petrol- and diesel-powered cars lost ground. Consequently, EUROFER remains optimistic regarding a modest rebound in automotive output in CY'26-27.

Recession in mechanical engineering continues:

The mechanical engineering sector is set to close CY'25 with a recession (-0.8%), though modest growth is expected in the next two years as manufacturers' confidence strengthens.

Demand outlook for tubes segment remains mixed:

In CY'25, a marginal 0.2% recovery in steel tubes output is expected. However, while output is expected to grow further in CY'26 and CY'27, the outlook remains mixed. As the EU transitions to LNG shipping, development of pipeline gas infrastructure will gradually stagnate. However, demand from the construction segment will likely increase and that from the automotive and engineering sectors will remain stagnant.



Outlook

GDP growth forecasts for the EU stand at 1.2% in 2026, revised downward from 1.4% previously, suggesting that steel demand will remain weak despite a modest rebound. However, at the moment, the more pressing concern is regarding

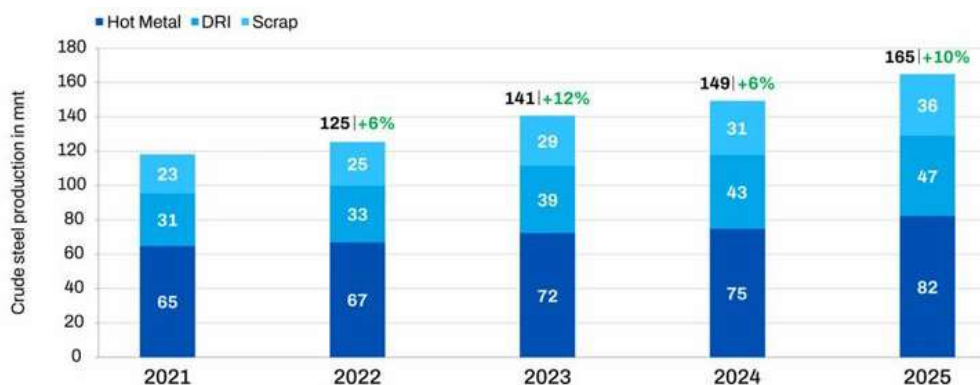
production. Given the outbreak of the US-Iran conflict and the resultant surge in gas and energy prices, it is uncertain whether EU steelmakers will be able to significantly lift their capacity utilisation rates, which were already at below profitable levels. This is despite protective measures such as the CBAM and reduced import quotas.

Weak demand will continue to pressure steel prices, but with cost pressures rising simultaneously, producers may be forced to slow down operations. This would again weigh on profitability, leading to (borrowing a term from EUROFER's report) a "continued downsizing of the European steel industry".

Source: BigMint Bureau

India's Steel Metallic Mix

India's raw material mix for steel production has shifted notably in the last five years, though hot metal output continues to dominate. While India's crude steel production has risen at a compound annual growth rate (CAGR) of 7% between CY21 and CY25, sponge iron or direct reduced iron (DRI) and scrap consumption have increased at sharper CAGRs of 9% and 10%, respectively. This suggests an increasing share of crude steel is being produced from these two metallics rather than hot metal.



|| above figures are rounded off | Quantity in million tonnes (mnt) | % change in year-on-year (y-o-y) | Source: BigMint

India's metallic mix in steel production

In absolute terms, scrap consumption has increased by 14 million tonnes (mnt) to 39 mnt in CY25 from CY21. Sponge iron consumption has increased by a higher 21 mnt to 58 mnt in CY25. In part, this shift has been enabled by a sharp increase in induction furnace (IF) based crude steel production over CY21-25 (15% CAGR). Meanwhile, output from electric arc furnaces (EAFs) has remained stable over the years. However, given that steel production has climbed up steadily, the share of

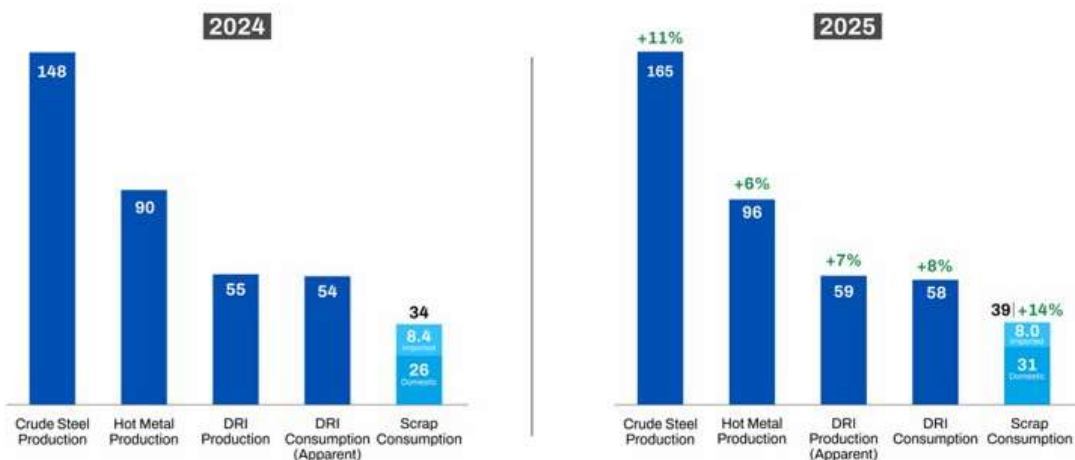
EAF-based output has gradually shrunk to 20% from 27%. Although crude steel output from hot metal remains the dominant steelmaking route, it has increased the slowest, at 5%. Consequently, the share of blast furnace (BF) based output has declined slightly to 42% from 46%.

CY'23 marks turning point

The majority of steel growth in CY23 came from the IF route. The surge reflected strong post-pandemic construction demand, faster ramp-up capability among smaller mills, and elevated coking coal prices that squeezed margins at integrated BF-based steelmakers.

Factors influencing Indias shifting raw material mix

Ample supply, competitive prices, boost DRI output. Sponge iron production has increased at a CAGR of 9% to 59 mnt in CY25 from 39 mnt in CY21. The rapid growth in sponge iron production can be attributed to the easy availability of iron ore and coal at competitive prices, cost-efficient operations achieved through the utilisation of waste heat in the coal-based DRI process, and the limited supply of ferrous scrap in the domestic market. Sponge iron prices have also declined 22% since CY22 if yearly averages are considered. Sponge iron (PDRI) averaged INR 31,000/tonne (t) exw-Raipur in CY22 and INR 24,100/t in CY25. Meanwhile, HMS 80:20 prices in Raipur fell 20% to INR 34,000/t DAP in CY25. The decline in sponge iron prices comes from rapid capacity growth, which has outpaced consumption, as well as subdued steel market dynamics. Capacity was estimated to be at around 68-70 mnt in CY25. Therefore, sponge iron remains more attractive than expensive scrap or coke-dependent hot metal.



Provisional figures | All above figures are rounded off | Quantity in million tonnes (mnt) | % change in year-on-year (y-o-y) | Source: BigMint

India's metallic mix scenario: 2025 Vs. 2024

Policy measures boost scrap generation but structural challenges remain. The Indian steel industry has also embraced greater scrap usage in pursuit of green steel targets. However, despite rising domestic scrap availability and policy push, scraps share remains lower due to structural limitations. India’s per capita steel consumption has only recently crossed 100 kilograms, meaning much of the country’s steel stock is still in use. Obsolete scrap generation typically lags consumption by up to around 30 years, limiting near-term supply. If domestic scrap collection and processing infrastructure fail to scale quickly, scrap penetration could slow, forcing mills to rely more heavily on sponge iron. Geopolitical tensions, disruptions to sea routes, and rising protectionist stances on scrap trade flows, are also likely to constrain import growth.

Outlook

With capacity expansion progressing rapidly, sponge iron production and consumption are projected to continue rising in CY26. However, a sponge iron-heavy mix has negative implications for emissions and policy, so over the longer term, DRI is expected to yield ground to scrap, aligned with the governments sustainability agenda. Consequently, scraps share in Indias metallic mix will eventually surpass that of DRI.

Source: BigMint Updates, 13 Feb. 2026

Global Steel Companies by Market Capitalization

Global Rank	Company	Country	Market Cap
1	ArcelorMittal	Global	~\$50B
2	Nucor	USA	~\$45B
3	JSW Steel	India	~\$36B
4	Steel Dynamics	USA	~\$30B
5	Tata Steel	India	~\$30B
6	POSCO Holdings	South Korea	~\$28-30B
7	Tenaris	Luxembourg	~\$25B
8	Jindal Steel	India	~\$14B
9	Steel Authority of India Limited	India	~\$8B
10	Hyundai Steel	South Korea	~\$6B
India has 4 co.s among Top10 Most valued Steel Co.s			

Global Steel Companies By Market Capitalization

India's Macro Economic Indicators 2025

Key Parameters	2025												2026
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan
Crude steel production (in million tonnes)	13.6	12.7	13.8	12.9	13.5	13.6	14.0	14.1	13.6	13.6	13.7	14.8	15.2
Pig iron production (in million tonnes)	0.67	0.61	0.73	0.74	0.73	0.74	0.88	0.72	0.68	0.65	0.67	0.71	0.71
Steel Exports (in million tonnes)	0.52	0.52	0.55	0.60	0.58	0.61	0.56	0.67	0.72	0.72	0.97	0.94	0.65
Steel Imports (in million tonnes)	0.75	0.50	0.62	0.47	0.70	0.61	0.85	0.70	0.79	0.69	0.60	0.59	0.47
Iron ore Imports (in million tonnes)	1.17	0.53	0.70	0.48	0.43	1.45	1.82	1.12	1.00	1.09	0.97	1.48	0.63
Coal Production (in million tonnes)	104	98	119	82	86	79	65	70	68	77	83	101	107
Coal Imports (in million tonnes)	21.7	19.3	23.2	24.7	27.2	24.2	21.3	20.0	20.6	16.9	18.9	16.9	17.9
Automobile Production (in million units)	2.54	2.34	2.47	2.31	2.58	2.36	2.69	2.69	3.07	2.80	2.94	2.63	2.92
Automobile Sales (in million units)	2.29	1.88	2.12	2.28	2.21	2.00	2.05	2.30	2.69	2.85	2.52	2.09	2.54
Daily Average Power Consumption ('000 MUs)	4.44	4.70	4.80	4.90	4.80	5.00	4.96	4.85	4.86	4.26	4.12	4.47	4.60
Merchandise exports (in Billion USD (\$))	36.4	38.9	42.0	38.5	38.7	35.1	37.2	35.1	36.4	34.4	38.1	38.5	36.8
EV Registrations ('000 Units)	125	147	100	121	131	138	142	143	141	190	159	137	168
GST Collections (in Trillion INR (₹))	1.96	1.84	1.96	2.37	2.01	1.85	1.96	1.86	1.89	1.96	1.75	1.75	1.93
Manufacturing PMI Index	57.7	56.3	58.1	58.2	57.6	58.4	59.1	59.3	57.7	59.2	56.6	56.0	55.4

Source: Various Ministries (Government of India) | SIAM | BigMint

Source: BigMint Updates 10 March 2026

Members' News

- Prof. Suddhasatwa Basu, IIT Delhi, Life Member, has moved to USA for 7-8 months under Fulbright Academic & Professional Excellence Fellowship at WashU and PurdueU for research and teaching
- Shri R. K. Vijayavergia. Life Member, IIM, and Past Chairman, IIM Delhi Chapter, has been appointed as a member of Board of Governors of the National Institute of Secondary Steel Technology (NISST). Shri R. K. Vijayavergia, has also joined Advisory Board of *minerals2metals*, a Quarterly Ezine, a publication of Indian Minerals Infomedia.
- Shri M P Sharma, Life Member, IIM, and Jt. Secretary of IIM Delhi Chapter, a well-known Aluminium Expert, has recently crossed 44009 followers in his Facebook account. His YouTube channel is Ajamps Foundry Tech. He is registered in MSME UDYAM - DL as (For Research and Experimental Development in Natural Science and Engineering.) - Scientific and Technical Expert (Regd. GST Department. Govt. of India) and also registered with Research Gate.
- Shri R. K. Singhal, Life Member, has joined Professional Golf Tour of India as Consultant – Communication.

Know Your Members



Shri Sudhanshu Shekhar Bharadwaj

B.E. (Metallurgical Engineering)

Former General Manager (Law)

Central Marketing Organization

Steel Authority of India Limited (SAIL)

Kolkata

After graduation in metallurgical engineering from Malviya Regional Engineering College, Jaipur (Now Malviya National Institute of Technology) in 1979, Shri SS Bhardwaj joined SAIL in April 1980 at Rourkela Steel Plant. He worked in Cold Rolling Mill and Production Planning & Control departments of Rourkela Steel Plant and then shifted in 1986 to Bokaro Steel Plant where he worked in Hot rolled Coil Finishing (HRCF).

He graduated in Law in 1982 and subsequently worked in Law Departments of Bokaro Steel Plant (2002), Raw Material Division (2005) and Centre Marketing Organization (2009) of SAIL. While at CMO he disposed of about 60 legal cases, some of them pending since 1964, through arbitration.

He was deputed to Bureau of Industrial Cost and Prices (BICP) of Ministry of Industries from SAIL during 1988 -90 for coordination in rolling mills area for report preparation for SAIL Modernization.

Shri Bhardwaj is a Life Member of IIM.

Contact details

Mobil: 8709032450; 9431083200 (WhatsApp only)

Email: champran3@gmail.com