IndusInd Bank

# PATH TO SUSTAINABILITY - GREEN STEEL

## Understanding the fundamentals

# Indian Steel Industry

## Steel Production[1]

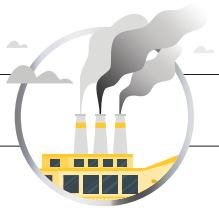
- India is the world's second-largest producer of Crude steel - 125.32 MT of Crude steel and 121.29 MT of Finished steel in FY23
- Crude steel and Finished steel production has grown at a CAGR of 4.98% and 3.83% respectively during the period FY16 – FY22
- Finished steel exports and imports stood at 11.14 MT (8.34% of Finished steel production) and 3.90 MT respectively in FY22
- India is home to fifth-highest reserves of iron ore in the world
- Odisha, Chhattisgarh, Jharkhand and Karnataka are the states with highest steel production

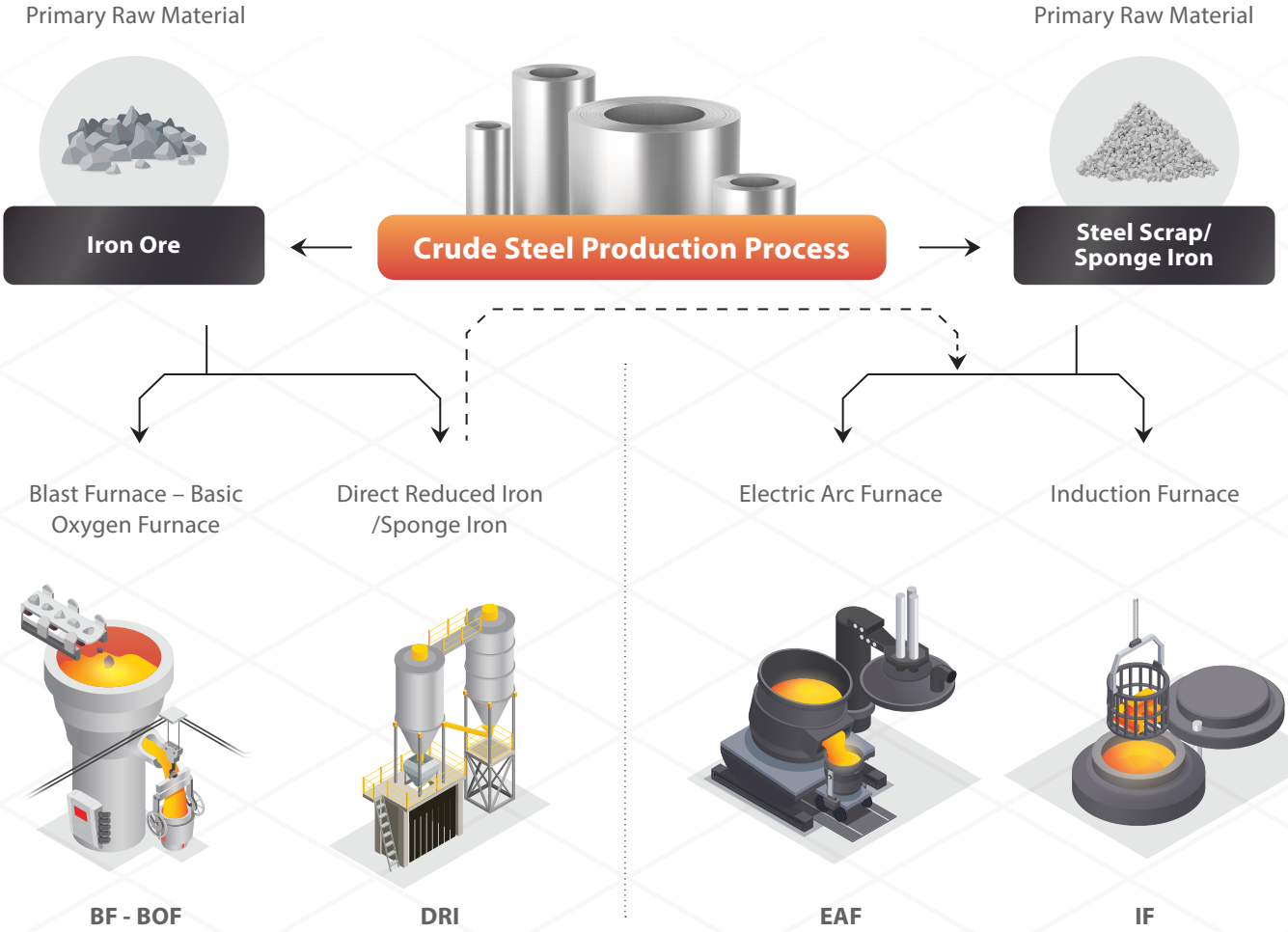

## Why Decarbonize the Steel Sector[2]

- Iron and Steel Industry contributes to nearly 12% of overall greenhouse gas emissions in India (7% to 9% of global $CO_2$ emissions caused by human activity)[3]
- National Steel Policy of India envisages 300 MT per annum of steel production and 160 kgs of per capita steel consumption by 2030 – 31 driven by growth in the infrastructure and industrial sector
- The growth in steel production and consumption will significantly add to the carbon footprint of the steel sector. Steel industry is considered as one of the six 'Hard to Abate' sectors due to the nature of the industry.
- **Ministry of Steel is committed to Net-Zero target by 2070**
- External Regulatory Interventions like The Carbon Border Adjustment Management (CBAM) by the EU may make Indian steel uncompetitive

## GHG footprint of Steel Industry

The GHG footprint of the steel industry is highly dependent on the production method being used



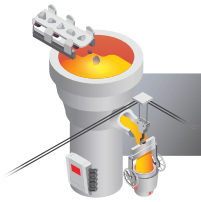



- Steel production in India is highly reliant on coal currently – either used as a reducing agent (BF – BOF & DRI) or as an energy source (EAF & IF)
- As per Ministry of Steel, Government of India, the average carbon intensity of the Indian steel industry (2.5 $tCO_2$/tcs) is higher than the global average (1.85 $tCO_2$/tcs)
- Higher carbon intensity of Indian steel industry is primarily due to lower energy efficiency and poor quality of raw materials (including high ash coal/ coke and high alumina iron ore among others)

### Steel production in India by production process[4]

| Production Process | Brief Description | % Share of Steel Production in India |
|---|---|---|
| BF - BOF | Metallurgical Coke used as reducing agent | 43% |
| DRI - IF | • Non – coking coal, natural gas, syngas or coke oven gas used as reducing agent | 26% |
| DRI - EAF | • Used in combination with EAF/IF | 6% |
| EAF (Scrap based) | Electricity is used to melt the scrap/ recycled iron | 25% |

## Technology Options for Decarbonization

## BF – BOF

### Production Process

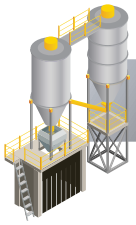
- Iron Ore converted to Pig Iron by reducing it with metallurgical coke (reductant) in the BF
- Pig Iron is converted to Crude Steel in the BOF by treating it with pure oxygen
- The use of coke as reductant results in high $CO_2$ emissions
- At a global level, BF – BOF has the highest GHG emissions amongst all processes due to use of coke as reductant[5]

### Emission Reduction Measures

- **Carbon Capture, Utilization and Storage (CCUS):** $CO_2$ emitted can be captured and utilized for various industrial purpose like production of chemicals, plastics, bio ethanol etc.
- **Reduction in Coke Rate:** Alternative injection materials like waste plastic, biomass, hydrogen etc. to reduce coke consumption
- **Promoting Usage of Scrap:** Scrap utilization can be increased from the current ~ 6% to a maximum of 25% leading to lower coke usage
- **Other Energy Efficiency & Energy Conservation measures**

### Key Challenges in India

- Difficult to obtain 100% green steel in the BF – BOF process because regular coking coal is still a necessary reductant agent in the blast furnace
- Most of proposed emission reduction measures like CCUS, hydrogen injection in BF etc. have not yet achieved commercial scale
- Availability of steel scrap for charging into BF – BOF



## DRI/Sponge Iron

### DRI/Sponge Iron

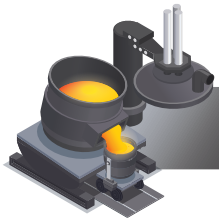
- Direct reduction of iron ore by using non – coking coal, natural gas, syngas or coke oven gas as reductant
- DRI is used in combination with EAF/IF as DRI subsequently requires EAF/ IF to heat up the reduced iron for further processing
- The coal-based route accounted for ~77% of total DRI production in India in 2021-22
- At a global level, DRI - EAF has the 2nd highest GHG emissions amongst all processes currently[6]

### Emission Reduction Measures

- Conventional reductants used in DRI like coal, natural gas etc. can be replaced with Hydrogen as the reducing agent
- Hydrogen can be produced using renewable energy sources, thus making the steel green

### Key Challenges in India

- Green hydrogen is still expensive to produce
- Green hydrogen production requires significant amount of electricity thus requiring significant investments in renewable energy
- Availability of water for green hydrogen production, since India is a water stressed country



## EAF/IF

### EAF/IF

- EAF/IF use scrap/recycled iron (already reduced) as feedstock for production of crude steel
- EAF/IF use electricity to melt the scrap/recycled iron
- Sponge iron can also be used to partly replace the scrap iron in EAF/IF for better quality steel
- At the global level, scrap based EAF has the lowest GHG emissions[7]

### Emission Reduction Measures

- Electricity used in EAF/IF can be produced by using renewable energy sources, thus making the steel green

### Key Challenges in India

- Availability of steel scrap for EAF/IF remains a challenge. As a result, imports of ferrous scrap grew at a staggering 172% in FY23.
- EAF/IF using steel scrap may not always produce the desired quality of steel

## Global Trends in Decarbonization of Steel Industry

In January 2023, ResponsibleSteel, as well as global banks, reached an agreement to accelerate steel decarbonization[12]

In September 2022, six global banks announced their decision to measure and disclose their steel-related loan emissions via the Sustainable STEEL Principles (SSP), the first climate-aligned finance agreement for the steel industry[14]

The global green steel market size was estimated at US $196.84 million in 2022 and it is projected to hit around US $6,24,414.85 million by 2032[8]

Several leading global steel firms have launched steel de-carbonization projects to meet their stated climate target[9]

Green Steel in Asia Pacific: The steel sector, which provides a key globally traded commodity, is responsible for 8% of global emissions. Emissions in this sector are generally recognized as hard to abate. Most of the world's steel production takes place in the Asia Pacific region, with China alone accounting for 53% of global output. Even under a net zero by 2050 scenario, global demand is projected to increase by 12%, and annual investments in green steel are projected to reach an average of almost $60 billion from 2026 to 2030[10]

The European Union plans to be climate-neutral by 2050[12], which will have a positive impact on the region's green steel market[11]

In January 2023, a green steel technology company raised $120 million, with a large multinational steel manufacturing corporation investing $36 million[13]

In October 2022, a Swedish steel venture announced that it has received funding of 4.55 billion Euros from European financial institutions for the construction of a hydrogen-based steel plant in Sweden[15]

## CBAM

### 01 EU is committed to Net Zero by 2050

- Stringent climate policies in the EU
- Industries including Steel are being forced to reduce their carbon footprint
- Leading to additional costs for EU steel makers and increase in carbon prices

### 02 Carbon Leakage

- EU steel becoming price uncompetitive against steel imports
- Relocation of EU steel industry to countries with less stringent climate policies

### 03 CBAM introduced in May 2023 to stop 'Carbon Leakage'

- Carbon tax in the form of CBAM certificates will be applied on steel imports having higher carbon footprint than EU – ETS benchmark
- Applicable from January 1, 2026 onwards
- Other sectors include aluminum, cement, fertilizer, hydrogen and electricity

### 04 Impact on Indian steel exports to EU[16]

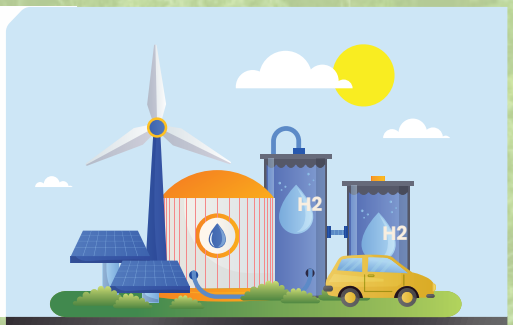
- India exports 3 -5 Million Tonnes of Finished steel to Europe every year
- Indian steel makers have ~12% higher emission intensity than the global average for BF – BOF route
- CBAM compliance requirement could result in decrease of profits by US $60 - 165/MT between 2026 – 2034

## Policy Initiatives – Decarbonization of Indian Steel Industry[17]

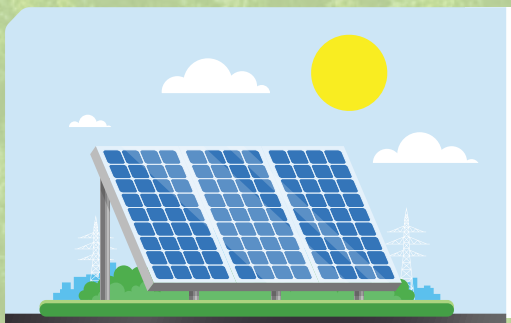
### Steel Scrap Recycling Policy

- Increase availability of scrap steel in the country to boost the use of recycled steel in steel production businesses
- Setting up adequate and scientific scrap collection centers, dismantling centers and scrap processing centers
- Promote entrepreneurs for setting up collection and/or dismantling centers for the collection and sorting of scrap steel

- Development of green hydrogen production capacity of at least 5 MMT (Million Metric Tonne) per annum with an associated renewable energy capacity addition of about 125 GW
- Abatement of nearly 50 MMT of annual greenhouse gas emissions
- The initial outlay for the Mission will be ₹19,744 crore



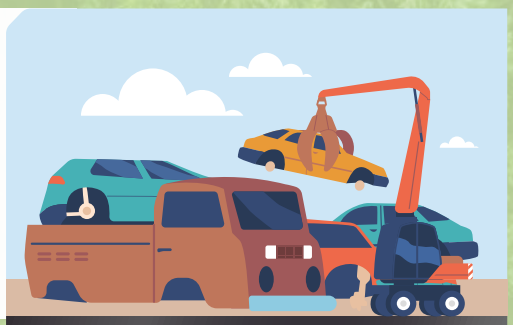

### National Green Hydrogen Mission



### National Solar Mission

- Development of Solar Parks and Ultra Mega Solar Power Projects
- Grid Connected Solar Rooftop Scheme (upto cumulative capacity of 40,000 MW)

- Reduce environmental pollution and enable recycling of vehicle parts such as steel, plastic, and other metals
- Commercial vehicles and private vehicles older than 15 and 20 years, respectively, shall be scrapped if they fail the fitness test



### Vehicle Scrappage Policy

# Decarbonization Initiatives by Indian Steel Companies

## JSW Group

- JSW Steel has committed to reduce its carbon intensity by 42% by 2030 and aligned its decarburization pathway along with the IEA Sustainable Development Scenario (SDS) and Paris Agreement. JSW Coated Steel targets to achieve carbon neutrality by 2030.
- Launched Project SEED (Sustainable Energy Environment and Decarbonization), a large-scale decarbonization programme in Vijayanagar and Dolvi to reduce emissions from BF – BOF operations through efficiency improvements and deployment of Best Available Technology (BAT)s.
- JSW Steel has earmarked ₹10,000 Cr of CAPEX to achieve its 2030 decarbonization goal and aims to use RE for steel making with a 10GW capacity additions. Has already in process to set up a 25MW electrolyser for use of Green Hydrogen in steel making and plans to set up 3MTPA Greensteel plant. JSW is already operating a 100TPD CCU project and plans to deploy the technology at scale.

*"At JSW, sustainability is a strategic business imperative that balances growth with responsibility. As the world transit to low carbon future, our robust decarbonization road-map supports the industry transition to cleaner technology adoption. Whilst we support the economic growth of the country, we recognize and determined to decouple our growth from the emissions so that we support to build a resilient and cleaner steel sector growth for India."*

**Mr. Prabodh Acharya**
Chief Sustainability Officer, JSW Group

## Tata Steel

- Tata Steel has set a target of Net-Zero emissions by 2045 across its operations in India, Europe and Thailand.
- Tata Steel has formulated different strategies for decarbonization in different geographies:
  - In Netherlands Tata Steel is committed to transitioning in a phased manner from BF operations to DRI and Electric Smelting EAF with eventual transition to green hydrogen
  - In the UK, Tata Steel is transitioning to EAF steelmaking and has received a support of GBP 500 million from the UK government.
  - In its India Steel operations, Tata Steel has adopted a two-pronged approach to decarbonization, focussing on Carbon Direct Avoidance (CDA) and CO2 Capture and Use.
- Implementing number of pilot projects and initiatives to reduce CO2 emissions like 5 TPA CCU plant, CBM and Hydrogen injection, HIsarna and increasing scrap charge into Blast Furnace
- Plans to set up a state of the art EAF of 0.75 MTPA in Ludhiana with minimal carbon foot print

*"Tata Steel is committed to the Tata Group's stated objective of achieving Net-Zero emissions by 2045, as part of the group-wide Project Aalingana (embrace). Tata Steel's approach and pace of decarbonization will be calibrated for each location based on the local regulatory framework, government support, and the willingness of customers to pay for higher-cost green steel."*

**Mr. Piyush Jha**
Head – Climate & Sustainable Finance, Tata Steel Limited

## Supporting a Greener Future

*At IndusInd Bank we follow a comprehensive framework embedding ESG principles across our diverse business units and launching innovative ESG linked products. We are committed to growing our Climate Finance book and have designed green, sustainability and transition finance linked solutions. Corporates that are in this transition journey towards becoming ESG positive, are invited to reach out to us for bespoke solutions.*

**Ms. Roopa Satish**

Head - Sustainable Banking, IndusInd Bank

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For more information, please write to **sustainability@indusind.com**

## References/Sources

1. India Brand Equity Foundation Website; 2. Ministry of Steel Website; 3. Ministry of Steel & World Steel Association Website; 4. Climate Group Website; 5. IEEFA Website; 6. IEEFA Website; 7. IEEFA Website; 8. Precedence; 9. Responsible Steel Website; 10. Glasgow Financial Alliance for Net Zero (GFANZ) website; 11. European Commission Website; 12. Responsible Steel Website; 13. Green Steel World Website; 14. Rock Mountain Institute Website; 15. Bloomberg Website news article Website; 16. ICRA Website; 17. Government of India Website/Policy Documents

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