APRIL 2026 Volume 1 No. 2

minerals2metals

QUARTERLY EZINE|METALLIC MINERALS|INDIA

IMPACT OF MIDDLE EAST WAR ON INDIAN STEEL INDUSTRY

Technology
Decarbonizing the Steel Industry

Refractories
Global Trends in Refractories For Iron & Steel Industry

Raw Materials
Coking Coal: A Critical Mineral

A PUBLICATION OF INDIAN MINERALS INFOMEDIA

Indian Minerals
WE MINE INFORMATION

Content

As I See It

The widening arc of conflict across the Middle East—spanning Israel, Iran, the Gaza Strip, and critical maritime corridors like the Hormuz Strait was no just a distant geopolitical concern for India. It became a material economic risk, with direct implications for the country's core sectors: steel, cement, refractories and others. The Indian steel industry is deeply integrated into global commodity, energy, and logistics networks—many of which pass through or depend on stability in the Middle East. Steelmaking is energy-intensive, and India relies heavily on imported fuels—particularly coking coal and natural gas. While coking coal primarily comes from Australia, energy pricing is globally benchmarked and highly sensitive to disruptions in oil and gas flows from the Middle East. The weakened rupee against dollar make coking coal and limestone import expensive.

In this backdrop, we welcome the ceasefire declared by the warring parties and sincerely wish that the fragile truce will be translated to lasting peace. There is nothing that this war has ever achieved that we could not better achieve without it.

The Middle East conflict underscores a broader truth: in a globalized economy, geopolitics and industry are inseparable. For India's core sector industries, the risks are immediate—higher costs, disrupted trade, and uncertain demand. But so are the lessons.

A. Dasgupta

Published By Srabanti Dasgupta,
c/o Indian Minerals Infomedia.

Phone: +91 85849 24582 email: admin@indianmin.in
Website: www.indianmin.in

PREMIER

PREMIER
REFRACTORIES OF INDIA PVT. LTD.

MANUFACTURERS OF HIGH QUALITY REFRACTORIES, MONOLITHICS & INSULATING MATERIAL

New Katni Junction, KATNI - 483501 (Madhya Pradesh) INDIA
Tel : 07622 - 237200, 237266, FAX : 237199, Email : marketing@premierrefractories.com
Visit us : www.premierrefractories.com

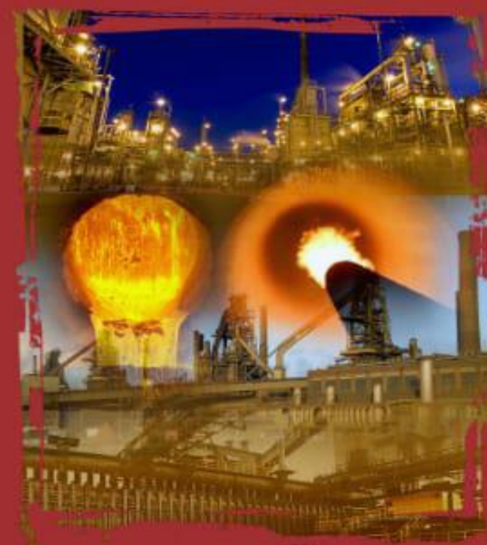
OUR STRENGTHS

- A well equipped modern plant with fully automatic heavy duty Swiss make BUCHER PRESSES of 1600MT & 900MT capacity.
- High Temperature Tunnel Kilns.
- A state of the art laboratory for material testing.
- Annual Capacity of producing 36000MT of refractory bricks.
- Annual Capacity of producing 24,00,000 pieces of insulating bricks.
- Annual Capacity of producing 24000MT of Castables and mortar.
- Own calcination units for manufacturing high quality raw materials and high alumina binders.

OUR PRODUCTS

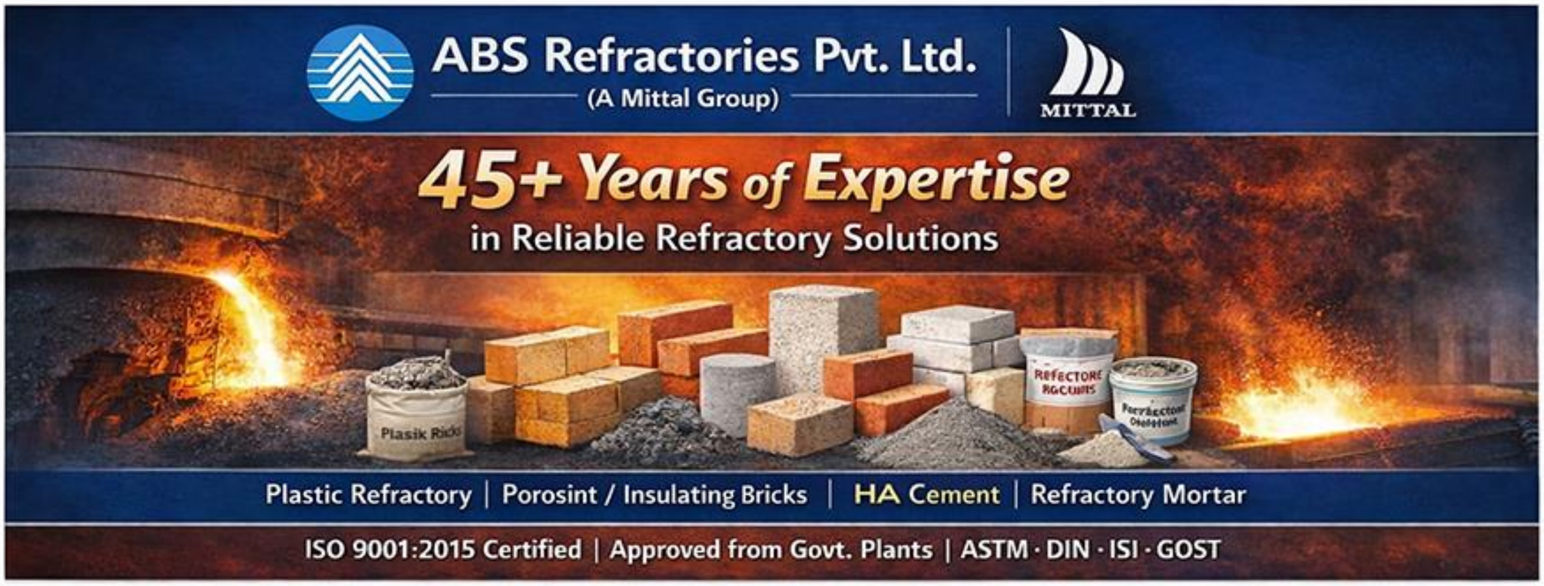
- High alumina dense refractory bricks ranging from 30% to 96% Alumina content.
- Light weight and high temperature insulating bricks with low thermal conductivity.
- High strength mortars for high temperature applications with alumina content up to 96%.
- Conventional Castables upto 96% Alumina.
- Low Cement Castables upto 96% Alumina.
- Low Iron Insulating Castables.
- Dense and Insulating mortars.
- Plastic Refractories with high abrasion resistance.
- Special refractories like Silicon Carbide, andalusite and mullite based.
- High alumina refractory binders.
- Pre Cast Pre Fired blocks and shapes.
- 19 Hole & 7 Hole Hexagonal checker bricks for Blast Furnace Stoves.
- Anti acid refractories.

INDUSTRIES WE ARE WORKING WITH



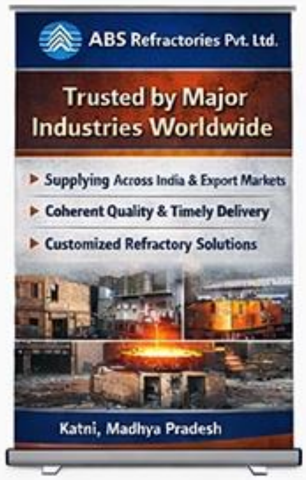
- **IRON & STEEL**
  - Pellet Plant
  - Sponge Iron
  - Blast Furnaces Stoves
  - Coke Ovens
  - Torpedo Ladles
  - Reheating Furnaces
  - HSM/ CRM
- **POWER**
  - CFBC Boilers
  - AFBC Boilers
  - Combustion Chambers
- **ALUMINIUM**
  - Anode Baking Furnaces
- **CEMENT**
  - Preheater Calciner
  - Rotary Kiln
  - Kiln Hood
- **REFINERIES**
  - Sulphur Recovery Unit
  - CDU
  - VDU
- **FERTILISER**
- **CERAMIC & REFRACTORIES**

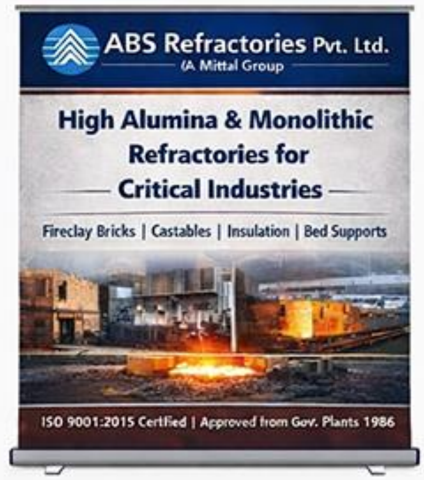
Name	Source	Port	Price	Month
Iron Ore Lump 10-40 mm (+62% Fe) CLO	India (Daitari)	N.A.	5745 (INR/mt)	21/03/2026
Iron Ore Lump 10-40 mm, CLO (62-65% Fe)	India (Kurmitar)	N.A.	6713 (INR/mt)	21/03/2026
Iron Ore Fine 62-65% Fe Fines (-10 mm)	India (Daitari)	N.A.	6,138 (INR/mt)	21/03/2026
Iron Ore Fine 60-62% Fe Fines (-10 mm)	India (Daitari)	N.A.	5661 (INR/mt)	21/03/2026
Cajaras Iron Ore Fines	Oman	Sohar	111 (USD/mt)	20/02/2026
Iron Ore Pellets Fe content: 64.03%	India	N.A.	11300 (INR/mt)	23/02/2026
Chrome Ore 54%+	India	N.A.	(INR/mt)	21/03/2026
Chrome Ore 46-48%	India	N.A.	(INR/mt)	21/03/2026
Chrome Ore (-)40% sub grade	India	N.A.	(INR/mt)	21/03/2026
Chromite Sand AFS 45-50	South Africa	Durban	526 (USD/mt)	28/02/2026
Chromite Sand AFS 50-55 (Orange Grade)	South Africa	Durban	459 (USD/mt)	18/02/2026
Chrome Ore Lumps Cr_2O_3: 37.97%	Turkey	Sohar	335 (USD/mt)	24/02/2026
Standard Metallurgical Grade CBG Bauxite	Guinea	Port Kamsar	78 (USD/mt)	24/02/2026
Bauxite 38-45% Al_2O_3	India	N.A.	3509 (INR/mt)	04/03/2026
Laterite II	India	N.A	525 (INR/mt)	03/03/2026
Limestone Lumps (05-15cm)	Egypt	Sokhna	32 (USD/mt)	27/02/2026
Limestone Powder Grade: ST 04	Vietnam	Haiphong	85 (USD/mt)	25/02/2026
CP Grade Limestone in bulk	UAE	Mina Saqr	20 (USD/mt)	28/02/2026
Lime Stone Lumps	Bhutan	Phuntsholing	40(USD/mt)	28/02/2026
Manganese Ore Assmang Nchwaning Fines 44.47% Mn	South Africa	Saldanha Bay	170 (USD/mt)	17/02/2026
Manganese Ore (MMD)(Mn: 46%)	Gabon	Libreville	228 (USD/mt)	23/02/2026


ABS Refractories Pvt. Ltd.
(A Mittal Group)
MITTAL
45+ Years of Expertise
in Reliable Refractory Solutions
Plastic Refractory | Porosint / Insulating Bricks | HA Cement | Refractory Mortar
ISO 9001:2015 Certified | Approved from Govt. Plants | ASTM · DIN · ISI · GOST


ABS Refractories Pvt. Ltd.
Complete Refractory Solutions Under One Roof
Fireclay & High Alumina Bricks
Dense & Insulating Castables
Low Cement / Ultra Low Cement Castables
Plastic Refractory
Refractory Mortar


ABS Refractories Pvt. Ltd.
Designed for High Temperature.
Tested for Reliability.
Service Temperature up to 1800°C
PLC/AR Controlled Expansion
High CCS & RUL Values
Tunnel & Shuttle Kiln Firing


ABS Refractories Pvt. Ltd.
Trusted by Major Industries Worldwide
Supplying Across India & Export Markets
Coherent Quality & Timely Delivery
Customized Refractory Solutions
Katni, Madhya Pradesh


ABS Refractories Pvt. Ltd.
High Alumina & Monolithic Refractories for Critical Industries
Fireclay Bricks | Castables | Insulation | Bed Supports
ISO 9001:2015 Certified | Approved from Gov. Plants 1986


ABS Refractories Private Limited
(A Mittal Group of Companies)
MITTAL


ABS REFRACTORIES

India's iron ore imports set to hit 7-year high in 2025-2026

India's imports of iron ore, a key raw material in steelmaking, are set to rise to a seven-year high in the fiscal year ending on March 31, driven by a shortage of high-grade ore. Overall imports are likely to reach 12 million to 14 million metric tons in 2025-26, more than doubling from a year earlier, analysts and trade officials said. The bulk of India's iron ore imports in the fiscal year originated from Brazil and Oman, which together accounted for about 70% of total shipments. Iron ore output in India, the world's second-largest crude steel producer, is expected to reach 305 million tons in the 2025-26 fiscal year, up from 289 million metric tons a year earlier.

India is one of the world's largest iron ore producers, yet it still imports iron ore. That may sound contradictory, but it happens for practical, economic, and quality reasons rather than scarcity.

1. Better quality (most important reason)

Modern steel plants—especially blast furnaces units—need high-grade ore (≥65% Fe) and consistent quality. So India imports from countries like Australia and Brazil. These suppliers offer high-grade, uniform ore, which improves productivity, fuel efficiency and steel quality.

2. Logistics & geography

Major iron ore mines are in Odisha, Jharkhand, Chhattisgarh but many steel plants are in western/southern India or coastal areas. Example: A coastal steel plant may find it cheaper to import ore by sea than transport domestic ore by rail over long distances.

3. Supply disruptions & policy constraints

India's domestic supply is not always stable due to mining bans/production caps (e.g., in Goa and Karnataka in the past), environmental restrictions and auction-based mining causing supply gaps.

4. Specific technological needs

Some steel processes require special types of ore like some pellet plants need specific fines quality for which imported ores are preferred. Steelmakers often blend low-grade Indian ore with high-grade imported ore. The benefits are cost optimization and better furnace performance.

5. Price arbitrage (when imports become cheaper)

Sometimes global prices become cheaper than domestic price and along with freight rates becoming favourable.

Key Companies which Import Iron Ore:

JSW Steel is the largest and most consistent importer among major Indian steelmakers, especially for its coastal operations. The reasons for JSW Steel's import are:

- Limited captive mines (historically dependent on merchant miners)
- Geography advantage: Dolvi (Maharashtra) is a port-based plant (imported ore via sea is often cheaper than inland transport)
- Past supply disruptions (Karnataka mining bans led to forced heavy imports)
- Quality needs (Uses high-grade imported ore for blending)

AMNS India once upon a time was structurally dependent on imports to a large extent as per its design. However it acquired two significant iron ore mines in 2020 and 2021 (Thakurani Iron Ore Mine and Ghoraburhani-Sagasahi Iron Ore Mines). For supply chain integration it has:

- Dabuna Beneficiation Plant: Ore from these mines is processed at the beneficiation plant in Dabuna, Odisha.
- Paradeep Pellet Plant: The beneficiated ore is transported via slurry pipeline to the company's 12 MTPA pellet plant at Paradeep, Odisha, for final utilization in steel production.

SAIL and Tata Steel have their own captive mines and are more or less self-reliant in this regard. They only import only if there are supply disruptions. RINL does not have captive mine and procure domestically from NMDC.

Company	Import Dependence	Core Reason
Tata Steel	Low	Captive mines + blending
JSW Steel	Medium–High	Limited mines + coastal logistics
AMNS India	Low	Captive mines + blending
SAIL	None	Strong captive resources
RINL	Low	Domestic buy
NMDC	None	Own mines

Table 1

India's Import of Iron Ore & Pellets 2025-26 (Annualized):

Items	Million Tonnes
Iron Ore Fines	15.27
Iron Ore Pellets	2.65

Table 2

JSW Steel is the main importer of iron ore while small steel makers and traders are the importers of pellets.

Country-wise Import of Iron Ore 2025-26(Annualized):

Items	Million Tonnes
Brazil	8
Oman	1.44
South Africa	4.84
Others	0.99
Total	15.27

Table 3

(Considering the current disturbance in the Middle East, the actual figure might be around 14 million tonnes).

Brazil is the main source country followed by South Africa. Oman is not a mining source but a significant iron ore processing and distribution hub highlighted by Vale's 9 million-ton pelletizing plant in Sohar. In other words, the iron ore coming from Oman is basically Brazilian iron ore.

Indian steel makers prefer Brazilian ore (from companies like Vale S.A.) as they have 62–67% Fe content. A 1% increase in Fe can improve blast furnace productivity by ~2% and reduce coke consumption. They are also perfect for blending with domestic iron ore achieving optimal chemistry for sinter/pellet plants.

Impact of Middle East War on Indian Steel Industry

The Middle East crisis (especially involving tensions around Strait of Hormuz, conflicts involving Iran, and broader regional instability) has multi-layered impacts on the global and Indian steel industry. The primary impact has been due to shortage of LPG (Liquefied Petroleum Gas).

Liquefied Petroleum Gas:

LPG is not a primary fuel in large-scale steelmaking like coal or natural gas, but it is widely used in auxiliary, precision, and localized heating applications across steel plants. Here's where LPG is actually used:

- Reheating Furnaces (Small / Secondary Units)
- Cutting, Preheating & Maintenance Operations
- Heat Treatment & Small Furnaces
- Start-up Fuel in Large Furnaces
- Ladle Heating & Drying.

In stainless steel making, LPG (Liquefied Petroleum Gas) plays a supporting but important role—mainly in heating, cutting, and auxiliary thermal processes. Media reports suggest that in initial phase when LPG was diverted for domestic consumer usage only, JSW Stainless faced initial difficulties which they tried to address by switching over to LNG. JSW Steel Coated Products has risked missing sales and supply obligation for tinplate under the government's incentive scheme and has requested a six-month extension.

It also has a major impact on steel-based micro, small and medium enterprises and their ancillary units.

Fig 1

Galvanizing & Tube Makers — Direct hit. Hot-dip galvanizing needs continuous LPG at ~450°C. No gas = no line.

Secondary Steel (~50 Mt ecosystem) — Induction furnaces and reheat furnaces run on LPG. Most clusters operate week-to-week. Raipur, Durg, Jalna, Howrah, Gujarat face 30–50% production cuts if supply tightens

Freight & Logistics Disruptions:

The sea freight rates have increased significantly in the last month. As of March 27, 2026, the Containerized Freight Index reported a 37.03% increase over the past month. This recent surge is driven by a combination of high vessel utilization, continued capacity management by carriers, and persistent geopolitical tensions. Key trends from the past month include:

- Continued Rate Hikes: The Drewry World Container Index recorded its fourth consecutive week of increases as of March 26, 2026, rising by 5% in that week alone.

- Regional Impacts: Spot rates for routes from Asia to Europe saw double-digit percentage increases in late March, with Shanghai-Genoa rates rising 12% in a single week.
- Capacity Constraints: Carriers are utilizing "blank sailings" (cancelled voyages) to manage capacity, keeping utilization high (above 90%) and driving up spot rates, particularly on Asia-Europe and Transpacific routes.
- Geopolitical Issues: Ongoing disruptions in the Middle East continue to force ships to avoid the Suez Canal and take longer routes, increasing costs.

These rate increases are expected to continue into April 2026, with carriers having announced higher rates to take effect on April 1.

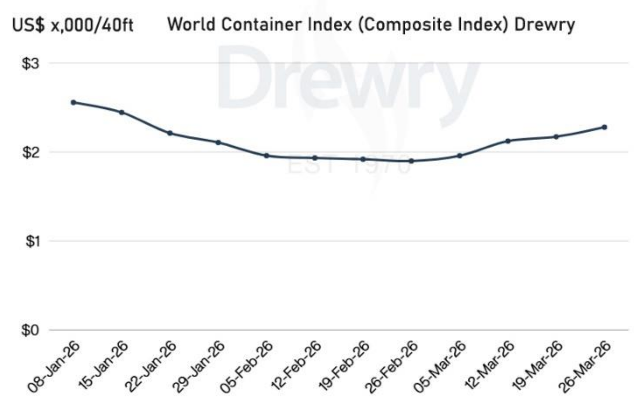


Fig 2

Devaluation of Rupee:

The Indian rupee plunged to a historic low on Friday, March 27, 2026, breaching the 94-per-dollar mark for the first time. The currency touched 94.30 against the US dollar, driven by escalating fears of a prolonged energy supply crisis stemming from the ongoing war in the Middle East. This sharp depreciation has put the rupee on course for a nearly 10% fall in the financial year 2025-26.

Raw Materials & Other Input Cost Variation:

This will immediately increase the input cost of steel makers especially coking coal, limestone, scrap etc. which are imported.

Key Items of Import by Steel Plants:

Item	Comment
Coking Coal	India imports ~85% of requirement, major sources being Australia (dominant), USA, Canada, Mozambique
Steel Scrap	Important for EAF/IF, imported mostly from USA, EU, Middle East
LNG / Natural Gas	Used in some DRI plants, critical for gas-based steelmaking
Fluxes & Additives	Mostly domestic, but specialty grades of limestone & dolomite are imported
Ferroalloys	Ferro Manganese, Ferro Silicon, Ferro Chrome are imported mostly from South Africa, China, Malaysia.
Refractories	Some converter bricks and other items
Graphite Electrodes	Essential for steelmaking
Capital Equipment & Technology	Plant Machinery and Automation & Digital Systems

Table 1

The single biggest vulnerability of Indian steel plants is Coking Coal imports and energy imports. Even if iron ore is domestic, ~40–50% of steel cost is still import-linked.

Latest Update:

On 27th March 2026, Ministry of Petroleum and Natural Gas restored commercial LPG supply to about 70 per cent of pre-crisis levels, with priority given to hospitality, food services and key industries. Amongst these, priority would be given to process industries or those requiring LPG for specialized heating purpose that cannot be substituted by natural gas. With this move in place, it is expected that stress on steel industry will be alleviated to a great extent.

COKING COAL: A CRITICAL MINERAL

In the Indian context, minerals that are essential for economic development, energy transition, and national security, and whose supply chains are vulnerable to disruption due to import dependence, limited domestic availability, or geopolitical concentration are considered critical minerals in India.

KEY ELEMENTS OF THE DEFINITION (INDIA-SPECIFIC):

Essentiality

- Required for core sectors like:
- Clean energy (solar, wind, EVs)
- Electronics & semiconductors
- Defence & space

Supply Risk

- High dependence on imports (e.g., lithium, cobalt)
- Concentration of supply in a few countries (e.g., China dominance)

Any disruption can significantly impact:

- Industrial production
- Energy transition
- National security

REASONS FOR INCLUSION OF COKING COAL AS A CRITICAL MINERAL:

India imports ~85–90% of its coking coal requirement. Major suppliers are Australia (dominant), Russia, USA, Canada and Mozambique. This creates supply concentration risk — any disruption (war, sanctions, weather in Australia) hits Indian steel immediately. India has coal reserves, but most are non-coking (thermal coal). Domestic coking coal has high ash content and is limited in quantity for which it cannot meet the demands of the Indian steel makers. Almost 45% of crude steel produced in India is through oxygen route where coking coal is the essential input. Disruption in coking coal supply can impact GDP growth as well as national security.

Coking coal was included as a critical mineral in India because it ticks all three key criteria:

Criteria	Status
Essential for Economy	steel backbone
Supply Risk	85–90% imports, concentrated sources
Lack of Substitutes	no scalable alternative yet

BENEFITS OF DECLARING COKING COAL AS CRITICAL MINERAL:

Declaring coking coal as a "critical mineral" in India is a policy move aimed at securing supply, reducing risk, and strengthening the steel sector. The benefits are both strategic and commercial:

1. Stronger Supply Security (Policy Priority). It gets top priority in government planning and enables:

- Strategic stockpiling
- Long-term import contracts
- Government-backed sourcing

It reduces risk of disruptions from countries like Australia or Russia.

2. Push for Overseas Asset Acquisition

Encourages Indian companies to secure mines abroad. Already seen with firms like Coal India Limited and NMDC Limited

In other words, Government support (financial + diplomatic) becomes easier for buying stakes in mines (Australia, Mozambique, Canada) and forming JV partnerships

3. Easier Financing & Investment Support

Critical tag leads to priority sector for funding and benefits include easier access to bank loans, sovereign support / viability gap funding and faster approval for large projects.

In effect it helps steelmakers like Tata Steel and JSW Steel secure raw material linkages.

4. Boost to Domestic Exploration & Mining

Encourages faster auction of coking coal blocks and private sector participation along with advanced exploration (deep mining, washing tech)

In effect even low-grade Indian coal can be beneficiated/ blended better.

Coal India plans a significant investment of Rs 3,300 crore for eight new coking coal washeries. This initiative aims to enhance domestic coal quality and decrease reliance on imports. The new facilities, with a combined capacity of 21.5 million tonnes per year, are expected to be operational by FY30.

5. Stability for Steel Industry (Cost & Planning)

Steel companies get more predictable supply, better price visibility. It also reduces sudden cost spikes and production disruptions.

This is important for all key steel makers to stabilize input price.

6. Reduced Import Vulnerability (Long Term)

Drives policies for import diversification, encourages blending domestic coal and technology upgrades (coal gasification)

Ultimate goal is to reduce import dependence over time.

7. Better Trade & Diplomacy Leverage

Helps India negotiate long-term supply agreements including coking coal in FTAs and build strategic mineral partnerships

This is somewhat similar to how countries secure lithium or rare earths.

BOTTOM LINE:

This move transforms coking coal from just a commodity into a "strategic resource" for India's growth and security. Declaring coking coal as a critical mineral gives India priority access (in terms of policy and funding), strategic control (overseas and domestic resources) and stability of the steel sector.

The "critical mineral" tag doesn't make steel companies more powerful sellers—but it makes them smarter and safer buyers, which ultimately protects and improves margins.

As of now, very few jurisdictions globally have explicitly classified coking coal as a "critical mineral".

- **India (2026): Officially declared coking coal as a "critical and strategic mineral" under the MMDR Act.**
- **United States (2025 update): Added metallurgical (coking) coal to its critical minerals list as part of a broader expansion.**
- **European Union: Recognizes coking coal as a critical raw material under its Critical Raw Materials framework.**

Sl. No.	Issue	Earlier Situation	Expected Result
1.	Raw Material Cost Volatility ↓ → Margins Stabilize Coking coal = 30–45% of steelmaking cost (BF route)	Spot buying → highly volatile prices Sudden spikes (e.g., >$600/t in crises) crushed margins	More long-term contracts + Govt-backed sourcing Strategic stockpiles reduce panic buying
2.	Shift from Spot Pricing → Contract Pricing Advantage	Indian mills traditionally depend on imported spot cargoes	Greater push for term contracts (quarterly/annual) Better negotiation through government diplomacy
3.	Reduced Margin Compression during crisis	Coal price spikes → immediate cost increase Steel prices lag → margins collapse	Stockpiles + contracts = buffer time Ability to pass on costs improves
4.	Long-Term Margin Expansion via Integration	India lacks in acquiring overseas assets compared to China especially the non-integrated players.	Policy push encourages Overseas mine acquisition and backward integration (Example: Tata Steel already has coal assets abroad)
5.	Industry Consolidation → Better Pricing Discipline	Smaller players struggle with volatile raw material costs while large players benefit from policy support and better sourcing	Leads to consolidation in Indian steel industry and less irrational price competition. This will eventually enable improved industry-wide pricing discipline.

Table 1

Concluding, steel is a global commodity and prices are influenced by Chinese demand/supply and global cycles. Indian are price takers and not price setters. So giving 'critical mineral' status to coking coal in India improves cost-control and cements long term supply but does not give full pricing power on the selling side.

Iron ore pellets are agglomerated iron ore fines (typically 8–16 mm size) used in Blast Furnaces (BF) and Direct Reduced Iron. They are a value-added substitute for lump ore and sinter.

Overview of Indian Pellet industry:

- Installed capacity: ~160–165 MTPA
- Production (FY25): ~105 MTPA
- Capacity utilisation: ~60–65% (Overcapacity)

SALIENT FEATURES OF THE MARKET:

Indian iron ore pellet industry is divided into two segments:

- Captive pellet plants like Tata Steel, JSPL and AMNS India
- Merchant pellet plants like KIOCL, NMDC, Essel Mining & Industries

Indian Pellet market at a Glance ('000 tonnes)

Year	2020-21	2021-22	2022-23	2023-24	2024-25
Production	69626	79021	79327	96523	103228
Import	379	170	0	0	354
Export	14459	11392	6427	12114	6870
Consumption	55248	67054	72981	84140	96411

Table 1 (Source: JPC)

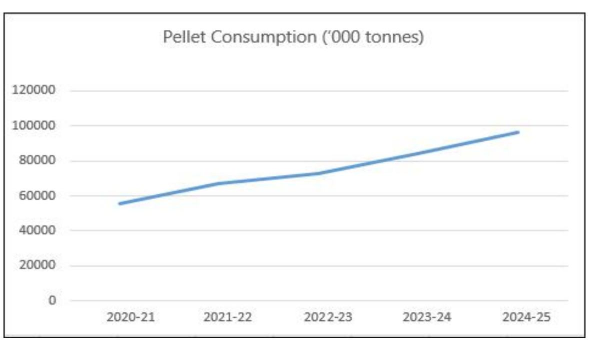


Fig1

The above table shows that pellet consumption has been steadily increasing in India due to steady increase in production of crude steel. Incidentally, India is now the second largest crude steel producer of the world. This has resulted in growth of sponge iron industry where pellet is preferred feedstock. Approximately 60-65% of feedstock in a DRI kiln comprises pellets.

Pellet usage has increased in blast furnace route of steel making as well because of a number of advantages:

- Pellets offer a high iron content (62–66%), excellent permeability due to uniform size (8–20 mm), and high mechanical strength. They reduce slag rate and can reduce coke consumption by 5–10%.
- Industry reports show that a 10–40% pellet ratio is common, but with specialized burden distribution, higher percentages (up to 60%) can be used successfully. Increasing pellet ratio beyond that has certain challenges which need to be addressed. However there is no rule of thumb to determine the pellet ratio which depends on the operations parameter of an individual steel plant.

Another advantage in favour of iron ore pellet is gradually decreasing quality of high grade iron ore whereas pellets enable usage of low grade fines.

Pellet prices are influenced by iron ore fines price (input cost), steel demand cycle and export parity pricing.

THE EXPORT MARKET:

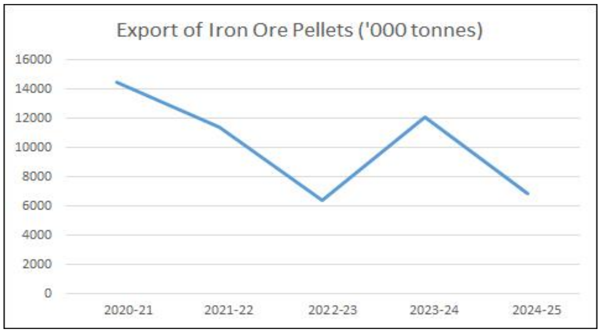


Fig 2

India's iron ore pellet exports are not stable by nature—they swing sharply year to year because pellets sit at the intersection of domestic steel demand, global price cycles, and policy changes. Above all, India prioritizes its own steel industry. When domestic steel production rises, pellet makers divert supply internally. Similarly, when steel demand weakens, surplus pellets are exported.

Pellet exports depend heavily on international price spreads:

- Key benchmark: pellet premium over iron ore fines
- Major demand centers: China, Europe, Middle East

If global pellet prices (especially in China) are:

- High → exports surge
- Low → exports collapse

China is particularly critical due to its large blast furnace capacity and environmental push for higher-grade inputs.

Country wise Export of Indian Pellet (2025-26) (annualized)

Country	Export (in '000 tonnes)
China	2650
Indonesia	167
Malaysia	518
Others	189
Total	3525

Table 2

CONCLUSION:

The industry is marked with overcapacity with ~160 MTPA capacity versus ~105 MT actual production, leading to pricing pressure.

The growth drivers are as follows:

- Steel capacity expansion to ~300 MTPA by 2030
- DRI route expansion (especially gas/coal-based hybrid)
- ESG push → pellets preferred over sinter
- From export-driven → domestic steel-driven industry
- Higher capacity utilisation over time
- Consolidation among merchant players

To conclude, companies with captive mines and pellet and steel production will enjoy comparative advantage over the merchant players where cost control and value chain integration will emerge as key factors. India has significant excess capacity, making it a structurally competitive but essentially a cyclical industry.

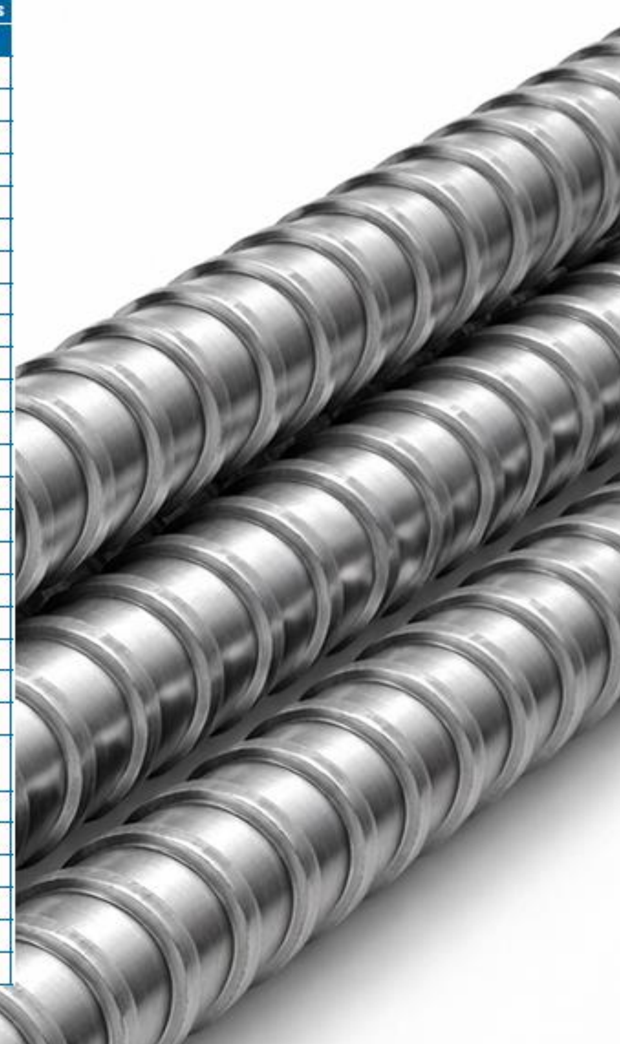
EXPORT MARKET OF INDIAN FINISHED STEEL

CATEGORY-WISE EXPORT OF IRON & STEEL: LAST 5 YEARS

Qty : '000 tonnes

CATEGORY	2020-21	2021-22	2022-23	2023-24	2024-25
SEMIS (Non-Alloy)	**6553**	**4866**	**1597**	**1022**	**1034**
FINISHED STEEL (Non-Alloy)					
Non-Flat					
Bars & Rods	974	2096	346	427	375
Structurals	116	203	185	102	80
Railway Materials	16	2	0	3	2
Total Non-Flat	**1107**	**2301**	**531**	**533**	**457**
Flat					
Plates	538	875	528	629	377
H R Coils/Sheets	6654	6185	1661	2750	999
C R Sheets/Coils	495	1059	352	517	467
GP/GC Sheets	952	1730	1132	1652	1136
Elec. Sheets	42	42	37	28	7
Tinplates	17	39	12	21	102
Tin Free Steel	2	2	0	0	1
Pipes	139	137	231	647	599
Total Flat	**8838**	**10067**	**3953**	**6244**	**3687**
Total Fin. Steel (Non-Alloy)	**9945**	**12369**	**4484**	**6776**	**4144**
Total Steel (Non-Alloy)	**16498**	**17234**	**6081**	**7798**	**5178**
Non-Flat Alloy/Stainless	301	634	304	280	311
Flat Alloy/Stainless	**538**	**491**	**1929**	**430**	**403**
Total Finished Steel (Alloy/ Stainless)	**839**	**1125**	**2233**	**710**	**714**
Semi-Finished (Alloy/Stainless)	**48**	**12**	**24**	**34**	**369**
Total Steel (Alloy/Stainless)	**887**	**1137**	**2257**	**744**	**1083**
Total Fin. Steel (Non-Alloy+Alloy)	**10784**	**13494**	**6716**	**7487**	**4858**
Total Steel (Non-Alloy + Alloy)	**17385**	**18372**	**8338**	**8542**	**6261**
PIG IRON	1099	1213	629	385	287
SPONGE IRON	511	788	1085	1309	1516

Source: JPC



Company	Estimated Share of India's Steel Exports	Key Export Strength
JSW Steel	25–30%	Flat steel (HRC/CRC), Europe & US
Tata Steel	20–25%	High-value steel, EU-focused
AMNS India	15–20%	Flat steel, automotive/export-grade
SAIL	10–15%	Long products + some flat exports

Rank	Country	Characteristics
1	Italy	Largest importer of Indian flat steel
2	Belgium	Major EU hub
3	UK	High-value coated & flat products
4	Spain	Automotive + construction demand
5	UAE	Construction + re-export hub
6	Vietnam	Fast-growing industrial demand
7	Nepal	Long products (TMT)
8	USA	Niche, high-spec exports

Key Strategic Insights

1. Flat steel = backbone of exports

Driven by: Automotive, Appliances, Demand for Coated steel

2. Europe = value market

High margins

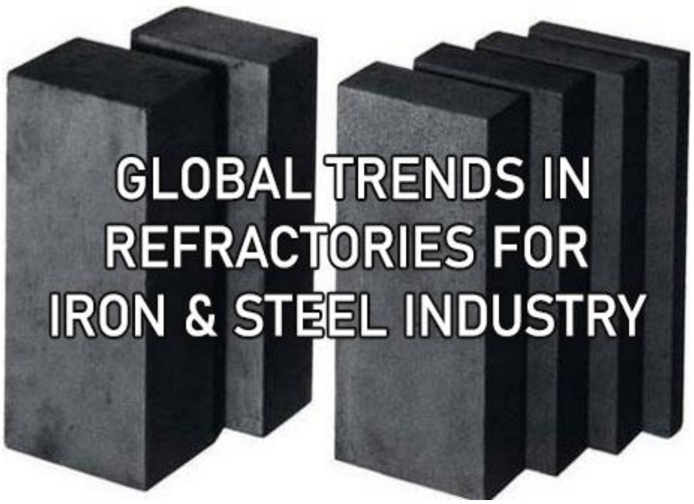
Quality-driven demand

3. Middle East & ASEAN = growth markets

Volume + proximity advantage

4. Long products = regional play

Mainly exported to: Nepal, Bangladesh, Middle East



Although exact figure in unavailable, the total turnover of global refractories industry ranges from USD35-48 billion. The total sale of refractories product is to the tune of 28-30 million tonnes, bulk of which is consumed by iron and steel industry.

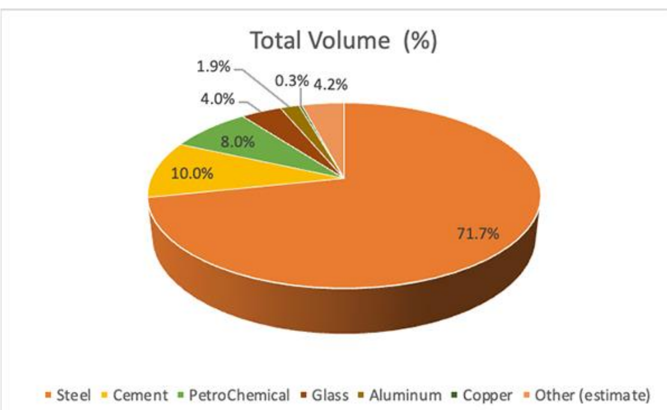


Fig. 1

The above figure shows that the fortunes of refractories industries are tied up with the growth in steel industry. World Steel Association data showed that the growth centres of crude steel production are as follows:

- India remained the fastest-growing major producer, increasing its output by over 10% to reach 164.9 Mt.
- Production in Middle East rose by 4.3% to 56.9 Mt, led by strong growth in Saudi Arabia (+12.3%).
- Overall production in Middle East was 56.9 Mt (+4.3%)

For obvious reasons, these countries led by India remained the growth centre of refractories.

In terms of static or sluggish market, the major impact has been the slowdown in China. It's crude steel output dropped to a seven-year low of 960.8 Mt due to a persistent downturn in the domestic property market and stricter environmental regulations.

Other sluggish market for refractories in the year 2025 were:

- European Union (EU-27): Output decreased by 2.6% to 126.2 Mt, with Germany seeing a sharp 8.6% decline due to high energy costs.
- North America: Recorded a modest 0.7% increase to 107.4 Mt.
- Russia & CIS + Ukraine: 81.3 Mt (-4.4%)
- South America: 41.5 Mt (-1.2%)

Going by the aforesaid data, the global growth rate of refractories is expected to the tune of 3-5% CAGR in the short term.

SHIFT IN STEEL MAKING TECHNOLOGIES:

As more and more countries opt for greener steel making we expect to see transition from BF-BOF to EAF/IF routes with increased usage of scrap based EAF and hydrogen based DRI.

The share of Electric Arc Furnace (EAF) in global steel production was approximately 29.1% in 2024 which is expected to grow further led by China due to easy availability of scrap.

Wear Mechanisms in Scrap-Based EAFs are as follows:

- Corrosion: Slag dissolves magnesia (MgO) from the lining; saturation levels typically range from 6% to 14%.
- Oxidation: Carbon in the bricks reacts with oxygen or iron oxide (FeO), leading to loss of structural strength.
- Mechanical Stress: Physical impact from heavy

scrap charging can cause cracks or immediate damage to the lining.

- Thermal Shock: Rapid heating and cooling, especially in the roof, can lead to spalling where pieces of the refractory break off.

Commonly used refractories will be:

- Magnesia-Carbon (MgO-C) Bricks: The most dominant choice due to their excellent resistance to slag corrosion and thermal shock.
- Monolithic Refractories: Include castables, ramming masses, and gunning mixes used for quick hot-repairs and maintaining irregular surfaces.
- Insulating Systems: Lightweight layers placed behind the working lining to reduce heat loss and protect the outer steel shell

In other words, the dominance of mag carbon will continue although specific consumption of refractories will come down due to smart refractories solutions and lesser slag generation (compared to DRI).

China's steel industry accounts for approximately 15% of the nation's total carbon emissions, ranking first among manufacturing sectors. Consequently, hydrogen metallurgy i.e. replacing carbon with hydrogen has emerged as a critical technological pathway for the steel industry to achieve its carbon peak and carbon neutrality goals. Under the dual carbon goals, high-emission industries like steel face unprecedented pressure to reduce emissions. In December 2025 alone, two major milestones occurred: while Baosteel's Zhanjiang project achieved full operational integration, the 1.25-million-ton integrated green electricity-green hydrogen-green steel project in Guyang County, Baotou City, Inner Mongolia, was formally signed with a total investment of 4.8 billion yuan. In Xinjiang, Hengtai Green Energy's 1.2 million-ton green hydrogen-based DRI project is scheduled to commence in April 2026.

Major Green Steel Projects in Europe are:

- Stegra (formerly H2 Green Steel) – Sweden: Located in Boden, this is set to be the world's first large-scale green steel plant. It features a 700 MW electrolyser to produce on-site hydrogen and is scheduled for commercial operations in 2026.
- HYBRIT – Sweden: A pioneering joint venture between SSAB, LKAB, and Vattenfall. In 2021, it produced the world's first fossil-free sponge iron using hydrogen.
- SALCOS® (Salzgitter Low CO_2 Steelmaking) – Germany: Managed by Salzgitter AG, this project recently laid the cornerstone for a 100 MW electrolysis plant to generate 9,000 tons of green hydrogen annually by 2026.
- Thyssenkrupp Steel – Germany: The "tkH2steel" project in Duisburg involves building a direct reduction plant that will eventually run on 100% green hydrogen.
- GravitHy – France: This project aims to open a hydrogen-based iron plant in Fos-sur-Mer by 2027, targeting a production capacity of 2 million tonnes of low-carbon iron annually. Hydrogen-based DRI (future)

Key Refractory Materials for Hydrogen DRI are:

- High-Alumina Refractories: Corundum (99%), Tabular Alumina, and Corundum-Fused Mullite are preferred for their high inertness to reduction in pure hydrogen atmospheres.
- Mullite: Suitable, but prone to reduction in long-term high-temperature hydrogen exposure, where it can eventually convert to secondary alumina.
- Low Iron Fireclay: Used in less aggressive sections of the shaft furnace.
- Lightweight Castables: Utilized for thermal insulation in reformer areas where hydrogen concentration is high.

ENERGY SAVING & CIRCULAR ECONOMY:

As energy saving becomes the 'mantra' of the day, we will experience more and more usage of unfired refractories for lining. Advanced monolithic formulations (such as low-cement and cement-free castables) are offering superior thermal shock resistance, chemical resistance, and longer service life, making them competitive with or sometimes superior to traditional brick linings. At present, unshaped refractories already account for ~55–65% of total usage (globally, varies by region, low in China and India). In future it is expected to rise to 65–75% + share. In Japan, the share is already 65%+.

The biggest consumption of refractories is in ladle lining where two approaches are followed:

- The most common is a fully bricked lining, offering advantages such as slag and high-temperature resistance, along with reliable campaign lifetimes.
- An alternative, which has been demonstrated in recent years, is monolithic technology based on alumina spinel.

In future we may see increased usage of alumina spinel as ladle lining material.

Another key advantage of monolithic lining is faster installation and lesser downtime of vessels.

However, shaped refractories (bricks) will still be critical in:

- BF hearth
- BOF converter
- High-load zones

Thus, future is not replacement but redistribution of shaped and unshaped products.

As the world has adjusted to fluctuations in raw material supply, the industry has sharpened focus on recycling of spent refractories. While there are serious challenges in recycling of refractories used in cement kilns, recycling of used refractories for steel production is relatively somewhat easier (key challenge is slag penetration) for which it has gained widespread popularity. Nowadays, some manufacturers use 15-20% of recycled raw materials for manufacturing mag carbon bricks. New technologies like hydration (and carbide stabilization) have emerged to reuse the graphite of mag carbon bricks instead of burning it away that was done earlier.

From environment point of view, we are witnessing:

- Low carbon mag carbon bricks
- Chrome free refractories
- Energy efficient kilns for production of refractories

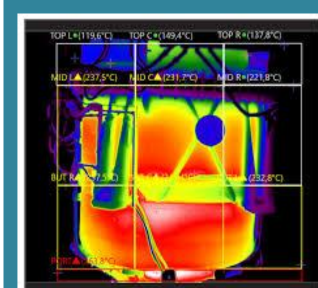
INDUSTRY 4.0:

AI based wear prediction and usage of robotics for installation of robotics is fast gaining traction due to predictive maintenance, reduced unexpected shutdowns and optimized refractory consumption. It also addresses the shortage of trained human resource at the shop floor level.

Future of refractories in steel is not about more material — but smarter material which can be integrated to the framework of Industry 4.0.

Smart ladle monitoring (real-time lining health)

Thermal cameras and sensors are installed on ladles along with continuous monitoring of shell temperature. Emergence of hotspots signify thinning of refractory lining following estimation of remaining lining thickness by AI models. This helps effectively predict the need for relining or patching thereby avoiding lining failure and extending campaign life by 10-15%.



Thermal imaging software analyzes temperature patterns across predefined regions of interest on the ladle surface. These regions are selected based on most susceptible areas.

INDIA AS THE GROWTH HUB OF REFRACTORIES:

It won't be gainsaying to state that Indian refractory industry has emerged as the sweetest spot in global refractories map. This is because of the consistent growth in steel, cement, aluminium, copper and other industries leading to steady demand for refractories. Almost 75% of refractories consumed in India goes to iron and steel industry.

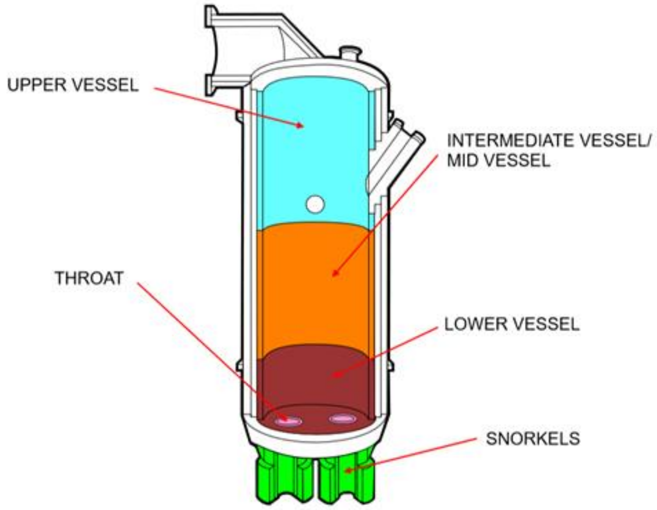
All the major global players have their established foothold for decades and are expanding their production bases along with their Indian counterparts.

As a part of "Make in India" drive of Govt. of India, a number of Indian refractory makers are now making converter and ladle bricks while high production growth has been witnessed in castables and flow control products. While the market looks attractive, there are a number of challenges as well:

- India does not have magnesite or good quality refractory grade bauxite for which it is dependent on imports mainly from China. This leads to price fluctuation when rupee devaluates against dollar, or container freight rates fluctuate or issues emerge from sourcing countries.
- In spite of recent consolidations, the market is still pretty fragmented leading to stiff competition and lesser realization of proper value. Commodification of refractories is another key challenge.
- Threat of import of finished refractories (mainly from China) mainly due to price considerations.

At present Indian refractories industry has a turnover of more than Rs 20,000 crores per annum and annual production of 2 million tonnes+. Growth varies across segment with MSME units witnessing a growth of 3-5% and larger units growing at an average pace of 8-10%.

Summing up, infrastructure development and government initiatives such as "Make in India" and Atmanirbhar Bharat are accelerating the demand and innovation in refractory industry, promoting the use of high-performance, energy-efficient, and eco-friendly refractory products. The next decade will see sustained growth, increased capacity, technological innovations, increased digitalization and market consolidation to further consolidate India's position as a key player in the global refractory market.



OPERATING PARAMETERS OF RH DEGASSER

The RH process is based on two key ideas: vacuum and circulation.

A typical RH unit includes a vacuum vessel and two snorkels immersed in molten steel. During operation, a vacuum is created in the vessel. With the help of gas lifting and pressure difference, molten steel rises through the up-leg snorkel into the vacuum vessel. Under vacuum, gases are removed more easily, and decarburization becomes more efficient. The treated steel then flows back to the ladle through the down-leg snorkel, forming a continuous loop.

RH Degasser is an essential vacuum degassing unit for production of ultralow C(< 30ppm),extra low H(<1ppm),extra low N(<30ppm)& special quality steels

The operating discipline of an RH Degasser is what separates an average heat from a clean, inclusion-controlled, ultra-low gas steel. It's less about equipment and more about strict process control and operator consistency.

RH performance = f (vacuum + circulation + time + temperature control)

1. Temperature Parameters
    - Start temperature: 1550–1650 °C
    - End temperature: 1540–1600 °C (grade-dependent)
    - Temperature loss: 20–60 °C
    - Heating margin (LF → RH): +20 to +40 °C

→ Must compensate for vacuum cooling and treatment time.

2. Vacuum Parameters

Evacuation start pressure: 100–300 mbar
Operating vacuum ranges:

- Deep vacuum (degassing): 0.5–1.5 mbar
- Moderate vacuum (decarburization): 5–20 mbar
- Evacuation time: 3–8 min
- Leak rate: Minimal (tight system essential)

→ Lower pressure = better H and N removal.

3. Circulation Parameters (Critical)

- Circulation rate: 80–180 tons/min
- Circulation cycles: 6–12 cycles per heat
- Snorkel immersion depth: 300–600 mm

→ Determines refining efficiency and homogenization.

4. Argon Gas Parameters (Gas type: Argon (Ar))

Flow rate (per snorkel):

- Low: 50–80 Nm³/hr
- Normal: 80–120 Nm³/hr
- High: 120–200 Nm³/hr
- Injection point: Up-leg snorkel

→ Controls lifting force → circulation rate.

5. Oxygen Blowing (RH-OB Variant)

Oxygen flow rate: 500–2000 Nm³/hr

Target carbon removal

- Low carbon: <0.03%
- Ultra-low carbon: <0.01%
- Top pressure during blowing: 5–20 mbar

→ Used for IF steel, automotive grades.

6. Time Parameters

- Total RH treatment time: 15–30 min
- Deep degassing stage: 8–15 min
- RH-OB decarburization: up to 20–40 min

→ Time depends on initial C, H, and grade.

7. Chemical Targets

- Hydrogen: <1–2 ppm
- Nitrogen: slight reduction (~10–30%)
- Carbon: down to 0.001–0.01%
- Oxygen (dissolved): controlled via Al killing

8. Slag Parameters

- Basicity (CaO/SiO_2): > 2.5
- FeO + MnO: < 1–2%
- Slag thickness: controlled, no carryover

→ Clean slag = clean steel.

9. Equipment Parameters

- Snorkel refractory life: monitored continuously
- Vacuum pump capacity: stable for deep vacuum
- Ladle freeboard: sufficient to avoid slopping

Operating Conditions of RH refining
Refining temperature:1560-1650oC
Vacuum degree max. : 66 Pa (0.5 Tor)
Longest vacuum treating/heat: 40 min.
RH degasser capacity: 265 ton
Steel circulating quantity: 200t/min.
Slag layer thickness in ladle: 50-100 mm
Basicity of slag: >2.0

KEY CONTROL INDICATORS (REAL-TIME)

Golden Rules (Operator Mindset):

- Stable circulation is everything
- Vacuum must be deep and steady
- Timing of additions is critical
- Slag control = cleanliness
- Temperature awareness at all times

Common Discipline Failures (Real Plant Issues):

- Vacuum leak → high hydrogen
- Low argon → poor circulation
- High FeO slag → inclusion defects
- Fast oxygen blowing → over-oxidation
- Skipping sampling → off-grade steel

FGK THERMAL PRIVATE LIMITED

(AN 1SO 9001 : 2015; ISO 14001 : 2015 & ISO 45001 : 2018 CERTIFIED COMPANY)

...SINCE 1978

Kiln...Furnace...Lehr...Dryer

For Ceramic, Graphite and Glass Industry

GSTIN : 19AAACF4504F1ZZ

Tel : +91 33 4000 7877 | E Mail : info@fgkthermal.com | Mobile : 98741 56206 | 70441 28941 | Web : www.fgkthermal.com

Office : 38L Maharaja Tagore Road, (Ist and 2nd Floor), Dhakuria, Kolkata 700 031, WEST BENGAL .

Factory : Balban, Palpara, Baruipur 700 144, 24 Parganas (S), WEST BENGAL

UNBURNT BASIC TEMPERING KILN

HIGH ALUMINA TUNNEL KILN

CCR KILN & DRYER

HIGH TEMPERATURE TUNNEL KILN

TABLEWARE DECORATING KILN

SNORKEL DRYER

GLASS BOTTLE DECORATING LEHR

BASIC TUNNEL KILN

UNBURNT BASIC TEMPERING KILN

GRAPHITE ELECTRODE REBAKE TUNNEL KILN

HIGH ALUMINA TUNNEL DRYER

PCPF DRYER

GRAPHITE PREHEATING FURNACE

FCPTUNNEL KILN

BASIC TEMPERING KILN

JINDAL STEEL LTD DEPLOYS SYNGAS TO ADDRESS FUEL SHORTAGE

Coal Gasification utilises the chemical energy present in coal and represents the cleanest and most efficient method for producing sponge iron. In comparison, the conventional steelmaking process via Blast Furnace emits ~1.85 tonnes of carbon dioxide, a quantity that can be significantly reduced by adopting the Coal Gasification technology. To overcome the challenge of the non-availability of natural gas, a coal gasification plant was set up by Jindal Steel Ltd. at Angul. It uses high ash coal, available near the site, and converts it into synthesis gas or Syngas. It is the first plant of its kind in India and only the 2nd in the world. The Syngas, produced through the gasification process, contains methane, carbon monoxide, carbon dioxide, hydrogen, and water vapour.

This process has a lower impact on the environment as compared to the coal combustion process. During the gasification process, the carbon dioxide emitted in the process is entirely absorbed back into the process, and the hydrogen sulphide is entirely used for sulphur production.

Capital expenditure for setting up the Syngas plant was high and had a gestation period of three years. However, this high investment was offset by the improved energy efficiency of the system, as compared to the conventional steel production model, and reduced environmental impact in the long run. Another added advantage Jindal Steel explored was the utilisation of waste. All seven by-products of the Syngas plant are recycled through internal use or sold to external parties.

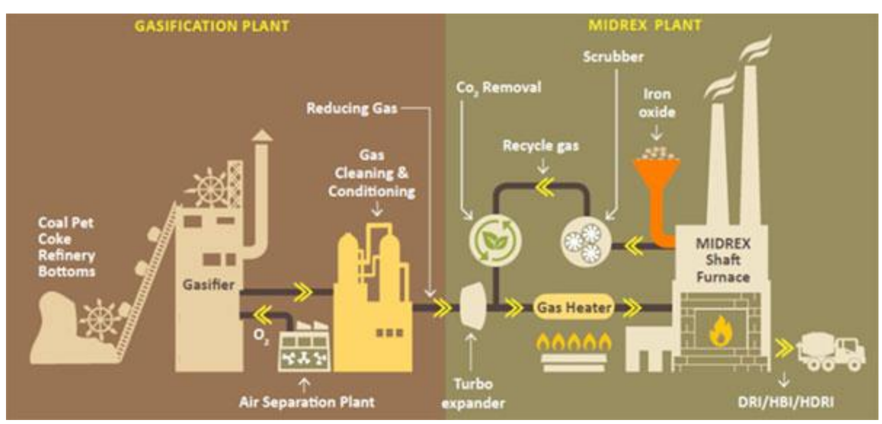
This active promotion of syn gas by Jindal Steel Ltd bore fruit in recent times when there was an acute shortage of LPG arising due to Middle East crisis. It deployed syngas produced from "swadeshi coal" in galvanising and colour coating line furnaces to mitigate shortages of Liquefied Natural Gas (LNG), Liquefied Petroleum Gas (LPG) and propane amidst the West Asia crisis. The company described this as "the first such application in the steel industry," adding that it has helped "better mitigate fuel shortages in these unprecedented times."

At Jindal Steel, syngas is also been injected into blast furnaces, which has reduced dependence on imported coking coal and lowered carbon emissions per tonne of steel.

Internationally, China Baowu Steel Group has actively pursued the coal gasification path. In China, coal gasification is a successful technology and manufacturers like Baosteel Zhanjiang Iron & Steel Co., Ltd. and Hebei Iron & Steel Co., Ltd. operate or are involved in DRI production processes that can utilize coal gasification.

Best Possible Locations for Coal Gasification Units which have DRI and abundant coal supply:

- Angul (Odisha):
- Raigarh (Chhattisgarh)
- Talcher–Rourkela belt (Odisha)
- Gadchiroli/Chandrapur (Chhattisgarh)
- Durgapur-Asansol (WB)



Sl. No.	Company	Key Mining Regions	Major Mines/Clusters	FY 26 Production Estimates (MT)	Growth Trends
1.	NMDC Ltd.	Chattisgarh, Karnataka	Bailadila (Kirandul, Bacheli), Donimalai	53.15	Strong growth, India's largest producer
2.	Odisha Mining Corporation	Odisha (Keonjhar, Mayurbhanj)	Gandhamardhan, Daitari, Jilling etc	38-40	Stable high output, near full utilization
3.	Tata Steel Ltd.	Jharkhand, Odisha	Noamundi, Joda, Katamati, Mithirda, Khondbondh	35-40 (9 in Jharkhand, 30-32 in Odisha)	Highly efficient integrated mining model
4.	Steel Authority of India Ltd.	Odisha, Jharkhand, Chhattisgarh	Bolani, Barsua, Taldih, Gua	30-35 (15 in Odisha)	Underutilized capacity
5.	JSW Steel Ltd.	Odisha	Nuagong, Jajong, Narayanposhi	18-20	Still import dependent
6.	AM/NS India	Odisha	Thakurani, Sagasahi, Gondkhari	15-20	Expanding mining base
7.	Rungta Group	Odisha	Keonjhar cluster, Barbil-Joda	12-15	Stable operations, merchant flexibility
8.	Jindal Steel & Power Ltd.	Odisha	Tensa(nearing closure), Kasia, Roida1, Thakurani A1, Rengalaberha	10-12	Moderate captive
9.	Llyods Metal & Energy Ltd.	Maharashtra (Gadchiroli)	Surajgarh	21-22	Fastest growth

India's Iron Ore Story — 3 Distinct Signals

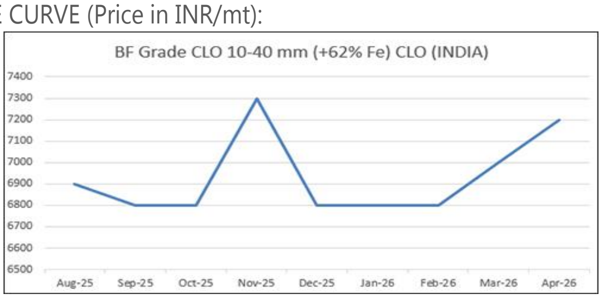
- Grade is improving. India is clearly moving toward >60% Fe iron ore — a decisive shift for productivity, pellet quality, and green steel readiness.
- Exports are falling. Not due to weakness — but because domestic realisations are stronger and value retention within India is now the priority.
- Geography is consolidating. Odisha ~50% of production, with Maharashtra emerging as a new growth centre — redefining the mining map of India.

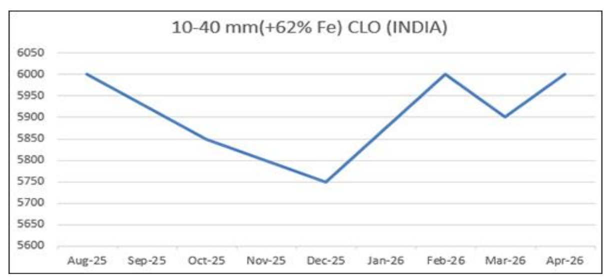
This is the real transformation: From volume mining → to value-driven resource strategy)

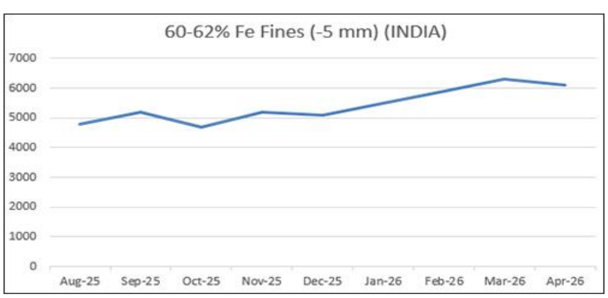
INDIA PRODUCTION SUMMARY					('000 tonnes)
ITEM	2020-21	2021-22	2022-23	2023-24	2024-25
SPONGE IRON					
Production	34376	39200	43621	51560	55764
Import	55	35	300	608	583
Export	511	788	1085	1309	1516
Consumption	33852	38321	42710	50835	54636
PELLETS					
Production	69626	79021	79327	96523	103228
Import	379	170	0	0	354
Export	14459	11392	6427	12114	6870
Consumption	55248	67054	72981	84140	96411

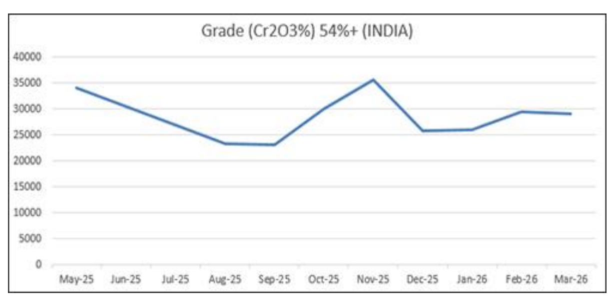
(Source: JPC)

PRICE CURVE (Price in INR/mt):









SARVESH

DOLOMITE REFRACTORIES FOR AOD CONVERTER

are designed for exceptional performance in AOD converters, ensuring outstanding resistance to slag corrosion & thermal shock.

What sets SARVESH apart is its focus on innovation & consistency.

Our AOD Dolomite Refractories offer:

- Superior resistance to chemical attacks from **basic slags**
- Reduced maintenance downtime through **high durability**
- Enhanced **thermal shock resistance** for longer-lasting performance

Corporate Office
AA-15, Civil Township
Rourkela - 769 012, Odisha, India

+91 6612461600

marketing@sarvesh.com

www.sarvesh.com